ANTALYA ALANYA MOTORWAY

ANTALYA-ALANYA MOTORWAY PROJECT

ESIA REPORT

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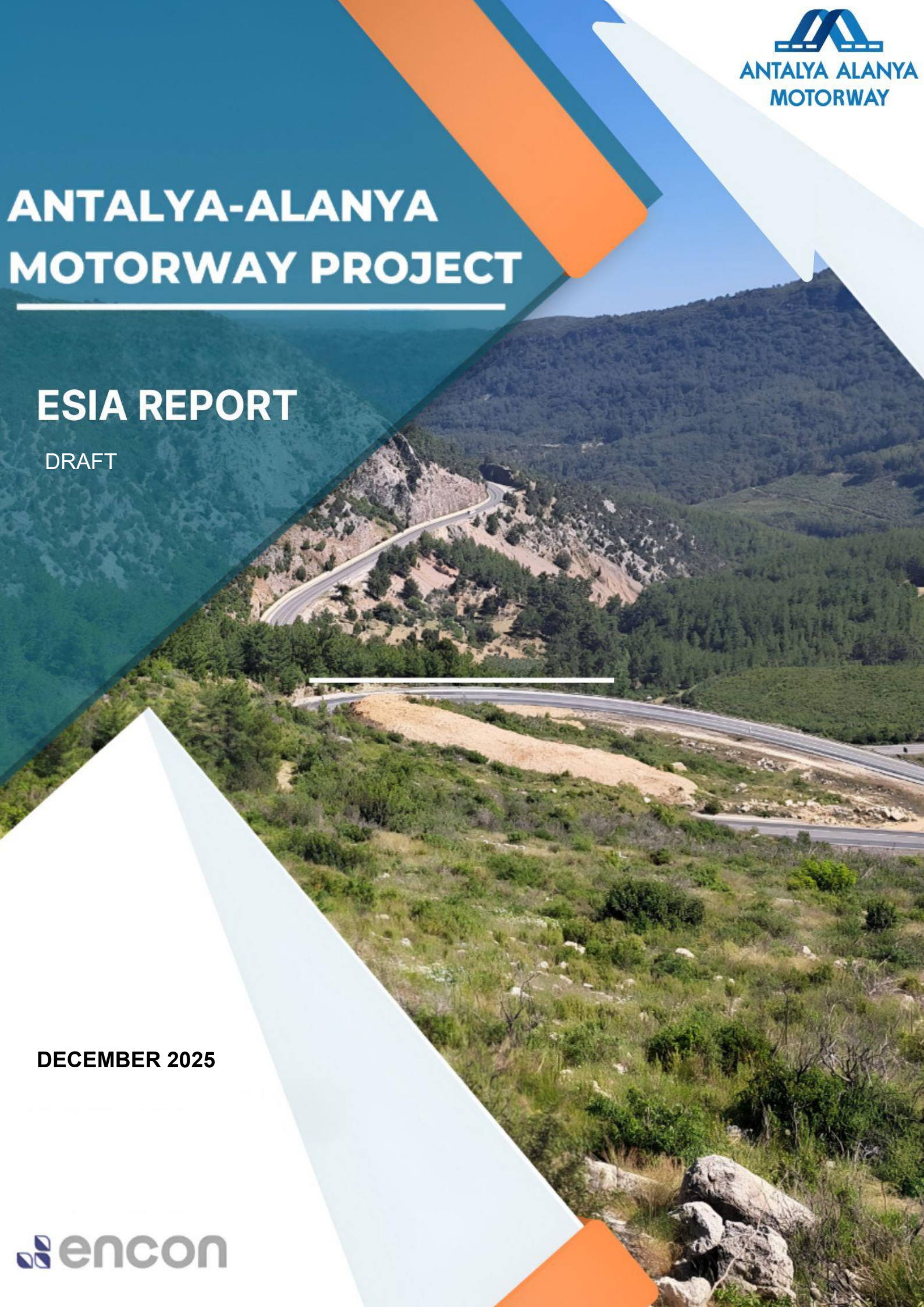

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LIST OF ABBREVIATIONS

AAOIAS	Antalya Alanya Otoyol İşletmesi A.Ş
AFAD	Disaster and Emergency Management Presidency
AoI	Area of Influence
AZE	Alliance for Zero Extinction
CEKUL	Foundation for the Protection and Promotion of the Environment and Cultural Heritage
CIMER	Presidency's Communication Center
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DSI	General Directorate of State Hydraulic Works
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EFPIs	Equator Principles Financial Institutions
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Programme
ENCON	ENCON Environmental Consultancy Co.
ESF	Environmental and Social Framework
ESHS	Environmental, Social Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Monitoring Report
ESMS	Environmental and Social Management System
EU	European Union
EUAS	General Directorate of Electricity Generation Corporation
GBV	Gender-Based Violence
GHG	Green House Gas
GIIP	Good international Industry Practice
GIS	Geographical Information System
GM	Grievance Redress Mechanism
GP	Good Practices
GRM	Grievance Redress Mechanism
IAPCR	Industrial Air Pollution Control Regulation
IBA	Important Bird Area
IFC	International Finance Corporation
ILO	International Labor Organization
IPA	Important Plant Area

IPCC	Intergovernmental Panel on Climate Change
ISKUR	General Directorate of Turkish Employment Agency
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
KGM	General Directorate of Highways
LACRP	Land Acquisition, Compensation, and Resettlement Plan
LARPF	Land Acquisition and Resettlement Policy Framework
LRP	Livelihood Restoration Plan
MoAF	Ministry of Agriculture and Forestry
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoLSS	Ministry of Labor and Social Security
MTA	General Directorate of Mineral Research and Exploration
NGOs	Non-Governmental Organizations
O&M	Operations and Maintenance
OHS	Occupational Health and Safety
OP	Operational Policies
PAP	Project Affected Person
PIF	Project Introduction File
PIU	Project Implementation Unit
PM_{10}	Particulate matters with aerodynamic diameter smaller than 10µm
$PM_{2.5}$	Particles with aerodynamic diameter smaller than 2.5µm
PMU	Project Management Unit
PS	Performance Standard
RAP	Resettlement Action Plan
RENC	Regulation on Environmental Noise Control
RP	Resettlement Plan
SAoI	Social Area of Influence
SCM	Stakeholder Consultation Meeting
SEA/SH	Sexual Exploitation and Abuse / Sexual Harassment
SEP	Stakeholder Engagement Plan
SEPA	Special Environmental Protection Areas
TEIAS	General Directorate of Electricity Transmission Company
The Project	Antalya-Alanya Motorway Project
TURKSTAT	Turkish Statistical Institute, TUİK
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
US EPA	United States Environmental Protection Agency
WB	World Bank
WBG	World Bank Group

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

This report has been prepared by ENCON Environmental Consultancy Co. (ESIA Consultant or "ENCON") to document the Environmental and Social Impact Assessment (ESIA) studies conducted for the Antalya-Alanya Motorway Project ("the Project").

The Project is one of the two sub-projects that constitute the Afyonkarahisar-Alanya Motorway Project, and is designed to connect Serik and Alanya districts through Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

Summary of the key information of the Project is provided in Table I.1 while Figure I.1 presents a map illustrating the entire route.

Table I.1. Summary of the Key Project Information

Contractor	Major Components	Specifications
AAOİAŞ	Main Motorway (Serik Interchange to Alanya Junction)	84 km of 3 line dual carriageway
	Access Roads (Serik, Taşağıl, Manavgat, Manavgat East, Alarahan, Konaklı, Alanya West)	33.8 km of 2 line dual carriageway

The component distances are approximates according to the current design.

[1] *The BOT Contract uses the term "Appointed Company" to refer Project Sponsor.*
[2] *It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design*

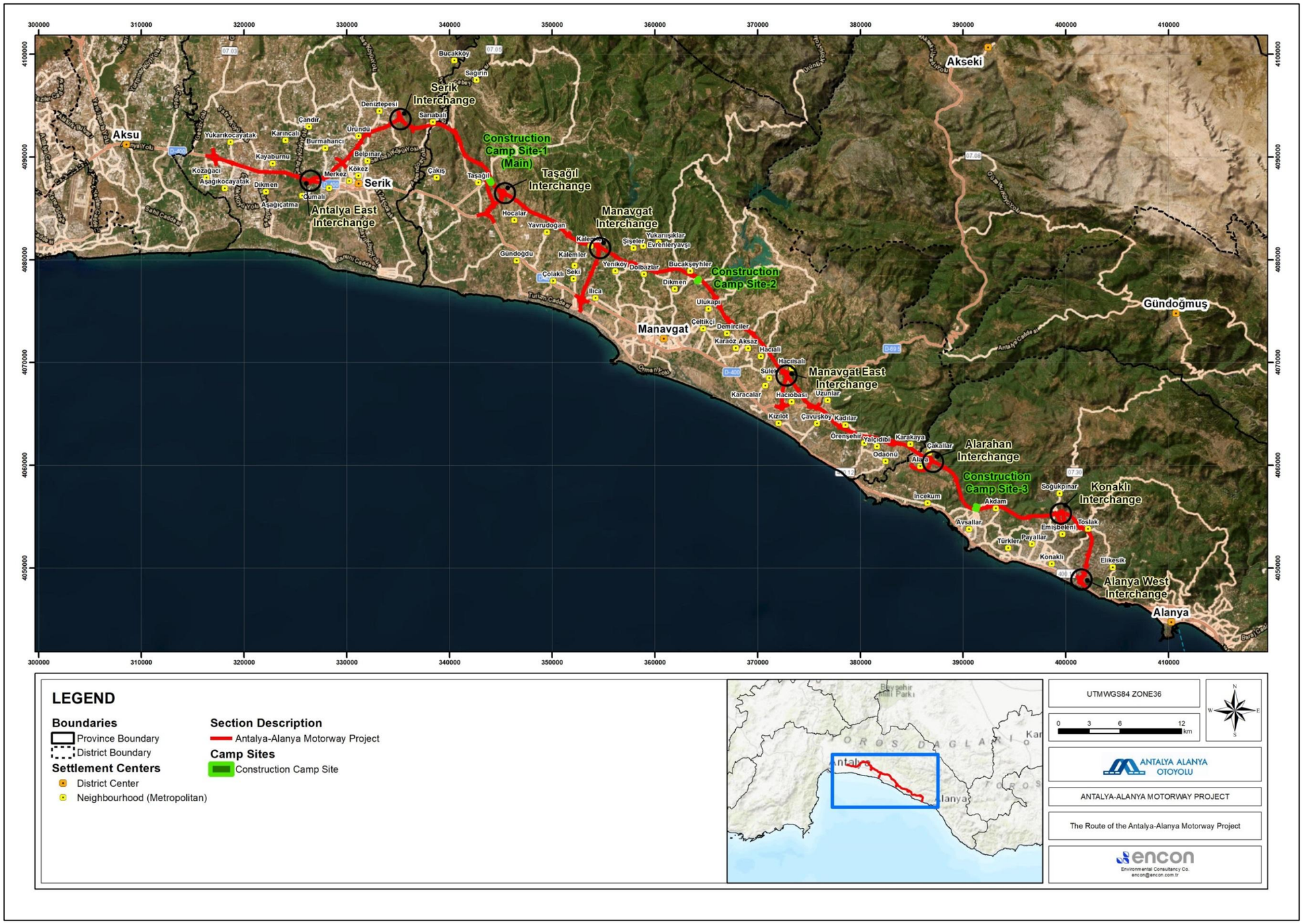

Figure I.1. The Route of the Antalya-Alanya Motorway Project

I.1. Aim of the ESIA Report

Expenditure on new development of roads is likely to be a major component of national budgeting. Due to high cost of construction and budget constraints, financing new motorway projects by national budget is difficult. Thus, in the recent years, build-transfer-operate (BOT) models, based on the project experience of the private sector and support of financial institutions, has been one of the most effective mechanisms in Türkiye for realizing large-scale motorway projects without causing burden to state budget (*KGM, June 2011*).

The Antalya-Alanya Motorway is a project that has been tendered out in the framework of BOT model. As the winning bidder, Project Sponsor seeks finance from financial institutions/potential lenders, who would require international environmental and social standards and guidelines to be adopted in the implementation of the Project. In consideration of Equator Principles, World Bank Environmental and Social Framework (ESF) and International Finance Corporation's (IFC) Sustainability Framework, the Project is evaluated to include activities and components that need to be effectively managed to avoid or minimize significant environmental and social impacts. In this respect, a detailed description of the national and international legal framework for the Project is provided in Chapter II of this report. Based on a detailed review and evaluation of a number of screening criteria defined in European Union's (EU) Environmental Impact Assessment (EIA) Directive, Turkish EIA Regulation as well as World Bank, IFC policies and guidelines, and Equator Principles 4 guidelines, the Project, with its specifically identified physical elements, aspects and facilities that are likely to generate potentially significant adverse environmental and social risks and impacts, has been proposed as a "Category A" project. For "Category A" projects, a comprehensive full-scale ESIA is required to be conducted (see Chapter II).

In line with the Category A designation, the Project Sponsor is responsible for preparing an Environmental Impact Assessment (EIA) Report as per national legislations, and a full-scale ESIA as per international finance organizations' requirements. The EU's EIA Directive and the Turkish EIA Regulation, which has been harmonized with EU's EIA Directive also define the motorway construction projects as Annex I activities, for which an EIA is required ("EIA Positive Decision" taken for the Project on August 17, 2018 and has validity until August 17, 2025). To secure financing for the Project, the environmental and social standards required by the potential international lenders must be met. Accordingly, the full-scale ESIA process was initiated for the Project officially in May 2024.

According to internationally accepted and applied impact assessment procedures, an ESIA process starts with the initial screening of the project and scoping of the assessment, and followed by other key process elements including examination of alternatives; stakeholder identification (focusing on those directly affected); gathering of environmental and social baseline data; impact identification, prediction, and analysis; generation of mitigation or management measures and actions; evaluation of significance of impacts and residual impacts; and documentation of the assessment process, which all together form an ESIA report (*IFC, January 2012*). The findings of the screening and scoping studies were documented in the Scoping Report and Inception Report of the Project, both dated July 2024. The primary aim of the Scoping Report has been the identification of the environmental and social issues and impacts that are anticipated to be significant, as well as to outline the scope of the ESIA Report. The Inception Report focused on detailing the methodologies to be applied throughout the ESIA process further refining the ESIA contents previously defined in the Scoping Report, and documenting the conducted field studies.

Following the scoping phase, other key processes including examination of alternatives; stakeholder identification (focusing on those directly affected) and engagement; gathering of environmental and social baseline data by means of desk-based and field studies[3]; impact identification, prediction, and analysis; generation of mitigation or management measures and actions; evaluation of significance of impacts and residual impacts; and documentation of the assessment process, were conducted in accordance with the requirements of the relevant Turkish laws and regulations, Equator Principles and IFC's Performance Standards and Sustainability Framework. The findings of the entire process have been compiled in this ESIA Report, prepared for the Antalya-Alanya Motorway Project.

This report has been structured as follows:

- Chapter I : Introduction
- Chapter II : Institutional and Legal Framework
- Chapter III : Project Description
- Chapter IV : ESIA Methodology
- Chapter V : Land Use and Property
- Chapter VI : Topography, Soils and Geology
- Chapter VII : Use of Resources and Wastes
- Chapter VIII : Water Resources
- Chapter IX : Ecology and Biodiversity
- Chapter X : Air Quality and Climate Change
- Chapter XI : Noise and Vibration
- Chapter XII : Protected Areas, Landscape and Visual Environment
- Chapter XIII : Archaeological and Immovable Cultural Heritage
- Chapter XIV : Socio-economic Environment
- Chapter XV : Community Health and Safety
- Chapter XVI : Labor and Working Conditions
- Chapter XVII : Cumulative Impact Assessment
- Chapter XVIII : Analysis of Alternatives
- Chapter XIX : Public Consultation
- Chapter XX : Environmental and Social Management System
- Annexes

The assessments done in the scope of this ESIA Report are based on the most current design and the information given in Chapter 3 ("Project Description").

I.2. Need for and Aim of the Project

Current Overview of the Motorways of Türkiye

The demand for freight and passenger transportation in Türkiye has two sources based on internal and external dynamics. The demand created by internal dynamics varies entirely depending on the current income level of Türkiye. As income increases, mobility also increases, triggering the transportation sector. Secondly, the demand created by external dynamics arises from transit transportation through Türkiye. In 2022, domestic freight transport was predominantly by road,

[3] *Site surveys have been conducted for all relevant environmental and social subjects (i.e. water, soil, air, noise, flora and fauna, and social) to collect/gather up-to-date/valid baseline information characterizing the existing conditions.*

accounting for 89.3%, while railways contributed 4.6% and maritime transport 6.1%. Passenger transport rates for 2022 were similarly dominated by road at 91.2%, followed by air at 6.8%, railways at 1.5%, and sea at 0.48%[4].The road network under the responsibility of KGM is as of January 1, 2025 is given in Table I.2, and motorway network of Türkiye as of 2023 is presented in Figure I.2.

Table I.2. Road Network of Türkiye as of January 2025*

Road Type	Road Length (km)	Length of Dual Carriageway (km)
Motorways**	3,796	3,796
State Roads	30,825	21,858
Provincial Roads	33,996	2,414
Total	68,617	28,068

** Source: KGM, 2025[5]*
*** BOT contracted motorways are included.*

The Project is situated within the administrative jurisdiction of the 13th Regional Directorate of the General Directorate of Highways (KGM). Encompassing an area of 44,119 km^2, the jurisdiction spans the entirety of Antalya, Isparta, and Burdur provinces, as well as parts of Afyon and Muğla provinces. Ninety-six percent (69%) of the road network managed by the 13th Regional Directorate consists of asphalt-paved roads, totaling 3,341 km in length. The region under the purview of the 13th Regional Directorate is home to a total population of 3,836,236 individuals, with 2,517,970 registered vehicles utilizing the roadways.

[4] *https://cevreselgostergeler.csb.gov.tr/ulastirma-turlerine-gore-tasinan-yolcu-ve-yuk-miktari-i-85789*
[5] *http://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Kurumsal/YolAgi.aspx*

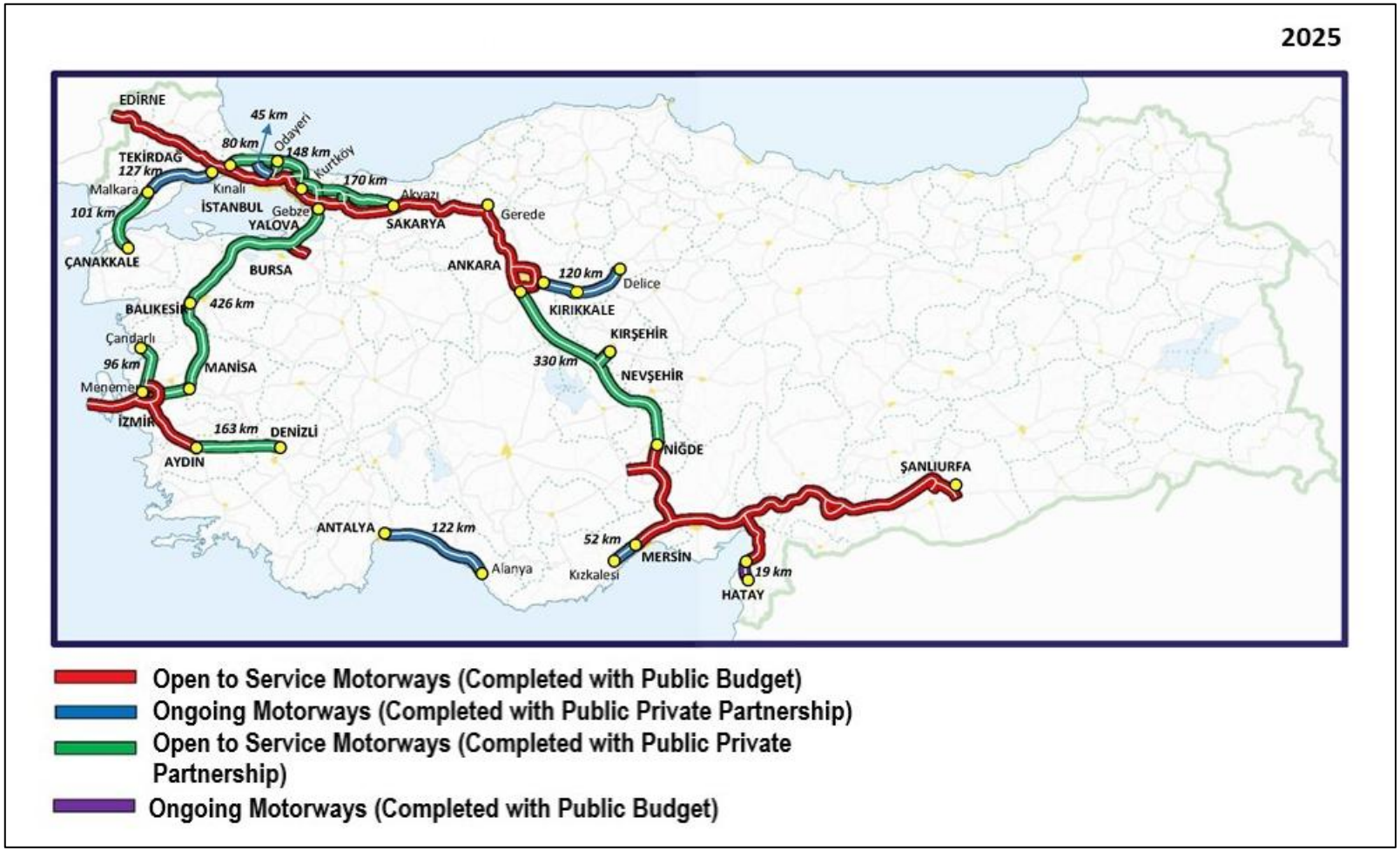

Figure I.2. Current Motorway Network of Türkiye as of 2025[6]

[6] http://www.kgm.gov.tr

Economic and Social Significance of the Project

Effective transportation infrastructure is a key to the development of countries. Today, transportation has become one of the basic needs of the mankind and a prominent driving force for the socio-economic development. In this respect, road transportation provides the most flexible transportation means as far as the topography, amount of the load to be transported and the time is concerned. Road transportation is usually preferred as it enables non-stop and fast transportation and thus most of the time is the most economical alternative when compared to other transportation systems.

Playing a key role in economic development and enhancement of welfare, road transportation is not only an important economic activity on its own but it also paves ground for interaction between different sectors. The fact that time gains primary importance in the globalizing world raises the importance of road transportation as it provides the ability to compete and establish flexible relations (*KGM, August 2010*).

States prioritize motorway investments for several compelling reasons. Firstly, efficient transportation infrastructure serves as the foundation of economic activity. Motorways facilitate the movement of goods and people, connecting businesses to markets, workers to jobs, and tourists to destinations. This interconnectedness fosters economic growth by stimulating trade and investment. Secondly, modern motorways prioritize safety by incorporating features like wider lanes, guardrails, and median barriers. These design elements significantly reduce traffic accidents, fatalities, and injuries, leading to a safer transportation network. Thirdly, investments in expanding motorways or improving traffic flow management systems can alleviate traffic congestion. This not only conserves time for commuters but also reduces fuel consumption and emissions from idling vehicles, contributing to environmental sustainability. Furthermore, well-maintained motorways bridge the gap between rural and urban areas by providing essential services, education, and healthcare access for residents in remote locations. This improved accessibility enhances the overall quality of life for people across the state. Finally, efficient motorways are critical for emergency response vehicles, ensuring faster response times for ambulances and fire trucks in times of crisis.

Akdeniz Region of Türkiye has a particular role in the tourism and agriculture sectors. The Project is planned in the Akdeniz Region, aiming to strengthen the region's capacity to serve this role in the most efficient and effective way possible. The Project is a vital component of a broader motorway network projects that aim to strengthen the existing road infrastructure and improve the accessibility and coverage throughout the region. The geographical positioning, rich cultural heritage, and historical landmarks, coupled with its favorable climate, render the Akdeniz Region a paramount center for both tourism and accommodation, and agriculture within Türkiye. The Project is an important opportunity to increase accessibility to the facilities located between Antalya province and Alanya district, which encompasses the accommodation facilities that cater to 9,093,324 visitors annually, 96.08% of whom are foreigners, according to 2021 data of the Turkish Statistical Institute (TurkStat)[7]. The Motorway route lies on the east-west axis on the southern coast of Türkiye, holding substantial significance in linking these prominent tourism centers.

Simultaneously, the region serves as a focal point for the cultivation of numerous fruits, notably citrus varieties, alongside year-round production of vegetables and flowers by greenhouses. The Project is anticipated to assume a crucial role in enhancing the efficiency of transporting these high-value agricultural commodities rapidly to both domestic and international markets, ensuring their faster delivery and hence increasing product freshness and quality.

Motorway investments play an important role in the infrastructure development strategies of nations. This role is especially important in Türkiye's transportation sector, where 91% of passenger

[7] *Source: https://biruni.tuik.gov.tr/ilgosterge/?locale=tr*

transportation and 89% of freight transportation rely on road networks[8]. Motorways offer efficient, safe, and rapid travel services, essential for overcoming the topographic and geological challenges present in Türkiye's terrain. Despite their strategic importance, motorway investments entail significant expenses in both initial capital outlay and ongoing operational costs. Given Türkiye's geographical position bridging historic and present-day economic and cultural trade routes, ensuring the security, comfort, and efficiency of these corridors is paramount to fostering new opportunities for economic and political collaboration. Consequently, Türkiye is improving its infrastructure by identifying crucial road corridors in order to achieve the targeted socio-economic goals and to realize the projects determined to be feasible through careful cost-benefit analyses.

Furthermore, each year, over 4,000 lives are tragically lost in traffic accidents on Türkiye's roads, resulting in an annual economic loss of approximately 5 billion dollars, with an additional 180,000 individuals suffering permanent disabilities[9][10]. In light of these disquieting statistics, the necessity for new motorway projects featuring dual carriageways and meeting stringent technical safety standards, aimed at improving the safety of passenger and freight transportation has become evident.

The Project's primary aim is to relieve the intense traffic burden on the Akdeniz Region's existing road network while building the capacity needed to accommodate future traffic. This purpose is aimed to be achieved by separating local traffic driven by urbanization and industrialization from intercity and international traffic. The Project, subject to this ESIA study, will create a transit corridor for freight that bypasses congested city centers.

In addition to improving transportation networks and benefiting users, the Project is expected to generate social and economic advantages, including job creation, local and regional development, better access to employment, markets, education, healthcare, and cultural/tourism facilities, as well as improved emergency response times and contributions to the national budget through tax revenues and strengthened national security. However, to maximize these benefits and ensure the Project's environmental and social acceptance, it is essential to effectively manage its potential impacts as outlined in this ESIA Report. As a result of these efforts, the quality of transportation services will improve, and the Project will help reduce traffic-induced energy consumption, air emissions, and time losses.

I.3. Background to the Project

The implementation of the Project (for which an EIA positive decision was taken in 2018), was tendered out in the framework of BOT model. Following the signing of the BOT contract, Project Sponsor has continued route, optimization and design works in cooperation with KGM and other related state authorities. The design of the Project has progressed and will progress in parallel to the ESIA studies. It should be noted that in case of any design change during and after the ESIA study has been completed, the Project would be managed in the scope of ESMS by means of Change Management Procedure and Project Sponsor will inform the relevant Ministry and fulfill the relative legislative requirements.

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8

[8] *https://cevreselgostergeler.csb.gov.tr/ulastirma-turlerine-gore-tasinan-yolcu-ve-yuk-miktari-i-85789*
[9] *https://dergipark.org.tr/tr/download/article-file/2119555*
[10] *https://data.tuik.gov.tr/Bulten/Index?p=Karayolu-Trafik-Kaza-Istatistikleri-2023-53479*

kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. The Motorway will be a dual carriageway with three lanes (3x2) along the 84 kilometers stretch, and the access roads will have two lanes (2x2) over the 33.8 kilometers length.

The expropriation plans for the current route have been submitted to KGM, and the land use permit processes have been continued by the Project Sponsor. On the other hand, based on the information provided by the Project Sponsor, permits for construction activities will be obtained gradually as the Project advances. Once the permitting activities reach a significant milestone, the status of the permits will be included in the Environmental and Social Action Plan (ESAP) Report.

It should be noted that the studies and assessments provided in this report are based on the current design. More information on the Project description is provided in Chapter III.

II. INSTITUTIONAL AND LEGAL FRAMEWORK

This chapter describes the institutional framework in Türkiye and identifies the national environmental legislation, international agreements and protocols and international environmental and social standards including Equator Principles IV and International Finance Corporation's (IFC) Policy (2012) and related Performance Standards (PSs) on Environmental and Social Sustainability that would be applicable to the Project.

II.1. Institutional Framework

Administrative structure in Türkiye is governed by central and local administrations. The central administration is organized so that the land mass of the country is divided into provinces and the provinces into further smaller divisions (i.e. districts, municipalities, villages/neighborhoods) according to geographic and economic conditions, and the need for public services. For the purpose of meeting collective local needs, the populations of provinces, municipalities, and villages/neighborhoods are administered by units of local government established by law (*Toksoz, F., 2006*). A general depiction of the institutional framework in Türkiye with relevance to the Project is shown in Figure II.1.

Ministries are the units of central administration. Local branches of ministries are composed of provincial organizations attached to governors and district organizations attached to the district governors (*Hacettepe University, Department of Political Science and Public Administration, April, 2015*). At the local level, municipality mayors and the mukhtars of the villages/neighborhoods are the representatives of the administrative structure.

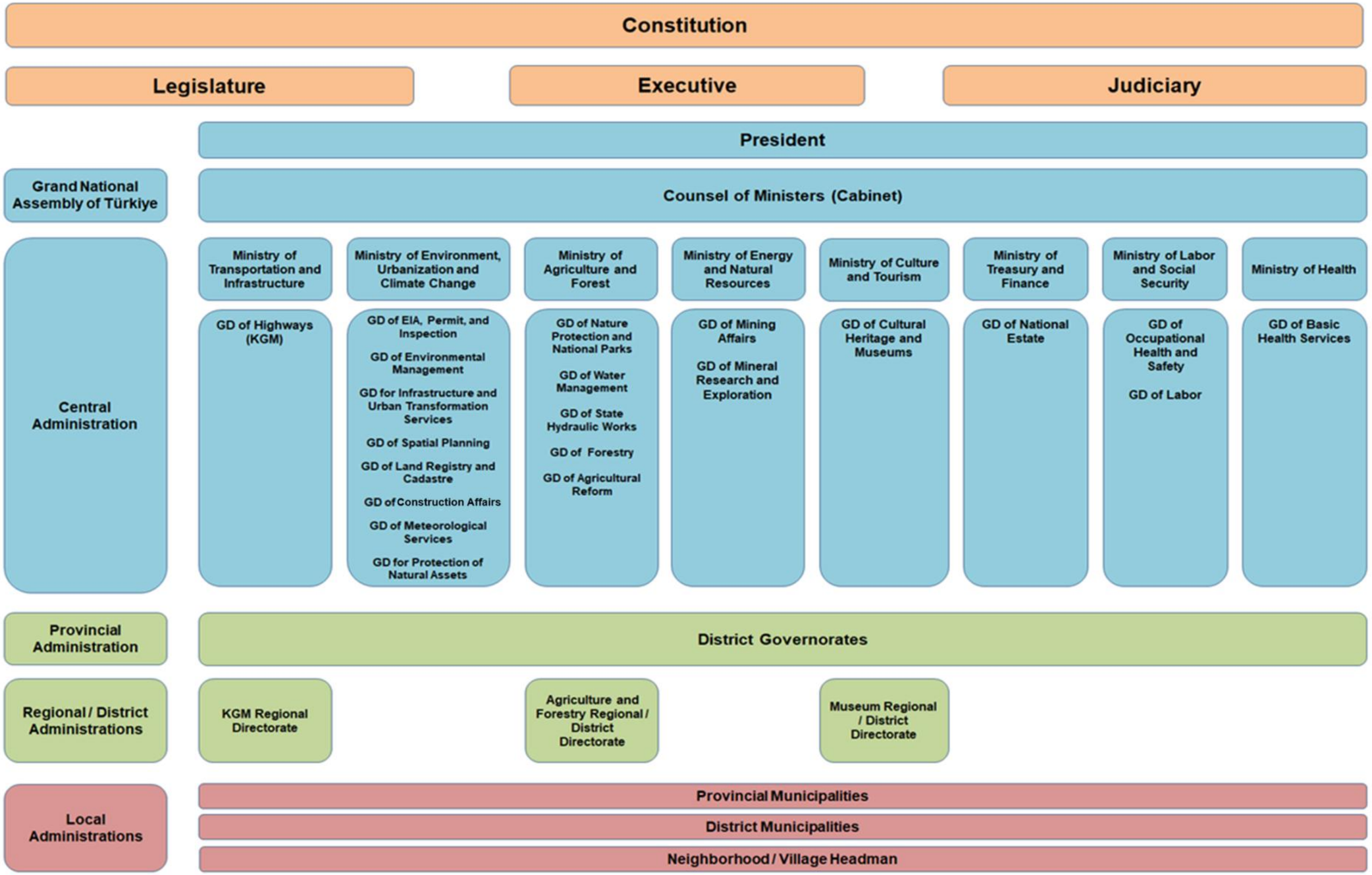

Figure II.1 Institutional Framework in Türkiye related to the Project

II.1.1. Central Administrations

Central administration is the core of the administrative structure. Each Ministry, being a unit of central administration, is headquartered in Ankara, with units at the provinces serving as their field organizations (*Toksoz, F., 2006*).

Ministry of Transport and Infrastructure (MoTI) is the key central administration in the scope of the Project. Under the Ministry, General Directorate of Highways is the authority responsible from the implementation of the Project.

In Türkiye, the Ministry of Environment, Urbanization and Climate Change (MoEUCC) is the responsible organization for the implementation of policies adopted for the protection and conservation of the environment, sustainable development and management of natural resources and national strategies for minimizing climate change effects. Thus, the MoEUCC will be the authority with the MoTI (through the General Directorate (GD) of KGM) and the Project Sponsor will collaborate regarding the assessment and management of environmental aspects of the Project.

The Ministry of Environment was first established as an Under-secretariat of the Prime Minister's office in 1987 and was promoted to the rank of Ministry of Environment in August 1991 by the Establishment Law No. 443. Then, the Ministry of Environment and Forestry was established in 2003 through a merger of the previously separate Ministry of Environment and the Ministry of Forestry. Recently, the environment part of the former Ministry of Environment and Forestry was separated and merged with the Ministry of Public Works and Settlement to form the Ministry of Environment and Urbanization. Finally, with a Presidential decree, the determination of climate change strategies was added to its duties in order to address the effects of climate change, and its name changed to The Ministry of Environment, Urbanization and Climate Change (MoEUCC).

The MoEUCC has an overall coordinating role for the development and implementation of environmental policies in Türkiye, including the approximation process for the EU Environmental Acquis. The MoEUCC is composed of the 16 different general directorates. The general directorates, which are relevant to or may have an interest in the Project, are listed below:

- Ministry of Environment, Urbanization and Climate Change
  - Directorate General of Environmental Management
  - Directorate General of Environmental Impact Assessment (EIA), Permit, and Inspection
  - Directorate General of Spatial Planning
  - Directorate General of Land Registry and Cadastre
  - Directorate General of Meteorological Services
  - General Directorate for Protection of Natural Assets
  - Directorate General of Construction Works

The MoEUCC holds the following principal responsibilities within Türkiye's environmental governance framework:

- Draft and enact legislation concerning environmental management, public infrastructure, and housing development, and ensure its effective enforcement through routine monitoring and auditing.
- Establish national strategies and guiding principles for environmental conservation, pollution control, and ecological restoration; develop and enforce related standards,

criteria, and implementation programs; and lead initiatives related to climate change adaptation and mitigation.

- Review and regulate facilities and activities with potential environmental impacts arising from the discharge of pollutants in solid, liquid, or gaseous form into natural receiving environments; conduct environmental permitting and compliance monitoring.
- Execute environmental measurement, monitoring, and analytical activities related to receiving environments.
- Formulate national frameworks and policy instruments addressing climate change and oversee the implementation of related preventive and adaptive measures.

For the management of environmental issues, MoEUCC collaborates with other ministries, government agencies and relevant stakeholders. Ministries (through related General Directorates), which would be relevant to or may have an interest in the Project, are listed below:

- Ministry of Transport and Infrastructure (MoTI)
  - General Directorate of Highways (KGM)
- Ministry of Agriculture and Forestry
  - General Directorate of Nature Protection and National Parks
  - General Directorate of Water Management
  - General Directorate of State Hydraulic Works
  - General Directorate of Forestry
  - General Directorate of Agricultural Reform
- Ministry of Culture and Tourism
  - General Directorate of Cultural Heritage and Museums
- Ministry of Energy and Natural Resources
  - General Directorate of Mining and Petroleum Affairs
  - General Directorate of Mineral Research and Exploration
- Ministry of Environment, Urbanization and Climate Change
  - General Directorate of National Estate
- Ministry of Labor and Social Security
  - General Directorate of Occupational Health and Safety
  - General Directorate of Labor
- Ministry of Health
  - General Directorate of Health Services

II.1.2. Provincial, Regional and District Level Administrations

Provincial, regional and district level administrations are the field organizations of the Ministries. Under the MoTI, GD of KGM, Antalya 132nd and Alanya 133rd Branch Directorates are the related local authorities. Antalya province also falls in the jurisdiction of the 13th Regional Directorate of KGM.

The MoEUCC, Ministry of Agriculture and Forestry, Ministry of Culture and Tourism and Ministry of Health have provincial directorates in Antalya province under the related Governorate. Provincial

directorates under the Antalya Governorate are the local governmental authorities related with the Project.

In addition, the Project is located within the jurisdiction of the 6th Regional Directorate of the Ministry of Agriculture and Forest located in Antalya province. The Project falls under the jurisdiction area of the 13th State Hydraulic Works (DSI) under the same Ministry.

Regarding the cultural heritage, Antalya Regional Board for Preservation of Cultural Assets and Antalya Protection Council under the Antalya Cultural Heritage Preservation Regional Board Directorate will be the responsible authority along the Project route.

II.1.3. Local Administrations

Local administration, which functions under the administrative tutelage of the central administration, is divided into three main administrative tiers. These are the special provincial administrations, municipalities, and village/neighborhood administrations (*Toksoz, F., 2006*). Since Antalya is a metropolitan municipality, no special provincial administration is present. Antalya Metropolitan Municipality, related district municipalities and the neighborhood mukhtar are the local administrations relevant to the Project.

II.2. Applicable Turkish Environmental and Social Legislation

Turkish Environmental Law (Law No: 2872), which came into force in 1983, handles environmental issues on a very broad scope. Under the Environmental Law, environmental regulations have been developed in line with national and international initiative and standards, and some of them have been revised recently to be harmonized with the European Union (EU) Directives in the scope of pre-accession efforts of Türkiye.

Complementary to the Environmental Law and its regulations, the laws listed below also govern the protection and conservation of the environment, prevention and control of pollution, implementation of measures for the prevention of pollution, health and safety and labor issues:

- Cadaster Law (Law No. 3402) (Official Gazette (OG): 09.07.1987 No. 19512)
- Code of Civil Law (Law No. 4721) (OG: 08.12.2001 No. 24607)
- Electricity Market Law (Law No. 6446) ((OG): 30.03.2013 – No. 28603)
- Energy Efficiency Law (Law No. 5627) (OG: 02.05.2007 – No. 26510)
- Expropriation Law (Law No. 2942) (OG: 08.11.1983 – No. 18215) (Law No. 2942, some articles of which were rearranged by Law No. 4650)
- Forestry Law (Law No. 6831) (OG: 08.09.1956 – No. 9402)
- Groundwater Law (Law No. 167) (OG: 23.12.1960 – No. 10688)
- Labor Law (Law No. 4857) (OG: 10.06.2003 – No. 25134)
- Law on the Conservation of Cultural and Natural Assets (Law No. 2863) (OG: 23.07.1983 – No. 18113)
- Law on Improvement of Olive Cultivation and Budding of Wild Species (Law No. 3573) (OG: 07.02.1939 – No. 4126)
- Law on Soil Protection and Land Use (Law No. 5403) (OG: 19.07.2005 – No. 25880)
- Mining Law (Law No. 3213) (OG: 15.06.1985 – No. 18785)
- Municipality Law (Law No. 5393) (OG: 13.07.2005 – No. 25874)

- National Parks Law (Law No. 2873) (OG: 11.08.1983 – No. 18132)
- Pasture Law (Law No. 4342) (OG: 28.02.1998 – No. 23272)
- Public Hygiene Law (Law No. 1593) (OG: 06.05.1930 – No. 1489)
- Public Finance Management and Control Law (Law No. 5018) (OG: 24.12.2003 No. 25326)
- Highway Traffic Law (Law No. 2918) (OG: 18.10.1983 – No. 18195)

The primary environmental laws, regulations, by-laws and communiques and other complementary regulations applicable to the infrastructure projects are listed below in Table II.1. Project Sponsor will comply with the requirements of relevant national legislations and codes of practice, and fulfill all other legal requirements.

Table II.1. National Environmental Legislation Applicable to the Project

Subject	Name of the Legislation
Land Use and Soils	
Agricultural lands	Law on Soil Protection and Land Use (Law No. 5403) (OG: 19.07.2005 – No. 25880)
	Implementation Regulation on Soil Protection and Land Use (OG: 09.12.2017 – No. 30265)
	By-law on Protection and Use of Agricultural Lands and Land Consolidation (OG: 09.12.2017 – No. 30265)
	Law on Improvement of Olive Cultivation and Budding of Wild Species (Law No. 3573) (OG: 07.02.1939 – No. 4126)
Forest lands	Forestry Law (Law No. 6831) (OG: 08.09.1956 – No. 9402)
	Implementation Regulation of Article 16 of the Forestry Law (OG: 24.09.2024 – No. 32672)
Pasture lands	Pasture Law (Law No. 4342) (OG: 28.02.1998 – No. 23272)
	Pastures Regulation (OG: 31.07.1998 – No. 23419)
Soils	Regulation on the Control of Soil Pollution and Lands Contaminated by Point Sources (OG: 08.06.2010 – No. 27605)
Rehabilitation	Regulation Concerning the Rehabilitation of the Lands Disturbed by Mining Activities (OG: 23.01.2010 – No. 27471)
Socio-economics	
Land Acquisition	Expropriation Law (OG: 08.11.1983 – No. 18215)
	Regulation on the Exchange of Treasury Lands in the Scope of Expropriation for Motorway Construction Purposes (OG: 30.01.2016 – No. 29609)
Water and Wastewater	
Water and Wastewater Management	Water Pollution Control Regulation (OG: 31.12.2004 – No. 25687)
	Surface Water Quality Regulation (OG: 30.11.2012 – No. 28483)
	Regulation on the Control of Pollution Caused by Dangerous Substances in and around the Water Bodies (OG: 26.11.2005 – No. 26005)
	Regulation on the Water Intended for Human Consumption (OG: 17.02.2005 – No. 25730)
	Regulation Concerning Protection of Groundwaters Against Pollution and Deterioration (OG: 07.04.2012 – No. 28257)
	Law on Groundwater Resources (Law No. 167) (OG: 23.12.1960 – No. 10688)
Air and Climate Change	

Subject	Name of the Legislation
Air Quality	Regulation on the Control of the Air Pollution Sourced by the Industry (OG: 03.07.2009 – No. 27277)
	Regulation on the Assessment and Management of Air Quality (OG: 06.06.2008 – No. 26898)
	Regulation on the Control of Exhaust Gas Emission (OG: 11.03.2017 – No. 30004)
	Regulation on the Control of Air Pollution from Heating (OG: 13.01.2005 – No. 25699)
Climate Change	Regulation Concerning Follow-up of Greenhouse Gas Emissions (OG: 17.05.2014 – No. 29003)
Odor	Regulation on Control of Emissions Causing Odor (OG: 19.07.2013 – No. 28712)
Noise	
Environmental Noise	Regulation on the Assessment and Management of Environmental Noise (OG: 30.11.2022 – No. 32029)
	Regulation on Environmental Noise Emission Caused by Equipment Used Outdoors (OG: 30.12.2006 – No. 26392)
Wastes	
Waste Management	Regulation on Waste Management (OG: 02.04.2015 – No. 29314)
	Regulation on the Control of Packaging Wastes (OG: 26.06.2021 – No. 31523)
	Regulation on the Control of Hazardous Wastes (OG: 02.04.2015 – No. 29314)
	Regulation on the Control of Medical Wastes (OG: 25.01.2017 – No. 29959)
	Regulation on the Control of Waste Oils (OG: 21.12.2019 – No. 30985)
	Regulation on the Control of Waste Batteries and Accumulators (OG: 31.08.2004 – No. 25569)
	Regulation on the Management of Waste Electrical and Electronic Equipment (OG: 26.12.2022 – No. 32055)
	Regulation on the Control of Waste Tires (OG: 25.11.2006 – No. 26357)
	Regulation on the Control of Waste Vegetable Oils (OG: 06.06.2015 – No. 29378)
	Regulation on the Control of Excavation Soil, Construction and Demolition Wastes (OG: 18.03.2004 – No. 25406)
	Regulation on Mining Wastes (OG: 15.07.2015 – No. 29417)
	Regulation on Zero Waste (OG: 12.07.2019 – No. 30829)
Landfills	Regulation on the Landfill of Wastes (OG: 26.03.2010 – No. 27533)
	Circular on the Preparation of Implementation Project for Landfills (Circular No: 2018/15)
	Circular on Landfill of Mining Wastes and Technical Arrangement of Other Landfills (Circular No: 2011/12)
Environmental Permits and Licenses	
General	Environmental Impact Assessment (EIA) Regulation (OG: 29.07.2022 – No. 31907)
	Environmental Permit and Licenses Regulation (OG: 10.09.2014 – No. 29115)
	Environmental Auditing Regulation (OG: 12.06.2021 – No. 31509)
	Starting Up and Opening a Workplace Regulation (OG: 10.08.2005 – No. 25902)
	Communique on Certificate of Competency (OG: 31.12.2022 – No. 32060)
Health and Safety	
Occupational Health	Labor Law (Law No. 4857) (OG: 10.06.2003 – No. 25134)

Subject	Name of the Legislation
and Safety	Law on Occupational Health and Safety (Law No. 6331) (OG: 30.06.2012 – No. 28339)
	Regulation on Occupational Health and Safety Services (OG: 29.12.2012 – No. 28512)
	Regulation on Risk Assessment for Occupational Health and Safety (OG: 29.12.2012 – No. 28512)
	Regulation on Occupational Health and Safety at Mining Worksite (OG: 19.09.2013 – No. 28770)
	Regulation on the Methods and Essentials of Occupational Health and Safety Trainings for Workers (OG: 15.05.2013 – No. 28648)
	Regulation on Health and Safety Signs (OG: 11.09.2013 – No. 28762)
	Regulation on the Occupational Health and Safety for Temporary or Fixed Term Jobs (OG: 23.08.2013 – No. 28744)
	Personal Protection Equipment Regulation (OG: 02.07.2013 – No. 28695)
	Regulation Concerning the Use of Personal Protection Equipment at Workplaces (OG: 02.07.2013 – No. 28695)
	Regulation on Machinery Safety (OG: 03.03.2009 – No. 27158)
	Regulation on Health and Safety Measures to be Taken at Works Involving Chemicals (OG: 12.08.2013 – No. 28733)
	Regulation on the Protection of Workers from Noise Related Risks (OG: 28.07.2013 – No. 28721)
	Regulation Concerning the Protection of Workers from Risks Associated with Vibration (OG: 22.08.2013 – No. 28743)
	Regulation on Protecting Workers from Hazards of Explosive Environments (OG: 30.04.2013 – No. 28633)
	Manual Handling Operations Regulation (OG: 24.07.2013 – No. 28717)
	First Aid Regulation (OG: 29.07.2015 – No. 29429)
	Regulation on Emergency Situations in Workplaces (OG: 18.06.2013 – No. 28681)
	Regulation on Management of Dust (OG: 05.11.2013 – No. 28812)
	Communique on Hazard Classes List related to Occupational Health and Safety (OG: 26.12.2012 – No. 28509)
	Regulation on Occupational Hygiene Measurement, Testing and Analysis (OG: 27.01.2023 – No. 32086)
	Regulation on the Occupational Health and Safety in Construction Works (OG: 05.10.2013 – No. 28786)
	Regulation on Control of Large-Scale Industrial Accidents (OG: 02.03.2019 – No. 30702)
	Highway Traffic Law (Law No. 2918) (OG: 18.10.1983 – No. 18195)
	Regulations on Traffic Signs (OG: 19.06.1985 – No. 18789)
Dangerous Substances	Regulation on the Transportation of Dangerous Materials on Motorways (OG: 18.06.2022 – No. 31870)
	Regulation Concerning the Classification, Packaging and Labeling of Dangerous Substances (OG: 11.12.2013 – No. 28848)
	Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (OG: 23.06.2017 – No. 30105)
Structural Safety	Regulation on Structures to be Built in Disaster Zones (OG: 14.07.2007 – No. 26582)
	Regulation on Structures to be Built in Earthquake Zones (OG: 14.07.2007 – No. 26582)
	Regulation on the Protection of Buildings from Fire (OG: 19.12.2007 – No. 26735)

Subject	Name of the Legislation
Nature and Cultural Heritage	
Protection	Law on the Conservation of Cultural and Natural Heritage (OG: 23.07.1983 – No. 18113)
	Regulation on Procedures and Principles Concerning the Protection of Game and Wild Animals and Their Habitats and Combat with Their Pests (OG: 24.10.2005 – No. 25976)
Wetlands	Regulation on the Protection of Wetlands (OG: 04.04.2014 – No. 28962)
Others	
General	Regulation Concerning the Increase of Efficiency in the Usage of Energy Resources (OG: 27.10.2011 – No. 28097)
	Regulation on the Implementation of the Law Concerning Private Security Services (OG: 07.10.2004 – No. 25606)
	Regulation on Subcontractors (OG: 27.09.2008 – No. 27010)
	Law on the Right to Information (OG: 24.10.2003 – No. 25269)
	Use of the Right to Petition (OG: 10.11.1984 – No. 18571)
	Law on the Protection of Personal Data (OG: 07.04.2016 – No. 29677)

II.2.1. EIA Process under Turkish EIA Regulation

Under Article 10, Environmental Law sets out the general scope of the Environmental Impact Assessment (EIA) procedure in Türkiye, indicating that institutions, agencies and establishments that lead to environmental problems as a result of their planned activities are obliged to prepare environmental impact assessment report or Project Information File. Based on this legal framework, the EIA Regulation was put into force for the first time after being published in the Official Gazette numbered 21489 and dated on February 7, 1993. Since then there had been several amendments in the first regulation and new EIA regulations were published in 2008, 2013 and 2014 repealing the former regulations in force. The latest EIA Regulation (2022 EIA Regulation) has been published in the Official Gazette dated 29.07.2022 and numbered 31907, which repealed the 2014 EIA Regulation.

Under its annexes, the EIA Regulation categorizes investments as projects subject to full EIA (Annex-1) and projects subject to screening-elimination criteria (Annex-2). This categorization is done based on the type of activity and/or plant capacity. If the planned investment is defined as an activity under Annex-1 of the EIA Regulation, a full EIA Report is required. For Annex-2 activities, first a Project Information File is prepared in accordance with a limited format specified in the Annex-4 of the EIA Regulation and the MoEUCC evaluates the need for a full EIA process for the project.

The categorization for motorway projects under Turkish EIA regulation is done according to the type or length of the road (km) as follows:

- Full EIA process is required for the following Annex-1 activities;
  - Highways and state motorways (Article 9-c).

- Limited EIA process is required to be conducted for the following Annex-2 activities;
  - Facilities with a production capacity of 5 tons/hour and above, producing shaped materials using cement or other binding materials (Article 18-c),
  - Asphalt plants (Article 22),
  - Provincial roads and ring roads (except neighborhood/village roads; Article 28-d),
  - Addition of tunnels to highways or railways (Article 28-e).

The Project's EIA Report had been prepared in March 2016, submitted to the MoEUCC, reviewed by the evaluation committee and EIA Positive decision had issued on August 17th, 2018 In accordance with the EIA legislation in force on the date when the Project EIA Positive Decision was given (2014 EIA Regulation), the EIA Report of the Project has the **vested right** of upholding its EIA Positive Decision validity **for 7 years** before the start of the construction works for the Project. The scope of the EIA Report that was subject to the positive decision basically covers the main route, its right of way, the access roads and not consists of the quarries, asphalt plants, cement plants, crushers, aggregate facilities, construction camps, etc. In other words, the associated and affiliated facilities that are needed for the realization of the Project, was not covered in the scope of EIA reviews. In addition to that for the sections of the current version of the Project that differ from the Project's EIA report approved in 2018, a Clearance Letter must be obtained from the relevant authorities (MoEUCC) by submitting a request detailing the said changes from the EIA report. As of April 2025, these changes are:

- Upon the request of the KGM administration, the Antalya-Alanya motorway will end at the Alanya center connection road (136+000 km point) instead of continuing to Gazipaşa district and connecting Gazipaşa and Alanya districts as stated in the Project's EIA report. However a new motorway consisting of approximately 5 kilometers of 2x2 lanes extending from Antalya-Alanya 136+000 km point to Alanya center and its connection road, which was not in the scope of the EIA but later included in the Project upon the request of the KGM administration;
- Establishment and operation of facilities not specified in the EIA report (quarries, storage areas, borrow pits, asphalt facilities, mechanical facilities and campsites) in order to meet the Project material and facility needs.

Any future changes in the Project that is not in the scope of the study area specified in the approved EIA of the Project also must be included in the clearance letter that will be submitted to the related authorities (MoEUCC).

Status of Environmental Permits and Licenses

The Project, the permit and licensing processes are still ongoing. As these processes are completed, the relevant information will be collected and presented as a table in this subsection.

Regarding main environmental permits and/or licenses that would be required for the Project are listed below:

Land Preparation and Construction Phase

- **Land Use**
  - Forestry permit
  - Permit for the use of pasturelands
  - Permit for the use of agricultural lands for non-agricultural purposes
  - Land use agreements with state authorities for state-owned lands
  - Expropriation of privately-owned lands

- **Construction and Camp Sites**

- Crossing permits/approvals for railroads, rivers, roads, canals, power supply lines, natural gas pipelines, etc.
- Workplace notification for Camp Sites
- Utility permits for the temporary connection to existing utilities (telecom, electricity, etc.)
- Fuel storage permit
- Permits for service roads
- Provisional operation certificate/environmental permit for the operation of ready mixed concrete plants
- Provisional operation certificate/environmental permit for the operation of asphalt plants
- Provisional operation certificate/environmental permit for the operation of crushing and screening plants
- Provisional operation certificate/environmental permit for the operation of mechanical plants

- **Water/Wastewater Management**
  - Provisional operation certificate/environmental permit for the operation of package wastewater treatment plants
  - Wastewater treatment plant identification certificate
  - Groundwater Utilization Permit

- **Waste Management**
  - Permit for temporary waste storage areas
  - Storage permit for the access amount raised by the cut
  - Waste management plan approval
  - Agreements with licensed waste management/disposal companies

- **Quarry Operation**
  - Raw material production/quarry operation license
  - Permission to use long vehicles

- **Blasting and Explosives Management**
  - Blasting permit
  - Permit for storage of explosives

- **Others**
  - Private security permit
  - EIA Process

II.2.2. Expropriation Process under Turkish Expropriation Law

As it is known, expropriation is the most widely used method for land acquisition. Article 46 of the Constitution of Republic of Türkiye explains that state and legal public entities, in cases of public benefit, are entitled to entirely or partially expropriate immovable properties in private possession, on condition that the real value of those immovable properties are paid in advance and in cash; and to establish easement (servitude) on these immovable properties in compliance with the procedures and principles set by expropriation law.

There are a large number of laws and regulations relevant to the implementation of land acquisition, which are namely; Expropriation Law (Law No: 2942), Turkish Civil Code (Law No: 4721), Cadastre Law (Law No: 3402), Forest Law (Law No: 6831), Environment Law (Law No: 2872), Municipalities Law (Law No: 5393), Pasture Law (Law No: 4342) and Village Law (Law No: 442) and several implementation regulations pertaining to the above-mentioned laws. Expropriation implementation activities based on Turkish laws and regulations can be summarized in line with the following stages:

- Project approval (public benefit decision),
- Preparation of expropriation plans,
- Identification of property owners and address investigation,
- Expropriation decision,
- Establishment of a “Valuation Commission” and the Valuation Process,
- Establishment of a “Negotiation Commission” and Purchasing Process.

Before describing the expropriation process, it should be underlined that the expropriation works for the Project will be carried out by KGM (government) as the related administrative authority according to the provisions of the BOT Contract and in accordance with the relevant provisions of the Expropriation Law (Law No: 2942). Project Company will comply with international standards regarding the execution of the expropriation works.

The process under Turkish Expropriation Law starts with the approval of relevant ministry/authority of the expropriation works on behalf the public interest. This decision is made public at the office of village/neighborhood mukhtar for 15 days and then it is regarded as “cutoff date”. After the approval of the project, expropriation plans are prepared. The actual size (surface area) and boundaries of the immovable properties and resources are determined by land surveys and a scaled (usually with a scale of 1/5.000) expropriation map is prepared. Expropriation maps shall demonstrate the boundaries, surface area and kind of immovable properties and resources to be expropriated. Mainly title deeds, taxes and state registers and/or external researches are used for identification of the owners.

Stage by stage (in accordance with the expropriation priority) the project responsible agency takes the “expropriation decision” for designated areas and informs/requests to the Land Titling and Cadastre Directorate to put an “expropriation note” on the register of the relevant property. The responsible agency establishes a Valuation Commission of at least three experts to determine the values of assets and resources. Valuation commission determines the unit and ceiling values of assets and resources to be expropriated. Then, responsible agency establishes a negotiation commission within its own entity to reconcile with property owners on the value. Each negotiation commission comprises of at least three members. The commission sends an official invitation letter to each property owner without declaring the value for the asset that was previously estimated by valuation commission. If the property owner(s) agrees on the predetermined value of the expropriated land(s), the expropriation fee is deposited to the rightful owners within 45 days after the meeting with the negotiation commission. If the land owner(s) takes the case to court thinking that he/she has suffered any kind of loss, the situation and the expropriation fee is re-evaluated in the court. The process is completed by calculating the total amount to be paid for the expropriated land(s) with the newly determined value and depositing the amount to the bank on behalf of the beneficiary within 15 days. The right holder (owner) has to bear the costs for the evacuation of the expropriated immovable property, such as costs for moving of personal goods, official transaction fees for purchase new land and/or new houses or related structures, with his/her own means.

Article 27 of the Expropriation Law states that; for the expropriation of immovable properties in situations for which Minister of Councils takes decision regarding the need or urgency for national defense in the scope of the implementation of the Law on National Defense Obligations (Law No: 3634) or during emergencies foreseen by special laws, the immovable property subject to expropriation may be seized by the related administration on condition that the procedures other than valuation shall be completed afterwards. In this process, following the request of the related administration, compensation amount for the immovable property and resource shall be appraised by the court within 7 days through the experts assigned as per Article 10 and 15 of the Expropriation Law. Seizure shall only be made following the invitation to be done in accordance with Article 10 and the amount is deposited to the bank specified in the announcement.

II.2.3. Resettlement Process under Turkish Resettlement Law

In Türkiye, resettlement activities of the government are regulated by Resettlement Law (No: 5543). The Resettlement Law deals with the families applying to related governmental agencies in the project region and requesting government assisted resettlement. Law also covers the procedure of resettlement of immigrant families coming from other countries, as well as that of nomadic families.

Resettlement assistance of the government is provided to entitled families upon their request while expropriation compensation payments are paid to all individuals holding immovable properties in the project area. Three types of resettlement can be applied according to the choices and requests of affected families. Entitlement criteria related with resettlement whose lands will be expropriated are defined by Implementation Regulations of Resettlement Law. According to the Regulation, owners requesting the resettlement must be residing at the project affected area, and they must earn annually less than 18 times monthly minimum official wages, and they should be seen as a family and must not be a civil servant.

Agricultural Resettlement: Agricultural resettlement is implemented through providing a family with one or more of the following; agricultural land at the amount of envisaged in special resettlement project, house, management building, and animal for income generation, agricultural devices and tools, workbench and loans.

Non-agricultural Resettlement: This type of resettlement is implemented through providing a family with one or more of the following: building plot at the amount provisioned in special resettlement project, house, devices, tools, workbench and loans.

Physical Settlement: This type of resettlement is implemented through providing construction credit support to a family within the amount of loan determined by the Ministry (MoEUCC) with the aim of re-building (moving) of villages because of unsuitability of a village center or consolidating of villages because of dispersed settlement or villages which are fragmented as a result of disasters; after selling land (house plot) from village development areas to people in need.

Article 12 of Resettlement Law refers to the resettlement of persons whose immovable properties are expropriated and specifies eligibility criteria for government assisted resettlement as follows:

(1) Due to the construction of a dam, an area adjacent to the dam, an area under protection, airport, highway, railway, plant and other facilities related to national economy and defense will be erected by public institutions and organizations; and due to the implementation of special laws and in order to protect historical and natural valuables;

a) The families who have to leave their locations/places as a result of partial or full expropriation of their immobile properties,

b) The families who do not own any immovable property, but who reside in the expropriation area at least for three years before the beginning of the calendar year, in which the resettlement planning studies were commenced, will be resettled to the locations/places indicated by the MoEUCC according to the provisions of this Law, provided that they request.

(2) However, the families who own immovable properties to be expropriated but left their places before the commencement date of resettlement planning studies shall not be resettled. Within the last three years as of this date, the families who sold their immobile properties without any compulsory situation and did not purchase immovable property with the equal or higher value shall not be resettled even if they did not leave their places. The compulsory situations mentioned above shall be determined by the regulations.

(3) Among the families residing in the expropriation area, those who are affected from the expropriation implemented by the public institutions and organizations, can be resettled by the Ministry to a location indicated within their village boundaries upon their written application if they do not want to be resettled by the government in any other place, provided that the suggestion of relevant Governorate and the approval of the Ministry of Internal Affairs are obtained.

(4) Among the families included in the scope of the this article, and requested to be resettled by the Government; the families who do not apply within the ninety day following the ending date of the announcement of resettlement, and the families who do not commit to deposit the amount determined by the MoEUCC from their expropriation compensation they received or will receive, or their full expropriation compensation and additional increase awarded by court in the case that the amount of expropriation compensation is lower than the amount (determined by the Ministry) into the account of the Central Account Unit of the Ministry, shall not be resettled.

Article 9 of Resettlement Law explains the resettlement assistance (which is similar to World Bank Standards) as follows:

(1) The immigrants, nomads, the persons whose places/grounds are expropriated and persons who are decided to be relocated by the reason of the national security shall be resettled in cities, towns and villages by means of providing the following through debiting/repayment according to the provisions of this Law, and pursuant to the plan and the project (specific) prepared by the MoEUCC;

a) At first, house and its' house- plot (for building),
b) For craftsmen, artisans and tradesmen: work place and its' building plot and operation credit to enable them providing for their livelihood,
c) For farmers, land, necessary agricultural inputs, agricultural structures or plot of structure, and in kind and in cash operation and equipment credits as envisaged in agricultural resettlement project (specific),
d) In case of the request of the right holder families (entitled to resettlement), resettlement credits can be given to the families collectively or individually, if the house, work place and agricultural land are found by themselves and their suggestions are approved by MoEUCC.

(2) Annual operation and equipment credits provisioned in agricultural resettlement projects (specific) shall not be paid to the families who did not request the mentioned credits within two years following the transfer of their agricultural lands.

(3) For immigrants accepted to enter the country according to this Law, as of the date they pass (enter) the border gates with their used goods which are exempt of customs; and for the people whose grounds(immovable properties) are expropriated and for those who are resettled due to national security and for the nomads, as of time when they are transferred to their resettlement areas; they shall be provided the support of medical help, accommodation, food, fuel and the support of clothing (for once only) for persons in need, and gratuitous assistances for temporary re-settlement for those whose immovable properties are expropriated; these supports shall be provided according to the time, amount and the conditions specified in the regulations of the Law.

(4) Transportation (moving) of those (families) mentioned above to the resettlement areas (sites) shall be provided free of charge by the government according to the "Transportation (moving) Project" to be prepared (specifically) by the Ministry.

From the international standards point of view of, another important point is the allocation of expenditure regarding land acquisition and resettlement under a single/same budget item. Resettlement Law Article 33 states that the resettlement allowance will be allocated from the budget of the institution responsible for expropriation.

It should be noted that in the selection of the Project route, physical displacement has been avoided to the extent the highway design criteria allowed. In the scope of the land acquisition process to be conducted for the potentially limited number of parcels on which buildings/structures located within the expropriation corridor according to the current design, it is essential that the related authorities to aim the conduct acquisition process based on negotiated settlements to be established in accordance with the Expropriation Law thus the affected families do not apply to government and request government assisted resettlement.

Resettlement activities in Turkey are governed by the Resettlement Law (Law No. 5543, 2006) and it's Implementing Regulation. This legislation provides for state-assisted resettlement in both rural and urban areas and is typically applicable to large-scale infrastructure projects — such as dam developments — that may require the relocation of entire settlements, including district centers. The Resettlement Law is implemented by the Ministry of Environment, Urbanization and Climate Change (MoEUCC) and its authorized institutions.

The Resettlement Law is not applicable to highway projects implemented by KGM, as these typically involve the physical displacement of a limited number of structures, dispersed along the highway route. In such cases, cash compensation is provided by KGM in accordance with the provisions of the Expropriation Law (Law No. 2942, as amended).

For this Project, the relocation or resettlement of affected households and businesses, whether owners or users will be carried out in conformity with the Expropriation Law, implemented by KGM. This process will be undertaken in collaboration with the Special Purpose Vehicle (SPV) through the implementation of a Relocation Action Plan (RAP).

II.2.4. Cultural Heritage Management under Conservation of Cultural and Natural Assets Law

According to the Conservation of Cultural and Natural Assets Law (Law no: 2863), all cultural and natural properties requiring protection are considered as state property. As stated in the same law, the

Ministry of Culture and Tourism and its local branches (Boards for Preservation of Cultural Assets, Museums) are the main national government institutions who have the authority of conducting the works of identification and registration of cultural assets and defining the conditions of conservation. In this respect, Antalya Regional Board for Preservation of Cultural Assets is the sole competent authority within the scope of the Project.

The Project area is under the responsibility of Antalya Regional Board for Conservation for Cultural Assets. The Project is bound legally to follow the decision taken and shall be taken by the preservation board. Information on the relevant regional board for the preservation of cultural assets is provided in Table II.2.

Antalya Museum Directorate, and Antalya - Alanya Museum Directorate is responsible for officially supervising actions such as official monitoring and/or further activities (trial pits, salvage excavation, re-routing and remote sensing surveys) in line with the decisions taken by Antalya Regional Board for Preservation of Cultural Assets. They will also prepare the conclusion reports about actions to be taken and submit to Preservation Board for re-evaluation of the sites. Information on the museum directorates is presented in Table II.3.

Table II.2. Relevant Regional Board for Preservation of Cultural Assets

Regional Board for Conservation of Cultural Assets	Regional Board Responsibility Area	Related Sections of the Motorway	Address	Phone and Fax
Antalya Regional Board for Conservation for Cultural Assets	Antalya, Burdur, Isparta provinces	All sections	Kılıçaslan Mah., Zafer Sk., No:6, 07100, Kaleiçi - Antalya	(0242) 243 21 60 (0242) 247 87 61 (0242) 248 35 33

Table II.3. Relevant Museum Directorates

Museums	Districts of Responsibility	Address	Phone	Email
Antalya Museum Directorate	Aksu, Döşemealtı, Muratpaşa, Kepez, Konyaaltı, Kemer, Kumluca, Finike, Serik	Bahçelievler Mah., Konyaaltı Cad., No:88, 07050, Antalya	(242) 238 56 88	antalyamuzesi@kultur.gov.tr
Antalya Alanya Museum Directorate	Alanya, Gazipaşa, Gündoğmuş	Saray Mah., İ.Hilmi Balcı Cad., No:2, 07400, Alanya-Antalya	(242) 513 12 28	alanyamuzesi@ktb.gov.tr
Antalya Side Museum Directorate	Manavgat	Side Müze Müdürlüğü, Side Mahallesi, Liman Caddesi Manavgat/ANTALYA	(242) 753 10 06	sidemuzesi@ktb.gov.tr

The Project management is responsible for conservation of immovable cultural assets in case of discovery, and implementation of plans minimizing the adverse impacts of the construction activities over these assets and keeping relevant government institutions informed. In this respect, the Project management is obliged to prepare a plan which comprises of the construction activities and their impacts on the archaeological and immovable cultural assets located within the boundaries of the Project construction and its impact area and to propose methods for eliminating or minimizing the negative impacts of construction activities over the concerned sites for the opinion of the directorate of Preservation Board.

II.3. Relevant International Agreements and Protocols

Turkish national policy on protection of environment, cultural heritage and conservation of biological resources has been constituted on the base of relevant international agreements that Türkiye has signed or ratified. Relevant environmental international agreements and conventions that have been ratified by Türkiye are listed below.

- European Cultural Convention (1957),
- European Convention on the Protection of the Archaeological Heritage (1969),
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) (1972),
- International Convention for the Prevention of Pollution from Ships (also known as Marpol 73/78) (1973),
- The Convention for the Protection of Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) (1981),
- Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (1981)
- Convention on Long Range Transboundary Air Pollution (CLRTAP) (1983),
- Convention Concerning the Protection of the World Cultural and Natural Heritage (1983),
- Berne Convention on the Conservation of European Wild Life and Natural Habitats (1984),
- Convention for the Protection of the Architectural Heritage of Europe (1985)
- Specially Protected Areas Protocol / SPA and Biodiversity Protocol (1986), and its protocols including Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (1988),
- Vienna Convention for the Protection of the Ozone Layer (1991),
- Montreal Protocol on Substances Depleting the Ozone Layer (1991),
- The International Convention on the Established of an International Fund for Compensation for Oil Pollution Damage (also known as FUND 1992),
- International Convention on Civil Liability for Oil Pollution Damage (1992),
- Convention on Wetlands of International Importance, Especially as Waterfowl Habitat (RAMSAR) (1994),
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1994),
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (also known as CITES) (1996),
- Kyoto Protocol (1997),
- Convention on Biological Diversity (Rio Convention) (1997),
- United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (1998),
- European Landscape Convention (Florence Convention) (2001),
- UN Framework Convention on Climate Change (UNFCCC) (2004),
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (2004),
- Convention for the Protection of the Black Sea Against Pollution (Bucharest Convention) (1994) and its protocols including The Black Sea Biodiversity and Landscape Conservation Protocol (2004),
- Convention for the Safeguarding of the Intangible Cultural Heritage (2006),
- Stockholm Convention on Persistent Organic Pollutant (POPs) (2009).

II.4. Applicable International Environmental and Social Standards and Guidelines

International financial institutions follow specific policies and procedures for the assessment and management of environmental and social impacts of the projects they finance. The relevant environmental and social requirements of these institutions are primarily based on the World Bank Group (WBG) Safeguard Policies. For private sector financing, the Environmental, Health and Safety (EHS) Guidelines and the Performance Standards on the Environmental and Social Sustainability developed by the WBG/International Finance Corporation's (IFC) have become the one of the most important international requirements. These standards have also been adopted by the major international private banks through their commitment to the Equator Principles (EPs) a risk management framework designed to ensure that financed projects are developed in a socially and environmentally responsible manner.

The ESIA Report to be prepared for the Project will be in accordance with the Equator Principles (IV) and IFC's Performance Standards on Environmental and Social Sustainability and general as well as sector-specific Environmental, Health and Safety Guidelines. Key points of each international principle, standard and guideline is provided in the following sections. It should be noted that when Turkish (host country) regulations differ from the levels and measures presented in the EHS Guidelines, the Project will aim to achieve whichever is more stringent.

II.4.1. Equator Principles IV

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs apply globally to all industry sectors.

Most of the large private international banks (so called Equator Principles Financial Institutions-EPFIs) have officially adopted these principles (According to EP IV, published November 2019 and came into force in October 2020), summarized below, to ensure that the projects financed or advised by them are developed in a manner that is socially responsible and reflect sound environmental management practices.

Principle 1: Review and Categorization

When a Project is proposed for financing, the EPFI will, as part of its internal environmental and social review and due diligence, categorize the Project (Category A, B or C) based on the magnitude of its potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity. Such categorization is based on the IFC's environmental and social categorization process.

Principle 2: Environmental and Social Assessment

The EPFI will require the client to conduct an Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and impacts of the proposed Project. The Assessment Documentation should propose measures identified to minimize, mitigate and offset/resolve the adverse impacts of risks on workers, affected communities and the environment.

The client is expected to include assessments of potential adverse Human Rights impacts and climate change risks as part of the ESIA or other Assessment, with these included in the Assessment Documentation. The client should refer to the (United Nations Guiding Principles on Business and Human Rights) UNGPs when assessing Human Rights risks and impacts, and the Climate Change Risk Assessment should be aligned with Climate Physical Risk and Climate Transition Risk categories of the Task Force on Climate-related Financial Disclosures (TCFD).

Principle 3: Applicable Environmental and Social Standards

The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.

Principle 4: Environmental and Social Management System and Equator Principles Action Plan

For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System. Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards.

Principle 5: Stakeholder Engagement

For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to: the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion and intimidation.

Principle 6: Grievance Mechanism

For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the Environmental and Social Management System, to establish a grievance mechanism designed for use by Affected Communities and Workers to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The grievance mechanism is required to be scaled to the risks and impacts of the Project.

Principle 7: Independent Review

For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant will carry out an Independent Review of the Assessment Documentation including the ESMPs, the Environmental and Social Management System, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.

Principle 8: Covenants

An important strength of the Equator Principles is the incorporation of covenants linked to compliance. For all Projects, where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance.

The client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects. EPFIs will take reasonable measures to ensure that all existing environmental and social obligations continue to be included in the new financing documentation.

Principle 9: Independent Monitoring and Reporting

For all Category A and, as appropriate, Category B Projects, in order to assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information.

Principle 10: Reporting and Transparency

For all Category A and, as appropriate, Category B Projects, the client will ensure that, at a minimum, a summary of the ESIA is accessible and available online; and the client will publicly report GHG emission levels during the operational phase for Projects. In addition to these, the EPFI will encourage the client to share commercially non-sensitive Project-specific biodiversity data with the Global Biodiversity Information Facility (GBIF) and relevant national and global data repositories, using formats and conditions to enable such data to be accessed and re-used in future decisions and research applications.

II.4.2. IFC Standards and Guidelines

The following subsections outline the relevant IFC standards and guidelines applicable to the Project, including the Performance Standards on Environmental and Social Sustainability, the General Environmental, Health, and Safety (EHS) Guidelines[1], the EHS Guidelines for Toll Roads, and the EHS Guidelines for Construction Materials Extraction.

II.4.2.1. Performance Standards on Environmental and Social Sustainability

IFC published its current Policy on Environmental and Social Sustainability in 2012. Within the framework of this Policy, it applies a comprehensive set of Performance Standards to manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing in the member countries eligible for financing. The Performance Standards may also be applied by other financial institutions electing to apply them to projects in emerging markets.

The following eight Performance Standards establish the requirements that the client has to meet throughout the life of an investment supported by IFC or other relevant financial institution using these Standards.

[1] https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standards-en.pdf

Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

The main objective of Performance Standard 1 is to ensure that clients of the IFC identify, assess, and manage the environmental and social risks and impacts associated with their projects. This standard emphasizes a systematic approach to understanding and addressing potential adverse effects on the environment and affected communities.

PS1 stresses the importance of engaging with and consulting relevant stakeholders throughout the project life cycle. This includes obtaining input from affected communities, considering their concerns, and providing opportunities for meaningful participation. The project is required to disclose certain information regarding its environmental and social performance. This transparency helps build trust among stakeholders and enables informed decision-making.

Compliance with PS1 is a prerequisite for IFC financing, and it establishes a framework for responsible and sustainable project development. The IFC provides guidance and support to clients to help them meet the requirements of Performance Standard 1.

Performance Standard 2: Labor and Working Conditions

PS2 focuses on promoting employment opportunities and ensuring employees have fair and favorable working conditions. This includes issues such as working hours, wages, benefits and the right to form and join workers' organizations.

This standard emphasizes the necessity of a safe and healthy working environment. This standard includes identifying and mitigating potential occupational health and safety hazards, providing access to necessary facilities, and creating emergency preparedness and response plans.

Performance Standard 3: Resource Efficiency and Pollution Prevention

This standard provides guidelines for managing the environmental impact of projects financed by IFC. These guidelines; It includes environmental assessment, management of environmental and social risks, prevention and reduction of pollution, waste management, emissions, resource efficiency, public health and safety, biodiversity protection and sustainable natural resource management.

It emphasizes the importance of conducting an environmental assessment to determine potential project impacts, taking into account environmental, social and health issues. It requires the Project Sponsor to establish an Environmental and Social Management System (ESMS) to manage and reduce environmental and social risks throughout the project lifecycle. As part of this system, pollution prevention measures are adopted and cleaner production technologies are supported. It encourages the reduction, reuse and recycling of waste generated by the project. It also requires the Project Sponsor to minimize air emissions.

Performance Standard 4: Community Health, Safety and Security

This standard aims to ensure that the project activity does not pose unacceptable risks to the health and safety of employees, affected communities, and project visitors and to ensure the safety of people and assets.

IFC PS4 includes occupational health and safety, community health and safety, emergency preparedness and response, and stakeholder engagement. The standard requires projects to identify and assess potential health and safety risks and implement measures to prevent accidents and injuries. It also assesses and addresses the potential health and safety impacts of the project on local communities. PS4 requires projects to establish security arrangements to ensure the safety of project personnel, affected communities, and project assets.

Performance Standard 5: Land Acquisition and Involuntary Resettlement

The purpose of PS5 is to ensure that individuals and communities affected by a project are fairly compensated and assisted in their efforts to improve or, at the very least, restore their standard of living if adversely affected by land acquisition or involuntary resettlement. This standard aims to facilitate communication with affected communities; conduct social assessments including the displacement or loss of livelihoods endeavor to restore or enhance livelihoods, provide equitable compensation for assets and properties affected by the project, avoid force eviction, and safeguard cultural heritage sites and monuments that may be affected.

Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

This standard focuses on the Conservation of Biodiversity and Sustainable Natural Resource Management. The aim of the standard is to promote the conservation of biodiversity and the sustainable management of natural resources within the scope of the project.

According to this standard, projects should avoid operating within protected areas. In exceptional cases where this is not possible, measures should be taken to minimize and mitigate impacts, and the conservation objectives of the protected area should be supported. The ecosystem services provided by natural habitats should be acknowledged, and sustainability should be preserved whenever possible. Communication with relevant stakeholders, including local communities and users involved, is essential for maintaining the biological diversity and sustainable natural resource management of the Project.

Performance Standard 8: Cultural Heritage

The aim of PS8 is to ensure that projects respect and take into account the cultural heritage of affected communities and avoid negative impacts on cultural resources. This standard provides a comprehensive identification and evaluation of cultural heritage, including tangible and intangible elements related to the project area, communication with affected communities, preventing the impact on cultural heritage, minimizing the impact if it cannot be prevented, and informing the affected public.

To summarize briefly, the objectives of Performance Standard 1 are;

- To identify and evaluate environmental and social risks and impacts of the project,
- To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and where residual impacts remain, compensate/offset risks and impacts to workers, Affected Communities, and the environment,
- To promote improved environmental and social performance of clients through the effective use of management systems,

- To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately,
- To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.

Performance Standards 2 through 8 describe potential environmental and social risks and impacts that require particular attention. Where environmental or social risks and impacts are identified, the client is required to manage them through its Environmental and Social Management System (ESMS) consistent with Performance Standard 1, which is applicable to all projects that may have environmental and social risks and impacts. IFC's Performance Requirements/Standards applicability to the Project is given in Table II.4.

Table II.4 IFC's Performance Standards and their Applicability to the Project

IFC Performance Standards (2012)		Applicability
PS 1	Assessment and Management of Environmental and Social Risks and Impacts	Yes
PS 2	Labor and Working Conditions	Yes
PS 3	Resource Efficiency and Pollution Prevention	Yes
PS 4	Community Health, Safety and Security	Yes
PS 5	Land Acquisition and Involuntary Resettlement	Yes
PS 6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes
PS 7	Indigenous Peoples	No
PS 8	Cultural Heritage	Yes

II.4.2.2. General Environmental, Health, and Safety (EHS) Guidelines

In addition to the IFC Performance Standards, the International Finance Corporation (IFC) has developed a series of Environmental, Health, and Safety (EHS) Guidelines, which represent internationally, recognized Good International Industry Practice (GIIP). Among these, the General EHS Guidelines, published in April 2007, provide overarching guidance that is applicable across all industry sectors and are intended to be used in conjunction with sector-specific guidelines where relevant.

The General EHS Guidelines outline performance levels and measures that are achievable in new or modernized facilities using current technology and economically feasible methods. The document offers comprehensive guidance on the management of environmental impacts, occupational health and safety, and community health and safety, covering all phases of a project lifecycle, including construction, operation, and decommissioning.

For infrastructure projects such as this one, the General EHS Guidelines form the basis for ensuring compliance with international best practices and complement the requirements of applicable national legislation. In addition to the General Guidelines, sector-specific EHS Guidelines, such as those for Toll Roads and Construction Materials Extraction, are also applicable and are discussed in the following sections.

Relevant provisions from both the General and sector-specific EHS Guidelines have been taken into account during the ESIA process and have been integrated into the Project's environmental and social management plans to ensure alignment with international standards and the requirements of potential lenders.

II.4.2.3. Environmental, Health, and Safety (EHS) Guidelines for Toll Roads

The Environmental, Health, and Safety (EHS) Guidelines for Toll Roads, published by the International Finance Corporation (IFC) in April 2007, provide sector-specific guidance on the management of environmental and social risks associated with the development and operation of toll road and highway infrastructure projects, including bridges and overpasses.

These guidelines complement the IFC General EHS Guidelines (2007) and are intended to be applied jointly. While the General Guidelines address overarching EHS issues relevant across all industries, the Toll Roads guideline focuses on sector-specific concerns.

Key topics covered include:

- Road safety management, including traffic control and accident prevention measures;
- Air emissions and noise impacts during both construction and operational phases;
- Surface water and soil pollution mitigation from storm water runoff and spills;
- Waste management practices, particularly during construction;
- Community health and safety, including risks to road users and nearby populations;
- Biodiversity and ecosystem impacts, particularly where road alignment intersects with natural habitats or protected areas.

The Project will ensure alignment with these guidelines as part of its commitment to Good International Industry Practice (GIIP), particularly in compliance with the environmental and social requirements of international financing institutions.

II.4.2.4. Environmental, Health, and Safety (EHS) Guidelines for Construction Materials Extraction

The Environmental, Health, and Safety (EHS) Guidelines for Construction Materials Extraction, published by the International Finance Corporation (IFC) in April 2007, provide guidance on the management of environmental and social risks associated with the extraction of construction materials. These materials include aggregates, limestone, slate, sand, gravel, clay, gypsum, feldspar, silica sands, quartzite, and dimension stones.

These guidelines are applicable to both stand-alone extraction projects and to quarrying activities that support larger construction or infrastructure developments, such as highways, bridges, and civil works. In the context of this Project, where construction materials may be sourced from external or project-associated quarries, the application of these guidelines is particularly relevant.

The document outlines Good International Industry Practices (GIIP) for managing impacts such as:

- Land disturbance and landscape alteration, including progressive rehabilitation and closure planning;
- Airborne dust emissions, noise, and vibrations from blasting or mechanical extraction;

- Surface and groundwater impacts, including sedimentation and contamination;
- Occupational health and safety risks associated with excavation, transport, and processing of raw materials;
- Community health and safety, particularly in relation to haul roads, blasting, and dust dispersion.

Implementation of the recommendations in this guideline will support the Project's efforts to mitigate potential environmental and social impacts related to construction material sourcing and align with the standards expected by international lenders.

II.4.3. EU Directives

The environmental and social assessment of motorway projects within the European Union is guided by a comprehensive set of directives aiming to protect environmental quality, natural resources, public health, and community well-being. These directives establish the legal framework for evaluating potential impacts and ensuring that mitigation and monitoring measures are implemented effectively throughout the project lifecycle.

The Environmental Impact Assessment (EIA) Directive (2011/92/EU, amended by 2014/52/EU) requires that major infrastructure projects, such as highways, undergo a systematic assessment of their potential environmental effects before development consent is granted. This includes evaluating impacts on biodiversity, soil, water, air, climate, landscape, and human health. Public participation is a central requirement of the directive, ensuring that communities and stakeholders have the opportunity to provide input at an early stage in project planning.

Closely related to the EIA Directive is the Strategic Environmental Assessment (SEA) Directive (2001/42/EC), which applies to plans and programs that set the framework for future development projects, including road networks. It ensures that environmental considerations are integrated at the strategic decision-making level, particularly in national or regional transportation planning.

With regard to air quality, the Ambient Air Quality Directive (2008/50/EC), recently revised by Directive (EU) 2024/2881, establishes limit values for key pollutants such as PM_{10}, $PM_{2.5}$, NO_2, and SO_2. These pollutants are commonly associated with traffic emissions and construction activities. For example, the new air quality standards to be met by 2030 include a limit of 20 µg/m³ for PM10 and 10 µg/m³ for $PM_{2.5}$ (annual averages), 20 µg/m³ for NO_2, and hourly and daily thresholds for SO_2. Compliance with these limits is essential to protect human health and the environment.

The Environmental Noise Directive (2002/49/EC) requires the development of noise maps and action plans for major roads, railways, and agglomerations. Projects must assess potential noise impacts during both construction and operational phases, with particular attention to night-time levels. Member States define their own noise limit values; however, the directive obligates project developers to prevent, reduce, and mitigate harmful noise exposure through appropriate design and barrier measures.

In terms of waste management, the Waste Framework Directive (2008/98/EC) establishes the waste hierarchy, emphasizing prevention, reuse, recycling, and recovery over disposal. Road construction projects must include strategies for managing construction and demolition waste, ensuring compliance with recovery targets and minimizing environmental risks associated with landfill disposal or hazardous waste.

Lastly, the Environmental Liability Directive (2004/35/EC) enforces the "polluter pays" principle. Developers are financially and legally responsible for preventing and remedying environmental damage caused by their activities. This includes damage to water resources, protected species and habitats, and land contamination. Appropriate risk management and emergency response plans must be developed as part of the overall environmental and social management system.

II.4.4. AIIB Environmental and Social Framework

The Project will be implemented in compliance with the Asian Infrastructure Investment Bank (AIIB) E&S Framework (ESF) approved in February 2016, amended in February 2019, May 2021, November 2022, and lastly June 26, 2024. The AIIB Environmental and Social Framework, effective since 2021, outlines the Bank's commitment to ensuring environmentally and socially sustainable outcomes in all its operations.

The Environmental and Social Policy (ESP) sets out AIIB's vision, principles, and mandatory environmental and social requirements for project implementation. It ensures that projects avoid, minimize, or mitigate adverse impacts while enhancing positive outcomes. There are three core ESSs:

- ESS 1: Environmental and Social Assessment and Management: Requires borrowers to conduct comprehensive environmental and social impact assessments and to develop appropriate management plans.
- ESS 2: Involuntary Resettlement: Ensures that any displacement is minimized and affected persons are compensated and assisted in restoring their livelihoods.
- ESS 3: Indigenous Peoples: Protects the rights and cultural heritage of indigenous communities that may be affected by the project.

In the standards described above, all standards except ESS-3 are applicable within the scope of the project. In line with the AIIB Environmental and Social Framework (ESF), the project will undertake a structured Environmental and Social Impact Assessment (ESIA) process. This includes stakeholder engagement, public disclosure, grievance redress mechanisms, and the development of an Environmental and Social Management Plan (ESMP). Furthermore, if the project involves any land acquisition or affects vulnerable groups, detailed Resettlement Action Plans (RAPs) must be prepared and disclosed in accordance with AIIB guidelines.

Accordingly, the project's legal framework will incorporate the AIIB ESF as a binding component, requiring the Borrower and the implementing agencies to ensure full compliance throughout the project lifecycle.

II.4.5. Other Applicable Standards and Guidelines

In addition to the primary lender standards described in previous sections, several additional international standards and good practice guidelines have been considered during the preparation of this assessment, in order to ensure alignment with Good International Industry Practice (GIIP). These standards provide technical direction and support enhanced environmental and social performance throughout the project lifecycle.

World Bank Group Environmental, Health and Safety (EHS) Guidelines

The World Bank Group has developed a series of EHS Guidelines that serve as technical reference documents with general and industry-specific guidance. These documents are widely recognized within the international financing community and are referenced in both the World Bank's

Environmental and Social Framework and IFC's Performance Standards. The following guidelines have been considered as relevant to this motorway project:

- General EHS Guidelines (2007)[2]
- EHS Guidelines for Toll Roads (2007)[3]
- EHS Guidelines for Construction Materials Extraction (2007)[4]
- IFC/EBRD Guidance Note on Worker Accommodation: Processes and Standards (2009)[5]

Other International Standards and Guidelines

In addition to the EHS Guidelines, the following international standards and principles have also been considered during the Environmental and Social Impact Assessment (ESIA) process:

- OECD Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (2016)6
- International Labor Organization (ILO) Core Conventions, which address fundamental principles and rights at work, including freedom of association, elimination of forced and child labor, and non-discrimination
- United Nations Guiding Principles on Business and Human Rights (UNGPs)7, which outline the corporate responsibility to respect human rights
- Voluntary Principles on Security and Human Rights8, providing guidance on how companies can maintain the safety and security of their operations while respecting human rights

These supplementary standards serve to enhance the project's environmental and social performance and ensure compatibility with the expectations of international financial institutions and stakeholders.

II.4.6. Project Categorization

As part of its environmental and social due diligence process for proposed investments, the International Finance Corporation (IFC) implements an environmental and social categorization system to evaluate the type, scale, and significance of potential risks and impacts. This categorization enables IFC to determine the scope and level of environmental and social review required, as well as the disclosure obligations in accordance with its Access to Information Policy.

The categorization framework is structured as follows:

- **Category A:** Projects that are expected to have significant adverse environmental and/or social risks and impacts that are diverse, irreversible, or unprecedented. These typically involve complex or large-scale operations—such as major infrastructure, extractive industries, or heavy industrial facilities—where the potential impacts extend beyond the project site and require comprehensive assessment and mitigation planning.
- **Category B:** Projects with potential limited adverse environmental and/or social risks and impacts that are generally site-specific, predictable, and reversible. These impacts are

[2] https://www.ifc.org/en/home
[3] https://www.ifc.org/content/dam/ifc/doc/2000/2007-toll-roads-ehs-guidelines-en.pdf
[4] https://www.ifc.org/content/dam/ifc/doc/2000/2007-construction-materials-extraction-ehs-guidelines-en.pdf
[5] https://documents1.worldbank.org/curated/en/604561468170043490/pdf/602530WP0worke10Box358316B01PUBLIC1.pdf
[6] https://legalinstruments.oecd.org/public/doc/280/280.en.pdf
[7] https://www.ohchr.org/sites/default/files/documents/publications/guidingprinciplesbusinesshr_en.pdf
[8] https://www.voluntaryprinciples.org/wp-content/uploads/2023/10/Voluntary-Principles_ENGLISH.pdf

usually easier to manage through standard mitigation and management measures. Category B projects still require due diligence but at a less detailed level than Category A projects.

- **Category C:** Projects that are likely to have minimal or no adverse environmental or social risks and impacts. These activities typically do not require further environmental and social assessment beyond screening.

IFC, in its Guidance Note 1 on the Assessment and Management of Environmental and Social Risks and Impacts, states that "For certain projects, and particularly for greenfield investments and projects (including, but not limited to, major expansion or transformation-conversion activities) involving specifically identified physical elements, aspects and facilities that are likely to generate potentially significant adverse environmental and social risks and impacts, the client should conduct a comprehensive full-scale ESIA". Accordingly, ***Antalya-Alanya Motorway Project*** would be categorized as "**Category A**" based on WB/IFC's criteria and thus a comprehensive full-scale ESIA report would be required for the Project.

To provide further evaluation in the scope of national and international categorization criteria in consideration of existing indicative lists of Category A project, the screening criteria defined in the European Union's (EU) EIA Directive and Turkish EIA Regulation is also considered as described below.

According to the EU's EIA Directive, all projects listed in Annex I of the Directive, are considered as having significant effects on the environment and require an EIA (*http://ec.europa.eu*). "Construction of motorways and express roads" and "Construction of a new road of four or more lanes, or realignment and/or widening of an existing road of two lanes or less so as to provide four or more lanes" are listed under Article 7 of the EIA Directive's Annex I list. Thus, the ***Antalya-Alanya Motorway Project would be categorized as an Annex I activity according to the EU's EIA Directive***.

As Türkiye gained a candidate country status in EU access process in 1999, the Turkish EIA Regulation has been harmonized with the EU's EIA Directive with several revisions and amendments made on the regulation since then. In parallel to the categorization approach of EU's EIA Directive, the Turkish EIA Regulation requires an EIA Report to be prepared for the activities listed under Annex-1 of the EIA Regulation. As mentioned in Section II.2.1, "Highways and state motorways (Article 8-c)" and "Construction of express roads having four and more lanes (Article 8-ç)" are listed as Annex-1 activities thus; same with the categorization under EU's EIA Directive, Antalya-Alanya Motorway Project would be an Annex-1 activity according to the Turkish EIA Regulation as well.

Taking into account the project categorization frameworks and criteria set forth by the IFC, the EU EIA Directive, and the Turkish EIA Regulation, the Antalya-Alanya Motorway Project has been identified as a **Category A** project due to the scale and nature of its potential environmental and social impacts. Accordingly, a full-scale Environmental and Social Impact Assessment (ESIA) has been prepared to meet the requirements of international financial institutions and relevant national and regional legislation.

II.5. Project Standards

The Project Sponsor is committed to full compliance with the applicable requirements of national legislation, as well as the Equator Principles (EPs), the International Finance Corporation (IFC) Performance Standards, and the associated General and sector-specific Environmental, Health and Safety (EHS) Guidelines.

In cases where discrepancies exist between national legal requirements and the standards, measures, or threshold values defined by the IFC Performance Standards or EPs, the Project will adopt the more stringent requirement in order to ensure alignment with Good International Industry Practice (GIIP) and the expectations of international financial institutions.

All relevant environmental and social standards, limits, and performance requirements applicable to the Project have been identified and incorporated into the respective thematic sections of this ESIA Report. These include, but are not limited to, standards related to air quality, noise, vibration, surface and groundwater quality, waste management, biodiversity, land acquisition, labor conditions, and community health and safety.

A summary of the applicable project standards is provided in Table II.5.

Table II.5 Project Standards

No	Topic	National Standards/ Requirements	Limit Values in National Legislation	International Standards/ Requirements	Limit Values in International Legislation	Project Standards
1	Noise	Regulation on Environmental Noise Control (Official Gazette Date/Number: 30.11.2022/32029) Annex- 2 "Table-1 Limit Values for ambient noise level"	Noise source: Industrial Facilities, Transportation: Day time (07:00-19:00): LAeq, 5 min.< 65 dB(A) Evening time (19:00-23:00): LAeq, 5 min.< 60 dB(A) Night time (23:00-07:00): LAeq, 5 min.< 55 dB(A)	IFC General EHS Guidelines: Environmental Noise Management Table 1.7.1 – Noise Level Guidelines Noise impacts should not exceed the levels specified in the Table 1.7.1, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.	Receptor: Residential; institutional, educational: Day time (07:00-22:00): One Hour LAeq dB(A) < 55 dB(A) Night time (22:00-07:00): One Hour LAeq dB(A) < 45 dB(A) Receptor: Industrial, commercial: Day time (07:00-22:00): One Hour LAeq dB(A) < 70 dB(A) Night time (22:00-07:00): One Hour LAeq dB(A) < 70 dB(A)	Receptor: Residential; institutional, educational: Day time (07:00-22:00): One Hour LAeq dB(A) < 55 dB(A) Night time (22:00-07:00): One Hour LAeq dB(A) < 45 dB(A) Receptor: Industrial, commercial: Day time (07:00-19:00): LAeq, 5 min.< 65 dB(A) Evening time (19:00-23:00): LAeq, 5 min.< 60 dB(A) Night time (23:00-07:00): LAeq, 5 min.< 55 dB(A)

<table>
<tr><th>No</th><th>Topic</th><th>National Standards/ Requirements</th><th>Limit Values in National Legislation</th><th>International Standards/ Requirements</th><th>Limit Values in International Legislation</th><th>Project Standards</th></tr>
<tr><td>2</td><td>Vibration</td><td>Regulation on Assessment and Management of Environmental Noise (Official Gazette Date/Number: 27.04.2011/27917)</td><td>
Vibration Limits for Quarries:
<table>
<tr><th rowspan="2">Structure Type</th><th colspan="3">Maximum Vibration Velocity at the Foundation of Buildings, (mm/s) (according to frequency, f=Hz)</th><th rowspan="2">n the top floor[2] slab for all frequencies</th></tr>
<tr><th>= 1-10</th><th>=10-50</th><th>=50-100[1]</th></tr>
<tr><td>Industrial buildings</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Durable structures such as houses, bricks, and concrete</td><td></td><td>5</td><td>0</td><td>5</td></tr>
<tr><td>Buildings, historical and natural structures that are sensitive to vibration and are not included in items 1 and 2 [3]</td><td></td><td></td><td>0</td><td></td></tr>
</table>
Vibration Limits for Ground Vibrations Caused by Road Transport Vehicles, Workplaces and Industrial Facilities in the Nearest Structure:
<table>
<tr><th></th><th>Frequency of Vibration (Hz)</th><th>Maximum Allowed Vibration Speed (rms value (mm/s))</th></tr>
<tr><td rowspan="2">Residential buildings</td><td>1[1]</td><td>1.5</td></tr>
<tr><td>8-100</td><td>0.3</td></tr>
<tr><td rowspan="2">In the offices</td><td>1(2)</td><td>3.5</td></tr>
<tr><td>8-100</td><td>0.6</td></tr>
<tr><td>Historical and</td><td>1(3)</td><td>0.8</td></tr>
</table>
</td><td>IFC General EHS Guidelines</td><td>IFC General EHS Guidelines recommend avoiding structural damage and significant disturbance; no numeric limits provided.</td><td>
Vibration Limits for Quarries:
<table>
<tr><th rowspan="2">Structure Type</th><th colspan="3">Maximum Vibration Velocity at the Foundation of Buildings, (mm/s) (according to frequency, f=Hz)</th><th rowspan="2">n the top floor[2] slab for all frequencies</th></tr>
<tr><th>= 1-10</th><th>=10-50</th><th>=50-100[1]</th></tr>
<tr><td>Industrial buildings</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Durable structures such as houses, bricks, and concrete</td><td></td><td>5</td><td>0</td><td>5</td></tr>
<tr><td>Buildings, historical and natural structures that are sensitive to vibration and are not included in items 1 and 2 (3)</td><td></td><td></td><td>0</td><td></td></tr>
</table>
Vibration Limits for Ground Vibrations Caused by Road Transport Vehicles, Workplaces and Industrial Facilities in the Nearest Structure:
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<tr><th></th><th>Frequency of Vibration (Hz)</th><th>Maximum Allowed Vibration Speed (rms value (mm/s))</th></tr>
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<tr><td rowspan="2">In the offices</td><td>1(2)</td><td>3.5</td></tr>
<tr><td>8-100</td><td>0.6</td></tr>
<tr><td>Historical and</td><td>1(3)</td><td>0.8</td></tr>
</table>
</td></tr>
</table>

No	Topic	National Standards/ Requirements	Limit Values in National Legislation	International Standards/ Requirements	Limit Values in International Legislation	Project Standards
2	Air Quality	Regulation on the Assessment and Management of Air Quality (Official Gazette Date/Number: 06.06.2008/26898) Annex – 1	PM10 1-Year: 40 µg/m3 24-Hour: 50 µg/m3 (not to be exceedance more than 35 times per year)	IFC General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality Table 1.1.1.: WHO Ambient Air Quality Guidelines	PM10 1-Year: 20 µg/m³ 24-Hour: 50 µg/m³ (99th percentile (i.e.3-4 exceedance days per year) PM2.5 1-Year: 10 µg/m3 24-Hour: 25 µg/m3 (99th percentile (i.e.3-4 exceedance days per year)	Turkish Legislation has not described a limit value for PM2.5. Therefore, in the assessment of the measurement result, the limit value set forth by the Ambient Air Quality and Cleaner Air for Europe and IFC 24-hour limit values are used, which is 25 µg/m3 for both of them. PM10 1-Year: 20 µg/m³ 24-Hour: 50 µg/m3 (99th percentile (i.e.3-4 exceedance days per year)
				Ambient Air Quality Directive (2008/50/EC), revised by Directive (EU) 2024/2881	PM_{10}: 24-hour average: 50 µg/m³ (Not to be exceeded more than 35 times/year) Annual average: 40 µg/m³ $PM_{2.5}$: Annual average: 25 µg/m³	PM2.5 1-Year: 10 µg/m³ 24-Hour: 25 µg/m³ (99th percentile (i.e.3-4 exceedance days per year)
		Industrial Air Pollution Control Regulation (Official Gazette Date/Number: 03.07.2009/27277 revised in the Official Gazette Date/Number: 6.11.2020/31296) Annex- 2 "Table-2.2	SO2: 350 µg/m³ (hourly), 60 µg/m³ (Long Term Limit Value) NO2: 200 µg/m³ (hourly), 40 µg/m³ (annual) CO: 10 mg/m³ (maximum daily 8-hour average) Total VOC: Hourly 280 µg/m³, 24-hour 70 µg/m3	IFC General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality	**SO_2:** 10 min 500 µg/m³ 24 hour 20 µg/m³ **NO_2 :** Hourly 200 µg/m³ Annual 40 µg/m³	SO2: 350 µg/m³ (hourly), 60 µg/m³ (Long Term Limit Value) NO2: 200 µg/m³ (hourly), 40 µg/m³ (annual) CO: 10 µg/m³ (maximum daily 8-hour average) Total VOC: Hourly 280 µg/m³, 24-hour 70 µg/m3

No	Topic	National Standards/ Requirements	Limit Values in National Legislation	International Standards/ Requirements	Limit Values in International Legislation	Project Standards
			Settled dust: 390 µg/m³ (Short Term Limit Value), 210 µg/m³ (Long Term Limit Value) Pb and its compounds (long term limit value) 250 mg/m²day Cd and its compounds (long term limit value) 3.75 mg/m²day Tl and its compounds (long term limit value) 5 mg/m²day	EU Ambient Air Quality Directives – Directive 2008/50/EC and Directive 2004/107/EC	SO_2: 1-hour average: 350 µg/m³(Not to be exceeded more than 24 times/year) 24-hour average: 125 µg/m³(Not to be exceeded more than 3 times/year) CO: Maximum daily 8-hour mean: 10 mg/m³ NO_2: 1-hour average: 200 µg/m³(Not to be exceeded more than 18 times/year) Annual average: 40 µg/m³(To be reduced to 20 µg/m³ by 2030) Lead (Pb) Calendar Year 0,5 µg/m³ Cadmium (Cd) Calendar Year 5,0 ng/m³	Settled dust: 390 µg/m³ (Short Term Limit Value), 210 µg/m³ (Long Term Limit Value) Pb and its compounds (long term limit value) 250 mg/m²day Cd and its compounds (long term limit value) 3.75 mg/m²day Tl and its compounds (long term limit value) 5 mg/m²day

<table>
<tr><th>No</th><th>Topic</th><th>National Standards/ Requirements</th><th>Limit Values in National Legislation</th><th>International Standards/ Requirements</th><th>Limit Values in International Legislation</th><th>Project Standards</th></tr>
<tr><td>3</td><td>Surface Water Quality</td><td>Regulation on Surface Water Quality-Water Quality Classes (Official Gazette Date/Number: 30.11.2012/ 28483) Annex – 5)</td><td>
<table>
<tr><th>Parameter</th><th>Unit</th><th colspan="3">Surface Water Quality Regulation Water Quality Classes</th></tr>
<tr><th></th><th></th><th>I (very good)</th><th>II (good)</th><th>III (moderate)</th></tr>
<tr><td>Ammonium (NH_4^+)</td><td>mg/L</td><td><0.2</td><td>1</td><td>>12</td></tr>
<tr><td>Color</td><td>m^{-1}</td><td>RES 436 nm: ≤ 1,5 RES 525 nm: ≤ 1,2 RES 620 nm: ≤ 0,8</td><td>RES 436 nm: 3 RES 525 nm: 2,4 RES 620 nm: 1,7</td><td>RES 436 nm: > 4,3 RES 525 nm: > 3,7 RES 620 nm: 2,5</td></tr>
<tr><td>Oil and Grease</td><td>mg/L</td><td><0.2</td><td>0.3</td><td>>0.3</td></tr>
<tr><td>Biological Oxygen Demanded BOD(BOD_5)</td><td>mg/L</td><td><4</td><td>8</td><td>>8</td></tr>
<tr><td>Dissolved Oxygen (DO)</td><td>mg/L</td><td>>8</td><td>6</td><td><6</td></tr>
<tr><td>Conductivity</td><td>µS/cm</td><td><400</td><td>1000</td><td>>1000</td></tr>
<tr><td>Chemical Oxygen Demanded (COD)</td><td>mg/L</td><td><25</td><td>50</td><td>>50</td></tr>
<tr><td>Nitrate (NO_3^-)</td><td>g/L</td><td><3</td><td>10</td><td>>10</td></tr>
</table>
</td><td>IFC General EHS Guidelines: Environmental Wastewater and Ambient Water Quality</td><td>IFC General EHS Guidelines Environmental-Wastewater and Ambient Water Quality mention that: " Discharges to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria or, in the absence of local criteria, other sources of ambient water quality."

Since National Standards exist, compliance with National Standards will be ensured.</td><td>
<table>
<tr><th>Parameter</th><th>Unit</th><th colspan="3">Surface Water Quality Regulation Water Quality Classes</th></tr>
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<tr><td>Biological Oxygen Demanded BOD(BOD_5)</td><td>mg/L</td><td><4</td><td>8</td><td>>8</td></tr>
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<tr><td>Chemical Oxygen Demanded (COD)</td><td>mg/L</td><td><25</td><td>50</td><td>>50</td></tr>
<tr><td>Nitrate (NO_3^-)</td><td>mg/L</td><td><3</td><td>10</td><td>>10</td></tr>
<tr><td>pH</td><td>-</td><td>6-9</td><td>6-9</td><td>6-9</td></tr>
<tr><td>Total</td><td>m</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
</table>

No	Topic	National Standards/ Requirements	Limit Values in National Legislation	International Standards/ Requirements	Limit Values in International Legislation	Project Standards
4	Groundwater Quality	Regulation of Water Intended for Human Consumption (RWIHC) issued by the Ministry of Health, which was published in the Official Gazette dated 17.02.2005 and numbered 25730 (Amended: RG-20/10/2016-29863),	Ammonium: 0.5 mg/L Arsenic: 10 µg/L Mercury: 1 µg/L Boron: 1,000 µg/L Conductivity: 2500 µS/cm Cadmium: 5 µg/L Chloride: 250 mg/L Lead: 10 µg/L Manganese: 50 µg/L Nitrate: 50 mg/L Sulphate: 250 mg/L Total Cyanide: 50 µg/L Total Pesticide: 0.5 µg/L Trichloroethylene: 10 µg/L pH : 6.5-9.5	WHO Standards (Guidelines for Drinking Water Quality" developed by the World Health Organization (WHO, 2022))	Arsenic: 10 µg/L Mercury: 6 µg/L Boron: 2,400 µg/L Cadmium: 3 µg/L Chloride: 5 mg/L Lead: 10 µg/L Nitrate: 50 mg/L Trichloroethylene: 8 µg/L	Cadmium: 3 µg/L Chloride: 200-300 mg/L Trichloroethylene: 10 µg/L For the other parameters (Ammonium, Arsenic, Boron, Mercury, Conductivity, Lead, Nitrate, Sulphate, Total Cyanide and Total Pesticide) limit values defined for the Regulation of Water Intended for Human Consumption will be used.
				Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the Quality of Water Intended for Human Consumption	Arsenic: 10 µg/L Mercury: 1 µg/L Boron: 1,500 µg/L Cadmium: 5 µg/L Chloride: 250 mg/L Lead: 5 µg/L Nitrate: 50 mg/L Manganese: 50 µg/L Trichloroethylene: 10 µg/L	
		Regulation on the Protection of Groundwater Against Pollution and Deterioration (Official Gazette Date/Number: 07.04.2012/ 28257) (Annex – 3)	Nitrate: 50 mg/L Total Pesticide: 0.5 µg/L For the other parameters given below (included in Annex-3 of the Regulation) no limit value is defined. Ammonium Arsenic Mercury Conductivity Cadmium Chloride Lead Sulfate Tetrachloroethylene Trichloroethylene Salinity	Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the Protection of Groundwater Against Pollution and Deterioration	Nitrate: 50 mg/L Active substances in pesticides, including their relevant metabolites, degradation and reaction products: 0.5 µg/L	Nitrate: 50 mg/L Active substances in pesticides, including their relevant metabolites, degradation and reaction products: 0.5 µg/L

No	Topic	National Standards/ Requirements	Limit Values in National Legislation	International Standards/ Requirements	Limit Values in International Legislation	Project Standards
5	Effluent Water Quality	Regulation on Water Pollution Control (Official Gazette Date/Number: 31.12.2004/25687 and revised in the Official Gazette Date/Number 12.05.2023/32188.)	Discharge Standards for the Treated Process Water to Receiving Environment in the Regulation on Water Pollution Control for Mixed Industrial Wastewater (Table 19 of the Regulation on Water Pollution Control) COD: 250 mg/L TSS: 200 mg/L Oil and grease: 20 mg/L Total Phosphorus (P): 2 mg/L Total Chrome: 2 mg/L Chrome (Cr+6): 0.5 mg/L Lead (Pb): 2 mg/L Total Cyanide (CN-): 1 mg/L Cadmium (Cd): 0.1 mg/L Ferrous (Fe): 10 mg/L Fluoride (F-): 15 mg/L Copper (Cu): 3 mg/L Zinc (Zn): 5 mg/L Mercury (Hg): 0.05 mg/L Sulphate (SO4-2): 1500 mg/L Total Kjeldahl Nitrogen (TKN): 20 mg/L Fish Bioassay (TDF): 10 Color: 280 Pt-Co pH:6-9	NA	NA	Discharge Standards for the Treated Process for Mixed Industrial Wastewater: COD: 250 mg/L TSS: 200 mg/L Oil and grease: 20 mg/L Total Phosphorus (P): 2 mg/L Total Chrome: 2 mg/L Chrome (Cr+6): 0.5 mg/L Lead (Pb): 2 mg/L Total Cyanide (CN-): 1 mg/L Cadmium (Cd): 0.1 mg/L Ferrous (Fe): 10 mg/L Fluoride (F-): 15 mg/L Copper (Cu): 3 mg/L Zinc (Zn): 5 mg/L Mercury (Hg): 0.05 mg/L Sulphate (SO4-2): 1500 mg/L Total Kjeldahl Nitrogen (TKN): 20 mg/L Fish Bioassay (TDF): 10 Color: 280 Pt-Co pH:6-9
			Discharge Standards for the Treated Wastewater to Receiving Environment in the Regulation on Water Pollution Control for Domestic Wastewater (Table 21.1 of the Regulation on Water Pollution Control) pH: 6-9 BOD:50 mg/L COD:160 mg/l TSS:60 mgl/l	IFC General Environmental, Health, and Safety (EHS) Guidelines	pH: 6-9 BOD:30 mg/L COD:125 mg/l Total Nitrogen: 10 mg/l Total phosphorus:2 mg/l TSS:50 mgl/l Oil and grase: 10 mg/l Total coliform bacteria: 400	Discharge Standards for the Treated Process for Domestic Wastewater: pH: 6-9 BOD:30 mg/L COD:125 mg/l Total Nitrogen: 10 mg/l Total phosphorus:2 mg/l TSS:50 mgl/l Oil and grase: 10 mg/l Total coliform bacteria: 400
				EU standards from Directive 91/271/EEC concerning urban wastewater treatment	BOD:25 mg/l COD:125 mg/l Total Nitrogen: 15 mg/l Total Phosphorus 2 mg/l TSS:35 mg/l	

No	Topic	National Standards/ Requirements	Limit Values in National Legislation	International Standards/ Requirements	Limit Values in International Legislation	Project Standards
			Discharge Standards for the Treated Wastewater to Receiving Environment in the Regulation on Water Pollution Control for Industrial Purposes Other Wastewater (Table 20.3 of the Regulation on Water Pollution Control) (Gas Stations, Floor and Vehicle Washing Wastewater) COD:150 mg/l Oil&Grease: 20 mg/L Fish Bioassay (ZSF): 20 pH: 6-9	NA	NA	Discharge Standards for the Treated Process for Industrial Purposes Other Wastewater (Gas Stations, Floor and Vehicle Washing Wastewater): COD:150 mg/l Oil&Grease: 20 mg/L Balık Biodeneyi (ZSF): 20 pH: 6-9
6	Soil Quality	Regulation on Soil Pollution Control and Point Source Contaminated Fields (Official Gazette Date/Number: 08.06.2010/27605 revised in the Official Gazette Date/Number: 11.07.2013/28704), (Annex-1)	Antimony: 31 mg/kg Arsenic: 0.4 mg/kg Boron: - Cadmium: 70 mg/kg Chromium (VI): 235 mg/kg Copper: 3129 mg/kg Lead: 400 mg/kg Mercury: 23 mg/kg Nickel: 1564 mg/kg Selenium: 391 mg/kg Silver: 391 mg/kg Zinc: 23464 mg/kg Tin: 46929 mg/kg Titanium: 312857 mg/kg Total Petroleum Hydrocarbons (TPH): - Total Organic Halogens (TOX): -	IFC General EHS Guidelines: Environmental	Since limit values regarding soil quality are not given at IFC General EHS Guidelines: Environmental, compliance with National Standards will be ensured.	Antimony: 31 mg/kg Arsenic: 0.4 mg/kg Boron: - Cadmium: 70 mg/kg Chromium (VI): 235 mg/kg Copper: 3129 mg/kg Lead: 400 mg/kg Mercury: 23 mg/kg Nickel: 1564 mg/kg Selenium: 391 mg/kg Silver: 391 mg/kg Zinc: 23464 mg/kg Tin: 46929 mg/kg Titanium: 312857 mg/kg Total Petroleum Hydrocarbons (TPH): - Total Organic Halogens (TOX):-

II.6. Permits

In this section, a comprehensive table has been prepared to summarize the current status of all permits and licenses relevant to the Project. The table includes both the permits that have already been obtained and those that have been applied for, covering the entire scope of the planned highway construction activities.

It is important to note that the table reflects the status as of the time of this ESIA report preparation. A more detailed Permit Register will be developed separately and maintained throughout the Project lifecycle. This register will be regularly monitored and updated to ensure compliance with national legal requirements and lender standards.

A summary of the permits obtained and in process within the scope of the project is given in Table II.6 below.

Table II.6 Summary of Permits

Authority	Related Subject	Comment	Date
Ministry of Environment, Urbanization and Climate Change	Environmental Impact Assessment (EIA) Positive Decision	Construction must begin within 7 years under the scope of the EIA decision. As of March 2025, construction activities have started within the scope of the project, and the decision remains valid.	17.08.2018
Ministry of Agriculture and Forestry, General Directorate of Forestry Management	Forest Permits for Highway Route	Forest Permits have been obtained for the highway route with a validity period of 49 years.	19.02.2025
Serik Forest Management Directorate	Forest Permit for Concrete Plant (KM 55+400)	An application for a Forest Permit for the Concrete Plant facility at KM 55+400 was submitted on 03.06.2025. It was reviewed and accepted, and the permit is valid from 21.08.2025 to 14.10.2027.	21.08.2025
	Excavated Material Storage Permit for Depot-2 (KM 52+544)	An application for a Forest Permit for the Excavated Material Storage Depot-2 (KM 52+544) was approved and is valid from 11.07.2025 to 11.07.2030.	11.07.2025
Taşağıl Forest Management Directorate	Forest Permits for Concrete Plant, Mechanical, Asphalt Plant, Warehouse, Workshop	Forest Permits for the Concrete Plant, Mechanical, Asphalt Plant, Warehouse, and Workshop (KM 59+400) were obtained under approval dated 15.02.2025 .	15.02.2025
	Camp Site-1	The approval dated 26.05.2025 was signed for the main camp site (KM 64+300) and was delivered to the Operations Directorate on 28.05.2025 for the commitment notes and field delivery procedures to be carried out.	28.05.2025
	Land use permit for Construction Site Layout, Warehouse, Workshop	The approval dated 26.05.2025 was signed for the Construction Site Settlement, Warehouse and Workshop (KM 87+500), and was delivered to the Operations Directorate on 04.06.2025 for the commitment notes and field delivery procedures to be carried out.	04.06.2025
	Land use permit for Concrete Plant, Mechanical, Asphalt Plant	The approval dated 26.05.2025 was signed for the Concrete Plant, Mechanical, Asphalt Plant (KM 87+700) and was delivered to the Operations Directorate on 28.05.2025 for the commitment notes and site delivery procedures to be carried out.	28.05.2025

Authority	Related Subject	Comment	Date
	Land use Permit for Concrete Plant	The area where the Concrete Plant (KM 80+400) will be located is not located in the Forest area, and the report requested by the Ministry within the scope of the application for non-agricultural use was prepared by the Provincial Directorate of Agriculture and Forestry and submitted with a letter dated 21.05.2025, and approval is awaited.	In Progress
		The approval dated 26.05.2025 was signed for the Concrete Plant (KM 89+700) and was delivered to the Operations Directorate on 28.05.2025 for the commitment notes and site delivery procedures to be carried out.	28.05.2025
General Directorate of Forestry	Land use Permit for Concrete Plant	The Land Use Permit application for the Concrete Plant (KM 99+200) was submitted to the General Directorate on 20.05.2025. It has been approved and is valid from 21.08.2025 to 14.10.2027.	21.08.2025
	Alternative-1 (Concrete Plant, Mechanical, Asphalt Plant, Construction Site Layout)	The application file was returned with the letter dated 13.03.2025 and delivered to the 13th Regional Directorate of Highways on 14.03.2025. It was determined that the application for Construction Site-9 was made by mistake while the application for Construction Site-10 should have been made. The application is under evaluation at the General Directorate.	In Progress
Antalya Regional Directorate of Forestry	Alternative-2 (Concrete Plant, Mechanical, Asphalt Plant, Construction Site Layout	The Forest Permit application for Alternative-2 (KM 124+300) was submitted to the Regional Directorate of Forestry on 26.05.2025. It has been reviewed and accepted, and is valid from 11.08.2025 to 14.10.2027.	11.08.2025
	Excavated Material Storage Permit for Depot-6 (KM 61+500)	The Forest Permit application for Depot-6 (KM 61+500) was revised following a site visit on 06.04.2025, during which it was requested that an access road be incorporated into the project scope. The revised application was submitted to the Antalya Regional Directorate of Forestry on 30.05.2025, and it has been accepted with validity from 30.06.2025 to 30.06.2030.	30.06.2025
	Excavated Material Storage Permit for Depot-11 (KM 74+360)	The Forest Permit application for Depot-11 (KM 74+360) was submitted to the Antalya Regional Directorate of Forestry on 30.05.2025. It has been approved and is valid from 04.06.2025 to 04.06.2030.	04.06.2025
	Excavated Material Storage Permit for Depot-14 (KM 76+240)	The Forest Permit application for Depot-14 (KM 76+240) has been approved and is valid from 11.07.2025 to 11.07.2030.	11.07.2025

Authority	Related Subject	Comment	Date
	Excavated Material Storage Permit for Depot-31 (Alternative to Depot 17 and located at KM 88+000)	The Forest Permit application for Depot-31 (KM 88+000) was submitted to the Regional Directorate of Forestry on 26.05.2025. It has been approved and is valid from 30.06.2025 to 30.06.2030.	30.06.2025
	Excavated Material Storage Permit for Depot-32 (Alternative to Depot 17 and located at KM 88+000)	The Forest Permit application for Depot-32 (alternative to Depot-17, KM 88+000) has been approved and is valid from 11.07.2025 to 11.07.2030.	11.07.2025
	Excavated Material Storage Permit for Depot-18 (KM 95+410)	The Forest Permit application for Depot-18 (KM 95+410), for which the technical report had been completed, was submitted to the Regional Directorate and reviewed. As the requested area overlapped with a TEDAŞ transmission line, formal consent was required, and a consent request letter was issued on 09.05.2025. The permit was subsequently approved and is valid from 24.06.2025 to 24.06.2030.	24.06.2025
	Excavated Material Storage Permit for Depot-19 (KM 95+450)	The Forest Permit application for Depot-19 (KM 95+450), for which the technical report had been completed, was submitted to the Regional Directorate and reviewed. Since the requested area overlapped with both a TEDAŞ power line and a Türk Telekom communication line, formal consents were required, and a consent request letter was issued on 09.05.2025. The permit was subsequently approved and is valid from 24.06.2025 to 24.06.2030.	24.06.2025
	Excavated Material Storage Permit for Depot-20 (KM 98+290)	The Forest Permit application for Depot-20 (KM 98+290), for which the technical report had been completed, was submitted to the Regional Directorate and reviewed. As the requested area overlapped with a TEDAŞ transmission line, formal consent was required, and a consent request letter was issued on 09.05.2025. The permit was subsequently approved and is valid from 24.06.2025 to 24.06.2030.	24.06.2025
	Excavated Material Storage Permit for Depot-22 (KM 107+850)	The Forest Permit application for Depot-22 (KM 107+850), for which the technical report had been completed, was submitted to the Regional Directorate and reviewed. Since the requested area overlapped with both a TEDAŞ transmission line and a designated canyon permit area, formal consent was required, and a consent request letter was issued on 09.05.2025. The permit was subsequently approved and is valid from 30.06.2025 to 30.06.2030.	30.06.2025

Authority	Related Subject	Comment	Date
	Excavated Material Storage Permit for Depot-24 (KM 113+050)	The Forest Permit application for Depot-24 has been approved and is valid from 04.07.2025 to 04.07.2030.	04.07.2025
	Excavated Material Storage Permit for Depot-27 (KM 124+500)	The Forest Permit application for Depot-27 was prepared and submitted to the Antalya Regional Directorate of Forestry, and the review process was completed. The permit has been approved and is valid from 13.08.2025 to 13.08.2030.	13.08.2025
Alanya Forest Enterprise Directorate	Excavated Material Storage Permit for Depot-26 (KM 123+000)	The Forest Permit application for Depot-26 (KM 123+000) is pending, as completion of the technical report and submission to the Regional Directorate has not yet been finalized. Based on discussions with the Forest Operations Chief, it was indicated that an alternative area will be requested, as the current site falls within a productive forest zone and is likely to be evaluated unfavorably.	In Progress
	Excavated Material Storage Permit for Depot-28 (KM 127+000)	The completion of the technical report and the submission of the file to the Regional Directorate is currently pending. Following discussions with the Forest Operations Chief, it was indicated that an alternative location would be required, as the current area lies within a productive forest zone and is expected to be evaluated unfavorably.	In Progress
	Excavated Material Storage Permit for Depot-30 (KM 132+720)	A Forest Permit application for Depot-30 (KM 132+720) was submitted on 08.07.2025. Based on discussions with the Forest Operations Chief, it was indicated that an alternative site would be requested, as the current location falls within a productive forest area and is likely to be evaluated unfavorably.	In Progress
Presidential Decision	Expropriation Decision	Within the scope of the Antalya-Alanya Motorway and Connection Roads Project numbered 9708, published in the Official Gazette numbered 32857 dated 30 March 2025, it has been decided by the General Directorate of Highways to urgently expropriate the relevant real estates.	29.03.2025
State Hydraulic Works (DSİ)	Wastewater Discharge Point	The discharge of effluent from the domestic wastewater treatment plant with a capacity of 200 m^3/day, planned for the construction site located within the boundaries of Taşağıl Neighborhood, Manavgat District, on an area of 66,449.77 m^2 and accommodating 1,000 workers, into the Kaymazboğazı Stream has been approved by the 13th Regional Directorate of State Hydraulic Works (DSİ).	26.05.2025
	Groundwater and Surface Water	The Water for Use Permit (non-drinking purposes) for Camp Site-2 (Taşağıl, KM 59+400) was obtained on 07.03.2025, and valid throughout the Project.	07.03.2025

Authority	Related Subject	Comment	Date
Directorate of Environment, Urbanization and Climate Change	Wastewater Treatment Plant Design Document Approval	For onsite wastewater treatment plants/units, an approval will be obtained as per Wastewater Treatment/Deep Sea Discharge Project Approval Circular dated 04.03.2014 and numbered 2014/7.	In Progress
Ministry of Agriculture and Forestry, General Directorate of Forestry Management	Forest Permits for Surplus Material Storage Areas (SMSA)	Forest Permits have been obtained for 2 SMSA sites. Applications for 20 SMSA Forest Permits have been submitted and official procedures are ongoing at the Regional Directorate of Forestry.	In Progress
General Directorate of Mining and Petroleum Affairs (MAPEG)	Material Quarries	Licenses have been obtained from the General Directorate of Mining and Petroleum Affairs (MAPEG) for six quarries (Sarıabalı, Karakaya, Saburlar, Karamanlar, Çakış, and Bademliyar). For Uzunlar, a Raw Material Extraction License (License No. 07/2025-07) was completed on 03.06.2025 and is valid until 03.06.2030. For Soğukpınar, a Raw Material Production Permit (License No. 07/2025-08) was completed on 27.05.2025 and is valid until 27.05.2030. The application process for Kuruçay Quarry is still ongoing at MAPEG. Additionally, an application for the Dikmen Quarry has been submitted to the Antalya Governorship Investment Monitoring and Coordination Directorate, as this quarry falls under the jurisdiction of the Antalya Governorship.	In Progress
General Directorate of Highways (KGM)	Expropriation	Expropriation Plans for the entire route have been approved. Valuation survey studies have been completed for the entire route except for the Çakallar and Akdam regions. Valuation reports are being entered into the General Directorate of Highways (KGM) system	In Progress
	Excavated Material Storage Permit for Depot-3 (KM 59+580)	The Forest Permit application file was submitted to the Regional Directorate of Forestry. During a site visit conducted on 06.04.2025 at other depot areas, it was requested that access roads be incorporated into applications lacking such connections. Accordingly, the return of previously submitted files was officially requested by letter dated 16.05.2025 for revision. The revised permit file was prepared and submitted to the 13th Regional Directorate of Highways on 03.06.2025. The permit was subsequently approved on 06.08.2025 and is valid until 06.08.2030.	06.04.2025
General Directorate of National Property	Treasury Allocations	Applications for treasury allocation have been made for all treasury lands along the project route, and the process is ongoing at the General Directorate of National Property.	In Progress

III. PROJECT DESCRIPTION

Antalya-Alanya Motorway Project (the Project) is one of the two sub-projects that constitute the Afyonkarahisar-Alanya Motorway Project and is designed to connect Serikli and Alanya districts through Manavgat district of Antalya province. The Project will enhance the existing transportation network services with surrounding provinces (Burdur, Muğla, Konya, Isparta, Karaman and Mersin). Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the current design as of April 2025, the total length of the motorway, which will consist of a dual carriageway with predominantly three lanes and partially two lanes in each direction (3x2 and 2x2), is 117.8 kilometers, including both the main carriageway and access roads.

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways (KGM), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Limak has been designated as the main contractor for the Project and will henceforth be referred to as the Contractor. Table III.1 provides the approximate distances of the Motorway according to the current design.

Table III.1. Information of the Motorway

Start Location	End Location	Main Road (Motorway)	Access Roads	Total
Km 52+000	Km 136+000	84+000	33+800	117+800

In accordance with the terms of the BOT contract signed between the KGM and the Project Sponsor, the Project includes financing, planning/design, building/construction, operation, full range of maintenance and repair works during the operation period and transfer of the Motorway to the KGM at the end of the contract duration free from any debt or commitment and in a well-maintained, operating, in-service condition, without any charge. The Project Sponsor's rights to operate maintain and repair the Motorway will expire at the end of the contract duration.

According to the BOT Contract, the contract period covers both construction and operation phases. In accordance with the relevant provisions of the BOT contract, guaranteed minimum traffic (in passenger vehicle equivalent (PCE)) for the Antalya-Alanya Motorway will be presented in PCE/day once the traffic projection is completed.

III.1. Project Design Criteria

Motorways are access-controlled highways that have two or more traffic lanes in each direction and provide uninterrupted flow, on which opposing traffic is separated by a median and collection of tolls are performed at designated points. Motorway has been designed in accordance with the KGM's technical specifications for motorways. The design criteria specified by the KGM for the Antalya-Alanya Motorway is listed in Table III.2.

Table III.2. Motorway Design Criteria

Design Criteria Component	Unit	Motorway (Main Carriageway)	Access Roads
Speed Limit	km/hour	120	100
Width of the Traffic Lane	m	3.75	3.50
Number of Traffic Lanes	-	2x3	2x2
Shoulder Width (Emergency Lane)	m	3	3
Side Width for Guardrails (At Fill)	m	1	1
Refuge Width	m	5	3
Shoulder Width for Central Reserve	m	1	1
Baseline Design Side Slope (Minimum Superelevation)	%	2.5	2.5
Maximum Superelevation	%	6	6
Minimum radius for Horizontal Curve	m	1,000	600
Radius for Horizontal Curve (Minimum Superelevation=2.5%)	m	3,400	2,050
Radius for Horizontal Curve with no Superelevation Requirement	m	5,000	4,500
Minimum vertical Clearance for Bridges	m	5	5

Source: Highway Design Handbook (December, 2016)

A typical cross-section for the Motorway's main carriageway is provided in Figure III.1. As can be seen from this cross-section, the Motorway will be a dual carriageway having 3 lanes in each direction. Each of the 6 lanes will have a width of 3.75 meters. The central reserve will be 7 meters (3.5 m x 2) plus 2 meters of lined shoulder (1 m in each side of the reserve). At the outer side of the traffic lanes in each direction, there will be 3 meters of lined shoulders that will serve as emergency strips and 1 meter of shoulder edge side strips. Thus, the total width of the platform consisting of central reserve, lined shoulder, traffic lanes, emergency line, and shoulder edge side strips for both directions will be 39.5 meters. There will be also ditches as required in both sides of the main carriageway.

Access roads will have a different design when compared to main carriageway. Access roads will be composed of 2 lanes in each direction. Each of the 4 lanes will have a width of 3.5 meters. The central reserve in access roads will be 5 meters (2.5 m x 2) plus 2 meters of lined shoulder (1 m in each side of the reserve). At the outer side of the traffic lanes in each direction, there will be 3 meters of lined shoulders that will serve as emergency strips and 1 meter of shoulder edge side strips. Thus, the total width of the access roads' platform consisting of central reserve, lined shoulder, traffic lanes, emergency line, and shoulder edge side strips for both directions will be 29 meters. Typical cross-section for the Motorway's access roads is presented in Figure III.2. Additional drawings for the Motorway's carriageway and access roads are presented in Annex-1.

Design speed at the interchange arms will vary between 50 and 80 km/hour depending on the radius of the horizontal curve. Minimum relative slope will be 0.4% while maximum slope will vary between 0.5% and 1%. Additional design criteria are listed below:

- For all types of topographical models, side slope for standard coating shall be 2.5% and superelevation will not exceed 6%.
  - Vertical clearance shall be minimum 5 meters for all roads passing over or under the Motorway.
- Embankment (fill) slopes (s) shall be determined based on the height (h) of the embankment as follows:
  - For h<1,5 m ; s=4:1;
  - For 1,5 m<h<3 m ; s=3:1;
  - For h>3 m ; s=2:1;
- Cutting slopes shall be determined based on the results of geotechnical studies.
- Minimum bench width shall be 5 meters on the embankments and cuttings.
- Horizontal (i.e. shoulder lines, traffic lines, parking lines, etc.) and vertical signing (i.e. traffic signs, plates, etc.) of the Motorway will be in accordance with KGM's technical specifications (i.e. dimensions, color, material, reflectivity features, numbering, information figures, location of signs, etc.).

Although the Project's specifications state a design speed of the main road (motorway) 120 km/h for the main road (motorway), in line with the current developments and the requirements of KGM, the Project design speed was increased to 140 km/h for the main road and 110 km/h for the access roads. All necessary design and construction works for the Project have been and will continue to be carried out based on the Project's updated design speed values. The updated criteria for Project roads are detailed in Table III.3.

Table III.3. Updated Design Criteria of the Project

Design Criteria Components	Unit	Motorway	Access Road
Speed Limit	km/h	140	110
Strip Width	m	3.75	3.50
Banquette Width (Emergency Shoulder Width)	m	3	3
Refuge Banquette Width	m	1	1
Refuge Width	m	7	5

The total width of the Motorway's main carriageway, measuring 39.5 meters, is calculated in detail below:

Central reserves: 3.5 m x 2 = 7 m.
Lined shoulder in each side of the reserve: 1 m x 2 = 2 m.
Dual carriageway with 3 lanes in each direction: 3.75 m x 6 = 22.5 m.
Outer side lined shoulders (emergency strips): 3 m x 2 = 6 m.
Shoulder edge side strips: 1 m x 2 = 2 m.

Total Length = [(3.5m x 2) + (1m x 2) + (3.75m x 6) + (3m x 2) + (1m x 2)] = 39.50 m.

The total width of the Motorway's access roads, measuring 29 meters, is calculated in detail below:

Central reserves: 2.5 m x 2 = 5 m.
Lined shoulder in each side of the reserve: 1 m x 2 = 2 m.
Dual carriageway with 3 lanes in each direction: 3.5 m x 4 = 14 m.
Outer side lined shoulders (emergency strips): 3 m x 2 = 6 m.
Shoulder edge side strips: 1 m x 2 = 2 m.

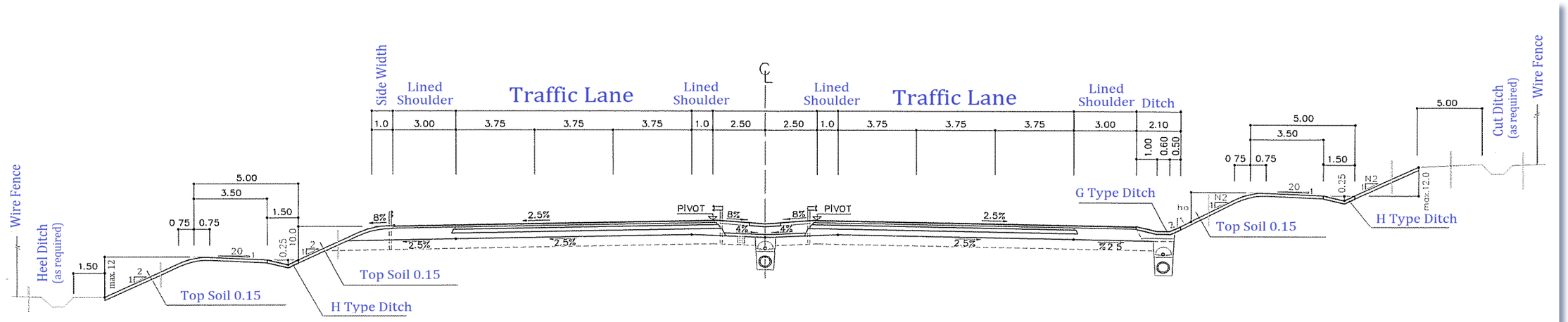
Total Length = [(2.5m x 2) + (1m x 2) + (3.5m x 4) + (3m x 2) + (1m x 2)] = 29 m.

The Motorway will be a dual carriageway with three lanes (3x2) along the 84 kilometers stretch, and the access roads will have two lanes (2x2) over the 33.8 kilometers length[1]. Table III.4 presents the permanent access roads that are defined as project components and connected to interchanges along the motorway. Access roads that are temporary in nature and considered auxiliary facilities for use during the construction phase are addressed separately in Section III.2.4.

Table III.4. Details on the Access Roads

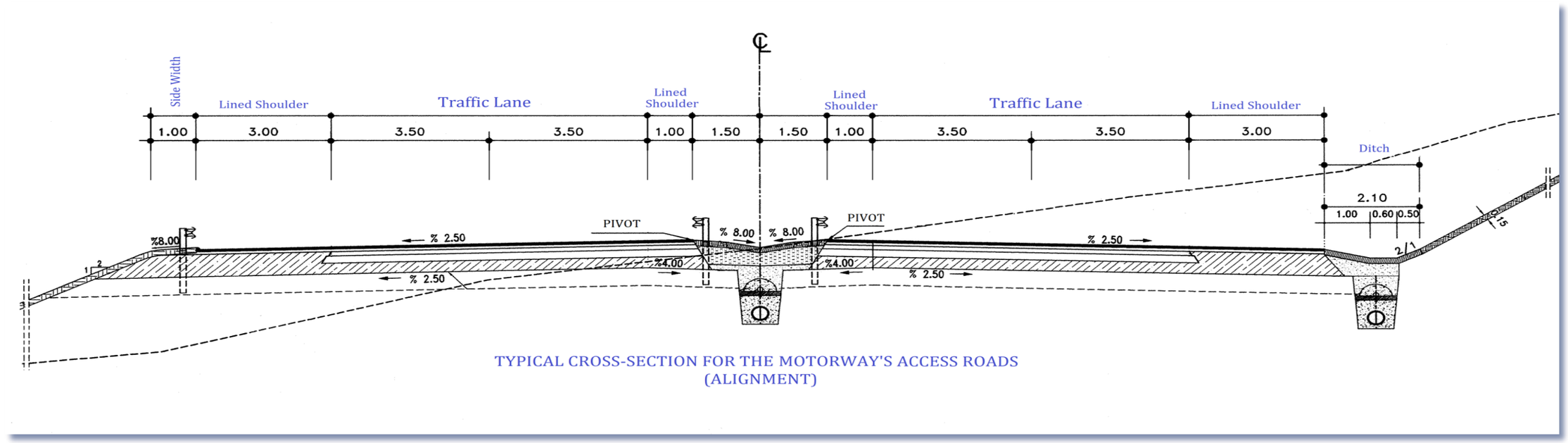
Interchanges/Access Roads	Location on the Route (Motorway Km)	Connected Road	Access Road Length (Km)
Serik Interchange	52+324	D-400 State Road	10+746
Taşağıl Interchange	66+288	D-400 State Road	2+620
Manavgat Interchange	77+030	D-400 State Road	6+809
Manavgat East Interchange	100+737	D-400 State Road	3+460
Alarahan Interchange	117+581	Okurcalar-Alara Road	2+835
Konaklı Interchange	133+436	Konaklı-Güzelbağ Road	1+600
Alanya West Interchange	136+000	D-400 State Road	5+705
Total (Access Road)			**33+775**

[1] It should be noted that the environmental and social baseline characterization, maps and assessments provided in this report are based on the design as of April 2025.



TYPICAL CROSS-SECTION FOR THE MOTORWAY'S MAIN CARRIAGEWAY
(ALIGNMENT)

Figure III.1. Typical Cross-section for the Motorway's Main Carriageway



TYPICAL CROSS-SECTION FOR THE MOTORWAY'S ACCESS ROADS
(ALIGNMENT)

Figure III.2. Typical Cross-section for the Motorway's Access Roads

III.2. Description of Activities and Project Components

The main activities to be conducted before the commissioning of the Antalya-Alanya Motorway will include the land acquisition, land preparation and construction stages. In this scope, before the start of construction works, the lands on which the Motorway and its components will be located and will be acquired in line with the applicable Turkish laws and regulations. In the scope of the Antalya-Alanya Motorway Project, KGM is the authority responsible from the implementation of expropriation works in accordance with the national Expropriation Law. For the forestry lands, treasury lands and other state-owned lands, necessary permits, land use permits and/or easement rights will be obtained by KGM from the related authorities in the scope of applicable legislation.

The works on the planned route is carried out in several main steps. The first step, which is substructure works, starts with earthwork activities such as topsoil stripping, poor soil excavations, and cut-fill operations. Following the earthwork activities, engineering structures such as bridges, underpasses, overpasses, retaining walls, culverts, concrete pipes, and viaducts are constructed. The next step involves pavement work, which includes forming the subbase, base, asphalt layer, and concrete or parquet paving for specific situations[2]. After the substructure and pavement work is completed, finishing operations are carried out, including the placement of horizontal and vertical traffic signs, as well as the installation of guardrails and fences. Upon completion of the park and service areas, maintenance and operation centers, and toll collection systems, the Motorway will be ready for the tests and commissioning. This standard procedure will be followed in the construction of the Project.

When the Project intersects existing infrastructure, including sewage, electricity, water supply, telecommunication, and natural gas lines, these utilities will be relocated in the scope of the construction works so that no permanent interruption would occur on the services provided to local users. Similarly, some of the existing roads may need to be temporarily closed and the users of the affected roads will be directed to the service roads to ensure local transportation services are not interrupted.

During the operation phase, road maintenance and repair works will be conducted by the Project Sponsor until the end of contract duration. Maintenance works will involve routine maintenance, winter maintenance and periodic maintenance works. Periodic maintenance, involving large-scale repairs of the superstructures, is expected to be required every 10 years. Maintenance and repair works will be performed in accordance with the operation, maintenance and repair standards and technical specifications. The rights of the Project Sponsor to operate maintain and repair the Motorway will expire at the end of the contract duration, when the motorway shall be transferred to the KGM free from any debt or commitment and in a well-maintained, operating, in-service condition, without any charge. Number of vehicles subject to passage fee will be identified by means of electronic passage systems to be installed in line with the specifications. Technical and legal supervision and control of the construction and operation works/periods will be executed by the personnel or independent consulting firms to be assigned by the KGM. Special structures will be inspected and released/signed off during site surveillance.

According to the IFC Performance Standards (2012), “Associated Facilities” are defined as facilities that:

- are not financed as part of the Project;
- are necessary for the Project’s viability; and
- would not have been constructed or expanded without the Project.

[2] *http://www.kgm.gov.tr*

As part of the ESIA process, an assessment was carried out to evaluate whether any external facilities could be considered “associated facilities” in line with the IFC definition. The review covered potential infrastructure and services typically linked to large-scale projects, including access roads, energy transmission lines, water supply systems, wastewater treatment plants, and waste management facilities.

The assessment results indicate that the Antalya-Alanya Motorway Project has been designed and financed as a self-sufficient and stand-alone infrastructure project. The alignment connects directly to the existing D-400 State Road at the Serik and Alanya interchanges. The Project does not depend on the development, upgrade, or expansion of third-party infrastructure for its functionality. In addition, all critical operational elements including interchanges, service areas, drainage systems, and other supporting facilities are included within the scope and financing of the Project.

The Antalya–Alanya Motorway Project is one of the two sub-projects of the Afyonkarahisar–Alanya Motorway and is designed independently from the Afyonkarahisar–Antalya section to connect the districts of Serik and Alanya through Manavgat within Antalya Province. The Project constitutes a stand-alone infrastructure directly connected to the existing D-400 State Road at the Serik and Alanya interchanges. Its implementation does not require any third-party infrastructure development, upgrade, or expansion, and its operational viability is fully ensured within its own scope and financing.

Based on the above assessment, the Project does not involve any facilities that meet the IFC criteria for associated facilities. The motorway is a self-contained and operationally viable development, independent of external infrastructure beyond its direct connections to the national road network.

III.2.1. Construction Camp Sites and Quarries

During the construction works, temporary construction facilities/sites will be needed. These facilities and sites include construction campsites, quarries, plants and service roads. Following the completion of construction activities, temporary facilities will be decommissioned. Table III.5 provides a list of the campsites, quarries and plants to be used in the scope of the Project. A map showing the locations of construction compounds is provided in Figure III.3.

Table III.5. Locations of the Borrow Pits/Quarries and Plants

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)	Capacity Information / Operation Period
Km 53+800	Antalya	Serik	Sarıabalı	Sarıabalı (AO-1) Borrow Pit	249,000	375 m³/hour
						36 months
Km 55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1	13,946	140 m³/hour
						36 months
Km 56+500	Antalya	Manavgat	Çakış	Çakış (TOY4a) Quarry	250,000	375 m³/hour
						36 months
Km 58+500	Antalya	Manavgat	Taşağıl	Kuruçay (TOY4b) Quarry	243,000	375 m³/hour
						36 months
Km 59+400	Antalya	Manavgat	Taşağıl	Concrete Plant-2	66,450	140 m³/hour
						36 months
				Mechanical Plant-1		550 tonnes/hour
						16 months
				Asphalt Plant-1		240 tonnes/hour
						16 months
Km 64+400	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)	-	
Km 80+400	Antalya	Manavgat	Yeniköy	Concrete Plant-3	15,000	140 m³/hour
						36 months
Km 83+000	Antalya	Manavgat	Sarılar	Dikmen Borrow Pit	245,000	375 m³/hour
						36 months
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2	-	
Km 87+700	Antalya	Manavgat	Bucakşeyhler	Concrete Plant-4	42,371	140 m³/hour
						36 months
				Mechanical Plant-2		550 tonnes/hour
						16 months
				Asphalt Plant-2		240 tonnes/hour
						16 months
Km 89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a	11,665	140 m³/hour
						36 months
Km 99+200	Antalya	Manavgat	Sülek	Concrete Plant-5	11,977	140 m³/hour
						36 months
Km 104+750	Antalya	Manavgat	Gençler	Bademliyar (TO2) Quarry	179,000	375 m³/hour
						36 months
Km 105+000	Antalya	Manavgat	Uzunlar	Çengel Stream	190,000	375 m³/hour

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)	Capacity Information / Operation Period
				Material Quarry		36 months
Km 106+000	Antalya	Manavgat	Uzunlar	Uzunlar (TOY5) Quarry	247,000	375 m^3/hour
						36 months
Km 114+200	Antalya	Manavgat	Karakaya	Karakaya Quarry	250,000	375 m^3/hour
						36 months
Km 117+000	Antalya	Alanya	Saburlar	Saburlar Quarry	250,000	375 m^3/hour
						36 months
Km 119+500	Antalya	Alanya	Karamanlar	Karamanlar Quarry	250,000	375 m^3/hour
						36 months
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3	-	
				Concrete Plant-6	85,000	140 m^3/hour
						36 months
				Mechanical Plant-3		550 tonnes/hour
						16 months
				Asphalt Plant-3		550 tonnes/hour
						16 months
Km 134+000	Antalya	Alanya	Soğukpınar	Soğukpınar Quarry	251,000	375 m^3/hour
						36 months

Campsites will include facilities such as cafeteria, infirmary, showers and toilets, wastewater treatment plants/septic tanks, water supply facilities (i.e. water wells, water tanks) etc.

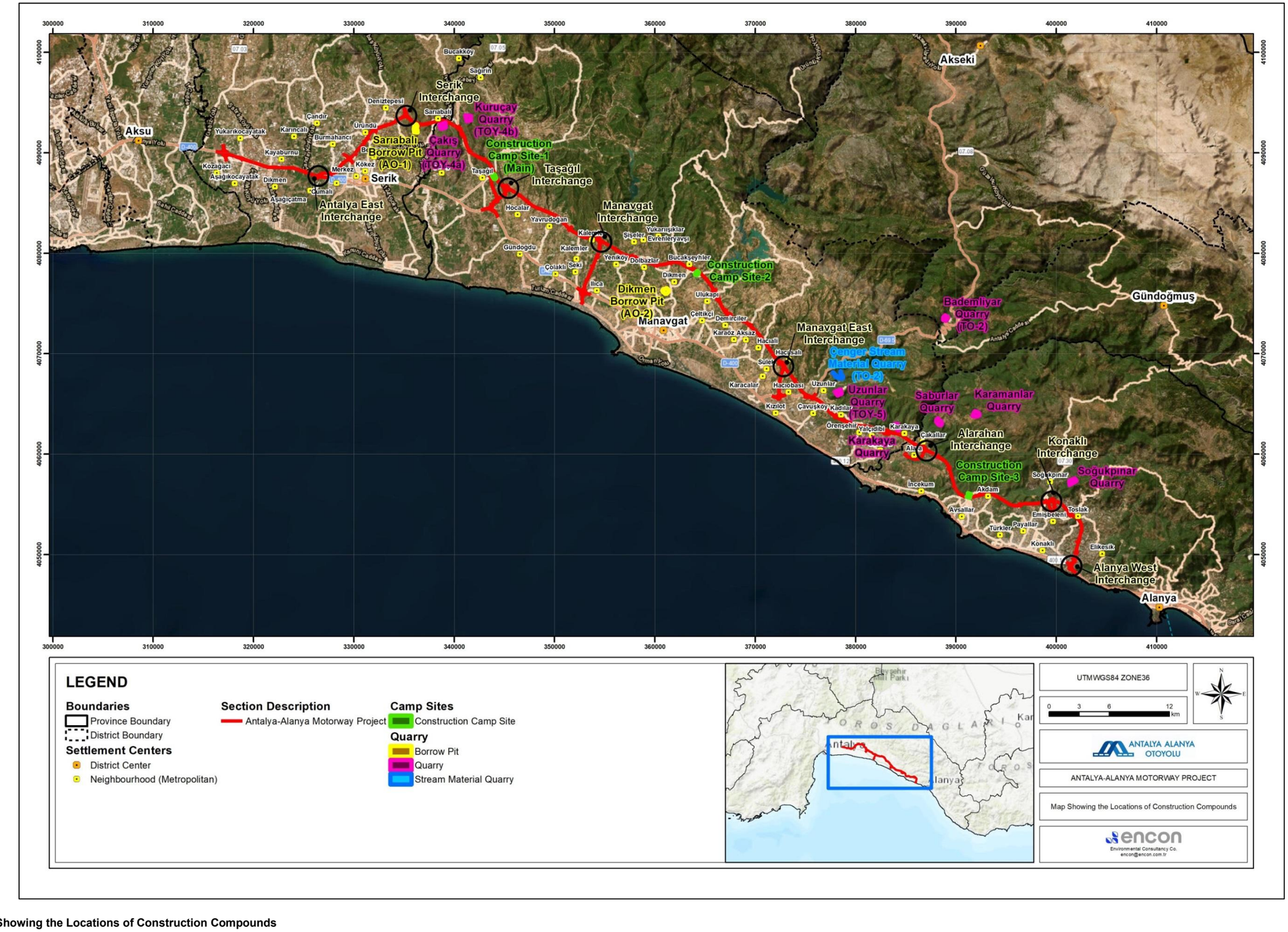


Figure III.3. Map Showing the Locations of Construction Compounds

Construction Camp Site - 1 (Main)

Main Construction Camp Site No. 1 is located near Km 64+500 near the Taşağıl neighborhood of Manavgat district of Antalya province. The Construction Camp site-1 is planned to remain as a maintenance-operation area. Photograph of the Construction Camp Site-1 is presented in Figure III.1.



Construction Camp Site-1

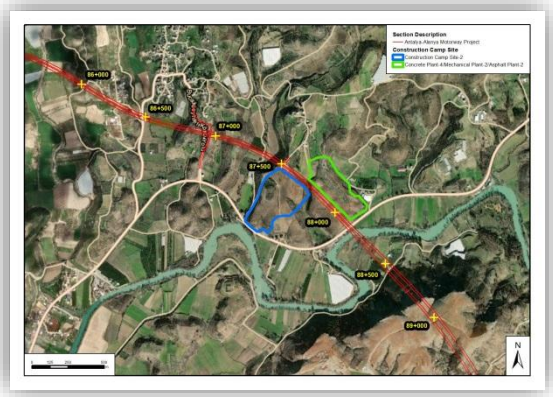


General View

Figure III.4. Photographs Showing Construction Camp Site-1 (Km 64+500)

Construction Camp Site - 2

Construction Camp Site No. 2 is located near Km 87+800 near the Bucakşeyhler neighborhood of Manavgat district of Antalya province. Concrete Plant-4, Mechanical Plant-2 and Asphalt Plant-2 located in the west of the site. Photograph of the Construction Camp Site-2 is presented in Figure III.5.



Construction Camp Site-2

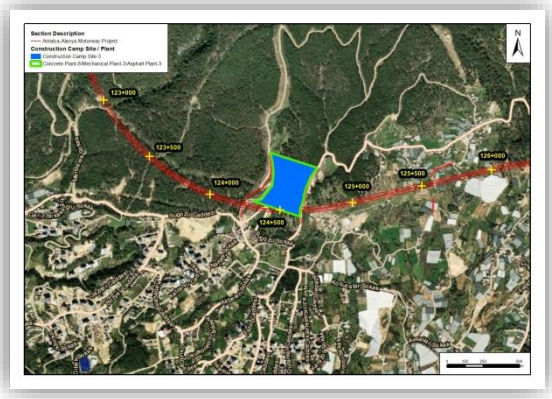


General View

Figure III.5. Photographs Showing Construction Camp Site-2 (Km 87+700)

Construction Camp Site - 3

Construction Camp Site No. 3 is located near Km 124+300 near the Avsallar and İncekum neighborhoods of Alanya district of Antalya province. Construction Camp Site - 3 is located in a forest area. Photograph of the Construction Camp Site-3 is presented in Figure III.6.



Construction Camp Site-3

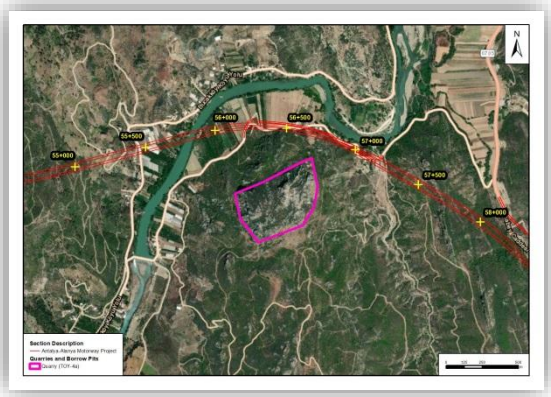


General View

Figure III.6. Photographs Showing Construction Camp Site-3 (Km 123+000)

Çakış (TOY-4a) Quarry

Çakış (TOY-4a) Quarry is located on an area of 25 hectares around Km 56+500. The operation period is planned for 36 months and has a capacity of 375 m^3/h. Photograph of the TOY-4a Quarry is presented in Figure III.7.



Çakış (TOY-4a) Quarry

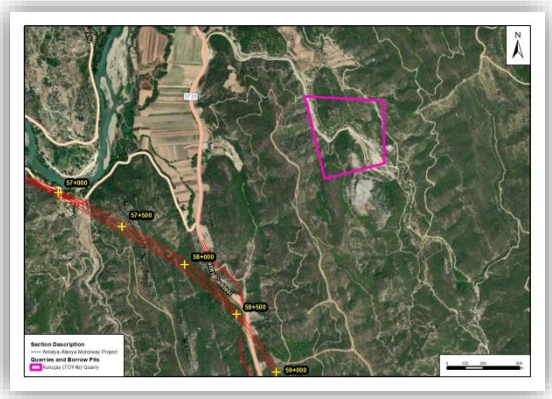


General View

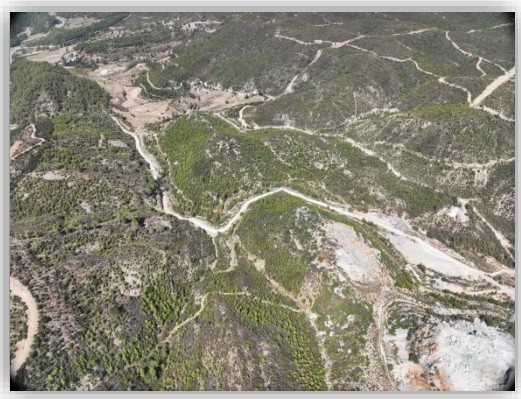
Figure III.7. Photographs Showing Çakış (TOY-4a) Quarry (Km 56+500)

Kuruçay (TOY4b) Quarry

Kuruçay (TOY4b) Quarry is located on an area of 24.3 hectares around Km 58+500. The operation period is planned for 36 months and has a capacity of 375 m^3/h. Photograph of the Kuruçay (TOY4b) Quarry is presented in Figure III.8.



Kuruçay (TOY4b) Quarry



General View

Figure III.8. Photographs Showing Kuruçay (TOY4b) Quarry (Km 58+500)

BademliyarTO2 Quarry

Bademliyar (TO2) Quarry is located on an area of 17.9 hectares around Km 104+750. The operation period is planned for 36 months and has a capacity of 375 m^3/h. Photograph of the TO-2 Bademliyar Quarry is presented in Figure III.9.



Bademliyar-TO2 Quarry

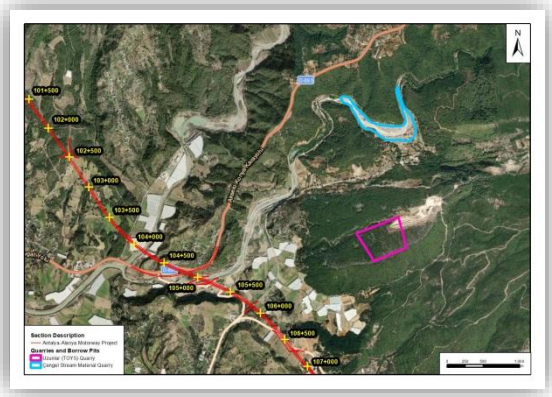


General View

Figure III.9. Photographs Showing Bademliyar (TO2) Quarry (Km 104+670)

Çengel Stream Material Quarry

Çengel Stream Material Quarry is located on an area of 19 hectares around Km 105+000. The operation period is planned for 36 months and has a capacity of 375 m^3/h. Photograph of Çengel Stream Material Quarry is presented in Figure III.10.



Çengel Stream Material Quarry

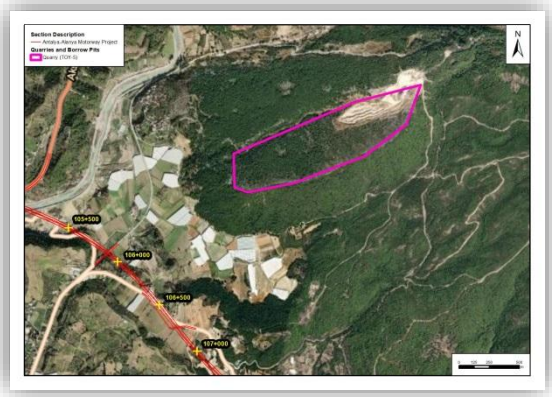


General View

Figure III.10. Photographs Showing Çengel Stream Material Quarry (Km 105+000)

Uzunlar (TOY-5) Quarry

Manavgat Uzunlar (TOY-5) Quarry is located on an area of 24.7 hectares around Km 106+000. The operation period is planned for 36 months and the facility has production capacity of 375 m^3/h. Photograph of the Manavgat Uzunlar TOY-5 Quarry is presented in Figure III.11



Uzunlar TOY-5 Quarry

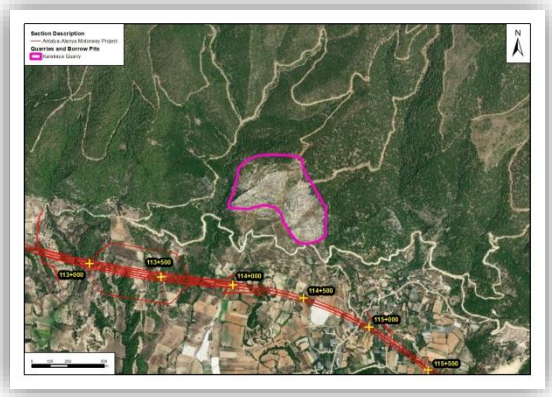


General View

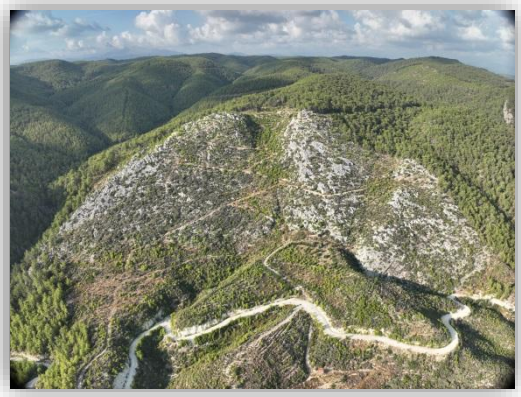
Figure III.11. Photographs Showing TOY-5 Quarry (Km 106+000)

Karakaya Quarry

Karakaya Quarry is located on an area of 25 hectares around Km 114+200. The operation period is planned for 36 months and the facility has production capacity of 375 m^3/h. Photograph of the Karakaya Quarry is presented in Figure III.12.



Karakaya Quarry

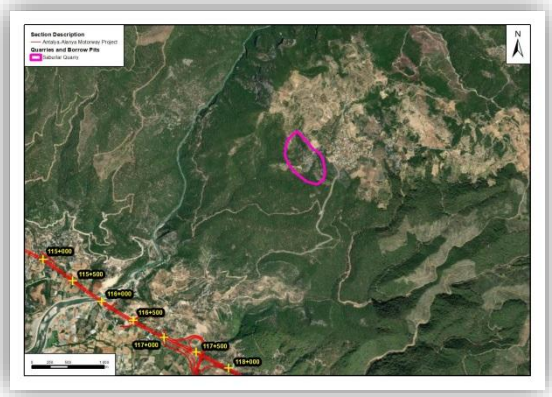


General View

Figure III.12. Photographs Showing Karakaya Quarry (Km 114+200)

Saburlar Quarry

Saburlar Quarry is located on an area of 25 hectares around Km 117+000. The operation period is planned for 36 months and the facility has production capacity of 375 m^3/h. Photograph of the Saburlar Quarry is presented in Figure III.13.



Saburlar Quarry

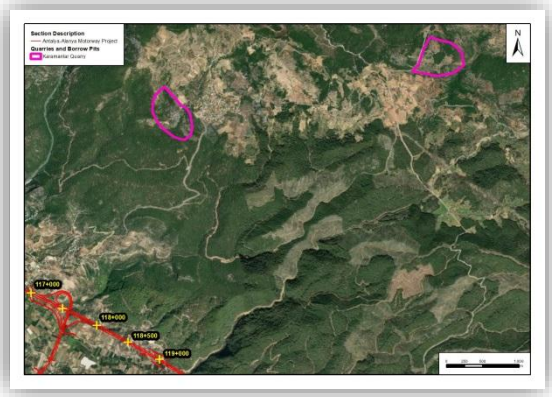


General View

Figure III.13. Photographs Showing Saburlar Quarry (Km 117+000)

Karamanlar Quarry

Karamanlar Quarry is located on an area of 25 hectares around Km 119+500. The operation period is planned for 36 months and the facility has production capacity of 375 m^3/h. Photograph of the Karamanlar Quarry is presented in Figure III.14.



Karamanlar Quarry

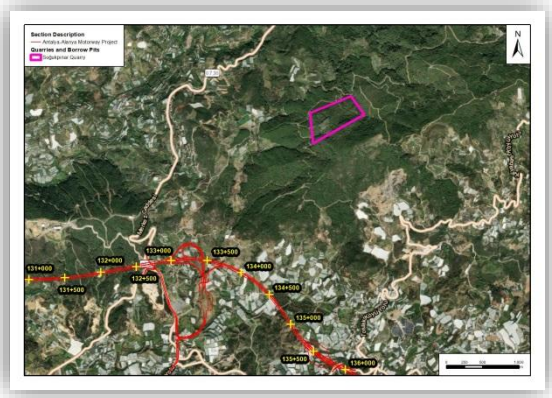


General View

Figure III.14. Photographs Showing Karamanlar Quarry (Km 119+500)

Soğukpınar Quarry

Soğukpınar Quarry is located on an area of 25.1 hectares around Km 134+000. The operation period is planned for 36 months and the facility has production capacity of 375 m^3/h. Photograph of the Soğukpınar Quarry is presented in Figure III.15.



Soğukpınar Quarry

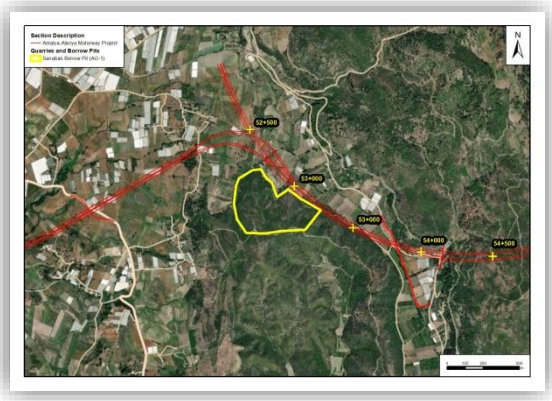


General View

Figure III.15. Photographs Showing Soğukpınar Quarry (Km 134+000)

Sarıabalı (AO-1) Borrow Pit

Sarıabalı (AO-1) Borrow Pit is located on an area of 24.9 hectares around Km 53+800. The operation period is planned for 36 months and has a capacity of 375 m^3/h. Photograph of the Sarıabalı Borrow Pit is presented in Figure III.16.



Sarıabalı (AO-1) Borrow Pit

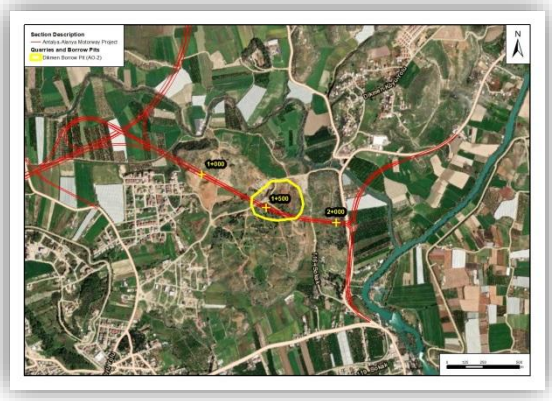


General View

Figure III.16. Photographs Showing Sarıabalı (AO-1) Borrow Pit (Km 53+800)

Dikmen (AO-2) Borrow Pit (Manavgat Connection Road)

Dikmen (AO-2) Borrow Pit is located on an area of 24.5 hectares around Km 83+000. The operation period is planned for 36 months and has a capacity of 375 m^3/h. Photograph of the Dikmen Borrow Pit is presented in Figure III.17.



Dikmen (AO-2) Borrow Pit



General View

Figure III.17. Photographs Showing Dikmen Borrow Pit (Km 83+000)

III.2.2. Storage Sites

In the scope of road construction works, excavated materials are planned be used in the filling operations wherever the characteristics and the quality of the materials are suitable. When there is a surplus of excavated materials, excess material will be needed to be stored at designated storage areas. In this regard, list of storage sites identified to be used for the motorway is presented in Table III.6.

Table III.6. List of Storage Sites Planned to be used

Location		Description of the Site	Capacity Information (m^3)	Planned Capacity Usage (m^3)
Km 52+544	Antalya, Serik	D-2	736,660.28	470,850.34
Km 59+580	Antalya, Serik	D-3	2,111,705.36	56,553.44
Km 61+500	Antalya, Manavgat	D-6	4,378,853.62	156,734.25
Km 64+160	Antalya, Manavgat	D-7	3,327,945.41	615,670.09
Km 71+800	Antalya, Manavgat	D-10	7,516,026.00	184.77
Km 74+360	Antalya, Manavgat	D-11	1,037,880.08	149,039.49
Km 76+240	Antalya, Manavgat	D-14	371,940.90	160,175.41
Km 78+790	Antalya, Manavgat	D-15	1,261,077.59	223,457.91
Km 86+340	Antalya, Manavgat	D-16	4,869,058.60	1,050,435.77
Km 87+800	Antalya, Manavgat	D-17	2,504,385.12	262,361.54
Km 95+410	Antalya, Manavgat	D-18	1,124,258.46	73,868.29
Km 95+410	Antalya, Manavgat	D-19	1,522,633.16	162,563.18
Km 98+290	Antalya, Manavgat	D-20	711,115.13	41,87.43
Km 100+000	Antalya, Manavgat	D-21	1,648,102.37	2,174.86
Km 107+850	Antalya, Manavgat	D-22	1,222,720.44	301,963.83
Km 110+820	Antalya, Manavgat	D-23	20,093,692.94	584,686.39
Km 113+050	Antalya, Manavgat	D-24	2,552,495.14	205,287.40
Km 123+000	Antalya, Alanya	D-26	5,638,396.17	871,743.65
Km 124+250	Antalya, Alanya	D-27	1,926,864.50	1,297,126.46
Km 127+000	Antalya, Alanya	D-28	3,763,723.90	383,579.61
Km 130+400	Antalya, Alanya	D-29	1,991,642.98	1,625,062.08
Km 132+720	Antalya, Alanya	D-30	3,307,202.05	2,132,211.56

III.2.3. Engineering Structures

Main engineering structures in the Project includes the viaducts, bridges, overpasses and underpasses, culverts, etc. In accordance with KGM's specifications, the design and engineering of the structures have prioritized safety, durability, aesthetics, environmental compatibility, construction and maintenance costs, constructability, and construction duration. The design of these structures has utilized the Standard Specifications for Highway Bridges published by the American Association of State Highway and Transportation Officials (AASHTO). For the seismic calculations, the Standard Specifications for Highway Bridges (1977) have been used. Where required, Project-specific revisions have been or will be made, with the approval of KGM, to adequately adapt these specifications to the Project. Summary of the total number of engineering structures for sections of the Project is provided in Table III.7. It should be noted that the design work is ongoing and will be updated accordingly in the subsequent reports until the design freeze stage is reached.

Table III.7. Summary of the Engineering Structures for the Project

Engineering Structure	Number
Viaduct	16
Bridge	22
Culvert	305
Interchange	25
Overpass	56
Underpass	43
Tunnel	5

Viaducts are substructures constructed on girders/beams. They are effectively used to cross challenging topographical and/or geotechnical conditions while providing protection for the corresponding habitats (e.g. forests, wetlands, river valleys, etc.). Viaducts are particularly suitable for narrow, steep-sided valleys and offer several environmental advantages. They minimize land usage and fragmentation within a valley by allowing watercourses and existing nature conservation interests to continue flowing beneath the structure. Additionally, viaducts help maintain connectivity for species movement; and preserve views up and down the valley (Viaducts are substructures constructed on girders/beams. They are effectively used to cross challenging topographical and/or geotechnical conditions while providing protection for the corresponding habitats (e.g. forests, wetlands, river valleys, etc.). Viaducts are particularly suitable to for narrow, steep-sided valleys and they offer have several environmental advantages. They as they can minimize land take usage and fragmentation within a valley by allowing watercourses and any existing nature conservation interests to continue flowing beneath under the structure. Additionally, viaducts help maintain connectivity for species movement; and retain preserve views up and down the valley (European Cooperation in the Field of Scientific and Technical Research; Luell et.al. 2003). Viaducts to be constructed for the Motorway are listed in Table III.8.

Table III.8. Viaducts to be Constructed for the Motorway

Viaducts		Length (m)	Location on the Route (Motorway Km)	
			Start Location	End Location
Viaduct-1	Left	789.38	Km 55+456.830	Km 56+246.208
	Right	799.27	Km 55+437.903	Km 56+237.175
Viaduct-2	Left	548.39	Km 56+775.071	Km 57+323.460
	Right	511.00	Km 56+814.978	Km 57+325.979
Viaduct-3		376.80	Km 71+132.710	Km 71+509.510
Viaduct-4		416.00	Km 77+899.168	Km 78+315.169
Viaduct-5		596.30	Km 85+310.190	Km 85+906.486
Viaduct-6		382.24	Km 86+384.330	Km 86+766.574
Viaduct-7		243.61	Km 87+221.500	Km 87+465.106
Viaduct-8		460.85	Km 88+128.443	Km 88+589.296
Viaduct-9		167.00	Km 94+316.000	Km 94+483.000
Viaduct-10		416.00	Km 96+200.000	Km 96+616.000
Viaduct-11	Left	166.30	Km 96+851.550	Km 97+017.850
	Right	198.40	Km 96+841.550	Km 97+979.000
Viaduct-12		240.50	Km 97+738.500	Km 97+979.000
Viaduct-13		480.00	Km 98+482.648	Km 98+962.648
Viaduct-14		124.98	Km 104+100.000	Km 104+224.984
Viaduct-15		330.00	Km 127+730.926	Km 128+060.926
Viaduct-16		338.95	Km 134+420.858	Km 134+759.809

The bridges, overpasses and underpasses to be constructed for the Motorway, to provide connections between settlements, agricultural land roads, forest roads or development roads. The bridges are listed Table III.9, overpass in Table III.10, and underpasses in Table III.11.

Table III.9. Bridges to be Constructed for the Motorway

Bridges	Length (m)	Location on the Route (Motorway Km)	
		Start Location	End Location
K1-Hydraulic Bridge	91.84	Km 80+203.672	Km 80+295.514
K2-Hydraulic Bridge	124.94	Km 93+505.637	Km 93+630.575
K3-Bridge	40	Km 100+717.057	Km 100+757.056
K4 Hydraulic Bridge	378.04	Km 104+976.381	Km 105+354.422
K5 Hydraulic Bridge	212	Km 115+851.160	Km 116+063.160

Bridges	Length (m)	Location on the Route (Motorway Km)	
		Start Location	End Location
K6 Bridge	35	Km 117+563.856	Km 117+598.856
K7 Hydraulic Bridge	166.85	Km 121+734.322	Km 121+901.170
K8 Bridge	35	Km 133+418.186	Km 133+453.186
K9 Bridge	45.61	Km 141+491.695	Km 141+537.305
K10 - Kav011 Serik-2 Interchange	38	Km 0+182.556	Km 0+220.556
K11 - Kav012 Serik-3 Interchange	37.85	Km 0+393.173	Km 0+431.027
K12 Serik Connector Road Hydraulic Bridge	32	Km 8+968.286	Km 9+000.286
K13 - Kav013 Serik-4 Interchange	55.99	Km 11+328.534	Km 11+384.526
K14 - Kav021 Taşağıl-2 Interchange	33	Km 1+828.000	Km 1+861.000
K15 - Kav031 Manavgat-2 Interchange	43.47	Km 5+750.558	Km 5+794.032
K16 - Kav041 Manavgat East-2 Interchange	60	Km 3+242.000	Km 3+302.000
K17 - Konaklı K-1 Connector Road Hydraulic Bridge	158	Km 1+088.000	Km 1+246.000
K18 - Konaklı K-2 Connector Road Hydraulic Bridge	70	Km 0+555.000	Km 0+625.000
K19 Hydraulic Bridge	35	Km 1+596.640	Km 1+631.640
K20 - Kav101 Çardaklı Interchange	140	Km 2+362.647	Km 2+502.647
K21 Hydraulic Bridge	55	Km 3+831.148	Km 3+886.148
K22 - Kav103 Kocayatak Interchange	140	Km 8+793.527	Km 8+933.527

Table III.10. Overpass to be Constructed for the Motorway

Overpass	Length (m)	Location	Location on the route (Motorway Km)
Overpass	46	Main Road	Km 67+076.000
	46	Main Road	Km 68+464.000
	46	Main Road	Km 68+758.000
	46	Main Road	Km 71+832.000
	50	Main Road	Km 73+738.000
	50	Main Road	Km 76+265.000
	60	Main Road	Km 78+831.000
	54	Main Road	Km 81+058.000
	46	Main Road	Km 81+930.000
	62	Main Road	Km 83+047.000
	104	Main Road	Km 83+278.000

Overpass	Length (m)	Location	Location on the route (Motorway Km)
	46	Main Road	Km 86+272.000
	46	Main Road	Km 86+960.000
	48	Main Road	Km 87+511.000
	52	Main Road	Km 90+100.000
	52	Main Road	Km 91+076.000
	46	Main Road	Km 92+658.000
	45	Main Road	Km 93+097.000
	46	Main Road	Km 93+917.000
	44	Main Road	Km 94+524.000
	48	Main Road	Km 95+450.000
	74	Main Road	Km 97+583.000
	63	Main Road	Km 100+140.000
	50	Main Road	Km 102+450.000
	125	Main Road	Km 104+886.000
	51	Main Road	Km 106+707.000
	46	Main Road	Km 108+022.000
	46	Main Road	Km 110+824.000
	45	Main Road	Km 116+516.000
	70	Main Road	Km 120+768.000
	70	Main Road	Km 126+462.000
	48	Main Road	Km 126+972.000
	52	Main Road	Km 130+008.000
	71	Main Road	Km 132+718.000
	64	Main Road	Km 135+904.000
	93	Main Road	Km 136+433.000
	44	Main Road	Km 138+270.000
	46		Km 138+838.000
	110	Motorway	Km 140+032.000
	64	Motorway	Km 140+664.000
	49	Serik Connector Road	Km 1+427.000
	42	Serik Connector Road	Km 2+670.000
	36	Serik Connector Road	Km 4+863.000
	40	Serik Connector Road	Km 5+401.000
	46	Serik Connector Road	Km 6+758.000

Overpass	Length (m)	Location	Location on the route (Motorway Km)
	36	Serik Connector Road	Km 9+963.000
	80	Serik Connector Road	Motorway Km 52+324
	78	Serik Connector Road	Serik K-1 Km 0+829
	56	Taşağıl Connector Road	Km 1+204.000
	65	Taşağıl K3 Kol-1	Km 0+175.000
	54	State Road D400	Km 0+877.000
	32	Ring Road	Km 1+095.000
	46	Manavgat Connector Road	Km 1+915.000
	35	Manavgat Connector Road	Km 3+012.000
	36	Manavgat Connector Road	Km 4+553.000
	114	Alarahan Connector Road	Km 1+119.000

Table III.11. Underpasses to be Constructed for the Motorway

Manufacturing No	Dimensions (m x m)	Location	Location On The Route (Motorway Km)
A1	15.00x6.00	Main Road-Serik-1 Interchange	Km 52+559
A2	10.00x6.00	Main Road	Km 53+825
A3	10.00x6.00	Main Road	Km 54+153
A4	13.00x6.00	Main Road	Km 58+560
A5	10.00x6.00	Main Road	Km 60+494
A6	12.00x6.00	Main Road	Km 62+606
A7	2(13x6.00)	Main Road	Km 64+180
A8	10.00x6.00	Main Road	Km 65+828
A9	2(15.00x6.00)	Main Road	Km 66+288
A10	10.00 x 6.00	Main Road	Km 67+600
A11	10.00x6.00	Main Road	Km 73+012
A12	12.00x6.00	Main Road	Km 74+963
A13	2(15.00x6.00)	Main Road	Km 77+028
A14	12.00x6.00	Main Road	Km 79+926
A15	12.00x6.00	Main Road	Km 84+721
A16	10.00 x 6.00	Main Road	Km 92+469
A17	10.00x6.00	Main Road	Km 103+903
A18	12.00x6.00	Main Road	Km 105+857

Manufacturing No	Dimensions (m x m)	Location	Location On The Route (Motorway Km)
A19	10.00 x 6.00	Main Road	Km 107+523
A20	10.00 x 6.00	Main Road	Km 108+934
A21	7.00x5.50	Main Road – Agricultural Road	Km 109+099
A22	10.00 x 6.00	Main Road	Km 109+516
A23	7.00x5.50	Main Road - Agricultural Road	Km 111+447
A24	12.00x6.00	Main Road	Km 112+129
A25	10.00 x 6.00	Main Road	Km 112+653
A26	10.00 x 6.00	Main Road	Km 113+957
A27	12.00x6.00	Main Road	Km 115+166
A28	10.00 x 6.00	Main Road	Km 115+469
A29	13.00x6.00	Main Road	Km 116+148
A30	10.00 x 6.00	Main Road	Km 117+001
A31	10.00 x 6.00	Main Road	Km 119+066
A32	12.00x6.00	Main Road	Km 124+241
A33	12.00x6.00	Main Road	Km 124+655
A34	10.00 x 6.00	Main Road	Km 125+763
A35	10.00 x 6.00	Main Road	Km 139+630
A36	2(12.006.00)	Main Road	Km 140+982
Underpass	10.00X6.00	Taşağıl Connector Road	Km 0+794
Underpass	15.00x6.00	Taşağıl State Road	Km 1+060
Underpass	15.00x6.00	Taşağıl K-3	Km 0+608
Underpass	10.00X6.00	Manavgat Connector Road	Km 1+508
Underpass	12.00X6.00	Manavgat Doğu Connector Road	Km 3+051
Underpass	10.00X6.00	Alarahan Connector Road	Km 0+444
Underpass	12.00X6.00	Alarahan Connector Road	Km 0+882

Culverts are hydraulic engineering and service structures of small-scale that are used to ensure passage/drainage of perennial surface water bodies, creeks formed as a result of precipitation through the road body and also passage of pedestrians, cyclists/motorcyclists and animals. Culverts of different dimensions to be constructed for the Motorway are listed in Table III.12.

Table III.12. Culverts to be Constructed for the Motorway

Culverts	Dimensions (m x m)	Location on the Route (Motorway Km)
Culvert	2.00 x 2.00	Km 52+731, Km 52+940, Km 53+180, Km 53+324, Km 53+458, Km 54+180, Km 56+361, Km 56+614, Km 58+201, Km 59+602, Km 59+713, Km 60+306, Km 60+456, Km 60+750, Km 60+899, Km 63+433, Km 65+010, Km 66+697, Km 2+225, Km 2+408, Km 2+717, Km 67+550, Km 67+901, Km 69+076, Km 69+389, Km 69+775, Km 69+869, Km 70+859, Km 71+605, Km 71+912, Km 72+711, Km 73+426, Km 73+920, Km 74+170, Km 75+098, Km 75+608, Km 75+832, Km 76+012, Km 76+167, Km 76+862, Km 77+086, Km 77+357, Km 77+630, Km 78+675, Km 79+826, Km 79+946, Km 82+095, Km 83+125, Km 83+527, Km 2+808, Km 3+659, Km 4+046, Km 4+265, Km 4+384, Km 6+274, Km 6+572, Km 6+650, Km 6+695, Km 6+755, Km 6+780, Km 6+870, Km 83+790, Km 84+751, Km 85+060, Km 86+893, Km 87+032, Km: 89+718, Km 89+899, Km 90+156, Km 90+950, Km 91+829, Km 92+863, Km 93+379, Km 94+005, Km 95+016, Km 95+258, Km 97+186, Km 99+222, Km 99+709, Km 100+396, Km: 100+632, Km 100+987, Km 1+854, Km 2+077, Km 2+279, Km 2+478, Km 2+821, Km 101+918, Km 102+139, Km 102+222, Km 103+600, Km 103+953, Km 105+792, Km 106+003, Km 107+317, Km 107+456, Km 108+915, Km 109+059, Km 109+948, Km 110+162, Km 110+405, Km 110+654, Km 111+327, Km 111+570, Km 111+856, Km 112+662, Km 114+550, Km 114+808, Km 115+690, Km 2+503, Km 2+393, Km 2+150, Km 1+884, Km 1+224, Km 0+937, Km 0+880, Km 116+950, Km 117+296, Km 0+068, Km 117+848, Km 118+447, Km: 118+774, Km 119+007, Km 119+091, Km 120+013, Km 121+239, Km 122+613, Km 123+683, Km 124+119, Km 124+247, Km 124+445, Km 125+452, Km 125+675, Km 126+700, Km 127+238, Km 128+375, Km 129+353, Km 129+593, Km 129+770, Km 129+944, Km 130+369, Km 130+508, Km 130+760, Km 131+046, Km 131+291, Km 131+450, Km 131+530, Km 131+877, Km 132+071, Km 132+174, Km 132+423, Km 132+534, Km 133+243, Km 133+395, Km 133+607, Km 134+419, Km 135+207, Km 135+438, Km 135+709, Km 135+906, Km 136+099, Km 136+490, Km 137+034, Km 138+586, Km 138+790, Km 139+348, Km 139+728, Km 140+250, Km 140+971, Manavgat K-2, Lane-1, Km 67+000 (Taşağıl K-1, Lane-2), (Taşağıl K-1, Lane-3), (Taşağıl K-1, Lane-4), Taşağıl State Highway, (Manavgat Access Road)*2, Manavgat K-3, Kol-2, Manavgat K-2, Lane-3, Manavgat K-2, Lane-2, Manavgat K-5, Lane-1, (Manavgat K-5, Lane-2)x2, Manavgat K-5, Lane-3, Manavgat K-5, Lane-7, (K1, Manavgat East K-1)
	2.50 x 2.50	Km 58+585, Km 3+432, Km 3+515, Km 68+538, Km 72+181, Km72+969, Km 75+757, Km 81+670, Km 84+525, Km 0+326, Km 91+515, Km 92+527, Km 100+331, Km 112+217, Km 112+418, Km 124+750, Km 133+678, Km 138+150, (Taşağıl K2, Lane-3)
	3.00 x 3.00	Km 67+296, Km 75+418, Km 112+934, Km 113+607, Km 123+058, Km 126+224
	4.00 x 4.00	Km 53+772, Km 64+152, Km 65+968, Km 66+057, Km 68+910, Km 82+425, Km 3+218, Km: 107+812, Km 0+635 Km 67+000(Taşağıl K-1, Lane-1), (Manavgat East K-2, Lane-2)x2
	5.00 x 5.00	Km 62+691, Km 62+983, Km 63+297, Km 74+930, Km 82+830, Km 90+387, Km 113+815, Km 117+458, Km 137+618, Km 140+609
	5.00 x 3.00	Km 3+152
	7.00 x 5.00	Km 1+895, Km 109+171
	7.00 x 3.00	Km 2+884, Km 6+429, Km 7+672
	10.00 x 4.00	Km 4+620, Km 1+450

Culverts	Dimensions (m x m)	Location on the Route (Motorway Km)
	10.00 x 5.00	Km 0+000
	15.00 x 6.00	Km 119+452

Interchanges of different dimensions to be constructed for the Motorway are listed in Table III.13.

Table III.13. Interchanges to be Constructed for the Motorway

District	Interchanges	Location	Location on the Route (Motorway Km)
Serik	K1 - Interchange	Main Road	Km 52+559.000
	K2 - Interchange	Connector Road	Km 3+634.423
	K2 - Interchange MDK-1	Connector Road	Km 0+000.000
	K2 - Interchange MDK-2	Connector Road	Km 0+363.670
	K3 - Interchange	Connector Road	Km 7+574.941
	K3 - Interchange MDK-1	Connector Road	Km 0+000.000
	K3 - Interchange MDK-2	Connector Road	Km 0+590.095
	K4 - Interchange	Connector Road	Km 11+357.574
Taşağıl	K1 - Interchange	Main Road	Km 66+288.418
	K2 - Interchange	Connector Road	Km 1+844.578
	K3 - Interchange	Connector Road	Km 2+620.000
	K4 - Interchange	Ring Road	Km 2+563.178
Manavgat	K1 - Interchange	Main Road	Km 77+028.230
	K2 - Interchange	Connector Road	Km 5+772.545
	K3 - Interchange	Connector Road	Km 6+808.758
East Manavgat	K1 - Interchange	Main Road	Km 100+735.636
	K2 - Interchange	Connector Road	Km 3+271.769
Alarahan	K1 - Interchange	Main Road	Km 117+581.939
	K2 - Interchange	Connector Road	Km 2+835.386
Konaklı	K1 - Interchange	Main Road	Km 133+517.868
	K2 - Interchange	Connector Road	Km 1+600.757
West Alanya	Interchange	Connector Road	Km 141+593.052
Çardaklı	Interchange	State Road D400	Km 2+432.647
Kadriye	Interchange	State Road D400	Km 5+903.339
Kocayatak	Interchange	State Road D400	Km 8+863.527

Tunnels to be constructed for the Motorway are listed in Table III.14.

Table III.14. Tunnels to be Constructed for the Motorway

Tunnels		Length (m)	Location on the Route (Motorway Km)	
			Start Location	End Location
T 1	Left	1049	Km 54+327.000	Km 55+376.000
	Right	1065	Km 54+311.000	Km 55+376.000
T 2	Left	532	Km 57+366.000	Km 57+898.000
	Right	597	Km 57+388.000	Km 57+985.000
T 3	Left	1554	Km 60+923.000	Km 62+477.000
	Right	1527	Km 60+950.000	Km 62+477.000
T 4	Left	344	Km 70+131.000	Km 70+475.000
	Right	344	Km 70+131.000	Km 70+475.000
T 5	Left	865	Km 88+676.000	Km 89+544.000
	Right	873	Km 88+671.000	Km 89+544.000

III.2.4. Temporary Access Roads

Temporary access roads are planned to facilitate the safe and efficient transportation of materials, equipment, and personnel between key construction areas (e.g., tunnels, viaducts, bridges) and material supply points (e.g., concrete plants, quarries) during the construction phase of the Project. These access roads are preliminarily identified based on current construction planning needs and are intended to support the initial phases of construction.

It is important to emphasize that the identified routes represent potential access roads, and their actual use will depend on the evolving requirements and progress of construction activities. Accordingly, the final set of roads to be used may differ from the current list, and additional routes may be introduced or some of the identified routes may not be utilized at all.

In selecting these access roads, the project team has prioritized the use of existing roads-including public roads, forest roads, and rural paths-with the aim of minimizing new land disturbance. No new roads have been planned unless absolutely necessary. Some of the identified routes, such as forest roads, are already established and in use. However, minor modifications or maintenance may be required, depending on their condition and suitability for construction traffic.

Table III.15 lists the temporary access roads identified for use during the construction of the Project. It includes the unique identifier for each route, the origin and destination points, the corresponding chainage interval along the motorway, and the closest neighborhood or settlement to each route.

There are a total of 79 temporary access roads identified for the project. These routes generally originate from concrete plants or quarries, such as Concrete Plant 1 to Concrete Plant 6, as well as TOY4a and Çengel Stream Material Quarry, and terminate at key construction sites including viaducts, tunnels, interchanges, and structural work zones along the motorway. The access roads are distributed across the entire alignment, but a greater concentration is observed in the chainage

intervals between KM: 68+000 and KM: 111+000, corresponding to areas with higher densities of engineering structures and multiple active work fronts.

Proximity to neighborhoods is particularly relevant in this context, as temporary access roads may intersect or run adjacent to residential areas, thereby increasing the potential for disturbances such as noise, dust, and traffic safety risks. The presence of these settlements necessitates careful planning and mitigation to minimize adverse impacts on local communities. Relevant mitigation measures are presented in detail in Chapter XV.

The spatial distribution and alignment of the temporary access roads are illustrated in the series of maps provided in Figure III.18 through Figure III.24. Each figure corresponds to a specific section of the motorway, organized by chainage intervals, and displays the connections between material supply points and associated construction sites.

Additionally, the transport of cement and rebar to each concrete plant will be conducted via seven dedicated delivery routes. These designated routes are depicted in Figure III.25.

Table III.15. Transportation Routes Between Material Supply Points and Construction Sites

Road ID	Start	End	Location	Closest Neighborhood
Yol-1	Concrete Plant 1	T1-Entrance (Structures)	Between 52+000–55+000	Sarıabalı
Yol-2	Concrete Plant 1	Serik Interchange	Between 52+000–55+000	Sarıabalı, Deniztepesi
Yol-3	Concrete Plant 1	Between T1 Exit and Viaduct-1	Between 52+000–55+000	No settlement
Yol-4	Concrete Plant 1	T1 Entrance Section	Between 52+000–55+000	Sarıabalı
Yol-5	TOY4a Rock Quarry	Concrete Plant 1	Between 52+000–55+000	Belkıs, Taşağıl, Sarıabalı
Yol-6	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	Viaduct 1 Exit	Between 55+000–68+000	No settlement
Yol-7	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	T2 Entrance	Between 55+000–68+000	No settlement
Yol-8	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	T2 Exit	Between 55+000–68+000	No settlement
Yol-9	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	T3 Exit	Between 55+000–68+000	Taşağıl
Yol-10	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	T3 Exit–Main Camp Area	Between 55+000–68+000	Taşağıl
Yol-11	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	Taşağil K1 Interchange	Between 55+000–68+000	Taşğıl, Bereket, Hocalar
Yol-12	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	Km:68+500 Structures	Between 55+000–68+000	Taşğıl, Bereket, Hocalar
Yol-13	Concrete Plant 2 Mechanical Plant-1	Km:65+800 Structures	Between 55+000–68+000	Taşğıl, Bereket, Hocalar

Road ID	Start	End	Location	Closest Neighborhood
	Asphalt Plant-1 Temporary Camp Site			
Yol-14	Toy4a Rock Quarry	Concrete Plant 2	Between 55+000–68+000	No settlement
Yol-15	Concrete Plant 3	Viaduct 4 Entrance And Structures	Between 68+000–83+000	Yeniköy
Yol-16	Concrete Plant 3	Viaduct 3 And Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Yavrudoğan
Yol-17	Concrete Plant 3	Km:75+000 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Yavrudoğan
Yol-18	Concrete Plant 3	T4	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Yavrudoğan
Yol-19	Concrete Plant 3	Km:68+500 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Gündoğdu, Hocalar
Yol-20	Concrete Plant 3	Km:68+500 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Gündoğdu, Hocalar
Yol-21	Concrete Plant 3	Taşağil K1 Interchange	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Gündoğdu, Hocalar
Yol-22	Concrete Plant 3	Km:75+000 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Yavrudoğan
Yol-23	Concrete Plant 3	Km:73+000 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Yavrudoğan
Yol-24	Concrete Plant 3	Km:71+850 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Yavrudoğan
Yol-25	Concrete Plant 3	Km:75+750 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Yavrudoğan, Kalemler
Yol-26	Toy4a Rock Quarry	Concrete Plant 3	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Gündoğdu, Bereket, Taşağıl
Yol-27	Concrete Plant 4a	Km:90+000 Structures	Between 89+000–94+000	Ulukapı
Yol-28	Concrete Plant 4a	Km:89+000 Structures	Between 89+000–94+000	Ulukapı
Yol-29	Concrete Plant 4a	Km:91+000 Structures	Between 89+000–94+000	Ulukapı, Aşağıışıklar
Yol-30	Concrete Plant 4a	Km:92+500 Structures	Between 89+000–94+000	Ulukapı, Aşağıışıklar
Yol-31	Concrete Plant 4a	Km:92+750 Structures	Between 89+000–94+000	Ulukapı, Aşağıışıklar
Yol-32	Concrete Plant 4a	Km:93+500 Structures	Between 89+000–94+000	Ulukapı, Aşağıışıklar, Demirciler
Yol-33	Çengel Stream Material Quarry (Remote)	Concrete Plant 4	Between 89+000–94+000	Uzunlar, Çavuşköy, Kızlot, Çavuşköy, Kızılağaç, Karacalar, Seydiler, Doğançam, Aksaz, Karaöz, Demirciler, Aşağıışıklar, Çeltikçi, Ulukapı
Yol-34	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Viaduct 7	Between 83+000–89+000	Bucakşeyhler
Yol-35	Çengel Stream	Concrete Plant 4a	Between 83+000–89+000	Uzunlar, Çavuşköy, Kızlot,

Road ID	Start	End	Location	Closest Neighborhood
	Material Quarry (Remote)			Çavuşköy, Kızılağaç, Karacalar, Seydiler, Doğançam, Aksaz, Karaöz, Demirciler, Aşağıışıklar, Çeltikçi, Örnek, Eskihisar, Bahçelievler, Aydınevler, Mimar Sinan, Sorgun, Hatipler, Sarılar, Dikmen, Bucakşeyhler
Yol-36	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:87+000 Structures	Between 83+000–89+000	Bucakşeyhler
Yol-37	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Viaduct 6	Between 83+000–89+000	Bucakşeyhler
Yol-38	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Viaduct 6	Between 83+000–89+000	Bucakşeyhler
Yol-39	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:84+750 Structures	Between 83+000–89+000	Bucakşeyhler, Dikmen
Yol-40	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Manavgat K1 Interchange	Between 83+000–89+000	Bucakşeyhler, Dikmen, Yukarıışıklar
Yol-41	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:81+000 Structures	Between 83+000–89+000	Bucakşeyhler, Dikmen, Sarılar, Dolbazlar, Evrenleryavşı
Yol-42	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:82+000 Structures	Between 83+000–89+000	Bucakşeyhler, Dikmen, Sarılar, Dolbazlar, Evrenleryavşı
Yol-43	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:83+000 Structures	Between 83+000–89+000	Bucakşeyhler, Dikmen, Yukarıışıklar
Yol-44	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Viaduct 8	Between 83+000–89+000	Ulukapı
Yol-45	Çengel Stream Material Quarry (Remote)	Concrete Plant 5	Between 94+000–111+000	Uzunlar, Çavuşköy, Kızlot, Çavuşköy, Kızılağaç, Karacalar, Seydiler, Sülek
Yol-46	Concrete Plant 5	Viaduct 13	Between 94+000–111+000	No settlement
Yol-47	Concrete Plant 5	Viaduct 12	Between 94+000–111+000	Sülek, Cevizler, Hacıali
Yol-48	Concrete Plant 5	Viaduct 13	Between 94+000–111+000	Sülek, Cevizler

Road ID	Start	End	Location	Closest Neighborhood
Yol-49	Concrete Plant 5	Km:97+200 Structures	Between 94+000–111+000	Sülek, Cevizler, Hacıali
Yol-50	Concrete Plant 5	Viaduct 11	Between 94+000–111+000	Sülek, Cevizler, Hacıali
Yol-51	Concrete Plant 5	Viaduct 10	Between 94+000–111+000	Sülek, Cevizler, Hacıali
Yol-52	Concrete Plant 5	Km:95+450 Structures	Between 94+000–111+000	Sülek, Cevizler, Hacıali, Seydiler, Aksaz
Yol-53	Concrete Plant 5	Viaduct 9	Between 94+000–111+000	Sülek, Cevizler, Hacıali, Seydiler, Aksaz, Karaöz
Yol-54	Concrete Plant 5	Manavgat East K1 Interchange	Between 94+000–111+000	Sülek
Yol-55	Concrete Plant 5	Km:105+000 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası, Uzunlar
Yol-56	Concrete Plant 5	Km:104+950 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası
Yol-57	Concrete Plant 5	Viaduct 14	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası
Yol-58	Concrete Plant 5	Km:102+100 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası
Yol-59	Concrete Plant 5	Km:105+900 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası
Yol-60	Concrete Plant 5	Km:107+550 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası, Kadılar
Yol-61	Concrete Plant 5	Km:110+850 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Çenger, Örenşehir
Yol-62	Concrete Plant 5	Km:109+150 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Çenger, Örenşehir, Kadılar
Yol-63	Karamanlar Rock Quarry	Concrete Plant 6	Between 111+000–141+000	No settlement
Yol-64	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:124+250 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü, Yalçıdibi
Yol-65	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:120+000 Structures	Between 111+000–141+000	Avsallar
Yol-66	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:115+200 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü, Karakaya
Yol-67	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:115+950 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü, Karakaya
Yol-68	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:114+000 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü

Road ID	Start	End	Location	Closest Neighborhood
Yol-69	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:112+700 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü, Yalçıdibi
Yol-70	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:119+000 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Alara, Çakallar
Yol-71	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:133+400 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Emişbeleni, Soğukpınar
Yol-72	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Viaduct 15	Between 111+000–141+000	Avsallar, Türkler, Akdam
Yol-73	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Viaduct 16	Between 111+000–141+000	Avsallar, Türkler, Payallar, Emişbeleni
Yol-74	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Alanya West K1 Interchange	Between 111+000–141+000	Avsallar, Türkler, Payallar, Konaklı
Yol-75	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:136+550 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Emişbeleni, Toslak
Yol-76	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:139+700 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Emişbeleni, Toslak
Yol-77	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:140+150 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Konaklı
Yol-78	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:141+100 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Konaklı
Yol-79	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:140+550 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Konaklı

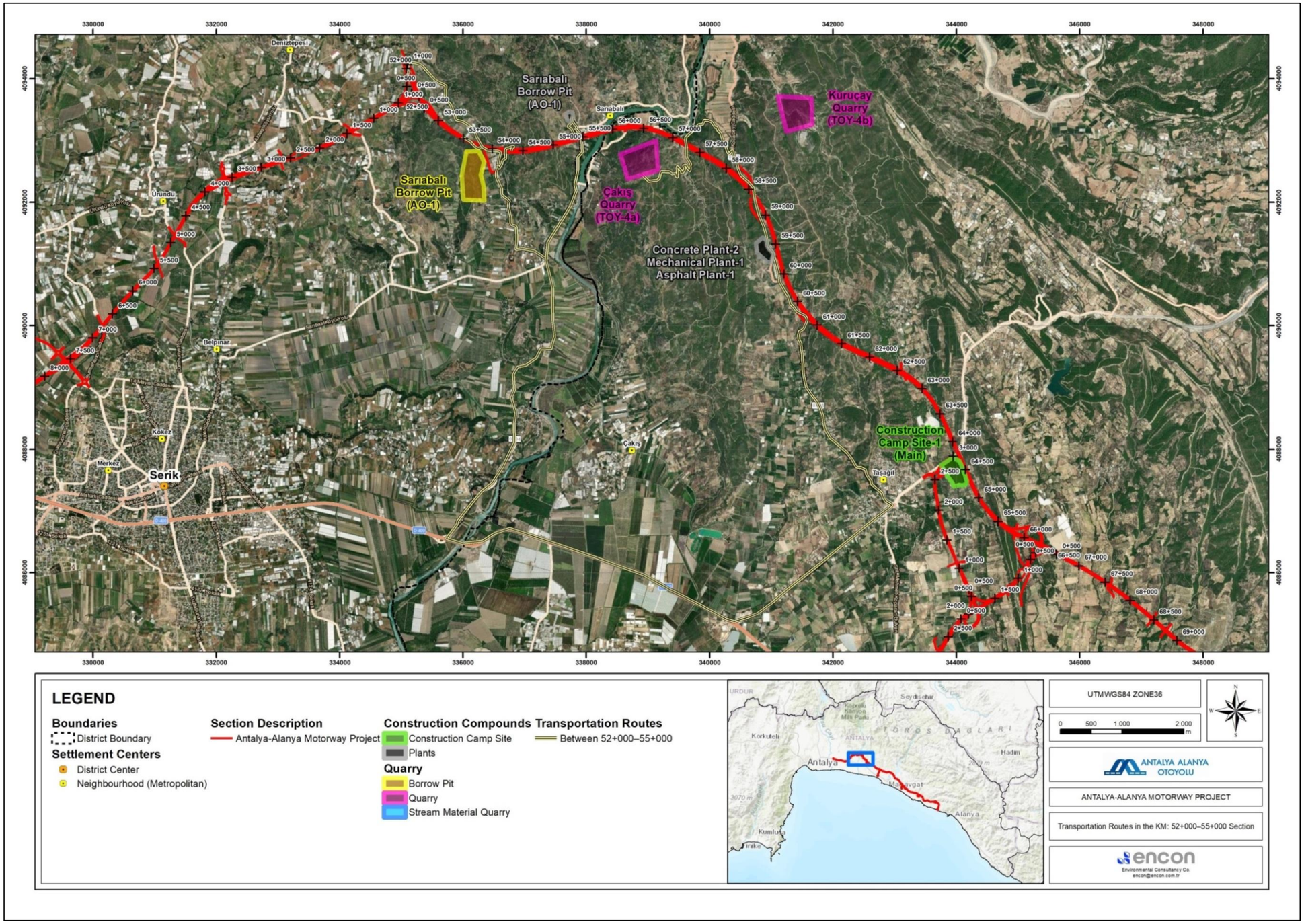


Figure III.18. Transportation Routes in the KM: 52+000–55+000 Section

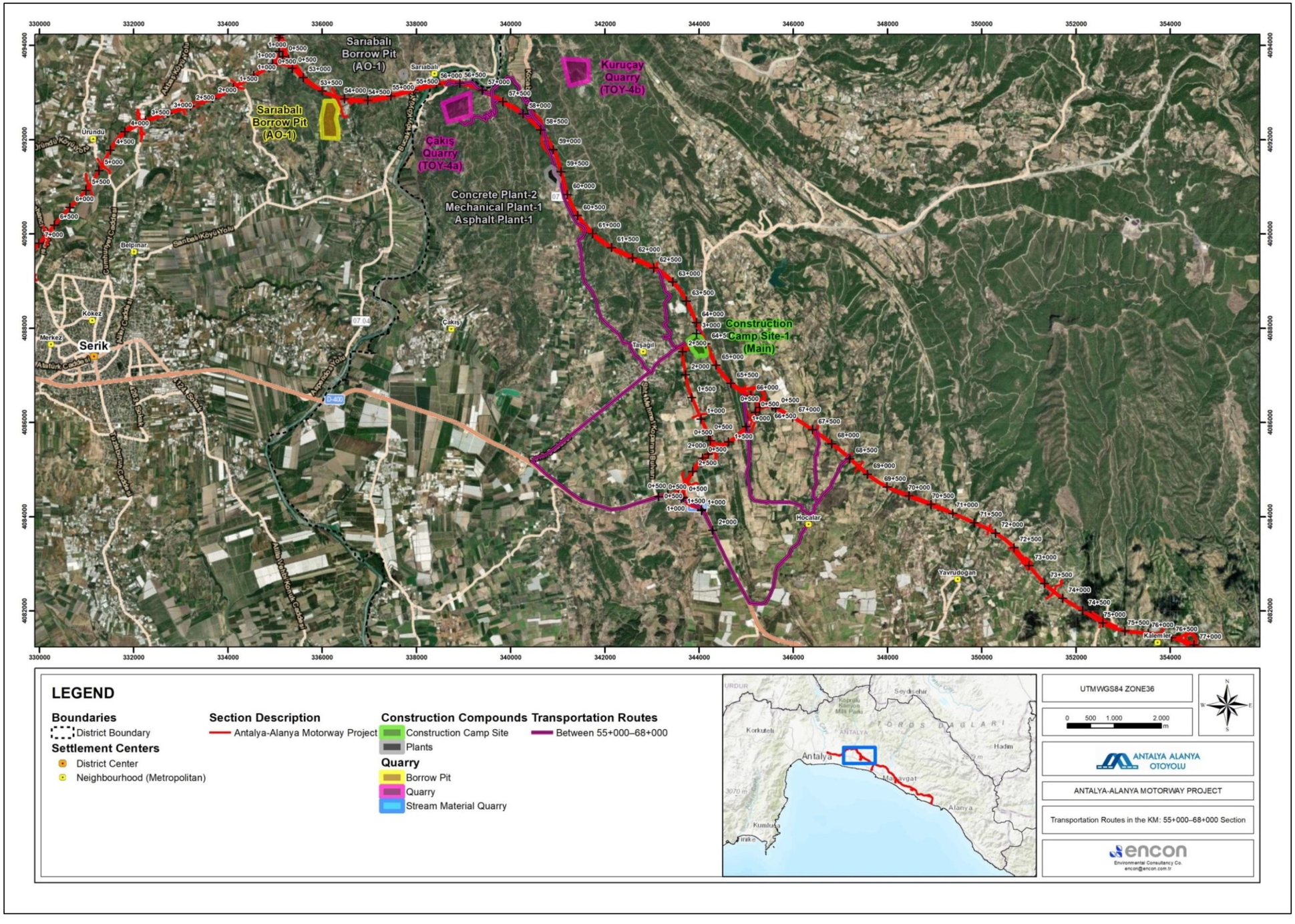


Figure III.19. Transportation Routes in the KM: 55+000–68+000 Section

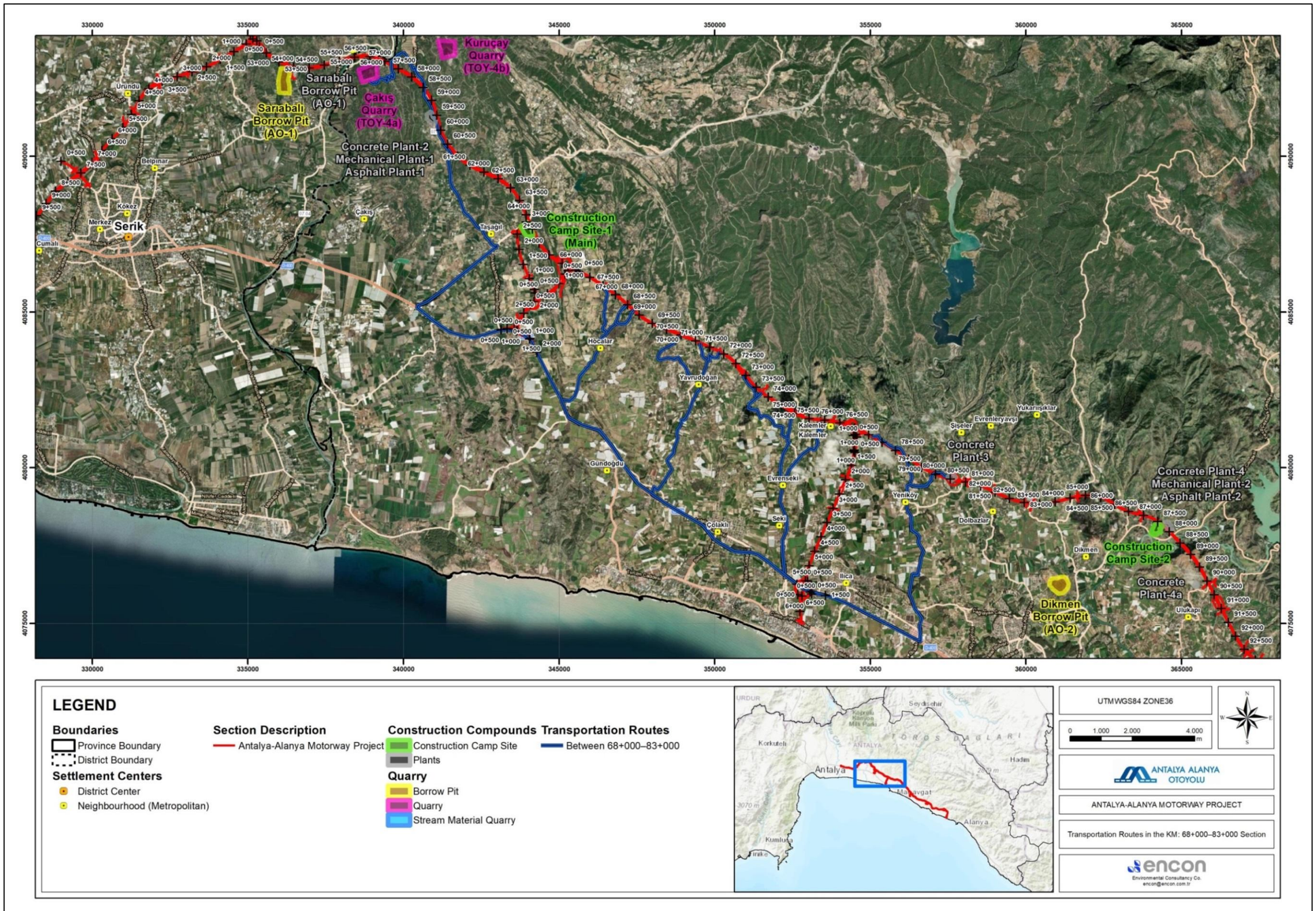


Figure III.20. Transportation Routes in the KM: 68+000–83+000 Section

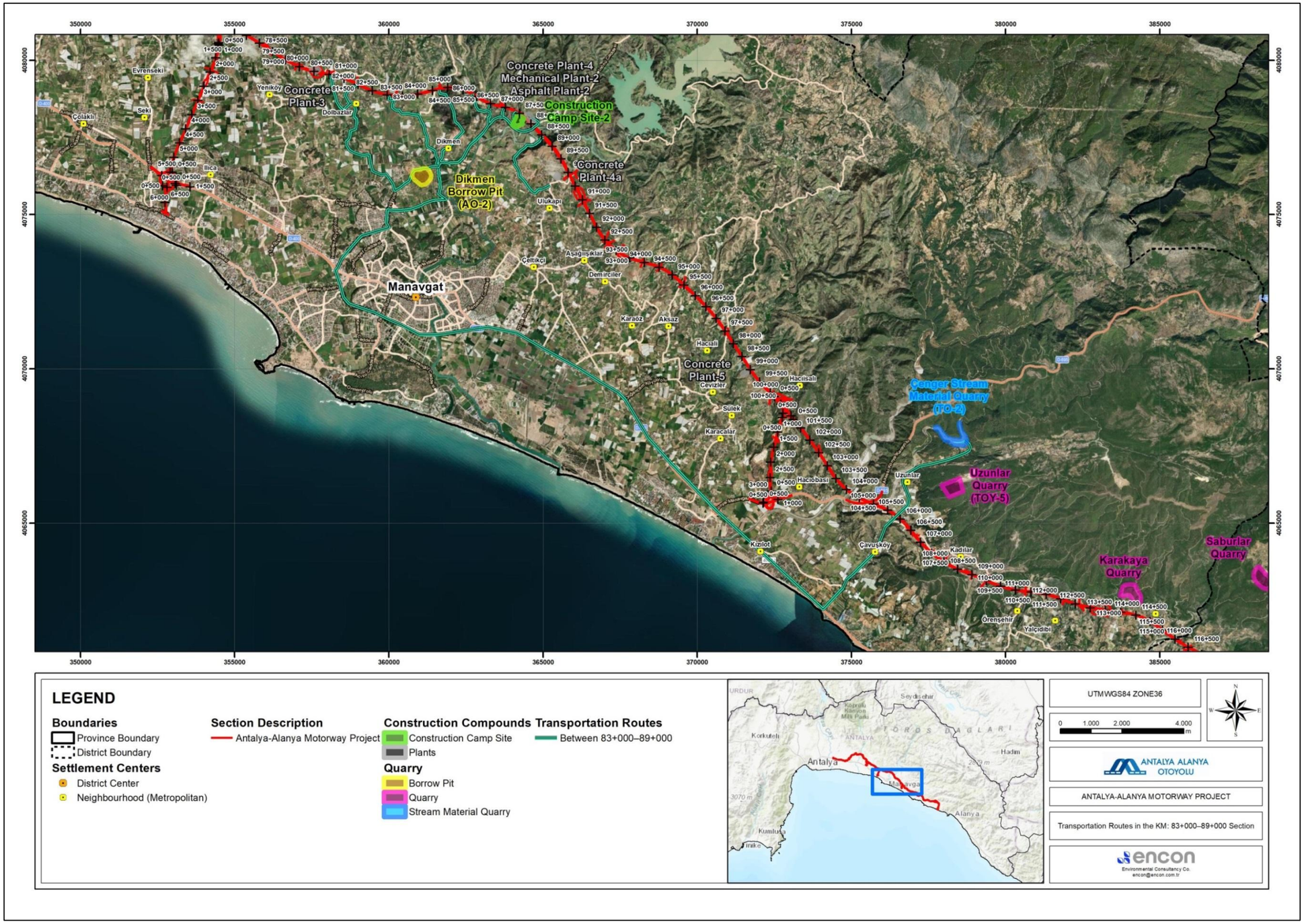


Figure III.21. Transportation Routes in the KM: 83+000–89+000 Section

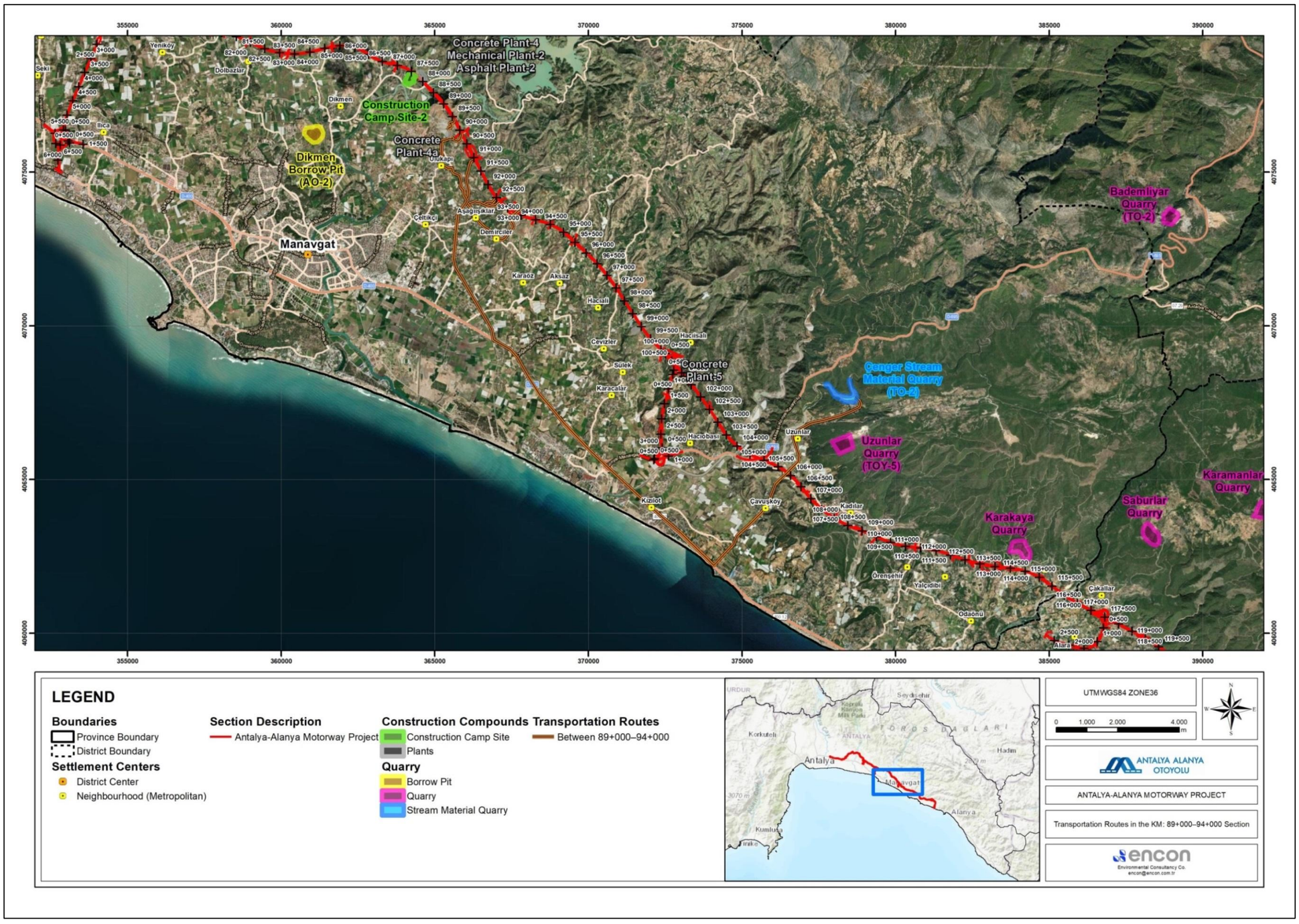


Figure III.22. Transportation Routes in the KM: 89+000–94+000 Section

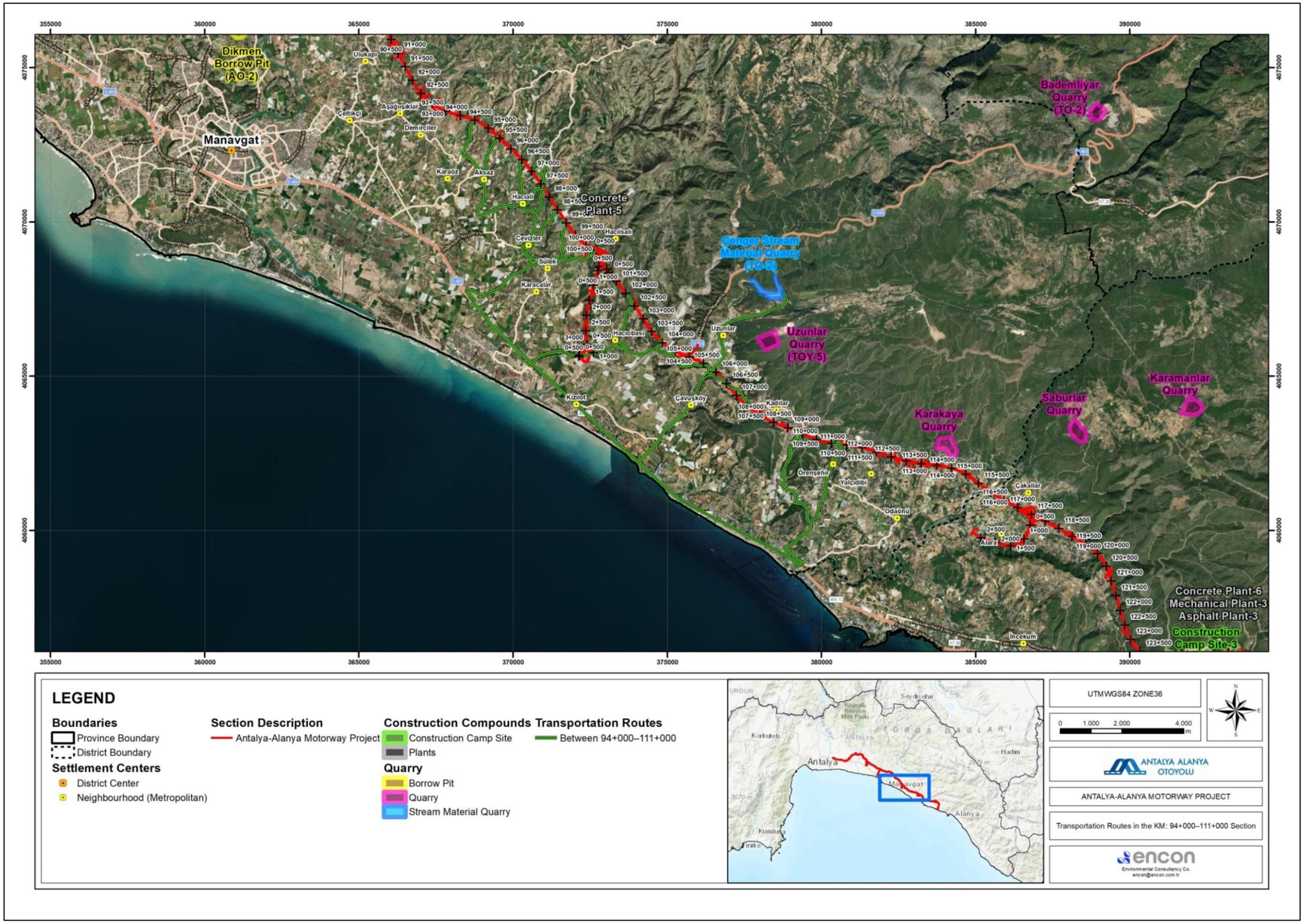


Figure III.23. Transportation Routes in the KM: 94+000–111+000 Section

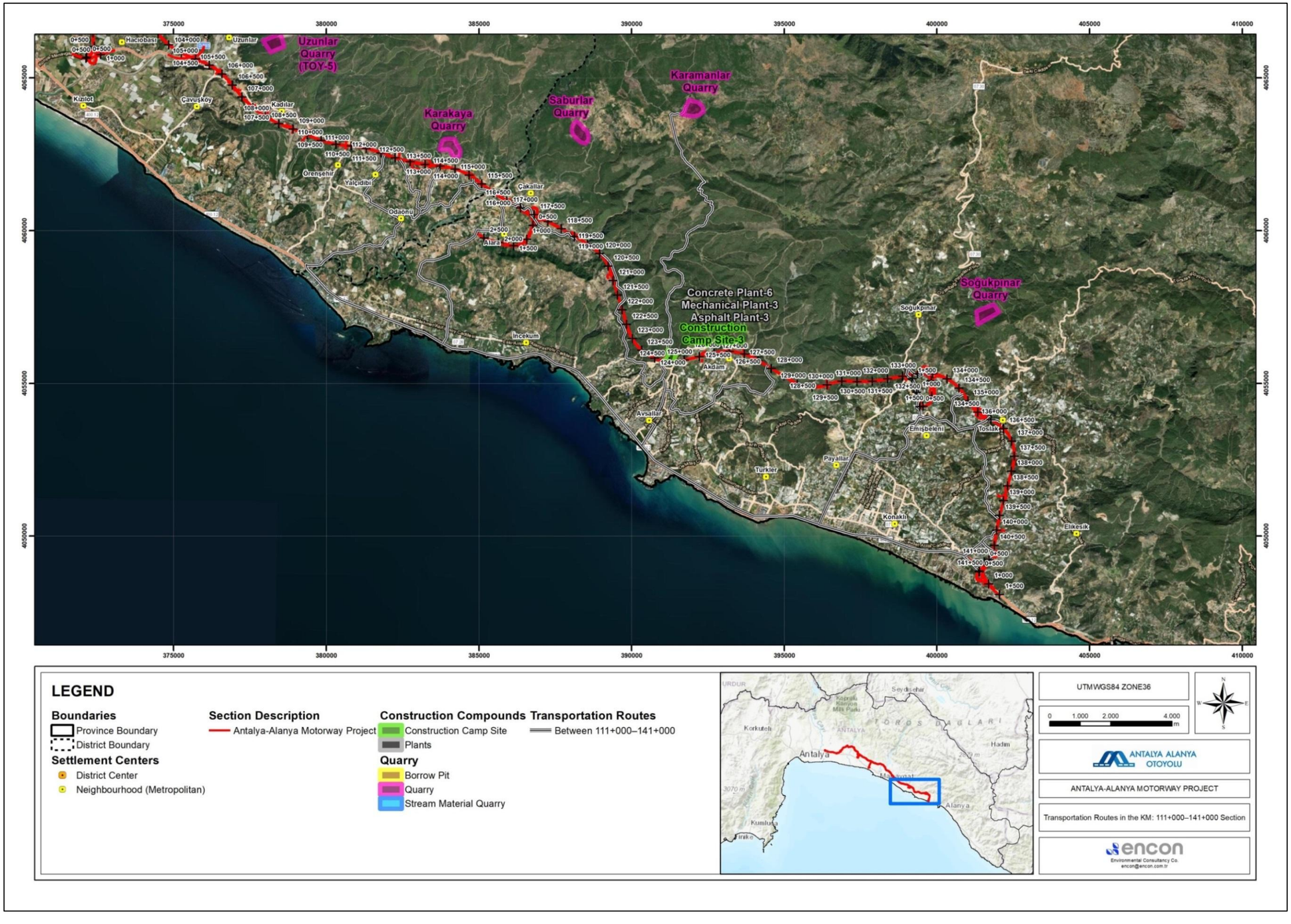


Figure III.24. Transportation Routes in the KM: 111+000–141+000 Section

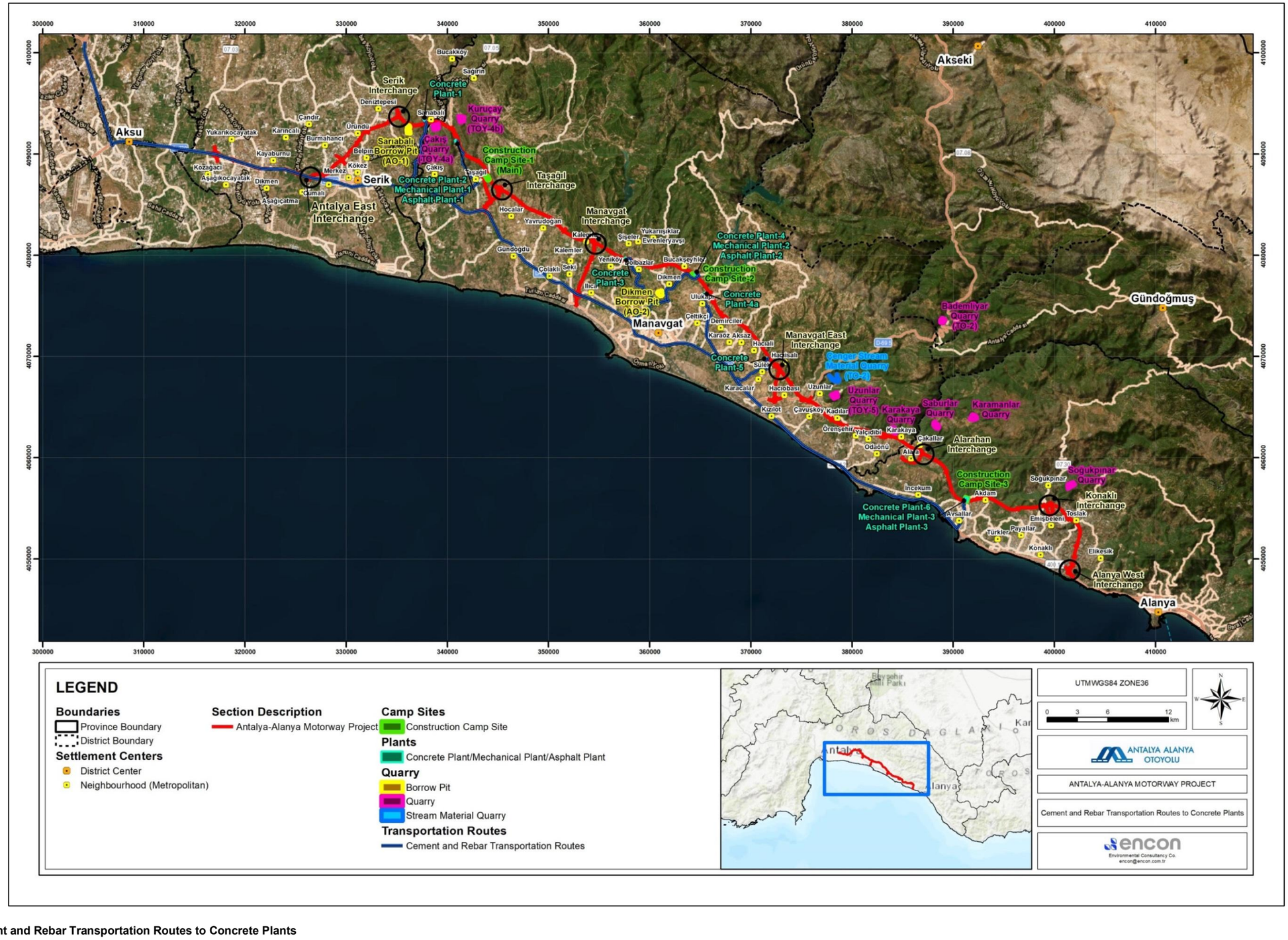


Figure III.25. Cement and Rebar Transportation Routes to Concrete Plants

III.2.5. Toll Collection Areas

Since the Motorway will be operated with an access-controlled system, all entry and exit points will be equipped with toll collection stations with fast pass system (HGS) infrastructures.

Toll plazas, toll passage lanes, operation building(s), transformer building(s) and parking areas will be available at the toll collection areas. Toll plazas and passage lanes will be designed to have sufficient capacity for the existing and future traffic projections. Communication infrastructure will be provided to allow data transfer to traffic management systems. An example layout drawing for toll stations is provided in Figure III.26.

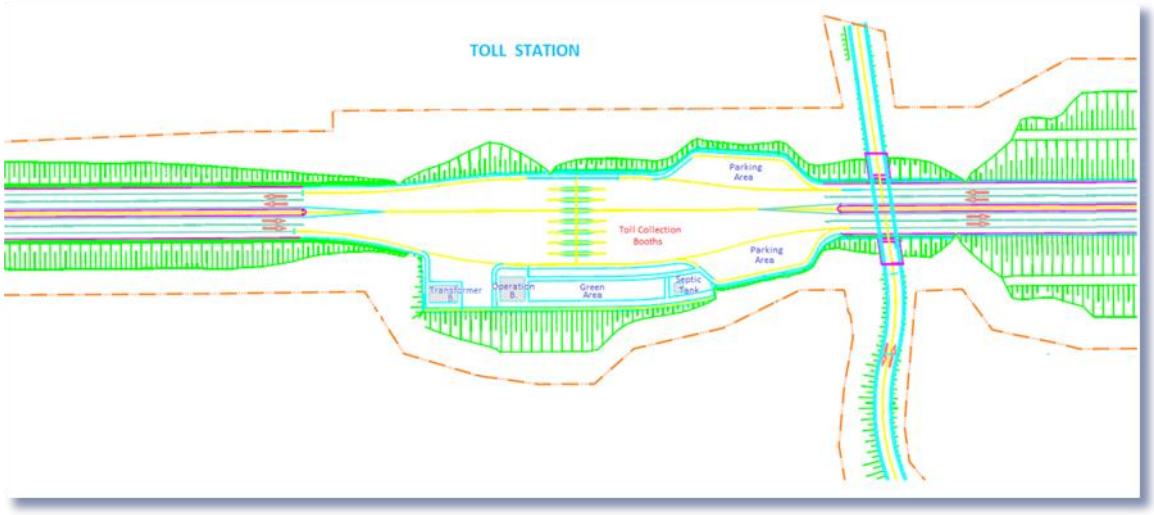


Figure III.26. Example Layout of a Toll Station

III.2.6. Service Areas

Service areas are facilities constructed to international standards at intervals of 20-50 km along the motorways. They are designed to meet the needs of users continuously (24 hours a day, 7 days a week) and efficiently, providing drivers with a place to rest and take breaks. Four different types (A, B, C, and D) of services areas can be built on motorways. The type of service areas to be built in the Project has not yet been clarified.

In the scope of the Project, service areas will be built on each side of the Motorway, opposing to each other. Connection between two sites will be provided by suitable road structures (e.g. culvert, overpass, etc.). Parking areas for passenger vehicles and heavy vehicles will be separated. Service areas to be constructed of the Motorway are listed in Table III.16. An example layout for service areas is presented in Figure III.27.

Table III.16. List of Service Areas

Service Areas	Location on the Route (Motorway Km)
Service Area	Km 80+500
Service Area	Km 90+500
Service Area	Km 113+500
Service Area	Km 135+500



Figure III.27. Example Layout of a Service Area

III.2.7. Maintenance and Operation Centers

Maintenance centers should be constructed at least every 50-60 km on highways to ensure adequate level of service and regular maintenance and repair works. Additionally, primary maintenance centers will be established at intervals of every 120-150 km. Maintenance centers include offices, workshops, salt tanks, storage areas, garages, gas stations, management residences, dormitories and parking areas. The maintenance and operation center to be constructed for the Project is planned to be built at Km 64+500. It should be noted that the design works and approval process are ongoing; therefore, the specifications of these structures' may subject to change.

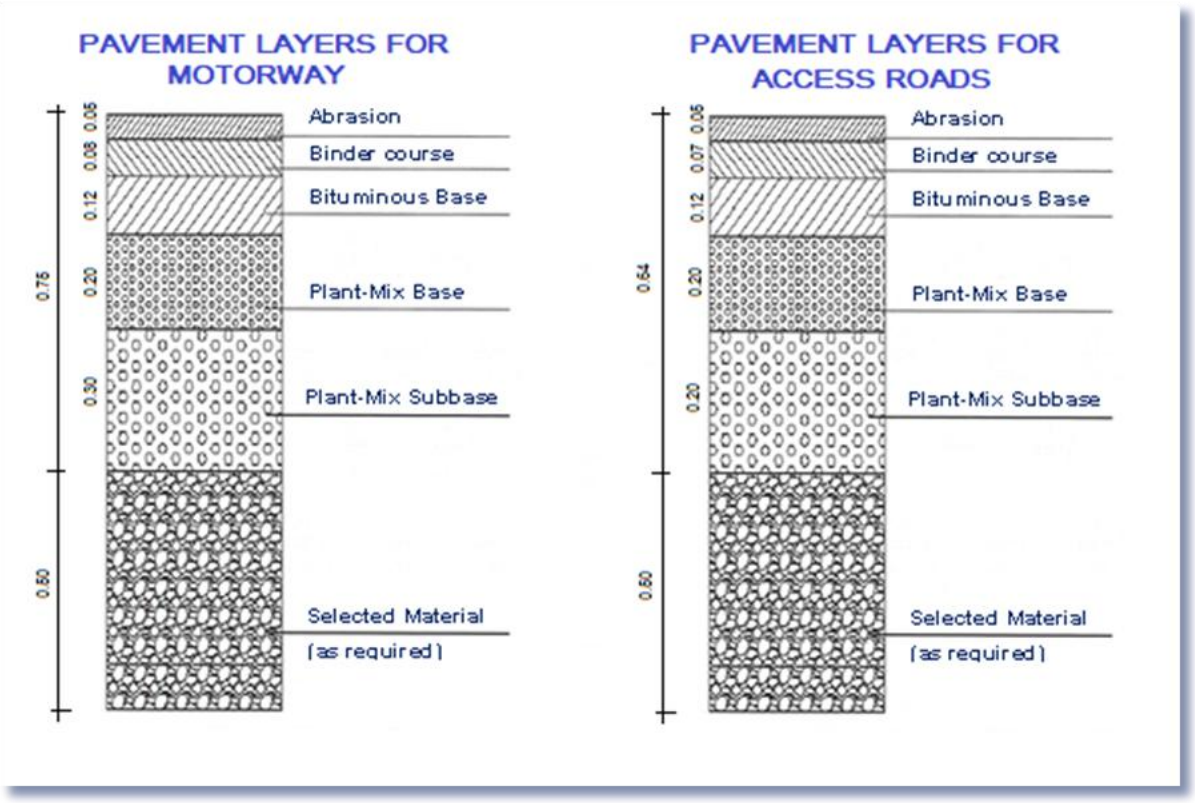
III.2.8. Pavement Structure

Layers of the road pavement and their thickness on the Motorway, access roads and other roads according to motorway specifications is listed in Table III.17 and demonstrated on the sketch given in Figure III.28. Mainly crushed and screened quarry materials will be used for the preparation of the pavement layers.

Table III.17. Pavement Layers and their Thickness

Layer	Thickness of Layers (cm)		
	Motorway	Access Roads	Ancillary Roads
Abrasion/Wearing Coarse*	5	5	5
Binder	8	7	7
Bituminous Base	12	12	10
Plant-Mix Base	20	20	20
Plant-Mix Subbase	30	20	20
TOTAL	**75**	**64**	**62**
Selected Material (CBR>=10)	50	50	50

**Abrasion Layer shall be of modified bituminous stone mastic asphalt*



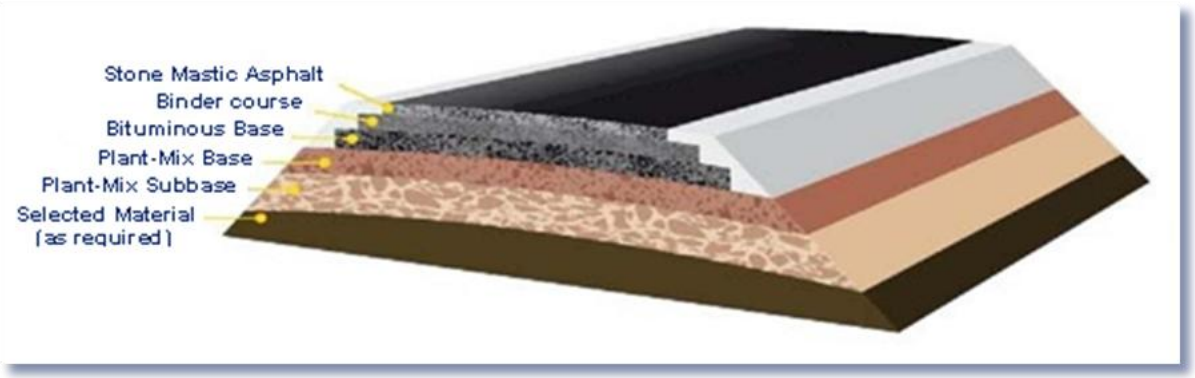


Figure III.28. Pavement Layers for the Motorway and Access Roads

III.3. Expropriation Corridor

In motorway projects, expropriation corridor is minimum 100 meters according to KGM standards. Where required, expropriation corridor is widened to cover the excavation and embankment areas and construction areas for the larger structures such as interchange areas, acceleration lanes, park and service areas, drainage ditches, etc. In the Project, expropriation corridor will be minimum 100 meters in accordance with the KGM's specifications, and it can be widened up to 350 meters depending on the topographical conditions and type and location of large Project components. The area to be allocated to the Motorway will be enclosed by suitable structures/materials (e.g. wire fence etc.).

III.4. Description of the Route

Based on the current design, the total length of the Motorway, which will be mostly 3 and partly 2 lane (3x2 and 2x2) divided road in each direction, is 117.8 kilometers including the main carriageway and access roads. A brief description of the Motorway is described in Table III.18 below with reference to the Motorway km(s).

Table III.18. Brief description of the Motorway

Km Chainage	Description
52+000 / 56+000	**Flat Agricultural Lands in Deniztepesi and Sarıabalı Neighborhoods** This section is located at the beginning of the Motorway route. The area consists mostly of flat agricultural lands, greenhouse areas, rural settlements and some residences of Deniztepesi Neighborhood. The southwest of this section is urbanized starting from a distance of approximately 6 km. Serik Junction near Deniztepesi and Sarıabalı neighborhoods are located in this section. Köprüçay also passes through the region. There are agricultural areas, greenhouse areas and some residences on the banks of Köprüçay in Sarıabalı Neighborhood.
56+000 / 66+000	**Sloping Forest Lands in Çakış, Sağırin and Taşağıl Neighborhoods** In this section of the Motorway route, there are sloping forest lands and agricultural lands on the slopes of the hills, as well as agricultural lands on the plains in Taşağıl Neighborhood.
66+000 / 70+500	**Flat Agricultural Lands in Hocalar and Gündoğdu Neighborhoods** In this section of the Motorway route, the entire area consists of flat agricultural lands. In Yavrudoğan Neighborhood, sloping forest lands on the slopes of the hills are noteworthy. Taşağıl Junction near Hocalar Neighborhood is located in this section.
70+500 / 88+000	**Flat Agricultural Lands in Yavrudogan, Kalemler, Yeniköy, Şişeler, Dolbazlar, Yukarıışıklar, Dikmen and Bucakşeyhler Neighborhoods** In this section of the Motorway route, the whole area consists of flat agricultural land, wooded areas on the slopes of hills and some houses belonging to neighborhoods. Manavgat Junction near Yukarıışıklar Neighborhood is located in this section. Along the connection road to Manavgat Junction, urban settlements are dense and there are also agricultural areas and greenhouse areas. Manavgat Stream also passes through the area.
88+000 / 90+500	**Sloping Forest Lands in Ulukapı Neighborhood** In this section of the Motorway route, there are sloping forest lands on the slopes of the hills and agricultural lands on the plains, as well as a few residential areas belonging to the Ulukapı Neighborhood.
90+500 / 100+000	**Flat Agricultural Lands in Aşağıışıklar, Demirciler, Karaöz, Aksaz, Hacıali, and Sülek Neighborhoods** In this section of the Motorway route, the entire area consists of flat agricultural land and forest areas on the slopes of hills. The Manavgat Interchange near Kalemler neighborhood is located in this section. There are a few greenhouses with larger areas in this section of the route.
100+000 / 104+000	**Sloping Forest Lands in Hacıisalı and Hacıobası Neighborhoods** In this section of the Motorway route, there are sloping forest lands on the slopes of the hills and agricultural lands on the plains. Manavgat East Junction near Hacıisalı Neighborhood is located in this section.
104+000 / 120+000	**Flat Agricultural Lands in Çavuşköy, Kadılar, Örenşehir, Yalçıdibi, Odaönü, Karakaya and Çakallar Neighborhoods** In this section of the Motorway route, the entire area consists of flat agricultural lands, greenhouse areas, wooded areas on the slopes of hills and residential areas belonging to neighborhoods. Alarahan Junction near Çakallar Neighborhood is located in this section.

Km Chainage	Description
120+000 / 125+500	**Sloping Forest Lands in İncekum and Avsallar Neighborhoods** In this part of the Motorway route, sloping forest lands are predominant on the slopes of the hills. There are also greenhouse areas on the plains of Avsallar Neighborhood.
125+500 / 136+000	**Sloping Forest Lands in Akdam, Türkler, Soğukpınar and Toslak Neighborhoods** In this section of the Motorway route, there are sloping forest lands on the slopes of the hills, as well as greenhouse areas on the plains of Akdam, Türkler, Soğukpınar and Toslak Neighborhoods, and scattered houses within these areas. The Konaklı Junction near the Soğukpınar Neighborhood is located in this section. Along the Konaklı Junction connection road, greenhouse areas are dense and residential areas are also located on the route.

The settlements located in the vicinity of the Motorway components are listed in Table III.19.

Table III.19. Settlements Located in The Vicinity of the Motorway Components

Districts	Neighborhoods	Nearest Approximate Motorway Km	Approximate Distance of the Settlement Center to Nearest Motorway Components (the nearest building) (m)	Direction with respect to Main Carriageway	Population (TURKSTAT 2024)
Serik	Kozağacı	D400	0	South	1005
	Yukarıkocayatak	D400	0	North	4293
	Aşağıkocayatak	D400	5	South	1393
	Kayaburnu	D400	10	North	983
	Dikmen	D400	17	South	836
	Çandır	D400	20	North	1819
	Aşağıçatma	D400	1.175	South	204
	Cumalı	D400	20	Southeast	2011
	Burmahancı	Serik Interchange Access Road	100	Northwest	1193
	Merkez	Serik Interchange Access Road	25	Southeast	17969
	Üründü	Serik Interchange Access Road	0	Northwest	889
	Kökez	Serik Interchange Access Road	12	Southeast	15011
	Deniztepesi	Km 52+500	0	Northwest	982
	Sarıabalı	Km 53+500	0	South	1117
Manavgat	Çakış	Km 57+000	0	South	1818
	Sağırin	Km 57+500	540	Northeast	163
	Taşağıl	Km 60+500	0	Southwest	4813
	Hocalar	Km 67+000	170	Southwest	477
	Gündoğdu	Km 70+000	65	Southwest	2158
	Yavrudoğan	Km 72+000	0	Southwest	1853
	Kalemler	Km 76+000	12	South	341
	Evren	Manavgat Interchange Access Road	1.000	South	3756*
	Seki	Manavgat Interchange Access Road	100	South	3756*

Districts	Neighborhoods	Nearest Approximate Motorway Km	Approximate Distance of the Settlement Center to Nearest Motorway Components (the nearest building) (m)	Direction with respect to Main Carriageway	Population (TURKSTAT 2024)
	Ilıca	Manavgat Interchange Access Road	0	East	13689
	Yeniköy	Km 79+000	125	Southwest	763
	Şişeler	Km 81+000	80	North	236
	Evrenleryavşı	Km 81+500	40	North	443
	Dolbazlar	Km 82+500	115	South	665
	Yukarıışıklar	Km 83+500	0	North	888
	Dikmen	Km 85+000	0	South	1261
	Bucakşeyhler	Km 87+000	0	North	737
	Ulukapı	Km 90+000	0	Southwest	3797
	Aşağıışıklar	Km 92+000	10	Southwest	1595
	Demirciler	Km 93+000	320	Southwest	1566
	Karaöz	Km 94+000	30	South	1102
	Aksaz	Km 95+500	10	Southwest	786
	Hacıali	Km 97+000	40	South	332
	Cevizler	Km 98+500	5	Southwest	242
	Sülek	Km 100+000	360	Southwest	1162
	Hacıisalı	Km 101+000	0	Northeast	364
	Hacıobası	Manavgat East Interchange Access Road	0	Southwest	581
	Karacalar	Manavgat East Interchange Access Road	1.375	Southwest	2123
	Kızılot	Manavgat East Interchange Access Road	390	South	2015
	Uzunlar	Km 106+000	0	North	348
	Çavuşköy	Km 106+000	300	Southwest	994
	Kadılar	Km 108+000	35	North	173
	Örenşehir	Km 110+500	0	South	998
	Yalçıdibi	Km 112+000	30	South	224
	Odaönü	Km 113+500	875	Southwest	308
	Karakaya	Km 115+000	0	North / South	452
Alanya	Çakallar	Km 117+500	0	Northeast	599
	Alara	Alarahan Interchange Access Road	0	South	624
	İncekum	Km 122+000	430	Southwest	3361
	Avsallar	Km 125+000	0	South	16118
	Akdam	Km 127+000	0	South	1393

Districts	Neighborhoods	Nearest Approximate Motorway Km	Approximate Distance of the Settlement Center to Nearest Motorway Components (the nearest building) (m)	Direction with respect to Main Carriageway	Population (TURKSTAT 2024)
	Türkler	Km 130+000	0	Southwest	4949
	Soğukpınar	Km 133+000	0	North	401
	Emişbeleni	Konaklı Interchange Access Road	0	South	1607
	Toslak	Km 136+000	0	Northeast	3722
	Konaklı	Km 140+000	0	East	17927
	Elikesik	Alanya West Interchange Access Road	10	Northeast	2212

III.5. Workforce

The Project workforce will consist of personnel employed by the main contractor (direct workers) and by subcontractors (contracted workers). These personnel will be classified as site-based workers and office/administrative staff. Site-based workers refer to those directly engaged in field construction activities, whereas office/administrative staff include roles such as project managers, administrative staff, and drivers who are not physically involved in construction works.

During the peak construction phase, a total of approximately 2,300 personnel are expected to be employed, including 2,300 direct workers and 1,000 contracted workers. In the operation phase, the Project is anticipated to employ an estimated 250 personnel. These figures represent the maximum workforce requirements and are subject to variation depending on the pace and scale of construction and operational activities.

All labor-related environmental and social impacts assessed in this ESIA—such as accommodation needs, community health and safety risks, resource consumption, traffic load, and waste generation—have been calculated based on these estimated workforce numbers for both construction and operation phases. A detailed breakdown of the workforce distribution by project phase and employment type is provided in Table III.20**Error! Reference source not found.**.

Table III.20. Workforce Distribution by Project Phase and Employment Type

Project Phase	Workforce Type	Estimated Number of Workers
Construction Phase	Main Contractor Personnel	2,300
	Subcontractor Personnel	1,000
	Total Construction Workforce	3,300
Operation Phase	Operational Staff (All types)	250

** The number of personnel required will become clearer upon transition to the operational phase.*

Site personnel are mainly composed of engineers, technicians, foremen, topographers, operators, drivers, laboratory workers and unskilled workers. On the other hand, composition of office/administrative personnel generally includes Project Manager, Site Manager, office engineers, financial staff and other drivers.

In the operation phase, relevant personnel will work at the control, operation and maintenance centers and toll plazas. At each toll plaza, 4-5 personnel will provide services in shifts for the arrangement of cash payments. In addition, 4-5 personnel will work at each control center that will be established at the toll collection areas. Personnel to be employed at operation and maintenance centers will include white and blue-collar workers who will provide snow removal services and conduct maintenance, technical, repair and workshop operations.

In addition to the personnel to be employed at the toll collection areas and operation, control and maintenance works, the Project will create employment opportunities for local people at the service areas that will include restaurants, tea and coffee houses, shops, gas stations, kiosks, etc.

III.6. Construction Machinery

Number and distribution of construction machinery at the peak level of construction are provided in Table III.21.

Table III.21. List of Construction Machinery

Type of Machinery	Number of Machinery
Excavator	51
Grader	5
Bulldozer	14
Jumbo	12
Telehandler	12
Mobile Crane	20
Trans mixer	50
Shotcrete Machine	12
Loader	20
Mobile Concrete Pump	7
Fixed Concrete Pump	16
Water Truck	7
Drum Compactor	10
Asphalt Paver	12
Asphalt Distributor	2
Soil Compactor	14
Roller	10
Dump Truck	140
Rock Driller	12
Total	**426**

III.7. Materials to be used

Construction works require aggregates, concrete, steel, aluminum, cement, bitumen, cables, etc. Concrete will be required for the construction of bridges, retaining walls, culverts and other engineering structures. Aggregate material for concrete production will be sourced from licensed quarries. After extraction, the aggregate will be crushed, screened and washed as necessary. Concrete types/grades to be used in the Project will include the following:

- Precast prestressed beam concrete
- Post-tensioned prestressed beam concrete
- Reinforced Concrete
- Flat concrete

During the operation phase, road deicing activities will require the use of salt (NaCl), calcium chloride (CaCl2) and magnesium chloride (MgCl2). These materials will be used directly or mixed in appropriate proportions. The amount of chemicals to be used per m^2 of road surface will depend on road conditions (i.e. open roads before the onset of snowfall, snow-covered roads, and slippery icy roads) and air temperatures (between 0^0C and -12^0C).

In addition to the use of appropriate chemicals and materials such as concrete, cement, epoxy, repair mortar, rust removing chemicals, and hydrochloric acid for the repair and maintenance of engineering structures, the project will also require the use of various natural resources, including water and energy. These resources will be utilized during construction activities for purposes such as material processing, equipment operation, and site maintenance. Details including estimated quantities are given in the related chapters of this ESIA.

III.8. Traffic Projections

In accordance with the relevant provisions of the BOT contract, the guaranteed minimum traffic, measured in passenger vehicle equivalent (PCE) for the Project is set at 100.000 cars per day. Further traffic projection studies related to project feasibility are being conducted by the Project Sponsor. Upon completion, the relevant sections of the mentioned report will be incorporated into subsequent reports.

In review, we forecast that the total Average Annual Daily Traffic (AADT) on the Motorway will be c.25K passenger car equivalent units (pcu) in 2028, rising to c.60K pcu by 2040. The analysis assumes the motorway will become operational in 2028. Traffic projections are based on 2028 as the base year and consider four key future years: 2028, 2032, 2036, and 2040.

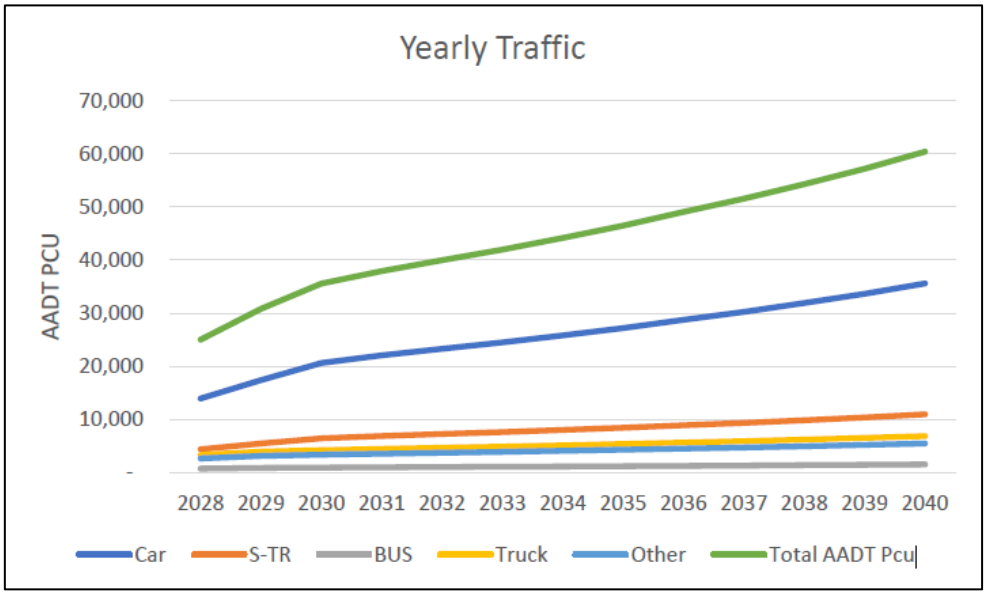


Figure III.29. Yearly Traffic of the Motorway

As can be observed in Figure III.29, light vehicle growth is projected to outpace truck growth, leading to a further decline in heavy-vehicle representation which is forecasted at 27% in 2028, and this is projected to fall to 22% in 2040.

The average capture rate at the beginning of the operation is projected to be approximately 44%. By 2040, the total traffic volume on the state road is expected to reach around 23,000 AADT (Annual Average Daily Traffic) in Passenger Car Units (PCU), while the motorway is anticipated to carry approximately 60,000 AADT PCU. This corresponds to an estimated average diversion rate of 72% by the end of the concession period. Detailed information on traffic projections and analysis is provided in the Traffic Due Diligence Report (Annex-12).

The land traffic in the construction phase will be generated by the machinery, equipment, material, and staff to be transported to the Project construction sites. During the construction phase especially an increase of trucks is expected. The transportation of heavy loads between burrow pits and quarries will be carried out by trucks. Most of these areas are right next to the construction area, except for Bademliyar and Saburlar Quarries, D-7 Storage Site (Two options). The routes are to be taken to and from this locations are as shown in Figure III.30 and Figure III.31, respectively.

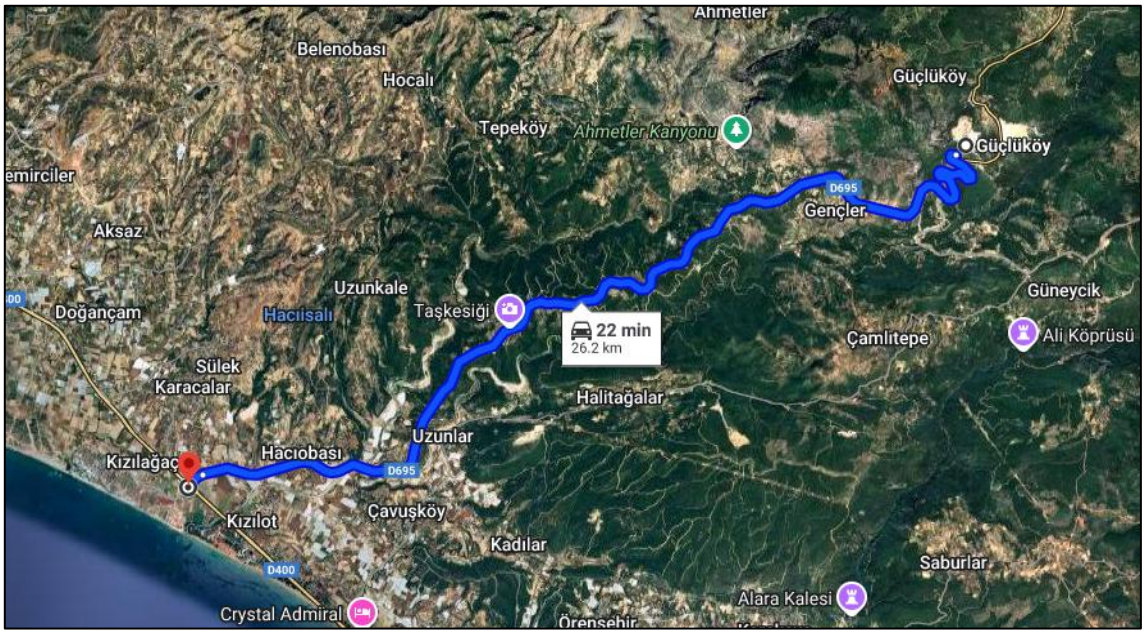


Figure III.30. D695 Route between Bademliyar Quarry and Motorway

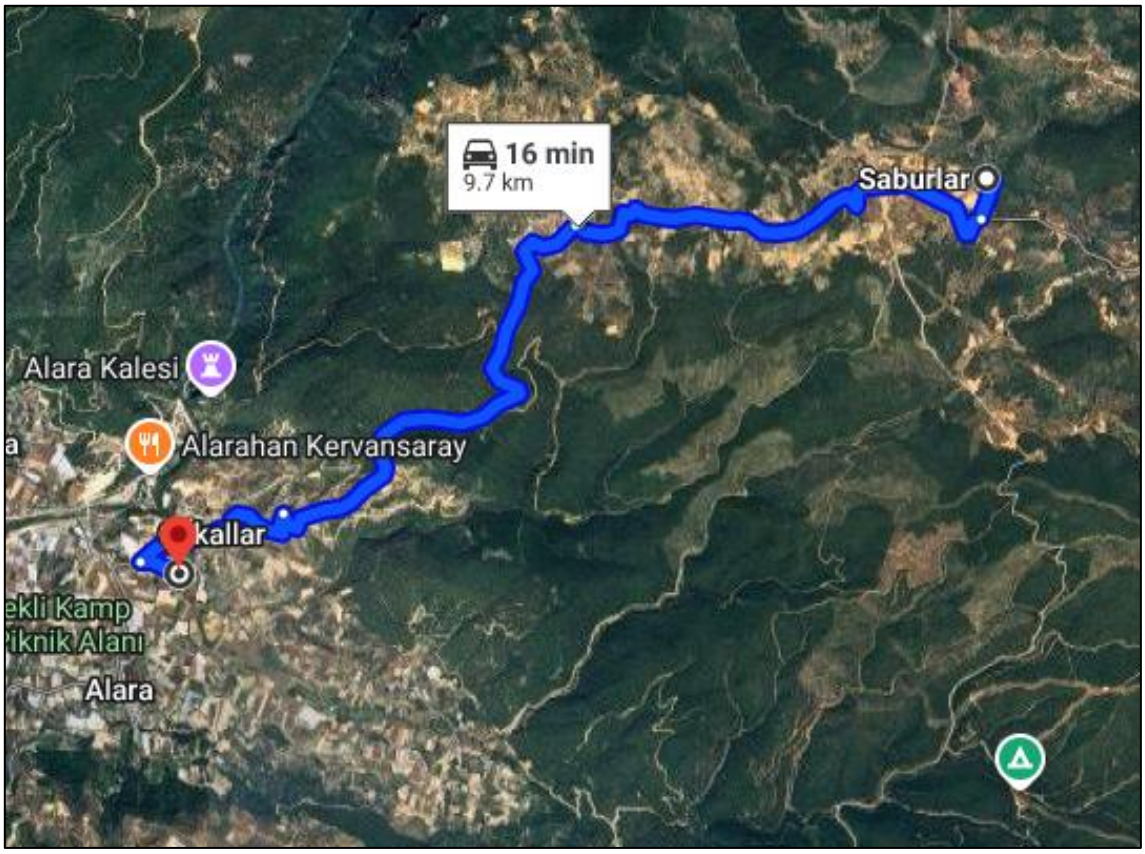


Figure III.31 Route between Saburlar Quarry and Motorway

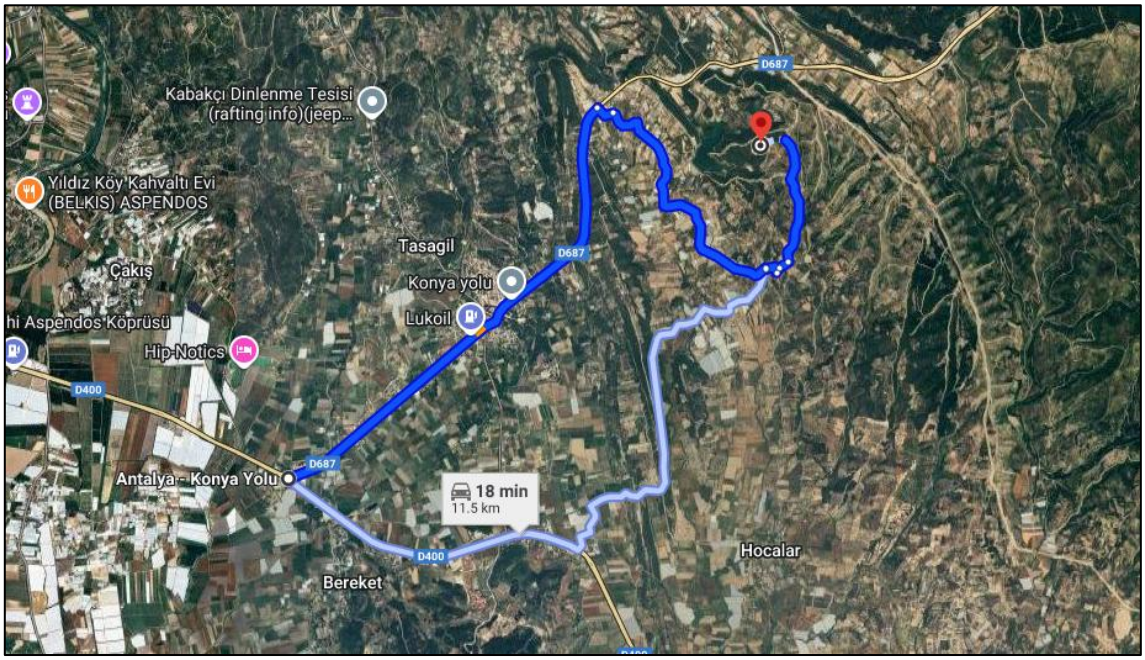


Figure III.32 Routes between D-7 and Motorway

Table III.22. Road Assessment for Transportation of Heavy Loads

Site	Route	Distance	Road Type
Bademliyar	D695	26.2 km	Single-lane road
Saburlar	Country Road	9.7 km	Single-lane road
D-7 (Option 1)	D687 → Country Road	12.2 km	Mostly double-lane road, partially single-lane road
D-7 (Option 2)	D400 → Country Road	11.5	Mostly single-lane road, partially double-lane road

During the construction phase, the Project's vehicles will not be on the road at the same time. However, in the worst-case scenario, it is assumed that all the vehicles will be on the road at the same time. It should be noted that since the assessment is based on the maximum traffic load increases at worst-case scenario, the increase in road traffic will be much lower than the values given in the table above in most of the time during a daily period.

As explained in the previous sections, these access roads to be within the scope of the Project already exist and may need extension / rehabilitation. Geometries of these roads were also assessed in terms of heavy goods vehicle movements during the route selection stage. Therefore, additional road construction is expected, with some extension or rehabilitation works as needed.

The anticipated impacts of increased traffic load during the construction phase are expected to manifest in several key areas. From an environmental perspective, the rise in traffic volume may result in notable consequences, particularly in terms of noise pollution and air emissions. Elevated noise levels along access roads leading to construction sites can disturb both local communities and wildlife, especially during early morning and late evening hours when ambient noise levels are typically lower.

In addition to environmental concerns, increased traffic may cause temporary road interruptions and closures due to ongoing construction activities. These disruptions can lead to traffic congestion and limited access for local residents and emergency services, creating both inconvenience and potential safety risks. Furthermore, the operation of heavy construction vehicles at high speeds introduces significant safety concerns for nearby communities. This is particularly critical in residential areas where pedestrian activity is prevalent, thereby increasing the likelihood of traffic-related accidents.

Lastly, the frequent use of existing roads by heavy vehicles may accelerate deterioration of road surfaces, leading to premature wear and tear. This degradation not only affects local infrastructure but also poses safety hazards for all road users, necessitating additional maintenance and repair efforts throughout the construction period.

III.9. Implementation Program

The Project is scheduled to be implemented over a six-year period, beginning in December 2023 and continuing through October 2028. The project comprises four main phases: contractual processes, administrative affairs, expropriation works, and highway construction works. The contractual phase extends from December 2023 to October 2024, followed by administrative procedures that are planned between October 2024 and October 2025. Expropriation works will be carried out from October 2024 through April 2026, overlapping with the construction phase, which spans from October 2024 to October 2028. A visual summary of the construction schedule is provided in Figure III.33, while further details on task breakdowns and timeframes are included in Annex-13.

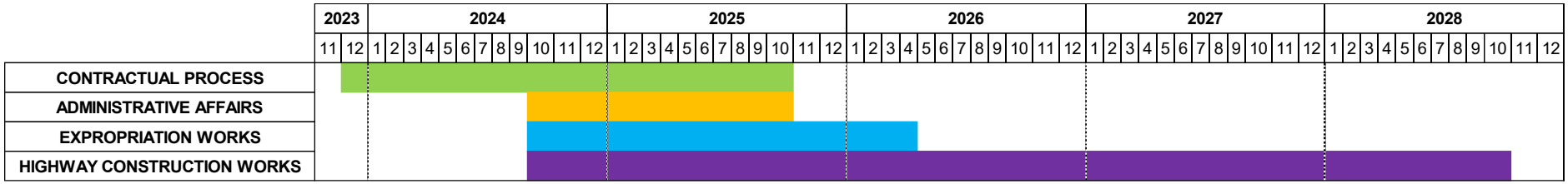


Figure III.33. Summary Construction Schedule of the Project

III.10. Project Cost and Incomes

As the Project will be implemented in the framework of a BOT model, financing, planning/design, building/construction, operation and full range of maintenance and repair works will be under the responsibility of the Project Sponsor for the contract duration. Finance structure of the Project as a BOT model is represented in Figure III.34.

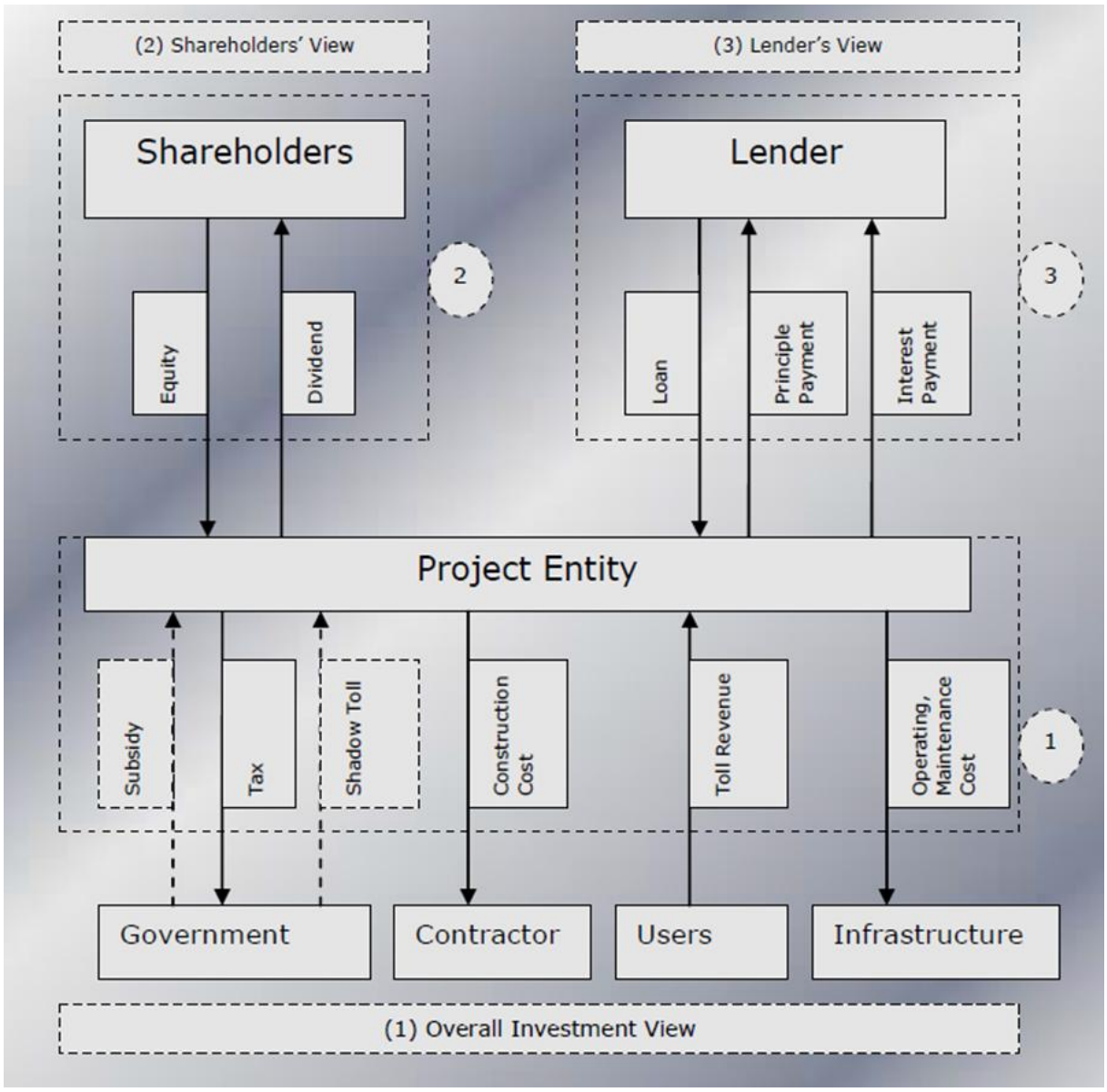


Figure III.34. Representation of the Finance Structure of BOT Projects (*Source: KGM, August 2010*)

The main cost items for the pre-operation and operation phases of the Project would include the following (KGM, June 2011):

- Expropriation costs;
- Construction costs for the Motorway components and access roads;
- Maintenance and repair costs during the operation phase (routine maintenance, winter maintenance, periodic maintenance in every 10 years);
- Other operation costs;
- Taxes;
- Reimbursement of credit principal and interest.

Construction costs will mainly include the costs for the expropriation, surveys, design, consulting services, earthworks, construction of engineering structures, bridges, overpasses, underpasses, etc.

Following the completion of the construction and commissioning of the Motorway, toll revenues will be collected from the road users by the Project Sponsor for the duration of the contract, specified as a total of 15 years, including 3 years for construction and 12 years for operation. If the toll revenues collected fall below the projected revenue for the minimum traffic guaranteed under the BOT contract (defined as 100.000 cars per day - see Section III.8), the difference will be compensated to the Project Sponsor. Additional revenue will be generated from the operation of the service areas.

IV. ESIA METHODOLOGY

The Antalya-Alanya Motorway Project is not considered in the scope of the EIA exemption decision and thus, full EIA report has been required for the Project in the context of the Turkish EIA Regulation. An EIA Report has been prepared and submitted to the MoEUCC and an "EIA Positive Decision" issued on August 17, 2018 (see Section II.2.1. for further explanation on the EIA positive decision).[1]

On the other hand, the Project Sponsor has secured a facility agreement with a group of lenders led by Deutsche Bank as Mandated Lead Arranger (MLA), which requires compliance with international environmental and social standards and guidelines throughout the implementation of the Project. In consideration of Equator Principles, World Bank policies and IFC's Sustainability Framework, the Project is evaluated to be likely to include activities and components that are to be effectively managed to avoid or minimize significant environmental and social impacts. In this respect, the Project would be classified as a ***Category A Project***, for which the borrower is responsible for preparing an EIA Report/full-scale ESIA. Similarly the EU's EIA Directive and the Turkish EIA Regulation, which has been harmonized with EU's EIA Directive also define the motorway construction projects as Annex I activities, for which an EIA is required. Similarly, an EIA Report has been prepared and an "EIA Positive Decision" had been issued for the Project which is the performance indicator that the project has gathered a local (national) environmental clearance. Consequently, a full-scale ESIA report will be prepared for the Project. The methodology to be followed in the ESIA study is described in the following sections.

In its simplest form, impact assessment is defined as the process of identifying the future consequences of a current or proposed action by the International Association for Impact Assessment. The environmental and social impact assessment (ESIA) study to be conducted for the Project will conform to both the requirements of the Turkish EIA Regulation as well as the international standards including Equator Principles (EPs) IV and IFC's Performance Standards on Environmental and Social Sustainability (including general and sector-specific EHS guidelines). IFC, in its Guidance Note 1 on the Assessment and Management of Environmental and Social Risks and Impacts, which was published in January 1, 2012 and updated in June 14, 2021, specifies the key process elements of an ESIA study as follows:

(i) Initial screening of the project and scoping of the assessment process;
(ii) Examination of alternatives;
(iii) Stakeholder identification (Focusing on those directly affected) and gathering ofenvironmental and social baseline data;
(iv) Impact identification, prediction and analysis;
(v) Generation of mitigation or management measures and actions;
(vi) Significance of impacts and evaluation of residual impacts;
(vii) Documentation of the assessment process (i.e. ESIA report).

Considering the procedural steps of the Turkish EIA Regulation (see II.2.1. for detailed explanation of the process) and based on IFC's approach that summarizes the international good practice for impact assessment, the systematic process to be conducted for the assessment of the Project's environmental and social impacts and development of mitigation measures and plans for the management of significant impacts is illustrated in Figure IV.1.

[1] *https://eced.csb.gov.tr/jsp/ek1/12532*

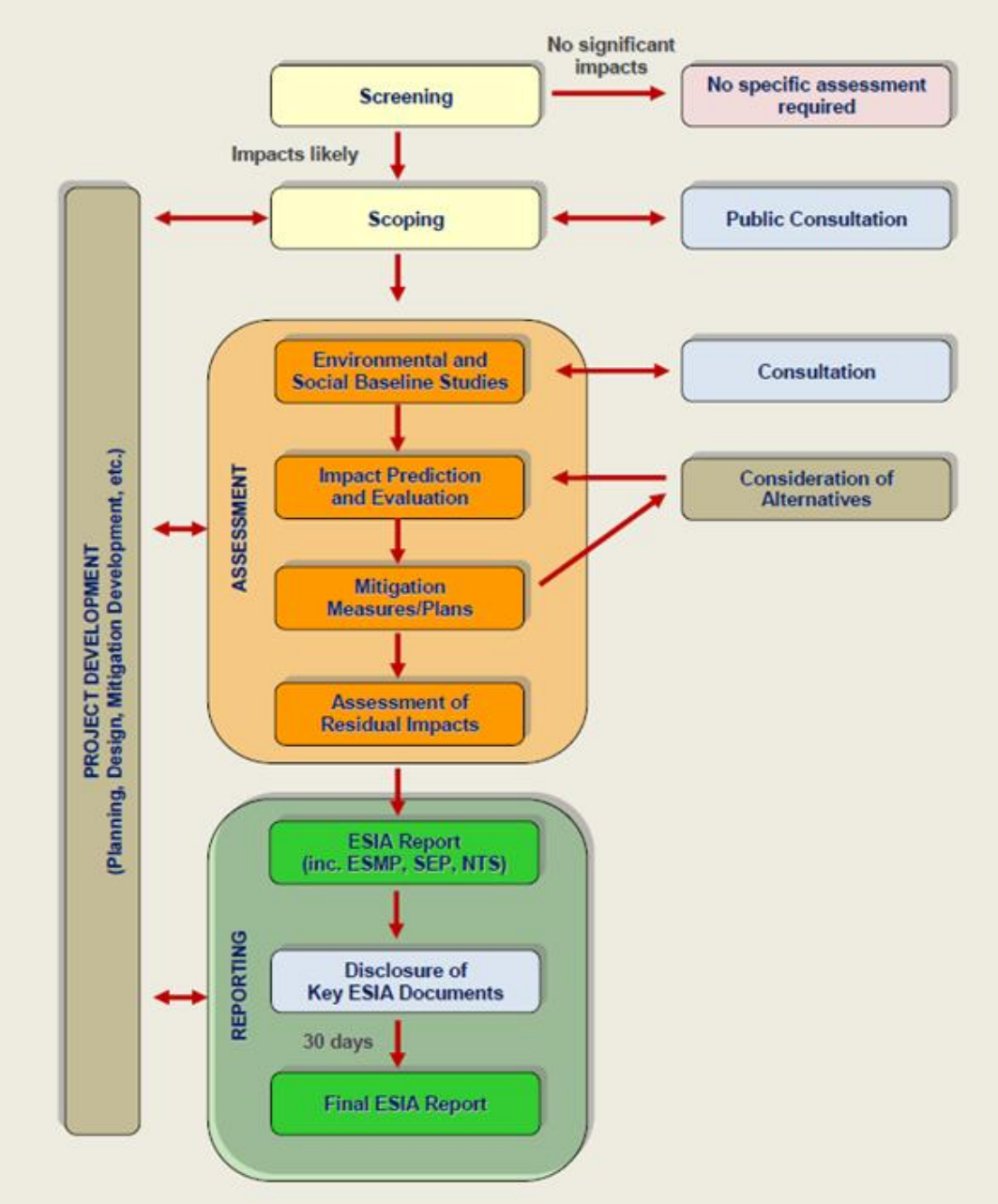


Figure IV.1. ESIA Process (adapted from IFC's Guide to Biodiversity for the Private Sector)

In the ESIA process, screening is used to make a rapid, high-level analysis to determine whether a full ESIA is necessary. The screening process conducted for the Project determined that the classification of the Project is "***Category A"***, thereby rendering the Project Sponsor responsible for preparing an EIA Report/full-scale ESIA.

Following the screening of the Project, scoping works have been conducted to identify the impacts likely to be significant and should become the main focus of the ESIA. A comprehensive baseline information assembly program was designed for the Project to establish a reference point from which any future changes associated with the Project can be assessed and provide information for subsequent monitoring. The baseline program relied on both desk-based studies to analyze readily

available information from governmental organizations, academic publications, internet resources, etc. as well as field surveys to gather site-specific environmental and social information.

Impact prediction and evaluation is the key of the ESIA and involves analyzing the impacts identified in the scoping and baseline work to determine their nature (adverse or beneficial, direct or indirect), temporal scale (permanent or temporary), spatial (local, regional, national, etc.) scale, reversibility (reversible or irreversible), magnitude (high, medium, low), likelihood (certain, likely, possible, unlikely etc.), extent and effect. Such detailed impact analysis requires professional judgment and input from relevant experts. Once the potential impacts are fully understood, it is necessary to judge the significance of each impact to determine whether it is acceptable, requires mitigation or is unacceptable. Cumulative impacts, which may result from multiple actions on valued receptors, have been separately assessed according to the IFC guidelines as a part of the study to the extent the level of readily available information allowed. As an iterative process, emerging findings of the assessments have been conveyed to design teams to develop mitigation plans for the Project, where feasible[2].

It should be noted that determining the significance of impacts is a complex and subjective process. A number of factors affect significance including the importance of resources at local, regional, national or international levels; whether the area is subject to formal or informal protection; the ecological values of potentially affected animal and plant species and habitats, and the value of the ecosystems as sources of food or livelihood for local communities[3].

Scoping of Environmental and Social Impacts

Scoping phase of an ESIA process serves for:

(i) Determination of impacts that are likely to be significant and should become the main focus of the upcoming impact assessment studies;
(ii) Identification of data availability and any gaps; and
(iii) Determination of the appropriate spatial and temporal scopes for the assessment and suggestion of suitable survey and research methodologies[4].

As with similar large infrastructure projects, the primary impacts of the Project that are to be assessed and suitably managed are anticipated to occur during the construction phase as a result of vegetation clearing, earth moving activities and civil works, extraction of construction materials (from quarries), involvement of large numbers of personnel and heavy machines/equipment, etc. The associated impacts would include changes in the land use and soils, habitat alteration and fragmentation, waste and wastewater generation within the construction corridor and construction sites (including campsites, quarries, and plants if any), emissions into air, noise generation, etc. In addition, acquisition of lands prior to the start of construction and the large-scale employment to be caused by the Project is likely to bring a variety of occupational health and safety issues and socio-economic impacts (i.e. physical or economic displacement) that require evaluation and management. For the Project, maximum duration of the construction phase has been specified in the related BOT Contract as 3 years. Thus, the construction phase impacts of the Project will be generally temporary, except the impacts on biodiversity and socio-economic environment.

During the operation phase, environmental and social impacts of the Project will be as a result of vehicle traffic on the Motorway route, road maintenance activities and surface water runoff through the impermeable road surfaces, etc. Employment opportunities will be provided, but at relatively lower

[2] *https://www.ifc.org/content/dam/ifc/doc/2021/20210614-ifc-ps-guidance-note-1-en.pdf*
[3] *IFC, 2016. A Guide to Biodiversity for the Private Sector: The Social and Environmental Impact Assessment Process*
[4] *IFC, 2016. A Guide to Biodiversity for the Private Sector: The Social and Environmental Impact Assessment Process*

levels when compared to construction phase. The associated impacts of the Motorway's operation are likely to include air emissions and noise generation along the Motorway route, use of hazardous materials, and waste and wastewater generation at service areas.

Besides the adverse environmental and social impacts, the Project is likely to bring several benefits including contribution to alleviation of existing traffic problems especially in Antalya and its surrounding provinces (Burdur, Muğla, Konya, Isparta, Karaman and Mersin), reduced travel times and increased transportation comfort, new employment opportunities during the construction phase and operations to be conducted at the service areas, maintenance works, etc.

Thus, the ESIA study focuses on the assessment and mitigation of the potential impacts on these environmental and social components. In addition, cumulative impacts on each environmental and social component are also assessed in the scope of ESIA study. It should be noted that this report including all the baseline information, scoping analyses and assessments and the maps presented in this Chapter, which has been prepared based on the current version of the route design, might be changed if a change order is submitted by the KGM in the future. Therefore, this ESIA Report is prepared based on the most current design available, until the Project has matured to the design freeze state.

As a consequence of the Project, the environmental and social components that are likely to interact with the construction and operation phase activities of the Project are listed below:

- Air Quality; and Climate Change
- Topography, Soils, and Geology;
- Water Resources;
- Noise and Vibration;
- Use of Resources and Waste Management;
- Protected Areas, Landscape, and Visual Environment;
- Ecology and Biodiversity;
- Cultural Heritage;
- Land Use and Property;
- Socio-economic Environment (including local and national conditions, transportation network and traffic loads);
- Labor and Working Conditions; and
- Community Health and Safety.

An interaction matrix is presented in Table IV.1 in order to outline the activities and/or impact factors that have potential to cause interaction of the Project with each related environmental and social component. This list identifies the activities that have a potential to cause environmental and social impacts and thus will be evaluated in the scope of ESIA studies. Based on this evaluation, mitigation measures will be developed for the activities that would be likely to cause significant environmental and social impacts.

Table IV.1. Interaction Potential Matrix for Scoping

Project Activities / Interaction Factors	Environmental and Social Components															
	Air Quality	Climate Change	Topography, Soils, and Geology	Water Resources	Noise and Vibration	Use of Resources and Waste Management	Landscape and Visual Environment	Protected Areas	Ecology and Biodiversity	Cultural Heritage (known and Undiscovered)	Land Use and Property	Local Social and Economic Conditions	National Economy	Transportation Network and Traffic Loads	Labor and Working Conditions	Community Health and Safety
Land Preparation and Construction Phase																
Land acquisition																
Veg. clearing, top soil stripping, cut/fill, construction																
Storage of excess excavated materials																
Construction materials extraction																
Construction material transportation																
Construction and operation of plants (mechanical, asphalt, cement)																
Hazardous materials use and waste generation																
Water use and domestic wastewater generation																
Rehabilitation works																
Employment of workforce																
Procurement of materials and services																
Operation Phase																
Operation of Motorway																
Road maintenance works																
Surface run-off																
Employment of workforce																
Operation of service areas, operation centers, etc.																

Source: Adapted from EIA Sectoral Guidance for Motorways/Toll Roads published by the former Ministry of Environment and Forestry in June 2009.

Color Code: *Interaction Potential* *Benefit Potential*

In the scope of the impact assessment, impacts will be categorized as land preparation and construction phase impacts and operation phase impacts. Additionally, residual impacts remaining after the mitigation measures will also be identified in the assessment. Activities such as vegetation removal, top soil stripping, soil improvement, land levelling, etc. will be considered as pre-construction activities, while the cut and fill operations, road construction, construction of road structures such as viaducts, overpasses, underpasses, culverts, buildings, service areas, completion of superstructures and finishing operations will be considered as the construction phase activities. Since the Project's construction will progress kilometer by kilometer and the pre-construction and construction activities will be conducted gradually in different sections, a strict distinction of the pre-construction and construction phases and the associated activities would not be practical thus impacts associated with both phases will be considered under the heading of "construction phase activities/impacts". The period after the completion of construction activities will be the operation phase of the Project. Due to the nature of the Project (a motorway project), no decommissioning has been assumed for the Project.

Study Area and Area of Influence (AoI)

Good ESIA practice suggests that the study area for ESIA is to be defined on a case-by-case basis reflecting the project and the surrounding environment over which significant effects can reasonably be thought to have the potential to occur both from that project in combination with other projects. The study area is recommended to be set for each individual topic[5].

The Area of Influence (AoI) for the Project will be determined individually for each different environmental and social component. In line with IFC PS 1, the AoI will encompass the following as appropriate:

- The area likely to be affected by: (i) the Project (e.g. Project sites, immediate airshed and watershed, or transport corridors) and the Project Sponsor's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project (e.g. access roads, borrow and disposal areas construction camps); (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.
- Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.
- Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The Social Area of Influence (SAoI), on the other hand, is defined by comprehensively evaluating key factors such as the socio-economic environment, social impacts (including population, demography, economy, employment, land acquisition, land use as well as vulnerable groups/peoples), labor influx, community health and safety, and cultural heritage. Thus, the Social Area of Influence (SAoI) of the Project is delineated as a 2-kilometer buffer zone (2 x 2 km buffer corridor both sides of the Motorway) surrounding the licensed area to encompass all potentially socially affected areas.

[5] *UK Highways Agency 205/08, Design Manual for Roads and Bridges*

In this respect, the Motorway including all of its components (i.e. interchanges, viaducts, service areas, etc.) as well as service roads, construction campsites (if any), quarries and plants (if any), borrow pits, storage areas, and temporary disposal sites have been considered in the ESIA to the extent the level of information allowed.

The ESIA study areas were determined to specifically cover the AoI and the SAoI. The Motorway width (37.5 m) and the minimum width of the expropriation corridor (55 m) were considered in determining these study areas. It should be noted that the expropriation corridor may extend up to a maximum 450 meters at the locations of interchanges, large embankment and cut sites, service areas, etc. Additionally, the quarries and storage areas that are located outside the expropriation corridor necessitated an expansion of the study area. The overall study area for the air quality and socio-economic environment studies were determined as 4 km (a 2 km buffer area on each side of the Motorway axis) to appropriately cover related risks and impacts. Lastly, within the scope of cumulative impact assessment (CIA) studies, an area of 5 km buffer zone around the Motorway route was determined to carry out the studies. In this respect, the proposed study areas for each environmental and social component are listed in Table IV.2. For any future location changes of the construction campsites, quarries and plants, and disposal sites as well as relevant Project components (i.e. interchanges), the study area will be expanded to cover the new AoI and SAoI during the ESIA studies as needed.

Table IV.2. Proposed Study Area for the Motorway

Environmental and Social Component	Study Area (m)*	Possible AoI / SAoI (m)
Air Quality	4,000	2,000
Topography, Soils, and Geology	400	100
Water Resources	1,000	500
Noise and Vibration	2,000	1,000
Landscape and Visual Environment	400	400
Ecology and Biodiversity***	400	100
Protected Areas	400	100
Cultural Heritage	400	100
Land Use and Property	400	100
Socio-economic Environment **	4,000	2,000
Community Health and Safety	2,000	1,000
Cumulative Impact Assessment	10,000	10,000

** Represents the total width. For example; a 400 m study area is composed of 2 x 200 m corridors (200 m located in the left side and 200 m located in the right side of the Motorway's axis, making a total of 400 m in total).*

*** It should be noted socio-economic environment, due to its nature, propound a distinction in the ESIA approach; thus the study area specified in the table for socio-economic environment should be considered as the minimum study area. Settlements, whose lands extend beyond the proposed study area, have also been included in the scoping assessments and will be included in the scope of ESIA assessments as well, wherever necessary.*

**** For biodiversity, the area of influence was initially defined based on the project's direct impacts. Nevertheless, the impact assessment and field surveys extended beyond the 400 m study area, and wider components of the project footprint were incorporated into the evaluation.*

The studies and measurements carried out within the scope of ESIA in accordance with the determined impact areas (AoI and SAoI) are summarized in Table IV.3 below (see Figure IV.2).

Table IV.3. Summary of the Studies and Measurements Planned/Conducted within the Scope of ESIA Studies

Subject		Date of the study	Number of Measurement Points
Preliminary Studies			
Reconnaissance Field Study		2-3 May 2024	-
Environmental Studies and Measurements			
Air Quality and Climate Change	Particulate Matter (PM_{10} & $PM_{2.5}$)	16 September-8 October 2024	21
	NO_2 & SO_2	21 September-21 October 2024	5
	VOC	17 October 2024	5
	Settled Dust	21 September-21 October 2024	21
Noise and Vibration		16-18 September 2024 21-22 September 2024	21
Soil		17-20 September 2024 24 September 2024	7
		29-30 May 2025	35
Water	Surface Water	17-21 September 2024 24 September 2024 26-28 December 2024	12
	Ground Water		8
Biodiversity Studies	Terrestrial Flora and Fauna	6-22 July 2024 28 September-12 October 2024 10-29 January 2025 28 February-31 March 2025	36 point + 19 transect + wider project components
	Aquatic Flora and Fauna	6-22 July 2024 28 September-12 October 2024 10-29 January 2025 28 February-31 March 2025	14
Social Studies			
Socio-economic Field Study		3-6 June 2024	11
Public Consultation Meetings		26-27 August 2025	Serik Manavgat Avsallar Konaklı
Cultural Heritage Studies			
Cultural Heritage Field Study		26 August – 8 September 2024 14 – 17 March 2025	-

** Dates are subject to change based on the progress of the expropriation process.*

Assessing the Significance of Impacts

The significance of impacts is the key output of the environmental and social impact assessment process as the mitigation strategies/approaches of Projects are developed depending on the level of the significance.

The significance of impacts is a function of the value and sensitivity of the receptor or resource and the magnitude of the impact that causes a change in the conditions of the receptor or resource. Thus, assigning environmental and social value and sensitivity of the resources/receptors and estimation of the magnitude of impact are the initial steps to be completed to assess the significance of impacts. Once the value and sensitivity of the receptor/resource as well as the magnitude of impact, are determined, assessment of the significance is typically conducted through the use of impact categorization matrices.

For the evaluation of the significance of the impacts for construction and operation phases of the Project, the categorization matrix given in Table IV.4 will be used. This matrix allows the evaluation of the magnitude of impacts in combination with the sensitivity/value of receptors/resources. After the overall significance of impacts are categorized on the basis of this matrix, mitigation measures will be developed for the significant (i.e. high and/or medium) impacts, and the residual impacts could be evaluated after the implementation of the mitigation measures.

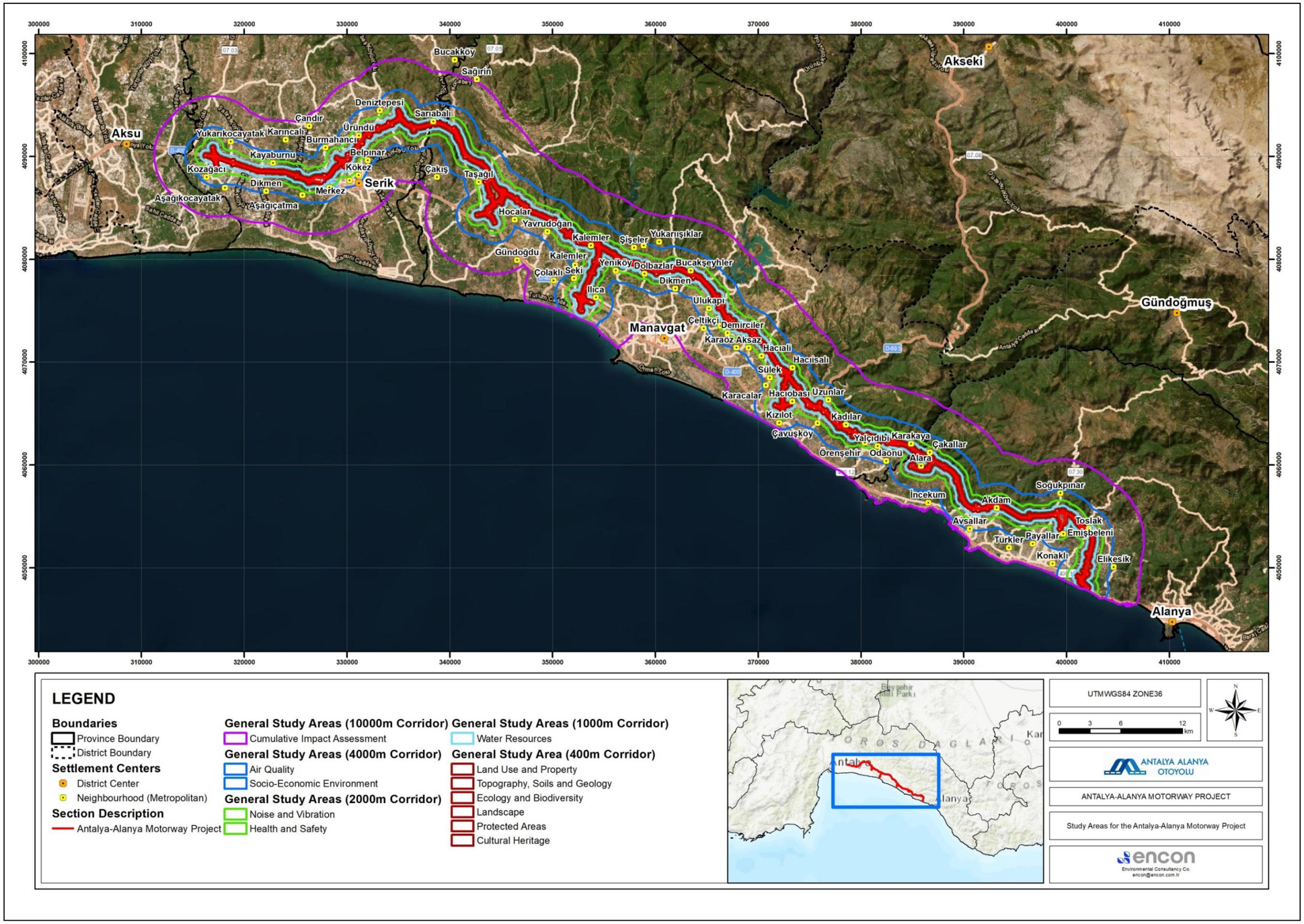


Figure IV.2. Study Areas for the Motorway Sections

Table IV.4. Impact Categorization Matrix*

		Sensitivity/Value of Receptor/Resource		
		High (3)	**Moderate (2)**	**Low (1)**
Magnitude of Impact	**Wide (A)**	High (A3)	High (A2)**	Medium (A1)
	Medium (B)	High (B3)	Medium (B2)	Low (B1)
	Restricted (C)	Medium (C3)	Low (C2)	Low (C1)

Impact Significance* **		
	High	Imperative to reduce impact significance by relevant mitigation before proceeding
	Medium	Significance is to be reduced to a lower category as long as it is feasible by taking relevant mitigation measures; if not possible can be proceeded by acceptance of associated risks
	Low	Acceptable to proceed without additional measures assurance of compliance with standards and safety criteria is assured

**Adapted from World Bank, December 2012.*

***It should be noted that the significance level represented by A2 was ranked as "medium" in the source document; but it has been modified to "high" in this assessment in order to be on the safe side and make a stricter assessment.*

****Adapted from L. Canter, 1993.*

The "magnitude" of the impacts given in this matrix represents their physical/geographical extent/range (in terms of area, length, etc.), duration (long-term, medium-term or short term), reversibility of the impact (short-term reversible, long-term reversible or irreversible), frequency (one-off, intermittent or continuous) and likelihood (unlikely, probable or certain) etc. The categorization of the magnitude (as restricted, medium, wide) would change for each resource (i.e. environmental media) under consideration. In this categorization, information on the total width of the Motorway and the extent of the expropriation corridor were also taken into consideration.

The structure of the impact categorization matrix to be used in the scope of the assessments entails categorization of value/sensitivity and magnitude in three levels. The "sensitivity/value" of receptor/resource given in the categorization matrix are defined individually for each type of receptor/resource depending on their value/importance for the community (i.e. cultural or economic) or wild life, existing quality, protection status that are identified based on the findings of the baseline studies (desk-based and field) and consultation to be done with local stakeholders. When a government-established threshold or national/international scientific literature is defined for a receptor/resource, it is prioritized during the sensitivity/value designation process. Otherwise, sensitivity/value designation is determined using professional judgement of the ESIA experts. Once the impacts are predicted and evaluated including judgment of significance, mitigation measures and plans could be developed, to eliminate or reduce adverse impacts. Typical descriptors that would be considered to describe specific sensitivity/value criteria for each individual environmental and/or social component under the relevant chapters of this ESIA Report are provided in Table IV.5.

Table IV.5. Typical Descriptors to be considered in Assigning Individual Value/Sensitivity Criteria

Value / Sensitivity Level	Typical Criteria Descriptors
High	High importance and rarity, international or national scale, and very limited potential for substitution.
Medium	Medium importance and rarity, regional scale, limited potential for substitution.
Low	Low importance and rarity, local scale.

Adapted from Highways Agency 205/08: Design Manual for Roads and Bridges.

Applying the matrix, the greater the environmental sensitivity/value of the receptor/resource, and the greater the overall magnitude of impact, the more significant the impact. For example, the consequences of a highly valued environmental resource or highly sensitive receptor suffering a major detrimental impact of high magnitude would be a very significant adverse impact[6].

In consideration of the individual factors, overall magnitudes of the impacts are determined for each impact separately. Magnitude factors and the typical descriptors that would be considered to estimate overall magnitude for impacts under the relevant chapters of this ESIA Report are provided in Table IV.6.

[6] *Highways Agency 205/08: Design Manual for Roads and Bridges*

Table IV.6. Impacts Magnitude Criteria

Magnitude Factors						Typical Criteria Descriptors for Overall Magnitude *		
Type	**Geographic Extent**	**Duration**	**Reversibility**	**Frequency**	**Magnitude**	**Overall Magnitude Level**	**Adverse/Negative**	**Beneficial/Positive**
Beneficial / Positive	**Restricted** (within the expropriation corridor; < 200 m at each side of the Motorway axis)	**Short** (less than 1 year)	**Short term reversible** (within 3 years)	**One-off / Occasional**	**Low** (e.g. amount of land use to be affected is less than 5% of the total amount of land use within the impact area)	**Minor**	**Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements**	**Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring**
Neutral	**Local** (200 to 1,000 m at each side of the Motorway axis)	**Medium** (1 - 3 years)	**Long term reversible** (3 - 15 years)	**Intermittent**	**Medium** (e.g. amount of land use to be affected is less than 10% of the total amount of land use within the impact area)	**Moderate**	**Loss of resource, but not adversely affecting the integrity; partial loss of / damage to key characteristics, features or elements**	**Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality**
Adverse / Negative	**Wide** (> 1,000 m at each side of the Motorway axis)	**Long** (more than 3 years)	**Irreversible**	**Recurrent / Continuous**	**High** (e.g. amount of land use to be affected is more than 10% of the total amount of land use within the impact area)	**Major**	**Loss of resource and / or quality and integrity of resource; severe damage to key characteristics, features or elements**	**Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality**

** Adapted from Highways Agency 205/08: Design Manual for Roads and Bridges.*

Mitigation and Residual Impacts

Following the determination and assessment of impacts, which includes valuing their significance, mitigation measures and plans are developed to eliminate or reduce adverse impacts and enhance benefits. The mitigation hierarchy given in Figure IV.3 will be followed at this stage of the ESIA whenever technically and financially possible. In this hierarchy, avoidance is considered the most acceptable form of mitigation. It may require changes to be made on the Project's design or location that would be done wherever technically and financially feasible. Minimization and mitigation through environmental and social measures/treatments/design is aimed where avoidance is not a possible option. Compensation/offset for residual risks and impacts is considered to be the last option in this hierarchy where avoidance or minimization and/or mitigation measures are not available. This option does not eliminate the identified adverse risks and impacts, but they seek to offset it with an (at least) comparable positive one.

1. Avoidance of impacts altogether.
2. Minimization/reduction of impacts where unavoidable.
3. Mitigation of impacts (e.g. restoration of habitats to their original state, relocation of affected species and habitats, etc.).
4. Compensation for any residual, unavoidable damage.

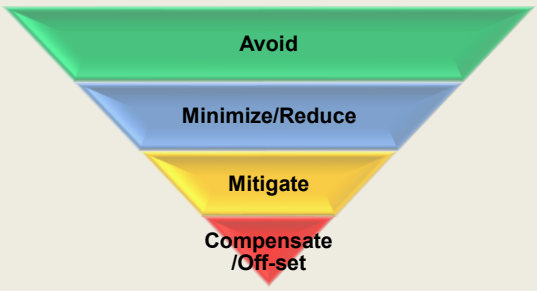


Figure IV.3. Mitigation Hierarchy to be Adopted

Within this ESIA, impact categorization and significance have been evaluated with reference to definitive standards, accepted/published criteria and legislation, where available. Where it has not been possible to quantify impacts, qualitative assessments have been carried out, based on expert knowledge, GIIP and professional judgement. Quantitative methods predict measurable changes as a result of the Project and rely on accurately measuring baseline conditions to make accurate predictions/estimations regarding the potential impacts. Qualitative assessment methods rely on expert judgement and experience.

While it is important to identify the initial significant impacts associated with the Project, the key focus of the impact assessment has been to define the significance of residual impacts and effects following application and/or consideration of mitigation measures. A residual impact is one which continues to be present following the application of avoidance and/or mitigation measures. In this regard, a summary table is provided in the final section of each chapter to indicate the potential significance of impacts first in the absence and then in the presence of mitigation to assist in demonstrating the anticipated effectiveness of proposed mitigation measures and assign the significance of residual impacts.

Cumulative impacts have been separately assessed in Chapter 17 ("Cumulative Impact Assessment"). The methodology for the cumulative impact assessment (CIA) is also provided in the same chapter.

V. LAND USE AND PROPERTY

This Chapter identifies the existing land use characteristics and ownership properties along the Antalya-Alanya Motorway route and assesses the potential impacts of the Antalya-Alanya Motorway Project on these aspects. Measures proposed for the mitigation of the potential impacts and the residual impacts are also described in this Chapter. Potential socio-economic impacts on local communities and/or owners/users of the affected lands (e.g. physical displacement, economic displacement, etc.) associated with the changes in the existing land use characteristics are covered in Chapter 14 ("Socio-economic Environment").

V.1. Assessment Methodology and Data Sources

The study area for the land use analyses has been determined based on the width of the expropriation corridor, which will have a width of minimum 55 meters in accordance with motorway standards and may expand up to 450 meters depending on topographical conditions and associated cut and fill plans. Accordingly, the GIS analyses have been conducted for a corridor having a width of 400 meters (in addition to the Motorway width, around 200 meters in each side), which covers the maximum expropriation corridor.

The land use characteristics for each section of the Motorway have been analyzed using "Coordination of Information on the Environment (CORINE) Land Cover" (2018) database, "Identification and Improvement of Problematic Agricultural Lands Project (STATİP)" (2015) database and Former Turkish General Directorate for Rural Services (GDRS) database for Antalya, all with the aid of GIS tools. The results of the land use analyses are presented in

Table V.3 and Table V.4 according to CORINE (2018), STATIP (2015) and GDRS, respectively. Comparison of the results of the land use analyses is also given in Table V.8.

Tunnels and viaducts have been incorporated into the Project design primarily to address geotechnical and topographic challenges along the route, while also aiming to avoid or minimize impacts on environmental and social receptors such as f orested areas, water bodies, residential zones, and cultural heritage sites. Due to their structural characteristics, these engineering solutions are expected to result in no or minimal physical impact on existing land use and ownership patterns, with potential effects limited to the footprints of tunnel portals and viaduct foundations. Therefore, in the context of the land use assessment, these structures are considered to have negligible influence on land use characteristics within the corridor.

Since land use along the sections above tunnels (excluding cut-and-cover tunnels) will remain unchanged—for instance, forestlands located above the tunnel alignment will be fully preserved—and the impact of viaducts will be limited to their foundation points, which represent a negligible area relative to the total length of the structures, these portions of the corridor have not been included in the land use study area in order to prevent potential misinterpretation of land take and impact.

The study area (400 m) itself does not directly represent the amount of land to be affected by the Project, as it has been identified more than the maximum width of the expropriation corridor, which is 450 meters. Accordingly, to make more accurate judgments on the amount of land to be affected, as the next step, expropriation plans prepared for the Antalya-Alanya Motorway Project and land use (i.e. forestry) permits obtained/to be obtained for the lands to be used will also be analyzed to characterize the land use patterns and ownership information. To characterize the forestry features within the study corridor, relevant Forest Management Plans and Forest Stand Maps will be analyzed with the aid of GIS. For the construction facilities that are located on registered lands, database of the General Directorate of Land Registry and Cadastre and land use permits will also be used. The result of the

analyses to be conducted will be presented in tabular formats and land use maps will also be produced for visual representation.

The data sources to be used in this scope are listed below:

- Coordination of Information on the Environment (CORINE) Land Cover" (2018)
- Identification and Improvement of Problematic Agricultural Lands Project (STATİP) (2015)
- Land Use Database of the former Turkish General Directorate for Rural Services (GDRS)
- Database of the General Directorate of Land Registry and Cadastre
- Forest Management Plans and relevant Forest Stand Maps (official data from the General Directorate of Forestry)
- 1/100.000 scale Environmental Master Plan of Antalya-Burdur-Isparta Planning Region
- Expropriation Plans prepared for the Antalya-Alanya Motorway Project
- Land use permits/easement rights obtained by KGM in the scope of the Project.

Significance Criteria

The significance criteria for the impacts on land use and property will be determined, as high, medium or low, based on the evaluation of magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter 4 ("ESIA Methodology") will be used for the determination of the magnitude of impact on the land use components, while sensitivity/value criteria to be used in the scope of impact assessment is summarized in Table V.1. Detailed explanation of the sensitivity components for each resource/receptor is provided in the following section: Baseline Conditions.

Table V.1. Criteria for Sensitivity/Value of Resource/Receptor

Resource/Receptor	Sensitivity/Value Level		
	High (3)	Moderate (2)	Low (1)
Forest lands	Forests having ecological functions according to Forestry Management Plans	Forests having social and cultural funcitons according to Forestry Management Plans	Forests having economic function according to Forestry Management Plans
Agricultural areas	Lands having land use capability of Class I-II according to GDRS Database (agricultural lands suitable for agricultural soil cultivation)	Lands having land use capability of Class III-IV according to GDRS Database (agricultural lands not suitable for soil cultivation)	Lands having land use capability of Class V-VIII according to GDRS Database (Non-arable lands)
Pasturelands	Lands having land use capability of Class I-V according to GDRS Database	Lands having land use capability of Class VI according to GDRS Database	Lands having land use capability of Class VII-VIII according to GDRS Database

V.2. Baseline Conditions

Further evaluation of the baseline land use characteristics according to different information sources is provided below.

V.2.1. Land Use Characteristics within the Study Area

V.2.1.1. Land Use Characteristics according to CORINE Database

The CORINE program was initiated in the European Union in 1985 (http://www.eea.europa.eu/). As part of this initiative, the land cover project was developed to provide consistent, localized geographical information on land cover across the member states of the European Community.

The studies in the scope of CORINE program in Türkiye were started by the former State Statistical Institute (currently acting as Turkish Statistical Institute-TurkStat) in 2001. The former Ministry of Food, Agriculture and Livestock (now the Ministry of Agriculture and Forestry) were then involved. As a result of the studies, CORINE 1990, 2000, 2006, 2012, 2018 land cover maps and changed databases between 1990-2000, 2000-2006, 2006-2012, 2012-2018 were created and submitted to the European Environment Agency and as of now, they have been merged with European land cover maps and have taken their place in the whole European map1. The overall land cover classification of CORINE database, which provides a conceptual framework for understanding the different types of land cover, is listed in **Error! Reference source not found.**.

Table V.2. General Land Cover Classification of the CORINE Database

Level 1	Level 2	Level 3	Definition
1. Artificial surfaces	1.1. Urban Fabric	1.1.1. Continuous Urban Fabric	Most of the land is covered by buildings, roads and artificially surfaced area covering almost all the ground. Non-linear areas of vegetation and bare soil are exceptional.
		1.1.2. Discontinuous urban fabric	Most of the land is covered by structures. Buildings, roads and artificially surfaced areas associated with vegetated areas and bare soil, which occupy discontinuous but significant surfaces.
	1.2 Industrial, commercial and transport	1.2.1. Industrial or commercial units	Areas with artificial surfaces (asphalt, concrete, stabilized) consisting of buildings and/or green areas without vegetation.
		1.2.2. Road and rail networks and associated land	Motorways, railways, including associated installations (stations, platforms, embankments). Minimum width to include: 100 m.
		1.2.3. Port areas	Infrastructure of port areas, including quays, dockyards and marinas.
		1.2.4. Airports	Airport installations: runways, buildings and associated land.
	1.3. Mine, dump and construction sites	1.3.1. Mineral extraction sites	Areas with open-pit extraction of industrial minerals (sandpits, quarries) or other minerals (opencast mines). Includes flooded gravel pits, except for river-bed extraction.
		1.3.2. Dump Sites	Landfill or mine dump sites, industrial or public.
		1.3.3. Construction Sites	Spaces under construction development, soil or bedrock excavations, earthworks.
	1.4. Artificial, non-agricultural vegetated	1.4.1. Green Urban Areas	Areas with vegetation within urban fabric. Includes parks and cemeteries with vegetation.

[1] *https://corine.tarimorman.gov.tr/corineportal/turkiyecalismalar.html*

Level 1	Level 2	Level 3	Definition
	areas	1.4.2. Sport and Leisure Facilities	Camping grounds, sports grounds, leisure parks, golf courses, racecourses, etc. Includes formal parks not surrounded by urban zones.
2. Agricultural areas	2.1. Arable Land	2.1.1. Non-irrigated arable land	Cultivated areas regularly ploughed and generally under a rotation system.
		2.1.2. Permanently irrigated land	Crops irrigated permanently and periodically, using a permanent infrastructure (irrigation channels, drainage network). Most of these crops could not be cultivated without an artificial water supply. Does not include sporadically irrigated land.
		2.1.3. Rice fields	Land developed for rice cultivation. Flat surfaces with irrigation channels. Surfaces regularly flooded.
	2.2. Permanent crops	2.2.1. Vineyards	Areas planted with vines.
		2.2.2. Fruit trees and berry plantations	Parcels planted with fruit trees or shrubs: single or mixed fruit species, fruit trees associated with permanently grassed surfaces. Includes chestnut and walnut groves.
		2.2.3. Olive groves	Areas planted with olive trees, including mixed occurrence of olive trees and vines on the same parcel.
	2.3. Pastures	2.3.1. Pasture Areas	Dense, predominantly graminoid grass cover, of floral composition, not under a rotation system. Mainly used for grazing, but the fodder may be harvested mechanically. Includes areas with hedges (bocage).
	2.4. Heterogeneous agricultural areas	2.4.1. Annual products available together with permanent products	Non-permanent crops (arable lands or pasture) together with permanent crops on the same parcel.
		2.4.2. Complex cultivation	Juxtaposition of small parcels of diverse annual crops, pasture and/or permanent crops.
		2.4.3. Land principally occupied by agriculture, with significant areas of natural vegetation	Areas principally occupied by agriculture, interspersed with significant natural areas.
		2.4.4. Agro-forestry areas	Annual crops or grazing land under the wooded cover of forestry species.
3. Forests and semi-natural areas	3.1 Forests	3.1.1 Broad-leaved forest	Vegetation formation composed principally of trees, including shrub and bush understories, where broad- leaved species predominate.
		3.1.2 Coniferous forest	Vegetation formation composed principally of trees, including shrub and bush understories, where coniferous species predominate.
		3.1.3 Mixed forest	Vegetation formation composed principally of trees, including shrub and bush understories, where broad- leaved and coniferous species co-dominate.
	3.2. Shrub and/or herbaceous vegetation	3.2.1. Natural grassland	Low productivity grassland. Often situated in areas of rough uneven ground. Frequently includes rocky areas, briars, and heathland.

Level 1	Level 2	Level 3	Definition
	associations	3.2.2. Moors and heathland	Vegetation with low and closed cover, dominated by bushes, shrubs and herbaceous plants (heath, briars, broom, gorse, laburnum, etc.).
		3.2.3. Sclerophyllous vegetation	Bushy sclerophyllous vegetation. Includes *maquis and garrige.* *Maquis:* a dense vegetation association composed of numerous shrubs associated with siliceous soils in the Mediterranean environment. *Garrigue:* discontinuous bushy associations of Mediterranean calcareous plateaus. Generally composed of kermes oak, arbutus, lavender, thyme, cistus, etc. May include a few isolated trees.
		3.2.4. Transitional woodland/shrub	Bushy or herbaceous vegetation with scattered trees. Can represent either woodland degradation or forest regeneration/colonization.
	3.3. Open spaces with little or no vegetation	3.3.1. Beaches, dunes, and sand plains	Beaches, dunes and expanses of sand or pebbles in coastal or continental, including beds of stream channels with torrential regime.
		3.3.2. Bare rock	Scree, cliffs, rocks and outcrops.
		3.3.3. Sparsely vegetated areas	Includes steppes, tundra and badlands. Scattered high-attitude vegetation.
		3.3.4. Burnt areas	Areas affected by recent fires, still mainly black.
		3.3.5. Glaciers and perpetual snow	Land covered by glaciers or permanent snowfields.
4. Wetlands	4.1. Inland wetlands	4.1.1. Inland marshes	Low-lying land usually flooded in winter, and more or less saturated by water all year round.
		4.1.2. Peatbogs	Peatland consisting mainly of decomposed moss and vegetable matter. May or may not be exploited.
	4.2. Coastal wetlands	4.2.1. Salt marshes	Vegetated low-lying areas, above the high-tide line, susceptible to flooding by sea water. Often in the process of filling in, gradually being colonized by halophilic plants.
		4.2.2. Salines	Salt-pans, active or in the process of. Sections of the salt marsh exploited for the production of salt by evaporation. They are clearly distinguishable from the rest of the marsh by their segmentation and embankment systems.
		4.2.3 Intertidal flats	Generally unvegetated expanses of mud, sand or rock lying between high and low water-marks. On contour on maps.
5. Water bodies	5.1. Inland waters	5.1.1. Water courses	Natural or artificial water-courses serving as water drainage channels. Includes canals. Minimum width to include: 100 m
		5.1.2. Water bodies	Natural or artificial stretches of water.
	5.2. Marine waters	5.2.1. Coastal lagoons	Unvegetated stretches of salt or brackish waters separated from the sea by a tongue of land or other similar topography. These water bodies can be connected with the sea at limited points, either permanently or for parts of the year only.
		5.2.2. Estuaries	The mouth of a river within which the tide ebbs and flows.

Level 1	Level 2	Level 3	Definition
		5.2.3. Sea and ocean	Zone seaward of the lowest tide limit.

Land use characteristics within the study corridor were analyzed according to CORINE 2018 database and the results of the analysis are presented in **Error! Reference source not found.**. In addition, Maps demonstrating the land-use character of the Project sections, five (5) sections in total, according to CORINE 2018 database are presented in from
Figure V.1 to Figure V.5 respectively.

Table V.3. Land Use Characteristics along the Project Route according to CORINE 2018

Level 1	Level 2	Level 3	Code 2018	Antalya-Alanya Motorway Project			Level 1 Total Area (ha)		Level 2 Total Area (ha)		Level 3 Total Area (ha)	
				Area (m2)	Area (ha)	Percent (%)	Area (ha)	Percent (%)	Area (ha)	Percent (%)	Area (ha)	Percent (%)
1. Artificial surfaces	1.2. Industrial, commercial and transport	1.2.1. Industrial or commercial units	121	91,797.01	9.18	0.13	47.58	0.69	9.18	0.13	9.18	0.13
	1.4. Artificial, nonagricultural vegetated areas	1.4.2. Sport and Leisure Facilities	142	384,052.48	38.41	0.56			38.41	0.56	38.41	0.56
2. Agricultural areas	2.1. Arable Land	2.1.1. Non-irrigated arable land	211	3,683,385.18	368.34	5.37	5,214.46	76.06	1,409.85	20.56	368.34	5.37
		2.1.2. Permanently irrigated land	212	10,415,098.92	1,041.51	15.19					1,041.51	15.19
	2.2. Permanent crops	2.2.2. Fruit trees and berry plantations	222	1,683,775.13	168.38	2.46			168.38	2.46	168,38	2.46
	2.4. Heterogeneous agricultural areas	2.4.2. Complex cultivation	242	29,504,838.11	2,950.48	43.04			3,636.24	53.04	2,950.48	43.04
		2.4.3. Land principally occupied by agriculture. with significant areas of natural vegetation	243	6,857,517.57	685.75	10.00					685.75	10.00
3. Forests and semi-natural areas	3.1. Forests	3.1.1 Broad-leaved forest	311	70,289.40	7.03	0.10	1,554.82	22.68	722.65	10.54	7.03	0.10
		3.1.2. Coniferous forest	312	7,114,442.48	711.44	10.38					711.44	10.38
		3.1.3. Mixed forest	313	41,721.90	4.17	0.06					4.17	0.06
	3.2. Shrub and/or herbaceous vegetation associations	3.2.1. Natural grassland	321	1,789,565.62	178.96	2.61			832.17	12.14	178.96	2.61
		3.2.3. Sclerophyllous vegetation	323	264,907.65	26.49	0.39					26.49	0,39
		3.2.4. Transitional woodland/shrub	324	6,267,273.73	626.73	9.14					626.73	9.14
5. Water bodies	5.1. Inland waters	5.1.1. Water courses	511	232,318.19	23.23	0.34	39.27	0.57	39.27	0.57	23.23	0.34
		5.1.2. Water bodies	512	160,343.40	16.03	0.23					16.03	0.23
Total				**68,561,326.77**	**6,856.13**	**100,00**	**6,856.13**	**100.00**	**6,856.13**	**100.00**	**6,856.13**	**100.00**

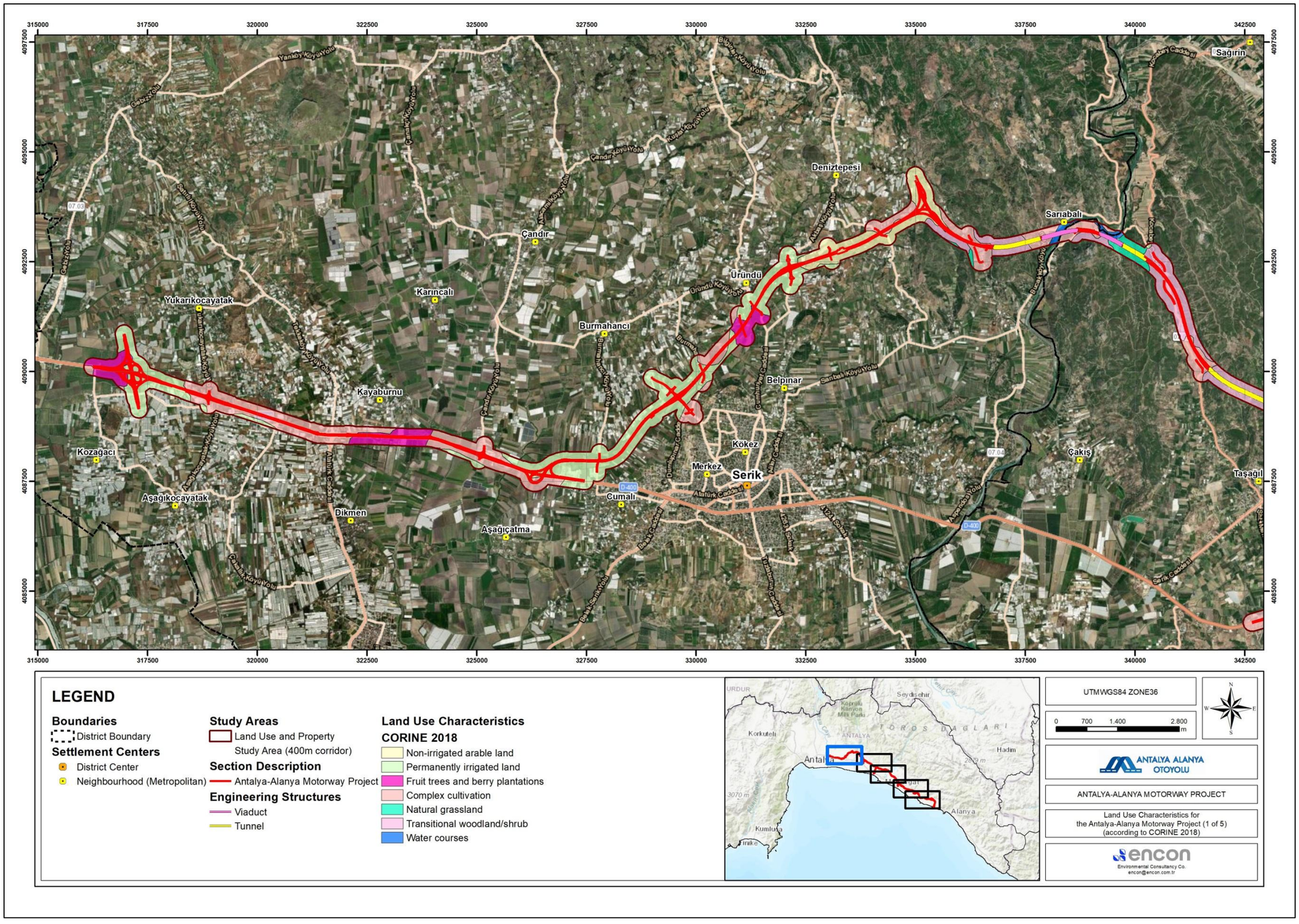


Figure V.1. Map of Land Use Characteristics for the Project according to the CORINE 2018 (1 of 5)

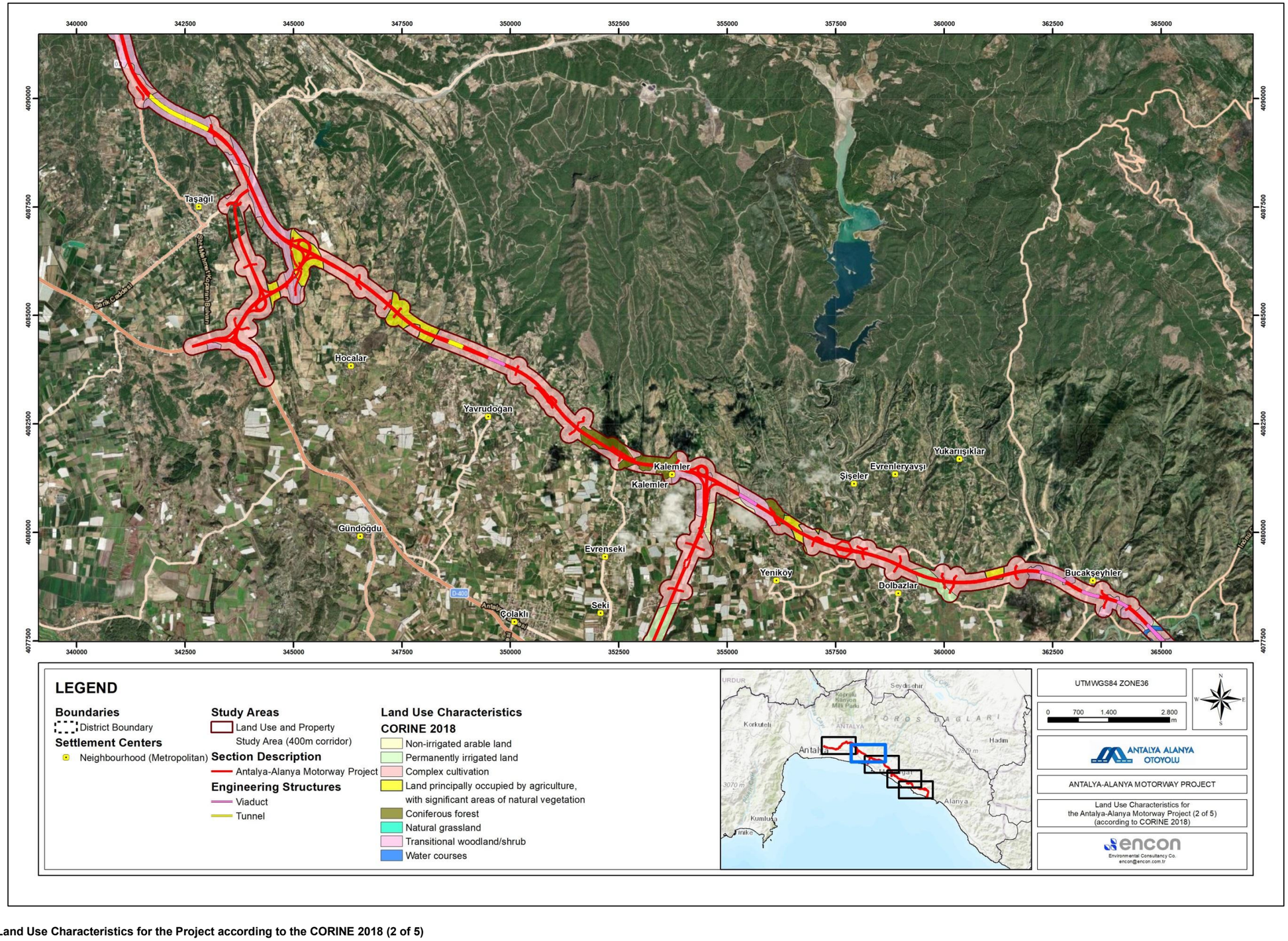


Figure V.2. Map of Land Use Characteristics for the Project according to the CORINE 2018 (2 of 5)

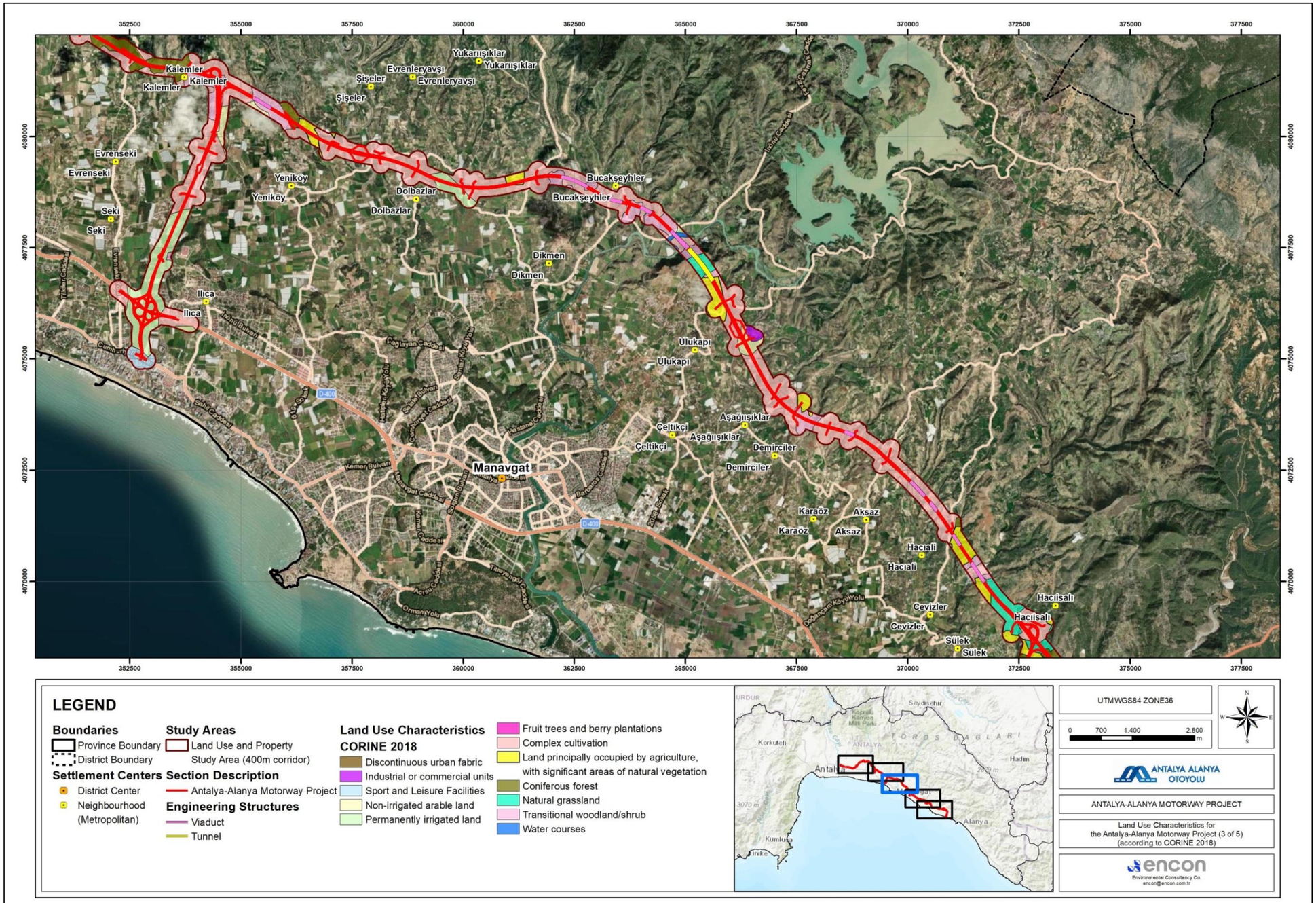


Figure V.3. Map of Land Use Characteristics for the Project according to the CORINE 2018 (3 of 5)

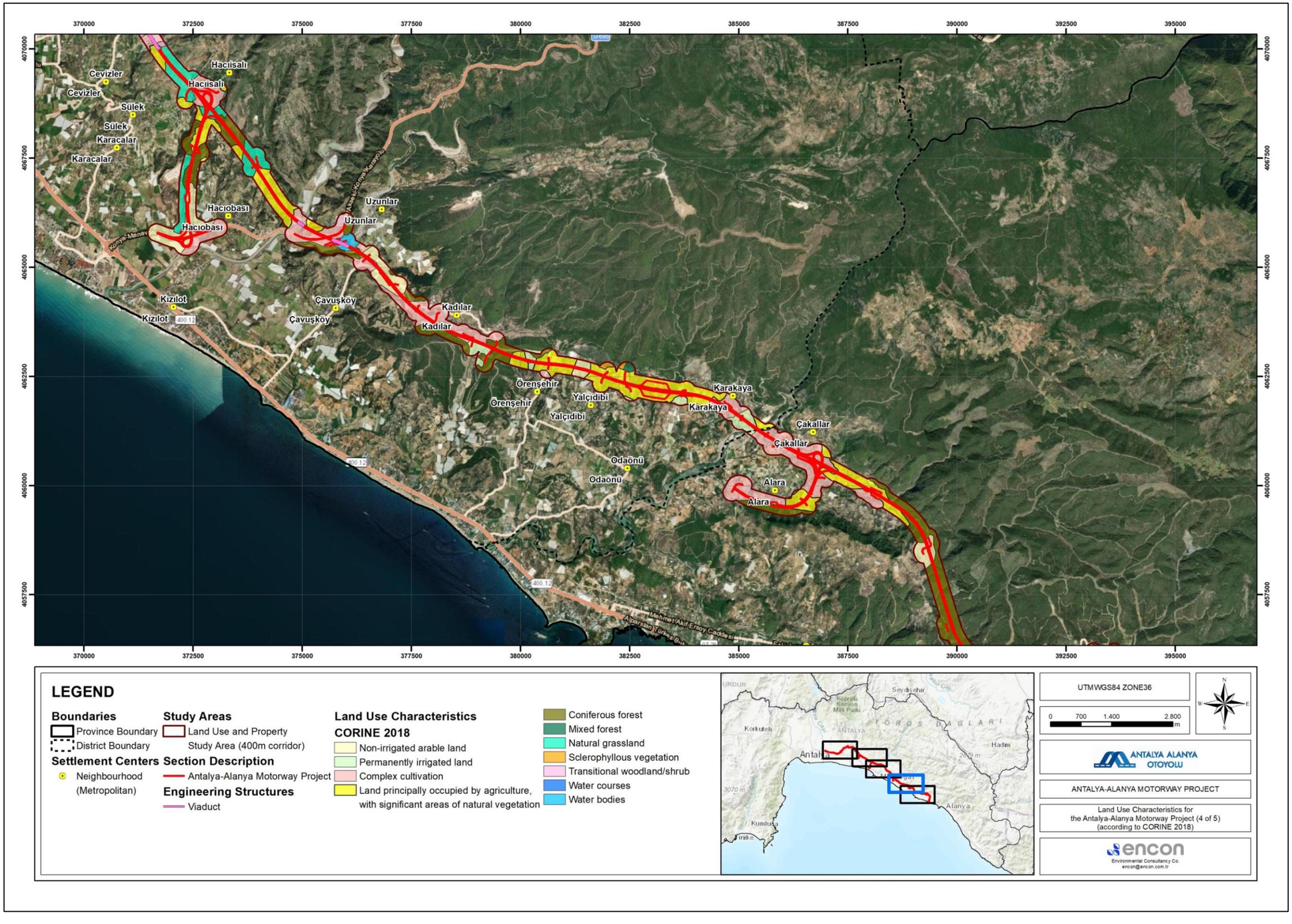


Figure V.4. Map of Land Use Characteristics for the Project according to the CORINE 2018 (4 of 5)

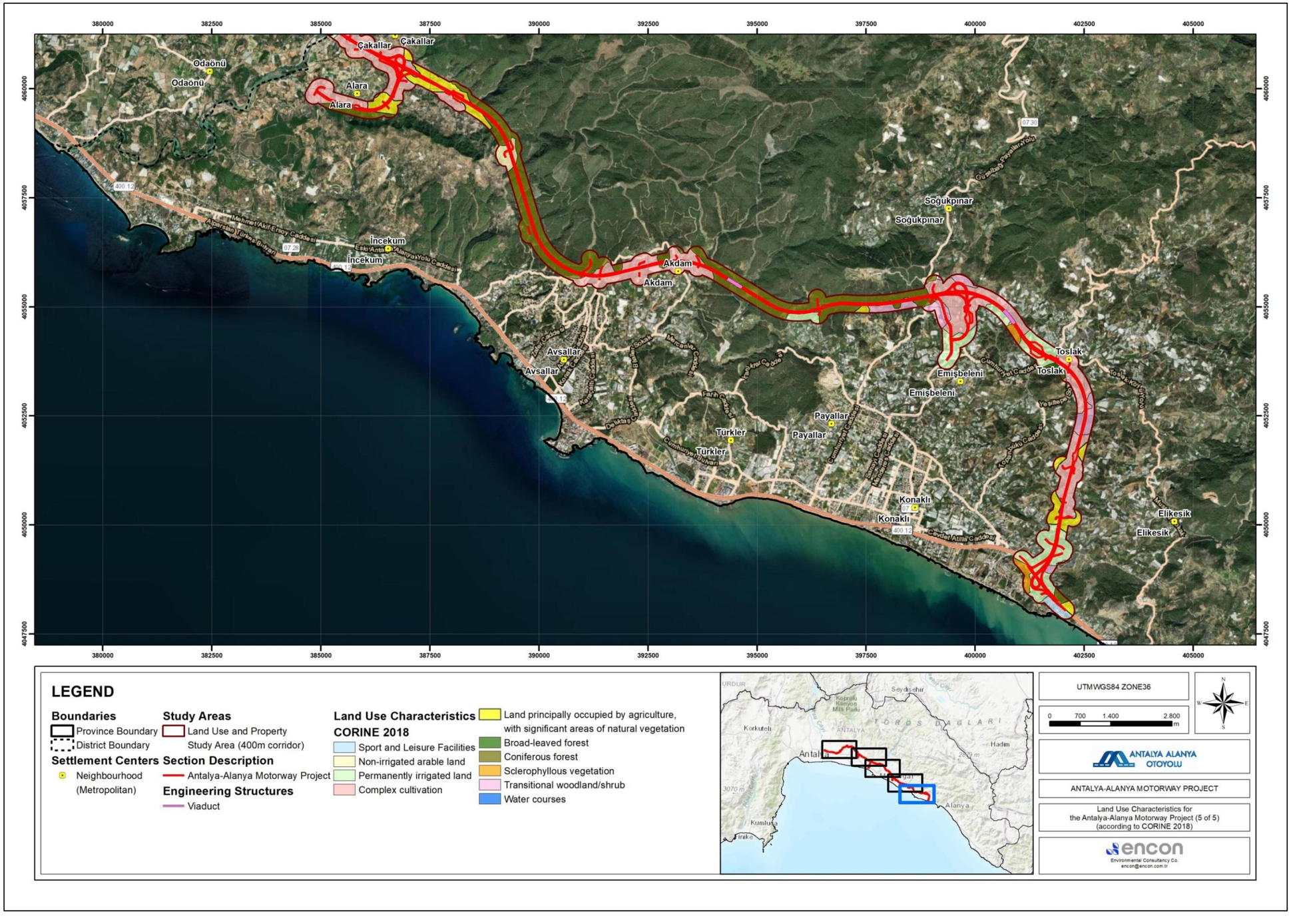


Figure V.5. Map of Land Use Characteristics for the Project according to the CORINE 2018 (5 of 5)

The land use characteristics along the Antalya–Alanya Motorway route (covering the maximum expropriation corridor of 450 meters) have been analyzed using the CORINE Land Cover (2018) classification system. The total study area is 6,856.13 hectares. The key findings of the analyses done based on CORINE database for the total study corridor of 6,856.13 hectares is summarized below.

The analysis reveals that the predominant land use type within the corridor is agricultural land, which accounts for 76.06% of the total area (5,214.46 ha). Within this category, heterogeneous agricultural areas are the most widespread, covering 53.04% of the study area (3,636.23 ha), followed by arable land at 20.56% (1,409.85 ha) and permanent crops at 2.46% (168.38 ha).

Forest and semi-natural areas represent the second-largest land use category, comprising 22.68% of the corridor (1,554.82 ha) consisting of forests and shrub and/or herbaceous vegetation associations. The most dominant sub-category within this classification is coniferous forest (711.44 ha; 10.38%) followed by transitional woodland-shrub areas (626.73 ha; 9.14%).

Artificial surfaces make up a very small proportion of the corridor, amounting to just 0.69% (47.58 ha), primarily consisting of industrial, commercial, and transport units and sport and leisure facilities.

Water bodies occupy a negligible portion of the study area, covering only 0.57% (39.27 ha), mainly in the form of water courses and water bodies.

This distribution highlights that the project corridor is largely dominated by agricultural and forested landscapes, with minimal presence of urban or industrialized land uses. A significant portion of the study area consists of natural and semi-natural land types, including forests, shrublands, and heterogeneous agricultural areas.

V.2.1.2. Land Use Characteristics according to Identification and Improvement of Problematic Agricultural Lands Project (STATİP)

STATIP (“Identification and Improvement of Problematic Agricultural Lands Project”) aims to identify and classify land and soil resources in accordance with scientific principles within the framework of the Law No. 5403 on Soil Conservation and Land Use. In 2002, it was initiated by the General Directorate for the Development of Agricultural Production and was later carried out by the Agricultural Basins Branch Directorate and currently by the Department of Geographical Information Systems of the General Directorate of Agricultural Reform. It digitized village boundaries and agricultural lands using 1/25,000 scale topographic maps and satellite images, transferred the data to GIS environment and shared it with public institutions. Its objectives include providing rapid access to land information, supporting agricultural production and planning, identifying land uses in line with EU standards and providing up-to-date data for greenhouse gas emission calculations.

Land use characteristics within the study corridor were analyzed according to STATIP 2015 database and the results of the analysis are presented in Table V.4. In addition, maps showing the land use characteristics of the Project sections, which consist of five (5) sections in total, according to STATIP 2015 database are presented in from Figure V.6 to Figure V.10 respectively.

Table V.4. Land Use Characteristics along the Project Route according to STATİP 2015

Level 1	Level 2	Level 3	STATIP CODE	Antalya-Alanya Motorway Project			Level 1 Total Area (ha)		Level 2 Total Area (ha)		Level 3 Total Area (ha)	
				Area (m^2)	Area (ha)	Percent (%)	Area (ha)	Percent (%)	Area (ha)	Percent (%)	Area (ha)	Percent (%)
1. Agricultural Areas	1,1, Dry Agricultural Areas	1,1,1, Dry Absolute Agricultural Land	111	855,557.88	85.56	1.25	4,341.80	63.33	857.83	12.51	85.56	1.25
		1,1,2, Dry Marginal Agricultural Land	112	7,722,780.45	772.28	11.26					772.28	11.26
	1,2, Irrigated Agricultural Areas	1,2,1, Irrigated Absolute Agricultural Land	121	26,202,987.29	2,620.30	38.22			3,083.80	44.98	2,620.30	38.22
		1,2,2, Irrigated Marginal Agricultural Land	122	2,076,677.23	207.67	3.03					207.67	3.03
		1,2,3, Irrigated High-Value Crop Agricultural Land	123	2,558,369.12	255.84	3.73					255.84	3.73
	1,3, Mixed Agriculture	1,3,1, Settlement-Agriculture	131	598,289.01	59.83	0.87			59.83	0.87	59.83	0.87
	1,4, Planted Agriculture	1,4,8, Other Planted Crops	148	12,477.21	1.25	0.02			340.33	4.97	1.25	0.02
		1,4,9, Orchard Lands	149	3,390,830.94	339.08	4.95					339.08	4.95
2. Settlement	2,1, Residential Areas	2,1,2, District Centers	212	38,183.57	3.82	0.06	122.22	1.79	30.56	0.45	3.82	0.06
		2,1,3, Village Centers	213	267,380.82	26.74	0.39					26.74	0.39
	2,2, Non-Residential Building Areas	2,2,3, Industrial Areas	223	466,498.17	46.65	0.68			91.67	1.34	46.65	0.68
		2,2,6, Highways	226	87,291.26	8.73	0.13					8.73	0.13
		2,2,7, Entertainment and Tourism Areas	227	362,893.13	36.29	0.53					36.29	0.53
3. Forest Areas	3,1, Broad-leaved Forest		31	713,765.79	71.38	1.04	1,991.45	29.05	71.38	1.04	71.38	1.04
	3,2, Coniferous Forest		32	11,655,117.14	1,165.51	17.00			1,165.51	17.00	1,165.51	17.00
	3,3, Mixed Forest		33	1,491,681.10	149.17	2.18			149.17	2.18	149.17	2.18
	3,4, Shrublands and Bushlands		34	6,053,983.91	605.40	8.83			605.40	8.83	605.40	8.83
4. Natural and Semi-natural Areas	4,1, Sparsely Vegetated Areas		41	8,823.94	0.88	0.01	8.74	0.12	0.88	0.01	0.88	0.01
	4,4, Riverbed Beaches		44	78,579.59	7.86	0.11			7.86	0.11	7.86	0.11
5. Meadow-Pasture	5,1, Pasturelands		51	2,270,420.02	227.04	3.31	338.85	4.94	227.04	3.31	227.04	3.31
	5,2, Meadowlands		52	1,118,033.78	111.80	1.63			111.80	1.63	111.80	1.63
7. Water Bodies	7,2, Rivers		72	530,705.42	53.07	0.77	53.07	0.77	53.07	0.77	53.07	0.77
Total				**68,561,326,77**	**6,856.13**	**100,00**	**6,856.13**	**100.00**	**6,856.13**	**100.00**	**6,865.96**	**100.00**

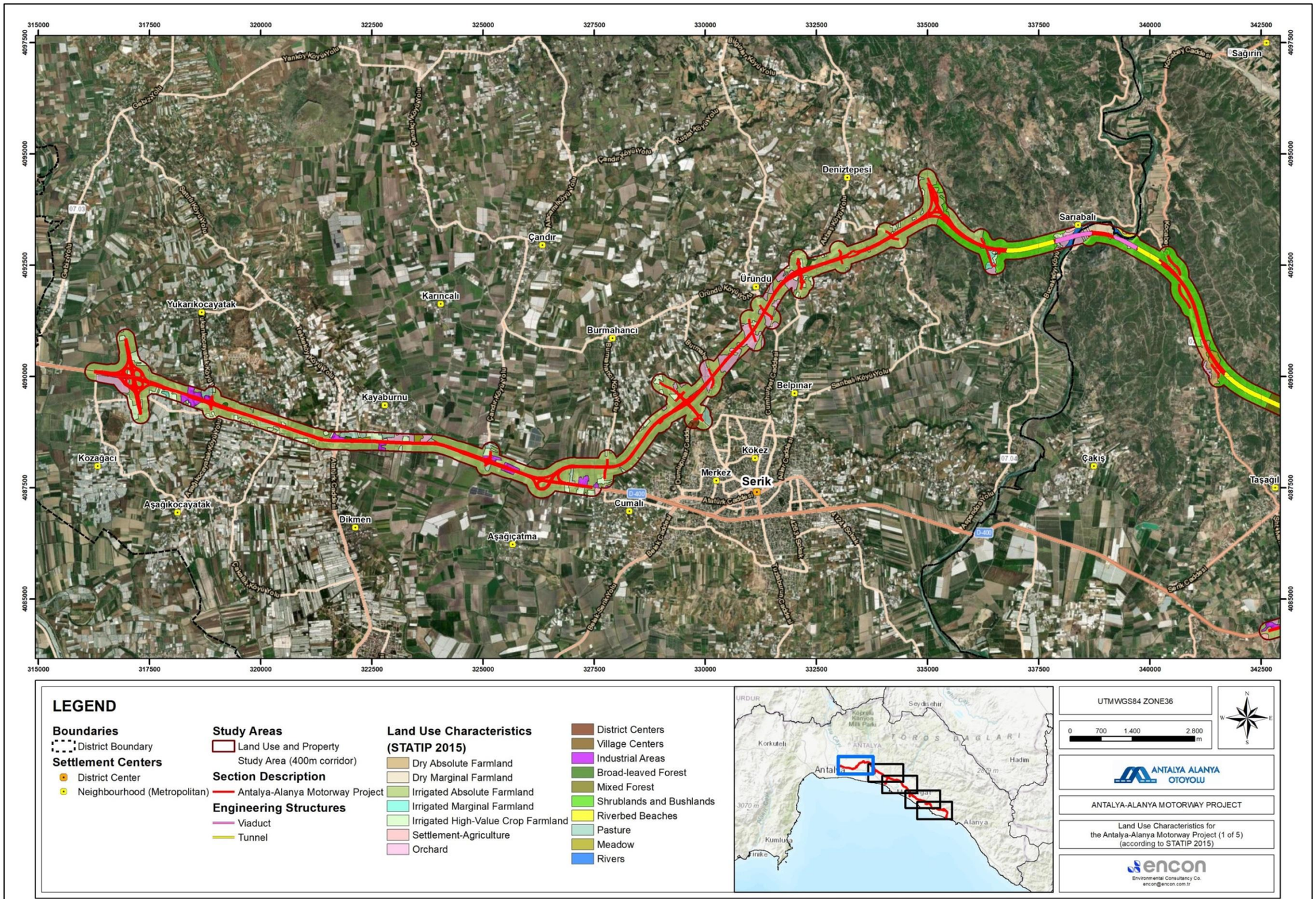


Figure V.6. Map of Land Use Characteristics for the Project according to STATİP 2015 (1 of 5)

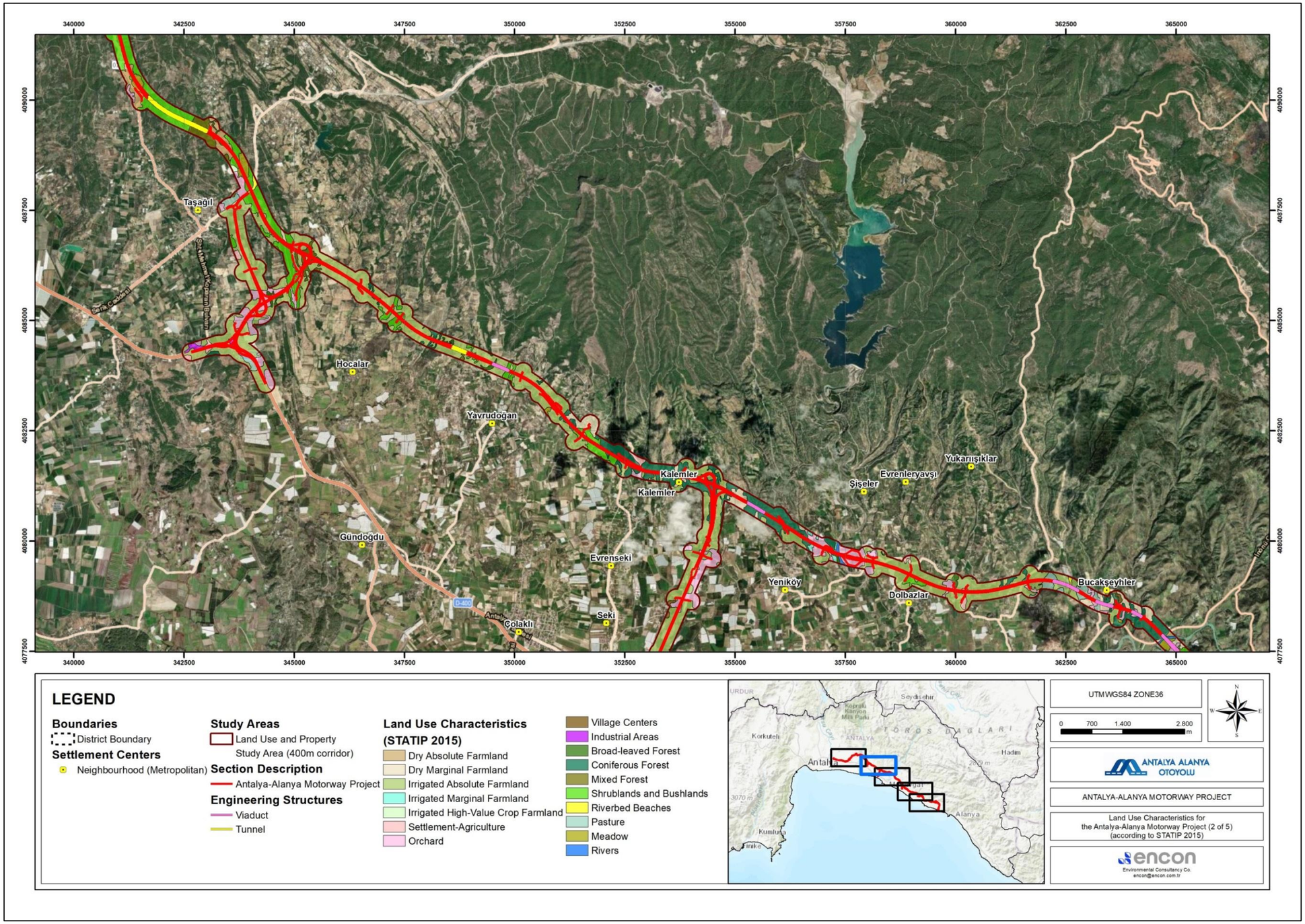


Figure V.7. Map of Land Use Characteristics for the Project according to STATİP 2015 (2 of 5)

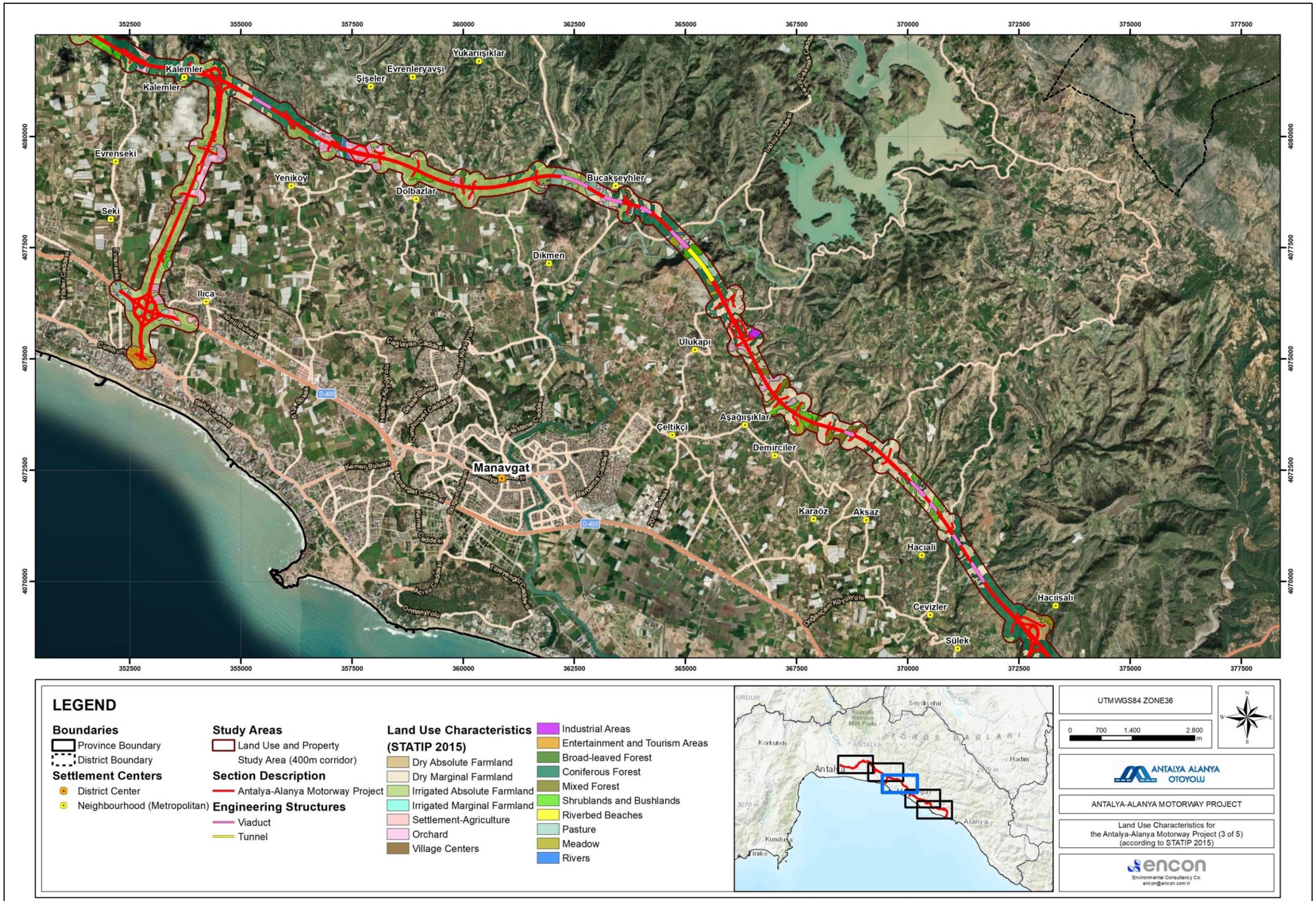


Figure V.8. Map of Land Use Characteristics for the Project according to STATİP 2015 (3 of 5)

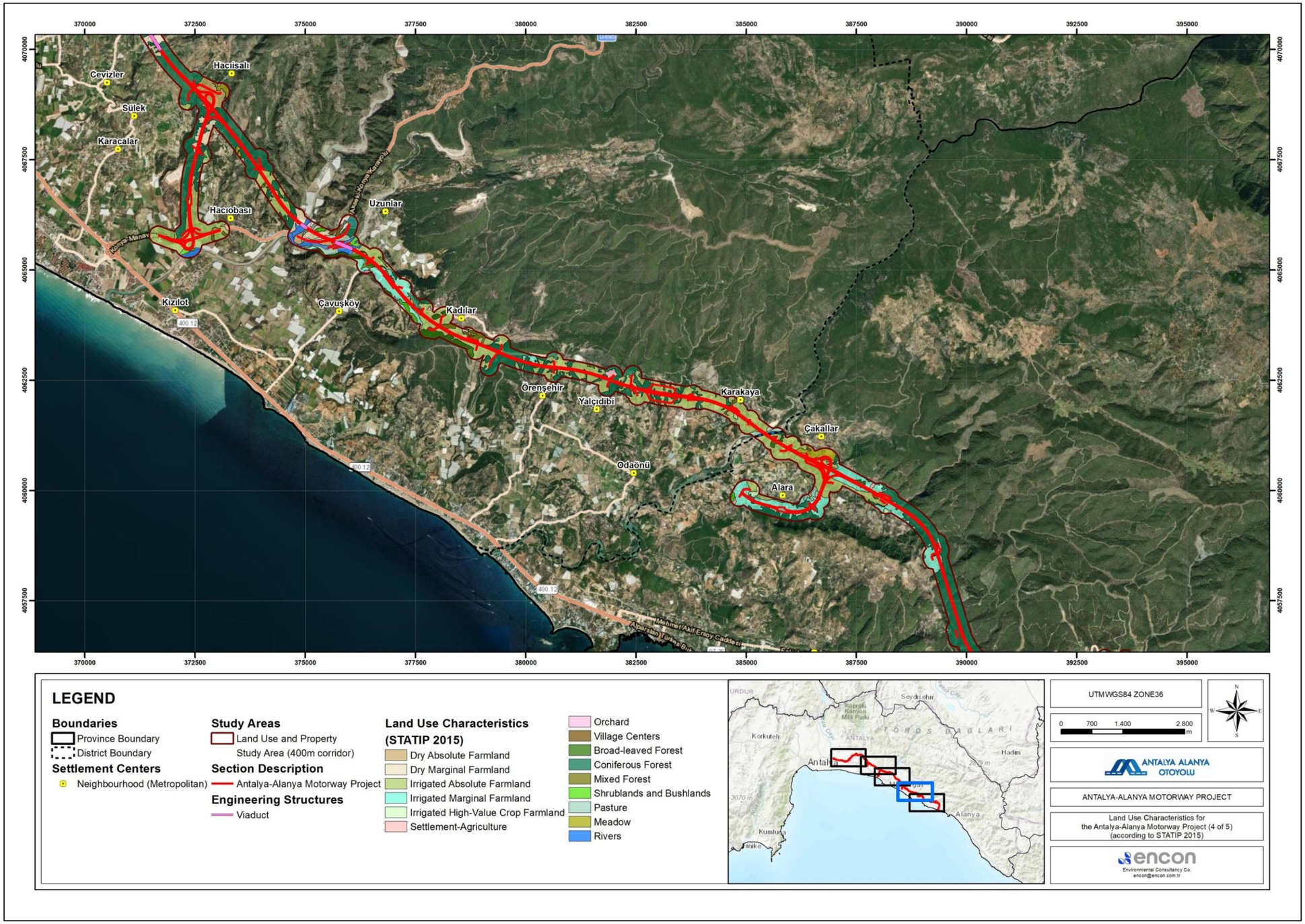


Figure V.9. Map of Land Use Characteristics for the Project according to STATİP 2015 (4 of 5)

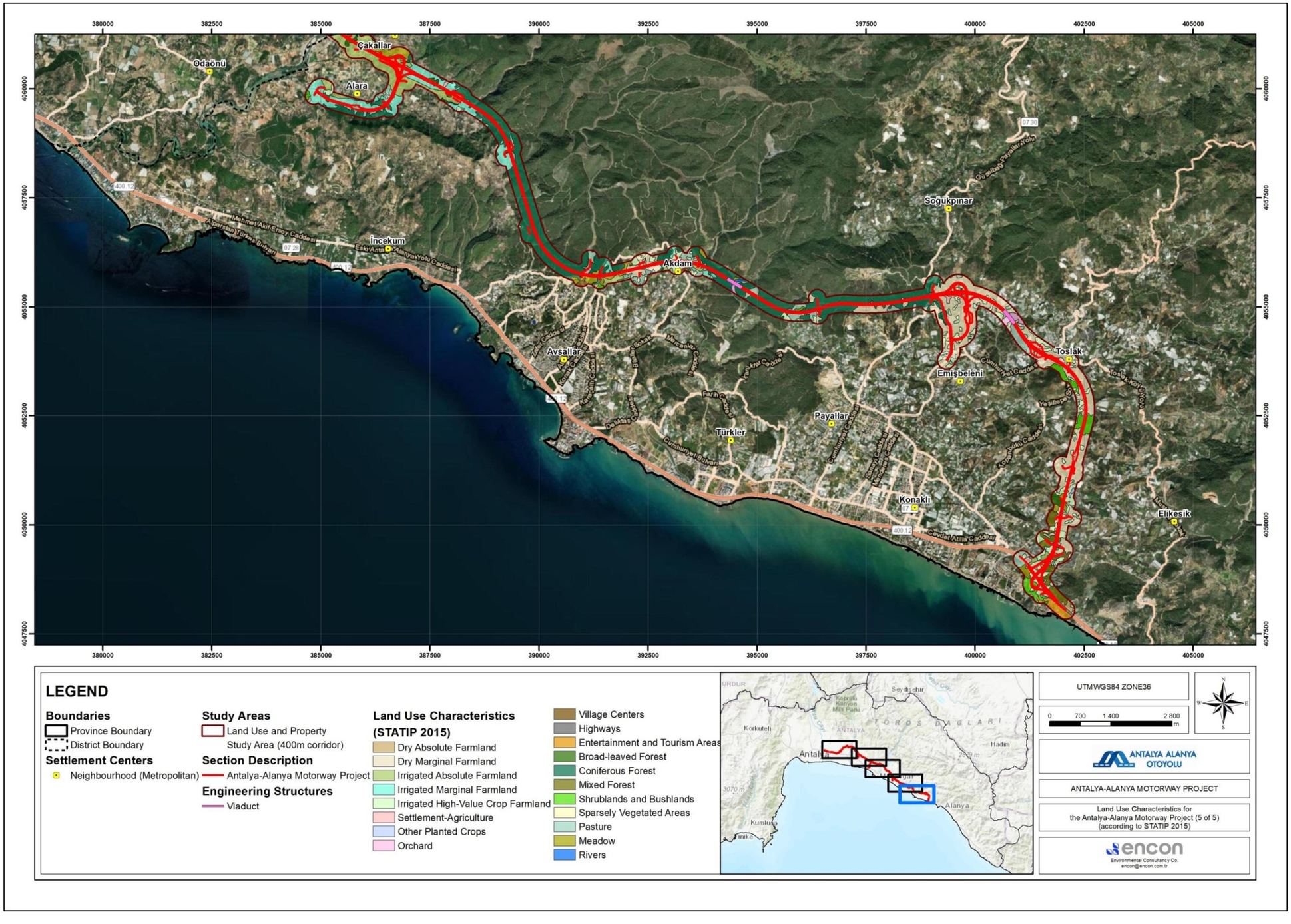


Figure V.10. Map of Land Use Characteristics for the Project according to STATİP 2015 (5 of 5)

The key findings of the analyses done based on STATİP-2015 database for the total study corridor of 6,856.13 hectares is summarized below.

Based on the STATİP-2015 classification system, agricultural areas constitute the predominant land use type within the project corridor, accounting for 63.33% (4,341.80 ha) of the total land cover. Within this category, irrigated agricultural areas dominate with 3,083.80 ha (44.98%), primarily made up of irrigated absolute and high-value crop lands (2,620.30 ha; 38.22%). Dry agricultural lands are the second largest sub-category (857.83 ha; 12.51%), consisting mainly of dry-marginal agricultural areas (772.28 ha; 11.26). Other notable agricultural sub-categories include orchard lands (339.08 ha; 4.95%) and settlement-agriculture types (59.83 ha; 0.87%).

Forest areas form the second most extensive land use category, covering a total of 1,991.45 ha, which corresponds to 29.05% of the project corridor. Among these, coniferous forests are the most prominent, occupying 1,165.51 ha (17.00%). Shrublands and bushlands also contribute significantly with 605.40 ha (8.83%), followed by mixed forests (149.17 ha; 2.18%) and broad-leaved forests (71.38 ha; 1.04%).

Meadow and pasture areas cover a limited portion of the project corridor, totaling 338.85 ha (4.94%). These areas are predominantly made up of pasturelands, which account for 227.04 ha (3.31%), while meadowlands represent 111.80 ha (1.63%) of the corridor.

Settlement areas, which include both residential and non-residential built-up zones, occupy a relatively small portion of the corridor, totaling 122.22 ha (1.79%). Within this category, the most notable components are village centers (26.74 ha), industrial areas (46.65 ha), and entertainment/tourism zones (36.29 ha).

Natural and semi-natural areas have minimal representation in the project corridor, covering 8.74 ha (0.12%). Similarly, meadow and pasture areas make up 338.85 ha (4.94%), predominantly consisting of pasturelands (227.04 ha; 3.31%) and meadowlands (111.80 ha; 1.63%).

Finally, water bodies, represented solely by river areas, account for a small fraction of the land use, with a total area of 53.07 ha (0.77%).

The land use distribution along the project corridor, as classified under the STATİP-2015 system, is predominantly composed of agricultural and forested areas. Agricultural areas, particularly irrigated lands, represent the majority land use, followed by forest areas with notable coverage of coniferous and shrubland types. Other land uses such as settlements, meadows-pastures, natural and semi-natural areas, and water bodies constitute relatively smaller proportions of the overall corridor.

V.2.1.3. Land Use Characteristics and Capabilities according to Land Use Database of the former Turkish General Directorate for Rural Services (GDRS)

Former Turkish General Directorate for Rural Services (GDRS) developed national land use and soil characteristics databases for all provinces based on the surveys performed by the General Directorate for Soil and Water (TOPRAKSU, one of the founding institutions of the Turkish General Directorate for Rural Services) in 1966-1971 and updated in 1982-1984 (former Ministry of Environment and Forestry, 2004). Land use and soil database for Antalya were established in 1993.

GDRS database defines the land use capabilities in eight (8) different classes as summarized in Table V.5. These classes represent the agricultural potential of the soil. In this classification system, soils are categorized between Class I, which represent the arable lands on which agricultural activities can be conducted in the most efficient, economic and simplest way without causing erosion, and Class VIII, which represent the lands that are not arable, cannot even be used as grassland or forest areas but support only wildlife development or can be used as resting area or national park by human. Characteristics of each class are summarized in Table V.5 (*Former Ministry of Agricultural and Rural Services, 2008*).

Table V.5. Agricultural Potentials Represented by Different Land Use Capability Classes and Their Characteristics

Class	Agricultural Potential	Definition of Land Use Capability
Class I	Agricultural lands suitable for agricultural soil cultivation	Class I lands are; flat or near flat, deep, fertile and easily cultivated so that the conventional agricultural methods can be applied; potential for water and soil erosion are minimal; have good drainage; are not prone to flood damage exposure; suitable for hoe plants and other intensively grown crops; Class I irrigated lands with low precipitation rates have slope values less than 1% slope, loamy structure, good water holding capacity and medium level permeability.
Class II		Class II lands are decent lands that can only be processed after taking some special precautions. Their difference from Class I lands is one or more of the limiting factors such as slight slope, moderate exposure to erosion, moderately thick soil, exposure to occasional moderate floods and a moderate level of moisture that can easily be isolated.
Class III		Class III lands are moderately good lands for hoe plants which can generate solid income provided they are utilized with a good cropping system and proper agricultural methods. Moderate slope, increased erosion sensitivity, excessive moisture, exposed soil, presence of stones, having a lot of sand and/or gravel, low water holding capacity and low yield are properties of this type of land.
Class IV		Class IV lands can be constantly utilized as meadows. Field crops can also be occasionally grown. High levels of slope, bad soil characteristics, erosion and climate are the factors limiting agricultural activities on these lands. Soils with low slopes and poor drainage are also classified as Class IV lands. These soils are not subject to erosion, but they are unsuitable for growing many agricultural products as they have a low yield and a tendency to suddenly dry up in the spring. In semi-arid regions, cropping systems incorporating legumes are generally not possible due to climate.
Class V	Agricultural lands not suitable for soil cultivation	Class V lands are reserved for long-life plantations such as meadows and forests as they generally are unsuitable for cultivated plants. A few factors such as stony structure and sogginess hinder cultivation here. The land is flat or near-flat. It is not subject to an excessive amount of wind and water erosion. Grazing and tree logging activities can be carried out on condition that a good soil cover is constantly maintained.
Class VI		Class VI lands require moderate precautions even when they are used as forest or meadow since they have quite a bit of slope and are subject to severe erosion. Exposed, soggy or very dry conditions make this type of land unsuitable for cultivation.
Class VII		Class VII lands have high slope, are stony and have been subject to violent erosion. Exposed soils, dry and/or some unfavourable conditions and swamps can be classified as Class VII soil. These can be used as forest or meadow without showing due care. If the vegetation on these soils diminishes, erosion can get quite violent.
Class VIII	Non-arable lands	Class VIII lands exhibit features that prevent them from being used as forest, meadow or cultivated land. This type of land is habitat to wild life and can also be used for recreational purposes or as catchment basins for streams. These include lands containing marshes, swamps, deserts as well as areas of high mountainous regions, rocky lands or lands with very deep craters.

Source: Former Ministry of Agricultural and Rural Services, 2008

The former Ministry of Agriculture and Rural Services, in its Technical Procedure on Soil and Land Classification Standards of 2008, specifies the suitability of different land classes for cultivation, grazing and forestry activities. These are summarized in Table V.6.

Table V.6. Usage Suitability Matrix for Different Land Use Classes

Land Use Capability Class	Wild life	Forestry	Grazing			Cultivation			
			Limited	Moderate	Intensive	Limited	Moderate	Intensive	Very Intensive
I									
II									
III									
IV									
V									
VI									
VII									
VIII									

**Colored boxes show the suitable uses for each type of activity.*
Source: Former Ministry of Agricultural and Rural Services, 2008.

The results of the land use analyses (land use types and land use capabilities) done for the study corridor based on the GDRS database are provided in Table V.7 and the relevant land use types maps are presented from Figure V.11 to Figure V.15, respectively and capabilities maps are presented from Figure V.16 to Figure V.20 respectively.

Table V.7. Land Use Characteristics and Capabilities within the Study Corridor (according to Turkish General Directorate for Rural Services, 1993)

Land Use Types	Land Use Capability	Study Corridor		
		Area (m^2)	Area (ha)	Percent (%)
Irrigated farmland	I	4,544,383.04	454,44	6.63
	II	11,140,131.74	1.114,01	16.25
	III	4,657,099.97	465,71	6.79
Sub-total (Irrigated farmland)		**20,341,614.74**	**2,034.16**	**29.67**
Irrigated farmland (insufficient)	III	672,595.06	67.26	0.98
Sub-total (Irrigated farmland (insufficient))		**672,595.06**	**67.26**	**0.98**
Dry farmland (fallow)	III	138,005.06	13.80	0.20
	IV	712,800.92	71.28	1.04
	VI	169,098.55	16.91	0.25
Sub-total (Dry farmland (fallow))		**1,019,904.54**	**101.99**	**1.49**
Dry farmland (non-fallow)	I	55,547.58	5.55	0.08
	II	2,459,261.89	245.93	3.59
	III	2,627,788.86	262.78	3.83
	IV	4,634,001.50	463.40	6.76
	VI	5,669,325.58	566.93	8.27

Land Use Types	Land Use Capability	Study Corridor		
		Area (m^2)	Area (ha)	Percent (%)
Sub-total (Dry farmland (non-fallow))		**15,445,925.42**	**1,554.59**	**22.53**
Pastures	VII	210,897.33	21.09	0.31
Sub-total (Pastures)		**210,897.33**	**21.09**	**0.31**
Forestry	VI	4,850,910.08	485.09	7.07
	VII	5,030,978.51	503.10	7.34
Sub-total (Forestry)		**9,881,888.59**	**988.19**	**14.41**
Shrubbery	III	243,806.54	24.38	0.35
	IV	4,071,020.16	407.10	5.94
	VI	9,006,212.68	900.62	13.13
	VII	6,949,608.60	694.96	10.14
Sub-total (Shrubbery)		**20,270,647.97**	**2,027.07**	**29.56**
Settlements		184,874.57	18.49	0.27
River		44,053.60	4.41	0.06
River Flood Plain	VIII	428,820.08	42.88	0.63
Coastal Dunes	VIII	60,104.88	6.01	0.09
Total		**68,561,326.77**	**6,856.13**	**100.00**

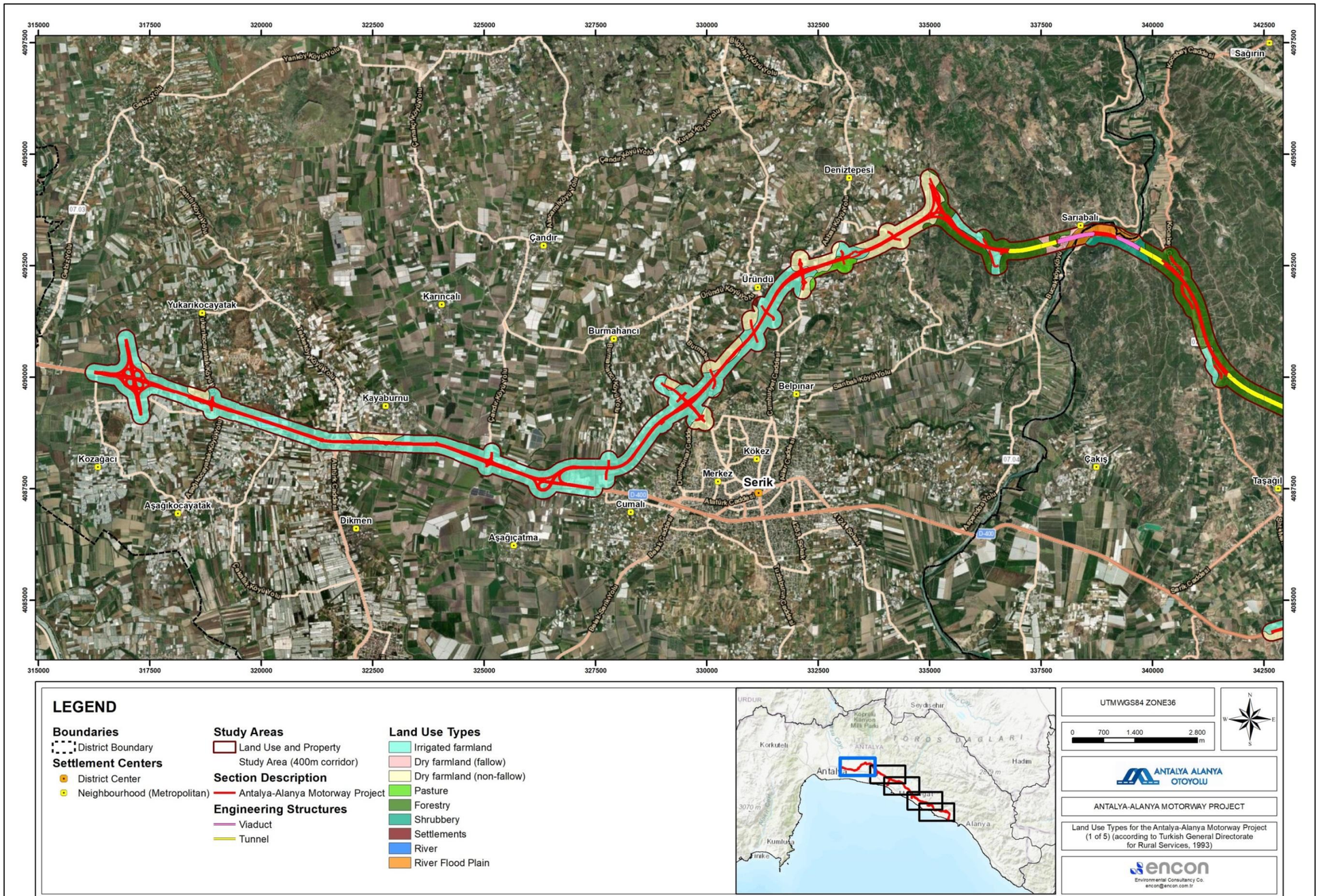


Figure V.11. Map of Land Use Types for the Project according to the GDRS, 1993 (1 of 5)

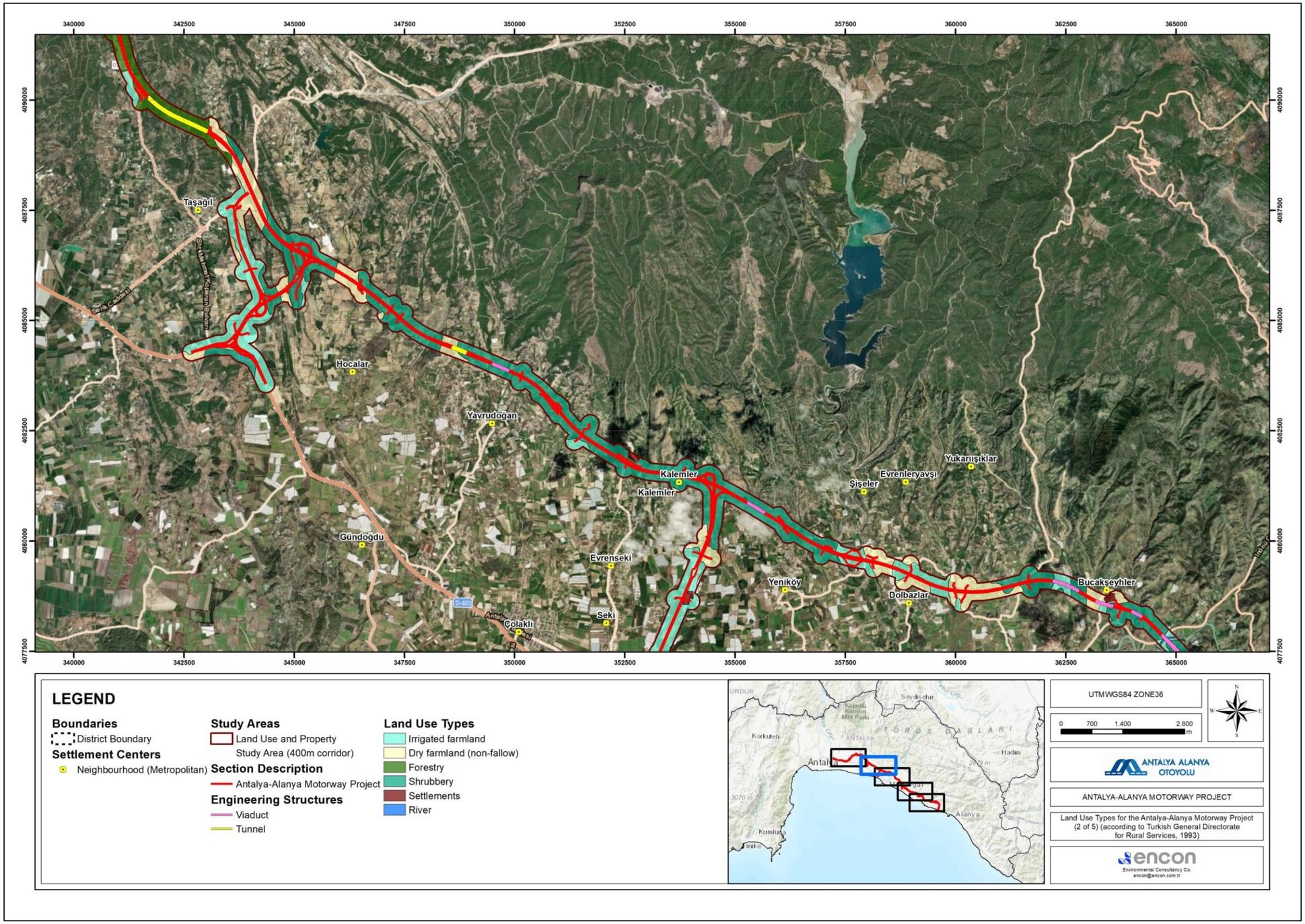


Figure V.12. Map of Land Use Types for the Project according to the GDRS, 1993 (2 of 5)

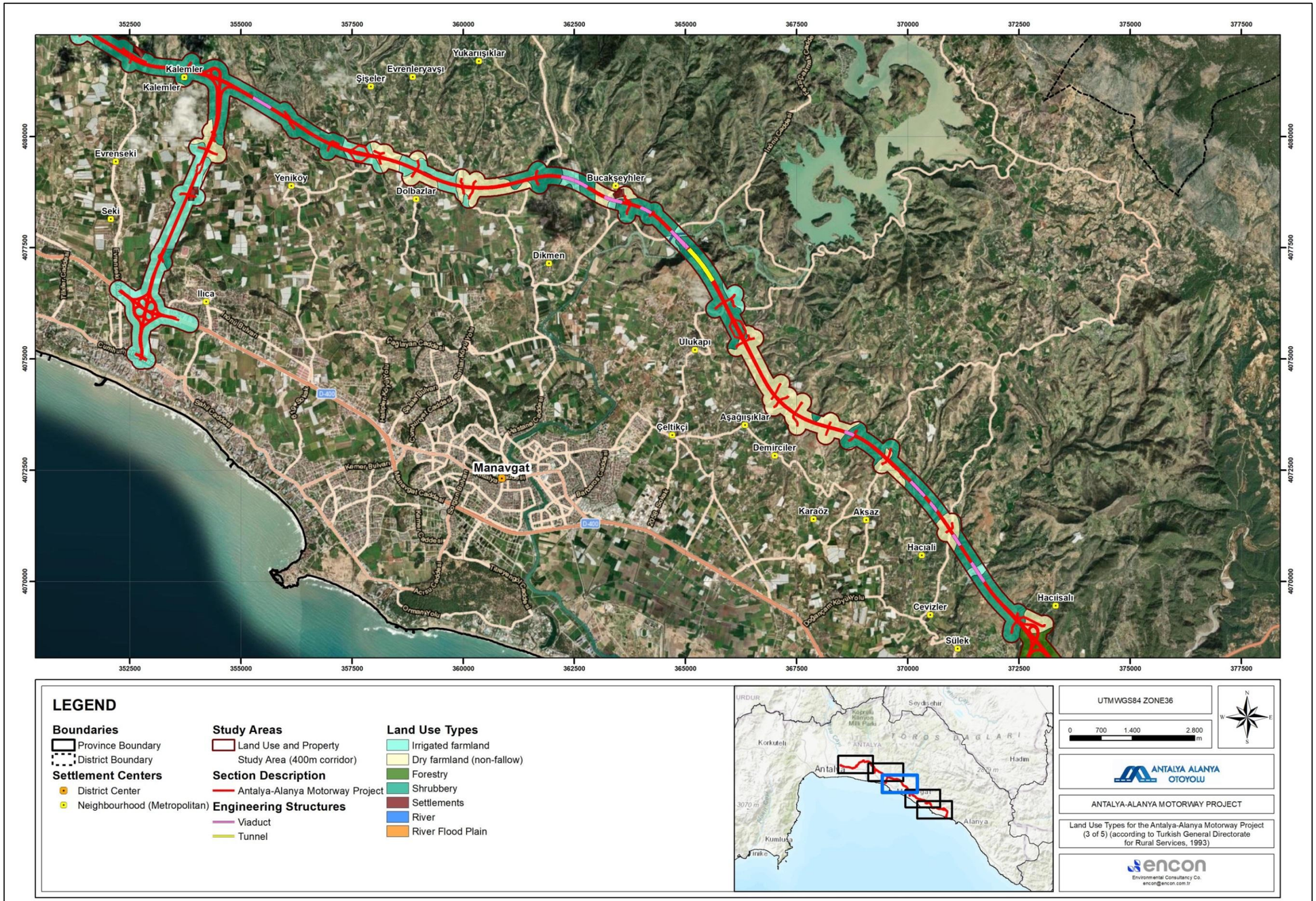


Figure V.13. Map of Land Use Types for the Project according to the GDRS, 1993 (3 of 5)

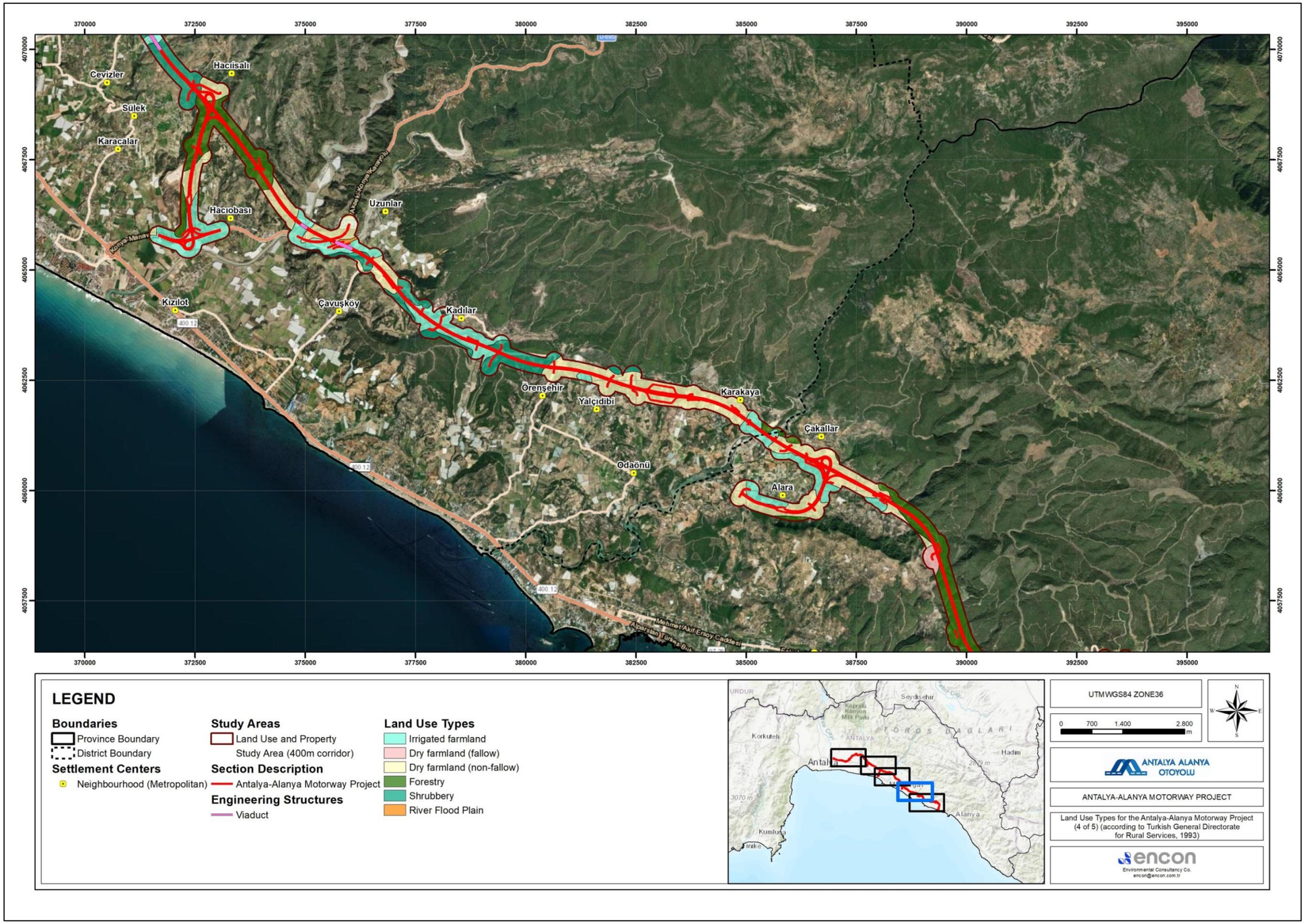


Figure V.14. Map of Land Use Types for the Project according to the GDRS, 1993 (4 of 5)

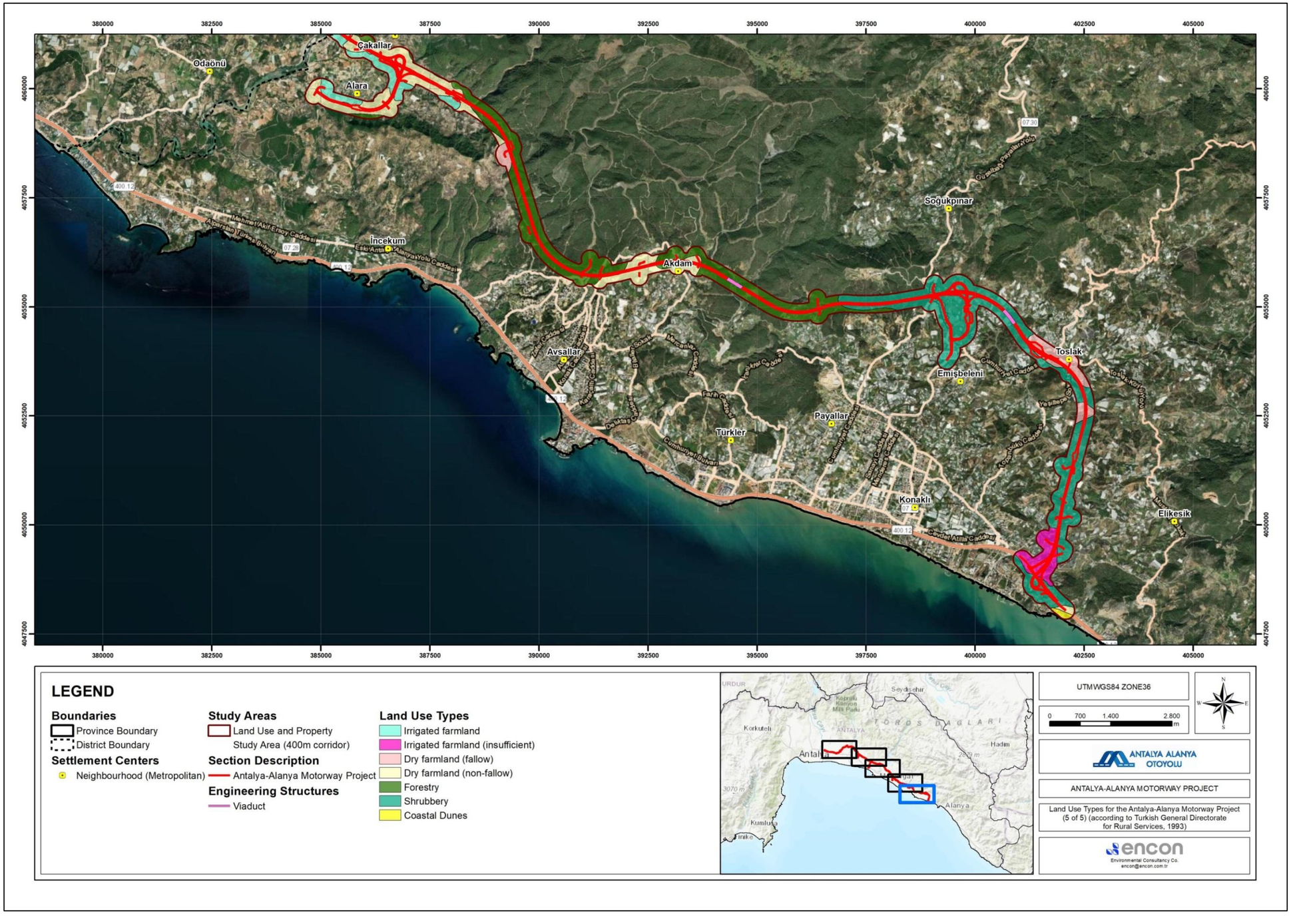


Figure V.15. Map of Land Use Types for the Project according to the GDRS, 1993 (5 of 5)

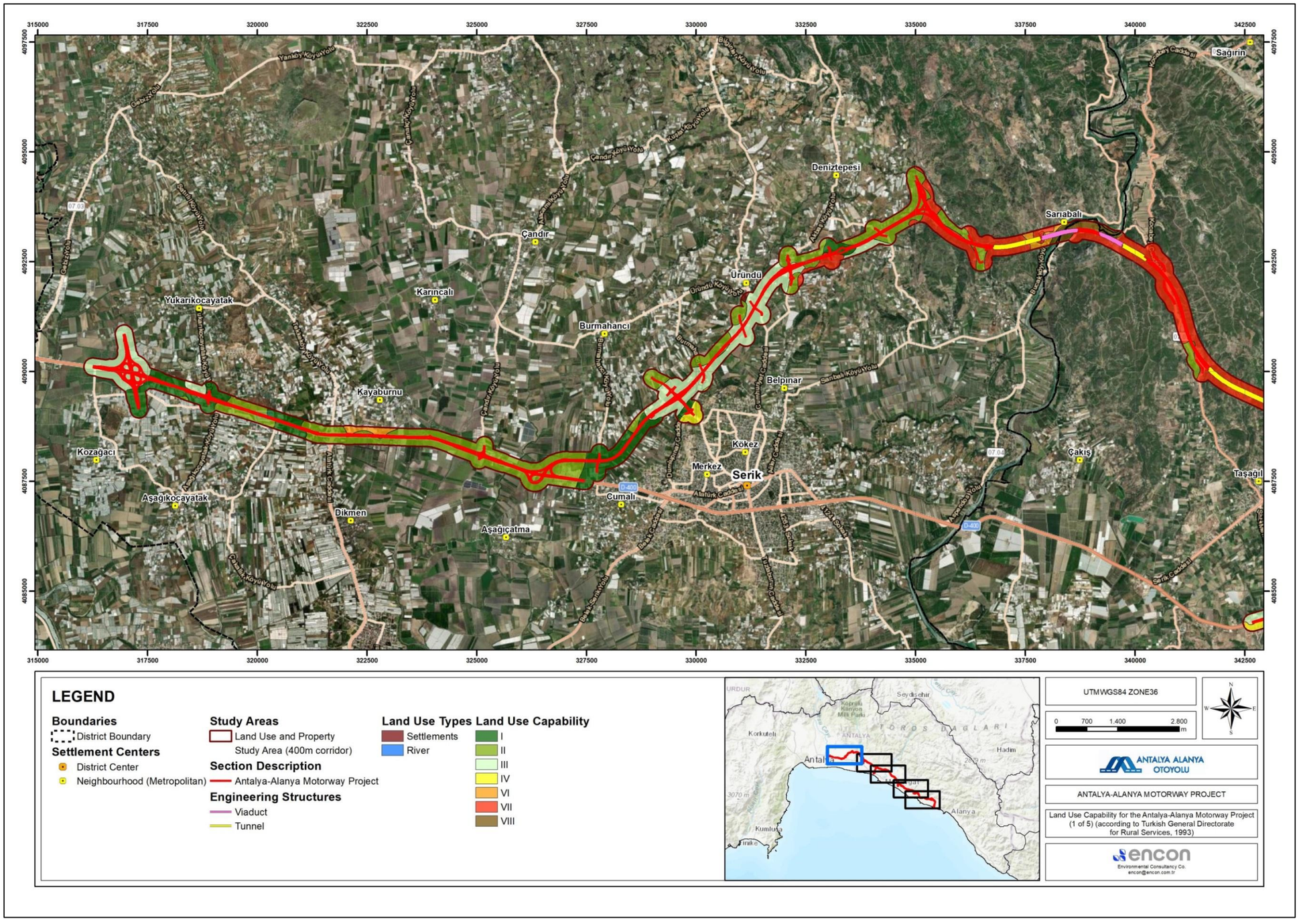


Figure V.16. Map of Land Use Capabilities for the Project according to the GDRS, 1993 (1 of 5)

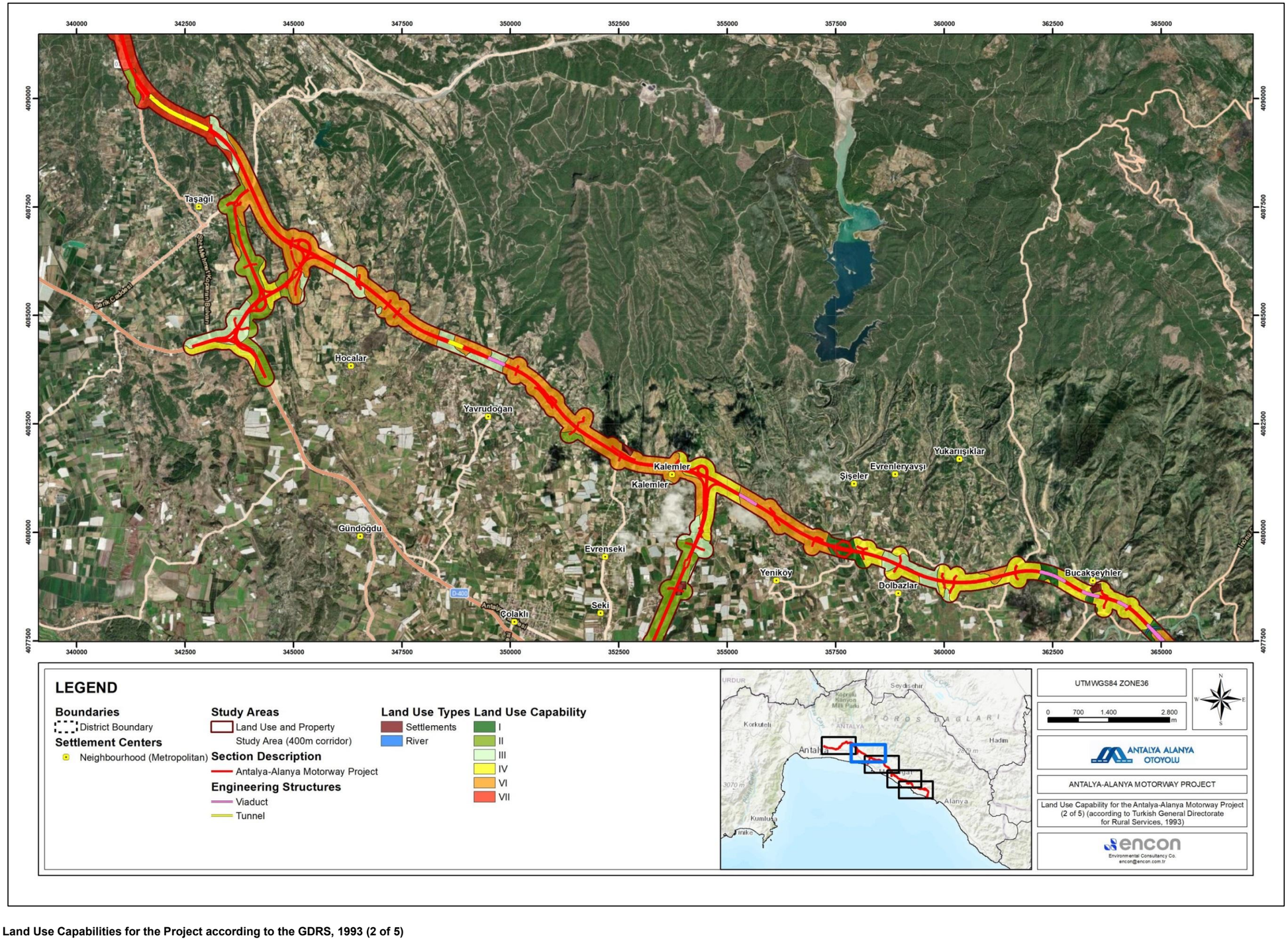


Figure V.17. Map of Land Use Capabilities for the Project according to the GDRS, 1993 (2 of 5)

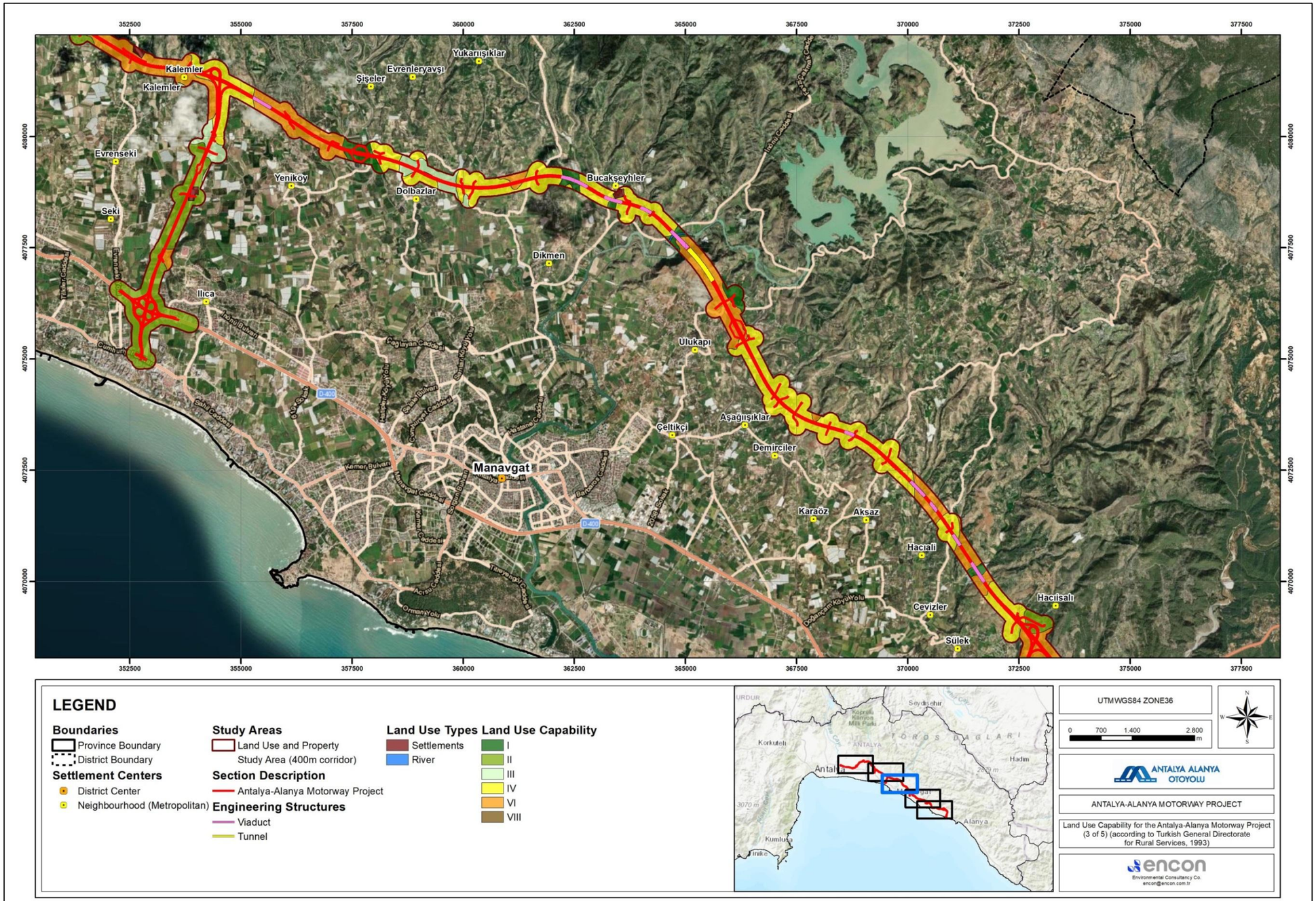


Figure V.18. Map of Land Use Capabilities for the Project according to the GDRS, 1993 (3 of 5)

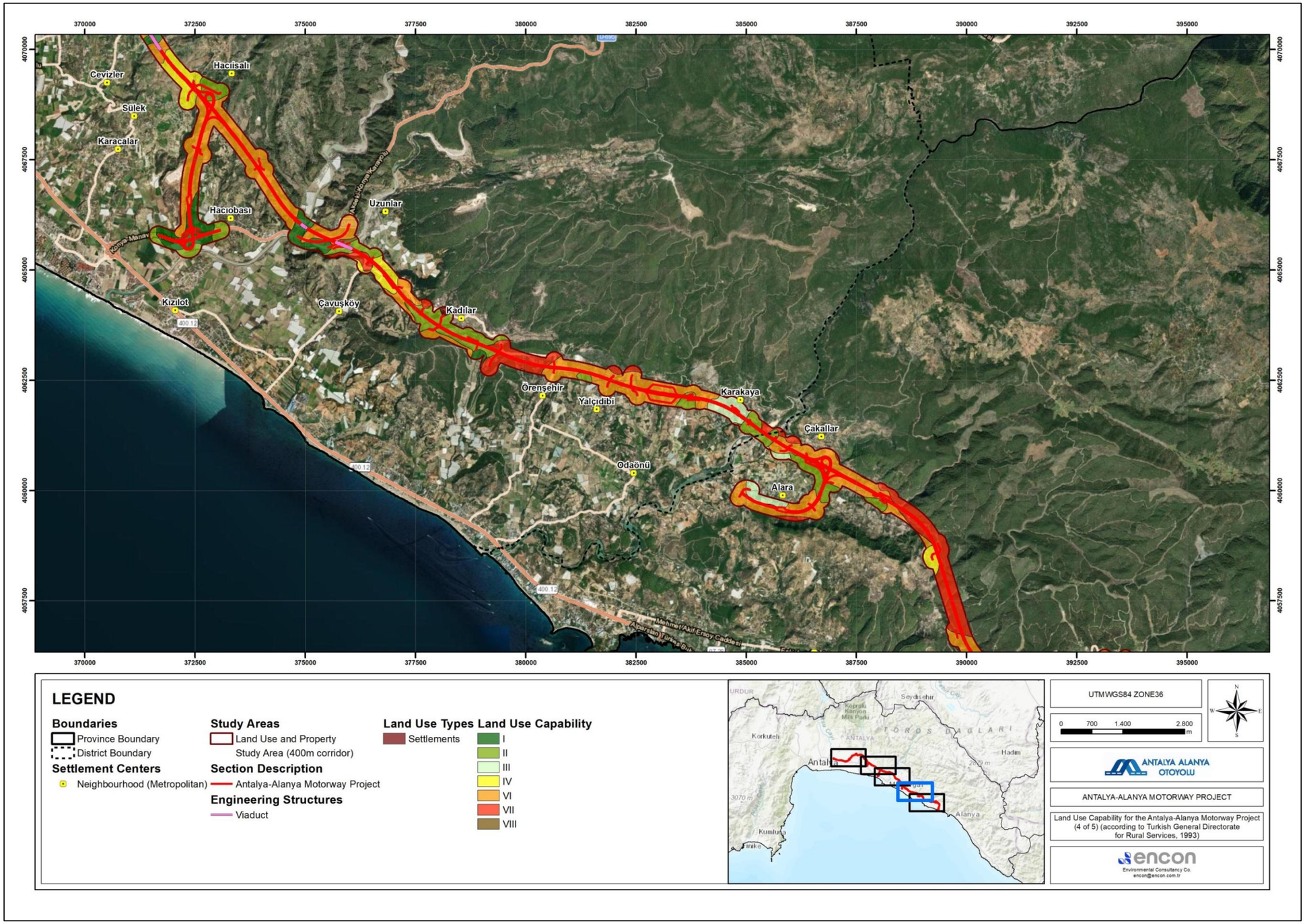


Figure V.19. Map of Land Use Capabilities for the Project according to the GDRS, 1993 (4 of 5)

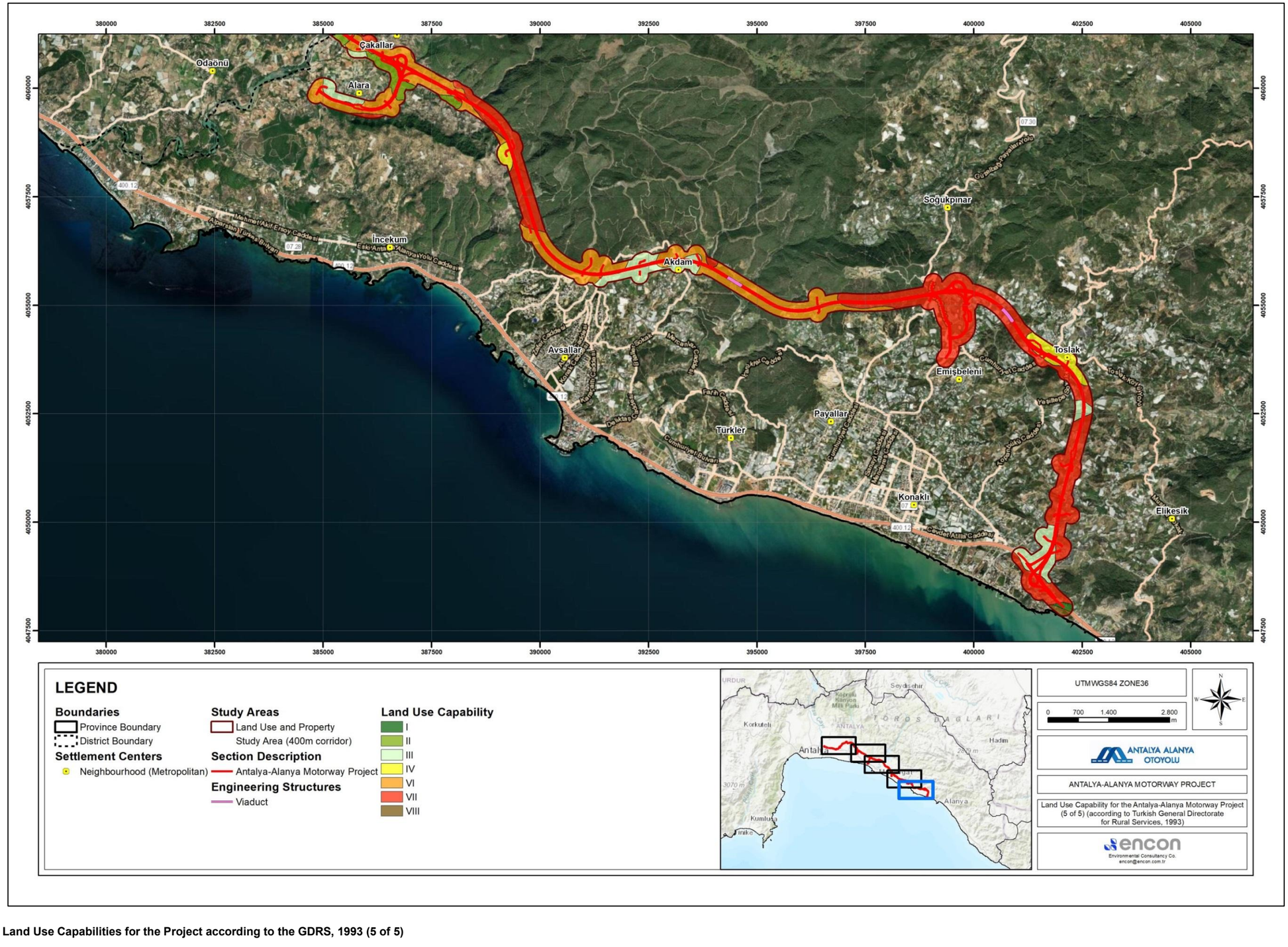


Figure V.20. Map of Land Use Capabilities for the Project according to the GDRS, 1993 (5 of 5)

According to GDRS, the study area comprises a mix of lands with varying degrees of agricultural, ecological, and economic value. The land use capabilities of the soils corresponding to the study corridor are presented in Table V.7 and have been interpreted in accordance with the guidance provided by GDRS.

The most extensive land use category in the corridor is irrigated farmland, covering 2,034.16 hectares, which constitutes 29.67% of the study area. These lands are classified under Capability Classes I (454.44 ha; 6.63%), II (1,114.10 ha; 16.25%), and III (465.71 ha; 6.79%), all of which are considered suitable for intensive to moderately intensive cultivation.

The second largest land capability group in terms of total area is shrubbery, with 2,027.07 hectares, making up 29.56% of the corridor. These areas are classified as Class VI (900.62 ha; 13.13%), Class VII (694.96 ha; 10.14%), Class IV (407.10 ha; 5.94%), and Class III (24.38 ha; 0.35%).

Dry farmland (non-fallow), which occupies 1,554.59 hectares (22.53%), is mainly distributed across Classes VI (566.93 ha; 8.27%), IV (463.40 ha; 6.76%), III (262.78 ha; 3.83%), and II (245.93 ha; 3.59%).

Forest areas, which span 988.19 hectares (14.41%), fall within Class VII (503.10 ha; 7.34%) and Class VI (485.09 ha; 7.07%). These lands are marked by significant limitations, including steep terrain, shallow or stony soils, and susceptibility to erosion.

Dry farmland (fallow) lands covers 101.99 ha (1.49%) consisting of Classes IV (71.28 ha; 1.04%), VI(16.91 ha; 0.25%), III(13.80 ha; 0.20%).

Pasture lands, although limited in spatial extent at 21.09 hectares (0.31%), are also classified under Class VII, reinforcing their restricted usability.

In conclusion, the GDRS-based land use capability assessment demonstrates a landscape where productive agriculture is feasible on Classes I–IV lands, particularly for irrigated use, while Classes V–VIII exhibit varying degrees of constraint that require controlled or conservation-oriented land use.

The key findings of the land use capability analyses are summarized below (settlement areas, ponds and rivers that cover 0.33% of the study corridor and not categorized under any of the land use capability classes are not taken into consideration in the following figures):

- Lands suitable for soil cultivation (Classes I, II, III and IV) cover 52.44% of the study corridor (3,595.64 ha).
- Lands not suitable for soil cultivation (Class VI and VII) cover 46.50% (3,188.77 ha) of the study corridor.
- Class VIII lands (non-arable lands) cover 0.71% of the study corridor (48.89 ha).

Table V.7 indicates the suitability of different land classes for cultivation, grazing and forestry activities. Class VIII lands are not suitable for cultivation, grazing or forestry activities and can only provide habitat use for wildlife components. Similarly, Class VII lands are only suitable for forestry and grazing activities to a limited extent.

V.2.1.4. Comparison of Study Area for Different Land Use Types

A comparison of the areas occupied by different land use types under CORINE (2018), STATİP (2015) and GDRS (1993) databases is provided in Table V.8 to allow an evaluation of the changes within years. It should be noted that the classification system of the three databases differs and the following comparison is given to provide a general overview of the development.

Table V.8. Comparison of Areas for Different Land Use Types According to CORINE (2018), STATIP (2015) GDRS (1993) Databases

Land Use Type	Data Source					
	CORINE (2018)		STATİP (2015)		GDRS (1993)	
	Area (ha)	Percent (%)	Area (ha)	Percent (%)	Area (ha)	Percent (%)
Agriculture/Farmlands	5,214.46	76.06	4,341.80	63.33	3,748.00	54.67
Forestry	722.64	10.54	1,386.05	20.22	988.19	14.41
Shrubbery	626.73	9.14	605.40	8.83	2,027.06	29.56
Pastures, Meadows, etc.	-	-	338.85	4.94	21.09	0.31
Others (Settlements/Urban Fabric, Mineral Extraction Sites, Transport Networks, Water Bodies etc.)	292.3	4,26	184.03	2.68	71.79	1.05
Total	**6,856.13**	**100.00**	**6,856.13**	**100.00**	**6,856.13**	**100.00**

V.2.1.5. Forestlands

In 1993, Helsinki Process began with the aim of developing guidelines for the sustainable management of forests in Europe. The Process has sought to identify measurable criteria and indicators for the evaluation of how European countries have progressed in their efforts to follow the principles of sustainable forest management and conservation of the biological diversity of European forests. The guidelines developed in the scope of the process concluded that forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual human needs of present and future generations. In alignment with the outcomes of the Helsinki process, Turkish Regulation on the Forestry Management categorizes the forestry functions under three groups as ecological, social/cultural and economic and attributes specific management goals for each sub-function as listed in Table V.9.

Forests with economic functions are operated/managed with the aim of production of forest products (wood and non-wood) having economic value and meet the economic demand for these products in a continuous and regular way. These forests are particularly allocated to economic functions, while they can co-perform other functions (e.g. ecological) as well. This function includes areas (i.e. wood productions forests) that are suitable for forest maintenance and regeneration works both in terms of growing conditions and also social considerations.

Some of the forests are established on sensitive ecological balances and shelter high ecological value so that these forests primarily serve for ecological functions as the irreversible impacts of forest production activities cannot be tolerated on such environments. Consequently, even if these types of forests have an economic value in terms of forest product production, conservation of them for their ecological value or environmental functions becomes the first priority.

Forests having social and/or cultural functions primarily serve for the protection of public health by preventing noise and/or air emissions and aesthetic and scientific research purposes and provide recreational areas for natural activities, sports, ecotourism purposes, etc. Forest zones in the vicinity of motorways or railways, having a width of minimum 50-100 m, are considered to be effective in mitigating the adverse impacts of noise generation and forming an aesthetic view.

Table V.9. Functions of Forests and Associated Management Goals

Functions	General Forestry Functions	Management Goals
Economic	Forest products production	Industrial plantation
		Quality and featured wood production
		Industrial wood production in maximum capacity
		Firewood production
		Others (specific afforestation, etc.)
		Production of non-wood forestry products
		Honey production areas
		Herbal products
		Animal products
		Water and mineral products
Ecological	Nature protection	Nature protection
		Gene conservation forest
		National Park
		Protection forest
		Nature Park
		Nature protection area
		Wildlife protection and development sites
		Alpine zone
		Natural old growth forest
		Ecological transition zone
		Sensitive ecosystems
		Coastal forests
		Forest ecosystem improvement areas
		Very unfavorable growth grounds
		Areas with very high protection value
		High mountain forest ecosystems
		Seed stands
		Seed orchards
		Areas to be protected from social stress
		Wild life protection and management sites of General Directorate of Forestry
		Biological diversity conservation and development areas
	Erosion protection/	Avalanche prevention

Functions	General Forestry Functions	Management Goals
	Soil conservation	Landslide prevention
		Stone and rock fall prevention
		Soil conservation
		Flood prevention
	Climate protection	Forests primarily allocated to climate protection
Social/ Cultural	Hydrological	Drinking water protection
		Utility water protection
		Conservation of water resources
	Public Health	Noise prevention
		Air pollution prevention
		City forests
		Protection of health facilities
	Aesthetics	Road protection for aesthetic purposes (green road)
		Aesthetic appearance
	Ecotourism and recreation	Nature trekking areas
		Rock climbing sites
		Bird watching sites
		Recreational areas (picnic areas, fest areas, etc.)
		Sports area
		Hunting area
		Tourism intended forests
	National security	Military installations and drill sites
		National border and strategic areas
	Scientific	Research intended areas
		Arboretum research forest
		Educational purposes
		Faculty research
		Forestry research forest

The Project falls within the jurisdiction of four (4) different Forestry Management Directorates (Serik, Taşağıl, Manavgat and Alanya) under Antalya Regional Directorate of Forestry as summarized in Table V.10.

Table V.10. Relevant Forestry Directorates for the Project

Regional Directorate	Forestry Management Directorate	Management Sub-directorate
Antalya Regional Directorate of Forestry	Serik Forestry Management Directorate	Serik Forestry Management Sub-directorate
		Akbaş Forestry Management Sub-directorate
	Taşağıl Forestry Management Directorate	Taşağıl Forestry Management Sub-directorate
		Çardak Forestry Management Sub-directorate
	Manavgat Forestry Management Directorate	Şelale Forestry Management Sub-directorate
		Naras Forestry Management Sub-directorate
		Manavgat Forestry Management Sub-directorate
		Yalçıdibi Forestry Management Sub-directorate
	Alanya Forestry Management Directorate	Alara Forestry Management Sub-directorate
		Avsallar Forestry Management Sub-directorate
		Kargı Forestry Management Sub-directorate

According to CORINE (2018) database, forestlands (including the broad-leaved forests, coniferous forest and mixed forest) cover 10.54% (722.65 ha) of the entire study corridor (6,856.13 ha).

According to STATİP (2015) database, forestlands (including the broad-leaved forests, coniferous forest, mixed forest and shrublands) cover 29.05% (1,991.45 ha) of the entire study corridor (6,856.13 ha).

According to GDRS (1993) database, forestlands cover 14.4% (988.19 ha) of the entire study corridor (6,856.13 ha).

Forest Management Plans prepared by the relevant Forest Management Sub-Directorate will be used to analyze the forest areas of the Project. Forest Management Plans cover both the actual forests where forest cover (e.g. trees) are present at different density levels and open areas where forest cover is absent (unwooded forest soils) or where uses other than forestry such as settlement, agricultural, quarry, etc. are present. Forest Management Plans categorize the actual forests as high forests and coppice forests. Each category is further classified as productive forests where canopy cover rates ranges between 11-100% and degraded forests, where canopy cover rate is lower than 10%. Classification of canopy levels as 1, 2 and 3 according to the density of cover is done as summarized inTable V.11.

Table V.11. Canopy Cover Classification According to Forest Management Plans

Canopy Cover Classification	Canopy Cover Levels	
	Symbol	Rate (%)
Absent to sparse	-	0-10
Sparse	1	11-40
Moderately closed	2	41-70
Closed to fully closed	3	71-100

Areas of actual forests (covered by forest vegetation) and open areas corresponding to the study area according to their functions and canopy levels have been analyzed by using the Forest Management Plans and the relevant database. The results of the analyses are presented in Table V.12.

Table V.12. Distribution of Forestlands according to their Functions and Types within the Study Area

Forest Functions			Area of Actual Forests (ha)								Open Areas (ha)												
			High Forests				Coppice Forests																
			Canopy Cover Classification				Canopy Cover Classification																
			Productive			Degraded	Productive			Degraded													
			Level 3 (71-100%)	Level 2 (41-70%)	Level 1 (11-40%)	(0-10%)	Level 3 (71-100%)	Level 2 (41-70%)	Level 1 (11-40%)	(0-10%)													
Antalya-Alanya Motorway Project											**2B Lands**	**Unwooded Forest Soil**	**Forest Storage**	**Special Afforestation**	**Quarry-Mine Pit**	**Facility**	**Settlements**	**Graveyard**	**Energy Transmission Line**	**Highway**	**Fire Stop Zone**	**Water**	**Agricultural Land**
Economic	Forest products production	Industrial wood production in maximum capacity	173.14	116.40	53.61	35.53																	
		Herbal products	1.57		1.04	1.32																	
Ecological	Nature protection	Poor growing areas				1.63																	
		Cultural and historical sites	2.32	1.06		0.59																	
		natural protected areas	0.37	0.22	0.14																		
	Erosion Protection/ Soil Conservation	Soil conservation	3.30	5.91	12.06	7.75																	
Social/ Cultural	Aesthetic	aesthetic appearance	4.90	7.00	1.04	1.74																	
	Ecotourism and Recreation	recreation	4.53	13.18																			
		forests for tourism purposes				5.96																	
	Scientific	forests for education and research purposes	0,72																				
Sub-total (Canopy Levels)			190.84	143.77	67.89	54.51	0.00	0.00	0,00	0,00													
Total (Actual Forest/Open Area Type)			457.01				0,00				27.05	46.58	4.87	10.28	4.60	1.75	33.23	0.24	9.88	1.10	2.26	1.39	1,186.36
Total (Actual Forests/Open Areas)			457,01								1,329.60												
Grand Total			1,786.61																				

According to the data derived from the Forest Management Plans and presented in Table V.12, within the study corridor, there is no forest specified as “coppice forest”, and thus all of the actual forests are categorized as high forests having different canopy covers. The key findings of the analyses done based on the relevant Forest Management Plans of the study area are summarized below:

Almost 88% (402,5 ha) of the actual forests are productive, where the canopy cover level changes between 11-100%, while the remainder 12% (54,51 ha) correspond to degraded forests where the canopy cover level is less than 10%.

In terms of forest functions, the majority of the actual forest areas 381.35 hectares, corresponding to 83.69% of total actual forests are designated for economic purposes, mainly for industrial wood production, maximum capacity timber production, and herbal product harvesting.

Forests allocated for ecological functions, such as nature protection, soil conservation, and erosion control, cover 35.35 hectares, accounting for approximately 7.73% of all actual forest areas.

The remaining social and cultural forest functions including areas dedicated to ecotourism and recreation and aesthetic use cover 39.07 hectares, which corresponds to around 8.51% of the total actual forest area. This classification highlights that forestlands within the project area are predominantly utilized for economic forestry purposes, with limited areas serving ecological and sociocultural roles.

Table V.13. Land Use Properties and Forestlands according to Stand Types within the Expropriation Corridor

Forest Stand Types	Section 1		
	Area (m^2)	Area (ha)	Percent(%)
Stone Pine	23.019,65	2,30	0,13
Red Pine	3.991.583,76	399,16	22,23
Daphne	18.765,21	1,88	0,10
Carob	85.007,99	8,50	0,47
Degraded Forest Area	545.132,79	54,51	3,04
2B Lands	270.537,87	27,05	1,51
Unwooded Forest Soil	465.830,46	46,58	2,59
Forest Storage	48.669,17	4,87	0,27
Special Afforestation	102.818,89	10,28	0,57
Quarry-Mine Pit	46.025,11	4,60	0,26
Facility	17.485,46	1,75	0,10
Settlements	332.255,44	33,23	1,85
Graveyard	2.354,84	0,24	0,01
Energy Transmission Line	98.786,86	9,88	0,55
Highway	11.024,86	1,10	0,06
Fire Stop Zone	22.600,03	2,26	0,13
Water	13.949,17	1,39	0,08
Agricultural Land	11.863.621,80	1.186,36	66,06
TOTAL	**17.959.469,37**	**1.795,95**	**100,00**

V.2.1.6. Agricultural Lands

According to CORINE (2018) database, agricultural areas (including the arable lands, permanent crops and heterogeneous agricultural areas) cover 76.06% (5,214.46 ha) of the entire study corridor (6,856.13 ha).

According to STATİP (2015) database, agricultural areas (including the dry, irrigated, mixed and planted agriculture areas) cover 63.33% (4,341.80 ha) of the entire study corridor (6,856.13 ha).

Assuming that the land use capabilities given for the study corridor according to GDRS database previously in Table V.7 are applicable to the current situation, Table V.14 provides an overview of the land use capabilities of the agricultural areas within the study corridor. As can be seen, a major part (36.3%) of the agricultural lands consists of soils having Class II land use capability. Class II lands are decent lands that can only be processed after taking some special precautions. Their difference from Class I lands is one or more of the limiting factors such as slight slope, moderate exposure to erosion, moderately thick soil, exposure to occasional moderate floods and a moderate level of moisture that can easily be isolated.

Table V.14. Land Use Capabilities of the Agricultural Areas within the Study Corridor (according to Turkish General Directorate for Rural Services, 1993)

Land Use Capability Class	Area (m^2)	Area (ha)	Percent (%)
I	4,599,930.62	459.99	12.27
II	13,599,393.62	1,359.94	36.28
III	8,095,488.95	809.55	21.60
IV	5,346,802.43	534.68	14.27
VI	5,838,424.14	583.84	15.58
Total	**37,480,039.76**	**3,748.00**	**100.00**

Land use capability of soils for the study area on settlement-basis is presented in
According to the data presented in the table, the largest land cover within the study area is agricultural land, which spans 1,186.36 hectares, corresponding to 66.06% of the total area assessed (1,795.95 ha). This is followed by Red Pine forests, which cover 399.16 hectares, making up 22.23% of the total area. Other notable land cover types include degraded forest areas (54.51 ha; 3.04%) and settlements (33.23 ha; 1.85%).

Table V.15.

According to the data presented in the table, the largest land cover within the study area is agricultural land, which spans 1,186.36 hectares, corresponding to 66.06% of the total area assessed (1,795.95 ha). This is followed by Red Pine forests, which cover 399.16 hectares, making up 22.23% of the total area. Other notable land cover types include degraded forest areas (54.51 ha; 3.04%) and settlements (33.23 ha; 1.85%).

Table V.15. Land Use Capability of Agricultural Lands in Each Settlement (GDRS, 1993)

Province	District	Neighborhood	Main Land Use Capability Class
Antalya	Serik	Kozağacı	I

Province	District	Neighborhood	Main Land Use Capability Class
Antalya	Serik	Yukarıkocayatak	I
Antalya	Serik	Aşağıkocayatak	I
Antalya	Serik	Kayaburnu	II
Antalya	Serik	Dikmen	II
Antalya	Serik	Çandır	II
Antalya	Serik	Aşağıçatma	II
Antalya	Serik	Burmahancı	II
Antalya	Serik	Merkez	I
Antalya	Serik	Üründü	III
Antalya	Serik	Kökez	III
Antalya	Serik	Deniztepesi	II
Antalya	Serik	Sarıabalı	VII
Antalya	Manavgat	Çakış	VII
Antalya	Manavgat	Sağırin	VII
Antalya	Manavgat	Taşağıl	VII
Antalya	Manavgat	Hocalar	VI
Antalya	Manavgat	Gündoğdu	III
Antalya	Manavgat	Yavrudoğan	VI
Antalya	Manavgat	Kalemler	IV
Antalya	Manavgat	Evren	II
Antalya	Manavgat	Seki	II
Antalya	Manavgat	Ilıca	II
Antalya	Manavgat	Yeniköy	VI
Antalya	Manavgat	Şişeler	I
Antalya	Manavgat	Evrenleryavşı	III
Antalya	Manavgat	Dolbazlar	IV
Antalya	Manavgat	Yukarıışıklar	IV
Antalya	Manavgat	Dikmen	IV
Antalya	Manavgat	Bucakşeyhler	IV
Antalya	Manavgat	Ulukapı	VI
Antalya	Manavgat	Aşağıışıklar	IV
Antalya	Manavgat	Demirciler	IV
Antalya	Manavgat	Karaöz	IV
Antalya	Manavgat	Aksaz	IV
Antalya	Manavgat	Hacıali	VI
Antalya	Manavgat	Cevizler	VI

Province	District	Neighborhood	Main Land Use Capability Class
Antalya	Manavgat	Sülek	IV
Antalya	Manavgat	Hacıisalı	VI
Antalya	Manavgat	Hacıobası	VI
Antalya	Manavgat	Karacalar	II
Antalya	Manavgat	Kızılot	II
Antalya	Manavgat	Uzunlar	VI
Antalya	Manavgat	Çavuşköy	IV
Antalya	Manavgat	Kadılar	II
Antalya	Manavgat	Örenşehir	VII
Antalya	Manavgat	Yalçıdibi	VI
Antalya	Manavgat	Odaönü	VI
Antalya	Manavgat	Karakaya	II
Antalya	Alanya	Çakallar	VI
Antalya	Alanya	Alara	VI
Antalya	Alanya	İncekum	VII
Antalya	Alanya	Avsallar	VI
Antalya	Alanya	Akdam	VI
Antalya	Alanya	Türkler	VI
Antalya	Alanya	Soğukpınar	VII
Antalya	Alanya	Emişbeleni	VII
Antalya	Alanya	Toslak	VII
Antalya	Alanya	Konaklı	VII
Antalya	Alanya	Elikesik	VII

V.2.1.7. Pasture Lands

According to CORINE (2018) database, pasturelands are not present within the study corridor. According to STATİP (2015) database, pasturelands are 3.31% for the Project and total area of pastureland is 227.04 ha. According to GDRS (1993) database, pasturelands are 0.31% for the Project and total area of pastureland is 21.09 ha. The pasture areas included in the STATİP 2015 data are within the scope of the Pasture Law No. 4342. It should be noted that; in this study, regardless of whether it is within the scope of the Law or not, the land is determined based on its current use according to its natural structure.

Additionally, in the scope of the socio-economic field interviews conducted (see Chapter 14 “Socio-economic Environment”), availability of pasturelands in the neighborhoods has been identified by means of questionnaires conducted with the mukhtar. It was stated that the pasturelands in the villages do not occupy a large amount of area. Therefore, there will not be a major impact in terms of pastureland in the villages where fieldwork is carried out.

V.2.2. Property and Ownership within the Expropriation Corridor

According to ownership, the lands corresponding to the Motorway and its components including the campsites, quarry, borrow pits, and storage areas are mainly categorized as follows:

- Privately owned lands
- State-owned lands (i.e. treasury lands, forestry, pasture lands, etc.)
- Lands owned by legal entities
- Litigious
- Co-owned by Private and State

Table V.16 presents the number of parcels and the corresponding land areas within the expropriation corridor for each section of the Motorway. As shown, the total area subject to expropriation is 1,559.53 ha.

The largest portion of this area is privately owned land, comprising 777.73 ha, 59.2% of the total. The second largest share is state-owned land, covering 746.71 hectares (36.6%). Within this category, treasury-forestry lands constitute the most substantial portion, with 462.10 hectares of the state-owned land.

The remaining area, approximately 35.3 ha, is distributed among legal entities, litigious lands, and lands co-owned by private individuals and the state.

Table V.16. Distribution of Lands According to Type of Ownership and Number of Corresponding Parcels within the Expropriation Corridor

Types of Ownership	Area (m^2)	Area (ha)	Number of Parcels	Ratio (%)
Privately-owned	7,777,271.86	777.73	2,085	59.2
State-owned	7,467,144.33	746.71	1,291	36.6
Treasury	1,302,505.63	130.25	810	23.0
Treasury – Forestry	4,621,025.44	462.10	136	3.9
Non-registered – Forestry	753,139.12	75.31	7	0.2
Treasury – Pasture	1,778.30	0.81	3	0.1
Non-registered (creek, park, road)	660,460.92	66.05	307	8.7
Non-registered (others)	128,234.92	12.82	28	0.8
Legal Entity	180,358.54	18.04	108	3.1
Litigous	129,990.61	13.00	26	0.7
Co-owned by Private & State	42,267.83	4.23	14	0.4
Total	**15,595,254.87**	**1,559.53**	**3,524**	**100.00%**

V.3. Potential Impacts

Land use and transportation are intrinsically related. Motorway development projects result in changes in the land use patterns and ownership structure along their route. Depending on the length of the

route and the width of the road and expropriation corridor, magnitude of the impacts would change. Similarly, the sensitivity of the affected lands (i.e. ecological importance, social and economic value to users, etc.) to be crossed by the motorway changes depending on their value, which in turn, together with the magnitude of the impact, determines the level of impact significance.

The Project will have a total length of 117.8 km, including the main carriageway and the access roads. The width of the expropriation corridor will be minimum 55 meters, whereas it may expand up to 450 meters depending on the scale of excavation and fill requirements and siting of the road structures such as interchanges, service areas, etc. Lands (within the expropriation corridor) required for the development and operation of the Motorway and its components will be acquired by the KGM prior to the start of construction activities in accordance with the relevant provisions of the national legislation (i.e., Expropriation Law numbered 2942, Forestry Law numbered 6831, Pastures Law numbered 4342, Law on Soil Conservation and Land Use numbered 5403). Total area to be acquired within the expropriation corridor will be 1,559.53 ha, which corresponds to 3.524 parcels. Following the acquisition of lands, Project activities including vegetation clearing, topsoil stripping, cut and fill operations and construction of motorway components and other buildings/facilities will result in permanent and temporary impacts that need effective management.

In addition to the direct physical impacts of the activities on the lands and socio-economic dimensions of the land acquisition, transportation projects possibly trigger further land developments in the vicinity of route, especially when the motorway provide access to lands.

In this context, direct potential impacts of the Motorway development on the land use and property and probable indirect impacts are listed below. Further assessment of the direct impacts for the land preparation and construction and operation phases, in consideration of the baseline conditions, are provided in the following headings, while evaluation of socio-economic impacts associated with land acquisition and changes in the existing land use patterns (e.g. physical or economic displacement) are provided in Chapter 14 (“Socio-economic Environment”).

- Permanent land acquisitions resulting in changes in the existing land use characteristics (i.e. agricultural, forest, pasture, etc.), physical or economic displacement;
- Temporary land acquisitions for construction facilities (i.e. construction campsites, quarry, borrow pits, storage areas) resulting in degradation of lands that need rehabilitation;
- Fragmentation of lands and restrictions on the access to lands;
- Planned and unplanned urban development in the expansion areas;
- Increased demand in residential and commercial properties resulting in a trend in increase in the property values;
- Increased demand in infrastructural services (i.e. transportation, electricity, water, wastewater, etc.).

V.3.1. Land Preparation and Construction Phase

Construction of the Motorway and its components will result in the changes in the existing land use. Accordingly, forest lands, agricultural areas, pastures, etc. corresponding to the expropriation corridor will be lost. In addition, land use characteristics corresponding to temporary construction compounds such as Camp Sites and quarries as well as permanent storage sites will also change temporarily or permanently depending on the nature of the activity. As a result of Motorway construction, the Motorway will cause permanent fragmentation of agricultural areas, forests and other lands at a number of locations, making the associated land less viable for existing owners and users through access restriction. These impacts will start to occur in the construction phase and continue during the

operation phase of the Project as well. Several culverts, underpasses and overpasses have been included in the design

For the forest lands to be used in the scope of the Project, permits have been/will be taken from the related forestry authorities. Trees located on the forest lands to be affected by the Project will be removed and evaluated by the forestry authorities. Areas of the forest and other types of lands to be affected by the Project have been identified by analyzing the expropriation plans. Number of trees to be removed have been estimated by using suitable tools (i.e. where available by using existing forest management plans, expropriation plans, GIS analyses, site surveys, etc.). Quantified assessment on each type of land use is provided below.

V.3.1.1. Temporary Impacts at the Construction Sites

Road construction sites, quarry, borrow pits, storage areas and construction campsites are the locations where temporary impacts of the construction activities may occur. In the scope of road construction works, construction activities are to be normally conducted within the expropriation corridor. For the privately-owned lands, construction activities have to start following the completion of expropriation process (in case of agreement, after payments are done; otherwise in accordance with Article 27 (“Urgent Expropriation”) of the Expropriation Law. Since the expropriation corridor is specified wide enough (minimum 55 meters and maximum 450 meters) to allow sufficient space for the works to be conducted by construction machinery and vehicle, intrusion of construction activities onto adjacent lands are normally avoided.

On the other hand, there may be exceptional cases when the construction personnel may cross the borders of the expropriation corridor (may be unintentionally or with informed decision) and pose risk of damage on the adjacent lands. Similarly, on very rare cases, drilling, land preparation or construction activities may be initiated by construction contractor before the expropriation or court decisions are finalized. To avoid such incidents and associated risks or damages to land and its owners/users, it is essential to manage construction personnel properly and strictly adhere to the expropriation corridor boundaries. If occurs, the impact would most likely be reversible by corrective measures to be taken.

The area to be covered by known construction components such as Camp Sites, quarries, storage sites, etc. and the corresponding land uses are summarized in Table V.17.

Table V.17. Areas and Land Use Information for the Construction Compounds

Location	Location			Description of the Site/Plant	Area (ha)*	Type of Land Use	Lot/ Parcel No.
	Province	District	Nearest Neighborhood				
Construction Camp Sites							
Km 59+500	Antalya	Manavgat	Taşağıl	Temporary Construction Camp Site**	6.65	Forest	644/1
Km 64+500	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)	5.34	Forest	653/1, 663/1
					1.35	Agricultural	515/413
					10.25	Road (formerly agricultural land)	515/535, 515/414, 515/415, 515/44

Location	Location			Description of the Site/Plant	Area (ha)*	Type of Land Use	Lot/ Parcel No.
	Province	District	Nearest Neighborhood				
Sub-total					16.20	Forest, Agricultural, Road	
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2	8.65	Forest	241/1
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3	9.54	Forest	Non-registered
Quarry & Borrow Pits							
Km 53+800	Antalya	Serik	Sarıabalı	Sarıabalı Borrow Pit (AO-1)	24.73	Forest	165/1
Km 56+500	Antalya	Manavgat	Çakış	Çakış Quarry (TOY-4a)	24.99	Forest	151/1
Km 58+500	Antalya	Manavgat	Sağrın, Taşağıl	Kuruçay Quarry	24.30	Forest	551/1, 644/1
Km 84+500	Antalya	Manavgat	Sarılar	Dikmen Borrow Pit (AO-2)	19.91	Forest	740/1
					4.48	Agricultural	644/1, 644/2, 645/5, 645/12, 645/13
Sub-total					24.40	Forest, Agricultural	
Km 104+750	Antalya	Akseki	Güçlüköy	Bademliyar Quarry (TO-2)	18.04	Forest	303/1
Km 105+000	Antalya	Manavgat	Uzunlar	Çenger Stream Quarry	-	-	Exact location not decided
Km 106+000	Antalya	Manavgat	Uzunlar	Uzunlar Quarry (TOY-5)	24.59	Forest	272/2
Km 114+200	Antalya	Manavgat	Karakaya	Karakaya Quarry	24.91	Forest	139/1
Km 117+000	Antalya	Alanya	Saburlar	Saburlar Quarry	7.76	Agricultural	102/1, 102/2, 102/3, 102/5, 102/6, 102/7, 103/25, 103/49, 103/50, 104/132, 104/133
					1.46	Garden	102/4, 103/24
					1.76	Winter pasture	103/23
					13.83	Forest	167/1
Sub-total					24.81	Agricultural, Garden, Winter pasture, Forest	
Km 119+500	Antalya	Alanya	İncekum	Karamanlar Quarry	21.30	Forest	167/1
					9.3	Agricultural	130/2, 130/3, 130/4, 130/5, 130/6, 130/7, 130/8, 130/9, 130/10, 130/11, 130/12, 131/10, 131/12, 131/13, 131/14, 131/16, 131/17,
					0.02	Pylon location	130/13
Sub-total					30.62	Forest, Agricultural, Pylon location	
Km 134+000	Antalya	Alanya	Burçaklar	Soğukpınar Quarry	21.58	Forest	192/1
Storage Sites							
52+544	Antalya	Serik	Sarıabalı	Storage-2	7.99	Forest	165/1
59+580	Antalya	Manavgat	Çakış	Storage-3	23.23	Forest	151/1

Location	Location			Description of the Site/Plant	Area (ha)*	Type of Land Use	Lot/ Parcel No.
	Province	District	Nearest Neighborhood				
61+500	Antalya	Manavgat	Taşağıl	Storage-6	23.53	Forest	644/1
64+160	Antalya	Manavgat	Çardak	Storage-7	25.55	Forest	101/1
74+360	Antalya	Manavgat	Seki	Storage-11	3.91	Forest	839/1
					0.40	Agricultural land	274/80, 834/1, 835/1
Sub-total					4.31	Forest, Agricultural land	
76+240	Antalya	Manavgat	Kalemler	Storage-14	4.71	Forest	208/1
					0.10	Agricultural land	121/310, 165/1
Sub-total					4.81	Forest, Agricultural land	
78+790	Antalya	Manavgat	Yeniköy	Storage-15	22.60	Forest	160/1, 131/1
86+340	Antalya	Manavgat	Bucakşeyhler	Storage-16	36.60	Forest	241/1
					0.39	Agricultural land	213/9, 213/8, 103/1, 104/1, 226/1
Sub-total					36.99	Forest, Agricultural land	
87+800	Antalya	Manavgat	Bucakşeyhler	Storage-17	12.98	Forest	241/1
					0.13	Agricultural land	193/9, 193/1
Sub-total					13.11	Forest, Agricultural land	
95+410	Antalya	Manavgat	Karaöz, Aksaz	Storage-18	8.94	Forest	174/1
					0.20	Agricultural land	103/3, 103/4
Sub-total					9.14	Forest, Agricultural land	
95+410	Antalya	Manavgat	Aksaz	Storage-19	8.18	Forest	Non-registered
98+290	Antalya	Manavgat	Cevizler	Storage-20	15.75	Forest	189/1
					1.19	Agricultural land	208/40, 208/7, 149/1
Sub-total					16.94	Forest, Agricultural land	
107+850	Antalya	Manavgat	Kadılar	Storage-22	10.56	Forest	150/1
110+820	Antalya	Manavgat	Kadılar, Yalçıdibi	Storage-23	112.95	Forest	150/1, 104/1
113+050	Antalya	Manavgat	Yalçıdibi	Storage-24	21.97	Forest	104/1
123+000	Antalya	Alanya	Avsallar	Storage-26	56.94	Forest	Non-registered
124+250	Antalya	Alanya	Avsallar	Storage-27	38.84	Forest	Non-registered
127+000	Antalya	Alanya	Aksam	Storage-28	36.79	Forest	Non-registered
130+400	Antalya	Alanya	Türkler	Storage-29	37.01	Forest	Non-registered
132+720	Antalya	Alanya	Payallar	Storage-30	35.73	Forest	936/1
Plants and Facilities							
55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1	1.39	Forest	167/1

Location	Location			Description of the Site/Plant	Area (ha)*	Type of Land Use	Lot/ Parcel No.
	Province	District	Nearest Neighborhood				
59+500	Antalya	Manavgat	Taşağıl	Concrete Plant-2 Mechanical Plant-1 Asphalt Plant-1	6.65	Forest	644/1
80+400	Antalya	Manavgat	Şişeler	Concrete Plant-3	2.33	Road (formerly agricultural land)	138/74, 138/76, 138/78, 138/80
87+700	Antalya	Manavgat	Bucak Seyhler	Concrete Plant-4 Mechanical Plant-2 Asphalt Plant-2	4.24	Forest	241/1
89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a	1.16	Forest	280/1
99+200	Antalya	Manavgat	Sülek	Concrete Plant-5	1.20	Forest	201/1
105+000	Antalya	Manavgat	Uzunlar	Çenger Stream Crusher	-	-	Exact location not decided
124+300	Antalya	Alanya	İncekum	Concrete Plant-6 Mechanical Plant-3 Asphalt Plant-3	9.54	Forest	Non-registered parcel
Total					**851.77**		

* The areas presented in the table have been calculated based on the aread provided in the RAP Report.
** Concrete Plant 2, Mechanical Plant 1 and Asphalt Plant 1 are located within the same area as the Temporary Camp Site.

As can be seen from the table, the majority of the construction components are located on forest lands, which occupy 221.92 hectares of the total 253.83 hectares allocated for construction. The lands on which the camp sites are established will be temporarily affected during the construction period, except for the main construction camp, which will remain permanently as it will serve as the O&M Centre during the operation phase. According to the BOT contract, the construction period is limited to a maximum of three years, during which the temporary camp sites (Camp Site 2 and Camp Site 3) will be in use. Quarries and borrow pits will be operated through the construction period but the impacts on the land-use will only be reversed in the long-term if rehabilitation activities are conducted effectively.

V.3.1.2. Impacts on Forestlands

Impacts of the Project (including the campsites, storage areas, quarries, and borrow pits) on the forestlands have been assessed based on the area to be affected and number of trees to be lost in economic, ecological and social/cultural forests.

Loss of Forestlands

The areas of forest within the expropriation corridor to be acquired as part of the Project are listed in Table V.18. A significant portion of the forestland to be affected by the Project is located near Alanya and Manavgat. In total, 1,030.69 hectares of forest area will be impacted by the motorway.

Table V.18. Forest Areas to be Acquired in the Scope of the Project

Regional Directorate	Forestry Management Directorate	Management Sub-directorate	Forest Area Corresponding to the Land Acquistion Corridor (ha)
Antalya Regional Directorate of Forestry	Serik	Akbaş	49.74
	Alanya	Alara	214.64
		Kargı	109.91
	Taşağıl	Çardak	7.22
		Taşağıl	169.93
	Manavgat	Manavgat	172.70
		Naras	70.99
		Şelale	64.08
		Yalçıdibi	157.81
		Murtiçi	13.67
Total			**1,030.69**

In addition to Motorway construction, most of the construction compounds including camp sites and quarries are located on forest lands as summarized previously in above sections. The forest area to be affected by these construction compounds are listed in Table V.19.

Table V.19. Areas and Land Use Information for the Construction Compounds

Location	Location			Description of the Site/Plant	Area (ha)*	Corresponding Main Forest Functions in the Relevant Forest Management Plan
	Province	District	Nearest Neighborhood			
Construction Camp Sites						
Km 64+500	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)	6.30	Economic
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2	6.50	Economic
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3**	50.15	Economic
Quarry & Borrow Pits						
Km 53+800	Antalya	Serik	Sarıabalı	Sarıabalı Borrow Pit (AO-1)	24.69	Economic, Ecological, Sociocultural
Km 56+500	Antalya	Manavgat	Çakış	Çakış Quarry (TOY-4a)	24.21	Economic, Ecological,
Km 58+500	Antalya	Manavgat	Sağrın, Taşağıl	Kuruçay Quarry	20.17	Economic
Km 84+500	Antalya	Manavgat	Sarılar	Dikmen Borrow Pit (AO-2)	19,.91	
Km 104+750	Antalya	Akseki	Güçlüköy	Bademliyar Quarry (TO-2)	13.66	Economic, Ecological,
Km 105+000	Antalya	Manavgat	Uzunlar	Çenger Çayı Quarry	0.73	Economic
Km 106+000	Antalya	Manavgat	Uzunlar	Uzunlar Quarry (TOY-5)	22.33	Economic

Location	Location			Description of the Site/Plant	Area (ha)*	Corresponding Main Forest Functions in the Relevant Forest Management Plan
	Province	District	Nearest Neighborhood			
Km 117+000	Antalya	Alanya	Saburlar	Saburlar Quarry	14.99	Economic
Km 119+500	Antalya	Alanya	İncekum	Karamanlar Quarry	10.00	Economic
Km 134+000	Antalya	Alanya	Burçaklar	Soğukpınar Quarry	24.96	Economic
Storage Sites						
52+544	Antalya	Serik	Sarıabalı	Storage-2	5.93	Economic
59+580	Antalya	Manavgat	Çakış	Storage-3	13.56	Economic, Ecological
61+500	Antalya	Manavgat	Taşağıl	Storage-6	17.70	Economic, Ecological
64+160	Antalya	Manavgat	Çardak	Storage-7	19.05	Economic, Sociocultural
74+360	Antalya	Manavgat	Seki	Storage-11	4.67	Economic
76+240	Antalya	Manavgat	Kalemler	Storage-14	3.49	Economic
78+790	Antalya	Manavgat	Yeniköy	Storage-15	12.75	Economic
86+340	Antalya	Manavgat	Bucakşeyhler	Storage-16	27.71	Economic, Sociocultural
87+800	Antalya	Manavgat	Bucakşeyhler	Storage-17	12.44	Economic, Ecological
95+410	Antalya	Manavgat	Karaöz, Aksaz	Storage-18	6.70	Economic
95+410	Antalya	Manavgat	Aksaz	Storage-19	7.38	Economic
98+290	Antalya	Manavgat	Cevizler	Storage-20	6.82	Economic
107+850	Antalya	Manavgat	Kadılar	Storage-22	7.27	Economic
110+820	Antalya	Manavgat	Kadılar, Yalçıdibi	Storage-23	65.00	Economic, Ecological
113+050	Antalya	Manavgat	Yalçıdibi	Storage-24	11.93	Economic, Ecological
123+000	Antalya	Alanya	Avsallar	Storage-26	30.43	Economic
124+250	Antalya	Alanya	Avsallar	Storage-27	17.23	Economic
127+000	Antalya	Alanya	Aksam	Storage-28	19.04	Economic
130+400	Antalya	Alanya	Türkler	Storage-29	15.78	Economic, Ecological
132+720	Antalya	Alanya	Payallar	Storage-30	14.13	Economic
Plants and Facilities						
55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1	1.39	Ecological
59+500*	Antalya	Manavgat	Taşağıl	Concrete Plant-2	6.58	Sociocultural
				Mechanical Plant-1		
				Asphalt Plant-1		
87+700	Antalya	Manavgat	Bucak Seyhler	Concrete Plant-4	6.58	Economic
				Mechanical Plant-2		
				Asphalt Plant-2		
89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a	11.78	Economic
99+200	Antalya	Manavgat	Sülek	Concrete Plant-5	17.96	Economic

Location	Location			Description of the Site/Plant	Area (ha)*	Corresponding Main Forest Functions in the Relevant Forest Management Plan
	Province	District	Nearest Neighborhood			
124+300	Antalya	Alanya	İncekum	Concrete Plant-6**	50.15	Economic
				Mechanical Plant-3**		
				Asphalt Plant-3**		
Total					**652.05**	

**The areas presented in the table have been calculated based on the boundaries provided as of 12.02..2025*
*** Concrete Plant 2, Mechanical Plant 1 and Asphalt Plant 1 are located within the same area as the Temporary Camp Site.*

In conclusion, total forest area to be affected by construction compounds and storage sites will be 652,05 ha.

Loss of Trees

Trees corresponding to the permitted road construction areas (road footprint and embankment and fill zones) will be removed and appraised by the relevant Regional Directorate of Forestry in coordination with the KGM and Project Sponsor. In this scope, exact number of trees to be removed is determined by the Regional Directorate after examination of current management plans and field studies.

In calculating the number of trees, the Forest Management Plans prepared by the relevant Forest Management Sub-Directorate, which cover the expropriation corridor and project corridor, were used as a basis. In particular, Table 13 “Tree Type Identification Tables” in these plans was used. Additionally, structures such as tunnels, viaducts, and bridges were included in the tree count estimates based on the worst-case scenario. Therefore, it should be noted that the calculated figures may change during the project implementation phase.

Accordingly, number of trees to be removed in the scope of the Project has been estimated by relevant forestry directorates for the project and is summarized in Table V.20. The figures given in this table has been calculated to cover the trees to be removed from the footprint of the Motorway construction areas including the embankment and fill zone. As can be seen from Table V.20, total number of trees that are lost is 278,915 for Antalya. The calculations were based on the expropriation corridor.

Table V.20. Estimated Number of Trees to be Removed in the Motorway

Forestry Management Directorate / Sub-Directorate	Number of Trees
Serik Forestry Management Directorate	
Akbaş	122
Alanya Forestry Management Directorate	
Alara	81,794
Kargı	68,568
Taşağıl Forestry Management Directorate	
Çardak	1,478

Forestry Management Directorate / Sub-Directorate	Number of Trees
Taşağıl	28,387
Manavgat Forestry Management Directorate	
Manavgat	48,226
Naras	287
Şelale	14,619
Yalçıdibi	33.618
Murtiçi	1,816
Total	**278,915**

Table V.21. Trees to be Removed According to their Types

Species Name	Turkish Name	Number of Cut Trees
Pinus brutia	Kızılçam	260,732
Cupressus sempervirens	Servi	10,186
Quercus cerris	Saçlı Meşe	5,020
Santalum album	Sandal	764
Pinus pinea	Fıstıkçamı	559
	Maki	1,654

Secondary Impacts associated with Loss of Forestlands

Besides direct loss of forestlands, as secondary impacts, increased human activity at the construction sites may increase the potential for the start of forest fires. Loss of carbon capture capacity in association with the number of trees lost is discussed in Chapter 10 (“Air Quality and Climate Change”). Socio-economic impacts of the loss of forestlands on local communities are covered in Chapter 14 (“Socio-economic Environment”).

V.3.1.3. Impacts on Agricultural Lands

To meet Project’s land acquisition requirements, agricultural lands located within the expropriation corridor will be expropriated by the responsible agency (KGM). One of the main direct results of the permanent land acquisition to be done in the scope of the Project will be the conversion of productive agricultural lands to built-up lands. Consequently, these lands will be permanently lost for agricultural activities of the local people. Besides the direct loss of lands, following impact types are likely to be encountered by local people on a case-by-case basis:

- Difficulties for local people to ensure access to agricultural lands in cases when the settlement center and the agricultural parcels are separated;
- The fragmentation of agricultural lands by the Motorway, hence difficulties for local people to ensure access between fragmented parts of an agricultural plot; an example to the fragmentation of agricultural lands is shown in Figure V.21.
- Economic losses of local people due to partial expropriation of parcels (e.g. loss of viability for use of the remaining part of the parcel to be expropriated);
- Loss of growing crops and trees as a result of the expropriation of agricultural lands;
- Economic impacts on people, who are not legal owners but rent or use the affected lands.

In addition to loss of lands available for agricultural activities, the Project will results in the severance and fragmentation of the agricultural lands resulting in restrictions in the access to lands by their owners and/or users. An example to the fragmentation of agricultural lands by existing Anatolian Motorway as shown in Figure V.21.



Figure V.21. Example to Fragmentation of Agricultural Lands by Motorways

V.3.1.4. Impacts on Pasture Lands

For the determination of pasturelands located within the expropriation corridor, expropriation plans (as of the date of the analysis) have been reviewed. Parcels registered as pasture are located only in the Uzunlar neighbourhood of the Manavgat district, as listed in Table V.22.
Figure V.22 presents a satellite image of the parcels registered as pasture. A preliminary review of this image suggests that these parcels may not be actively used for grazing purposes. The RAP field surveys confirmed that the registered pasture parcels within the expropriation corridor are not actively used for grazing purposes. According to RAP surveys, in winter, animals are mainly kept in barns and fed stored fodder, or grazed on agricultural fields.

According to CORINE (2018) database results, there is no pasture area to be permanently lost under the Project. According to the results of STATİP (2015) database, GDRS (1993) and socio-economic field interviews, it is concluded that the percentage of pasture land use is very low throughout the Project. Therefore, there will not be a major impact in terms of pastureland.

Table V.22.Pasturelands to be Affected by the Project

District	Neighbourhood	Corresponding Motorway KM	Parcel No	Area		
				Title Deed Area (m^2)	Approximate Area to be Acquired (m^2)	Percent of Area to be Acquired
Manavgat	Uzunlar	106+705.99	101/34	423.17	423.17	100%
		106+741.39	101/35	1,239.43	1,239.43	100%

District	Neighbourhood	Corresponding Motorway KM	Parcel No	Area		
				Title Deed Area (m²)	Approximate Area to be Acquired (m²)	Percent of Area to be Acquired
		106+771.52	101/36	618.88	115.7	18.7%
Total				**2,281.48**	**1,778.3**	



Figure V.22. Parcels registered as Pature and affected by the Project in Uzunlar neighbourhood

V.3.1.5. Impacts of Quarry and Borrow Pits

Land preparation (i.e., vegetation and top-soil clearing) and excavation activities to be conducted at the quarry and borrow pits will also result in local changes in the land use patterns. **Error! Reference source not found.** summarizes the area to be affected by each quarry and borrow pit.

Table V.23.Area to be Affected by Quarry/Material Borrow Site Operations

Location	Location			Description of the Site/Plant	Area (ha)*	Type of Land Use	Corresponding Main Forest Functions in the Relevant Forest Management Plan
	Province	District	Nearest Neighborhood				
Km 53+800	Antalya	Serik	Sarıabalı	Sarıabalı Borrow Pit (AO-1)	24.69	Forest	Economic, Ecological, Sociocultural
Km 56+500	Antalya	Manavgat	Çakış	Çakış Quarry (TOY-4a)	24.21	Forest	Economic, Ecological,
Km 58+500	Antalya	Manavgat	Sağrın, Taşağıl	Kuruçay Quarry	20.17	Forest	Economic
Km 84+500	Antalya	Manavgat	Sarılar	Dikmen Borrow Pit (AO-2)	19.91	Forest, Agricultural	
Km 104+750	Antalya	Akseki	Güçlüköy	Bademliyar Quarry (TO-2)	13.66	Forest	Economic, Ecological,

Location	Location			Description of the Site/Plant	Area (ha)*	Type of Land Use	Corresponding Main Forest Functions in the Relevant Forest Management Plan
	Province	District	Nearest Neighborhood				
Km 105+000	Antalya	Manavgat	Uzunlar	Çenger Çayı Quarry	0.73	-	Economic
Km 106+000	Antalya	Manavgat	Uzunlar	Uzunlar Quarry (TOY-5)	22.33	Forest	Economic
Km 117+000	Antalya	Alanya	Saburlar	Saburlar Quarry	14.99	Forest, Agricultural, Garden, Winter Pasture	Economic
Km 119+500	Antalya	Alanya	İncekum	Karamanlar Quarry	10.00	Forest, Agricultural, Pylon location	Economic
Km 134+000	Antalya	Alanya	Burçaklar	Soğukpınar Quarry	24.96	Forest	Economic
Total					**175.65**		

*The areas presented in the table have been calculated based on the boundaries provided as of 12.02.2025

V.3.1.6. Impacts of Excavated Material Storage Sites

As the excavated material storage sites will be permanent Project components, land use corresponding to these sites will change permanently as a result of the Project. Table V.24**Error! Reference source not found.** summarizes the area to be affected by excavated material storage site.

Table V.24.Area to be Affected by Excavated Material Storage Sites

Location	Location			Description of the Site/Plant	Area (ha)*	Type of Land Use	Corresponding Main Forest Functions in the Relevant Forest Management Plan
	Province	District	Nearest Neighborhood				
52+544	Antalya	Serik	Sarıabalı	Storage-2	5.93	Forest	Economic
59+580	Antalya	Manavgat	Çakış	Storage-3	13.56	Forest	Economic, Ecological
61+500	Antalya	Manavgat	Taşağıl	Storage-6	17.70	Forest	Economic, Ecological
64+160	Antalya	Manavgat	Çardak	Storage-7	19.05	Forest	Economic, Sociocultural
74+360	Antalya	Manavgat	Seki	Storage-11	4.67	Forest, Agricultural land	Economic
76+240	Antalya	Manavgat	Kalemler	Storage-14	3.49	Forest, Agricultural land	Economic
78+790	Antalya	Manavgat	Yeniköy	Storage-15	12.75	Forest	Economic
86+340	Antalya	Manavgat	Bucakşeyhler	Storage-16	27.71	Forest, Agricultural land	Economic, Sociocultural
87+800	Antalya	Manavgat	Bucakşeyhler	Storage-17	12.44	Forest, Agricultural land	Economic, Ecological
95+410	Antalya	Manavgat	Karaöz, Aksaz	Storage-18	6.70	Forest, Agricultural land	Economic
95+410	Antalya	Manavgat	Aksaz	Storage-19	7.38	Forest	Economic
98+290	Antalya	Manavgat	Cevizler	Storage-20	6.82	Forest, Agricultural land	Economic
107+850	Antalya	Manavgat	Kadılar	Storage-22	7.27	Forest	Economic

Location	Location			Description of the Site/Plant	Area (ha)*	Type of Land Use	Corresponding Main Forest Functions in the Relevant Forest Management Plan
	Province	District	Nearest Neighborhood				
110+820	Antalya	Manavgat	Kadılar, Yalçıdibi	Storage-23	65.00	Forest	Economic, Ecological
113+050	Antalya	Manavgat	Yalçıfibi	Storage-24	11.93	Forest	Economic, Ecological
123+000	Antalya	Alanya	Avsallar	Storage-26	30.43	Forest	Economic
124+250	Antalya	Alanya	Avsallar	Storage-27	17.23	Forest	Economic
127+000	Antalya	Alanya	Aksam	Storage-28	19.04	Forest	Economic
130+400	Antalya	Alanya	Türkler	Storage-29	15.78	Forest	Economic, Ecological
132+720	Antalya	Alanya	Payallar	Storage-30	14.13	Forest	Economic
Total					**319.01**		

**The areas presented in the table have been calculated based on the boundaries provided as of 12.02.2025*

V.3.2. Operation Phase

In the operation phase, the activities will not involve any additional physical interaction thus no additional impact on land use is foreseen. The impacts related with habitat fragmentation/alteration and socio-economic impacts due to land acquisition will be permanent thus this may result in changes (positive or negative) in the existing socio-economic conditions of some of the potentially affected households in the long term. Rehabilitation measures will be taken at the temporary Project components, including three campsites, two borrow pits and one Project Sponsor-operated quarry, following the completion of construction activities. The restoration of vegetation at these sites during the operation phase is expected to result in positive impacts on land use.

V.3.2.1. Future Urban Development Potential

The future development potential of the Project area has been analyzed based on the 1/100.0000 scale Antalya-Burdur-Isparta Planning Region Environmental Plan.

In addition to the direct physical impacts of the activities on the lands and socio-economic dimensions of the land acquisition, transportation projects possibly trigger further land developments in the vicinity of route, especially when the Motorway provide access to previously less accessible areas. Increased access to land raises its potential for development (e.g. residential, industrial, tourism) and need for additional transportation services. This in turn, results in changes of the land use patterns over a period of time (Oruonye, E.D., 2014).

Given the tourism priority of the Antalya-Alanya region, the infrastructural development provided by the Antalya-Alanya Motorway Project is expected to significantly boost tourism investments. Improving the accessibility to the region's cultural sites and natural attractions will possibly lead to the expansion of tourism facilities such as hotels, resorts, and recreational areas. This development may subsequently drive residential and commercial growth to support the increasing number of tourists and tourism-related businesses.

Moreover, while the region may also see some industrial growth, the primary impact of the Motorway is anticipated to be in enhancing the tourism sector, which could bring substantial social, cultural, and economic benefits. Consequently, the development and operation of the Motorway are expected to result in notable changes in existing land use patterns, increased population growth, and a higher demand for residential, commercial, and infrastructural development in the region, all centered on the burgeoning tourism industry.

V.4. Mitigation Measures

The route selection process for the Project has considered sensitivities related with the land use patterns and their socio-economic dimensions. As explained in details in Chapter 18 ("Analysis of Alternatives"), the Project has aimed to establish a balance between the crossing of ecologically sensitive forest areas and impact on agricultural lands to avoid intolerable ecological and socio-economic impacts associated with Project land acquisition. In the following sections, measures to be taken to minimize and/or mitigate direct impacts on the land use are described for the land preparation, construction and operation phases. It should be noted that implementation of the expropriation works and permitting process for the forests and public lands are under the responsibility of KGM as the administrative authority.

Measures to be taken against potential socio-economic impacts that would be associated with land use changes will further be evaluated in Chapter 14 ("Socio-economic Environment"). Measures to be taken to mitigate impacts on habitats and wildlife due to loss of forestlands are covered in Chapter 9 ("Ecology and Biodiversity").

V.4.1. Land Preparation and Construction Phase

Land use rights for the lands/parcels corresponding to Project components, including the construction campsites, storage areas, quarry and borrow pits will be acquired either permanently or temporarily. Acquisition of land use rights for those lands/parcels located within the expropriation corridor has been/will be done by the KGM in accordance with the national legislation. Following the acquisition of land use rights, these lands will be allocated to the Project In this respect;

- Privately-owned lands have been/will be acquired in line with the relevant provisions of the Turkish Expropriation Law;
- Forestry permits have been/will be obtained from the Forestry authorities in line with the Forestry Law;
- For the state-owned lands including treasury lands and pasture lands, applications will be done to acquire easement rights.

KGM will complete the process for the allocation of the private lands under the property of Treasury and the state-owned lands that are required for the Project and allocate those lands to the Project Sponsor for their use during the BOT contract duration. In this respect, free of any charge, easement rights for the benefit of Project Sponsor will be constituted for the private lands under the property of Treasury and usage rights for the use of state-owned lands will be provided for the duration of the contract. At the end of the contract duration, lands under the property of Treasury and the state-owned lands will be transferred to KGM free from any debt or commitment and in a well-maintained, operating, in-service condition, without any charge.

V.4.1.1. Construction Sites

In the scope of road construction works, the following measures will be taken to avoid and/or minimize the cases of unauthorized intrusion of construction machinery onto adjacent privately-owned lands that are out of the expropriation corridor:

- Borders of the construction areas and expropriation corridor will be identified by suitable markings.
- Construction personnel will be trained to stay within the border of the construction areas and expropriation corridor.
- For exceptional cases when the privately-owned land has to be used but the expropriation or court processes have not been finalized yet, no work will be started until bilateral agreements are settled and official consent letters are taken from the legal owners. In such cases, official commitment letters will be provided to legal owners by the Project Sponsor regarding the scope of works and compensation of probable damages and the works will be conducted in accordance with those consent and commitment letters.
- Grievance Mechanism will be established and utilized for the Project (see SEP for further details of the mechanism). If complaints related with unauthorized use of privately-owned lands, damages on adjacent lands, etc. are received through Project's Grievance Mechanism, evaluation/inquiry will be conducted on a case-by-case and where necessary, corrective actions will be planned and implemented.
- In accordance with KGM's technical specifications, in case of any direct or indirect damage on state or personal property as a result of the activities of the Project contractor or sub-contractors, Project Sponsor will ensure that relevant corrective measures (e.g. repair, maintenance, rebuilding, restoration, etc.) are implemented at its own cost in line with the instructions of the KGM or other related governmental agencies.

Construction campsites, concrete/asphalt/mechanical plants and borrow pits will be used for a temporary period throughout the construction phase. Once the construction activities are completed, following measures will be taken for the rehabilitation of sites:

- Initially above-ground construction compounds including the plants/facilities, prefabricated buildings/houses, relevant infrastructure and installations, etc. of no beneficial use will be dismantled and removed in accordance with the national and international legislation.
- Any storage tank and pipes will be taken out of operation and fully emptied. Liquid wastes will be removed in accordance with the national and international legislation.
- Affected lands at the construction campsites and service roads will be graded and appropriately rehabilitated to acceptable uses.
- Any void area formed as a result of demolition works will be filled with suitable soil or other materials that are compatible with the natural topography and local ground conditions.
- Topsoil stripped prior to the installation of construction compounds will be reapplied and landscaping activities will be conducted in conformity with the surrounding land uses. Lands that will not be restored for a specific community use will be seeded and revegetated with native species.

V.4.1.2. Forestlands

The legislation related to forest areas, their protection and utilization for public benefit is composed of laws and regulations that are based on the constitution of Türkiye. The central administrative authority is the Ministry of Agriculture and Forestry. The relevant agency within Ministry of Agriculture and Forestry is the General Directorate of Forestry, which itself has regional directorates (including Antalya Regional Directorate) in the country and management directorates and management sub-directorates in those regions. These directorates are responsible for protecting forestry and forestry resources

against negative impacts, and developing and managing forestry and forestry resources in a sustainable way.

Within this framework, forestlands corresponding to the Project components are under the authority of the Ministry of Agriculture and Forestry. In accordance with the Forest Law and associated regulations, relevant forestry permits have to be obtained by the KGM from the Ministry of Agriculture and Forestry, for the construction of Project components on forestlands.

Once the forestry permits are obtained, all the works including tree marking, felling, logging, chipping, removal and appraisal (selling, etc.) is performed by the General Directorate of Forestry and its Regional Directorates during the period between permit issuance and delivery of the land to the KGM.

For the forest lands to be used in the scope of the Project, forestry permit applications have been/are being submitted by KGM to related Forestry authorities in accordance with the Forest Law. Measures that have been taken to minimize the impact on forests and that will be taken in the course of the Project to compensate unavoidable impacts are described in the following paragraphs.

Minimization of the Loss of Forestlands

One of the main aims of the Project is to minimize the impact on forestlands to the greatest extent possible. Accordingly, the avoidance of forest areas was one of the key criteria considered during the route selection process. Where forest crossings were unavoidable, viaducts, bridges and tunnels were incorporated into the design to reduce direct ground-level disturbance and preserve underlying habitats.

Complementary measures such as erosion control, preservation of remaining vegetation, and long-term forest recovery monitoring will also support the minimization of forestland degradation throughout the construction and operational phases.

Afforestation

Following the completion of construction activities, measures will be taken to compensate (afforestation/reforestation) the lost forest assets at alternative locations to be determined by the Forestry authorities. In this scope, Project Sponsor will aim to compensate the loss of forest lands by planting trees at alternative areas on a voluntary basis. In the case of voluntary afforestation applications, afforestation is carried out in any region of Türkiye in line with the directions of the Forestry authorities. Project Sponsor will make the reasonable efforts to cooperate with the Forestry authorities and if approved by the Forestry authorities, afforestation activities in the scope of the Project will be conducted primarily at suitable locations in the region to adequately compensate the lost forest functions. Afforestation areas will be under the authority of relevant Forestry authorities, which decides for the specific tree species to be planted in each region, depending on the forest habitats and specific requirements of that region. These requirements are determined yearly and are specified on that year's afforestation plans of the Regional Directorate. The relevant Forestry authorities will be informed about the outcomes of the ecology studies done in the scope of the ESIA studies and the proposals for the plant species in consideration of the local ecological sensitivities.

Implementation of the Afforestation Plan will be initiated in the construction phase and may continue through the initial phases of the operation period. In order to compensate for the loss of forest assets in the Project Area, it is advised that the planting would be five times of the number of trees to be removed from the Project Area.

Response to Forest Fires

Regarding potential forest fires, the following measures will be taken in accordance with good site practices and KGM's technical specifications:

- Project Sponsor will require all contractor and sub-contractor personnel to take necessary measures to avoid forest fires and immediately respond to any fire event that could not be avoided by measures taken.
- Project Sponsor will cooperate with relevant governmental agencies to make all the reasonable effort in responding forest fires.
- Project personnel will be trained to immediately inform forestry authorities about the location and scale of any fire incident.
- Adequate number and amount of firefighting equipment will be provided at construction sites. Fire-fighting equipment will not be obstructed. On the field, there will be always proper trained personnel and units who can use fire-fight equipment efficiently.
- Proper fire extinguishers will be kept ready at site where hot/welding works will be performed.
- The operability's of fire-fight equipment will check regularly.
- Construction sites and work areas, which are prone to fire incidents, will be determined and accordingly, locations where smoking is not dangerous will be specified and smoking will only be allowed at these locations. Throwing cigarette butts on the floor will be prevented by means of relevant applications/sanctions (i.e. trainings, placing ashtrays to the locations where smoking is allowed within the construction site, etc.)
- Within the scope of the training program to be given to the personnel, basic field rules for fire protection will be explained, awareness on fire hazard will be raised and personal responsibilities will be defined. Against fire incidents that cannot be prevented by taking relevant measures, personnel will be trained on emergency procedures and use of emergency response equipment.
- Not all fires (e.g. forest fires caused by energy transmission line) will be responded with water. To stop a fire caused by electric current, sufficient amount of dry-type extinguishers will also be kept available at the site. Electric current may be cut off before responding to fire, if deemed necessary.

V.4.1.3. Agricultural Lands

Expropriation of privately-owned agricultural lands will be done by KGM in accordance with the relevant provisions of the Expropriation Law. In the accordance with Turkish Expropriation Law, if the land portion remaining from expropriation would not be viable anymore, eligible persons have the right to request the expropriation of the entire parcel (application has to be in line with the requirements of the Law) including the remaining portion, even if this portion is out of the expropriation corridor. Relevant article of the Law is provided below:

Article 12: Partial Expropriation Where only part of a property is to be expropriated its value is estimated in accordance with Article 12 of the Expropriation Law as follows: a. In cases where no change occurs in the value of the non-expropriated part due to the expropriation, the value of the expropriated part shall be determined in proportion to the total value of the whole property in accordance with Article 11 of the Expropriation Law.

b. If a decrease in the value of the non-expropriated part occurs as a result of expropriation, this loss is estimated and added to the expropriation value of the expropriated part as defined in the relevant paragraph of the Law.

c. If an increase in the value of the non-expropriated part occurs as a result of expropriation, this increase is estimated and subtracted from the value of the expropriated part as defined in the relevant paragraph of the Law.

d. The decreased and increased amounts stated in relevant paragraphs of the Law are determined according to the valuation method under Article 11 of the Expropriation Law.

e. When the remaining part of the property after expropriation remains suitable for use in accordance with the zoning legislation, the expenses and costs for reinstatement of any buildings, surrounding walls, sewerage, water, electricity and gas lines that are damaged shall be determined and added to the expropriation value.

f. When the remaining part of the property is no longer suitable for use, and the expropriation decision is not challenged in the courts, the owner may apply in writing within 30 days of the date of notification of the expropriation decision, for the remaining part also to be expropriated.

In accordance with Expropriation Law, standing crops, trees, irrigation structures, walls, fences, etc. will be considered in the valuation process and the compensations will be provided by responsible agency (in this case KGM) to cover the associated losses.

- Several underpasses and culverts have been included in the design to ensure access of local people to agricultural lands. These underpasses and culverts will ensure sufficient dimensions for the passage of harvesters, vehicles, etc. where required. Detailed lists of underpasses and culverts planned in the Project are provided in Chapter 3 (“Project Description”).
- Access roads will be constructed adjacent to the Motorway near agricultural areas/zones to provide access to agricultural lands, if/where necessary.
- Legitimate requests of local people regarding the avoidance and/or minimization of the restriction of access between their settlement areas and agricultural lands will be considered by the Project Sponsor’s design team and feasible solutions will be developed and implemented, where possible.

V.4.1.4. Pasture Lands

For the pasturelands that will be separated by the Motorway (fragmentation of land), impacts on the public users of the pasturelands will be mitigated by ensuring access between severed lands by using the culverts.

V.4.1.5. Quarry and Borrow Pits

A production license is required when state institutions and organizations plan to source construction raw materials from forest areas. Based on this permit, permission for all operations and construction associated with this activity is regulated by Implementing Regulation of the 16th Article of the Forest Law, production license will be obtained for the quarry and borrow pits to be used. Measures to be taken at the quarry and borrow pits are described below:

- Borders of the quarry and borrow pits will be identified by using proper methods (i.e. fencing, etc.) and material extraction activities will be conducted within these borders.
- Topsoil management measures (see Chapter 6 “Topography, Soils and Geology”) to be taken at Motorway construction sites will be applied at the quarry and borrow pits.

- Appropriate low-impact extraction methods that would result in final site contours supportive of habitat restoration principles and final land use will be selected wherever feasible.
- Preference for extraction will be given to thicker deposits as far as possible and as reasonable to land use changes and consequent loss of soil.
- Borrow pits will be reclaimed immediately after the completion of extraction activities. Rehabilitated lands will conform to acceptable uses consistent with local and regional land use plans.
- During reinstatement, affected land will be graded and appropriately prepared prior to the reapplication of soil layers that would sustain vegetative regrowth.

V.4.2. Operation Phase

As no additional direct physical impact on land use is anticipated in the operation phase, mitigation measures to be taken in this phase will be mainly limited with the afforestation activities that would continue in line with the commitments of the Project Sponsor and guidance of the relevant Forestry authorities. On the other hand, in order to minimize the unplanned development potential and meet the infrastructural needs of the potentially growing populations adequately, regional and local planning authorities and administrations should duly assess the future development potential of the region where Antalya-Alanya Motorway Project and other large-scale infrastructure projects are to be implemented and develop relevant measures.

V.5. Summary of Assessment and Residual Impacts

Table V.25 provides a summary of the land use assessments, highlighting the significance of identified impacts both before and after the implementation of mitigation measures. As can be seen from the Table V.25, in general, potential impacts on the forestlands, agricultural lands, etc. are anticipated to be reduced to low levels in the long-run with effective implementation of mitigation measures, with the exceptions of (i) forests having ecological functions for which the residual impacts have been evaluated as medium due to their importance; (ii) agricultural lands that are suitable for soil cultivation for which the residual impacts have been evaluated as high or medium depending on the land use capability class of the soils to be affected; (iii) pasturelands with Class I-V land use capability class for which the residual impacts have been evaluated as medium. Regional land use character would also change significantly (may be beneficial or adverse depending on the planning measures to be taken by the authorities) in the long-run.

It should be also noted that a certain period of time (from months to years) will be needed to ensure that the residual impacts are adequately mitigated to acceptable levels as measures such as rehabilitation of temporary Project sites or afforestation take time to show their effectiveness. Additionally, the Project may trigger future tourism, urban and industrial development in certain locations along the route. The residual impact of the development may be beneficial or adverse for different receptors, in any case being of high significance. The control of the development is under the authority and responsibility of the local and regional administrations and the stress to be put on the forests and agricultural areas surrounding the settlements has to be well balanced to avoid further significant losses of these land uses.

Table V.25.Summary of the Land Use Assessments

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phase												
Loss of forestland due to the Project components *	Forests: Ecological forest function	Adverse	Restricted	Long	Low (5-50 ha) Medium (50- 100 ha) High (> 100 ha)*	Long-term irreversible	One-off	Wide (A)	High (3)	High (A3)	• In accordance with the Forest Law and associated regulations, forestry permits will be obtained by the KGM from the Ministry of Forestry and Water Affairs for all construction sites located at forestlands. • Loss of forest lands will be minimized by taking relevant design measures. • In addition, ecological bridges will be constructed in line with the requirements of related forestry directorates after the KGM approval if needed • Afforestation Plan will be implemented.	Medium
	Forests: Socio-economic value.	Adverse	Restricted	Long	Low (5-50 ha) Medium (50- 100 ha) High (> 100 ha)*	Long-term irreversible	One-off	Wide (A)	Moderate (2)	High (A2)		Low
	Forests: Economic forest function.	Adverse	Restricted	Long	Low (5-50 ha) Medium (50- 100 ha) High (> 100 ha)*	Long-term irreversible	One-off	Medium (B)	Low (1)	Low (B1)		Low
Loss of trees	Forests: Ecological forest function	Adverse	Restricted	Long	High	Long-term irreversible	One-off	Wide (A)	High (3)	High (A3)		Low
	Forests: Socio-economic value.	Adverse	Restricted	Long	Medium	Long-term irreversible	One-off	Medium (B)	Moderate (2)	Medium (B2)		Low
	Forests: Economic forest function.	Adverse	Restricted	Long	Low	Long-term irreversible	One-off	Restricted (C)	Low (1)	Low (C1)		Low
Loss of forests due to accidental fires caused by the Project activities	Forests: Ecological forest function	Adverse	Wide	Short	High	Long-term reversible	One-off	Wide (A)	High (3)	High (A3)	• Project Sponsor will require all contractor and sub-contractor personnel to take necessary measures to avoid forest fires and immediately respond to any fire event that could not be avoided by measures taken. • Project Sponsor will cooperate with relevant governmental agencies to make all the reasonable effort in responding forest fires. • Project personnel will be trained to immediately inform forestry authorities about the location and scale of any fire incident. • Adequate number and amount of fire fighting equipments will be provided at construction sites. Fire-fighting equipment will not be obstructed. On the field, there will be always proper trained personnel and units who can use fire-fight equipments efficiently. • Proper fire extinguishers will be kept ready at site where hot/welding works will be performed. • The operability's of fire-fight equipments will check regularly. • Construction sites and work areas, which are prone to fire incidents, will be determined and accordingly, locations where smoking is not dangerous will be specified and smoking will only be allowed at these locations. Throwing cigarette butts on the floor will be prevented by means of relevant	Low
	Forests: Socio-economic value.	Adverse	Wide	Short	Medium	Long-term reversible	One-off	Medium (B)	Moderate (2)	Medium (B2)		Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
	Forests: Economic forest function.	Adverse	Wide	Short	Low	Long-term reversible	One-off	Restricted (C)	Low (1)	Low (C1)	applications/sanctions (i.e. trainings, placing ashtrays to the locations where smoking is allowed within the construction site, etc.) • Within the scope of the training program to be given to the personnel, basic field rules for fire protection will be explained, awareness on fire hazard will be raised and personal responsibilities will be defined. Against fire incidents that cannot be prevented by taking relevant measures, personnel will be trained on emergency procedures and use of emergency response equipments. • Not all fires (e.g. forest fires caused by energy transmission line) will be responded with water. To stop a fire caused by electric current, sufficient amount of dry-type extinguishers will also be kept available at the site. Electric current may be cut off before responding to fire, if deemed necessary.	Low
Loss of agricultural lands suitable for soil cultivation	Agricultural lands: Class I-II soils	Adverse	Restricted	Long	High Kozağacı, Yukarıkocayatak, Aşağıkocayatak, Kayaburnu, Dikmen, Çandır, Aşağıçatma, Cumalı, Burmahancı, Merkez, Debiztepesi, Evren, Seki, Ilıca, Şişeler, Karacalar, Kızılot, Kadılar Karakaya	Irreversible	One-off	Wide (A)	High (3)	High (A3)	• Expropriation of privately-owned agricultural lands will be done by KGM in accordance with the relevant provisions of the Expropriation Law. In the accordance with Turkish Expropriation Law, if the land portion remaining from expropriation would not be viable anymore, eligible persons have the right to request the expropriation of the entire parcel (application has to be in line with the requirements of the Law) including the remaining portion, even if this portion is out of the expropriation corridor. • Several underpasses and culverts have been included in the design to ensure access of local people to agricultural lands. These underpasses and culverts will ensure sufficient dimensions for the passage of harvesters, vehicles, etc. where required. • To ensure access to nearby agricultural lands, access roads will be constructed adjacent to the Motorway in agricultural areas or zones, if/where necessary. • Legitimate requests of local people regarding the avoidance and/or minimization of the restriction of access between their settlement areas and agricultural lands will be considered by the Project Sponsor's design team and feasible solutions will be developed and implemented, where possible.	Low
	Agricultural lands: Class III-IV soils	Adverse	Restricted	Long	Medium Üründü, Kökez, Gündoğdu, Kalemler, Evrenleryavşı, Dolbazlar, Yukarıışıklar, Dikmen, Bucakşeyhler, Aşağıışıklar, Demirciler, Karaöz, Aksaz, Sülek, Çavuşköy	Irreversible	One-off	Medium (B)	Moderate (2)	Medium (B2)		Low
Loss of non-arable lands that are not suitable for soil cultivation	Agricultural lands: Class V-VIII soils	Adverse	Restricted	Long	Low Sarıabalı, Çakış, Sağırin,Taşağıl, Hocalar, Yavrudoğan, Yeniköy, Ulukapı, Hacıali, Hacıobası, Uzunlar, Örenşehir, Yalçıdibi, Odaönü, Çakallar, İncekum, Avsallar, Akdam, Türkler, Soğukpınar, Emişbeleni, Toslak, Konaklı, Elikesik	Irreversible	One-off	Restricted (C)	Low (1)	Low (C1)		Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Loss of pasturelands available for public use	Pasturelands: Class I-V soils	Adverse	Restricted	Long	Low (area affected as pasture is less than 10% of the entire study area)	Irreversible	One-off	Medium (B)	High (3)	High (B3)	• Planning and construction of additional culverts at the immediate locations of the pastures (if not already planned) will be done. • Collaboration with the neighborhood mukhtar in selecting the exact locations and dimensions of culverts will be made.	Low
	Pasturelands: Class VI soils	Adverse	Restricted	Long		Irreversible	One-off	Medium (B)	Moderate (2)	Medium (B2)		Low
	Pasturelands: Class VII-VIII soils	Adverse	Restricted	Long		Irreversible	One-off	Restricted (C)	Low (1)	Low (C1)		Low
Exceeding the boundaries of the expropriation corridor, damage to adjacent lands due to illegal intrusion	Local Communities	Adverse	Local	Short	Low (cannot be quantified but the risk is likely to be associated with a very local land plot)	Short term reversible	One-off	Minor (C)	High (3) (can be medium or low depending on the quality and socio-economic value of the land plot; assumed as high for the worst case)	Medium (C3) (worst case)	• Borders of the construction areas and expropriation corridor will be identified by suitable markings. • Construction personnel will be trained to stay within the border of the construction areas and expropriation corridor. • For exceptional cases when the privately-owned land has to be used but the expropriation or court processes have not been finalized yet, no work will be started until bilateral agreements are settled and official consent letters are taken from the legal owners.In such cases, official commitment letters will be provided to legal owners by the Project Sponsor regarding the scope of works and compensation of probable damages and the works will be conducted in accordance with those consent and commitment letters. • If complaints related with unauthorized use of privately-owned lands, damages on adjacent lands, etc. are received through Project's Grievance Mechanism, evaluation/inquiry will be conducted on a case-by-case and where necessary, corrective actions will be planned and implemented. • In accordance with KGM's technical specifications, in case of any direct or indirect damage on state or personal property as a result of the activities of the Project contractor or sub-contractors, Project Sponsor will ensure that relevant corrective measures (e.g. repair, maintenance, rebuilding, restoration, etc.) are implemented at its own cost in line with the instructions of the KGM or other related governmental agencies.	Low
Start of activities on privately owned lands for which expropriation or court processes have not be finalized.											•	
Operation Phase												
Future urban development potential	Regional Land Use Character	Adverse or Beneficial	Wide	Long	High	Irreversible	Continuous	Major (A)	High (3)	High (A3)	• Good planning by central authorities/ administrations in consideration of other regional/local large-scale infrastructure development is essential (not under the control of Project).	Medium

**These forest areas and related impact assessments will be updated after the Forest Management Plan and Forest Stand Map are examine*

VI. TOPOGRAPHY, SOILS, AND GEOLOGY

This chapter identifies existing topographical, soil, and geological conditions along the Motorway route and assesses the potential impacts associated with these aspects. Measures proposed for the mitigation of the potential impacts and the residual impacts are also described in this chapter for the following main types of impacts:

- Permanent changes in the existing topographical features;
- Soil disturbance due to earthworks, construction activities, and materials extraction;
- Initiation and/or acceleration of soil erosion process;
- Risk of soil contamination due to accidental spills, leakage and improper waste management;
- Risks associated with the handling of existing contaminated lands;
- Geological and geotechnical risks.

VI.1. Assessment Methodology and Data Sources

Soil properties along the Motorway route will be defined for a 400 m study corridor (6,856 ha). In this context, major soil groups and erosion levels of these soils along the Motorway have been determined based on the Land Use and Soil Database prepared by the former General Directorate of Rural Services for Antalya (1993). In addition, the "Coordination of Information on the Environmental (CORINE) Land Cover Classification" (2018) database is also used to determine land use characteristics. A soil sampling and analysis program was carried out to determine the quality of representative soil samples at selected locations along the Motorway route. Geological-geotechnical investigation reports and readily available internet resources were utilized to characterize the fundamental geological and geotechnical conditions in the Project area.

The data sources to be used in this context are listed below:

- Land Use Database of the former General Directorate of Rural Services (GDRS; Antalya, 1993),
- Coordination of Environmental Information (CORINE) Land Cover (2018),
- Laboratory analysis results for soil samples collected in the Project area,
- Geological-geotechnical survey reports.

Significance Criteria

The significance criteria for the impacts on topography, soils, and geology will be determined as high, medium, or low, based on the evaluation of the magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter 4 (“ESIA Methodology”) will be used for the determination of the magnitude of impact on the land use components, while sensitivity/value criteria to be used in the scope of impact assessment are summarized in Table VI.1. A detailed explanation of the sensitivity components for each ecosystem component is provided in the following “Baseline Conditions” section.

Table VI.1. Criteria for Sensitivity/Value of Resource/Receptor

Ecosystem Component	Sensitivity/Value Level		
	High (3)	Medium (2)	Low (1)
Topography	Unique topographical structure	Natural topograpghy	Already disturbed topograpghy
Soil- Erosion	Soil with severe (Level 3) and very severe (Level 4) erosion potential according to GDRS Database	Soil with moderate (Level 2) erosion potential according to GDRS Database	Soils with none or very little (low) erosion potential (Level 1)
Soil - Contamination	Soils corresponding to lands classified by CORINE Land Cover Database as “Arable Land”, “Permanent Crops”, “Pastures” and Heterogenous Agricultural Areas” (under Agricultural Areas) and Forests (under Forests and Semi-natural Areas)	Soils corresponding to lands classified by CORINE Land Cover Database as “Artifical, Non-agricultural and Vegetated Areas” (under Artificial Surfaces) and “Shrub and/or Herbaceous Vegetation Associations” (under Forests and Semi-natural Areas)	Soils corresponding to lands classified by CORINE Land Cover Database as “Urban Fabric”, “Industrial, Commericial and Transport”, “Mine, Dump and Construction Sites” (under Artificial Surfaces)
Soil - Topsoil	Agricultural areas, where topsoil thickness is 20-30 cm	Forest areas, where topsoil thickness is 10-20 cm	Pastures/Steppe, where topsoil thickness is 5-10 cm
Geology - Landslides	Active landslide areas	Former/Ancient landslide areas	Areas with no landslide history
Geological Features	Sites with unique geological sites and features of scientific or social/cultural importance		Sites with no unique geological sites and features of scientific or social/cultural importance
Seismicity	1st Degree Earthquake Zones according to relevant Earthquake Zoning Maps	2nd Degree Earthquake Zones according to relevant Earthquake Zoning Maps	3rd Degree Earthquake Zones according to relevant Earthquake Zoning Maps

VI.2. Baseline Conditions

A detailed assessment of the existing topographic, soil and geological conditions along the Motorway route is presented in this subsection to understand the current conditions of the Project Area prior to the commencement of the Project.

VI.2.1. Topography and Soils

VI.2.2. Topographical Conditions

Topographical conditions combine terrain features, hills, slopes and elevation levels along the Motorway route. The distribution of slopes along the Project area is given in Table VI.2. According to the conducted studies, steep/very steep slopes of over 20% cover 49% of the Motorway while flat areas with less than 10% slopes comprise 26% of the route. Elevation and slope maps for the area where the project will be implemented are presented in
Figure VI.1.

Table VI.2. Slope Groups within the Study Corridor of the Project

Slope (%)	Area (m^2)	Area (ha)	Percent (%)
0 - 2 %	10,202,218.30	1,020.22	14.88
3 - 5 %	10,419,835.95	1,041.98	15.20
6 - 10 %	11,242,176.98	1,124.22	16.40
11 - 20 %	14,007,002.44	1,400.70	20.43
21 - 30 %	8,426,578.59	842.66	12.29
30+ %	14,263,514,51	1,426.35	20.80
Total	**68,561,326.77**	**6,856.13**	**100.00**

VI.2.2.1. Soil Characteristics

Soil conditions along the Motorway route will be described based on the soil groups, erosion levels, and the content of the soils that represent productivity. Slope conditions are provided under the previous “Topographical Conditions” subsection, while land use capabilities are described in Chapter 5 (“Land Use and Property”).

Soil Groups

Soil groups corresponding to the study corridor have been described based on the land use and soil database of the former Turkish General Directorate for Rural Services (GDRS) published for Antalya province in 1993. The results of the analyses done in this scope are provided in Table VI.4. Maps of soil groups within the study corridor are presented in

Figure VI.1 through
Figure VI.5.

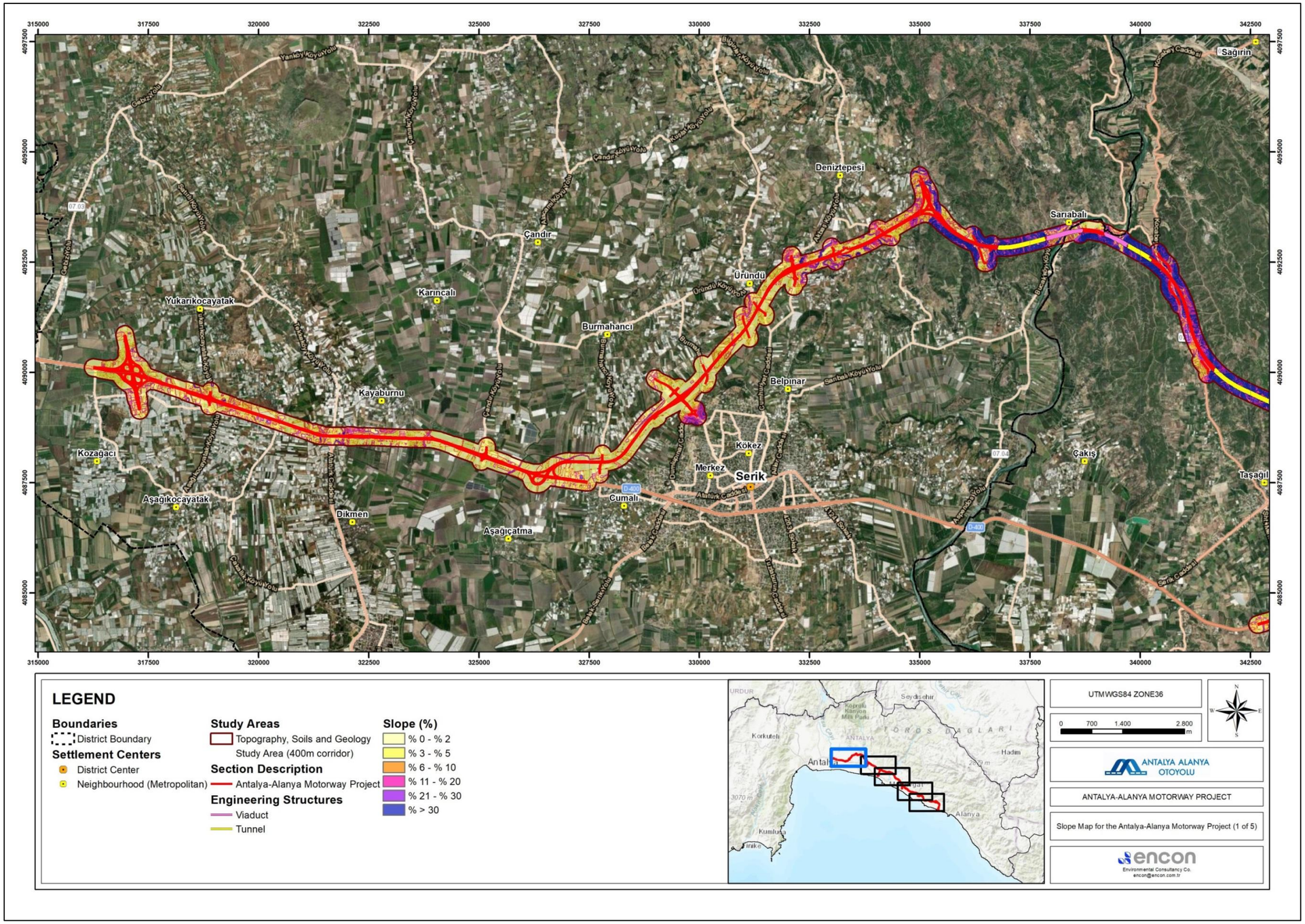


Figure VI.1. Slope Maps of the Project-1

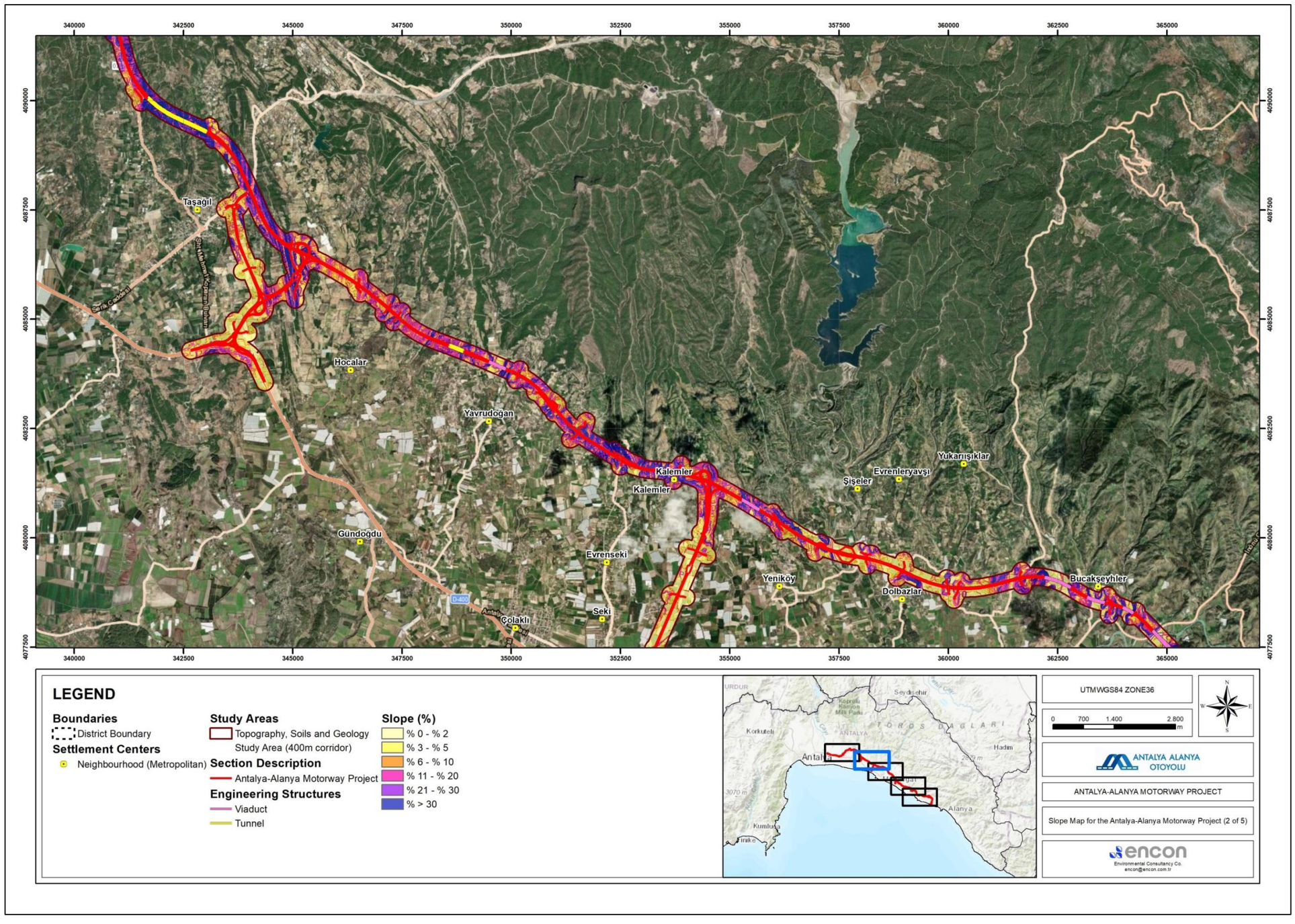


Figure VI.2. Slope Maps of the Project-2

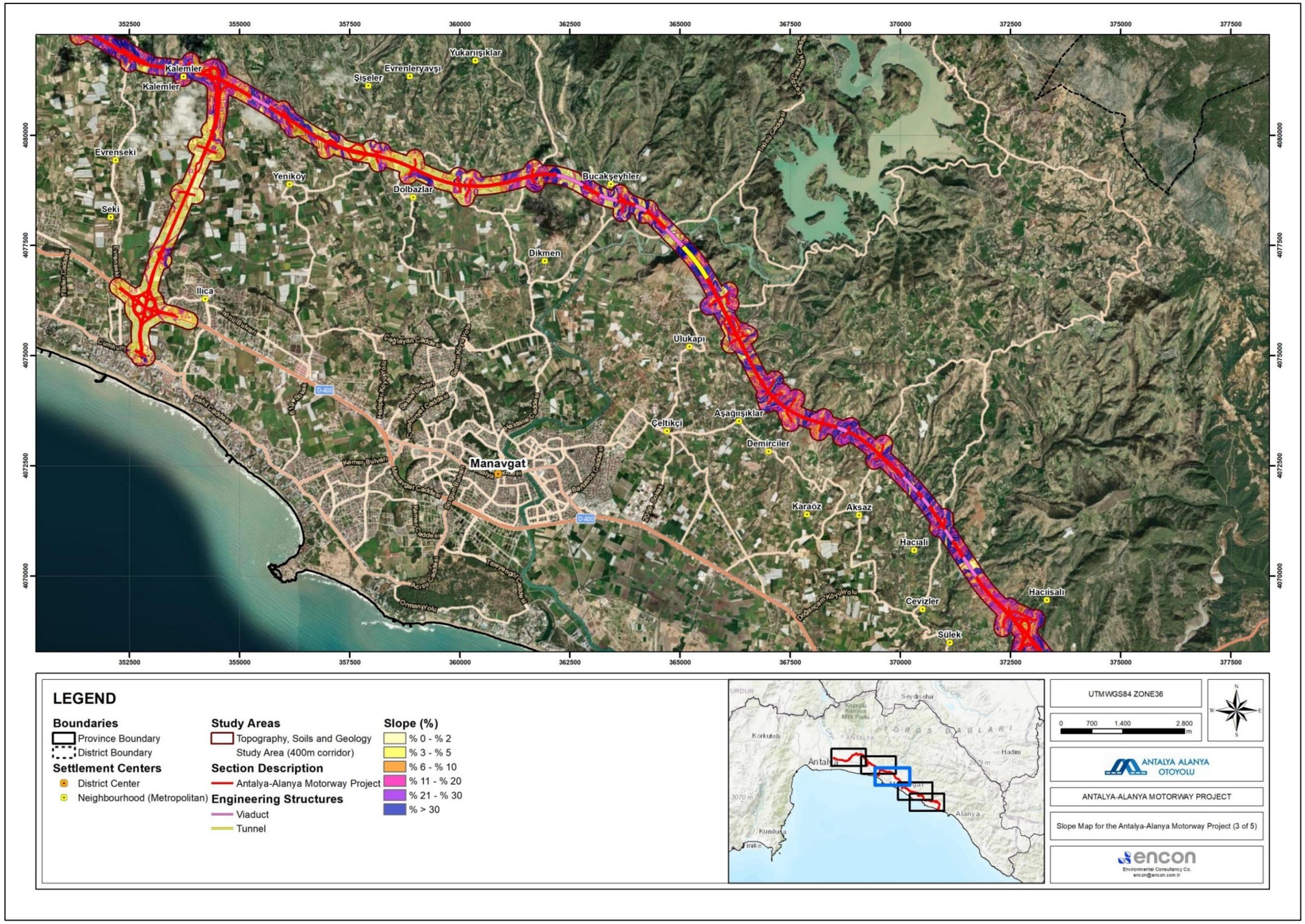


Figure VI.3. Slope Maps of the Project-3

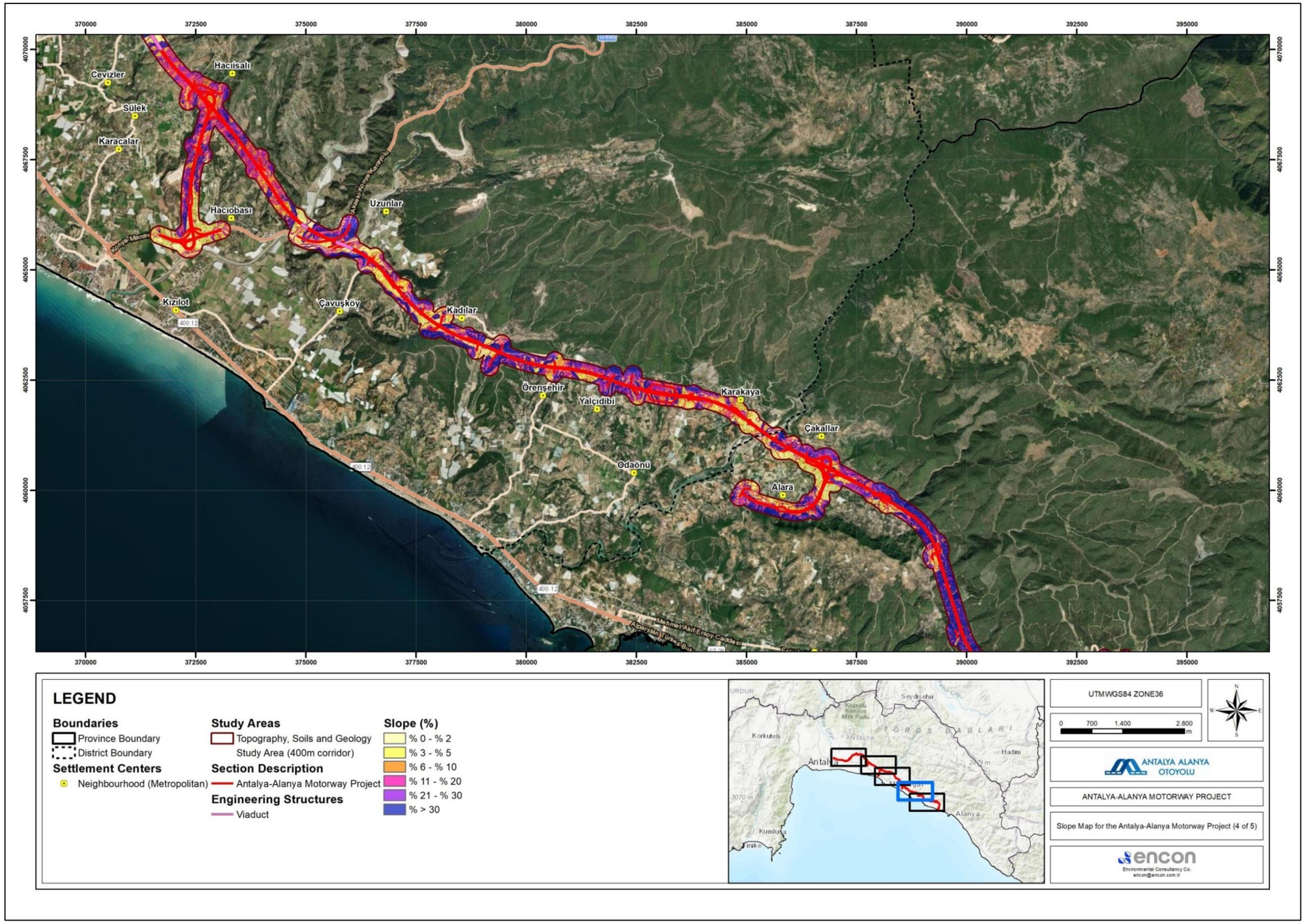


Figure VI.4. Slope Maps of the Project-4

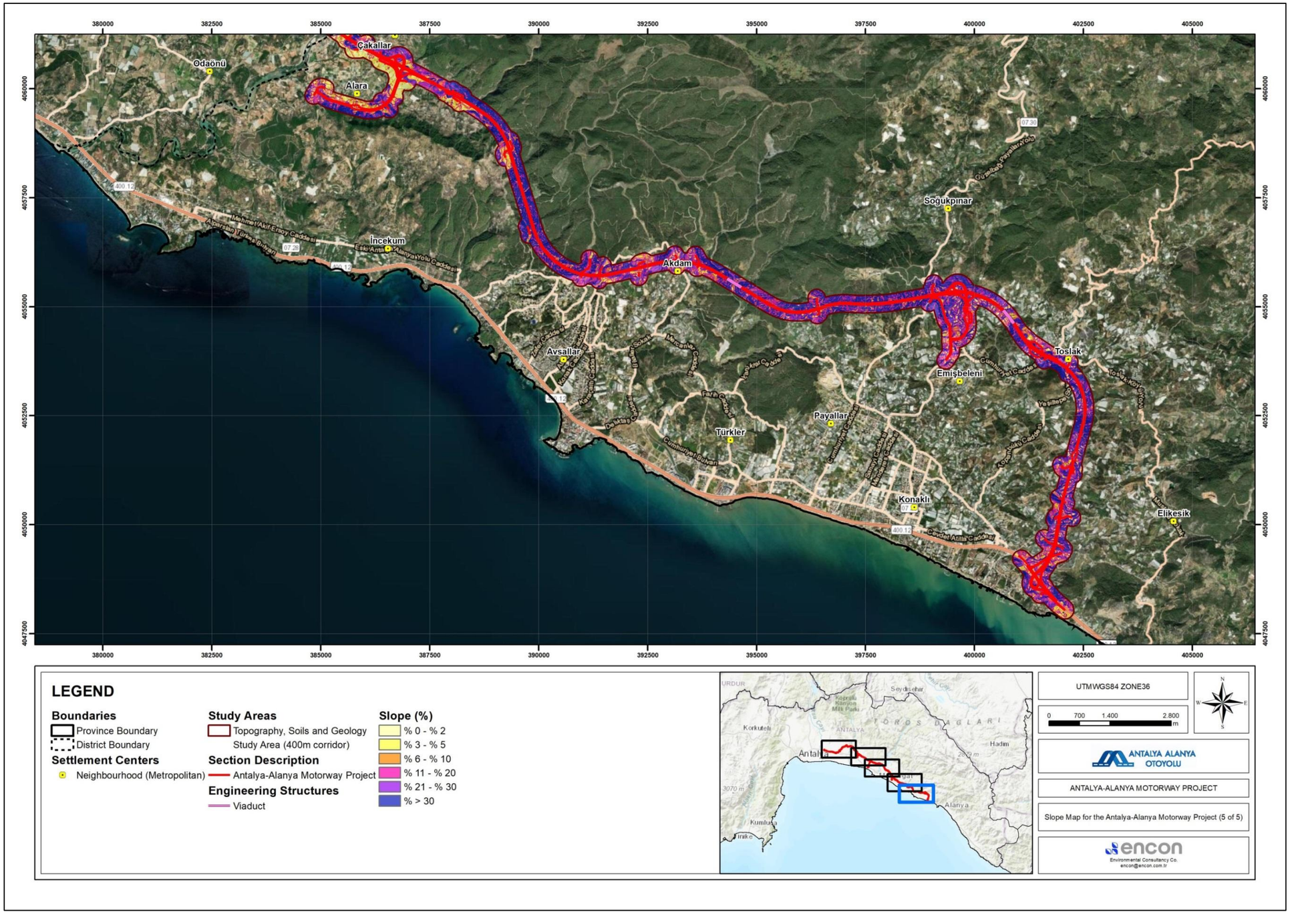


Figure VI.5. Slope Maps of the Project-5

According to the analysis conducted within the study corridor for the Motorway, the following soil groups are identified: non-calcareous brown soils, alluvial soils, colluvial soils, brown forest soils, rendzinas, and red Mediterranean soils. A description of the soil group is provided in Table VI.3.

Table VI.3. Description of Soil Groups

Soil Group	Description
Non-Calcareous Brown Soils	Topsoil is soft or slightly firm. Subsoil is more heavily textured and firmer. Although the lime is washed out, reaction is neutral or alkaline. Natural drainage is good. Natural vegetation cover is forest mixed with bushes and grass or shrubbery.
Brown Forest Soils	These soils are based on high-lime-content parent material. They have weakly developed layers. Their reactions are neutral or alkaline. Lime accumulation is observed in the lower portions of subsoil. They have good drainage.
Alluvial Soil	In these immature soils, layers are either not present or else very weakly developed even if they are present. On the other hand, various mineral layers with different properties are present. These soils which are very important for agriculture are generally under the influence of groundwater and are suitable for growing up all cultivated plants permitted by the climate. The yield could vary between very low and very high.
Colluvial Soils	These groups of soils is accumulated on the foot of step slopes with the effect of gravity, landslide, surface flow or tributaries as a result of transport from short distances and have formed on colluvial material. These young soils rather show the characteristics of the soil materials available in the upper elevations. They contain layers with varying material sizes depending on the level of precipitation and flow rate and the degree of elevation. Those layers are not parallel to each other as they are with the alluvial soils. The ones that are present at the foot of steep slopes and valleys generally include rough and coarse materials. With decreased rate of flow, material diameters reduce. These well drained soils are occasionally subject to flooding. Natural vegetative structure is dependent on the climate. They are productive under irrigation.
Rendzinas	The top layer in these soils, which consist of bedrocks with plenty of lime, is dark-coloured. These contain plenty of limestone, marn and pieces of chalk in them. The amount of lime could be little or plenty. Below this layer is a light-coloured calcareous transition layer. Below the transition layer is calcareous bedrocks. Natural vegetation cover is generally forests, but a mixture of bushes, forest and grass can also be found. Natural drainage of these soils is good.
Red Mediterranean Soils	These soils are formed on calcareous lands within the Mediterranean climate zone, typically developing under maquis vegetation and red pine forests. Lime is leached out of the soil, leading to the accumulation of iron oxide, which gives the soil its characteristic red and similar color tones. Due to this distinctive coloration, they are also referred to as "red Mediterranean soils." These soils are of medium fertility.

Source: Former Ministry of Agricultural and Rural Services. July 2008

The key findings of the soil group analyses conducted for the study corridor (6,856 ha) are provided in Table VI.4, and
Figure VI.6 through
Figure VI.10. A summary of the findings is presented below:

Table VI.4. Soil Groups within the Study Corridor of the Project (GDRS. 1993)

Soil Groups	Area (m^2)	Area (ha)	Percent (%)
Brown Forest Soils	15,883,056.69	1,588.31	23.17
Non-Calcareous Brown Forest Soils	8,103,133.76	810.31	11.82
Red Mediterranean Soils	3,031,804.25	303.18	4.42
Rendzinas	22,813,85.24	2,281.39	33.27
Alluvial Soil	14,241,289.36	1,424.13	20.77
Colluvial Soil	3,770,339.34	377.03	5.50
Settlements	184,874.57	18.49	0.27
River	44,053.60	4.41	0.06
River Flood Plain	428,820.08	42.88	0.63
Coastal Dunes	60,104.88	6.01	0.09
Total	**68,561,326.77**	**6,856.13**	**100.00**

As shown in the table, rendzinas are the dominant soil group along the study corridor (33.3%; 2,281.4 ha), which is followed by brown forest soils (23.2%; 1,588.3), alluvial soils (20.8%; 1,424.13 ha), non-calcareous brown forest soils (11.8%; 810.3 ha), colluvial soils (5.5%; 377.0 ha), and red Mediterranean soils (4.4%; 303.2 ha).

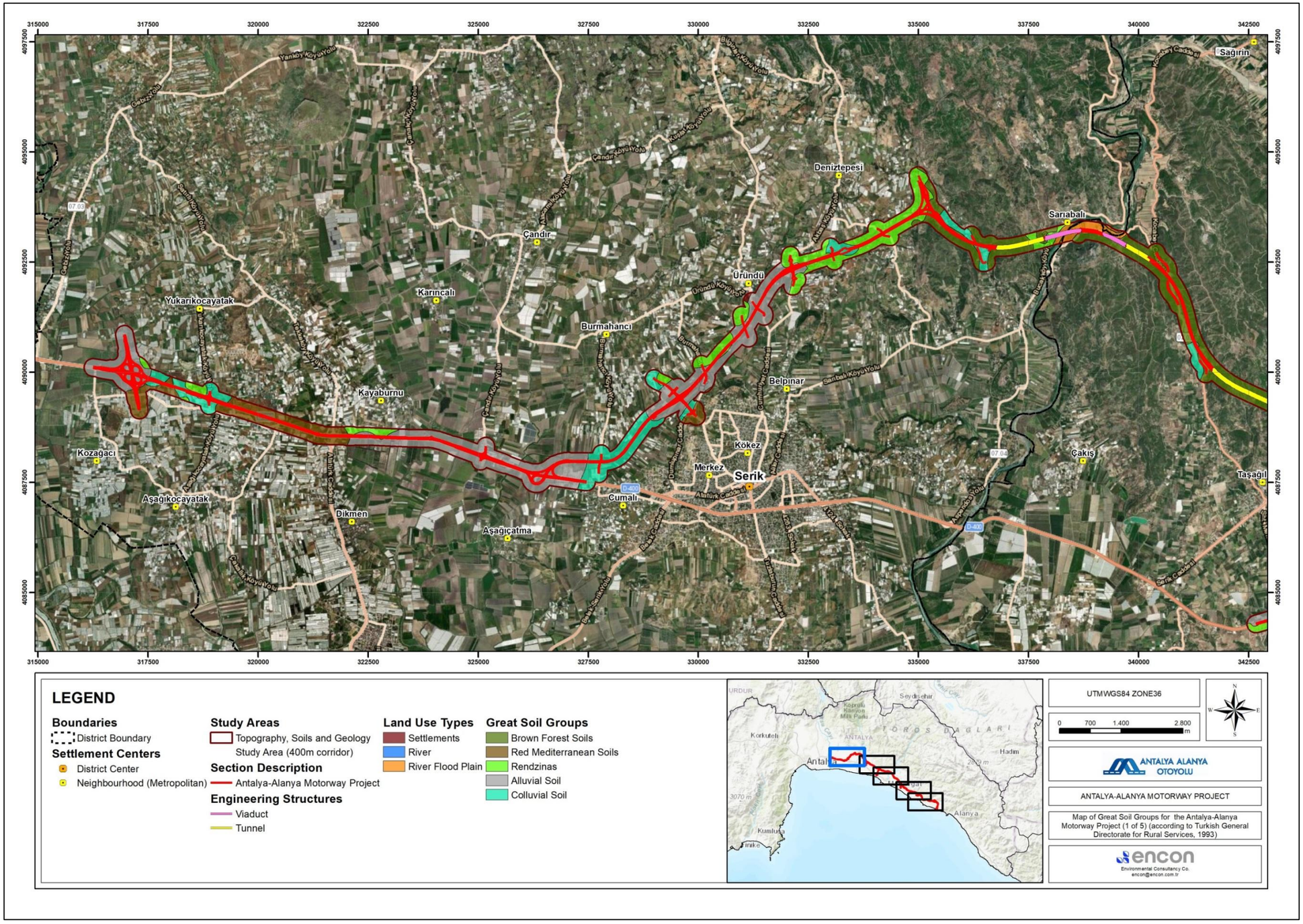


Figure VI.6. Great Soil Groups Maps of the Project-1

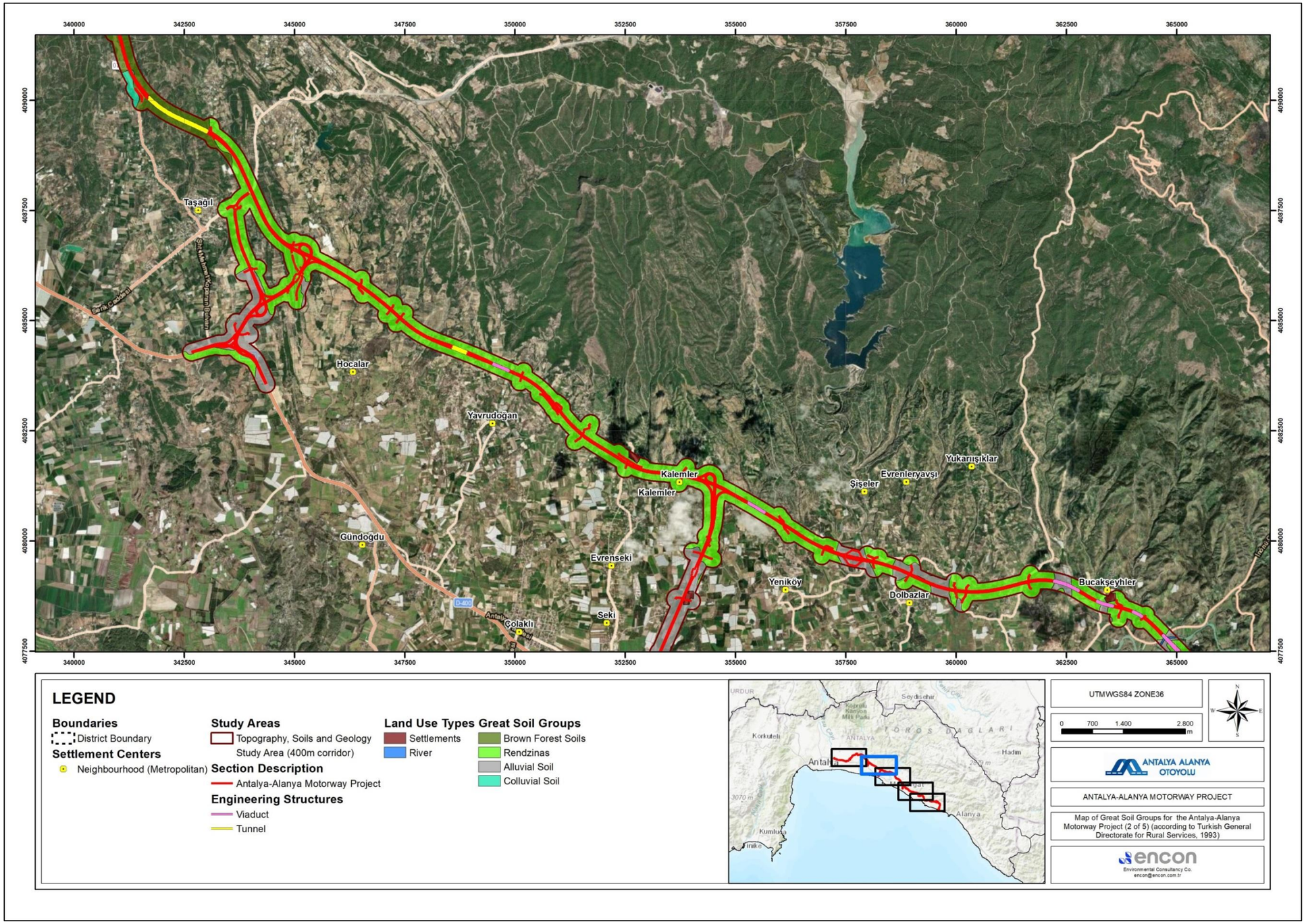


Figure VI.7. Great Soil Groups Maps of the Project-2



Figure VI.8. Great Soil Groups Maps of the Project-3

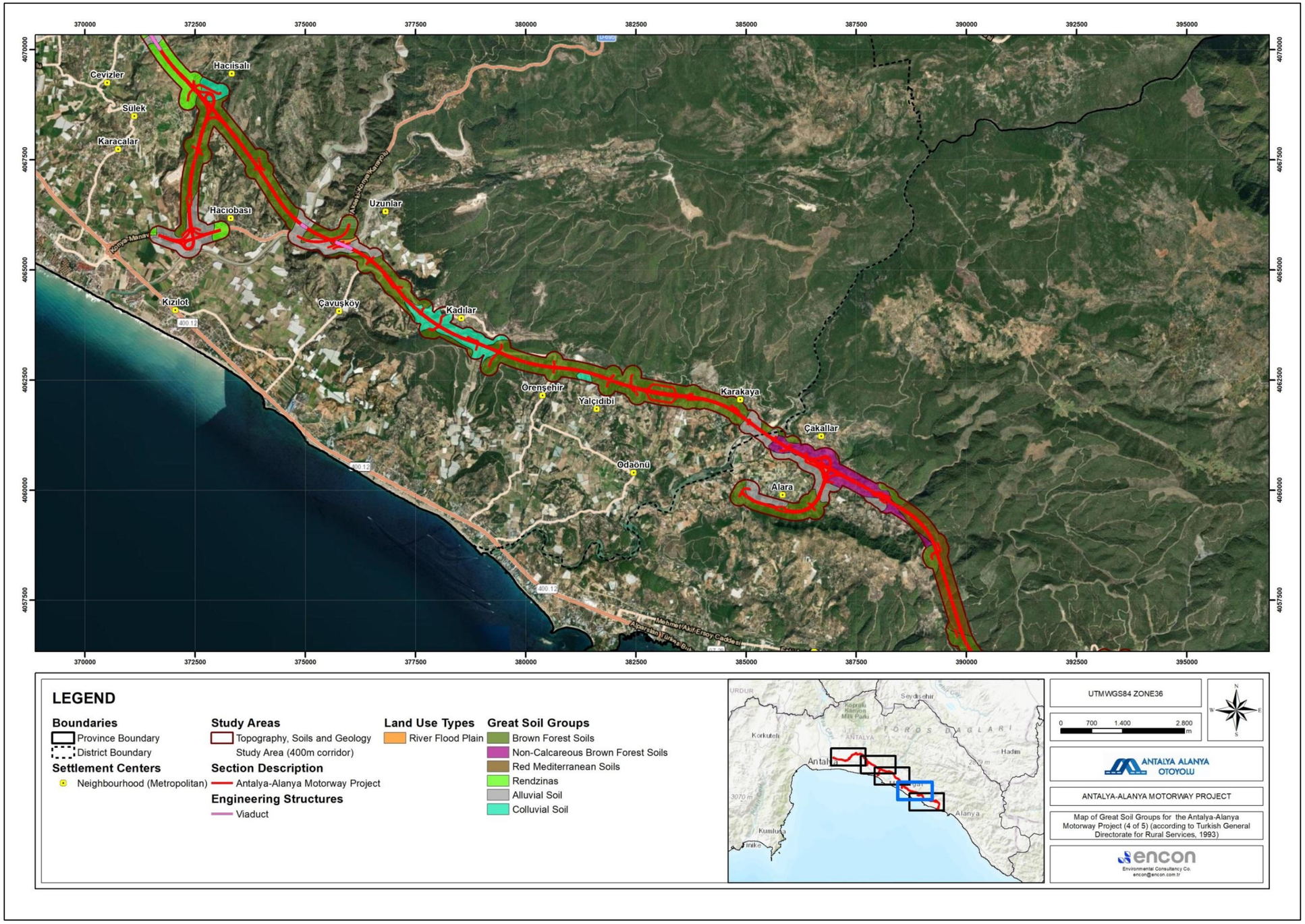


Figure VI.9. Great Soil Groups Maps of the Project-4

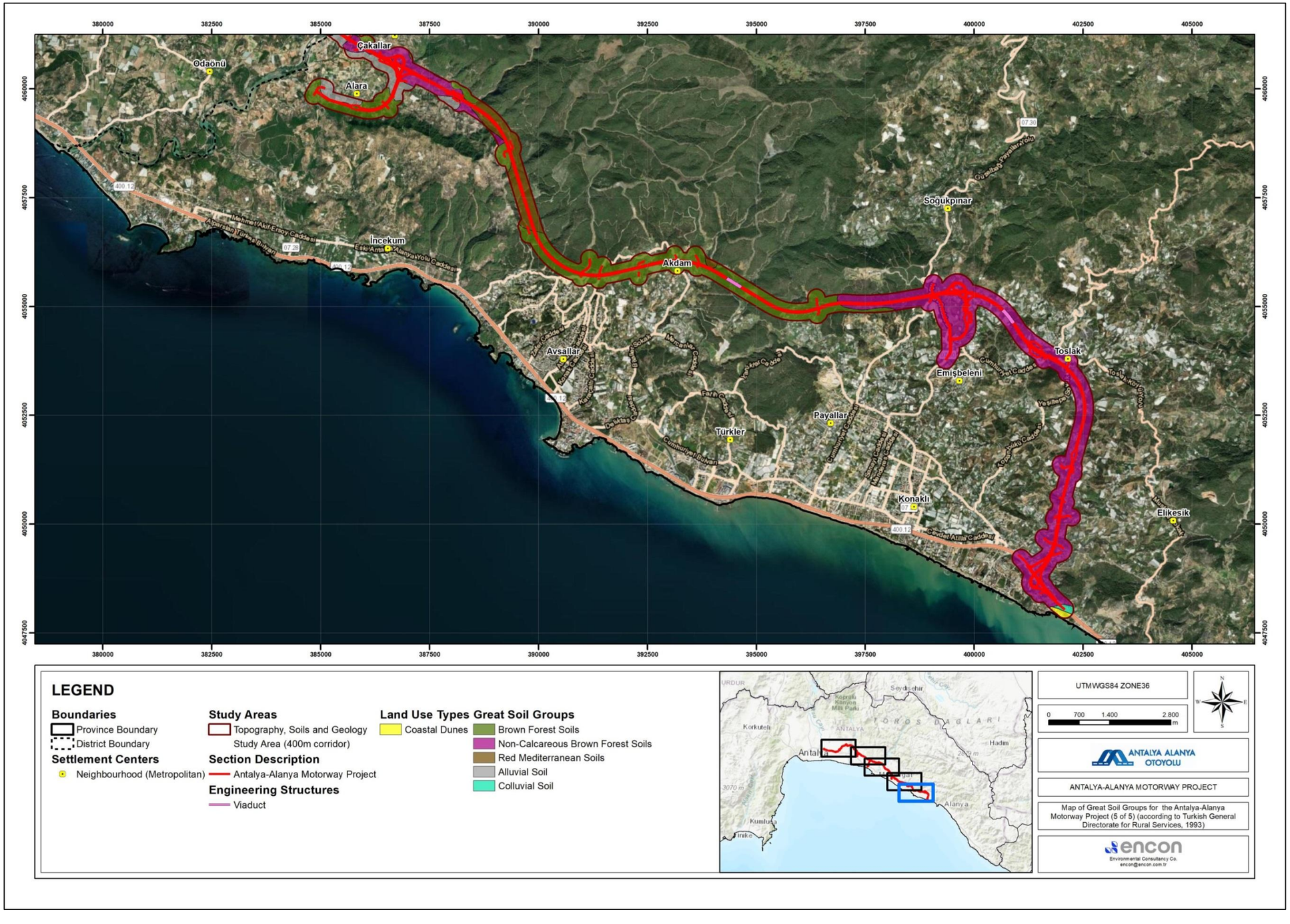


Figure VI.10. Great Soil Groups Maps of the Project-5

Soil Erosion

Soil erosion is refers to the displacement of the upper layer of soil, leading to degradation of the land. This process can occur naturally due to factors such as weather conditions (winds, rains, ice or extreme heat), or as a result of anthropogenic activities like deforestation, agriculture, and construction. The rate of erosion is increased due to improper agricultural practices such as cultivation on relatively high slope lands, plowing of the fields in the direction of the slope, and excessive grazing on pasturelands or deforestation. The primary agents of soil erosion are water and wind, where the former is more prominent. Water erosion takes place on lands with weak or no vegetative cover where runoff can flow with sufficient energy, transporting loosened soil particles down the slope. Consequently the fertile top layer of the soil is lost from the agricultural lands resulting in reduced agricultural productivity, and water quality of the surface water resources deteriorates as a result of sedimentation and eutrophication (Former Ministry of Agricultural and Rural Services. July 2008).

Evaluation of the erosion level to which soils are exposed is done based on the erosion classification system developed by US Department of Agriculture and adopted by several state authorities including Türkiye. Erosion levels specified in this classification system are listed in Table VI.5. Erosion levels corresponding to the Project area are presented in

Figure VI.11 through

Figure VI.15.

Table VI.5. Erosion Levels according to Technical Procedure on Soil and Land Classification Standards

Erosion Level	Definition
Level 1	Low
Level 2	Moderate
Level 3	Severe
Level 4	Very severe

Source: Former Ministry of Agricultural and Rural Services. July 2008.

Following the erosion level classification, erosion potential of the soils corresponding to the study corridor (6,856 ha total area; settlement, river, river flood plain, and coastal dune areas that cover 1.1% of the study corridor and not categorized under any of the soil groups. and are not taken into consideration in the following figures) have been described based on the land use, and soil database of the former GDRS published for Antalya province in 1993. The results of the analyses done in this scope are provided in Table VI.6.

As presented in the table, approximately 57% (3,933.2 ha) of the study corridor corresponds to soils with severe erosion levels (Level 3). This is followed by no or very low erosion level (Level 1), which accounts for about 25% (1,691.8 ha) of the study corridor. Soils with very severe erosion levels (Level 4) occur in about 2% of the study corridor. Soils with moderate erosion levels (Level 2) along the study corridor account for approximately 15% of the area. In addition, it should be noted that the Project area has experienced a rapid urbanization rate, especially in the last 30 years resulting in significant changes in the land use patterns and an increase in the overall area of artificial surfaces, including urban areas, industrial sites, transport networks, mine extraction sites, etc. Consequently it is likely that the erosion rate has accelerated, and the erosion exposure levels of the soils corresponding to the study corridor have increased.

Additionally, erosion levels of soils of the settlements within the study area are listed in Table VI.6.

Table VI.6. Erosion Potential of the Soils within the Study Corridor of the Project (GDRS. 1993)

Erosion Levels	Risks	Area (m^2)	Area (ha)	Percent (%)
None or very low	-	4,599,930.62	459.99	6.71
	Slope and erosion damage	2,107,249.47	210.72	3.07
	Soil insufficiency	553,026.62	55.30	0.80
	Drainage problems, oldness, flood damage	9,657,676.43	965.77	14.09
Sub-total (None or very low)		**16,917,883.15**	**1,691.79**	**24.67**
Moderate	Slope and erosion damage	7,656,224.52	765.62	11.17
	Slope and erosion damage Soil insufficiency	2,416,436.79	241.64	3.52
Sub-total (Moderate)		**10,072,661.30**	**1,007.27**	**14.69**
Severe	Slope and erosion damage. Soil insufficiency	39,331,463.24	3,933.15	57.37
Sub-total (Severe)		**39,331,463.24**	**3,933.15**	**57.37**
Very severe	Slope and erosion damage. Soil insufficiency	1,521,465.97	152.15	2.22
Sub-total (Very severe)		**1,521,465.97**	**152.15**	**2.22**
Settlements		184,874.57	18.49	0.27
River		44,053.60	4.41	0.06
River Flood Plain		428,820.08	42.88	0.63
Coastal Dunes		60,104.88	6.01	0.09
Total		**68,561,326.77**	**6,856.13**	**100.00**

Table VI.7. Erosion Levels of Soils in the Settlements within the Study Corridor (GDRS. 1993)

Province	District	Neighborhood	Erosion Level
Antalya	Serik	Kozağacı	None or very low
		Yukarıkocayatak	None or very low
		Aşağıkocayatak	None or very low
		Kayaburnu	None or very low
		Dikmen	Moderate
		Çandır	None or very low
		Aşağıçatma	None or very low
		Cumalı	None or very low
		Burmahancı	Moderate
		Merkez	None or very low
		Üründü	None or very low
		Kökez	None or very low

Province	District	Neighborhood	Erosion Level
		Deniztepesi	Moderate
		Sarıabalı	Severe
	Manavgat	Çakış	Severe
		Sağırin	Severe
		Taşağıl	Severe
		Hocalar	Severe
		Gündoğdu	Moderate
		Yavrudoğan	Severe
		Kalemler	Severe
		Evren	None or very low
		Seki	None or very low
		Ilıca	None or very low
		Yeniköy	Severe
		Şişeler	None or very low
		Evrenleryavşı	Severe
		Dolbazlar	Severe
		Yukarıışıklar	Severe
		Dikmen	Severe
		Bucakşeyhler	Severe
		Ulukapı	Severe
		Aşağıışıklar	Severe
		Demirciler	Severe
		Karaöz	Severe
		Aksaz	Severe
		Hacıali	Severe
		Cevizler	Severe
		Sülek	Moderate
		Hacıisalı	Severe
		Hacıobası	Severe
		Karacalar	Moderate
		Kızılot	None or very low
		Uzunlar	Severe
		Çavuşköy	Severe
		Kadılar	Moderate
		Örenşehir	Severe
		Yalçıdibi	Severe

Province	District	Neighborhood	Erosion Level
		Odaönü	Severe
		Karakaya	Moderate
	Alanya	Çakallar	Severe
		Alara	Severe
		İncekum	Very severe
		Avsallar	Severe
		Akdam	Severe
		Türkler	Severe
		Soğukpınar	Severe
		Emişbeleni	Severe
		Toslak	Severe
		Konaklı	Severe
		Elikesik	Severe

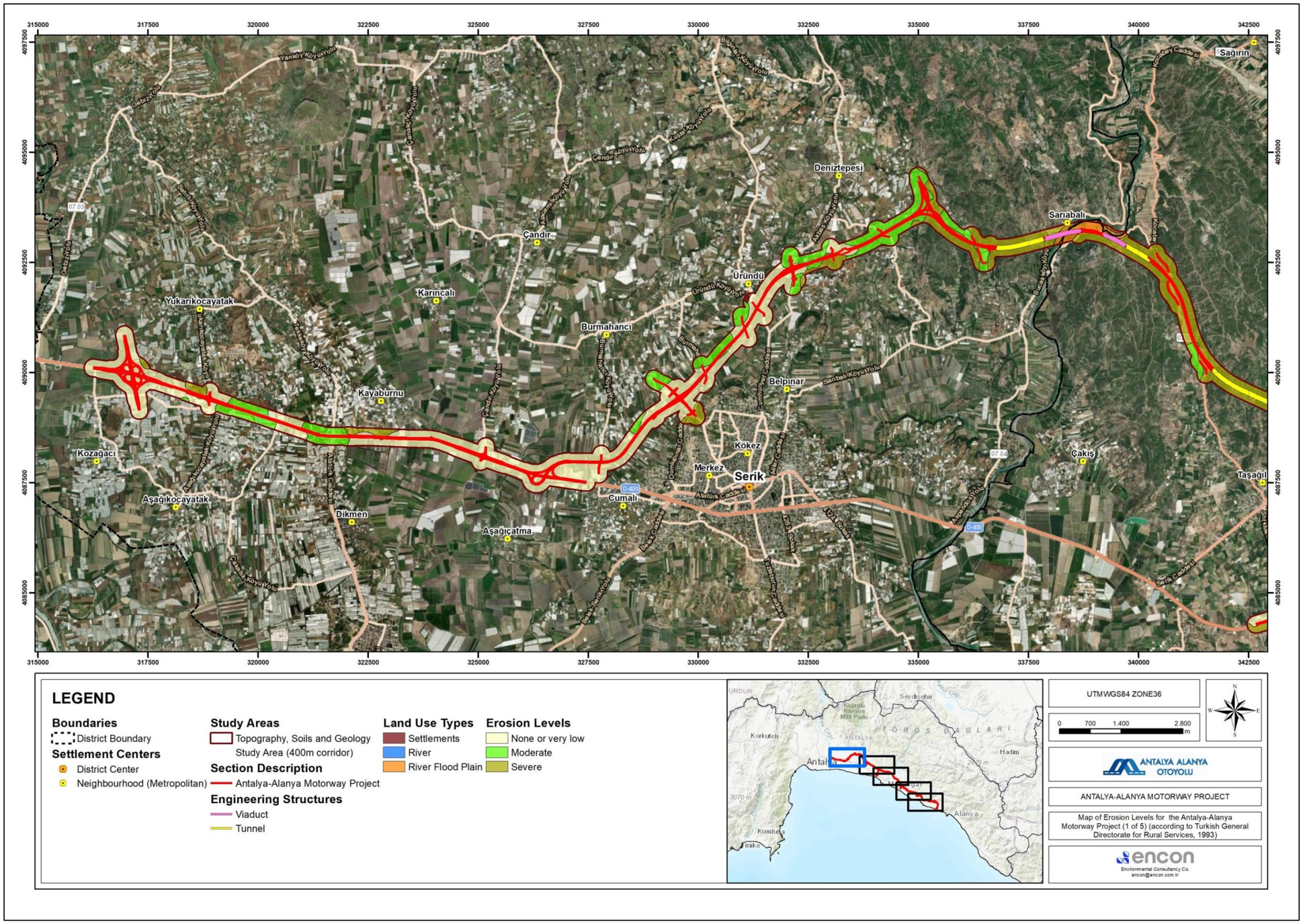


Figure VI.11. Erosion Levels Map of the Project-1

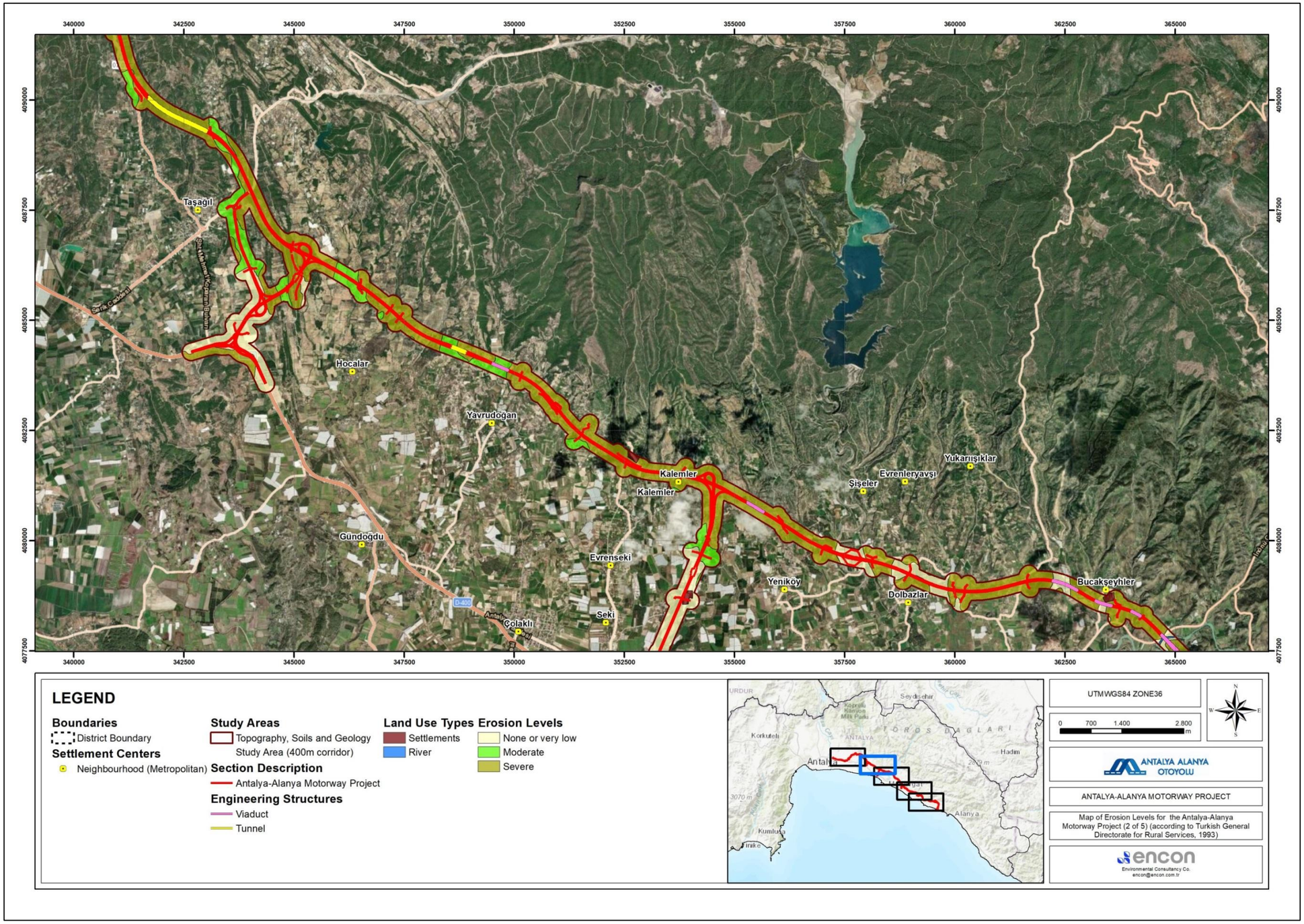


Figure VI.12. Erosion Levels Map of the Project-2

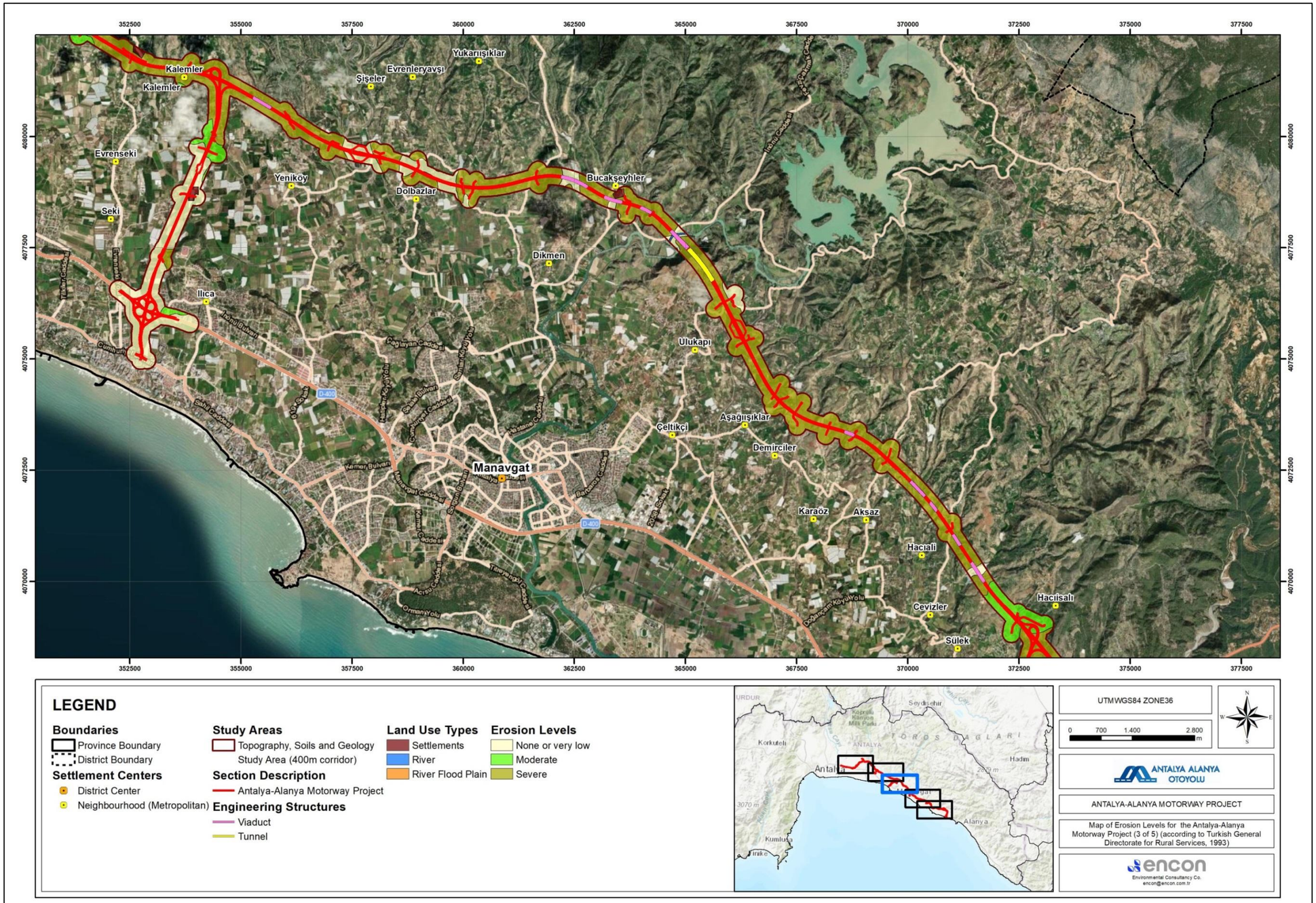


Figure VI.13. Erosion Levels Map of the Project-3

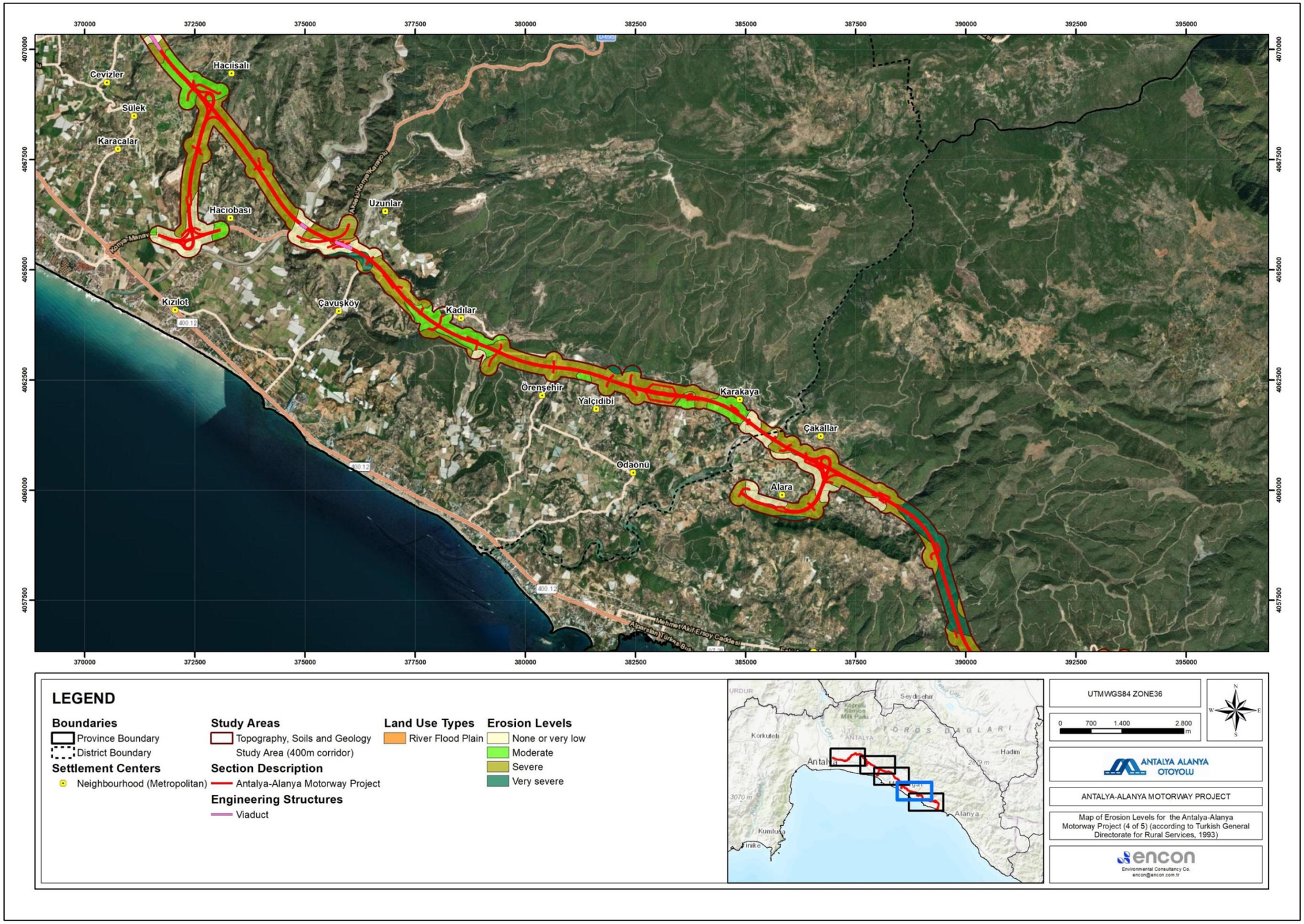


Figure VI.14. Erosion Levels Map of the Project-4

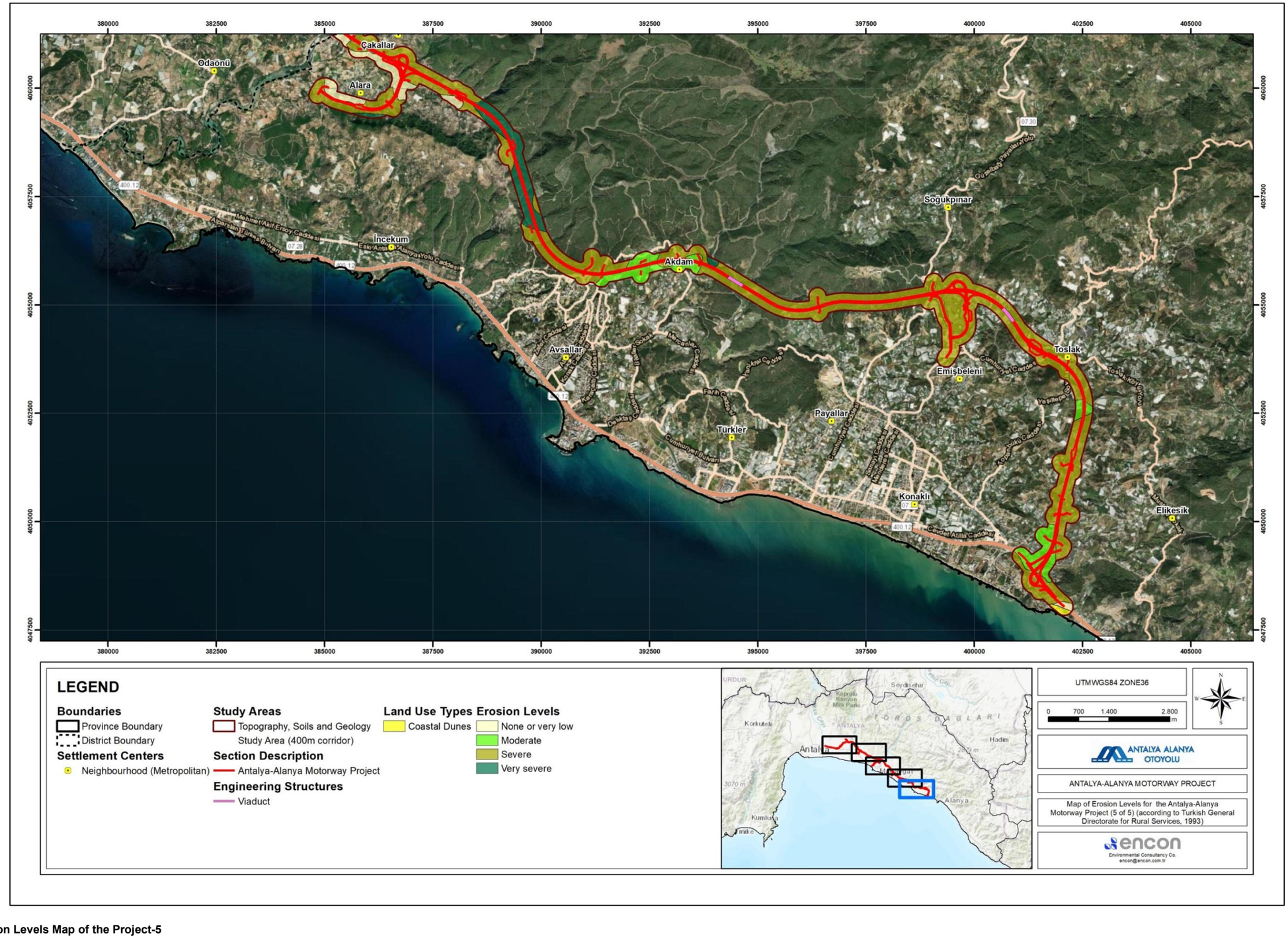


Figure VI.15. Erosion Levels Map of the Project-5

Soil Productivity and Quality

Soil productivity represents the capability of soils to supply primary nutrients in sufficient amounts and ratios proper for sustaining the growth of plants. Elements necessary for plant growth include carbon, hydrogen, and oxygen that are supplied from air and water. Additionally, plants require macronutrients such as and nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulphur (S), as well as micronutrients including iron (Fe), manganese (Mn), boron (B), molybdenum (Mo), copper (Cu), zinc (Zn) and chlorine (Cl) which are primarily supplied by soil and/or fertilizers.

The topsoil to be stripped along the Motorway route is expected to extend 25-30 cm below the ground surface. This topsoil layer is rich in humus (soil organic content) and has high microorganism activity, providing favorable conditions for plant growth. The typical composition of topsoil content is provided in Table VI.8 (*KGM. 2013*).

Table VI.8. Typical Composition of Topsoil

Parameter	Value / Concentration
pH	6.0 - 7.5
Lime (%)	4.0 - 9.0
Minimum organic material (%)	2.5 -1 2.0
Salt (%)	0.0 - 0.15
Nitrate-N (NO_3-N) (ppm)	25
Phosphoric acid (ppm)	15
Potassium oxide (ppm)	150

Soil Sampling and Analyses

Most of the Motorway route passes through agricultural lands and forest areas where the historical soil contamination potential is considered to be low. However, there are quarries, and remote settlement areas close to the study area where illegal waste disposal activities could occur. Thus, such areas may include contaminated lands.

Soil contamination is evaluated as a potential risk during the land preparation and construction works, road repair and maintenance activities, and accidents/emergencies during operation phase. This potential risk may arise from accidental spills during transfer, mixing, and storage of hazardous materials or from unexpected incidents.

A soil sampling and laboratory analysis program was conducted as part of the baseline studies for the Project. Initial soil sampling and laboratory analyses were conducted as of September 2024. Sampling locations are listed in Table VI.9 and shown on the map presented in
Figure VI.15 Laboratory result forms are presented in Annex-2.

Table VI.9. List of Soil Sampling Locations (September, 2024)

Station Name	Station Location	Sampling Date	Coordinates of the Station (UTM WGS84-Zone 36)	
			X (North)	Y (East)
T-1	Serik / Sarıabalı	17.09.2024	335630	4093475
T-2	Manavgat / Taşağıl	18.09.2024	343827	4087777
T-3	Manavgat / Kalemler	19.09.2024	353500	4081392
T-4	Manavgat / Sarılar	19.09.2024	360677	4076784
T-5	Manavgat / Cevizler	20.09.2024	371432	4070051
T-6	Alanya / Çakallar	24.09.2024	386801	4060407
T-7	Alanya / Konaklı	24.09.2024	402035	4051679

An additional soil sampling was conducted at 35 locations in May 2025 to enhance the baseline dataset for the ESIA. These supplementary sampling points, shown in
Figure VI.17, were selected to ensure comprehensive coverage of soil quality across all areas associated with the project components. This targeted selection aims to provide a thorough understanding of soil characteristics throughout the entire project footprint. The list of measurement points in May 2025 is presented in Table VI.10.

Table VI.10 List of Soil Sampling Locations (May,2025)

Station Name	Station Location	Sampling Date	Coordinates of the Station (UTM WGS84-Zone 36)	
			X (North)	Y (East)
T-8	Connection Road (Serik/Center)	29.05.2025	329765	4089316
T-9	Borrow Pit, Storage Area (Serik/Sarıabalı)	29.05.2025	336247	4092856
T-10	Camp Site -1 (Serik/Sarıabalı)	29.05.2025	337774	4093275
T-11	Quarry (Manavgat/Çakış)	29.05.2025	338941	4092416
T-12	Quarry (Manavgat/Sağırin)	29.05.2025	341125	4093739
T-13	Camp Site-Temporary (Manavgat/Taşağıl)	29.05.2025	340869	4091019
T-14	Storage Area (Manavgat/Çakış)	29.05.2025	340197	4090475
T-15	Storage Area (Manavgat/Taşağıl)	29.05.2025	342160	4089610
T-16	Storage Area (Manavgat/Çardakköy)	29.05.2025	347041	4089648
T-17	Storage Area (Manavgat/Yavrudoğan)	29.05.2025	351241	4083999
T-18	Storage Area (Manavgat/Yavrudoğan)	29.05.2025	351865	4082639
T-19	Storage Area (Manavgat/Yeniköy)	29.05.2025	355912	4081107
T-20	Storage Area (Manavgat/Bucakşeyhler)	29.05.2025	363597	4079723
T-21	Camp Site (Manavgat/Bucakşeyhler)	29.05.2025	363988	4077894
T-22	Storage Area (Manavgat/Bucakşeyhler)	29.05.2025	364974	4078502
T-23	Camp Site (Manavgat/Bucakşeyhler)	29.05.2025	364536	4078254

Station Name	Station Location	Sampling Date	Coordinates of the Station (UTM WGS84-Zone 36)	
			X (North)	Y (East)
T-24	Construction Area (Manavgat/Bucakşeyhler)	29.05.2025	365519	4076158
T-25	Storage Area (Manavgat/Karaöz)	29.05.2025	371884	4073788
T-26	Storage Area (Manavgat/Cevizler)	29.05.2025	371719	4071332
T-27	Storage Area (Manavgat/Hacıisalı)	29.05.2025	372924	4069784
T-28	Quarry (Manavgat/Uzunlar)	29.05.2025	378652	4066459
T-29	Creek Material (Manavgat/Uzunlar)	29.05.2025	378633	4067938
T-30	Quarry (Akseki/Güçlüköy)	29.05.2025	389066	4073345
T-31	Storage Area (Manavgat/Kadılar)	29.05.2025	379144	4063922
T-32	Storage Area (Manavgat/Yalçıdibi)	29.05.2025	381071	4063282
T-33	Quarry (Manavgat/Karakaya)	29.05.2025	384292	4062376
T-34	Quarry (Alanya/Saburlar)	29.05.2025	388517	4063378
T-35	Quarry (Alanya/Saburlar)	29.05.2025	391613	4063810
T-36	Camp Site (Alanya/İncekum)	29.05.2025	389789	4056225
T-37	Storage Area (Alanya/İncekum)	29.05.2025	390303	4057455
T-38	Construction Storage Area (Alanya/Avsallar)	29.05.2025	391388	4055614
T-39	Storage Area (Alanya/Akdam)	29.05.2025	393232	4057110
T-40	Storage Area (Alanya/Soğukpınar)	29.05.2025	397130	4054785
T-41	Storage Area (Alanya/Soğukpınar)	29.05.2025	398426	4055510
T-42	Quarry (Alanya/Burçaklar)	29.05.2025	401839	4057597

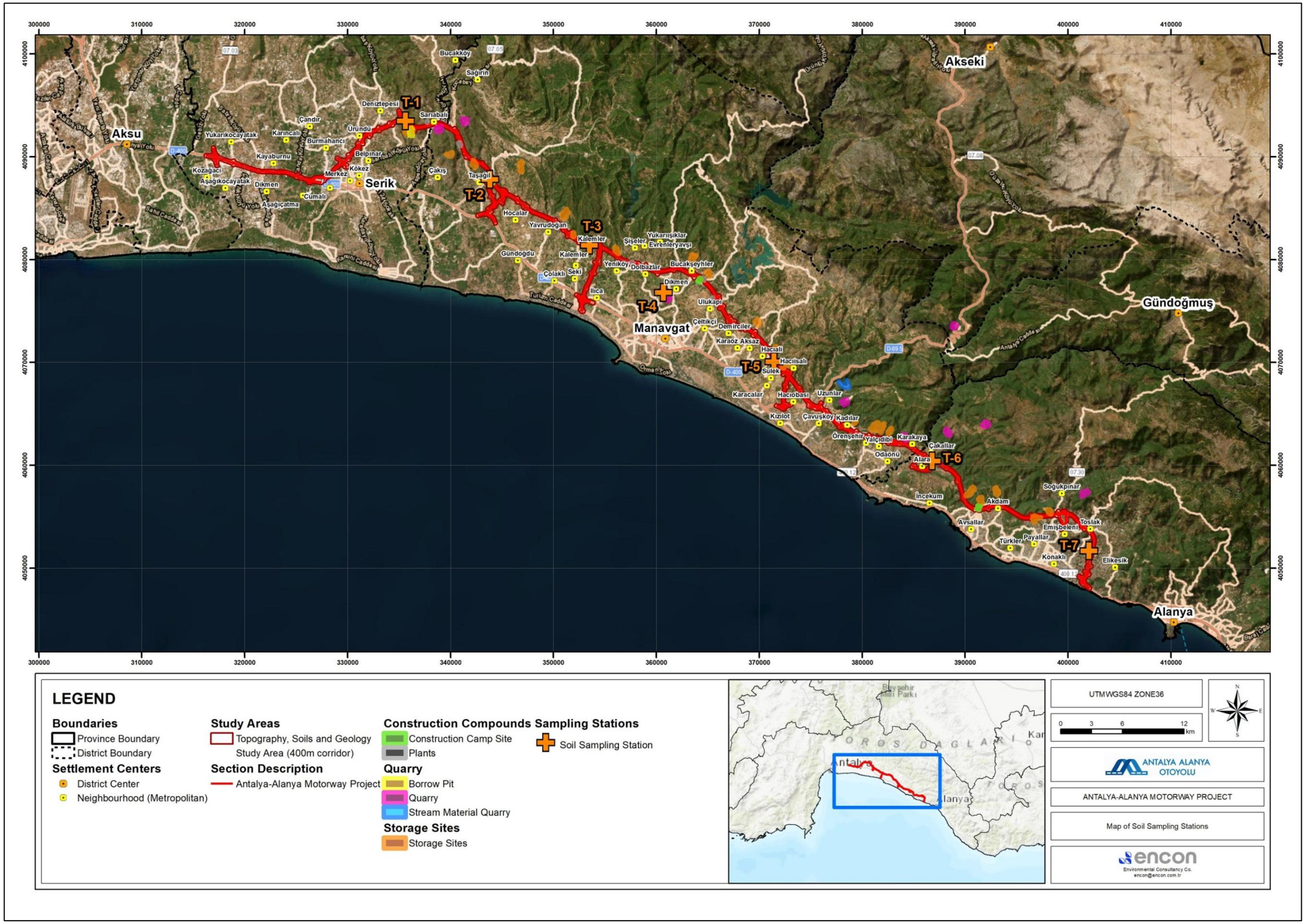


Figure VI.16 Soil Sampling Points of the Project (September, 2024)

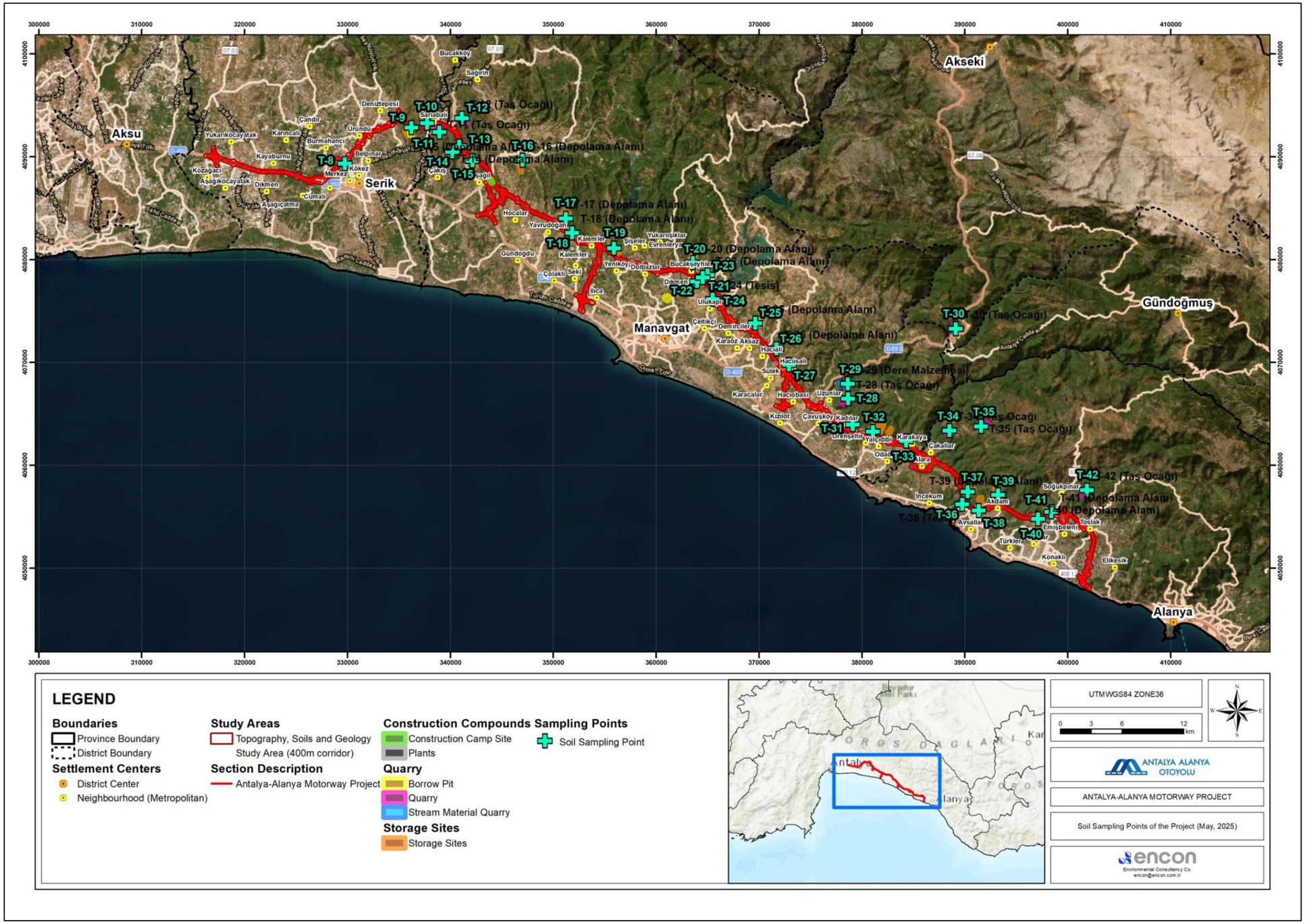


Figure VI.17 Soil Sampling Points of the Project (May, 2025)

Table VI.11 Soil Measurement Results (September, 2024)

#	Parameter	Unit	T-1	T-2	T-3	T-4	T-5	T-6	T-7
			365630/4093475	343827/4087777	353500/4081392	360677/4076784	371432/4070051	386801/4060407	402035/4051679
			September, 2024	September, 2024	September, 2024	September, 2024	September, 2024	September, 2024	September, 2024
1	Antimony	mg/kg	5.21	< 1.0	< 1.0	1.71	< 1.0	< 1.0	< 1.0
2	Arsenic	mg/kg	< 1.0	< 1.0	< 1.0	7.61	3.44	< 1.0	29.20
3	Copper	mg/kg	33.29	2.98	9.10	14.01	11.35	23.24	40.14
4	Barium	mg/kg	183.6	146.9	40.24	41.63	25.61	337.2	42.80
5	Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
6	Beryllium	mg/kg	0.183	< 0.1	0.147	0.348	< 0.1	0.555	0.295
7	Boron	mg/kg	57.97	< 1.0	18.31	42.55	< 1.0	2.426	40.18
8	Mercury	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9	Zinc	mg/kg	77.04	22.25	26.90	41.55	32.04	43.13	317.0
10	Silver	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
11	Cadmium	mg/kg	1.175	< 0.5	< 0.5	< 0.5	< 0.5	1.563	1.731
12	Tin	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
13	Cobalt	mg/kg	15.67	7.76	7.47	13.09	12.36	9.28	32.64
14	Chromium	mg/kg	98.18	2.57	47.67	75.93	10.63	4.74	174.9
15	Lead	mg/kg	6.71	1.08	4.82	8.16	22.82	7.28	< 0.5
16	Molybdenum	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	27.14
17	Nickel	mg/kg	168.2	68.06	95.64	126.0	92.41	51.61	< 0.5
18	Selenium	mg/kg	168.2	< 0.5	< 0.5	< 0.5	< 0.5	2.903	< 0.5
19	Thallium	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.563	5.457
20	Titanium	mg/kg	564.6	< 2.0	48.52	66.40	< 2.0	4.261	258.7
21	Total Petroleum Hydrocarbons	mg/kg	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
22	Total Volatile Organic Compounds	mg/kg	<0,25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
23	Vanadium	mg/kg	92.55	16.02	25.14	43.58	8.89	14.79	35.43

Measurements were made using EPA 3051 A. EPA 6010 D Method.

The soil measurements conducted in September 2025 provide important data for understanding the environmental conditions in the project area. Most of the measured elements remain at levels significantly below the project standards, indicating that environmental risks are low and soil health is generally at a safe level. In particular, the levels of toxic elements such as Antimony, Mercury, Silver, Tin, and Nickel are well below the limits set by the project, which creates a positive situation in terms of environmental impacts.

However, at certain measurement points, particularly for heavy metals such as Arsenic, Cobalt, Chromium, Zinc, Molybdenum, Thallium, and Vanadium, higher levels have been observed. The main causes of the elevated levels of heavy metals in the soil include natural geological characteristics, industrial activities, agricultural practices, and industrial waste.

It was observed that Arsenic concentrations increased at some measurement points, especially at T-4, T-5 and T-7. These points are located within agricultural areas, and T-4 is situated approximately 400 meters from the nearest settlement. T-7 also lies within the geological unit known as the Payallar Formation, which may naturally contribute to the background arsenic levels. The detected arsenic concentrations are likely influenced by natural geological conditions as well as agricultural activities, such as the historical use of arsenic-based pesticides.

Additionally, factors like air pollution and erosion can contribute to the accumulation of these metals in the soil. Overall, the levels of other elements such as Barium, Benzene, Toluene, Ethylbenzene, Xylene, and Vanadium remain low and do not pose any significant environmental risks.

In addition to the initial measurements, additional soil sampling was carried out at 35 different locations across the project area in May 2025. These new sampling points were selected to cover various project components, including Camp Sites 1, 2, and 3, storage areas, quarries, borrow pits, and other project-related sites. The purpose of these additional measurements was to assess the soil quality in areas that are directly related to the project's activities and ensure that the environmental impact is properly monitored across all relevant components

The following tables present the measurement results in the areas of the relevant project components.

Table VI.12 Soil Measurements in Quarry Areas (May,2025)

#	Parameter	Unit	T-11	T-12	T-28	T-30	T-33	T-34	T-35	T-42
			338941/4092416	341125/4093739	378652/4066459	389066/4073345	384292/4062376	388517/4063378	391613/4063810	401839/4057597
			May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025
1	Antimony	mg/kg	4,09	3,20	<1,00	1,91	2,30	2,00	4,06	1,94
2	Arsenic	mg/kg	<1,00	2,12	1,65	5,81	4,39	24,22	24,45	10,86
3	Copper	mg/kg	55,67	27,46	4,66	10,86	80,50	13,96	12,39	27,87
4	Barium	mg/kg	126,8	193,4	83,1	106,9	188,3	46,7	151,1	69,1
5	Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25
6	Beryllium	mg/kg	<0,10	0,334	0,128	1,166	0,448	1,000	1,521	0,367
7	Boron	mg/kg	69,07	40,85	10,66	34,39	51,91	38,20	58,19	42,25
8	Mercury	mg/kg	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10
9	Zinc	mg/kg	81,2	598,7	13,9	56,2	3760,8	47,7	63,9	60,3
10	Silver	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
11	Cadmium	mg/kg	<0,50	<0,50	0,57	0,93	<0,50	<0,50	0,76	<0,50
12	Tin	mg/kg	<1,00	<1,00	<1,00	<1,00	1,42	<1,00	1,01	<1,00
13	Cobalt	mg/kg	44,18	16,48	1,10	7,54	11,26	8,79	11,54	14,77
14	Chromium	mg/kg	198,3	132,2	16,0	70,5	96,3	76,1	121,1	67,2
15	Lead	mg/kg	8,50	11,35	7,03	15,01	10,71	17,02	26,16	17,04
16	Molybdenum	mg/kg	<0,50	<0,50	<0,50	0,545	1,848	1,580	3,934	0,540
17	Nickel	mg/kg	250,7	197,6	7,9	33,3	92,4	40,9	40,5	24,3
18	Selenium	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
19	Thallium	mg/kg	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00
20	Titanium	mg/kg	6229	313,8	40,6	196,4	102,8	47,2	173,6	179,9
21	Total Petroleum Hydrocarbons	mg/kg	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0
22	Total Volatile Organic Compounds	mg/kg	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25
23	Vanadium	mg/kg	185,9	79,3	21,5	83,2	38,6	52,7	88,0	36,4

Measurements were made using EPA 3051 A. EPA 6010 D Method

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Baseline soil samples were collected in May 2025 from eight locations across the quarry areas to assess existing soil quality prior to project activities. The analytical results were evaluated in comparison with the threshold values specified in the Turkish Regulation on Soil Pollution Control and Point Source Contaminated Sites. Overall, the majority of the parameters, including heavy metals such as Nickel, Chromium, Zinc, Lead, Cadmium, and Copper, were found to be significantly below their respective regulatory limits. Additionally, compounds such as Mercury, Silver, Tin, and Total Petroleum Hydrocarbons were either not detected or remained at very low concentrations across all sampling points.

However, Arsenic concentrations were consistently above the regulatory limit of 0.4 mg/kg in all samples, with particularly elevated levels identified at locations T-34, T-35, and T-42. These values are several times higher than the threshold and represent the only notable exceedance within the dataset.

Elevated arsenic concentrations observed at T-34, T-35, and T-42, which are located in forested areas designated for future quarry operations, may be attributed to natural geological conditions, particularly the mineral composition of the underlying bedrock. In undisturbed forest soils, arsenic can accumulate over time due to natural weathering of arsenic-bearing minerals, atmospheric deposition, and limited soil disturbance. Given the absence of significant anthropogenic activities in these areas, the elevated arsenic levels are likely to reflect background geological characteristics rather than external contamination sources.

Despite this, the overall soil quality in the quarry areas, aside from Arsenic, does not indicate any significant contamination concern based on the baseline measurements.

Soil measurements were also carried out in the project campsite and storage areas in these areas. The relevant measurement results are presented in Table VI.13.

Table VI.13 Soil Measurements in Camp Site Areas, Temporary Storage Areas (May,2025)

#	Parameter	Unit	T-10	T-13	T-21	T-23	T-24	T-36	T-38
			337774/4093275	340869/4091019	363988/4077894	364536/4078254	365519/4076158	389789/4056225	391388/4055614
			May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025
1	Antimony	mg/kg	2,55	21,39	<1,00	1,03	<1,00	<1,00	1,23
2	Arsenic	mg/kg	<1,00	15,98	4,44	4,67	4,16	6,75	4,78
3	Copper	mg/kg	77,49	52,97	9,11	7,58	9,82	15,59	13,26
4	Barium	mg/kg	149,9	58,9	36,6	55,7	46,7	71,6	137,7
5	Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25
6	Beryllium	mg/kg	<0,10	0,289	0,247	0,221	0,305	0,331	0,651
7	Boron	mg/kg	58,85	46,48	26,93	26,17	22,96	23,93	38,03
8	Mercury	mg/kg	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10
9	Zinc	mg/kg	57,6	5620,4	26,1	24,5	31,5	26,6	49,4
10	Silver	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
11	Cadmium	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
12	Tin	mg/kg	<1,00	185,0	<1,00	<1,00	<1,00	<1,00	<1,00
13	Cobalt	mg/kg	26,40	13,63	6,91	5,62	7,62	7,48	7,81
14	Chromium	mg/kg	109,4	120,7	50,8	51,7	58,3	41,2	73,3
15	Lead	mg/kg	11,46	37,85	17,94	19,09	9,60	15,32	12,05
16	Molybdenum	mg/kg	<0,50	1,10	<0,50	<0,50	<0,50	<0,50	<0,50
17	Nickel	mg/kg	109,5	149,3	77,4	49,9	89,4	34,1	52,4
18	Selenium	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
19	Thallium	mg/kg	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00
20	Titanium	mg/kg	1672	297,5	150,0	178,6	120,2	107,6	82,2
21	Total Petroleum Hydrocarbons	mg/kg	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0
22	Total Volatile Organic Compounds	mg/kg	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25
23	Vanadium	mg/kg	110,7	77,2	31,9	29,3	30,4	32,6	46,5

Measurements were made using EPA 3051 A. EPA 6010 D Method

Baseline soil samples were collected in May 2025 from seven locations identified for use as camp sites and temporary storage areas. The majority of the analyzed parameters were found to be well below the soil contamination threshold values defined in the Turkish Regulation on Soil Pollution Control. In particular, heavy metals such as Chromium, Nickel, Lead, Cadmium, and Copper showed concentrations significantly lower than their respective limits. Organic contaminants including Total Petroleum Hydrocarbons (TPH) and Total Volatile Organic Compounds (TVOCs) were below detection limits in all samples, and no exceedance was noted for Mercury, Silver, or Tin, except for Tin in T-13, which is still well below the regulatory threshold.

The only notable parameter with consistently elevated values was Arsenic, which exceeded the regulatory limit (0.4 mg/kg) in all samples except T-10. The highest concentration was observed at T-13, followed by other points ranging between 4–6 mg/kg. Additionally, Zinc levels at T-13 were significantly higher than at other locations but still below the threshold value. Overall, while Arsenic concentrations remain above acceptable levels across the area, all other measured parameters indicate that the soil quality in the designated support zones is within acceptable environmental limits based on the baseline data.

T-13 is located in an area where agricultural land borders a forested zone. This transitional location may be influenced by both natural and anthropogenic factors. The presence of agricultural activity suggests the potential for historical use of agrochemicals, particularly arsenic-based agricultural chemicals, which could contribute to elevated arsenic concentrations. At the same time, the proximity to forested land indicates possible natural enrichment through geological processes or atmospheric deposition. Therefore, any detected arsenic levels at this point may result from a combination of natural background levels and diffuse agricultural sources.

Measurements made in areas where storage areas are located are presented in the tables below.

Table VI.14 Soil Measurements in Storage Areas-1 (May,2025)

#	Parameter	Unit	T-14	T-15	T-16	T-17	T-18	T-19	T-20	T-22	T-25
			340197/4090475	342160/4089610	347041/4089648	351241/4083999	351865/4082639	355912/ 4081107	363597/4079723	364974/4078502	371884/4073788
			May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025
1	Antimony	mg/kg	2,88	2,37	1,98	35,29	1,02	1,09	1,39	1,07	1,90
2	Arsenic	mg/kg	<1,00	0,84	5,25	25,35	3,38	5,82	9,53	5,06	9,68
3	Copper	mg/kg	28,45	11,87	23,69	88,44	13,99	14,53	24,77	7,42	8,87
4	Barium	mg/kg	89,9	46,1	244,8	63,1	166,1	41,1	37,0	31,7	31,1
5	Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25
6	Beryllium	mg/kg	0,158	0,088	0,558	0,495	0,277	0,479	0,284	0,222	0,197
7	Boron	mg/kg	47,58	36,18	38,69	50,75	28,91	34,05	28,93	23,42	38,55
8	Mercury	mg/kg	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10
9	Zinc	mg/kg	61,1	33,7	45,0	10525,8	78,2	36,3	41,2	21,4	66,0
10	Silver	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
11	Cadmium	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
12	Tin	mg/kg	<1,00	<1,00	<1,00	1,98	<1,00	<1,00	<1,00	<1,00	<1,00
13	Cobalt	mg/kg	26,23	18,11	12,59	15,19	7,94	10,28	7,54	7,15	9,46
14	Chromium	mg/kg	187,2	176,7	100,5	137,5	62,8	75,2	56,2	66,1	71,3
15	Lead	mg/kg	15,71	12,62	13,22	47,04	13,18	15,69	12,19	10,61	11,50
16	Molybdenum	mg/kg	<0,50	<0,50	<0,50	1,62	<0,50	<0,50	0,586	<0,50	10,16
17	Nickel	mg/kg	321,5	267,1	121,2	148,9	80,2	110,7	62,9	88,0	131,8
18	Selenium	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
19	Thallium	mg/kg	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00
20	Titanium	mg/kg	601,4	575,7	185,4	331,3	171,2	213,5	172,0	128,1	245,0
21	Total Petroleum Hydrocarbons	mg/kg	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0
22	Total Volatile Organic Compounds	mg/kg	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25
23	Vanadium	mg/kg	117,4	75,7	57,4	72,4	35,9	48,1	29,8	31,5	52,7

Measurements were made using EPA 3051 A. EPA 6010 D Method

Table VI.15 Soil Measurements in Storage Areas-2 (May,2025)

#	Parameter	Unit	T-26	T-27	T-31	T-32	T-37	T-39	T-40	T-41
			371719/4071332	372924/4069784	379144/4063922	381071/4063282	390303/4057455	393232/4057110	397130/4054785	398426/4055510
			May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025	May, 2025
1	Antimony	mg/kg	2,95	1,91	<1,00	7,12	<1,00	<1,00	1,06	1,94
2	Arsenic	mg/kg	8,32	3,91	10,07	10,09	3,27	7,68	3,06	10,86
3	Copper	mg/kg	17,81	12,20	7,79	11,16	20,36	12,63	12,17	27,87
4	Barium	mg/kg	85,9	43,8	58,1	75,7	63,0	31,1	146,0	69,1
5	Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25
6	Beryllium	mg/kg	1,123	0,411	0,442	0,496	0,441	0,691	0,547	0,367
7	Boron	mg/kg	55,07	33,40	28,05	30,08	30,62	30,78	26,75	42,25
8	Mercury	mg/kg	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10	<0,10
9	Zinc	mg/kg	78,7	40,0	33,9	38,3	36,2	38,4	32,2	60,3
10	Silver	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
11	Cadmium	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
12	Tin	mg/kg	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00
13	Cobalt	mg/kg	10,15	7,91	4,92	6,26	9,26	4,66	6,10	14,77
14	Chromium	mg/kg	102,7	88,1	36,7	54,5	55,7	47,7	50,5	67,2
15	Lead	mg/kg	38,55	21,77	13,97	17,62	13,61	78,48	21,18	17,04
16	Molybdenum	mg/kg	0,987	0,883	0,661	0,895	<0,50	<0,50	0,519	0,540
17	Nickel	mg/kg	66,7	60,3	18,5	34,6	51,4	21,7	21,1	24,3
18	Selenium	mg/kg	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50	<0,50
19	Thallium	mg/kg	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00	<1,00
20	Titanium	mg/kg	216,6	222,1	31,3	60,5	91,2	31,3	77,7	179,9
21	Total Petroleum Hydrocarbons	mg/kg	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0	<25,0
22	Total Volatile Organic Compounds	mg/kg	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25	<0,25
23	Vanadium	mg/kg	71,9	39,9	26,1	44,0	38,7	40,1	35,3	36,4

Measurements were made using EPA 3051 A. EPA 6010 D Method

Baseline soil quality measurements were conducted in May 2025 at multiple locations designated for storage areas. The analysis shows that most parameters are well within the acceptable limits defined in the Turkish Regulation on Soil Pollution Control. Heavy metals such as Chromium, Nickel, Copper, Lead, and Zinc were all below their respective threshold values, and organic pollutants such as TPH and VOCs were below detection limits in all samples. Additionally, Mercury, Silver, Tin, and Cadmium were either not detected or detected in trace amounts far below regulatory concern levels.

However, some Arsenic concentrations were found to exceed the regulatory limit at most locations, with the highest levels observed at T-17, T-25, and T-22. Among the soil sampling points designated for future storage areas, the most notable arsenic concentration was observed at T-17. This point is located within a forested area, approximately 200 meters from the nearest settlement. The elevated arsenic levels at this location are likely attributable to natural geological factors, such as the mineral composition of the bedrock and limited anthropogenic disturbance. Given the site's forested setting and distance from intensive human activity, the arsenic concentration may reflect natural background conditions rather than contamination from external sources.

In addition, Zinc levels at T-17 were significantly elevated but still well below the threshold of 23,464 mg/kg. A single Antimony exceedance was recorded at T-17, marginally above the regulatory limit of 31 mg/kg. Despite these isolated high values, the overall soil quality across the storage areas can be considered acceptable for baseline conditions, with most locations showing low levels of contamination.

In addition to the sampling activities conducted in quarry areas, camp sites, temporary storage zones, and designated storage areas, additional soil sampling campaigns were carried out in May 2025 at locations corresponding to the connection road, borrow pit- storage area, and riverbed material extraction sites. These measurements aimed to provide a comprehensive understanding of the baseline soil quality across all key project components and support areas. These measurement results are also presented in Table VI.16.

Table VI.16 Soil Measurements in Other Locations

#	Parameter	Unit	T-8	T-9	T-29
			329765/4089316	336247/4092856	378633/ 4067938
			May, 2025	May, 2025	May 2025
1	Antimony	mg/kg	2,01	2,95	<1,00
2	Arsenic	mg/kg	3,31	1,81	2,34
3	Copper	mg/kg	25,21	38,12	6,55
4	Barium	mg/kg	68,7	150,8	88,4
5	Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0,25	<0,25	<0,25
6	Beryllium	mg/kg	0,453	<0,10	0,064
7	Boron	mg/kg	39,67	52,14	19,28
8	Mercury	mg/kg	<0,10	<0,10	<0,10
9	Zinc	mg/kg	60,8	61,6	21,0
10	Silver	mg/kg	<0,50	<0,50	<0,50
11	Cadmium	mg/kg	<0,50	<0,50	<0,50

#	Parameter	Unit	T-8	T-9	T-29
			329765/4089316	336247/4092856	378633/ 4067938
			May, 2025	May, 2025	May 2025
12	Tin	mg/kg	<1,00	<1,00	<1,00
13	Cobalt	mg/kg	16,15	28,17	5,75
14	Chromium	mg/kg	115,5	183,3	33,3
15	Lead	mg/kg	44,04	20,38	8,54
16	Molybdenum	mg/kg	<0,50	<0,50	<0,50
17	Nickel	mg/kg	137,8	215,2	14,1
18	Selenium	mg/kg	<0,50	<0,50	<0,50
19	Thallium	mg/kg	<1,00	<1,00	<1,00
20	Titanium	mg/kg	461,2	1752	359,5
21	Total Petroleum Hydrocarbons	mg/kg	<25,0	<25,0	<25,0
22	Total Volatile Organic Compounds	mg/kg	<0,25	<0,25	<0,25
23	Vanadium	mg/kg	77,1	113,7	46,7

Measurements were made using EPA 3051 A. EPA 6010 D Method

Additional baseline soil samples were collected in May 2025 from three project-related locations: T-8 (connection road), T-9 (borrow pit), and T-29 (river material extraction site). The results show that all parameters, including heavy metals and organic compounds (TPH, VOCs), remain well below the threshold values defined in the Turkish Regulation on Soil Pollution Control. Notably, TPH and VOCs were below detection limits, and Mercury, Silver, Cadmium, and Tin were either undetected or present in negligible concentrations.

As observed in other sampling areas, Arsenic concentrations exceeded the regulatory limit of 0.4 mg/kg in all three locations, with the highest value recorded at T-8. However, no other exceedances were noted. The Nickel concentration at T-9 was the highest among the three, but still well below the regulatory limit of 1564 mg/kg. These results confirm that, aside from Arsenic, the soil quality at the connection road, borrow pit, and riverbed areas is within acceptable limits for baseline environmental conditions.

Although specific asbestos sampling was not conducted during the ESIA baseline studies, the risk of asbestos presence in the project area is considered negligible for the following reasons:

- The project is located between Antalya and Alanya, a region not historically associated with naturally occurring asbestos or former asbestos mining or industrial use.
- The use, production, and import of asbestos have been officially banned in Türkiye since 1984. Given the nature of the project components and the geographic location, no legacy structures or facilities that may contain asbestos have been identified.
- Site inspections and consultations with local authorities and stakeholders did not reveal any evidence or concerns related to potential asbestos-containing materials (ACMs) within the project footprint.

VI.2.3. Geology

The information provided in this subsection is based on a detailed literature review of the Motorway route and its vicinity including reports compiled by relevant authorities and institutions such as on the geology map of the 1/100.000 scale Antalya O-25, Antalya O-26, Alanya O-27 maps prepared by MTA. Detailed investigation reports consisting of geology and geotechnical properties will be prepared separately for the Project Sponsor along the route by an expert geotechnical investigation firm. Upon the completion of mentioned geology report, this subsection will be revised accordingly.

Baseline descriptions are provided under the following subtopics:

- Regional geology
- Stratigraphy
- Project area geology - Lithology
- Geotechnical characteristics
- Structural Geology and Seismicity

VI.2.3.1. Regional Geology

Geological Setting and Tectonic Evolution

Türkiye's geology, in general, is highly complex, and although studied to the extent of a multitude of studies by several researchers, its main features and their relations with each other are yet to be understood clearly. On the largest scale, Türkiye is separated into three main tectonic units, the Pontides, the Anatolides-Taurides, and the Arabian Platform (Ketin, 1966; from Okay, 2008). Formerly surrounded by oceans, these tectonic units are currently separated by suture zones which mark the closing regions of these oceans. A map presenting the main tectonic units of Türkiye is presented in Figure VI.18.

The Anatolides-Taurides present similarities to the continent Gondwana; however, were separated from the main mass of this continent by the southern branch of Neo-Tethys ocean. This ocean, which lies in an approximately E-W direction, at the north of African-Arabian Plates, also closed approximately during Miocene by the continental collision of Anatolian Platform and Arabian Plate. The current eastern section of the Mediterranean is a remnant of this ocean. The ocean closing process is still ongoing and the active subduction zone in the Aegean Region is one of the current indicators of this condition (Okay, 2008). At the end of Middle Miocene, Southern Tethis Ocean was closed due to the continental collision that occurred along Bitlis-Zagros Suture Zone, and also around the same time, towards south of this suture zone, the Red Sea - Aden gulf was formed, pushing the Arabian Plate towards north-northeast. These two large-scale tectonic events caused the formation of North Anatolian Fault Zone (NAFZ) and East Anatolian Fault Zone (EAFZ). On the southwestern boundary of Anatolian-Aegean Plate, Aegean Region tectonic structures were also formed (due to N-S stresses) by north-northeast bound movement of the African Plate. Formation of these fault zones and tectonic structures is considered to be the beginning of Neo-tectonic period in Türkiye and corresponds approximately to Late Miocene – Early Pliocene (Okay, 2008).

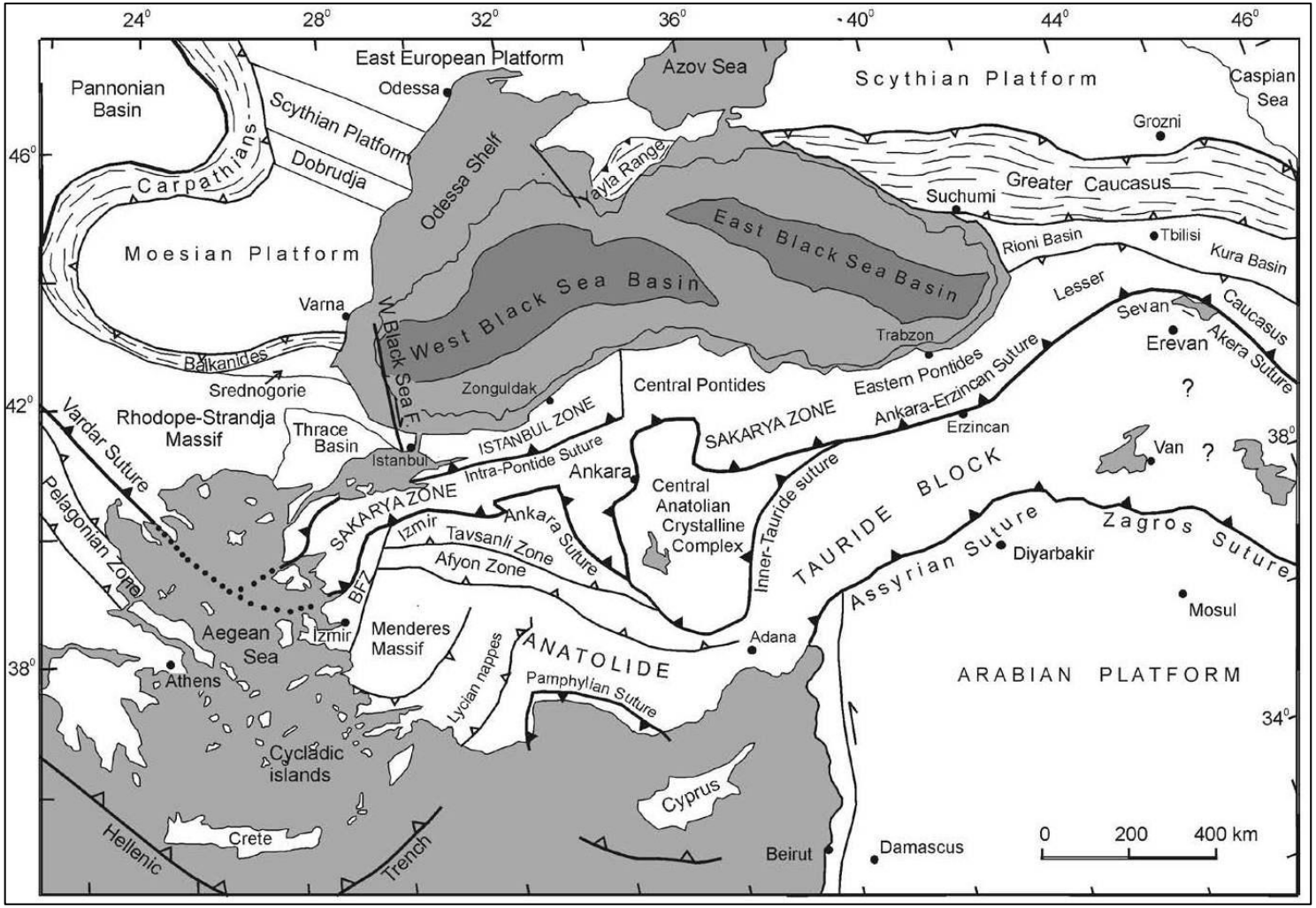


Figure VI.18 Tectonic Map of North-Eastern Mediterranean Region (Okay, 2008).

Representing autochthonous rock units of the Central Taurus, Anamas – Akseki autochthonous together with allochthonous Antalya nappes and Alanya nappe are exposed in region. In the region there are rock units of Anamas – Akseki autochthonous deposited from Late Triassic to Eocene and represented with structural units as Yelekdağ unit, Oğuz unit, Tepedağ unit, Pirnos unit, each of which is thrusted over another. In the region exposed units of the autochthonous are Leylek limestone of Rhaetian built from neritic limestones, late Rhaetian-early Liassic clastics of Üzümdere formation, Liassic Paleodascycladus- and bearing limestones of Alıçbeleni formation, middle-late Liassic dolomites of Hendos dolomite, Jurassic-Cretaceous neritic limestones of Kurucaova formation, Dogger-Malm oolitic-peloidal limestones of Çamkuşağı formation, Malm calciturbidites of Karlığın formation, Dogger-Early Cretaceous Belalan formation, Berriasian pelagic limestones of Susuzkır formation, Campaniyen – Maatsrichtian pelagic limestones of Dumanlı formation, Danian Çamlıdere olistostrome and Late Paleocene-Lutetian İbradi group including carbonates and clastics. The exposed units are Mahmutlar unit, Sugözü unit and Yumrudağ unit of Alanya nappe, the metamorphic counterpart of Antalya nappes as well as the rock units of Çataltepe nappe, Alakırçay nappe and Tahtalıdağ nappe of Antalya nappes, which contain structural units under diverse environmental conditions in the region.

Neoautochthonous deposits covering vast areas in the region are represented with possible Burdigalian-Langhian Kepez travertine and Sevinç conglomerate, Langhian Oymapınar limestone and Çakallar formation, Langhian Geceleme marl and Langhian-Serravalian clastics of Karpuzçay formation. Taşlık formation bearing Messinian clastics, late Messinian-early Pliocene Eskiköy, Yenimahalle and late Pliocene Kurşunlu formation outcrop in restricted areas. Quaternary is represented with Belkıs conglomerate, Moraine, Slope debris/cone of accumulation, Beach deposits, Dune and Alluvium.

Carbonate-dominated lithologies, especially limestones and dolomites of both autochthonous and allochthonous units, have made the region particularly prone to karstification. As a result, karst geomorphology has significantly shaped the regional landscape.

In the region, soluble rocks such as travertine, limestone, dolomite, and transitional types between limestone and dolomite are predominant. These lithologies have played a crucial role in shaping the topography through karstification processes. Karst features dominate the landscape, which has evolved primarily due to the dissolution of carbonate rocks. Tectonism, in particular, and fluvial activity have significantly contributed to the development of karst morphology. The present-day landscape reflects the cumulative effects of karstification, active tectonic movements, and fluvial processes that have been ongoing since earlier geological periods and continue today with varying intensities. In mountainous and plateau areas composed mainly of limestone, typical karstic landforms such as lapiez (karren), dolines, uvalas, poljes, caves, sinkholes, and karstic valleys are widely observed. Among these, poljes form broad, flat-floored depressions within otherwise barren karst terrain, making them important for both settlement and agriculture. The largest examples in the region include Kestel Polje and Elmalı Polje between Antalya and Burdur, as well as Akseki Polje located in the western part of the province.

VI.2.3.2. Stratigraphy

The region is predominantly characterized by the Anamas – Akseki autochthon, which includes rock units that formed between the Cambrian and the Eocene periods. Over these autochthonous units lie the southward-derived Antalya nappes and the Alanya nappe, which were emplaced during the Danian and late Eocene epochs. On top of these autochthonous and allochthonous rock units, there are Middle Miocene and Pliocene-aged rock units, as well as Neotectonic cover formations.

VI.2.3.3. Project Area Geology

The geological units cropping out along the project route and their lithological features are given below from the oldest to the youngest. The geological maps of the Project sections consisting of a total of five (5) sections are presented in Figure VI.19 to
Figure VI.23 respectively.

Lithologies

Paleozoic

Cambrian

Kurtbeleni Formation (Eku)

The Kurtbeleni Formation consists of medium to thickly bedded layers of quartz-schist and intermediate quartzites, displaying a range of colors including white, off-white, reddish-brown, yellowish-brown, and black, with occasional greenish hues. The quartzites are well-bedded, and the quartz grains are notably well-rounded, with sizes ranging between 0.4 and 0.5 mm. The formation exhibits a thickness of approximately 150-300 meters. Based on regional correlation and stratigraphic positioning, the Kurtbeleni Formation is considered to be of Early Cambrian age.

Karagedik Formation (Eka)

The formation begins with thickly layered dolomites in shades of gray, pale yellow, and brown, often featuring dissolution cavities and occasional silica nodules. These dolomites may contain localized barite formations. Overlying these dolomites are medium to thickly layered dolomites in beige, gray, brown, pink, red, and pale yellow colors with marble-like bands. At the top, marble-like dolomites resembling nodular limestones can be found. Within the unit, there are sporadic chert interbeds and cherty dolomites in the upper levels.

The Karagedik Formation is conformably situated above the Kurtbeleni Formation and exhibits a thickness of approximately 250 meters. Though rare, traces of trilobites are observed within this formation. Based on regional correlation and stratigraphic position, it is considered to be of Middle Cambrian age.

Ordovician - Cambrian

Payallar Formation (Eop)

The Payallar Formation primarily consists of chlorite schist and quartz schist in colors including green, gray, greenish-gray, dark green, olive green, yellowish-gray, yellowish-brown, blackish-gray, lead-gray, and bluish tones. These schists are generally medium to coarse-grained and include interbedded quartzites and quartz schists with variable iron and manganese content. In the lower part of the formation, there are red, pink, dirty yellow, and dirty white marbles with fine to medium bedding and occasional laminae of calcite veins, as well as coarsely crystalline marble. Additionally, reddish-brown dolomites with medium to thick bedding, interbedded with baritic dolomites and dolomitic limestones, are present.

The formation is intruded by diabase sills and dykes in some places. These diabase sills and dykes are dark green, dark brown, and black in color and are composed of quartz, albite, epidote, actinolite, and opaque minerals in their finer sections. The formation exhibits a variety of mineralogical

assemblages, including quartz-chlorite-feldspar schist, quartz-feldspar-mica gneiss, muscovite-quartz schist, chlorite-quartz-feldspar schist, quartz-feldspar-mica schist, feldspar-quartz-chlorite phyllite, feldspar-mica-quartz schist, mica-feldspar-quartz schist, feldspar-quartz-mica schist, milonitic schist, chlorite-feldspar-quartz schist, feldspar-sericite-quartz schist, chloritoid-bearing quartz schist, muscovite-feldspar-quartz schist, albite-actinolite-chlorite schist, chlorite-chloritoid quartz schist, feldspar-mica-quartz schist, feldspar-quartz-sericite-chlorite schist, and epidote-actinolite-albite schist.

The Payallar Formation transitions gradationally into the Karagedik Formation and has an approximate thickness of 1000 meters. Based on its stratigraphic position and lithological characteristics, it is considered to be of Late Cambrian to Ordovician age.

Permian

Cebireis Formation (Pce)

The formation begins with a lower section characterized by medium-thick, layered rocks in colors including white, yellow, pink, dirty white, yellowish pink, reddish-brown, black, and beige. This section is interspersed with iron-rich quartzites and quartz schists. The upper portion of the formation features massive, medium-thickly layered rocks in shades of gray, dark gray, black, and blackish-gray. This section includes medium-to-coarse crystalline marble, dolomite, and dolomitic-crystalline limestone. The dark-colored crystalline limestones are occasionally bituminous and may contain silicified fossil traces. The marbles and crystalline limestones are typically medium-to-coarse crystalline, with a sugary texture and/or saccharoidal texture, and exhibit flow features. The dolomites are generally massive, appearing in white-gray, light gray, and sometimes blackish-gray colors. They may be crumbly in places and often contain numerous small voids. The formation has an approximate thickness of 550 meters.

Mesozoic

Triassic

Anisian-Norian

Alakırçay Group (Tra)

The Alakırçay Group is composed of Late Anisian to Norian-aged fossiliferous sandstones, shales, pillow lavas, spilite-altered basalts, radiolarites, cherts, and limestones. These rock types, which transition into one another both laterally and vertically, display a chaotic appearance due to their highly fractured, folded, and complex nature.

Karadere Formation (Trak)

The unit comprises basalt with alkaline characteristics, including pillow lava formations in dark brown, dark green, greenish-black, and reddish hues, as well as spilit and basaltic compositions. It also includes intercalations of layered chert, radiolarian chert, micrite, shale, and occasional agglomerates and tuffs. The formation is intersected by local diabase dikes, with basaltic lavas being the predominant rock type. The unit exhibits lateral and vertical interactions with other formations of the Alakırçay Group. Its thickness ranges from 0 to 700 meters.

Stratigraphically, the formation is considered to be of Ladinian-Norian age. The Karadere Formation developed as a result of rifting associated with the fragmentation of the platform towards the end of the Anisian period.

Cretaceous

Sugözü Formation (Ksg)

This formation encompasses metamorphic rocks that have undergone metamorphism under high-pressure and low-temperature conditions. It is characterized by the presence of dolomite and marble blocks, which are commonly found in large-scale tectonic slices. The dominant rock type in the formation consists of garnet-bearing mica schists with fine to medium to coarsely foliated textures, displaying colors such as green, dirty yellow, gray, greenish-gray, light brown, bluish-gray, leaden, and reddish-brown. In the coarsely foliated sections, garnet, albite, and quartz are particularly prominent. The formation exhibits a highly folded, fractured, deformed, and chaotic structure. The boundary relationships of the unit are tectonic in nature. The formation has a thickness ranging from 500 to 750 meters, but this thickness diminishes laterally.

The metamorphic age of this unit, which includes tectonic slices and rock types of various ages, is assigned to the Late Cretaceous period.

Tekedağı Formation (JKt)

The unit consists of medium-thickness, locally massive limestone, recrystallized limestone, and dolomitic limestone in colors ranging from beige, cream, gray, to dirty white. Dolomitization is commonly observed within the unit. The limestones are present as small fragments. This unit is several tens of meters thick in the region.

Kırkdirek Formation (Kkm)

The serpentinite matrix encompasses blocks of varying sizes including limestone, plant-rich sandstone, shale, layered chert, radiolarite, basic volcanic rocks, and neritic limestone from the Jura-Cretaceous period, gabbro, diabase, and amphibolite. This formation is present as tectonic slices of different sizes within the Antalya nappes, with thickness varying between 0 and 600 meters. It developed during the late Senonian period, influenced by the emplacement of the ophiolite nappe over the continental crust.

Senozoic

Paleogene

Eocene

Kulalar Formation (Teku)

The formation begins with conglomerates derived from the Antalya nappes, characterized by rounded, sub-rounded, and angular clasts with intermediate to poor sorting. Overlying these conglomerates are sandstone, siltstone, mudstone, sandy-clayey limestone, calcarenite, micrite, and conglomerates with gray, green, greenish-gray, dirty yellow, and white colors, exhibiting irregular intercalations with fine to medium and locally coarse layers. Above these, there are additional conglomerates, also derived from the Antalya nappes, featuring angular clasts and intermediate to poor sorting, with a thickness of approximately 7 meters.

The total thickness of the formation is about 280 meters. This unit was deposited in a slope-basin environment influenced by turbidity currents.

Çakallar Formation (Tmça)

The unit typically consists of medium-thick, finely laminated breccias of limestone origin in colors such as beige, cream, gray, and dirty yellow. Within this formation, intermittent layers of brecciated limestone, calcareous shale, and marl are observed. It exhibits a thickness of approximately 330 meters. The unit is laterally interfingered with the Oymapinar Limestone and is considered Langhian in age based on its stratigraphic position. It was deposited in a shallow carbonate shelf environment.

Neogene

Miocene

Sevinç Conglomerate (Tmse)

The unit is generally characterized by stratified and/or thickly layered conglomerates, which are represented in reddish, brown, and gray colors. The pebbles within the unit vary in type and are typically rounded or well-rounded. In some areas, the pebbles exhibit moderate to good sorting, while in others, they show moderate to poor sorting. Locally, the conglomerates may resemble limestone, with pebble sizes reaching up to 60-70 cm. The Sevinç conglomerate occasionally includes layers of sandstone and sometimes mudstone. These sandstone and mudstone layers are brownish in color, with their thickness tapering laterally to form lens-like appearances. The layers exhibit cross-stratification and trough cross-stratification. Within the unit, plant fragments are present in places.

Oymapınar Limestone (Tmo)

The formation, exhibiting transgressive characteristics, typically begins with thin to medium-bedded, beige, cream, dirty yellow, and gray reefal limestones and conglomeratic limestones. In some areas, the base includes conglomerates, while in others; it starts with sandstones, mudstones, and conglomeratic limestones in intermediate levels. The upper part of the formation is characterized by dominant rock types, including locally medium-bedded, beige, cream, dirty yellow, dirty white, and light gray reefal limestones with occasional dissolution voids. The Antalya Nappes, which are unconformably overlying the Alanya Nappe, are locally unconformable over the Oymapınar Limestone and the Sevinç Conglomerate. The unit averages about 100 meters in thickness but shows lateral variability. It was deposited in a shallow carbonate shelf environment.

Karpuzçay Formation (Tmkp)

The Karpuzçay Formation is characterized by its finely, moderately, and coarsely layered sediments. It comprises sandstones, siltstones, and shales in a range of colors including gray, greenish-gray, light brown, dirty yellow, green, beige, and cream. Notably, the lower sections of the formation contain calcite turbidites and clayey-silty limestone layers. Additionally, the formation includes conglomerate layers in certain areas. Sparse fine tuff layers are also present within the formation. The thickness of the unit varies approximately between 20 and 450 meters. It was deposited under the influence of turbidity currents, initially in a shelf environment, and subsequently in slope and basin settings.

Geceleme Marl (Tmg)

The formation is composed of fine clayey-silty limestones, calcite turbidite levels, and thin to medium-thick beds of claystones and marls in shades of greenish-gray, gray, light gray, green, cream, and dark gray. It also includes occasional thin sandstone interbeds. The thickness of the unit ranges from 20 to 450 meters. This unit was deposited in a deep shelf-slope environment.

Aksu Formation (Tma)

The Tortonian aged formation consists of thick conglomerates. The unit consists of massive, thick, sometimes medium-bedded, medium to well-graded, rounded, semi-rounded, sometimes angular pebbly and sometimes blocky conglomerates. Sometimes sandstone, claystone, siltstone, marl and marl can be interbedded within the unit. It shows a maximum thickness of 400 meters in the region. The unit was deposited in shelf-slope environment.

Pliocene

Eskiköy Formation (ple)

The unit consists of massive or very thickly bedded terrestrial conglomerates at the base, and marine conglomerates, sandstones, and siltstones with thick bedding at the top. The thickness varies between 0 and 400 meters. This formation, dated to the Late Messinian to Early Pliocene, was initially deposited in a terrestrial environment and later in a coastal setting.

Quaternary

Pleistocene

Belkıs Conglomerate (Qb)

The unit consists of polygenic conglomerates. These conglomerates are typically characterized by rounded to well-rounded gravel, supported by the clasts, and exhibit indistinct and cross-bedded structures, with a matrix of sand and mud. The conglomerates may also include interbedded mud and ancient soil horizons. The thickness of these deposits ranges from 0 to 20 meters. The Belkıs Conglomerate, which is considered to be of Pleistocene age, has an alluvial origin and is found in terrace formations.

Alluvium (Qal)

In riverbeds and alluvial plains, sedimentary deposits such as sand, gravel, cobbles, and mud accumulate. When rivers reach the sea, these materials are deposited as deltaic sediments.
The geological map of the project area is presented from Figure VI.19 to Figure VI.23.

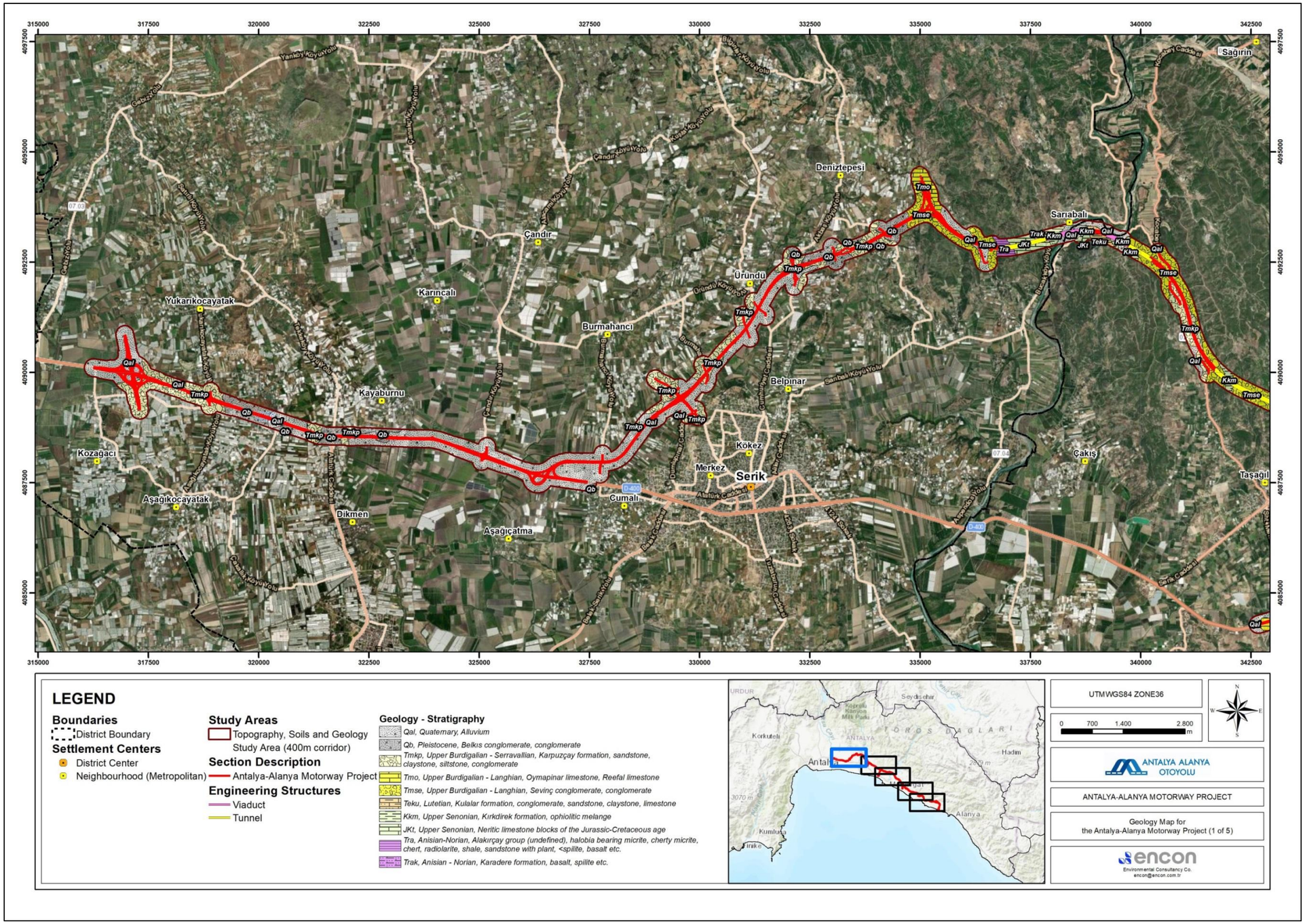


Figure VI.19 Geology Map for the Project (1 of 5)

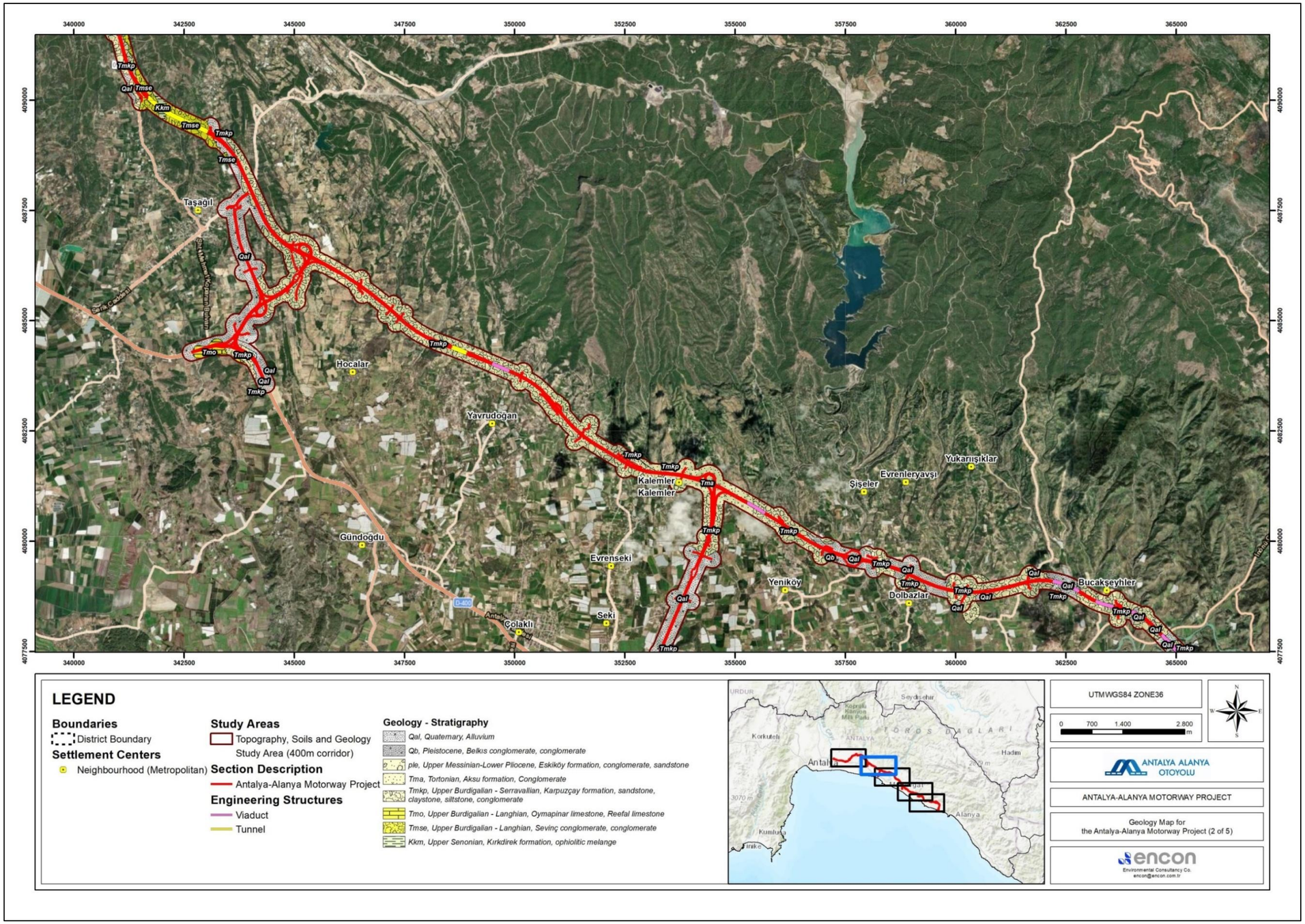


Figure VI.20 Geology Map for the Project (2 of 5)

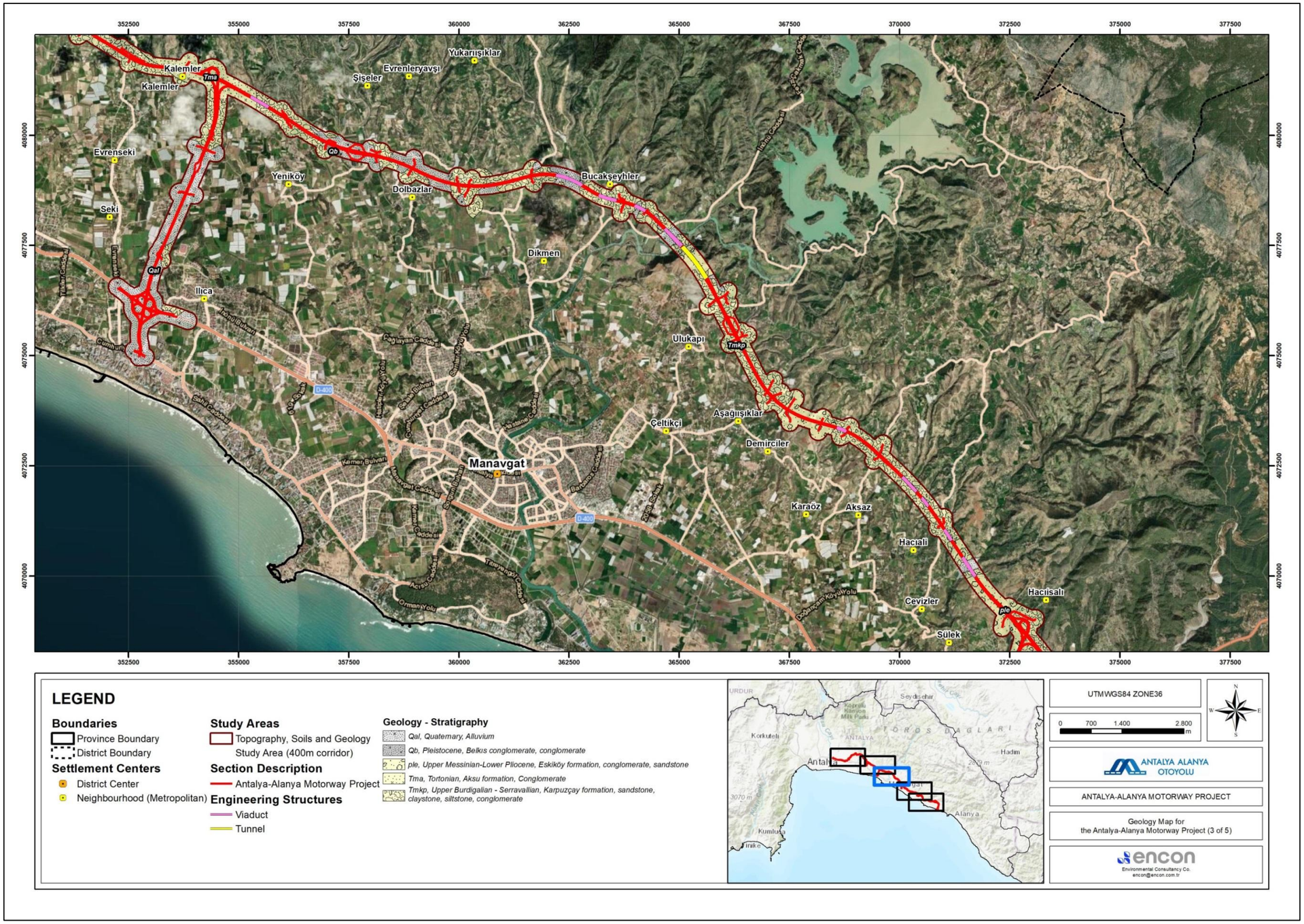


Figure VI.21 Geology Map for the Project (3 of 5)

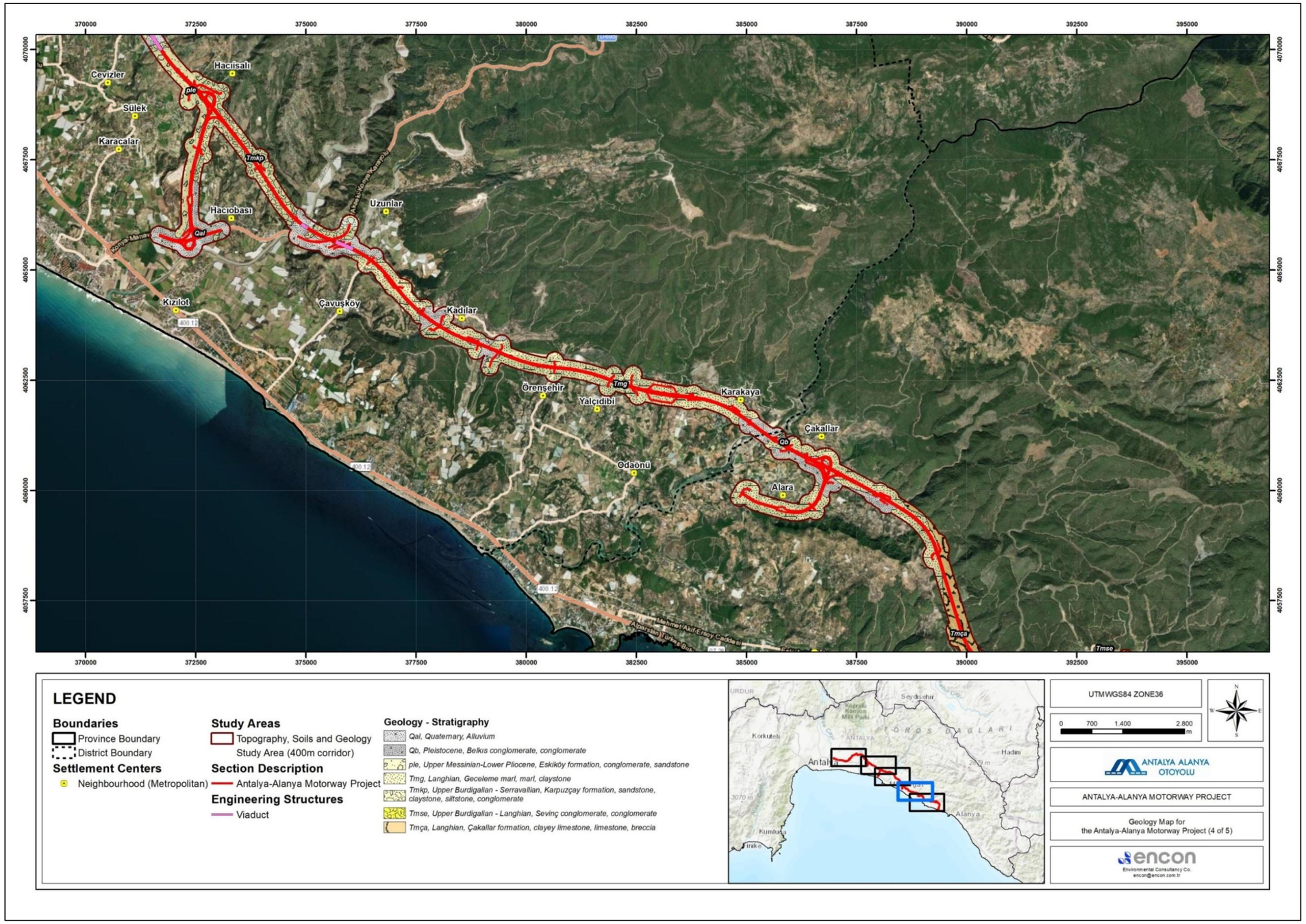


Figure VI.22 Geology Map for the Project (4of 5)

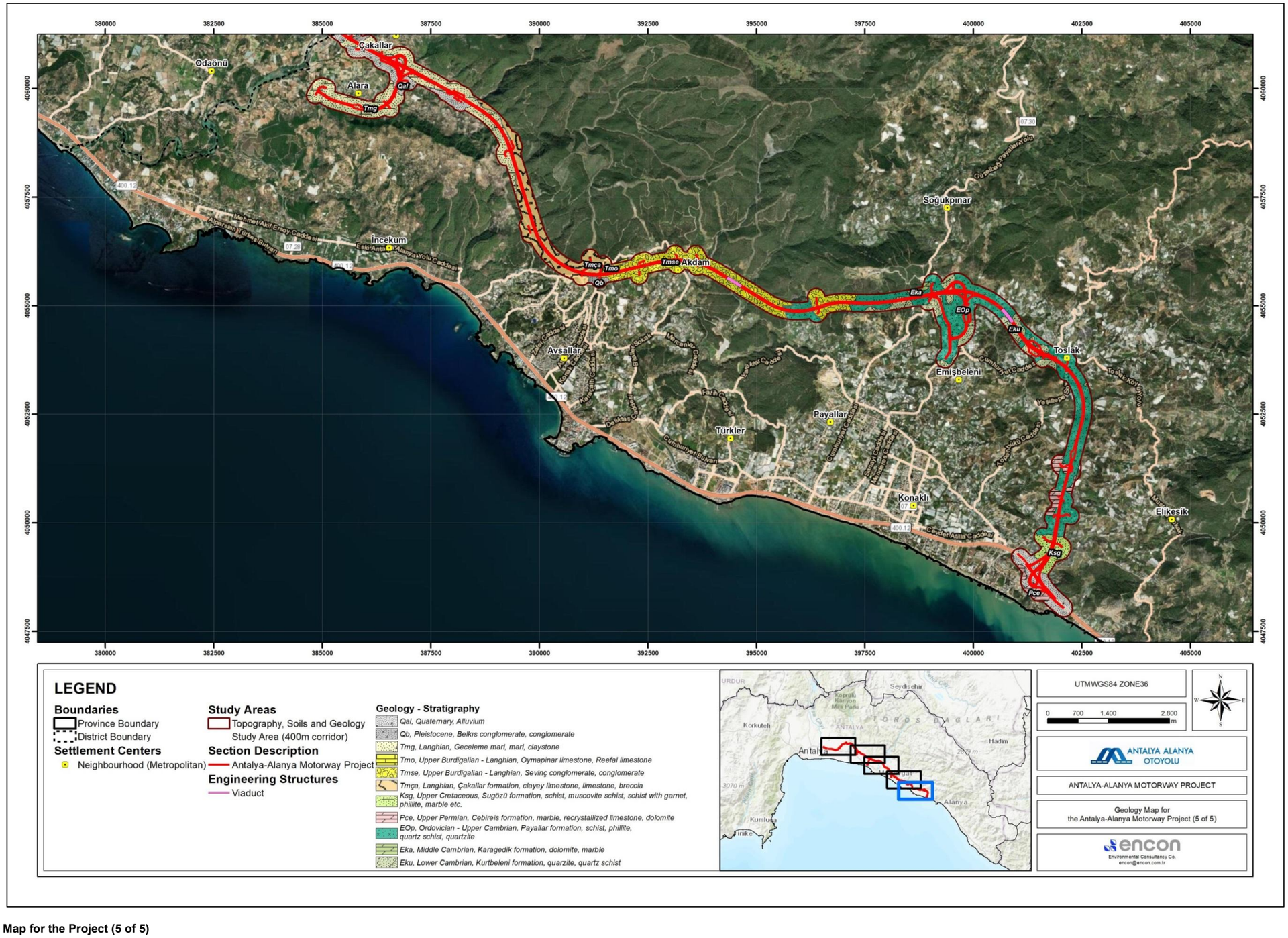


Figure VI.23 Geology Map for the Project (5 of 5)

VI.2.3.4. Geotechnical Characteristics

Within the scope of the project, a Geological–Geotechnical Survey Report was prepared by Mega Mühendislik Müşavirlik A.Ş. in 2024. This report formed the basis for the geological mapping, exploratory boreholes, trial pits, field testing, sampling, and laboratory analyses conducted along the designated route.

According to the findings and planning framework outlined in the Geological–Geotechnical Survey Report, a total of 417 boreholes were proposed—32 on the Serik Junction and Connection Roads, 19 on the Antalya State Highway, and 366 along the main project corridor. However, due to constraints such as permitting challenges, expropriation procedures, and limitations in site accessibility, the report notes that not all boreholes could be completed during the preliminary phase. The execution of the remaining boreholes has been scheduled for the construction stage, in line with the report's recommendations.

Similarly, the test pit program included 23 test pits on the Serik Junction and Connection Roads, 6 on the Antalya State Highway, 4 superstructure pits, and 55 along the main route. Field investigations for test pits are currently ongoing.

The drilling activities were carried out to determine the engineering properties of the soil and rock units. The drilling was carried out by drilling self-contained wells with rotary water system and wire-line type drilling equipment was used. Standard penetration tests (SPTs) were performed every 1.5 meters along the soil profile and soil samples were taken during these tests and preserved in double-layer nylon bags. Undisturbed samples of fine-grained soils, especially those with high clay and silt content, were obtained with a Shelby tube (UD) and paraffinized immediately to preserve the natural water content of the samples. In order to determine the groundwater level, the wells were emptied, waited for 24 hours and then measured. The samples were analyzed in the laboratory for soil index properties (natural water content, grain distribution, Atterberg limits), strength parameters (cohesion, internal friction angle) and deformation properties (swelling, compaction parameters). Core drilling method was applied in the bedrock units, core samples were numbered and stored in core boxes and logged and archived. All works were carried out in accordance with the "Technical Specifications for Soil Investigations" of the General Directorate of Highways, TSE and international standards.

Table VI.17 List of Boreholes Drilled at Serik Junction and Connection Roads

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
1	SBSK-52+440	52+440 (anayol)	Cutting / Excavation	153m right (main road)	4094338	602193	1,1	18	6,05,2024
2	SBSK-52+500	52+500 (anayol)	Underpass Bridge	35m right	4094341	602319	3,6	15	5,05,2024
3	SBSK-52+590	52+590 (anayol)	Underpass Bridge	15m left	4094331	602398	9	15	9,05,2024
4	SBSK-52+600	52+600 (anayol)	Cutting / Excavation	67m right	4094251	602352	--	20	7,05,2024
5	SBSK-1+415	1+415	Overpass Bridge	22m left	4093754	601289	6,3	20	8,05,2024
6	SBSK-1+425	1+425	Overpass Bridge	22m right	4093786	601258	5	15	10,05,2024
7	SBSK-1+755	1+755	Lithology	45m right	4093635	600970	2,4	10	15,05,2024
8	SBSK-1+810-1	1+810	Cutting / Excavation	52m left	4093522	600967	5,9	22	14,05,2024
9	SBSK-2+390	2+390	Toll Area	Centerline	4093343	600407	6,1	15	9,07,2024
10	SBSK-2+675-1	2+675	Overpass Bridge	22.7m right	4093269	600138	8,2	25	10,07,2024
11	SBSK-2+675-2	2+675	Overpass Bridge	23m left	4093226	600153	8,1	20	10,07,2024
12	SBSK-0+015	0+015 (K2 Kol-2)	Cutting / Excavation	37m right (Branch K2-2)	4093149	599735	7,2	21	8,07,2024
13	SBSK-3+660-1	3+660	Intersection Bridge	19m right	4092919	599208	9,2	20	9,07,2024
14	SBSK-3+660-2	3+660	Intersection Bridge	19m left	4092885	599222	9,4	30	11,07,2024
15	SBSK-3+660-A	3+647	Intersection Bridge	Centerline	4092908	599230	8,5	10	8,07,2024
16	SBSK-4+620-1	4+620	Culvert (For Irrigation)	24m right	4092220	598559	6,3	25	7,07,2024
17	SBSK-4+620-2	4+620	Culvert (For Irrigation)	20m left	4092201	598600	6,2	25	8,07,2024
18	SBSK-4+852	4+847	Overpass Bridge	40m right	4092028	598443	6,6	25	19,11,2024
19	SBSK-4+872	4+872	Overpass Bridge	18m left	4091979	598481	5,4	30	7,07,2024
20	SBSK-5+387	5+387	Overpass Bridge	17m right	4091548	598199	5,1	10,5	7,07,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
21	SBSK-5+400	5+400	Overpass Bridge	15m left	4091518	598217	4,8	19,6	6,07,2024
22	SBSK-6+120	6+120	Lithology	Centerline	4090983	597733	8,5	13	7,07,2024
23	SBSK-6+742	6+742	Overpass Bridge	21m right	4090508	597330	12,5	25	14,11,2024
24	SBSK-6+762	6+762	Overpass Bridge	22m left	4090468	597353	13,2	32	8,11,2024
25	SBSK-7+575-1	7+575	Intersection Bridge	15m right	4089904	596768	4	30	5,07,2024
26	SBSK-7+575-2	7+575	Intersection Bridge	15m left	4089883	596790	3,1	30	6,07,2024
27	SBSK-8+953	8+593	Hydraulic Bridge	14m left	4088956	595793	5,5	25	11,07,2024
28	SBSK-9+010	9+010	Hydraulic Bridge	16m left	4088928	595737	3,8	25	26,11,2024
29	SBSK-9+947	9+947	Overpass Bridge	15m right	4088400	595042	4,1	30	3,07,2024
30	SBSK-9+967	9+967	Overpass Bridge	16m left	4088368	595023	4,5	30	4,07,2024
31	SBSK-11+340	11+340	Intersection Bridge	11m right	4088041	593773	7,5	30	1,07,2024
32	SBSK-11+370	11+370	Intersection Bridge	16m left	4088001	593785	6	30	2,07,2024

(*) Due to reasons such as permits, expropriation, land conditions, etc., the point could not be reached and drilling will be carried out during the construction phase. (Geological–Geotechnical Survey Report,2024)

Table VI.18 List of Boreholes drilled on Antalya State Road

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
1	D-SK-1+595	1+595	Bridge (Extension to Existing) L=35m	19m right	4088192	593159	30	5,6	20,08,2024
2	D-SK-1+615	1+615	Bridge (Extension to Existing) L=35m	21m left	4088159	593129	30,03	7,1	19,08,2024
3	D-SK-1+635	1+635	Bridge (Extension to Existing) L=35m	22m right	4088206	593125	30,45	9,2	10,08,2024
4	D-SK-1+651	1+651	Bridge (Extension to Existing) L=35m	20m left	4088171	593095	28	8,6	15,08,2024
5	D-SK-2+362	2+362	Intersection Bridge (L=140m)	19m right	4088426	592432	(*)		

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
6	D-SK-2+397	2+397	Intersection Bridge (L=140m)	19m left	4088402	592385	30	10,2	9,08,2024
7	D-SK-2+467	2+467	Intersection Bridge (L=140m)	19m right	4088458	592331	(*)		
8	D-SK-2+503	2+503	Intersection Bridge (L=140m)	19m left	4088435	592285	30,07	9,9	10,08,2024
9	D-SK-2+980	2+980	Culvert (Extension to Existing) 10x5	23m right	4088621	591845	24,45	6,5	11,08,2024
10	D-SK-3+830-1	3+830	Bridge (Extension to Existing) L=55m	20m right	4088809	591014	30,45	22,5	12,08,2024
11	D-SK-3+830-2	3+830	Bridge (Extension to Existing) L=55m	20m left	4088772	591012	47	24,5	14,08,2024
12	D-SK-3+890-1	3+890	Bridge (Extension to Existing) L=55m	20m right	4088810	590954	36,45	6,3	13,08,2024
13	D-SK-3+890-2	3+890	Bridge (Extension to Existing) L=55m	20m left	4088771	590952	25,95	18,5	12,08,2024
14	D-SK-8+793	8+793	Intersection Bridge (L=140m)	19m right	4089539	586160	(*)		
15	D-SK-8+828	8+828	Intersection Bridge (L=140m)	19m left	4089514	586115	(*)		
16	D-SK-8+900	8+900	Intersection Bridge (L=140m)	19m right	4089571	586060	(*)		
17	D-SK-8+933	8+933	Intersection Bridge (L=140m)	19m left	4089544	586015	(*)		
18	D-SK-9+460	9+460	Culvert (Extension to Existing) 5x5	23m right	4089734	585523	12	9	15,08,2024
19	D-SK-9+905	9+905	Culvert (Extension to Existing) 7x5	18m left	4089821	585085	15	8,8	16,08,2024

(*) Due to reasons such as permits, expropriation, land conditions, etc., the point could not be reached and drilling will be carried out during the construction phase. (Geological–Geotechnical Survey Report,2024)

Table VI.19 List of Boreholes Drilled on the Project Route

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
1	SK-52+872	52+872	Embankment / Fill	45m left	4094108	602616	1,5	20	11,05,2024
2	SK-53+050	53+050	Cutting / Excavation	38m right	4094108	602616	3,3	15	13,05,2024
3	SK-53+390-1	53+390	Cutting / Excavation	145m right	4093633	602925	10,9	30	19,05,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
4	SK-53+390-2	53+390	Lithology	14m left	4093773	603003	3,6	15	16,05,2024
5	SK-53+700	53+700	Embankment / Fill	44m left	4093645	603283	1	16	12,05,2024
6	SK-53+790	44m sol	Underpass (9x6)	44m left	4093648	603377	10,1	21	16,08,2024
7	SK-53+865	55m sağ	Underpass (9x6)	55m right	4093533	603423	11,5	19,54	13,08,2024
8	SK-54+042-1	54+042	Embankment + Lithology	9m right	4093542	603609	5,5	20	20,05,2024
9	SK-54+042-2	54+042	Cutting / Excavation	61m left	4093611	603620	--	30	6,06,2024
10	SK-54+136	54+136	Box-Type Underpass	16m right	4093524	603702	8,8	25	22,05,2024
11	SK-54+153	53+136	Box-Type Underpass	13m left	4093552	603716	(*)		
12	SK-54+235	54+235	Tunnel Entrance Cutting	Centerline	4093535	603804	--	20	6,06,2024
13	SK-54+300	54+300	Tunnel Entrance Portal (Right)	Left of centerline	4093511	603867	--	45	4,06,2024
14	SK-54+318	54+318	Tunnel Entrance Portal (Left)	Right of centerline	4093558	603886	--	44	29,05,2024
15	SK-54+400	54+400	Tunnel Axis	Centerline	4093535	603967	--	80	3,08,2024
16	SK-54+705	54+705	Tunnel Axis	Centerline	4093576	604270	--	135	28,07,2024
17	SK-54+870	54+870	Tunnel Axis	Centerline	4093599	604434	--	202	11,09,2024
18	SK-55+030	55+030	Tunnel Axis	Centerline	4093661	604583	--	140	23,08,2024
19	SK-55+200	55+200	Tunnel	66m right	4093648	604767	--	75	27,10,2024
20	SK-55+233	55+233	Tunnel Axis	Centerline	4093720	604777	--	89	25,05,2024
21	SK-55+244	55+244	Tunnel	58m left	4093779	604771	--	102	5,10,2024
22	SK-55+315	55+315	Tunnel Axis	23m right	4093722	604862	--	65	2,07,2024
23	SK-55+365-1	55+365	Tunnel Exit Portal (Right)	22m right	4093738	604912	(*)		
24	SK-55+365-2	55+365	Tunnel Exit Portal (Left)	24m left	4093781	604899	--	60	2,06,2024
25	SK-55+437	55+437	Viaduct (End Pier)	22m right	4093759	604899	19,8	25	9,06,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
26	SK-55+445	55+445	Viaduct (End Pier)	23m left	4093804	604975	15,6	45	13,06,2024
27	SK-55+475	55+475	Viaduct	23m right	4093767	605015	5,1	31	19,07,2024
28	SK-55+481	55+481	Viaduct	23m left	4093814	605008	4,4	30	17,07,2024
29	SK-55+525	55+525	Viaduct (Pilot)	23.5m right	4093782	605064	3,2	45	13,07,2024
30	SK-55+634	55+634	Viaduct	23.5m left	4093859	605155	4,1	40	11,07,2024
31	SK-55+650	55+650	Viaduct	23m right	4093818	605183	(*)		
32	SK-55+710	55+710	Viaduct	23m left	4093881	605228	3,5	40	6,07,2024
33	SK-55+740	55+740	Viaduct	23m right	4093859	605155	3,6	25	1,07,2024
34	SK-55+800	55+800	Viaduct (Pilot)	23m left	4093906	605314	--	50	27,06,2024
35	SK-55+890	55+890	Viaduct	22m right	4093888	605413	4,1	60	25,07,2024
36	SK-55+950	55+950	Viaduct	22m left	4093946	605459	4,3	30	27,07,2024
37	SK-55+980	55+980	Viaduct	20m right	4093912	605499	4,5	30,09	29,07,2024
38	SK-56+023	56+023	Viaduct	19m right	4093922	605540	4	21	26,05,2024
39	SK-56+055	56+055	Viaduct	20m left	4093966	605562	5,5	21	28,05,2024
40	SK-56+065	56+065	Viaduct	17m right	4093932	605580	6	21	29,05,2024
41	SK-56+095	56+095	Viaduct	19m left	4093973	605604	5,2	25	2,06,2024
42	SK-56+107	56+107	Viaduct	17m right	4093940	605621	3,7	60	1,08,2024
43	SK-56+135	56+135	Viaduct (Pilot)	19m left	4093979	605643	6,1	25	9,06,2024
44	SK-56+150	46+150	Viaduct	15m right	4093947	605662	(*)		
45	SK-56+182	56+182	Viaduct	18m left	4093984	605691	3,2	60	30,07,2024
46	SK-56+191	56+191	Viaduct	14m right	4093952	605704	(*)		
47	SK-56+220	56+220	Viaduct (End Pier)	8m right	4093962	605732	(*)		

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
48	SK-56+236	56+236	Viaduct (End Pier)	15m left	4093986	605745	(*)		
49	SK-56+322	56+322	Retaining Wall	23m left	4093997	605831	7,2	30	8,06,2024
50	SK-56+525	56+525	Retaining Wall	21m left	4093984	606038	8,5	25	6,06,2024
51	SK-56+550	56+550	Retaining Wall	21m right	4093939	606057	(*)		
52	SK-56+665	56+665	Retaining Wall	21m left	4093959	606178	3,9	30	30,07,2024
53	SK-56+779	56+779	Viaduct	12m left	4093923	606287	(*)		
54	SK-56+822	56+822	Viaduct	12m left	4093910	606328	4,2	36	28,07,2024
55	SK-56+862	56+862	Viaduct	13m left	4093897	606366	3,8	31	26,07,2024
56	SK-56+900	56+900	Viaduct	13m left	4093884	606403	2,8	40	26,07,2024
57	SK-56+930	56+930	Viaduct	14m left	4093873	606433	3,1	37	24,07,2024
58	SK-56+945	56+945	Viaduct		4093843	606435	(*)		
59	SK-56+973	56+973	Viaduct		4093861	606473	(*)		
60	SK-57+015	57+015	Viaduct		4093841	606511	(*)		
61	SK-57+027	57+027	Viaduct	23m right	4093801	606505	3,8	24	25,07,2024
62	SK-57+065	57+065	Viaduct	17m left	4093821	606557	(*)		
63	SK-57+072	57+072	Viaduct	28m right	4093777	606543	(*)		
64	SK-57+110	57+110	Viaduct (Pilot)	21m left	4093804	606598	4,2	40	15,07,2024
65	SK-57+113	57+113	Viaduct	28m right	4093758	606578	(*)		
66	SK-57+148	57+148	Viaduct	25m right	4093746	606612	(*)		
67	SK-57+152	57+152	Viaduct	22m left	4093786	606635	5,8	29	16,07,2024
68	SK-57+192	57+192	Viaduct	22m left	4093767	606672	6,8	30,5	19,07,2024
69	SK-57+200	57+200	Viaduct	24m right	4093722	606659	15,3	60	23,07,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
70	SK-57+228	57+228	Viaduct	22m left	4093751	606704	12,5	60	18,07,2024
71	SK-57+238	57+238	Viaduct	23m right	4093707	606692	14,5	30	20,07,2024
72	SK-57+263	57+263	Viaduct	23m right	4093695	606714	15,6	30	23,07,2024
73	SK-57+275	57+275	Viaduct	23m left	4093730	606747	(*)		
74	SK-57+317	57+317	Viaduct (End Pier)	23m left	4093711	606784	(*)		
75	SK-57+320	57+320	Viaduct (End Pier)	23m right	4093668	606765	(*)		
76	SK-57+365	57+365	Tunnel Entrance Portal (Left)	22.5m left	4093687	606826	(*)		
77	SK-57+386	57+386	Tunnel Entrance Portal (Right)	21.5m right	4093639	606825	(*)		
78	SK-57+455	57+455	Tunnel Axis	52m right	4093579	606870	--	65	1,09,2024
79	SK-57+618	57+618	Tunnel Axis	85m right	4093474	607000	--	88	29,09,2024
80	SK-57+900	57+900	Tunnel Exit Portal (Left)	23m left	4093434	607296	(*)		
81	SK-57+980	57+980	Tunnel Exit Portal (Right)	23m right	4093350	607345	(*)		
82	SK-58+200	58+200	Embankment / Fill	56m left	4093283	607568	--	20	13,06,2024
83	SK-58+485	58+485	Underpass Bridge	66m left	4093089	607786	--	20	30,06,2024
84	SK-58+558	58+558	Underpass Bridge	Centerline	4092989	607785	--	25	11,06,2024
85	SK-58+615	58+615	Underpass Bridge	38m right	4092923	607790	--	25	28,06,2024
86	SK-58+970	58+970	Cutting / Excavation	98m left	4092697	608105	--	40	6,07,2024
87	SK-59+385	59+385	Cutting / Excavation	80m left	4092293	608255	--	40	3,07,2024
88	SK-60+380	60+380	Embankment / Fill	79m right	4091298	608462	--	21	1,10,2024
89	SK-60+765	60+765	Embankment / Fill	50m right	4090998	608720	--	13	30,06,2024
90	SK-60+852	60+852	Cutting / Excavation	28m left	4090988	608836	(*)		
91	SK-60+912	60+912	Tunnel Entrance Portal (Left)	20m left	4090940	608875	(*)		

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
92	SK-60+950	60+950	Tunnel Entrance Portal (Right)	24m right	4090884	608871	(*)		
93	SK-61+040	61+040	Tunnel Axis	Centerline	4090842	608956	--	90	22,09,2024
94	SK-61+530	61+530	Tunnel Axis	Centerline	4090569	609358	--	130	23,07,2024
95	SK-62+030	62+030	Tunnel Axis	Centerline	4090365	609819	--	110	31,07,2024
96	SK-62+483-1	62+483	Tunnel Exit Portal (Right)	23.6m right	4090165	610222	(*)		
97	SK-62+483-2	62+483	Tunnel Exit Portal (Left)	22.7m left	4090206	610243	(*)		
98	SK-62+550	62+550	Embankment + Lithology	22.5m left	4090207	610243	11,5	16	11,06,2024
99	SK-62+690	62+665	Embankment + Lithology	9.8m left	4090106	610399	14,3	18	2,10,2024
100	SK-62+890-1	62+890	Underpass (12x6) + Diversion	46.5m right	4089931	610545	10,2	20	3,10,2024
101	SK-62+890-2	62+890	Underpass (12x6)	39m left	4089996	610600	9,8	20	4,10,2024
102	SK-62+955	62+955	Embankment + Lithology	Centerline	4089923	610624	6,3	15	13,06,2024
103	SK-63+298	63+262	Embankment + Lithology	16m left	4089707	610843	6,6	15	8,10,2024
104	SK-63+578	63+578	Cutting / Excavation	104m left	4089476	611088	--	47	5,10,2024
105	SK-64+190	64+190	Underpass Bridge	53m right	4088851	611220	9,3	15,3	10,06,2024
106	SK-64+555	64+555	Embankment + Lithology	Centerline	4088461	611471	8,4	10	25,06,2024
107	SK-65+450	65+450	Cutting / Excavation	112m left	4087899	611994	25,8	60	23,06,2024
108	SK-65+827-1	65+827	Underpass (12x6)	23m right	4087584	612221	8,5	20	10,10,2024
109	SK-65+827-2	65+835	Underpass (12x6)	39m left	4087636	612257	8	21	9,10,2024
110	SK-66+030	66+030	Embankment + Lithology	Centerline	4087520	612417	6,6	20	12,10,2024
111	SK-66+495	66+495	Cutting / Excavation	56m right	4087283	612820	18,9	23	24,06,2024
112	SK-67+579-1	67+579	Underpass (9x6)	33m right	4086781	613773	5,4	20	13,10,2024
113	SK-67+579-2	67+579	Underpass (9x6)	29m left	4086832	613806	6,5	20	13,10,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
114	SK-68+468	68+468	Overpass Bridge	23m right	4086265	614496	9,9	20	9,10,2024
115	SK-68+758-1	68+758	Overpass Bridge	25m right	4086080	614714	8,7	20	9,10,2024
116	SK-68+758-2	68+758	Overpass Bridge	21m left	4086115	614744	8	20	10,10,2024
117	SK-68+930	68+930	Embankment / Fill	Centerline	4085988	614864	5,5	20	15,10,2024
118	SK-69+755	69+755	Embankment / Fill	Centerline	4085591	615583	(*)		
119	SK-70+130-2	70+130	Tunnel Entrance Portal (Left)	20m left	4085492	615944	(*)		
120	SK-70+130-1	70+130	Tunnel Entrance Portal (Right)	23.5m right	4085450	615931	(*)		
121	SK-70+475-1	70+475	Tunnel Exit Portal (Left)	23m right	4085337	616255	(*)		
122	SK-70+475-2	70+475	Tunnel Exit Portal (Right)	22.6m left	4085379	616270	(*)		
123	SK-70+545	70+545	Cutting / Excavation	57.5m left	4085389	616347	45	62	1,12,2024
124	SK-71+130-1	71+130	Viaduct (End Pier)	11m right	4085113	616871	19,8	20	2,06,2024
125	SK-71+130-2	71+130	Viaduct (End Pier)	11m left	4085133	616878	19,9	20	1,06,2024
126	SK-71+171-1	71+180	Viaduct	11m right	4085094	4085094	6,3	20	31,05,2024
127	SK-71+171-2	71+171	Viaduct	11m left	4085118	616917	9	20	1,06,2024
128	SK-71+215-1	71+215	Viaduct	11m right	4085103	616957	(*)		
129	SK-71+215-2 (P)	71+257	Viaduct (Pilot)	11m left	4085086	616996	4,9	30	30,05,2024
130	SK-71+257-1	71+257	Viaduct	11m right	4085066	616988	5	20	30,05,2024
131	SK-71+257-2	71+257	Viaduct	11m left	4085086	616996	5,4	22	31,05,2024
132	SK-71+300-1	71+300	Viaduct	11m right	4085051	617027	4	20	4,06,2024
133	SK-71+300-2	71+300	Viaduct	11m left	4085071	617035	4,7	20	5,06,2024
134	SK-71+342-1	71+342	Viaduct	11m right	4085035	617067	3,4	20	3,06,2024
135	SK-71+342-2	71+342	Viaduct	11m left	4085055	617075	3,9	20	1,06,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
136	SK-71+385-1	71+385	Viaduct	11m right	4085019	617106	(*)		
137	SK-71+385-2	71+385	Viaduct	11m left	4085039	617114	4	20	2,06,2024
138	SK-71+427-1 (P)	71+427	Viaduct (Pilot)	11m right	4085004	617146	(*)		
139	SK-71+427-2	71+427	Viaduct	11m left	4085024	617154	2,3	30	5,06,2024
140	SK-71+470-1	71+470	Viaduct	11m right	4084987	617185	4,5	20	3,06,2024
141	SK-71+470-2	71+470	Viaduct	11m left	4085007	617193	3,4	20	5,06,2024
142	SK-71+500-1	71+505	Viaduct (End Pier)	11m right	4084974	617218	(*)		
143	SK-71+500-2	71+505	Viaduct (End Pier)	11m left	4084994	617226	(*)		
144	SK-71+835	71+835	Overpass Bridge	24m right	4084835	617518	6,3	20	7,09,2024
145	SK-72+485	72+485	Cutting / Excavation	55m left	4084534	618103	16,9	25	28,06,2024
146	SK-73+000-1	73+000	Underpass (9x6)	33m right	4084092	618383	(*)		
147	SK-73+000-2	73+000	Underpass (9x6)	33m left	4084134	618433	(*)		
148	SK-73+300	73+300	Cutting / Excavation	57m left	4083926	618647	18,5	27	26,06,2024
149	SK-73+755	73+755	Overpass Bridge (L=50m)	24m right	4083561	618927	9,4	20	7,09,2024
150	SK-74+200	74+200	Embankment / Fill	Centerline	4083341	619315	(*)		
151	SK-74+955	74+955	Underpass (9x6)	34m left	4082999	619990	--	20	6,09,2024
152	SK-75+970	74+970	Underpass (9x6)	39m right	4082928	619966	--	20	6,09,2024
153	SK-75+400	74+400	Embankment / Fill	Centerline	4082810	620386	8,9	20	29,06,2024
154	SK-75+845	75+845	Embankment / Fill	Centerline	4082768	620826	(*)		
155	SK-76+259	76+259	Overpass Bridge (L=50m)	24m right	4082705	621237	8,2	20	6,09,2024
156	SK-77+100	77+100	Embankment / Fill	Centerline	4082501	622046	(*)		
157	SK-77+900-1	77+900	Viaduct (End Pier)	11m right	4082139	622758	23,6	35	25,06,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
158	SK-77+900-2	77+900	Viaduct (End Pier)	11m left	4082158	622769	24,4	32	23,06,2024
159	SK-77+975-1	77+975	Viaduct	13m right	4082100	622827	15,9	32,5	11,06,2024
160	SK-77+975-2	77+975	Viaduct	13m left	4082124	622838	12,9	27	12,06,2024
161	SK-78+105-1	78+105	Viaduct	13.5m right	4082038	622940	4,8	30	22,06,2024
162	SK-78+105-2	78+105	Viaduct	12.5m left	4082062	622951	(*)		
163	SK-78+235-1	78+235	Viaduct (Pilot)	14.5m right	4081974	623053	16,5	30	8,06,2024
164	SK-78+235-2	78+235	Viaduct	12.5m left	4081997	623064	15,9	20	6,06,2024
165	SK-78+315-1		Viaduct (End Pier)	12m right	4081935	623124	(*)		
166	SK-78+315-2	78+315	Viaduct (End Pier)	11.5m left	4081997	623064	21,2	25	26,06,2024
167	SK-78+850	78+850	Overpass Bridge (L=60m)	25m right	4081657	4081657	11,5	30	28,09,2024
168	SK-79+315	79+315	Cutting / Excavation	48m right	4081394	623962	19,6	30	28,06,2024
169	SK-79+902-1	79+902	Underpass (12x6)	27m right	4081148	624500	--	20	5,09,2024
170	SK-79+902-2	79+902	Underpass (12x6)	33m left	4081204	624523	(*)		
171	SK-80+247	80+247	Hydraulic Bridge	Centerline	4081059	624838	2,7	30	4,07,2024
172	SK-80+453	80+453	Service Facility	Centerline	4081009	625036	11,5	20	2,07,2024
173	SK-81+058-1	81+058	Overpass Bridge (L=54m)	27m right	4080880	625628	11,5	20	12,09,2024
174	SK-81+058-2	81+058	Overpass Bridge (L=54m)	27m left	4080935	625636	10,8	20	12,09,2024
175	SK-81+922	81+922	Overpass Bridge (L=46m)	20m right	4080630	626469	9,5	20	11,09,2024
176	SK-82+510	82+510	Embankment + Lithology	11m right	4080419	626995	7	20	4,10,2024
177	SK-83+035-1	83+040	Overpass Bridge (L=62m)	35m right	4080280	627515	16	20	10,09,2024
178	SK-83+035-2	83+040	Overpass Bridge (L=62m)	Centerline	4080311	627517	15,5	20	10,09,2024
179	SK-83+035-3	83+035	Overpass Bridge (L=62m)	30m left	4080341	627512	14,8	20	11,09,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
180	SK-83+278-1	83+278	Overpass Bridge (L=104m)	30m right	4080262	627751	6,6	20	8,09,2024
181	SK-83+278-2	83+278	Overpass Bridge (L=104m)	Centerline	4080292	627752	6,4	20	9,09,2024
182	SK-83+278-3	83+263	Overpass Bridge (L=104m)	73m left	4080369	627740	5,9	20	9,09,2024
183	SK-84+275	84+275	Cutting / Excavation	54.5m left	4080493	628719	12,8	30	13,07,2024
184	SK-84+500	84+500	Embankment + Lithology	Centerline	4080506	628948	5,5	10	5,07,2024
185	SK-84+675	84+675	Underpass + Embankment	22.6m right	4080532	629122	8,3	9	5,07,2024
186	SK-84+680	84+680	Underpass + Embankment	40m left	4080595	629112	8,5	10	6,07,2024
187	SK-85+310-1	85+310	Viaduct (End Pier)	10m right	4080582	629745	(*)		
188	SK-85+310-2	85+310	Viaduct (End Pier)	10m left	4080604	629748	(*)		
189	SK-85+352-1	85+352	Viaduct	10m right	4080575	629786	4,9	20	10,06,2024
190	SK-85+352-2	85+352	Viaduct	10m right	4080597	629790	5,2	20	8,06,2024
191	SK-85+395-1	85+395	Viaduct	13m right	4080567	629827	3,7	20	8,06,2024
192	SK-85+395-2	85+395	Viaduct	10m left	4080588	629830	4,8	20	8,06,2024
193	SK-85+435-1	85+435	Viaduct	13m right	4080557	629868	(*)		
194	SK-85+435-2	85+435	Viaduct	10m left	4080579	629873	(*)		
195	SK-85+480-1	85+480	Viaduct	13m right	4080549	629910	(*)		
196	SK-85+480-2 (P)	85+480	Viaduct (Pilot)	10m left	4080569	629914	(*)		
197	SK-85+523-1	85+523	Viaduct	13m right	4080537	629950	(*)		
198	SK-85+523-2	85+523	Viaduct	10m left	4080558	629956	5,5	21	23,06,2024
199	SK-85+565-1	85+565	Viaduct	13m right	4080523	629990	6,6	30	12,06,2024
200	SK-85+565-2	85+565	Viaduct	10m left	4080544	629995	6,3	35	25,06,2024
201	SK-85+608-1	85+608	Viaduct	13m right	4080510	630030	6,2	30	12,06,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
202	SK-85+608-2	85+608	Viaduct	10m left	4080531	630036	5,7	31	23,06,2024
203	SK-85+650-1	85+650	Viaduct (Pilot)	4m right	4080503	630071	5,6	35	11,06,2024
204	SK-85+650-2	85+650	Viaduct	10m left	4080515	630075	4,5	32,5	22,06,2024
205	SK-85+693	85+693	Viaduct	10m left	4080499	630117	2,9	36	29,06,2024
206	SK-85+735-1	85+735	Viaduct	9m right	4080499	630117	5,8	36	27,06,2024
207	SK-85+735-2	85+735	Viaduct	11m left	4080484	630157	6,9	35,5	2,07,2024
208	SK-85+780-1	85+780	Viaduct	13m right	4080443	630185	16,8	35	3,07,2024
209	SK-85+780-2	85+780	Viaduct (Pilot)	10m left	4080465	630195	19,3	40	2,07,2024
210	SK-85+820-1	85+820	Viaduct	11m right	4080427	630225	14,5	20	4,07,2024
211	SK-85+820-2	85+820	Viaduct	14m left	4080449	630235	13,9	25	3,07,2024
212	SK-85+865-1	85+865	Viaduct	12m right	4080428	630272	8,5	20	4,07,2024
213	SK-85+865-2	85+865	Viaduct	13m left	4080428	630272	(*)		
214	SK-85+905-1	85+905	Viaduct (End Pier)	12m right	4080387	630298	(*)		
215	SK-85+905-2	85+905	Viaduct (End Pier)	12m right	4080408	630308	(*)		
216	SK-86+385-1	86+385	Viaduct (End Pier)	12m right	4080160	630722	(*)		
217	SK-86+385-2	86+385	Viaduct (End Pier)	12m left	4080181	630732	(*)		
218	SK-86+425-1	86+425	Viaduct	12m right	4080146	630760	(*)		
219	SK-86+425-2	86+425	Viaduct	12m left	4080166	630770	(*)		
220	SK-86+470-1	86+470	Viaduct	12m right	4080131	630800	7,4	25	6,07,2024
221	SK-86+470-2	86+470	Viaduct (Pilot)	12m left	4080152	630810	7,1	30	6,07,2024
222	SK-86+510	86+510	Viaduct	13m left	4080140	630849	5,9	35	6,07,2024
223	SK-86+553	86+553	Viaduct	10m right	4080108	630883	4,7	35	7,07,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
224	SK-86+593	86+593	Viaduct	13m right	4080117	630930	4,5	20	8,07,2024
225	SK-86+638	86+638	Viaduct	13m right	4080108	630971	5,8	25	8,07,2024
226	SK-86+680-1	86+680	Viaduct (Pilot)	12m right	4080076	631008	7,4	30	9,07,2024
227	SK-86+680-2	86+680	Viaduct	11m left	4080096	631012	7,7	20	11,07,2024
228	SK-86+725-1	86+725	Viaduct	12m right	4080146	630760	9,6	20	10,07,2024
229	SK-86+725-2	86+725	Viaduct	11m left	4080166	630770	9,9	20	10,07,2024
230	SK-86+765-1	86+765	Viaduct	10m left	4080059	631090	(*)		
231	SK-86+765-2	86+765	Viaduct	13m right	4080080	631094	(*)		
232	SK-86+885	86+885	Embankment / Fill	41m right	4080007	631202	9	10	7,07,2024
233	SK-86+965-1	86+945	Overpass Bridge (L=46m)	21m right	4080016	631262	5	20	4,07,2024
234	SK-86+965-2	86+965	Overpass Bridge (L=46m)	25m left	4080057	631291	(*)		
235	SK-87+235-1	87+235	Viaduct (End Pier)	11m right	4079949	631545	(*)		
236	SK-87+235-2	87+235	Viaduct (End Pier)	13m left	4079970	631553	(*)		
237	SK-87+270-1	87+270	Viaduct	13m right	4079935	631579	(*)		
238	SK-87+270-2	87+270	Viaduct	13m left	4079956	631588	(*)		
239	SK-87+310-1	87+310	Viaduct	13m right	4079919	631613	(*)		
240	SK-87+310-2 (P)	87+310	Viaduct (Pilot)	13m left	4079940	631622	(*)		
241	SK-87+350	87+355	Viaduct	15m left	4079925	631667	9,5	40,5	14,07,2024
242	SK-87+385-1	87+385	Viaduct	11m right	4079888	631682	11,5	32,3	12,07,2024
243	SK-87+385-2	87+385	Viaduct	12m left	4079909	631692	10,8	35	10,07,2024
244	SK-87+425-1	87+425	Viaduct (Pilot)	12m right	4079870	631715	15,5	30	9,07,2024
245	SK-87+425-2	87+425	Viaduct	12m left	4079891	631726	16,3	25	8,07,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
246	SK-87+460-1	87+460	Viaduct (End Pier)	12m right	4079852	631747	(*)		
247	SK-87+460-2	87+460	Viaduct (End Pier)	12m left	4079873	631758	(*)		
248	SK-87+500	87+500	Overpass Bridge (=48m)	23m right	4079820	631778	13,5	20	15,07,2024
249	SK-87+715	87+715	Railway Bridge	10m left	4079724	631967	(*)		
250	SK-87+775	87+775	Railway Bridge	10m right	4079671	631998	(*)		
251	SK-88+128-1	88+128	Viaduct (End Pier)	12m right	4079426	632252	(*)		
252	SK-88+128-2	88+128	Viaduct (End Pier)	14m left	4079444	632270	(*)		
253	SK-88+170-1	88+170	Viaduct	10m right	4079399	632284	2,1	20	17,07,2024
254	SK-88+170-2	88+170	Viaduct	14m left	4079415	632300	1,9	20	16,07,2024
255	SK-88+212-1	88+212	Viaduct	13m right	4079366	632313	(*)		
256	SK-88+212-2	88+212	Viaduct	16m left	4079387	632333	(*)		
257	SK-88+255-1 (P)	88+255	Viaduct (Pilot)	15.6m right	4079334	632342	(*)		
258	SK-88+255-2	88+255	Viaduct	15.8m left	4079152	632585	1,9	50	2,07,2024
259	SK-88+300-1	88+300	Viaduct	17.3m right	4079303	632371	3,6	46,5	5,07,2024
260	SK-88+300-2	88+300	Viaduct	17.4m left	4079328	632395	3,9	48	4,07,2024
261	SK-88+341-1	88+341	Viaduct	19.9m right	4079270	632401	4,1	50	8,07,2024
262	SK-88+341-2	88+341	Viaduct	21m left	4079299	632430	4,8	51	8,07,2024
263	SK-88+385-1	88+385	Viaduct	20m right	4079241	632431	5,7	54	10,07,2024
264	SK-88+385-2	88+385	Viaduct (Pilot)	21m left	4079270	632459	5,9	50	10,07,2024
265	SK-88+427-1	88+427	Viaduct	19.5m left	4079211	632462	6,1	41,5	12,07,2024
266	SK-88+427-2	88+427	Viaduct	21.6m left	4079241	632491	5,6	37	11,07,2024
267	SK-88+470-1	88+470	Viaduct	21m right	4079180	632492	8,2	37	13,07,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
268	SK-88+470-2	88+470	Viaduct	23m right	4079212	632522	8,8	39	12,07,2024
269	SK-88+513-1	88+513	Viaduct	24m right	4079149	632521	10,5	26	15,07,2024
270	SK-88+513-2	88+513	Viaduct	24m left	4079183	632554	5	29	16,07,2024
271	SK-88+555-1	88+555	Viaduct	19m right	4079122	632555	12,2	25	19,07,2024
272	SK-88+555-2	88+555	Viaduct	24m left	4079152	632585	12,3	22	18,07,2024
273	SK-88+595-1	88+595	Viaduct (End Pier)	24m right	4079089	632582	(*)		
274	SK-88+595-2	88+595	Viaduct (End Pier)	24m left	4079124	632615	(*)		
275	SK-88+673	88+673	Tunnel Entrance Portal (Right)	21m right	4079039	632638	(*)		
276	SK-88+675	88+675	Tunnel Entrance Portal (Left)	21.7m left	4079067	632670	(*)		
277	SK-89+465	89+465	Tunnel Axis	Centerline	4078445	633157	31,2	58	27,07,2024
278	SK-89+543-1	89+543	Tunnel Exit Portal (Right)	24.5m right	4078366	633178	23,2	40	25,07,2024
279	SK-89+543-2	89+543	Tunnel Exit Portal (Left)	26m left	4078393	633221	25,5	37,7	22,07,2024
280	SK-89+600	89+600	Tunnel Exit	Centerline	4078331	633229	14,6	15	23,07,2024
281	SK-90+100-1	90+095	Overpass Bridge (L=52m)	45m right	4077880	633431	8,8	20	6,09,2024
282	SK-90+100-2	90+123	Overpass Bridge (L=52m)	21m left	4077885	633503	6,9	20	5,10,2024
283	SK-90+770	90+770	Service Facility	Centerline	4077310	633799	6,3	10	25,07,2024
284	SK-90+770-1	90+770	Service Facility / Embankment	173m right	4077249	633636	17,3	26,5	26,07,2024
285	SK-91+100	91+100	Overpass Bridge (L=52m)	25m right	4077009	633939	6,1	20	5,10,2024
286	SK-91+530	91+530	Embankment / Fill	Centerline	4076645	634170	10	5,2	24,07,2024
287	SK-92+270	92+270	Cutting / Excavation	51m left	4076037	634585	15,6	30	28,07,2024
288	SK-92+470	92+460	Underpass (9x6)	19.8m left	4075871	634675	8,8	20	5,09,2024
289	SK-92+486	92+486	Underpass (9x6)	31m right	4075817	634653	7	20	4,09,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
290	SK-92+658-1	92+658	Overpass Bridge (L=46m)	19.8m right	4075701	634781	14,5	20	2,09,2024
291	SK-92+658-2	92+658	Overpass Bridge (L=46m)	24.1m left	4075732	634812	13,8	20	3,09,2024
292	SK-92+770	92+770	Embankment / Fill	Centerline	4075637	634880	9,1	10	28,07,2024
293	SK-93+097-1	93+097	Overpass Bridge (L=45m)	24.8m right	4075426	635132	15	20	1,09,2024
294	SK-93+097-2	93+085	Overpass Bridge (L=45m)	15.7m left	4075467	635144	--	25	18,09,2024
295	SK-93+200	93+200	Cutting / Excavation	44m left	4075437	635250	19,2	21	29,07,2024
296	SK-93+520	93+520	Hydraulic Bridge	11.3m left	4075280	635530	(*)		
297	SK-93+552	93+552	Hydraulic Bridge	9.1m right	4075251	635554	(*)		
298	SK-93+585	93+585	Hydraulic Bridge	12.6m right	4075261	635590	(*)		
299	SK-93+615	93+615	Hydraulic Bridge	8.5m right	4075231	635616	12,5	20	2,08,2024
300	SK-93+925	93+925	Overpass Bridge (L=45m)	29.1m left	4075190	635922	--	20	31,08,2024
301	SK-94+315-1	94+315	Viaduct (End Pier)	12m right	4075054	636289	(*)		
302	SK-94+315-2	94+315	Viaduct (End Pier)	12m left	4075077	636296	(*)		
303	SK-94+355-1	93+355	Viaduct	12m right	4075042	636329	(*)		
304	SK-94+355-2	93+355	Viaduct	13.7m left	4075066	636337	(*)		
305	SK-94+400	94+400	Viaduct	13.9m right	4075027	636369	(*)		
306	SK-94+410-1	94+407	Viaduct (Pilot)	17.2m left	4075053	636387	18,4	30	2,08,2024
307	SK-94+410-2	94+407	Viaduct	39.6m left	4075075	636391	19,3	20	3,08,2024
308	SK-94+440	94+440	Viaduct	10.7m right	4075016	636409	(*)		
309	SK-94+450-1	94+446	Viaduct	18m left	4075041	636425	16,5	20	2,08,2024
310	SK-94+450-2	94+446	Viaduct	42m left	4075063	636433	17,8	20	1,08,2024
311	SK-94+470	94+480	Viaduct	12m right	4075000	636448	(*)		

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
312	SK-94+490-1	94+487	Viaduct (End Pier)	12m left	4075030	636464	19,3	20	1,08,2024
313	SK-94+490-2	94+490	Viaduct (End Pier)	45m left	4075052	636471	20,1	26	3,08,2024
314	SK-94+530	94+527	Overpass Bridge (L=44m)	20m right	4074976	636488	9,9	20	17,10,2024
315	SK-94+541-1	94+537	Overpass Bridge (L=44m)	16.5m left	4075007	636509	11,7	20	31,08,2024
316	SK-94+675	94+675	Cutting / Excavation	61.7m left	4074991	636656	(*)		
317	SK-94+955	94+960	Embankment / Fill	Centerline	4074790	636874	(*)		
318	SK-95+440	95+418	Overpass Bridge (L=48m)	104.2m left	4074583	637298	9,3	20	30,08,2024
319	SK-95+455	94+452	Overpass Bridge (L=48m)	56.7m left	4074536	637279	12,5	20	18,10,2024
320	SK-95+460	95+435	Overpass Bridge (L=48m)	9.6m right	4074473	637250	7	20	30,08,2024
321	SK-95+635	95+605	Cutting / Excavation	Centerline	4074383	637374	21,3	28	8,08,2024
322	SK-95+700	95+704	Cutting / Excavation	59.1m right	4074272	637403	11	27	10,10,2024
323	SK-96+200-1	96+200	Viaduct (End Pier)	12m right	4073978	637805	(*)		
324	SK-96+200-2	96+200	Viaduct (End Pier)	12m left	4073996	637822	(*)		
325	SK-96+275-1	96+275	Viaduct	12m right	4073923	637864	(*)		
326	SK-96+275-2	96+275	Viaduct	12m left	4073939	637879	(*)		
327	SK-96+405-1 (P)	96+405	Viaduct (Pilot)	12m right	4073833	637957	(*)		
328	SK-96+405-2	96+405	Viaduct	12m left	4073848	637972	(*)		
329	SK-96+535-1	96+535	Viaduct	12m right	4073739	638047	(*)		
330	SK-96+535-2	96+535	Viaduct	12m left	4073757	638065	(*)		
331	SK-96+615-1	96+615	Viaduct (End Pier)	13m right	4073682	638103	(*)		
332	SK-96+615-2	96+615	Viaduct (End Pier)	12m left	4073699	638120	(*)		
333	SK-96+860-1	96+860	Viaduct (End Pier)	13m right	4073504	638267	(*)		

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
334	SK-96+860-2	96+860	Viaduct (End Pier)	12m left	4073518	638284	(*)		
335	SK-96+900-1	96+900	Viaduct	13m right	4073471	638293	(*)		
336	SK-96+900-2	96+900	Viaduct	12m left	4073486	638310	(*)		
337	SK-96+945-1 (P)	96+945	Viaduct (Pilot)	13m right	4073439	638321	(*)		
338	SK-96+945-2	96+945	Viaduct	12m left	4073454	638337	(*)		
339	SK-96+985-1	96+985	Viaduct	13m right	4073407	638348	(*)		
340	SK-96+985-2	96+985	Viaduct	12m left	4073423	638366	(*)		
341	SK-97+030-1	97+030	Viaduct (End Pier)	13m right	4073374	638373	(*)		
342	SK-97+030-2	97+030	Viaduct (End Pier)	12m left	4073388	638391	(*)		
343	SK-97+182	97+150	Embankment / Fill	7m left	4073292	638466	9,5	10	9,08,2024
344	SK-97+616-1	97+580	Overpass Bridge (L=74m)	37m left	4072918	638687	9	20	29,08,2024
345	SK-97+616-2	97+555	Overpass Bridge (L=74m)	44m left	4072987	638740	10,5	20	29,08,2024
346	SK-97+783-1	97+750	Viaduct (End Pier)	12m right	4072796	638805	(*)		
347	SK-97+783-2	97+750	Viaduct (End Pier)	11m left	4072809	638822	(*)		
348	SK-97+823-1	97+790	Viaduct	11m right	4072766	638829	7,9	20	5,08,2024
349	SK-97+823-2	97+790	Viaduct	12m left	4072778	638846	7,4	20	5,08,2024
350	SK-97+868-1	97+835	Viaduct (Pilot)	7m left	4072731	638858	9,5	30	7,08,2024
351	SK-97+868-2	97+835	Viaduct	16m left	4072743	638875	12,2	20	6,08,2024
352	SK-97+910-1	97+875	Viaduct	6m right	4072696	638882	5,3	20	7,08,2024
353	SK-97+910-2	97+875	Viaduct	16.5m left	4072708	638899	5,6	20	8,08,2024
354	SK-97+952-1	97+920	Viaduct	5m right	4072661	638907	(*)		
355	SK-97+952-2	97+920	Viaduct	17m right	4072674	638924	(*)		

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
356	SK-98+000-1	97+960	Viaduct (End Pier)	5m right	4072626	638930	(*)		
357	SK-98+000-2	97+960	Viaduct (End Pier)	17m left	4072638	638947	(*)		
358	SK-98+515-1	98+483	Viaduct (End Pier)	6m right	4072198	639229	(*)		
359	SK-98+515-2	98+483	Viaduct (End Pier)	16m left	4072211	639248	(*)		
360	SK-98+605	98+574	Viaduct	18.6m left	4072139	639301	10,9	20	11,08,2024
361	SK-98+755-1	97+722	Viaduct (Pilot)	5m right	4072003	639367	10,7	30	10,08,2024
362	SK-98+755-2	98+722	Viaduct	19.5m left	4072017	639387	9,8	30	9,08,2024
363	SK-98+900-1	98+870	Viaduct	5m right	4071881	639453	(*)		
364	SK-98+900-2	98+870	Viaduct	20m left	4071896	639473	(*)		
365	SK-99+000-1	98+963	Viaduct (End Pier)	4m right	4071806	639506	(*)		
366	SK-99+000-2	98+963	Viaduct (End Pier)	19m left	4071820	639524	(*)		
367	SK-100+055	100+020	Cutting / Excavation	53m left	4071064	640259	15,6	19	10,08,2024
368	SK-100+171-1	100+140	Overpass Bridge	30m right	4070922	640284	(*)		
369	SK-100+171-2	100+140	Overpass Bridge	33m left	4070967	640328	(*)		
370	SK-100+752	100+726	Bridge	26m left	4070540	640730	14,5	20	6,10,2024
371	SK-101+325	101+290	Cutting / Excavation	30m left	4070139	641133	(*)		
372	SK-102+482	102+450	Overpass Bridge	25m right	4069179	641787	--	20	23,09,2024
373	SK-103+922	103+890	Underpass	29m left	4068081	642706	7,9	20	26,08,2024
374	SK-103+946	103+915	Underpass	32m right	4068018	642685	8,8	23	25,08,2024
375	SK-104+125-1	104+092	Viaduct	12m right	4067925	642840	(*)		
376	SK-104+125-2	104+092	Viaduct	12m left	4067944	642853	(*)		
377	SK-104+165-1	104+135	Viaduct	12m right	4067902	642874	1,9	57	21,08,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
378	SK-104+165-2	104+135	Viaduct	12m left	4067920	642887	1,8	51	24,08,2024
379	SK-104+207-1	104+175	Viaduct (Pilot)	12m right	4067877	636608	5,8	43	15,08,2024
380	SK-104+207-2	104+175	Viaduct	12m left	4067896	636621	5,2	41	17,08,2024
381	SK-104+245-1	104+216	Viaduct (End Pier)	12m right	4067854	636642	(*)		
382	SK-104+245-2	104+216	Viaduct (End Pier)	12m left	4067873	636655	(*)		
383	SK-104+680	104+645	Cutting / Excavation	71m left	4067752	643369	26,8	50	31,08,2024
384	SK-104+824	104+795	Underpass	20m right	4067598	643461	21,5	30	28,08,2024
385	SK-104+850	104+820	Underpass	Centerline	4067608	643494	11,5	20	29,08,2024
386	SK-104+887	104+855	Underpass	26m left	4067621	643537	15,5	20	28,08,2024
387	SK-105+032-1	105+000	Hydraulic Bridge	12m right	4067528	643657	12,6	20	5,08,2024
388	SK-105+032-2	105+000	Hydraulic Bridge	12m left	4067550	643666	11,7	46	3,08,2024
389	SK-105+062-1	105+032	Hydraulic Bridge	12m right	4067518	643685	8,4	44,5	7,08,2024
390	SK-105+062-2	105+032	Hydraulic Bridge	12m left	4067540	643694	9,4	20	5,08,2024
391	SK-105+100-1	105+072	Hydraulic Bridge	12m right	4067503	643724	6,7	42	8,08,2024
392	SK-105+100-2	105+072	Hydraulic Bridge	12m left	4067525	643733	6,2	41,5	9,08,2024
393	SK-105+145-1	105+115	Hydraulic Bridge	12m right	4067487	643763	3,6	50,5	15,08,2024
394	SK-105+145-2	105+115	Hydraulic Bridge (Pilot)	12m left	4067509	643771	3,5	41,5	11,08,2024
395	SK-105+186-1	105+156	Hydraulic Bridge	12m right	4067472	643801	4,3	20	5,08,2024
396	SK-105+186-2	105+156	Hydraulic Bridge	12m left	4067494	643810	4,1	50	13,08,2024
397	SK-105+228-1	105+196	Hydraulic Bridge	12m right	4067456	643839	4,5	55	3,08,2024
398	SK-105+228-2	105+196	Hydraulic Bridge	12m left	4067478	643848	3,9	30	5,08,2024
399	SK-105+270-1	105+238	Hydraulic Bridge	12m right	4067440	643877	6,3	30	23,08,2024

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
400	SK-105+270-2	105+238	Hydraulic Bridge (Pilot)	12m left	4067462	643887	6,5	53,5	23,08,2024
401	SK-105+310-1	105+280	Hydraulic Bridge	12m right	4067424	643916	11,5	55	17,08,2024
402	SK-105+310-2	105+280	Hydraulic Bridge	12m left	4067446	643925	9,6	56	21,08,2024
403	SK-105+352-1	105+320	Hydraulic Bridge	12m right	4067407	643954	11,3	52	24,08,2024
404	SK-105+352-2	105+320	Hydraulic Bridge	12m left	4067366	643963	11,5	52	10,08,2024
405	SK-105+394-1	105+362	Hydraulic Bridge	12m right	4067389	643991	14,9	43,5	6,08,2024
406	SK-105+394-2	105+362	Hydraulic Bridge	12m left	4067410	644000	15,5	55,5	8,08,2024
407	SK-105+878	105+847	Overpass	24m right	4067160	644410	11,3	20	11,08,2024
408	SK-105+893	105+862	Overpass	50m left	4067212	644465	12,2	20	12,08,2024
409	SK-106+728	106+695	Overpass Bridge	25m right	4066566	645002	(*)		
410	SK-106+750	106+718	Overpass Bridge	22m left	4066579	645052	(*)		
411	SK-107+555-1	105+525	Underpass (9x6)	38m right	4065975	645594	(*)		
412	SK-107+555-2	105+525	Underpass (9x6)	16m left	4066020	645624	(*)		
413	SK-107+812	107+780	Culvert (4x4)	Centerline	4065855	645820	(*)		
414	SK-109+125	109+090	Underpass (7x5)	41m right	4065288	647002	(*)		
415	SK-109+140	109+105	Underpass (7x5)	36m left	4065356	647041	(*)		
416	SK-109+175	109+140	Embankment + Lithology + Culvert	Centerline	4065311	647062	(*)		
417	SK-109+522	109+488	Underpass (7x5)	47m right	4065145	647371	(*)		
418	SK-110+475	110+442	Embankment / Fill	Centerline	4064913	648298	(*)		
419	SK-110+857-1	110+823	Overpass Bridge (L=46m)	23m right	4064847	648676	(*)		
420	SK-110+857-2	110+823	Overpass Bridge (L=46m)	23m left	4064892	648678	(*)		
421	SK-111+480-1	111+447	Underpass (7x5)	55m right	4064753	649287	(*)		

No	Drilling No	Km	Drilling Objective	Drilling Location	Coordinate (X)	Coordinate (Y)	Groundwater Level (m)	Depth	Date
422	SK-111+480-2	111+447	Underpass (7x5)	36m left	4064842	649303	(*)		
423	SK-111+640	111+608	Embankment / Fill	Centerline	4064775	649453	(*)		
424	SK-112+165	112+130	Underpass (12x6)	28m left	4064649	649963	(*)		
425	SK-112+665	112+631	Underpass (9x6)	18m left	4064502	650439	(*)		
426	SK-112+705	112+671	Underpass (9x6)	40m right	4064436	650465	(*)		
427	SK-113+815	113+780	Culvert (5x5)	Centerline	4064308	651570	(*)		
428	SK-114+000	113+968	Underpass (9x6)	32m right	4064264	651755	(*)		
429	SK-114+030	114+000	Underpass (9x6)	25m left	4064318	651788	(*)		

(*) Due to reasons such as permits, expropriation, land conditions, etc., the point could not be reached and drilling will be carried out during the construction phase. (Geological–Geotechnical Survey Report,2024)

According to the Geological - Geotechnical Investigation Report, there is no potential to encounter trapped water during excavations along the project route as there will be no passage through the porous - hollow karstic Antalya travertines, which have the potential to transport water.

Terrain models have been created based on topographic structure, geological and geomorphological features and project criteria so as not to require stability analysis for slits not exceeding 15 meters in height and embankments not exceeding 8 meters in height. In addition, in cases where the depth of the fill does not exceed 5 meters, in accordance with the General Directorate of Highways' Internal Circular dated March 09, 2009 and numbered 2007/73, the fill slope ratios are determined as follows:

Depth of Fill (H)	Slope Ratio (h/v)
0.00 m < H ≤ 1.50 m	4 / 1
1.50 m < H ≤ 3.00 m	3 / 1
3.00 m < H ≤ 5.00 m	2 / 1

For fills of 8 meters and above, the following safety coefficients must be provided in the slope stability analyses:

- Short term: G.S. ≥ 1.30
- Long term (static): G.S. ≥ 1.50
- Long term (earthquake): G.S. ≥ 1.10

Stability analyses to be performed in embankment areas, bearing capacity and settlement behavior of embankments and culverts will be evaluated in accordance with national and international standards and these analyses will be presented in the Route Geotechnical Report to be prepared by the company preparing the Geological - Geotechnical Investigation Report.

Acording to the Geological–Geotechnical Survey Report, a total of five tunnels are located along the project route. Detailed geological and geotechnical evaluations for these tunnels, including the entrance and exit portal areas, are planned to be addressed in the Portal and Tunnel Geological–Geotechnical Investigation Reports and Tunnel Calculation Reports, which will be prepared at a later stage by the contractor. The excavation classifications and slope angles presented in the current report pertain solely to the general alignment and do not include the tunnel portals. Slope design and geotechnical assessments for the portal zones will be carried out separately by the contractor in the relevant specialized reports.

VI.2.3.5. Structural Geology and Seismicity

Türkiye is located in one of the most actively deforming regions in the world. The tectonic in and around Türkiye depends on relative motions between the African, the Aegean, the Arabian, the Anatolian, the Black Sea, and the Eurasian plates. Neotectonics in Türkiye is mainly governed by the following three tectonic elements (*Kasapoğlu and Toksöz, 1983; Bozkurt, 2001; from Bayrak et al. 2011*):

- A convergent plate boundary where the African Plate to the south is subducting beneath the Anatolian Plate to the north
- The dextral North Anatolian Fault Zone
- The sinistral East Anatolian Fault Zone

Western Türkiye is located in one of the most seismically active regions in the world, owing to the fact that this region is located close to three large plate boundaries that are in constant movement (Taymaz et al., 1991). The kinematics of the regional deformation of the Aegean-Anatolian region is controlled by three critical factors (
Figure VI.24). These are the westward motion of the Anatolian microplate relative to the Eurasian plate, the collision between northwest Greece-Albania and the Apulia-Adriatic platform, and the presence of the Hellenic subduction zone to the south of the Aegean province (Taymaz et al., 1991).

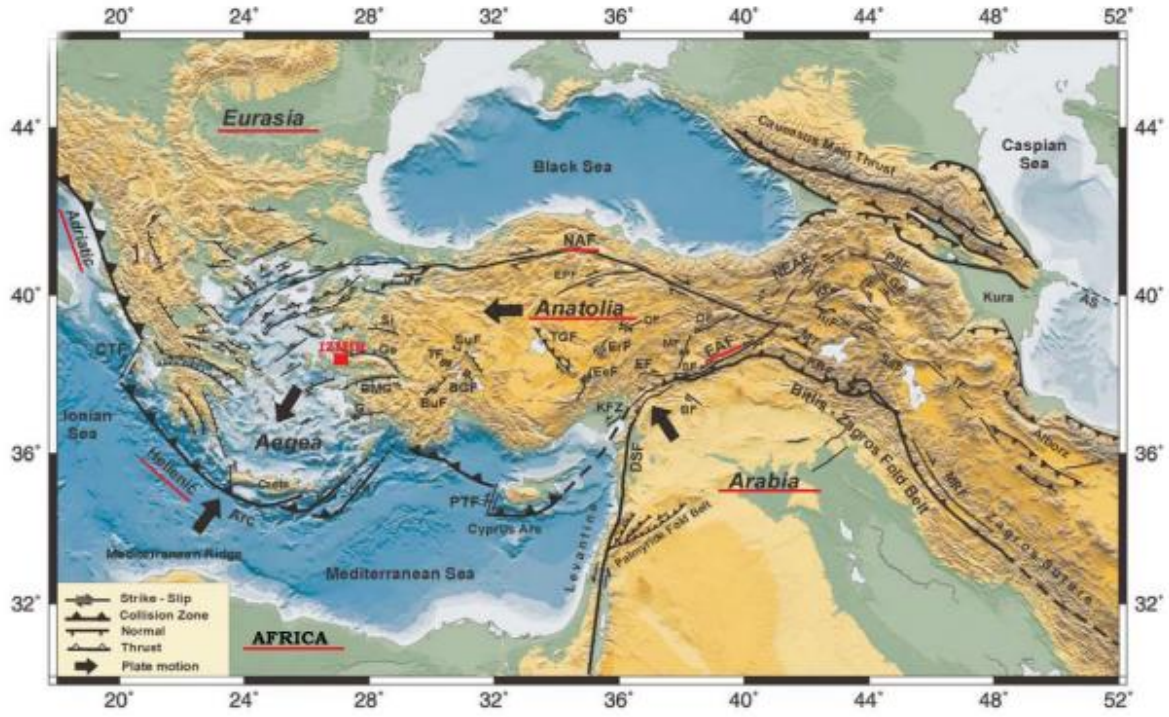


Figure VI.24 The eastern Mediterranean region, including faults and relative motions between plates/microplates

The westward motion of the Anatolian microplate is related to a collision in eastern parts of Türkiye and the Caucasus between the Arabian plate in the southeast and the Eurasian plate in the northwest. This motion is accommodated along two large well known strike-slip faults, namely “North Anatolian Fault Zone (NAFZ)” and “East Anatolian Fault Zone (EAFZ)”, which has right lateral and left lateral displacement, respectively (Taymaz et al., 1991). The collision between the Arabian and the Eurasian plate causes a crustal thickening, and the effect of the crustal thickening provides a buoyancy force that drives the Anatolian plate westwards, a process which has started about 12Myr ago back in the mid-Miocene (Taymaz et al., 1991).

The collision of the Arabian plate with the Eurasian plate is still active. This is causing the accumulation of high topography in eastern Türkiye and the Caucasus, driving the westward motion of the Anatolian and the Aegean plate. Continental materials are still being pushed over the oceanic crust of the eastern Mediterranean, forming the Hellenic subduction zone and the subducting slab beneath the Hellenic trench, thus maintain the present extension seen in the Aegean area (Taymaz et al., 1991). This extension is oriented NNE-SSW direction.

The Antalya nappes are allochthonous masses that formed during the Late Campanian – Maastrichtian as a result of oceanic crust being thrust over continental crust. During the Danian period,

these nappes were situated to the east and northeast of the Beydağları autochthon and to the south of the Anamas – Akseki autochthon. The potential metamorphic counterpart of the Antalya nappes, the Alanya nappe, underwent metamorphism during the Late Campanian – Maastrichtian. During the Maastrichtian, the Alanya nappe tectonically overthrust the Antalya nappes. Additionally, during the Danian, the Alanya nappe, along with the Antalya nappes, was positioned along the southern margin of the Anamas – Akseki autochthon.

In the Eocene, the northward migration of the Beyşehir – Hoyran – Hadim nappes led to their emplacement over the Anamas – Akseki autochthon. This emplacement, driven by north-south compressional forces, resulted in the Antalya nappes and the Alanya nappe being positioned along the southern margin of the Anamas – Akseki autochthon. However, the north-derived Beyşehir – Hoyran – Hadim nappes locally overstepped the Anamas – Akseki autochthon, overriding the southern Antalya nappes and the Alanya nappe.

During the Middle Miocene transgression, the region was affected by north-south compressional forces, leading to the folding of Miocene sediments towards the end of the Miocene. Subsequently, during the Pliocene and Quaternary periods, the region experienced faulting events.

The locations of the epicenters of historical earthquakes that occurred around the route between 1900-2024 period, with a magnitude greater than 4 are summarized in Table VI.20, and their locations are shown in
Figure VI.25.

Table VI.20. M ≥ 4 Earthquakes in the Region

No	Date	Longitude	Latitude	Magnitude
1	30.04.2021	31.59	36.55	4.0
2	28.09.2018	30.44	37.20	4.0
3	22.05.2011	31.40	36.33	4.0
4	19.10.2008	30.39	37.10	4.0
5	9.02.1995	32.00	37.00	4.0
6	5.07.1990	31.00	37.00	4.0
7	25.12.2013	31.04	36.99	4.1
8	27.06.2013	31.24	36.75	4.1
9	7.12.2012	31.58	36.68	4.1
10	24.09.1990	30.38	37.12	4.2
11	9.07.2016	30.46	36.97	4.3
12	15.05.2013	30.50	36.98	4.3
13	26.10.2012	31.46	36.51	4.3
14	25.07.2010	30.35	36.98	4.3
15	13.04.2018	31.96	37.09	4.4
16	29.09.2017	30.67	37.04	4.4
17	29.10.2010	30.68	37.16	4.4
18	22.09.2009	30.79	36.54	4.4

No	Date	Longitude	Latitude	Magnitude
19	2.05.2003	31.45	37.16	4.5
20	11.03.1991	30.83	37.08	4.5
21	03.01.2025	31.99	36.53	4.5
22	3.05.2003	31.49	36.84	4.6
23	9.04.2003	30.94	36.72	4.6
24	10.09.2018	30.62	37.20	4.8
25	13.04.2018	31.95	37.09	4.8
26	8.12.2013	31.26	36.69	5.0
27	26.03.1992	31.00	37.00	5.0

Source: www.deprem.gov.tr

According to the earthquake hazard map of Türkiye prepared by the Disaster and Emergency Management Presidency, the ground acceleration velocity (PGA 475) of the project varies between 0.216g and 0.237g. The ground velocity (PGV 475) of the Project varies between 9.1 - 10.4 cm/sec. The earthquake hazard map of Türkiye is presented in

Figure VI.26, and the active fault map of the Motorway route and its general region is given in Figure VI.27.

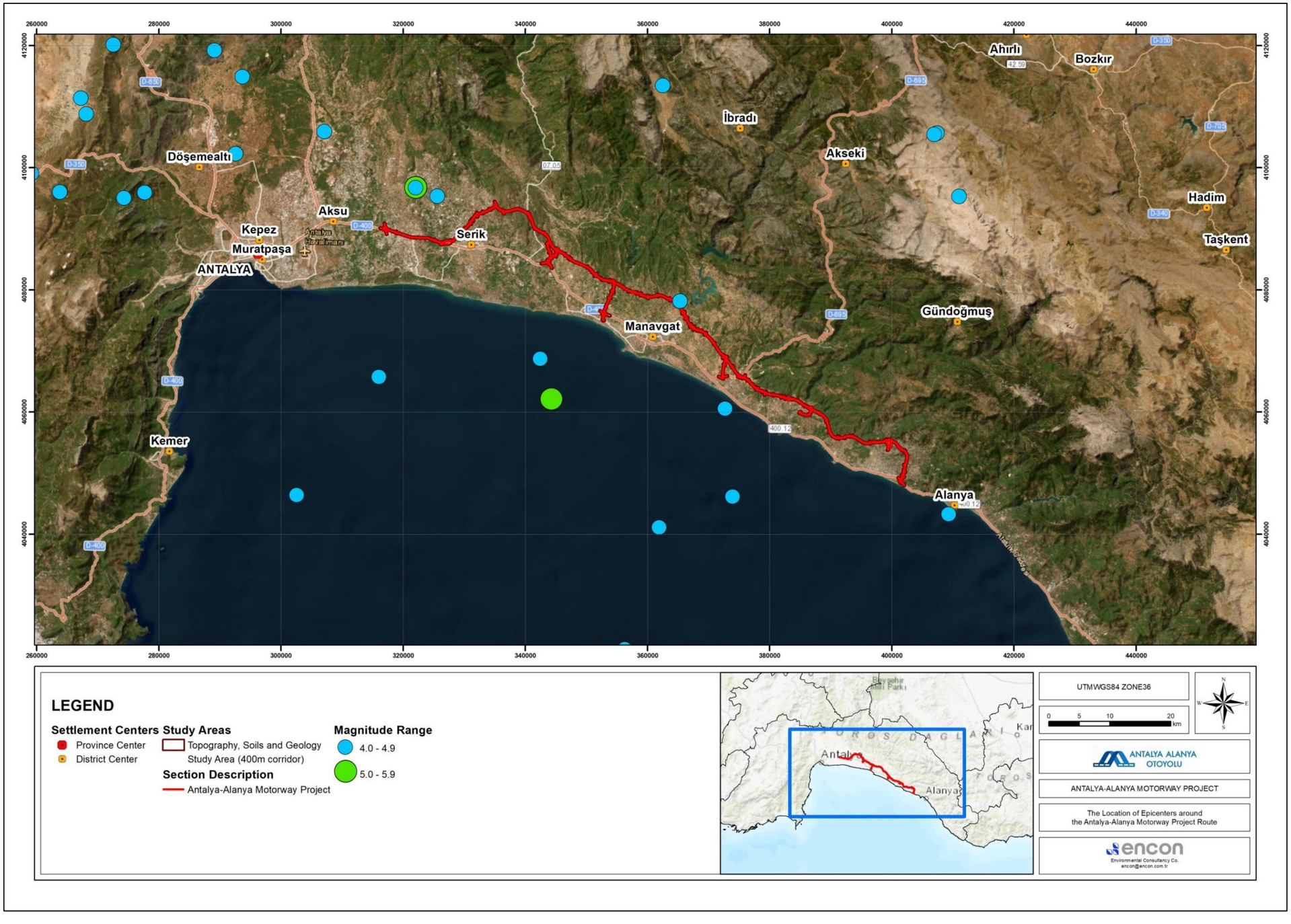


Figure VI.25 Location of Epicenters around the Project

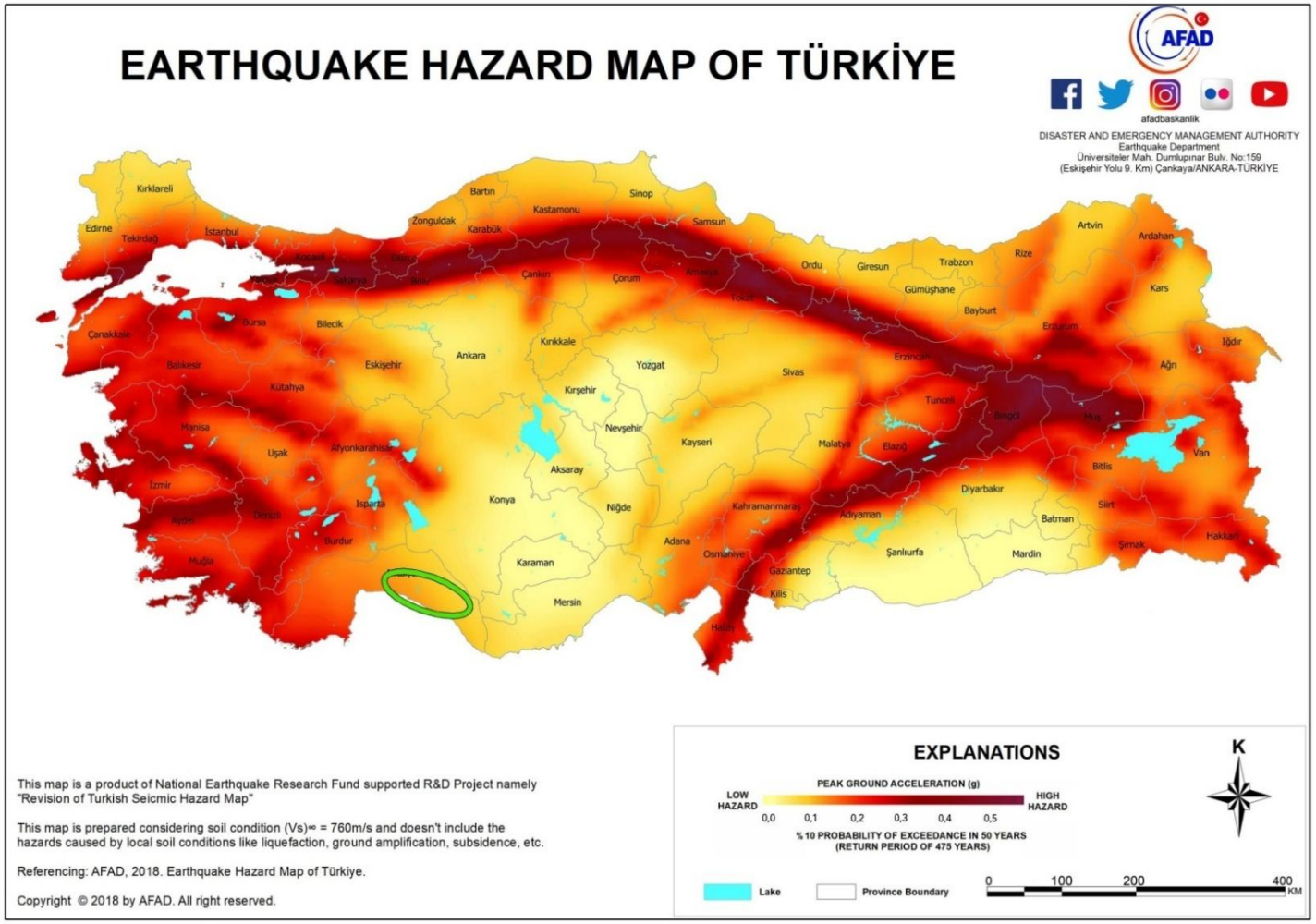


Figure VI.26 Earthquake Hazard Map of Türkiye

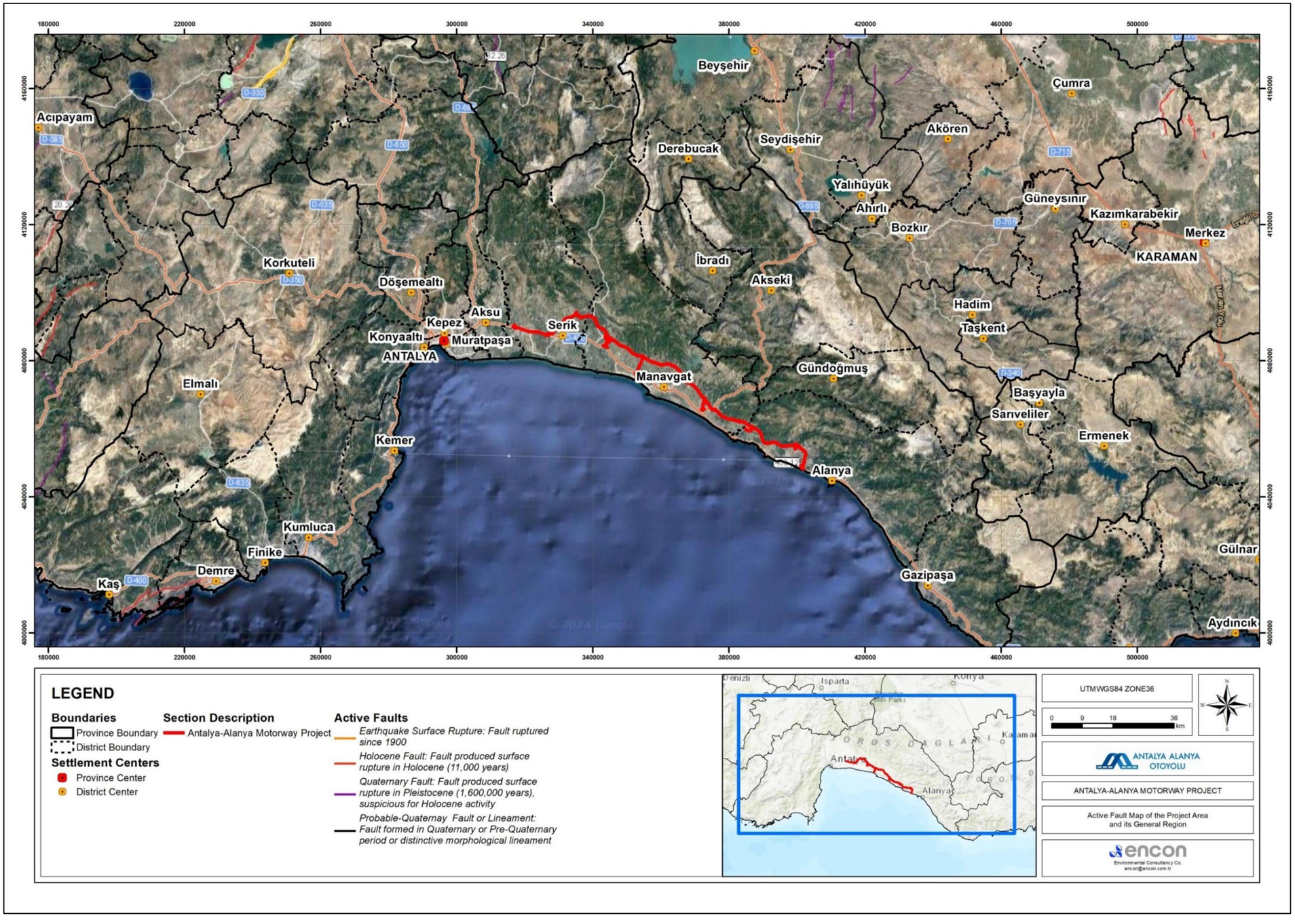


Figure VI.27 Active Fault Map of the Project Area and its General Region

VI.3. Potential Impacts

Direct impacts on topography, soil, and geotechnical risks will be a concern mainly during the land preparation and construction phase of the Project since construction works involves significant interaction with the environmental components. During the operation phase, while direct and extensive physical interaction with the environmental components, including soil, will be less, there is still potential risk of soil contamination due to accidents and geotechnical and seismic hazards. This potential risk is one of the primary concerns for the operation phase. Assessment of the impacts for the land preparation and construction, and operation phases in consideration of the baseline conditions is provided in the following subsections.

VI.3.1. Land Preparation and Construction Phase

The Project will involve substantial earth-moving activities and civil works in the land preparation and construction phase. These activities, including topsoil stripping activities, cut and fill operations, and other construction works, may impact existing soil conditions if not properly managed. Additionally, geotechnical risks along the Motorway route have to be accurately identified to ensure the safety and stability of the large structures to be constructed. Mitigation measures will be taken in order to minimize the risk of erosion, geotechnical risks, and risk of soil contamination.

VI.3.1.1. Impacts on Topographical Conditions

Topographical conditions are crucial in the design and construction of a motorway, influencing aspects such as cut and fill operations, road alignment (including curves), and the design of engineering structures (e.g., viaducts, excavations, embankments). Measures to address geotechnical risks, such as landslides, erosion, and rockfalls are directly related to topography. In addition, operation and maintenance costs are also affected by the topographical conditions of the selected route.

Excavation (cut) and embankment (filling) operations required for the construction works will create elevation differences along the selected motorway route, leading to noticeable and permanent changes in the topography of the Project area. Moreover, material extraction activities at quarry sites will contribute to these local topographical alterations. Within this respect, the excavation and fill volumes with 3 km intervals are shown in Table VI.21.

Table VI.21 Excavation and Fill Volumes for the Motorway

Start	Finish	Cut (m^3)	Fill (m^3)	Balance (Cut – Fill) (m^3)	Topsoil Cut to Depot
52+000,00	55+000,00	1.547.104,82	4.137.434,28	-2.590.329,46	849.762,16
55+000,00	58+000,00	338.821,20	220.828,88	117.992,32	11.995,33
58+000,00	61+000,00	2.111.296,45	2.288.620,64	-177.324,19	82.150,74
61+000,00	64+000,00	211.361,99	599.097,37	-387.735,38	60.060,04
64+000,00	67+000,00	4.726.931,87	3.979.674,76	747.257,11	387.898,17
67+000,00	70+000,00	651.038,77	807.847,80	-156.809,03	106.995,72
70+000,00	73+000,00	1.042.728,52	253.586,00	789.142,52	53.882,84
73+000,00	76+000,00	770.114,90	1.762.987,78	-992.872,89	95.800,74

Start	Finish	Cut (m^3)	Fill (m^3)	Balance (Cut – Fill) (m^3)	Topsoil Cut to Depot
76+000,00	79+000,00	3.112.672,16	3.071.774,94	40.897,22	334.517,90
79+000,00	82+000,00	746.642,11	587.635,50	159.006,61	143.897,42
82+000,00	85+000,00	937.645,33	687.423,16	250.222,17	111.238,75
85+000,00	88+000,00	372.179,86	145.428,98	226.750,88	33.148,49
88+000,00	91+000,00	617.152,90	712.410,58	-95.257,68	71.726,03
91+000,00	94+000,00	1.021.995,09	1.011.023,90	10.971,19	83.657,41
94+000,00	97+000,00	765.710,31	537.158,19	228.552,12	50.236,35
97+000,00	100+000,00	1.915.850,33	199.767,47	1.716.082,86	51.168,41
100+000,00	103+000,00	2.021.521,51	3.021.382,67	-999.861,15	240.889,03
103+000,00	106+000,00	1.064.794,29	517.736,56	547.057,72	92.766,32
106+000,00	109+000,00	553.597,99	398.752,97	154.845,01	72.484,50
109+000,00	112+000,00	653.252,01	1.654.240,00	-1.000.987,99	87.360,42
112+000,00	115+000,00	1.936.005,64	1.580.818,22	355.187,42	137.566,35
115+000,00	118+000,00	1.561.903,14	2.449.166,09	-887.262,95	249.809,00
118+000,00	121+000,00	2.120.651,82	1.255.933,32	864.718,50	152.378,76
121+000,00	124+000,00	2.454.907,26	1.173.619,02	1.281.288,24	102.389,14
124+000,00	127+000,00	1.179.184,34	2.075.598,10	-896.413,76	109.327,95
127+000,00	130+000,00	939.658,72	411.916,54	527.742,18	26.949,67
130+000,00	133+000,00	1.295.865,85	1.566.901,76	-271.035,91	70.822,93
133+000,00	136+000,00	2.448.153,13	2.502.177,94	-54.024,81	122.571,82
136+000,00	139+000,00	2.480.252,44	1.626.973,13	853.279,31	64.301,78
139+000,00	142+000,00	2.243.280,40	1.053.655,67	1.189.624,73	81.631,34
TOTAL		**43.842.275,14**	**42.291.572,25**	**1.550.702,89**	**4.139.385,50**

VI.3.1.2. Impacts on Soil Environment

Potential impacts of the land preparation and construction activities on the soil environment may include soil disturbance (e.g., loss of fertile top layer, mixing of soil layers and types, soil compaction, etc.) due to topsoil stripping, cut and fill operations, construction of road structures and extraction of construction materials at the quarry sites; soil erosion and soil contamination due to unexpected leakages or spills. Further evaluation of the potential impacts is provided in the following paragraphs.

Soil Disturbance due to Earthworks, Construction and Materials Extraction

Soil disturbance will occur across all sites where topsoil stripping, excavation, construction activities, including operation of heavy machinery operations, and materials extraction activities take place.

<u>Topsoil Stripping</u>

Prior to the commencement of construction activities, topsoil corresponding to the footprint of the Project components (road body, excavation and embankment sites, engineering structures, quarries etc.) will stripped to a sufficient depth, which is anticipated to be about 20-30 cm depending on local soil conditions.

The land-use characteristics along the expropriation area were determined based on the CORINE 2018 database. Since construction campsites have already been established, these sites have not been included in the assessment. Also, the quarries are not included in the calculations.

Without proper management, topsoil along the Motorway route could be lost due to erosion, mixing with coarse soils or contaminated soils during the land preparation and construction phase. Thus, topsoil management measures have to be applied throughout the Project, as described in the following subsections.

Cut and Fill Operations

Depending on the topographical conditions, cut and fill works will be carried out along the Motorway route and at the foundations/portals of the engineering structures. Planned excavation works in this scope are summarized below:

- Excavations along the Motorway route to develop road body;
- Excavations to remove weak soils (soils with poor static properties) beneath the road base;
- Excavations at material borrow pits to provide fill material;
- Excavations to prepare foundations for engineering and drainage structures.

Excavation and fill volumes have been given previous chapters. Depending on the quality and quantity of the excavated materials, they will be used as fill materials when suitable.

The Project is anticipated to result in the removal of vegetative cover along its 84 km main route, 33.8 km connection routes, and also at quarries, borrow pits, and excavated material storage sites. The earthworks and construction activities will be conducted within the expropriation corridor, which will have a width of 55 to 450 m, but the direct physical interaction with soils will occur at the footprint of the Project components (i.e., road body, portals, and foundations of engineering structures, etc.). The potential impacts of soil erosion on the receptors/resources will vary depending on existing exposure levels. The Table VI.6 presents the sensitivity of the Project area in terms of soil erosion impact. Within the study area, approximately 57% (3,933.2 ha) of the study corridor corresponds to soils with severe erosion levels (Level 3). This is followed by none or very low erosion level (Level 1), which accounts for about 25% (1,691.8 ha) of the study corridor. Soils with very severe erosion levels (Level 4) occur in about 2% of the study corridor. Soils with moderate erosion levels (Level 2) along the study corridor account for approximately 15% of the area. The amount of soils that will be mobilized will depend on the construction techniques.

Soil Contamination

Soil contamination may occur in several ways during the land preparation and construction phase (e.g., construction and materials extraction works) of the Project as described by Joint Assistance to Support Projects in European Regions (*JASPERS, 2010*) in the Sectoral EIA Guideline for motorway and Road Construction Projects. This may contribute to any historical contamination present at the

works sites or deposition of pollutant substances (SO_2, NO_x, and heavy metals) that occur by means of rain and snowfall. Potential sources of soil contamination for the Project, for which mitigation measures will be developed and taken, are listed below (*JASPERS, 2010*):

- Spreading on and infiltration of pollutant substances into the soil as a result of uncontrolled or accidental discharges, spills or leaks of hydro-carbons (oils, lubricants, fuels, dyes, solvents) along the Motorway construction corridor (i.e., from construction machinery) and at work sites including asphalt plants, concrete plants, etc. during transfer, mixing, storage or use of substances;
- Deposition of dust, possibly contaminated with other air pollutants, resulting from earthworks, loading, and unloading of raw materials, construction traffic, asphalt plants, concrete plants, etc.;
- Spillage/leakage from sewerage network and the infiltration of water loaded with binders, cement mixtures, and suspensions from concrete plants platforms or other construction locations;
- Infiltration of leachate from uncontrolled deposits of wastes and construction materials.

Due to the unpredictable nature of contamination events, it is not possible to accurately estimate the amount and frequency of accidental spills or leakage of hazardous substances. However, such incidents are expected to occur only occasionally. Immediate response measures will be implemented to ensure that any spill or leakage is contained before reaching significant levels. Additionally, the Project does not involve the use of substantial quantities of hazardous materials, which further limits the potential magnitude of any single spill or leakage event.

Contaminated Land

Land is considered contaminated when it contains concentrations of hazardous substances or oil above background or naturally occurring levels due to historical activities. Contaminated land mapping poses a risk to the health of the construction workforce and the ecology. It may also impose liabilities (e.g., remediation costs, damage to the business reputation and/or business-community relations) on the owner planning activities at such sites (IFC, April 2007).

Some of the Project components (campsites, storage areas etc.) were or will be established in formerly degraded areas and/or close proximity to settlements. As a result, these locations may contain contaminated land. Furthermore, in the land preparation and construction phase, soil remediation efforts and/or the removal of existing layers of soils, particularly in disturbed areas, are being considered to ensure geotechnical stability during construction. Consequently, addressing the treatment of contaminated soils may be an important issue to avoid interaction of contaminated and uncontaminated land through transport or release of contaminants.

VI.3.1.3. Geological and Geotechnical Risks

The geotechnical and geological investigations of the baseline are conducted to ensure the requirements for stability of the road during the construction and operation phase and that the route selection process reflects these characteristics. Geotechnical assessments are also required to assess the stability, settlement, and integrity of the designed structures. Thus, the significance of instability and erosion potential of soils is first and foremost defined by the various applicable minimum

design factors and the corresponding geological and geotechnical properties required to achieve the design standards.

Stability analyses to be performed in embankment areas, bearing capacity and settlement behavior of embankments and culverts will be evaluated in accordance with national and international standards and these analyses will be presented in the Route Geotechnical Report to be prepared by the company preparing the Geological - Geotechnical Investigation Report.

Exploration pits and drilling works are still ongoing within the scope of the Project and according to the studies conducted, there is no karst geological hazard.

Stability and Landslide Risks

Drilling operations are currently ongoing under the Geological and Geotechnical Survey Report for the existing route. The assessment of potential landslides along the Project route was made in line with the 1/500.000 scale MTA Landslide Risk Map (**Error! Reference source not found.**). According to Figure VI.28, there are no ancient or active landslides in the immediate vicinity of the Project.

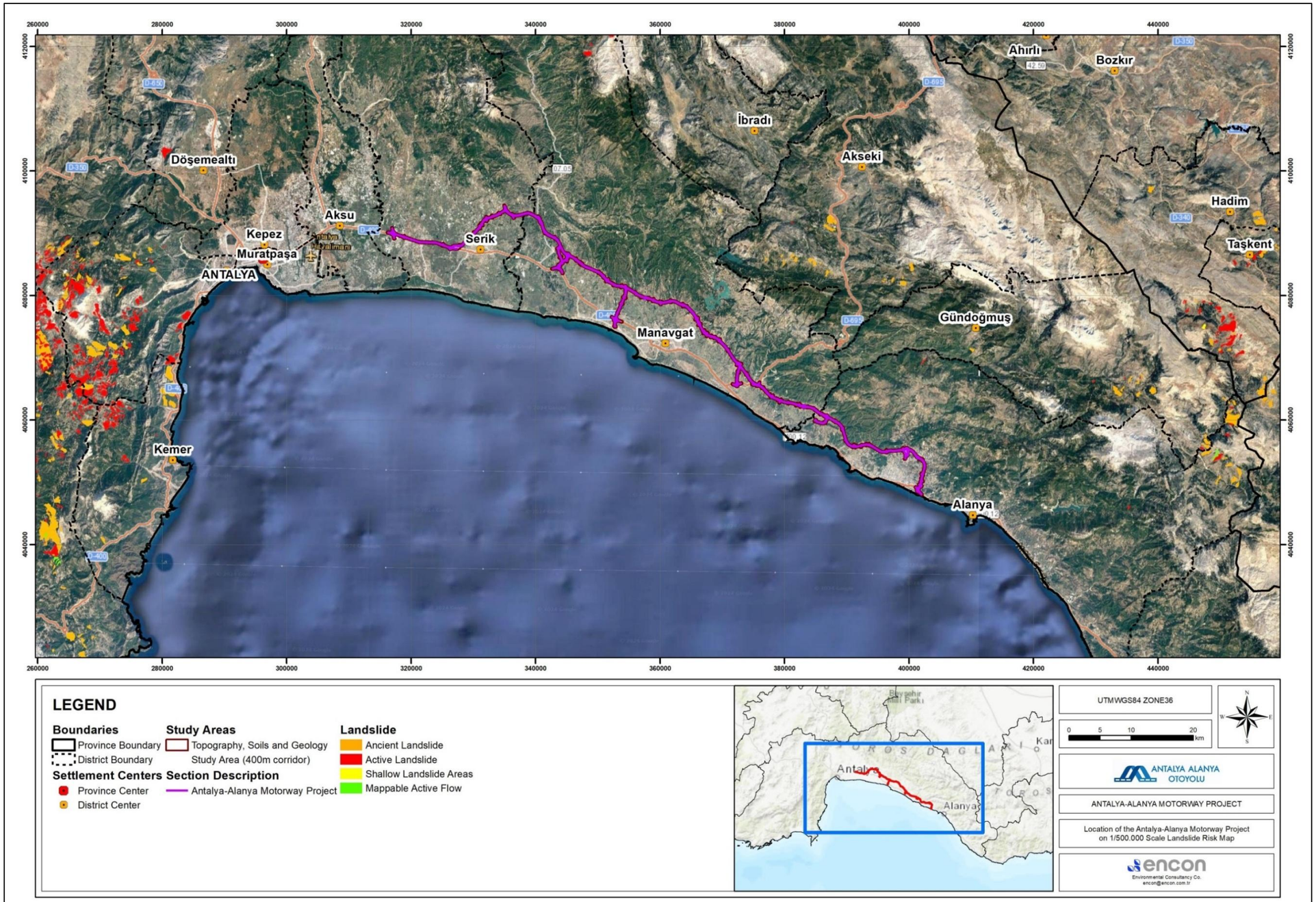


Figure VI.28 Location of the Project on 1/500.000 Scale Landslide Risk Map

Seismic Risk

The Earthquake Hazard Map of Türkiye, prepared by the Disaster & Emergency Management Authority Presidential of Earthquake Department, has been prepared with very detailed data, considering the most recent earthquake source parameters, earthquake catalogs, and new generation mathematical models. In the map, the highest ground acceleration values are shown instead of earthquake zones, and the concept of "earthquake zone" is eliminated. It assumes that a normal construction, which has 50 years of economic life, may not be exposed larger than these expected maximum acceleration values with 90% probability. For the important structures or buildings that have longer economic life, maximum acceleration values should be calculated. The horizontal equivalent earthquake coefficient to be used in the stability analyses was calculated according to the Principles for the Design of Road and Railway Tunnels and Other Ground Structures Under Earthquake Effects (2020). According to the earthquake hazard map of Türkiye prepared by the Disaster and Emergency Management Presidency, the ground acceleration velocity (PGA 475) of the project varies between 0.216g and 0.237g. The ground velocity (PGV 475) of the Project varies between 9.1 - 10.4 cm/sec.

The Motorway is required to be designed and built to stringent Turkish and international engineering standards that will minimize the potential damage in the event of an earthquake. In the seismic calculations, the Standard Specifications used for the seismic design of the highway bridges have been taken as a basis. Where required, Project-specific revisions have been or would be done with the approval of KGM to adapt these specifications to the Project adequately.

Local soil classes for the critical section along the route are mostly ZC-ZD. Table and earthquake parameters to be used in stability analyses are as follows.

Table VI.22 Local Soil Classes (Principles for the Design of Highway and Railway Bridges and Viaducts Under Earthquake Effects, 2020)

LOCAL SITE CLASSIFICATION	Soil/Rock Type	Average Properties in Upper 30 m		
		$(V_s)_{30}$	$(N_{60})_{30}$	$(c_u)_{30}$
		[m/s]	[blows/30cm]	[kPa]
ZA	Intact, hard rock	> 1500	–	–
ZB	Slightly weathered, moderately strong rock	760 – 1500	–	–
ZC	Very dense sands, gravels, and stiff clays, or weathered and heavily fractured weak rock	360 – 760	> 50	> 250
ZD	Medium dense to dense sands and gravels, or very stiff clays	180 – 360	15 – 50	70 – 250
ZE	Loose sands and gravels, or soft to stiff clays; includes profiles with soft clays (cu < 25 kPa) thicker than 3 m, meeting PI > 20 and w > 40% conditions	< 180	< 15	< 70
ZF	Soils requiring site-specific investigation and evaluation:			
	1) Soils at risk of subsidence and potential collapse under earthquake impact (liquefiable soils, highly vulnerable clays, collapsible weak cement soils, etc.),			
	2) Peat and/or clays with high organic content with a total thickness of more than 3 meters,			
	3) High plasticity (PI >50) clays with a total thickness of more than 8 meters,			
	4) Very thick (> 35 m) soft or medium stiff clays.			

Table VI.23 Local Soil Impact Coefficients for Short Period Region (TBDY, 2018)

LOCAL SITE CLASSIFICATION	LOCAL SOIL EFFECT COEFFICIENT FOR SHORT PERIOD REGION F_S					
	$S_s \leq 0.25$	$S_s = 0.50$	$S_s = 0.75$	$S_s = 1.00$	$S_s = 1.25$	$S_s \geq 1.50$
ZA	0.8	0.8	0.8	0.8	0.8	0.8
ZB	0.9	0.9	0.9	0.9	0.9	0.9
ZC	1.3	1.3	1.2	1.2	1.2	1.2
ZD	1.6	1.4	1.2	1.1	1.0	1.0
ZE	2.4	1.7	1.3	1.1	0.9	0.8
ZF	*Site Specific Soil Behavior Analysis will be Conducted*					

Flood Risk

Within the scope of the project, a Hydraulic–Hydrological Study Report was prepared by Mega Mühendislik Müşavirlik A.Ş. in 2024.

According to the findings and planning framework outlined in the Hydraulic–Hydrological Study Report, the catchment area was delineated in the hydrologic studies, and floods with 10, 100, and 500 years were extracted with rational, synthetic unit hydrograph for 305 culverts. More information on floods is given in section VIII.2.2.2. Running Water Bodies.

VI.3.2. Operation Phase

In the operation phase, the activities will not involve any additional physical interaction; thus no additional significant direct impact on topography, soils, and geological conditions is anticipated under normal operating conditions.

However, risks of soil contamination may arise from improper handling of the hazardous materials used in the road repair and maintenance activities, as well as leaks/spills of fuels, chemicals, etc., during accidents or emergencies. The potential impacts from these risks would be similar to the impacts described for the construction phase, and a similar mitigation strategy will be employed to address these issues. Additionally, seismic risks will be a concern throughout the entire operational life of the Motorway; thus, further evaluation on these risks and mitigation approaches is provided below.

Impacts on Soil Environment

Impacts on the soil environment during operation phase are anticipated to be limited. However, risks of soil contamination may arise from improper handling of the hazardous materials used in the road repair and maintenance activities, as well as leaks/spills of fuels, chemicals, etc., during accidents or emergencies. JASPERS (2010) list the potential impacts for operation phase in its Sectoral EIA Guidelines for motorway and Road Construction Projects as follows:

- Soil erosion and pollution along the road route due to the meteoric water flowing down on road embankments;
- Soil degradation along the route due to works for road embankments maintenance;
- Accidental, incidental, and seasonal soil pollution from:
    - Spreading on and infiltration of pollutant substances following the traffic accidents or failures (especially but not only in the liquid freight transport), incidental discharges of substances used for road maintenance, and snow-melt containing de-icing chemicals or sand;
    - Deposition of traffic-related pollutant substances (SO_2, NO_x, and heavy metals) from rain and snowfall.

In addition, deicing agents used in colder winter conditions and herbicides for vegetation management along the right-of-way may also be sources of potential soil contamination during the operation phase.

VI.4. Mitigation Measures

Mitigation measures to be taken for the protection of soils and minimization of geological/geotechnical risks during the land preparation and construction and operation phases of the Project is described below. The strategy will primarily adopt KGM's technical specifications, which are based on well-established practices developed in line with the relevant international standards and guidelines.

An Emergency Preparedness and Response Plan (see Annex-4) have been developed for the Project. In addition to the measures described in this chapter, appropriate measures will be taken in case of soil contamination incidents in accordance with this Plan.

VI.4.1. Land Preparation and Construction Phase

Mitigation measures to be taken to avoid and/or minimize impacts on soil environment during the land preparation and construction phases of the Project are described below. Topography was one of the most critical environmental criteria considered in the route selection process. It has been aimed that the route and the motorway design conforms with the existing topographical conditions to the maximum extent possible. To avoid the extraction of additional material from quarries/material borrow sites and increased interaction with the topography, excavated materials will be reused wherever the quality and quantity of the material are adequate. Further planning will be done to identify the source of the additional material extraction and storage site requirements. Necessary assessments will be conducted for other sites to be identified outside of the Supplementary ESIA study corridor.

Measures to be taken to Minimize Soil Disturbance

To minimize soil disturbance, the area of both temporary work sites and permanent Project components will be limited. For this purpose, work sites will be properly bordered (fencing, marking, etc.), and the construction personnel will be trained not to breach these predetermined borders. Additionally, drivers of the construction machinery and equipment will also be trained to use only designated routes to minimize soil disturbance. Other project-specific measures to be taken in each relevant subject are further described below.

Topsoil Management

Stripping and Temporary Storage of Topsoil

Before the commencement of construction activities, fertile topsoil present at the Project area (motorway route, quarry/material borrow sites, storage sites, etc.) will be stripped to sufficient depth (typically around 20-30 cm depending on local soil conditions). This stripped topsoil will be stored separately from subsoil and other coarse materials in designated topsoil storage areas along the route (within the expropriation corridor) or other work sites under suitable conditions for the conservation of its vegetative properties. The following procedures will be followed in accordance with KGM's Technical Specifications and industry best practices for topsoil stripping and storage practices:

- Stripping will not be conducted on wet soil to prevent compaction.
- Seeds, tubers, and rhizomes that can be reused in rehabilitation works will be collected and stored separately.
- The average height of topsoil stacks will be 1.5 meters. The side slope of the stacks will not exceed 3:1 ratio (h:v).
- Drainage will be provided via open channels, and the top of the stacks will be mildly compressed to minimize rainwater infiltration without creating anaerobic conditions.
- Berms will be constructed around the stacks to protect against flooding, if/where necessary.
- In case of long term storage of the topsoil, soil compaction and reduction in organic content of the soil may occur. Thus, soil stacks will be temporarily planted with legumes or grasses to maintain organic content of the topsoil if the topsoil is planned to be stored more than three months.
- Organic (grass, etc.) or inorganic (polyethylene, etc.) covers will be applied to improve its quality, prevent erosion, and avoid desiccation or invasion of wild herbs.

Reinstatement of Topsoil

Topsoil stripped and stored in suitable conditions will be reused in the rehabilitation of temporary construction sites upon completion of construction activities, on the finalization of side slopes and/or in landscaping activities. The following procedures will be followed in accordance with KGM's Technical Specifications and industry best practices for topsoil stripping and storage practices:

- Prior to the reinstatement of topsoil, the subsoil will be loosened either manually or using machinery to a depth of 15 cm. For compacted or heavy clay soils, this depth will be increased to 40-50 cm.
- Following the loosening operation, the ground will not be leveled to ensure a rough surface, which is more favorable for the absorption of topsoil.
- The average depth of topsoil reinstated on regular lands will be 15 cm. The depths for specific planting areas will be:
  - Side slopes : 10 cm
  - Germinated areas : 15 cm
  - Shrub plantation areas : 45 cm
  - Tree roots : 70 cm
- After reinstating the topsoil, grading operations will be conducted in accordance with natural slope and drainage conditions. Stones, grass, and any undesirable materials will be removed as much as possible, and the land will be prepared for planting operations.

The combined thickness of the topsoil and the vegetative growth layer will be restored to a level not less than that of the undisturbed areas.

Soil Erosion Minimization and Control

The following procedures will be followed in accordance with KGM's Technical Specifications and industry best practices for topsoil stripping and storage practices:

- Erosion control measures (e.g., geotextile filter barriers that would reduce the flow velocity and trap the sediments, drainage channels, settling structures, etc.) will be implemented along the route prior to the start of construction works in order to reduce or prevent off-site sediment transport during construction. Temporary erosion control measures will be adjusted and relocated as the construction progresses.
- Mulching will be applied to stabilize exposed areas, where stripping and excavation works will be planned.
- Activities will be adapted/modified or suspended during extreme rainfall and high winds to the extent practical.
- Contouring will be applied to reduce the length and steepness of slopes, minimizing erosion potential.
- All the earthworks will be structured regularly as frequently as necessary to control probable surface run-off due to precipitation and minimize associated erosion.
- All the water flow coming from the areas surrounding the worksites and from the side slopes will be diverted by means of temporary channels, earth banks and temporary engineering structures to avoid mixing of clean (non-contact) and contaminated (contact) runoff.
- Erosion control measures will be implemented at the outlet of culverts.
- At the outlet of the erosion control structures, relevant measures (i.e., use of riprap) will be taken to reduce the flow velocity and erosion impact.
- Following the completion of base excavations, permanent erosion control measures will be taken, and slope improvement works will be conducted.
- Dikes will be formed around the excavated material storage sites in order to prevent the loss of soil due to erosion.
- Channels and ditches will be designed in consideration of post-construction flows.
- Following the completion of the concrete lining of the drainage ditches, temporary erosion control structures will be dismantled, and the sites will be rehabilitated.
- Temporary service road gradients will be limited to reduce runoff-induced erosion.
- All the worksites will be revegetated to the extent possible promptly following the completion of works at that site.

Avoidance and Minimization of Soil Contamination Risk

Oil, fuel, dye and other hazardous substances may spill or leak at the construction sites during transportation, storage, preparation, or use. Training will be provided to the personnel working with such substances to minimize the risk of accidents. For accidents that cannot be avoided by taking relevant measures, immediate response measures will be implemented in accordance with the Emergency Preparedness and Response Plan (Annex-4 of this report) in order to prevent dispersion of contamination. The actions to be taken to avoid and/or minimize soil contamination are as follows:

- Any substance/material that may cause soil contamination will not be allowed to be discharged into the soil environment;
- Any spills or leaks will be responded in accordance with the procedures described in the Emergency Preparedness and Response Plan (Annex-4);
- Properly maintained construction machinery and equipment (preferably also with lower polluting engines) will be used to minimize deposition of air pollutants on soils;
- Wastes and wastewaters generated by Project activities will be properly managed in line with the requirements of national legislation as well as IFC EHS Guidelines as described in detail in Chapter 7 ("Use of Resources and Wastes") and Chapter 8 ("Water Resources"). Measures will be taken to prevent uncontrolled waste and wastewater from contacting the soil environment.
- Hazardous wastes and materials (such as diesel, fuel oil, degreasers, and solvents) will be handled in designated areas in accordance with the Hazardous Wastes Management Procedure developed as a part of the project-specific Environmental and Social Management Plan (Annex-1). In this respect, contact of hazardous wastes and materials with soil resources will be prevented by taking relevant measures (e.g., storage on the impervious ground, personnel training).

Management of Contaminated Lands

Management of contaminated lands is essential to avoid risks on human health and ecology. When contamination of land is suspected or confirmed during any phase of the Project, the cause of the uncontrolled release will be identified and actions will be taken to avoid further releases and associated adverse impacts. The following measures will be taken:

- Relevant provisions of the Turkish Regulation on the Soil Pollution Control and Sites Contamination by Point Sources, which are aligned with IFC's risk assessment and management approach for the contaminated lands, will be complied with to manage potentially contaminated sites. Coordination with local authorities will be established for the identification and management/remediation of the sites.
- Construction personnel will receive training on the identification and management of potentially contaminated sites. In case of an encounter, local authorities will be informed, and their guidance will be followed for site management. Measures will be designed on a case-by-case basis, depending on the scale and content of the contamination.

Geotechnical Safety

Mitigation measures will be taken to minimize geotechnical risks such as ground instability/ground movement, landslides, different groundwater levels and erosion during the construction phase of the Project.

VI.4.2. Operation Phase

Although operation activities will not directly impact topography and soils, mitigation measures will be taken to minimize and control potential soil erosion risks, particularly at the embankment areas, topsoil storage areas, exposed soils, and quarry sites. If not properly managed, these areas may remain vulnerable. Similarly, emergency preparedness and response measures will be maintained to address

soil contamination risks from potential road accidents, repair and maintenance works and activities in repair and maintenance, and operation centers as well as service areas. Similarly, the effectiveness of the design measures taken against geological and geotechnical risks will be ensured throughout the operation phase by taking the necessary management measures. Measures to be taken during the operation phase are detailed under the following subsections.

Soil Erosion Control during Operation

- Soil erosion during road operation will be prevented or minimized through timely strengthening/reinforcement and rehabilitation of the road, with scheduling adjustments during periods of heavy rainfall.
- Weekly inspections will be conducted on all erosion control structures. In the event of precipitation exceeding 10 mm within 24-hour period, on-site checks will be carried out to assess the condition of these structures, and maintenance will be performed as needed.
- Embankment and cutting slopes will be checked by qualified personnel at least once a year (preferentially after spring) to identify potential risks related erosion, landslide, or instability.
- Erosion control structures will be cleaned when half of their capacity is filled with sediment. Damaged or malfunctioning structures will be rebuilt or repaired.
- Stormwater management measures designed to slow peak runoff flow, reduce sediment loads, and increase infiltration, such as salt resistant vegetated swales, terracing, detention ponds, and basins, will be kept functional.
- Proper erosion and sediment control measures will be implemented during road paving works to reduce runoff at repair sites.
- Afforestation activities will be conducted according to the Afforestation Plan (will be added as an Annex) to minimize large scale erosion risks.

Soil Contamination Avoidance/Minimization and Response

- Against the risk of soil pollution due to road accidents that may result in the spill of hazardous liquids or substances on the road surface and surrounding areas, actions defined in the Emergency Preparedness and Response Plan (Annex-4) will be implemented.
- Low polluting de-icing products will be used in the scope of the deicing operations. Additional measures defined in Chapter 8 (“Water Resources”) for the road deicing operations will also contribute to the protection of soil resources.
- Treated effluents and wastes from the operation and maintenance centers as well as services areas will be discharged or disposed of in accordance with the requirements of the national legislations and IFC’s EHS Guidelines. Relevant measures for waste and wastewater management are described in Chapter 7 (“Use of Resources and Wastes”) and Chapter 8 (“Water Resources”).

Geotechnical Safety

In the design of the engineering structures, Standard Specifications for Highway Bridges published by the American Association of State Highway and Transportation Officials (AASHTO) has been used. In the seismic calculations, the Standard Specifications used for the seismic design of the highway

bridges have been taken as a basis. Where required, project-specific revisions have been and will be done as necessary with the approval of KGM to adequately adapt these specifications to the Project.

Foundations, viaduct (Viaduct-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16) supports, and bridges (K-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22) as well as other critical structural elements will be controlled by qualified technical personnel at least once a year (preferably in April) to detect any structural movement, undermining, maintenance needs, etc. that may pose risks to the durability of the structures and take the relevant corrective measures.

In the event of natural disasters (i.e., earthquakes) that may risk the structural safety of the Project structures, the operation personnel will conduct visual inspections, take immediate actions (e.g., communication with local people, restricting access to risky areas, etc.) and coordinate with local emergency response authorities to ensure public health and safety of the local people and protect the Motorway and its users.

VI.5. Summary of Assessments and Residual Impacts

Table VI.24 provides a summary of the assessments for impacts on topography, soils, and geology. The significance of the effects identified before and after the implementation of mitigation measures are summarized in this table. As shown, potential impacts on the relevant environmental components are anticipated to be reduced to low levels in the long run with effective implementation of mitigation measures, except the changes in the topography. It should be noted that some mitigation measures, such as erosion control or afforestation, require time (ranging from months to years) to show their effectiveness and ensure that the residual impacts are adequately mitigated to acceptable levels. Erosion and soil contamination risks are manageable by trained personnel through well-established site management plans. Thus, once the mitigation measures described in the ESIA Report are implemented, no significant risk would be posed by the construction and operation activities of the Project. In regard to seismic and geotechnical risks, strict adherence to international and national standards is essential in the design of the Motorway. This ensures that residual impacts are reduced to acceptable levels, thereby preventing unacceptable consequences that could jeopardize the health and safety of nearby communities and motorway users while preserving the structural integrity of the motorway during seismic events.

Table VI.24. Summary of the Topography, Soils and Geology Assessments

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phase												
Change of existing topographical conditions due to cut and fill operations, Disturbance of soils.	Topography and Soils: Natural topograpghy.	Adverse	Restricted	Long	High (for linear Project with 117.8 km length, 100 - 350 m expropriation corridor) Excavation: 43.8 mi. m^3 Fill: 42.3 mi. m^3	Irreversible	One-off	Medium (B)	Moderate (2)	Medium (B2)	• Motorway have been designed and will be constructed in conformity with the existing topographical conditions to the maximum extent possible. • Excavated materials will be reused whereever the quality and quantity of the material is adequate, to avoid extraction of additional material from quarries/material borrow sites. Further planning will be done to identify the source of the additional material extraction and storage site requirements. Necessary assessments will be conducted for additional sites to be identified outside of the Supplementary ESIA study corridor. • Working sites will be bordered by means of proper methods (i.e. fencing, marking, etc.) and construction workforce will be informed about not breaching the predetermined borders. • Drivers of the construction machinery and equipments will be trained to use only prescribed routes to minimize the area to be physically interacted.	Medium
	Topography and Soils: Already distrubed topograpghy.	Adverse	Restricted	Long	High (for linear Project with 117.8 km length, 100 - 350 m expropriation corridor) Excavation: 43.8 mi. m^3 Fill: 42.3 mi. m^3	Irreversible	One-off	Medium (B)	Low (1)	Low (B1)		Low
Risk of loss of quantity and quality (e.g. vegetative structure) of top soil.	Topography and Soils: Agricultural areas.	Adverse	Restricted	Long	High (for linear Project with 117.8 km length, 100-350 m expropriaton corridor)	Long term reversible	Continuous	Medium (B)	High (3)	High (B3)	Stripping and Temporary Storage of Top Soil • Prior to construction activities, fertile top soil available at the project area (Motorway route, quarry/material borrow sites, storage sites, etc.) will be stripped to sufficient depth (may change between 5 to 40 cm depending on local soil conditions) and will be stored separately from other coarse materials/soils (subsoil) at top soil storage areas to be designated along the motorway route or other work sites under conditions suitable for the conservation of vegetative properties. • To avoid soil compaction, stripping operation will not be done when soil is wet. • Seed, tuber, rhizome, situated on the top soil, which can be reused in rehabilitation works, will be collected and stored separately. • Average height of top soil stacks will be 1.5 meters. Side slope of these stacks will not exceed 3:1 (h:v). • Drainage of top soil storage areas will be provided by open channels. In order to minimize the amount of rain water that can infiltrate into the top soil stack, the upper parts of the top soil stacks will be compressed. Excessive compression can cause anaerobic conditions. Therefore, compression operations will be carried out mildly. • If it is necessary, soil stacks will be protected against the risk of floods by creating berms of adequate height. • In case of long term storage of top soil, soil compaction and reduction in organic content of the soil may occur. In this context, if the storage will last for more than three months, the upper part of fertile soil will be planted temporarily in order to conserve organic content. In planting operations, selected species of legume and grails will be used in proper seed mixture ratios.	Medium
	Topography and Soils: Forest areas.	Adverse	Restricted	Long	High (for linear Project with 117.8 km length, 100-350 m expropriaton corridor) 5.4 mi. m^3	Long term reversible	Continuous	Medium (B)	Moderate (2)	Medium (B2)		Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											• Organic (grass, etc.) or inorganic (polyethylene, etc.) materials will be applied on the top soil to be stored to improve its quality and avoid erosion, desiccation or invasion of wild herbs. Reinstation of Top Soil • Top soil stripped and stored in suitable conditions will be reused in rehabilitation of temporary construction sites upon completion of construction activities, on the finalization of side slopes and/or in the scope of landscaping activities. • Sub soil will be loosened by hand or machinery to a depth of 15 cm prior to the reinstation of top soil. For compact or heavy clay soils, loosening depth is to be increased up to 40-50 cm. • Following the loosening operation, ground will not be leveled before the reinstation of top soil so that a favorable rough surface is obtained for the adsorption of top soil. • Average depth of top soil to be reinstated on regular lands will be 15 cm. • Depth of top soil for areas to be planted will be suitable for side slopes, shrub plantation areas, tree roots, etc. • Following the reinstation of top soil, grading operation will be conducted in alignment with the natural slope and drainage conditions. Any stone, grass or undesired materials will be removed to the extent possible and the land will be prepared for the upcoming planting operations. • Combined thickness of topsoil and the vegetative growth layer will not be less than that prevailing in the undisturbed areas.	

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Erosion of soils due to earthworks.	Topography and Soils.	Adverse	Restricted	Long	High (assummed for the linear Project with 117.8 km length, 100-350 m expropriation corridor. The amount of material to be mobilized will depend on the construction technique)	Medium term reversible	Continuous	Medium (B)	High (3)	High (B3)	• Erosion control measures (e.g. geotextile filter barriers that would reduce the flow velocity and trap the sediments, drainage channels, settling structures, etc.) will be implemented along the route prior to the start of construction works in order to reduce or prevent off-site sediment transport during construction. Temporary erosion control measures will be moved forward as the construction progresses. • Stripping and excavation works will be planned in a way that maximum 30.000 m2 of exposed land will be created at once. Mulching will be applied to stabilize exposed areas. • Activities will be modified or suspended during extreme rainfall and high winds to the extent practical. • Contouring will be applied and length and steepness of slopes will be minimized. • All the earth works will be structured at the end of each work day in a way to control probable surface run-off due to precipitation and minimize associated erosion. • All the water flow coming from the areas surrounding the work sites and from the side slopes will be diverted by means of temporary channels, earth banks and temporary engineering structures to avoid mixing of clean (non-contact) and contaminated (contact) runoff. • Erosion control measures will be implemented at the outlet of culverts. • At the outlet of the erosion control structures, relevant measures (i.e. use of riprap) will be taken to reduce the flow velocity and erosion impact. • Following the completion of base excavations, permanent erosion control measures will be taken and slope improvement works will be conducted. • Dikes will be formed around the excavated material storage sites in order to prevent loss of soil due to erosion. • Channels and ditches will be designed in consideration of post-construction flows. • Following the completion of concrete lining of the drainage ditches, temporary erosion control structures will be dismantled and the sites will be rehabilitated. • Temporary service road gradients will be limited to reduce runoff-induced erosion. • All the work sites will be revegetated to the extent possible promptly following the completion of works at that site. • Operation and Rehabilitation of Quarries and Material Borrow Sites • Open pit mining method will be used at quarries and tunneling will not be applied. Open pit will be developed in benches. • Borders of the quarry and material borrow sites will be identified by using proper methods (i.e. fencing, etc.) and material extraction activities will be conducted within these borders. • During the operation of the quarries and material borrow sites; runoff from rain will be diverted from the face of the slopes, which are exposed in the excavation process. The runoff will then be conveyed in channels to stable disposal points. • Quarries and material borrow sites will be rehabilitated following the completion of material extraction activities.	Medium
Risk of soil contamination due to accidental spills, leakages, etc.	Topography and Soils: Agricultural areas, pastures, and forests.	Adverse	Restricted	Medium	Medium	Short term reversible	One-off	Restricted (C)	High (3)	Medium (C3)	• Emergency Preparedness and Action Plan will be implemented. • Any substance/material that would result in soil contamination will not be allowed to be discharged onto soil environment. • Any spill or leakage event will be responded in accordance with the procedures described in the Emergency Preparedness and Response Plan • Proper construction machinery and equipment endowed with low polluting engines will be used to minimize deposition of air pollutants on soils. • Wastes and wastewaters to be generated as a result of project activities will be properly managed in line with the requirements of national legislation as well as IFC EHS Guidelines. In this context, direct contact of the uncontrolled wastes and wastewaters with soil environment will be avoided by taking relevant measures.	Low
	Topography and Soils: Vegetated areas, recreational	Adverse	Restricted	Medium	Medium	Short term reversible	One-off	Restricted (C)	Moderate (2)	Low (C2)		Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
	areas, and shrubs										• Hazardous wastes and materials (i.e. diesel fuel oil, degreasers, solvents, etc.) will be handled at designated areas in accordance with the Hazardous Wastes Management Procedure developed as a part of the project-specific Environmental and Social Management Plan. In this respect, contact of hazardous wastes and materials with soil resources will be prevented by taking relevant measures (e.g. storage on impervious ground, training of personnel).	
	Topography and Soils. Artificial areas (urban fabric, industrial areas, mine dumps, construction sites)	Adverse	Restricted	Medium	Medium	Short term reversible	One-off	Restricted (C)	Low (1)	Low (C1)	• During operation, against the risk of soil pollution due to road accidents that may result in the spill of hazardous liquids or substances on the road surface and surrounding areas, actions defined in the Emergency Preparedness and Response Plan (see Annex-4) will be implemented. • During operation Low polluting de-icing products will be used in the scope of the deicing operations. Additional measures defined in Chapter 8 (“Water Resources”) for the road deicing operations will also contribute to the protection of soil resources. • During operation Treated effluents and wastes from the operation and maintenance centers as well as services areas will be discharged/disposed of in accordance with the requirements of the national legislation and IFC’s EHS Guidelines.	Low
Seismic risks	Geology-Geotechnics	Adverse	Wide	Medium	High (worst case)	Irreversible	One-off	Wide (A)	Moderate (2) (Project route does not pass through or near any active fault and is close to the medium level in terms of Peak ground acceleration hazard)	High (A2)	• Detailed geological-geotechnical surveys will be completed. • Foundations and legs of the viaducts and bridges as well as other structural elements will be controlled by competent technical personnel at least once a year (preferentially in April) in order to identify any structural motion, undermining, maintenance requirements, etc. that may pose risks on the durability of the structures and take the relevant corrective measures.	Medium
Landslide risks	Geology-Geotechnics	Adverse	Restricted	Medium	High	Short term reversible	One-off	Wide (A)	High (3)	High (A3)	• In the seismic calculations, the Standard Specifications used for the seismic design of the highway bridges has been taken as basis. Where required, project-specific revisions have been/would be done with the approval of KGM to adequately adapt these specifications to the project.	Medium
	Geology-Geotechnics	Adverse	Restricted	Medium	Medium	Short term reversible	One-off	Medium (B)	High (3)	High (B3)		Medium
	Geology-Geotechnics	Adverse	Restricted	Medium	Low	Short term reversible	One-off	Restricted (C)	High (3)	Medium (C3)		Low
Operation Phase												
Erosion of soils due to earthworks.	Topography and Soils.	Adverse	Restricted	Long	High	Medium term reversible	Continuous	Medium (B)	Low (1)	Low (B1)	• Soil erosion process during road operation will be prevented and/or minimized by timely strengthening and rehabilitation of the road and scheduling against heavy rainfall periods. • On-site control of all erosion control structures will be done once a week. In cases when the precipitation amount exceeds 10 mm in 24 hour periods, all the erosion control measures and their conditions will be checked on site. If required, relevant structures will be properly maintained. • Embankment and cutting slopes will be checked by competent persons at least once a year (preferentially following of spring months) to identify any erosion, landslide, stability, etc. risks. • Erosion control structures will be cleaned when half of their capacity is filled with sediment. Damaged structures or structures that are not functioning properly will be maintained/restructured. • Stormwater management measures that are designed to slow peak runoff flow,	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											reduce sediment loads and increase infiltration will be kept functional. These may include vegetated swales planted with salt-resistant vegetation, terracing, detention ponds and basins, etc. • Proper erosion and sediment control measures will be used during road paving works to decrease runoff from repair sites. • Afforestation activities will be conducted in accordance with the Afforestation Plan to reduce the risk of erosion in the large-scale.	
Risk of soil contamination due to accidental spills, leakages, etc.	Topography and Soils: Agricultural areas, pastures, and forests.	Adverse	Restricted	Medium	Medium	Short term reversible	One-off	Restricted (C)	High (3)	Medium (C3)	• Emergency Preparedness and Action Plan will be implemented. • Any substance/material that would result in soil contamination will not be allowed to be discharged onto soil environment. • Any spill or leakage event will be responded in accordance with the procedures described in the Emergency Preparedness and Response Plan • Proper construction machinery and equipment endowed with low polluting engines will be used to minimize deposition of air pollutants on soils. • Wastes and wastewaters to be generated as a result of project activities will be properly managed in line with the requirements of national legislation as well as IFC EHS Guidelines. In this context, direct contact of the uncontrolled wastes and wastewaters with soil environment will be avoided by taking relevant measures. • Hazardous wastes and materials (i.e. diesel fuel oil, degreasers, solvents, etc.) will be handled at designated areas in accordance with the Hazardous Wastes Management Procedure developed as a part of the project-specific Environmental and Social Management Plan. In this respect, contact of hazardous wastes and materials with soil resources will be prevented by taking relevant measures (e.g. storage on impervious ground, training of personnel). • During operation, against the risk of soil pollution due to road accidents that may result in the spill of hazardous liquids or substances on the road surface and surrounding areas, actions defined in the Emergency Preparedness and Response Plan (see Annex-4) will be implemented. • During operation Low polluting de-icing products will be used in the scope of the deicing operations. Additional measures defined in Chapter 8 (“Water Resources”) for the road deicing operations will also contribute to the protection of soil resources. • During operation Treated effluents and wastes from the operation and maintenance centers as well as services areas will be discharged/disposed of in accordance with the requirements of the national legislation and IFC’s EHS Guidelines.	Low
	Topography and Soils: Vegetated areas, recreational areas, and shrubs	Adverse	Restricted	Medium	Medium	Short term reversible	One-off	Restricted (C)	Moderate (2)	Low (C2)		Low
	Topography and Soils. Artificial areas (urban fabric, industrial areas, mine dumps, construction sites)	Adverse	Restricted	Medium	Medium	Short term reversible	One-off	Restricted (C)	Low (1)	Low (C1)		Low
Seismic risks	Geology-Geotechnics	Adverse	Wide	Medium	High (worst case)	Irreversible	One-off	Wide (A)	Moderate (2) (Project route does not pass through or near any active fault and is close to the medium level in terms of Peak ground acceleration hazard)	High (A2)	• Detailed geological-geotechnical surveys will be completed. • Foundations and legs of the viaducts and bridges as well as other structural elements will be controlled by competent technical personnel at least once a year (preferentially in April) in order to identify any structural motion, undermining, maintenance requirements, etc. that may pose risks on the durability of the structures and take the relevant corrective measures.	Medium
Landslide risks	Geology-Geotechnics	Adverse	Restricted	Medium	High	Short term reversible	One-off	Wide (A)	High (3)	High (A3)	• In the seismic calculations, the Standard Specifications used for the seismic design of the highway bridges has been taken as basis. Where required, project-specific revisions have been/would be done with the approval of KGM to adequately adapt these specifications to the project.	Medium
	Geology-Geotechnics	Adverse	Restricted	Medium	Medium	Short term reversible	One-off	Medium (B)	High (3)	High (B3)		Medium
	Geology-Geotechnics	Adverse	Restricted	Medium	Low	Short term reversible	One-off	Restricted (C)	High (3)	Medium (C3)		Low

VII. USE OF RESOURCES AND WASTE MANAGEMENT

As with other infrastructure projects, materials such as rock, sandstone, limestone, basalt, etc. as well as concrete, steel, aggregates, asphalt, etc. will be used in significant quantities during the construction works of the Project. Additionally, the Project will require the procurement of construction materials from quarries and other suppliers for materials needed for the operation phase activities and maintenance works to be conducted in the operation phase. As a result, the use of resources and other construction and operation/maintenance activities as well as the domestic/municipal requirements of the personnel and the users of the Motorway, will generate different types of wastes throughout the life of the Project. All the waste to be generated during the construction and operation phases of the Project are required to be properly managed in line with the requirements of national waste management legislation and international good practice in order to avoid impacts on soils, nearby water resources and flora and fauna elements. This chapter identifies the resources to be used in this context and assesses the impacts associated with waste generation. Waste management measures to be applied in accordance with relevant Turkish regulations and international standards (i.e. IFC's General EHS Guidelines) are also described in this chapter. Potential impacts of material supply and waste generation on soil and water resources, ecological components and socio-economic environment are discussed in the relevant chapters of this report.

VII.1. Assessment Methodology and Data Sources

To assess the impacts associated with the use of resources and waste generation, information provided by the Project Sponsor on the quarries, borrow pits, construction campsites, etc. has been reviewed. To understand the existing waste management infrastructure of the region, public information given in the web site of Antalya Metropolitan Municipality has been relied on. For the calculations of the amount of municipal solid wastes, waste statistics published by TurkStat (2022) have been considered, together with the maximum number of personnel to be employed.

Significance Criteria

The significance criteria for the impacts on land use and property are determined, as high, medium or low, based on the evaluation of magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter IV ("ESIA Methodology") is used for the determination of the magnitude of impact on the land use components, sensitivity/value criteria to be used in the scope of impact assessment is summarized in Table VII.1.

Table VII.1. Criteria for Sensitivity/Value of Resource/Receptor

Resource/Receptor	Sensitivity/Value Level		
	High (3)	Medium (2)	Low (1)
Local waste infrastructure	If the local waste infrastructure has not sufficient capacity; landfills do not meet the requirements of the regulations.	If the local waste infrastructure has sufficient capacity; but there are some shortcomings in meeting the regulations or capacity may be stressed under high-load conditions.	If the local waste infrastructure has sufficient capacity; landfills meet the requirements of the regulations.

VII.2. Baseline Conditions

VII.2.1. Quarries and Material Borrow Sites

The mining sector in Antalya primarily based on marble, limestone and barite extraction. Marble and limestone are mainly utilized in the construction sector for building materials and landscaping. Barite, used in various sectors, is predominantly employed in the production of paint, paper and rubber. Due

to their economic value, these products, especially marble, are significant export commodities. Additionally, there are a few travertine mines in Antalya. Mineral map of Antalya province is presented in Figure VII.1.

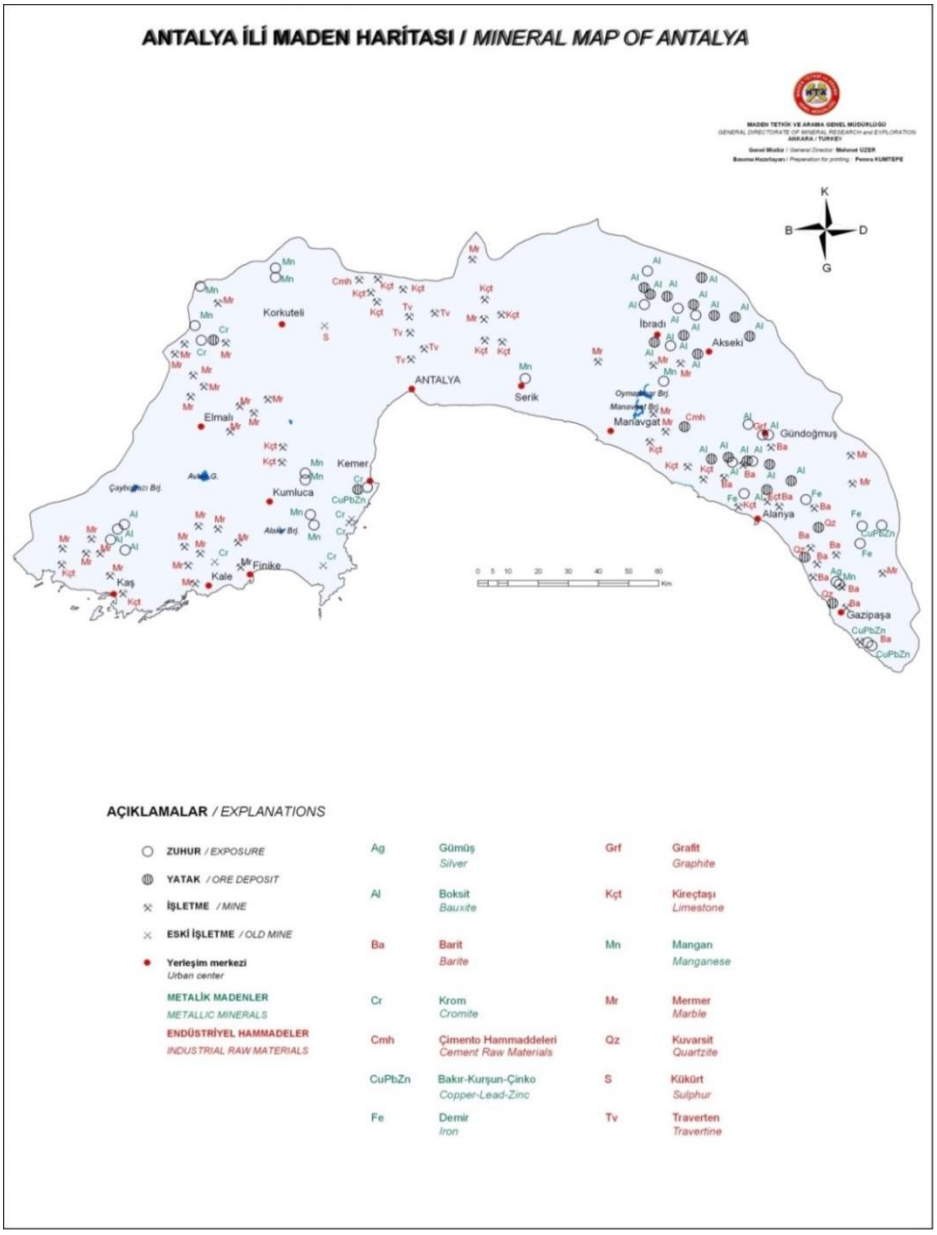


Figure VII.1. Mineral Map of Antalya[1]

[1] *www.mta.gov.tr*

According to the provided map above, there are 34 marble, 17 limestone, 11 barite, 5 travertine and one cement additive mines are present in Antalya province. Types of mining groups and their descriptions according to the Mining Law are provided in Table VII.2.

Table VII.2. Types of Mining Groups and their Description

Group No	Description of the Group in the Mining Law
I-A Group	Sand and gravel
I-B Group	Brick-tile clay, cement clay, marn, tras, and other rock materials used in cement and ceramic industries
II-A Group	Rock material used for producing aggregate, ready-made concrete and asphalt from calcite, dolomite, limestone, granite, andesite, basalt
II-B Group	Stones produced as stone as marble, travertine, granite, andesite, basalt
II-C Group	Rock material used in producing cement, chalk, and calcite from dolomite, limestone, granite, andesite, basalt
Group III	Salts, carbondioxide (geothermal, natural gas and oil sites excluded), hydrogen sulfur (secluding 07/03/1954 dated and 6326 numbered Oil Law), dissolved in sea, lake and spring water,
Group IV	Lignite, coal, gold, silver, copper, zinc, chromium, iron, cobalt, nickel, aluminum, trona, sulphur, etc.
Group V	Diamond, sapphire, opal, amazonite, etc.

Source: Mining Law Numbered 3213 (Amended: 04/02/2015 – 6592/1)

In the scope of the Project, two quarries are planned to be used to supply the material requirements. These quarries have raw material production licenses. Additionally, two borrow pits and another quarry to be opened will be utilized in the Project (Table VII.3).

Table VII.3. Raw Material Extraction Sites to be used in the Project

Quarry Site	Area (ha)	Operation Duration (months)	Type of Raw Material to be Extracted	Capacity (m^3/h)
Sarıabalı Borrow Pit*	24.9	36	Crystallized limestone, marble/To be analyzed	375
Çakış Quarry (TOY4*a)	24.7	36	Crystallized limestone, marble/To be analyzed	375
Kuruçay Quarry (TOY4a Alternative)	24.3	36	Crystallized limestone, marble/To be analyzed	375
Dikmen Quarry**	24.4	36	Crystallized limestone, marble/To be analyzed	375
Bademliyar Quarry (TO2)	17.8	36	Crystallized limestone, marble/To be analyzed	375
Çenger Bourn Stream Material Quarry*	19.0	36	Crystallized limestone, marble/To be analyzed	375
Uzunlar Quarry (TOY5)*	24.6	36	Crystallized limestone, marble/To be analyzed	375
Karakaya Quarry	24.9	36	Crystallized limestone, marble/To be analyzed	375
Saburlar Quarry	24.9	36	Crystallized limestone, marble/To be analyzed	375
Karamanlar Quarry*	31.2	36	Crystallized limestone, marble/To be analyzed	375
Soğukpınar Quarry	25.1	36	Crystallized limestone, marble/To be analyzed	375

*Most likely to be utilized
**It will not be utilized as the connection to Manavgat has changed.

VII.2.2. Existing Waste Management Infrastructure in the Region

Municipal Solid Waste

There are four landfills in Antalya province. Their names are Patara Solid Waste Landfill, Manavgat Solid Waste Energy Recovery and Landfill Facility, Alanya Integrated Solid Waste Recycle and Disposal Facility, and Kızıllı Integrated Solid Waste Recycle and Landfill Facility (see Table VII.4). Generated solid wastes are collected by the waste trucks of district municipalities, transferred to one of the six solid waste transfer stations, and disposed of at these landfills, which are designed in accordance with the requirements of the Regulation on the Landfill of Wastes. In this context, landfills have proper impermeability layers and the leachate collected at the landfills is treated by means of physical, chemical, and anaerobic processes. In the province, treated wastewater is discharged into the sewerage system of the Antalya Water and Wastewater Administration (ASAT) (Antalya Province Environmental Status Report, 2022). For the wastewater management of the Project, package WWTPs are planned to be used in the campsites during the construction phase.

Table VII.4. Landfills and Transfer Stations in Antalya Province

Landfills
Patara Solid Waste Landfill
Manavgat Solid Waste Energy Recovery and Landfill Facility
Alanya Integrated Solid Waste Recycle and Disposal Facility
Kızıllı Integrated Solid Waste Recycle and Landfill Facility
Transfer Stations
Elmalı Transfer Station
Kumluca Transfer Station
Serik Transfer Station
Kemer Transfer Station
Korkuteli Transfer Station
Manavgat Transfer Station
Facilities in Construction, Permitting and Commissioning Stages
Demre Transfer Station
Gazipaşa Transfer Station

Source: Antalya Province Environmental Status Report, 2023

The closest and appropriate landfills would be identified and used for the management of Project-sourced wastes. Required agreements will be made with the municipalities and the facilities for the transfer, recovery, disposal and landfill services.

Municipal Wastewater

There are 35 wastewater treatment plants (WWTPs) in Antalya province[2]. All of the WWTPs are designed as either biological treatment or advanced treatment systems. 16 of these plants discharge their treated water into suitable water bodies while 19 of them are utilizing deep sea discharge. Package WWTPs will be constructed in each campsite to treat the domestic wastewater that will be generated during the construction phase of the Project. The total equivalent population for these plants is 3.750 people. A total of 3.300 people will be accommodated across three campsites as part of the Project. It is assumed that approximately 1,100 people will stay at each campsite. Considering potential visitors and occasional overcapacity, a package WWTP with a capacity for 1,250 people is calculated to be sufficient for the domestic wastewater treatment needs of each campsite.

Construction, Demolition Wastes and Excavated Soil

There is only one construction and demolition waste disposal site in Antalya to manage excavation, construction and demolition wastes, in Karaöz Street of Kızıllı Neighborhood. In the year 2023, the site collected 3.2 million m^3 of excavation waste and 1.3 million m^3 of construction and demolition waste. Antalya Metropolitan Municipality issues licenses for the transportation of the construction and demolition wastes produced in the city. The transportation of these wastes is carried out by licensed vehicles/trucks within the city, and the wastes are disposed of in the area designated by the Municipality (Antalya Province Environmental Status Report, 2023).

Packaging Waste

As of 2023, 25 packaging waste facilities have the relevant environmental permits and licenses in a total of Antalya Metropolitan Municipality. These facilities serve for the recovery of packaging materials including plastics, metals, composite packages, paper and cardboard, glass, and wood-produced collection and separation facilities in Antalya (Antalya Province Environmental Status Report, 2023).

Hazardous and Special Waste

Hazardous and special wastes produced in Antalya are managed by different methods including recovery, disposal, storage, export, etc. The amount of hazardous waste recorded in 2023 was 15,364 tons in the province. Non-hazardous and special wastes including waste tires, medical wastes, waste vegetable oils, waste batteries, and accumulators are managed (e.g. recovery) and/or disposed of at licensed facilities (Antalya Province Environmental Status Reports, 2023).

Regarding the management of hazardous wastes, the province has two hazardous waste recovery facility providing services in the field of hazardous waste recovery, disposal, landfill and exportation. In 2023, 11,096 tons of waste was recovered, 4,064 tons were sent for disposal, 205 tons collected for storage (Antalya Province Environmental Status Report, 2023).

Medical Waste

Medical wastes produced in the province are collected by medical waste transportation vehicles and disposed of at the licensed medical waste sterilization facility. As of 2023 there is one such facility in the province that is operating 6 medical waste transportation vehicles. A total of 3,458 tons of medical

[2] *Antalya Province Environmental Status Report, 2023*

waste was collected from a diverse set of businesses, institutions and facilities, including 47 hospitals, 297 polyclinics, 37 laboratories, 12 dialysis centers, 444 dentists 458 tourism businesses and 17 municipal service buildings operating in the province (Antalya Province Environmental Status Report, 2023).

Vegetable Oil Waste

There are 10 licensed interim storage facilities for waste vegetable oil; however, the province lacks a waste vegetable oil recovery facility. The amount of waste vegetable oil collected in Antalya was recorded as 1,520 tons (Antalya Province Environmental Status Report, 2023).

Waste Tire

There is a one licensed waste tire recovery facility and one waste tire recycling facility in the province for the management of waste tires. A total of 20 tons of waste tires were sent to recovery (energy recovery by incineration) facility, while 231 tons were processed by the waste tire recycling facility (Antalya Province Environmental Status Report, 2023).

Waste Batteries and Accumulators

There is one licensed waste accumulator recycling facility and nine temporary waste accumulator storage facilities in the province. The amount of waste accumulators and waste batteries collected in the province was 538 tons (Antalya Province Environmental Status Report, 2023).

VII.3. Potential Impacts

As with other infrastructure projects, materials such as rock, sandstone, limestone, basalt, etc. as well as concrete, steel, aggregates, asphalt, etc. will be used in significant quantities during the construction of the Project. In the operation phase, use of materials will be limited with the maintenance activities to be conducted at the road, operation and maintenance centers and fuel stations. In addition to those mentioned raw materials, chemical materials will also be used for the Project. The names, properties and Material Safety Data Sheets (MSDS) of some of the chemicals that will be used have been identified by the Project Sponsor.

Different types of wastes (hazardous, non-hazardous or inert) will be generated as a result of the materials used and personnel requirements during the land preparation and construction, and operation activities. As use of construction materials and personnel involvement will be at significant levels during the construction phase, waste generation will be a more important issue when compared to operation phase. Types of wastes to be generated in each phase are identified in the following sections, with quantification for certain types of wastes (i.e. municipal, excavated materials) wherever possible.

If not properly managed, waste generation may cause soil contamination, pollution of surface and groundwater resources, and disturbance of flora and fauna components, visual nuisance and risks to public and personnel health and safety. Adverse impacts on ecosystem components including soil, surface and ground water resources as well as flora and fauna components and other social issues associated with waste generation can be avoided and/or minimized with effective implementation of

good waste management practices in accordance with the requirements of national legislation and international standards.

VII.3.1. Land Preparation and Construction Phase

During the construction works, temporary facilities/sites will be needed. These facilities and sites include construction campsites, quarries, borrow pits, plants and service roads. Following the completion of construction activities, temporary facilities will be decommissioned. Table VII.5 provides a list of the campsites, quarries and plants to be used in the scope of the Project.

Table VII.5. Locations of the Quarries, Plants and Storage Sites

Location		Description of the Site / Quarry / Plant	Area (ha) / Capacity Information (m^3)
Mechanical Plants			
Km 59+400	Antalya, Manavgat	Mechanical Plant-1	6.65 ha (550 tonnes/hour)*
Km 87+700	Antalya, Manavgat	Mechanical Plant-2	4.24 ha (550 tonnes/hour)*
Km 124+300	Antalya, Alanya	Mechanical Plant-3	8.50 ha (550 tonnes/hour)*
Asphalt Plants			
Km 59+400	Antalya, Manavgat	Asphalt Plant-1	6.65 ha (240 tonnes/hour)*
Km 87+700	Antalya, Manavgat	Asphalt Plant-2	4.24 ha (240 tonnes/hour)*
Km 124+300	Antalya, Alanya	Asphalt Plant-3	8.50 ha (550 tonnes/hour)*
Concrete Plants			
Km 55+450	Antalya, Serik	Concrete Plant-1	1.40 ha (140 m^3/hour)
Km 59+400	Antalya, Manavgat	Concrete Plant-2	6.65 ha (140 m^3/hour)*
Km 80+400	Antalya, Manavgat	Concrete Plant-3	1.50 ha (140 m^3/hour)
Km 87+700	Antalya, Manavgat	Concrete Plant-4	4.24 ha (140 m^3/hour)*
Km 89+700	Antalya, Manavgat	Concrete Plant-4a	1.17 ha (140 m^3/hour)
Km 99+200	Antalya, Manavgat	Concrete Plant-5	1.20 ha (140 m^3/hour)
Km124+300	Antalya, Alanya	Concrete Plant-6	8.50 ha (140 m^3/hour)*
Construction Sites			
Km 64+500	Antalya, Manavgat	Construction Site-1 (Main)	10.00 ha
Km 87+500	Antalya, Manavgat	Construction Site-2	3.80 ha
Km 1124+300	Antalya, Alanya	Construction Site-3	8.50 ha
Quarry Sites			
Km 53+800	Antalya, Serik	Sarıabalı (AO-1) Borrow Pit	24.9 (375 m^3/hour)
Km 56+500	Antalya, Serik	Çakış (TOY4a) Quarry	24.7 (375 m^3/hour)
Km 58+500	Antalya, Serik	Kuruçay (TOY4b) Quarry	24.3 (375 m^3/hour)
Km 83+000	Antalya, Manavgat	Dikmen Borrow Pit	24.4 (375 m^3/hour)
Km 104+750	Antalya, Manavgat	Bademliyar (TO2) Quarry	17.8 (375 m^3/hour)

Location		Description of the Site / Quarry / Plant	Area (ha) / Capacity Information (m^3)
Km 105+000	Antalya, Manavgat	Çenger Stream Material Quarry	19.0 (375 m^3/hour)
Km 106+000	Antalya, Manavgat	Uzunlar (TOY5) Quarry	24.6 (375 m^3/hour)
Km 114+200	Antalya, Manavgat	Karakaya Quarry	24.9 (375 m^3/hour)
Km 117+000	Antalya, Alanya	Saburlar Quarry	24.9 (375 m^3/hour)
Km 119+500	Antalya, Alanya	Karamanlar Quarry	31.2 (375 m^3/hour)
Km 134+000	Antalya, Alanya	Soğukpınar Quarry	25.1 (375 m^3/hour)
Storage Sites			
Km 52+544	Antalya, Serik	D-2	736,660.28 m^3
Km 59+580	Antalya, Manavgat	D-3	2,111,705.36 m^3
Km 61+500	Antalya, Manavgat	D-6	4,378,853.62 m^3
Km 64+160	Antalya, Manavgat	D-7	3,327,945.41 m^3
Km 71+800	Antalya, Manavgat	D-10	7,516,026.00 m^3
Km 74+360	Antalya, Manavgat	D-11	1,037,880.08 m^3
Km 76+240	Antalya, Manavgat	D-14	371,940.90 m^3
Km 78+790	Antalya, Manavgat	D-15	1,261,077.59 m^3
Km 86+340	Antalya, Manavgat	D-16	4,869,058.60 m^3
Km 87+800	Antalya, Manavgat	D-17	2,504,385.12 m^3
Km 95+410	Antalya, Manavgat	D-18	1,124,258.46 m^3
Km 95+410	Antalya, Manavgat	D-19	1,522,633.16 m^3
Km 98+290	Antalya, Manavgat	D-20	711,115.13 m^3
Km 100+000	Antalya, Manavgat	D-21	1,648,102.37 m^3
Km 107+850	Antalya, Manavgat	D-22	1,222,720.44 m^3
Km 110+820	Antalya, Manavgat	D-23	20,093,692.94 m^3
Km 113+050	Antalya, Manavgat	D-24	2,552,495.14 m^3
Km 123+000	Antalya, Alanya	D-26	5,638,396.17 m^3
Km 124+250	Antalya, Alanya	D-27	1,926,864.50 m^3
Km 127+000	Antalya, Alanya	D-28	3,763,723.90 m^3
Km 130+400	Antalya, Alanya	D-29	1,991,642.98 m^3
Km 132+720	Antalya, Alanya	D-30	3,307,202.05 m^3

**The areas are given as the sum of the respective concrete, asphalt and mechanical plant areas.*

Wastes anticipated to be generated at the campsites and other worksites during the construction phase of the Project would mainly include cleared vegetation, municipal (domestic) solid wastes, domestic wastewater, treatment sludge, packaging wastes, excavation wastes, construction wastes, debris from settling ponds at concrete plants, hazardous wastes (including packaging wastes that contacted with hazardous substances), waste oils, waste tires, waste vegetable oils and other types of special wastes. Further information on the main types of wastes anticipated to be generated in the scope of land preparation and construction activities are provided below.

Waste Management Regulation includes a list of wastes as an appendix. In this list, hazardous wastes are marked with an asterisk (*) along with one of the letters (A) or (M). Letter (A) refers to wastes that will be directly categorized as hazardous, while (M) refers to wastes for which hazardousness characteristics will be determined through analyses conducted in accordance with the Regulation.
An indicative list of waste types that are anticipated to be generated during land preparation and construction activities, taken from the waste list in the annex of the Waste Management Regulation, is given in

Table VII.6. The waste codes are as specified in the Regulation and remarks column indicates the hazardousness classification of the wastes as described in the previous paragraph.

Table VII.6. Indicative List of the Potentially Generated Wastes Types During the Land Preparation and Construction Activities

Waste Code	Waste Code Definition	Remarks
01	Wastes Generated During the Exploration, Extraction, Operation and Physical or Chemical Processing of Ores	
01 01	Wastes generated due to mining excavations	
01 01 02	Wastes due to non-metallic ores	
01 04	Wastes from physical and chemical processing of non-metallic minerals	
01 04 07*	Wastes containing dangerous substances from the physical and chemical processing of non-metallic minerals	M
01 04 09	Waste sand and clays	
01 04 13	Wastes from stone chipping and cutting operations other than those mentioned in 01 04 07	
01 04 99	Wastes that not otherwise specified	
13	Oil Wastes and Liquid Fuel Wastes (Excluding Renewable Oils)	
13 01	Waste hydraulic oils	A
13 02	Waste engine, transmission and lubrication oils	A
13 03	Waste insulation and heat conduction oils	A
13 04	Bilge oils	A
13 05	Oil/water separator contents	A
13 07	Wastes of liquid fuels (fuel oil, diesel, gasoline, other fuels including mixtures)	A
15	Waste Packaging and Absorbents, Wiping Clothes, Filter Materials and Protective Clothing Not-Classified Under Other Waste Types	
15 01	Packaging (including packaging material collected by the municipality separately)	
15 01 01	Paper and cardboard packaging	
15 01 02	Plastic packaging	
15 01 03	Wood packaging	
15 01 04	Metallic packaging	
15 01 05	Composite packaging	
15 01 06	Mixed packaging	
15 01 07	Glass packaging	

Waste Code	Waste Code Definition	Remarks
15 01 09	Textile packaging	
15 01 10*	Packaging containing traces of hazardous materials or contaminated with hazardous materials	A
15 01 11*	Metallic packaging material containing hazardous porous solid structures (asbestos, for example), including empty pressurized containers	A
15 02	Absorbents, filter materials, wiping clothes and protective clothing	
15 02 02*	Absorbents, filter materials (oil filters if not classified in any other way), wiping clothes, protective clothing contaminated with hazardous materials	M
15 02 03	Absorbents, filter materials, wiping clothes and protective clothing excluding 15 02 02	
16	Wastes not Classified under any other Type of Waste in the List	
16 01	Wastes generated due to vehicle maintenance (excluding 13, 14, 16 06 and 16 08), end-of-life vehicles and the dismantling of end-of-life vehicles (including construction machinery) in various transportation categories	
16 01 03	End-of-life tires	
16 01 04*	End-of-life vehicles	A
16 01 06	End-of-life vehicles that do not contain liquids or hazardous substances	
16 01 07*	Oil filters	A
16 02	Electrical and electronic equipment wastes	A
16 04	Explosive wastes	A
16 06	Batteries and accumulators	A
16 10	Aqueous liquid wastes to be sent to off-site treatment	
16 10 01*	Aqueous liquid wastes containing dangerous substances	M
16 10 02	Aqueous liquid wastes other than those mentioned in 16 10 01	
16 10 03*	Aqueous concentrated substances containing hazardous substances	M
16 10 04	Aqueous concentrates other than 16 10 03	
17	Construction and Demolition Wastes (Including Excavations Conducted at Contaminated Sites)	
17 01	Concrete, brick, tile and ceramic	
17 01 01	Concrete	
17 01 02	Bricks	
17 01 03	Tiles and ceramic	
17 01 06*	Mixtures or separated groups of concrete, brick, tile and ceramic containing hazardous substances.	M
17 01 07	Mixtures or separated groups of concrete, brick, tile and ceramic, excluding 17 01 06	
17 02	Wood, glass and plastic	
17 02 01	Wood	
17 02 02	Glass	
17 02 03	Plastic	
17 02 04*	Wood, glass and plastic containing or contaminated with hazardous substances.	A
17 03	Mixtures containing bitumen, coal tar and products containing tar	
17 03 01*	Mixtures with bitumen, containing coal tar	M
17 03 02	Mixtures containing bitumen, excluding 17 03 01	

Waste Code	Waste Code Definition	Remarks
17 03 03*	Coal tar and products containing tar	A
17 04	Metals (including their alloys)	
17 04 01	Copper, bronze and brass	
17 04 02	Aluminium	
17 04 03	Lead	
17 04 04	Zinc	
17 04 05	Iron and steel	
17 04 06	Tin	
17 05	Soil (including excavations conducted in contaminated sites), stones and dredging mud	
17 05 03*	Soil and stones containing hazardous substances	M
17 05 04	Soil and stones excluding 17 05 03	
17 06 01*	Insulation materials containing asbestos	A
17 06 05*	Construction materials containing asbestos	A
17 09	Other construction and demolition waste	
17 09 01*	Construction and demolition waste containing mercury	M
17 09 02*	Construction and demolition waste containing PCB (example: filling paste containing PCB, resin-based base coating material containing PCB, coated enamelling units containing PCB, capacitors containing PCB)	M
17 09 03*	Other construction and demolition waste containing hazardous substances (including mixed waste)	M
17 09 04	Mixed construction and demolition waste, excluding 17 09 01, 17 09 02 and 17 09 03	
18	Healthcare Waste	
18 01 03*	Wastes whose collection and disposal is subject to special requirements in order to prevent infection*	A
19	Materials from waste and water treatment	
19 08 05	Sludges from urban wastewater treatment	
19 13 08	Concentrated liquids and aqueous liquid wastes due to groundwater rehabilitation, excluding 19 13 07	
20	Municipal Waste including Separately Collected Fractions (Household Waste and Similar Commercial, Industrial and Institutional Waste)	
20 01	Separately collected fractions (excluding 15 01)	
20 01 01	Paper and cardboard	
20 01 02	Glass	
20 01 08	Biodegradable kitchen and canteen wastes	
20 01 10	Clothing	
20 01 11	Textile products	
20 01 13*	Solvents	A
20 01 14*	Acids	A
20 01 15*	Alkalines	A
20 01 17*	Photo chemicals	A

Waste Code	Waste Code Definition	Remarks
20 01 19*	Pesticides	A
20 01 21*	Fluorescent lamps and other mercury-containing wastes	A
20 01 37*	Wood containing hazardous substances	M
20 01 38	Wood excluding 20 01 37	
20 01 39	Plastics	
20 01 40	Metals	
20 02	Garden and park wastes (including cemetery wastes)	
20 02 01	Biodegradable wastes	
20 02 02	Soil and stones	
20 02 03	Other non-biodegradable wastes	
20 03	Other municipal wastes	
20 03 01	Mixed municipal waste	
20 03 04	Septic tank sludge	

Source: Waste Management Regulation, Appendix-4

(*): Indicates that the waste is either potentially hazardous or hazardous waste.

(A): Indicates that the waste is a hazardous waste, there is no need for any further analysis.

(M): Indicates that the waste is potentially hazardous waste. In order to determine whether the waste is hazardous or not, an analysis is carried as stipulated in Article 11 of this Regulation.

Wastes ending with 99: Wastes ending with the six-digit waste code 99 define wastes that are not classified as hazardous or non-hazardous waste and are not otherwise defined in the list. "Waste Code Determination Hierarchy" and the provisions of Article 12 of this Regulation shall be applied in the use of this waste code.

Municipal Solid Wastes

According to the TurkStat data (2022), the average daily amount of municipal solid waste per capita in Türkiye is 1.03 kg, while this amount is 1.37 kg in Antalya. Most of the municipal solid waste generation due to the Project will be in the campsites. The amount of domestic solid waste to be produced in the campsites is estimated by multiplying the average daily municipal solid waste production per capita of Antalya province by the number of personnel employed due to the Project. The information on maximum number of personnel to be employed and estimated amount of municipal waste to be generated is summarized in Table VII.7. Assuming 20% (Ministry of Environment, Urbanization and Climate Change, 2020) of the municipal solid wastes (by weight) is formed of packaging wastes, estimated amount of packaging wastes within the total municipal wastes to be produced is also provided in the last column of the table. For the handling of municipal solid waste, licensed transportation vehicles and authorized disposal and landfill facilities operated by the municipalities will be used. Where feasible, disposal sites that are both compliant and located in close proximity to the workers' campsites will be prioritized to enhance fuel efficiency, reduce transport time, and minimize environmental impact. All waste handling practices will be carried out in accordance with applicable national regulations and good international industry practice.

Table VII.7. Estimated Solid Municipal Waste Generation of the Campsites

Number of Personnel* (cap)	Daily Municipal Waste Generation (kg/day/cap)	Daily Packaging Waste Generation (kg/day/cap)
3,300	1.37	0.27

** Maximum Project related employee number including subcontractors; provided by the Project Sponsor.*

The amount of municipal solid waste to be produced per day at the campsites is:

1.37 kg/day/cap * 3,300 cap = 4.52 ton/day

When compared to the total municipal solid waste generation of the Antalya province, which is 1,340,770 tons per year (Turkstat, 2022), the Project's contribution to solid waste generation of the province is less than one per two thousand. Additionally it should be noted that the campsites will be present for a maximum of 3 years during the construction period of the Project. Since the waste load contribution of the Project on the existing waste management infrastructure capacity is limited in both time and impact, the overall impact of the Project is determined as negligible.

Municipal Wastewater

According to the TurkStat data (2022), the average daily amount of municipal wastewater per capita in Türkiye is 197 liters, while this amount is 318 liters in Antalya province. Daily municipal water usage per capita is 229 liters in Türkiye, and 349 liters in the province. This disparity between national and regional statistics is mainly due to regional temperature differences and income sources. Antalya, located in the south of Türkiye, is significantly above of the country's average temperature statistics. As temperatures increase, the amount of water lost due to evaporation and the need for water consumption also rise. Additionally, tourism and farming are major sources of income for the province. Since the registered population does not include visiting tourists, the data does not accurately reflect the total number of people in the city. Consequently, water consumption and wastewater production statistics for the province are roughly 50% higher compared to national averages (TurkStat 2022).

According to the maximum personnel numbers in campsites, daily municipal wastewater generation and water usage are calculated below and provided in Table VII.8.

Assumptions:

1- Narrower/specialized statistics have priority over general/national ones if available.
2- It is assumed that the Project personnel in the campsites use %70 of average daily per capita water amount.

3- Water to wastewater ratio is calculated as 0.91 for the Antalya province and assumed as 0.9 for calculations.

Water Consumption:

3,300 personnel; campsite water usage ratio = 0.7; 349 liters/day/cap.

= 3,300 cap * 0.7 * 349 liters/day/cap = 806,190 liters/day = 806.2 tons/day

Wastewater Generation:

Water to wastewater ratio = 0.9

= 806,190 liters/day * 0.9 = 725,571 liters/day = 725.6 tons/day

Table VII.8. Estimated Municipal Wastewater Generation and Water Usage of the Campsites

Number of Personnel* (cap)	Daily Water Demand (L/day)	Daily Wastewater Generation (L/day)
3,300	806,190	725,571

** Maximum Project related employee number including subcontractors; provided by the Project Sponsor.*

As previously mentioned, package WWTPs will be used for domestic wastewater management during construction phase of the Project. In addition, impermeable septic tanks also will be utilized at the campsites, if/when necessary. The mitigation measures are elaborated in the VII.4. Considering the capacity of the WWTPs and other water and wastewater management systems, no significant impact is anticipated due to municipal wastewater management.

Treatment Sludge :

The total wastewater flow from all camp sites (Camp Site-1, Camp Site-2 and Camp Site-3) are approximately 0.725 m³/day. As a result of the treatment process, a small amount of sludge is generated. The sludge production rate corresponds to approximately 0.7 kg of dry solids generated per cubic meter of influent wastewater treated.

Based on this sludge yield, the daily dry sludge production is estimated as follows:

0.725 m^3/day x 0.7 kg/m^3 = 0.5075 kg/day

Therefore, approximately 0.51 kg of dry sludge is expected to be produced daily from all camp sites combined.

The generated sludge will be collected and removed regularly by licensed waste transport vehicles, ensuring proper handling and disposal in accordance with applicable environmental regulations and standards.

Dust Suppression:

To control and minimize fugitive dust emissions during the construction phase of the highway project, dust suppression by water spraying is planned along the main access road. This measure is recognized as an effective way to reduce airborne particulate matter and thereby improve air quality in the vicinity of the project site.

For the purposes of this estimation, the following project-specific parameters and assumptions have been used: the highway will be 10 km in length and 5 m in width, resulting in a total surface area of 50,000 m² that will require periodic spraying. In order to keep the road surface adequately damp and control the release of particulates, an application rate of 0.5 L/m²/day (0.0005 m³/m²/day) has been applied, in accordance with the EPA's Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures (EPA-450/2-92-004). This application rate is considered appropriate under warm and dry climate conditions, such as those frequently encountered in Antalya.

Based on these parameters, the daily water consumption for dust suppression along the highway is estimated to be approximately 25 m³/day. This is a preliminary approximation and may vary depending

on site-specific conditions, operational practices, and climate factors. Water used for dust suppression will be sourced from non-potable or recycled water, where available, in order to minimize freshwater withdrawal and reduce pressure on local water resources. Dust suppression will be carried out using treated water sourced from the wastewater treatment plant outlets, water recovered from ready-mixed concrete sedimentation tanks, and, where necessary and with the appropriate permits, surface water.

Furthermore, proper application methods and equipment will be used to avoid excess usage, water runoff, or soil erosion. This practice forms a key mitigation measure to control air emissions and protect nearby communities and the environment during the construction phases of the highway project.

Concrete and Asphalt Production

Water consumption in concrete plants and mechanical equipment manufacturing plays a crucial role in ensuring production quality and efficiency. In concrete production, water is a fundamental component for the homogeneous mixing of cement and aggregates, as well as for achieving the desired strength parameters. In mechanical equipment manufacturing, water is primarily used in processes such as cleaning, cooling, and surface treatment.

Controlling and optimizing water use is essential not only for reducing operational costs but also for minimizing environmental impacts as part of effective resource management. The table below presents the estimated water consumption (m^3) for various processes in concrete plants and mechanical manufacturing workshops.

Table VII.9 Water Consumption in Concrete Plants and Mechanical Plant Manufacturing m^3

Motorway Km	Facilities Name	Area (m^2)	Maximum Hourly Capacity (m^3/h)	Operation Period (Month)	Water Consumption in Concrete Plants and Mechanical Plant Manufacturing (m^3)
55+450	Concrete Plant-1	13,946	140	36	66,667.05
59+400	Concrete Plant-2	66,450	140	36	81,020.94
	Mechanical Plant		550	16	73,601.07
	Asphalt Plant-1		240	16	-
80+400	Concrete Plant-3	15,000	140	36	56,391.94
87+700	Concrete Plant-4	42,371	140	36	42,943.78
	Mechanical Plant-2		550	16	64,216.74
	Asphalt Plant-2		240	16	-
89+700	Concrete Plant-4a	11,665	140	36	28,701.11
99+200	Concrete Plant-5	11,977	140	36	73,368.82
124+300	Concrete Plant-6	85,000	140	36	83,610.62
	Mechanical Plant-3		550	16	86,669.95
	Asphalt Plant-3		240	16	-

Excavated Materials

In the scope of road construction works, excavated materials are planned be used in the fill operations wherever the properties and the quality of the materials are suitable. According to the Project's calculations, approximately 43,842,275.13 m³ of cut material will be excavated, 4,145,614.09 m³ will be removed by stripping, and 42,291,572.24 m³ will be used in fill operations. This results in a surplus of excavated materials that cannot be used for fill. The surplus is estimated to be approximately 5,696,316.98 m³ (about 10,253,370.57 tons, assuming an average soil density of 1.8 ton/m³).

The surplus of excavated materials that is not suitable for filling operations will be stored at designated excess excavation storage areas. In this regard, list of suitable storage sites identified for the Project is presented in Table VII.5.

Potential impact of the Project due to construction materials extraction will be minimized by reusing the excavated materials as fill material to the greatest extent possible. This approach will also reduce the area required for storage of these materials. The storage areas are placed as close as possible to the Route for fuel and time efficiency. These areas may be repurposed for landscaping purposes upon the completion of the construction phase of the Project.

Construction and Demolition Wastes

Fences, barriers, buildings, walls, former engineering structures, etc. corresponding to the Motorway route will be dismantled and removed prior to construction resulting in generation of construction and demolition wastes. Those wastes will be handled with the use of appropriate construction and demolition waste areas. The generated demolition waste, mainly consisting of rubble and other construction debris, will be transported by trucks with a capacity of approximately 40 tons each. Based on the estimated waste volume per household, it is expected that about 2 truckloads will be required to remove the demolition waste generated from one residential unit.

Preliminary estimates indicate that a total of 304 houses, 37 business structures, and 831 greenhouses will be affected by the Project. Considering an average building height of 3 m for houses and business structures, with wall thickness yielding a structural volume of 300 m³ each, and a debris density of 2 ton/m³, the total waste generated from houses is estimated to be approximately 182,400 ton. The business structures are expected to produce an additional 22,200 ton of waste under the same assumptions. The greenhouses, constructed with lighter materials and typically 2 m in height, are expected to generate approximately 83,100 ton of waste, with a rubble density of 0.5 ton/m³. Overall, a total of approximately 287,700 ton of construction and demolition waste is expected to be generated by the Project. All waste will be efficiently managed, temporarily stored at designated sites, and subsequently disposed of or recycled in compliance with applicable legislation and best practices. Additionally, affected households and business owners will be permitted to salvage any materials or components of value from the demolition site following the completion of demolition activities, prior to the removal and disposal of debris.

This waste will be efficiently managed through transportation, temporary storage at designated sites, and subsequent disposal or recycling in compliance with applicable legislation and environmental best practices.

All construction and demolition wastes will be temporarily stored in designated storage areas and subsequently disposed of or recycled in compliance with applicable legislation and regulations. Proper waste management practices will be implemented to minimize potential impacts on the environment and human health.

Hazardous and Special Wastes

Hazardous waste shares the properties of a hazardous material (e.g. ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed. Wastes may also be defined as “hazardous” by local regulations or international conventions, based on the origin of the waste and its inclusion on hazardous waste lists, or based on its characteristics (IFC, April 2007). Waste Management Regulation specifies the hazardousness properties (explosive, oxidizing, flammable, irritating, toxic, and carcinogenic, etc.) of wastes and lists the types of wastes that are to be handled directly as hazardous or after tests to be done if their hazardousness properties and concentrations are confirmed. Additionally, specific regulations are in force for the management of special wastes such as waste tires, medical wastes, waste vegetable oils, waste batteries and accumulators.

In the scope of the Project, it is likely that special wastes, hazardous wastes (e.g. spent solvents) or wastes contaminated with substances having hazardous properties (e.g. packaging wastes, personal protective equipment, oily cleaning rags, empty paint cans, chemical containers, used lubricating oil, used batteries, lighting equipment such as lamps or lamp ballasts, etc.) would be produced during the construction activities, as it is the case in many projects (IFC, April 2007).

The total quantity of hazardous waste generated on-site thought the project is estimated to be approximately 750 tons.

Amount of waste engine and machinery oils may be relatively higher in comparison to other types of hazardous and special wastes due to the large number of equipment to be involved in the construction works. Assuming that the average oil capacity of the construction machineries is 20 liters and motor oils of these machineries will be changed 4 times a year, total amount of waste oil to be produced can be estimated as given in Table VII.10.

Table VII.10. Estimated Engine Oil Waste Amounts

Machinery	Piece	Total Engine Oil Capacity (L)	Annual Engine Oil Waste (L)
Excavator	51	1,020	4,080
Grader	5	100	400
Bulldozer	14	280	1,120
Loader	20	400	1,600
Roller	10	200	800
Rock Driller	24	480	1,920
Transmixer	50	1,000	4,000
Compactor	24	480	1,920
Paver	12	240	960
Truck	147	2,940	11,760
Other (Mobile crane, injector, shotcretor, asphalt distributor, pump etc.)	115	2,,300	9,200
Total	**472**	**9,440**	**37,760**

VII.3.2. Operation Phase

The municipal solid waste will be generated by operational activities, including food waste, packaging, office waste, and hygiene-related waste. Based on an average generation rate of 1.04 kg/person/day and a site presence ratio of 0.7, total municipal solid waste from employees is estimated at approximately 182 kg/day (or 0.182 tons/day). This waste will be collected, separated where necessary, and transported to licensed disposal or recovery facilities via authorized service providers.

While the number of personnel is modest compared to the construction phase, this daily recurring load on the waste and wastewater infrastructure has been considered in this ESIA. Provided that proper mitigation measures are implemented—including adequate sanitary systems, timely collection and disposal, and compliance with national waste regulations—no significant environmental impact is anticipated during the operation phase in terms of waste and wastewater generation.

Solid waste generation during operation and maintenance activities will be caused by road resurfacing waste (e.g. removal of the old road surface material); road litter, illegally dumped waste, or generic solid waste from the toll plazas, control and weigh stations, roadside assistance/emergency and security buildings, operation/maintenance centers as wells as the employees of these facilities and users/visitors of these services, animal carcasses, vegetation waste from right-of-way maintenance, and sediment and sludge from storm water drainage system maintenance (including sediment traps and oil/water separation systems). After separate collection of recyclable wastes, all municipal solid wastes will be sent for disposal, according to the waste type, in a timely manner, to licensed facilities using licensed solid waste transportation vehicles.

During operation and maintenance activities, municipal wastewater will be generated from the toll plazas, control and weigh stations, roadside assistance/emergency and security buildings, operation/maintenance centers as well as the wastewater generated by the employees of these facilities and users/visitors of these services. It is expected that approximately 250 personnel will be employed in the Project facilities. When the estimated site availability rate is taken as 0.7 and the daily water use per person is taken as 349 liters, the total water consumption attributed to the operation personnel is calculated as approximately 61.1 tons/day. When the standard water-wastewater conversion coefficient of 0.9 is applied, the amount of domestic wastewater to be generated is estimated as approximately 55 tons/day. The facilities of the Project will be connected to the municipal sewer system or utilize septic tanks, preventing the discharge of untreated wastewater into any receiving environment.

The package wastewater treatment plant located in Concrete Plant-2, Mechanical Plant-1 and Asphalt Plant-1 Area will continue in the operation phase. In the event of a failure, emergency, overflow or maintenance, the municipal wastewater that are stored in septic tanks and/or trapped in the sewer systems will be sent for treatment, in a planned and timely manner, to licensed facilities of the relevant municipalities using licensed septic/vacuum trucks. Formal agreements for the removal and transportation of this wastewater will be finalized in advance. These agreements will clearly specify the designated disposal locations and confirm the treatment capacities of the receiving facilities.

Hazardous wastes may also be produced in limited quantities at the maintenance and operation centres. Paint waste may also be generated from road and bridge maintenance for example due to removal of old paint from road stripping and bridges prior to re-painting (IFC, April 2007). These wastes will be properly managed in line with the requirements of national waste management legislation and international good practice in order to avoid impacts on soils, nearby water resources and flora and fauna elements. Hazardous waste will be stored in separate containers in the temporary storage area allocated for this purpose, to avoid mixing with the non-hazardous waste as indicated in

Waste Management Regulation. This area will have an impermeable base/ground and will be protected from the surface flows and rain.

With proper implementation of good waste management practices, international standards and national regulations, waste generation would not cause any significant impact on the soil or water resources or on the ecosystem components that would bring associated risks on health and safety of the community and/or Project personnel. Therefore, during the operation phase of the Project, no significant impact is anticipated due to waste generation and management related to the Project facilities (including the Motorway) after implementation of necessary mitigation measures provided in the following subsection.

VII.4. Mitigation Measures

Wastes generated in the scope of Project activities will be managed in accordance with the waste management hierarchy (see Figure VII.2). In this respect, waste generation will be avoided or minimized at the source to the extent possible. Once these options are exhausted, on-site waste reuse options will be explored and implemented. If on-site waste reuse is not viable, alternative external recycling/recovery options will be evaluated. Lastly, as an ultimate alternative, wastes will be sent to final disposal only if other waste management methods are not possible. Legitimate contractors, possessing the appropriate licenses from the Ministry of Environment, Urbanization and Climate Change for the transportation, recycling/recovery or disposal of specific types of wastes, will be selected for waste management throughout all phases of the Project. Detailed procedures to be applied for each type of generated waste are provided in the Solid Waste Management Plan (presented as Annex-4). Training will be provided to the Project personnel regarding the proper implementation of waste management procedures in line with the requirements of national legislation, international standards and good practices.



Figure VII.2. Waste Management Hierarchy (https://www.epa.gov)

Waste management of all Project activities will comply with the following regulations, legislations and laws:

- Environmental Law
- Regulation on Waste Management,
- Hazardous Wastes Control Regulation,
- Water Pollution Control Regulation,
- Surface Water Quality Regulation,
- Regulation on the Control of Pollution Caused by Dangerous Substances in and around the Water Bodies,
- Regulation Concerning Protection of Groundwater against Pollution and Deterioration,
- Ordinance on Groundwater Resources,
- Regulation on Safety Data Sheet on Harmful Substances and Mixture,
- Regulation on the Preparing and Distributing Safety Data Sheets Regarding Dangerous Materials and Preparations,
- Regulation on the Classification, Labeling and Packaging of Materials and Mixtures,
- Regulation on Transportation of Hazardous Goods on Highways,
- Equator Principles (EPs) IV,
- International Finance Corporation (IFC) Performance Standards 1 and 3 and 4,
- IFC Environmental, Health, and Safety General Guidelines,
- IFC Environmental, Health and Safety Guidelines – Toll Roads,
- Regulation on the Control of Packaging Wastes,
- Regulation on the Control of Medical Wastes,
- Regulation on the Control of Waste Oils,
- Regulation on the Control of Waste Batteries and Accumulators,
- Regulation on the Control of Waste Tires,
- Regulation on the Control of Waste Vegetable Oils,
- Regulation on the Control of Excavation Soil, Construction and Demolition Wastes,
- Regulation on Mining Wastes,
- Regulation on the Landfill of Wastes,
- Circular on the Preparation of Implementation Project for Landfills,
- Circular on Landfill of Mining Wastes and Technical Arrangement of Other Landfills,
- Mining Law,
- Forestry Law,
- Pasture Law,
- Pasture Regulation,
- Regulation Concerning the Rehabilitation of the Lands Disturbed by Mining Activities,
- World Business Council for Sustainable Development (WBCSD), December 2011, and
- Guidelines on Quarry Rehabilitation.

Regarding the management of Project-sourced wastes, written agreements/protocols will be established with the local waste management service providers that have valid permits and licenses from the Ministry of Environment, Urbanization and Climate Change. Copies of all the relevant documents will be retained at the campsites and in Project offices.

VII.4.1. Land Preparation and Construction Phase

Hazardous and special wastes such as waste oils, tires, will be generated from maintenance of vehicles and equipment during the construction phase. These wastes will be properly managed in line with the requirements of national waste management legislation and international good practice in order to avoid impacts on soils, nearby water resources and flora and fauna elements. Hazardous waste will be stored in separate containers in the temporary storage area allocated for this purpose, to avoid mixing with the non-hazardous waste as indicated in Waste Management Regulation. This area will have an impermeable base/ground and will be protected from the surface flows and rain. General measures that will be applied to avoid or minimize potential impacts or risks sourced from waste generation are summarized below (provided in ESMP, Annex-6):

- Wastes will be collected systematically in closed containers with various types of wastes (non-hazardous, hazardous and special wastes) sorted for proper handling and disposal.
- Throughout the project life cycle, hazardous materials will be stored in designated areas at storage points with appropriate containment and Material Safety Data Sheets (SDS). When chemicals need to be temporarily removed from these designated storage areas for operational purposes, appropriate spill control materials will be available at the points of use.
- Recyclable wastes will be collected separately to be transported by licensed recycling/recovery facilities.
- The use of non-hazardous materials will be preferred, whenever possible and feasible. If the use of hazardous materials is unavoidable, the generated hazardous wastes will be segregated from non-hazardous wastes to prevent mixing and contamination. Therefore minimizing the amount of hazardous waste by preventing new formations.
- No waste will be burned, illegally dumped or buried on site.
- To prevent solid wastes from being blown away by the wind, wastes will be stored in closed containers and disposed of in a timely manner. Any garbage scattered due to wind, rain etc. will be cleaned daily. The cleanliness of the construction site areas, campsites and their surroundings will be maintained properly.
- Project personnel will be trained on proper waste management procedures.
- Temporary storage areas will be established at the campsites for the storage of both hazardous and non-hazardous wastes. The necessary permits will be obtained for these areas and then they will be put into use.
- Licensed waste transportation vehicles will be used to remove wastes temporarily stored at Project sites. Private companies and relevant municipalities will be consulted for this purpose. Potential management options will be evaluated in accordance with the relevant waste management regulations, and all actions will be documented and retained by Project Management.

Temporary hazardous and non-hazardous waste storage areas will have the following features (also provided in detail in ESMP, Annex-6):

- All chemicals and hazardous materials will be stored in designated hazardous materials storage areas that has lean-to roof, concrete floor, secondary containment of at least 110% of the stored volume and proper drainage for spills/leaks;
- The roof and sides of the storage area will be properly covered to prevent rainwater intrusion;

- The floor of the area will be sealed with either reinforced concrete or epoxy material;
- Drainage of the areas will be facilitated with the channels leading to blind sumps;
- Access to storage areas will be controlled through gates equipped with proper locking systems;
- Necessary signs and boards will be properly placed; name and contact number of the personnel responsible for the area will be displayed on the boards;
- Separate storage compartments/containers will be provided for the storage of different types of wastes;
- Leak-proof containment structures will be placed under the tanks/drums holding liquid wastes to prevent contamination from any potential spillage/leakage;
- For the storage of liquid wastes greater than 220 liters, secondary containment will be provided with an available volume of at least 110% of the largest storage container or 25% of the total storage capacity, whichever is greater;
- Relevant fire-fighting equipment (i.e. mobile fire extinguishers) will be kept readily outside the storage areas;
- Absorbents will be readily available to respond to potential leakage/spillage events;
- Adequate ventilation will be provided in areas designated for storage of volatile wastes.
- All the hazardous and non-hazardous temporary waste storage areas will be subject to regular visual inspections by assigned site personnel. Additional information is presented in ESMP, Annex-6.

Municipal Wastes/Wastewater

Municipal solid wastes to be generated at campsites and other work sites will be stored in closed containers and will be collected by municipality trucks or licensed firms for disposal. Separate waste containers (drums, bins, or bags) will be provided for different types of waste. As mentioned previously, closest landfills will be considered for the disposal of Project-sourced municipal solid wastes. Project Sponsor will coordinate with the relevant municipalities to ensure that municipal solid wastes are disposed of in accordance with the established agreements.

Municipal wastewater generated at the campsites and work sites will be treated by package WWTPs (wastewater treatment plants). Environmental permits for discharges from these package WWTPs will be obtained, and wastewater disposal agreements/channel connection permits will be established with the relevant municipalities. The quality of the treated water will meet the Project Standards.

Additionally, the capacity of package WWTPs will be monitored to ensure operational standards. The monitoring will be conducted in compliance with national legislation and international standards.

A detailed monitoring program will be developed for all discharges from WWTPs, including those in the temporary construction area. The program will specify discharge locations, monitoring frequencies, and applicable discharge standards. In addition, the operational capacity of package WWTPs will be regularly monitored to ensure continued compliance with national legislation and applicable international standards. A comprehensive maintenance program will also be developed and implemented to ensure the effective and uninterrupted functioning of all WWTP units.

Furthermore, a clear process will be established for investigating any non-compliance with discharge limits, including corrective measures and temporary storage of effluent until regulatory compliance is restored.

The accredited laboratories (accredited by TÜRKAK or a similar national accreditation body) will perform a range of physico-chemical and microbiological tests, including pH, suspended solids, BOD, COD, and heavy metals, following standard analytical methods (EPA, ISO). Wastewater management practices at concrete plants will also be monitored. Additionally, presence and functionality of drainage systems will be evaluated annually during the operation phase. Further details of these processes provided in ESMP, Annex-4.

Excavated Materials

Materials to be excavated from the Motorway route will be reused as fill material in the construction of the road base, shoulders, side slopes etc. to the extent the quality and quantity of materials allow. This approach will minimize excavation waste and reduce the volume of excess material that needs to be permanently stored. The excess of excavated materials and/or the materials are not suitable for being used in construction or filling processes, will be permanently stored in the designated storage areas. Permits of these designated storage areas will be acquired from the related authorities. Transportation of the materials to the storage areas will be carried out with licensed vehicles. Locations of planned designated storage areas for the excess excavated materials are given in previous chapters/sections.

Construction Wastes

Construction and demolition wastes will be disposed of in accordance with the Regulation on the Control of Excavation Soil, Construction and Demolition Wastes. Generated scrap metals will be collected separately from other construction wastes. These wastes will be managed by the recycling/recovery companies licensed by Ministry of Environment, Urbanization and Climate Change.

Hazardous and Special Wastes

Hazardous and special wastes (e.g., waste oils, waste tires, waste batteries, and waste accumulators) will be collected separately in closed containers and will be transported to licensed firms for recycling, recovery, or final disposal facilities. Hazardous materials will not be stored on bare soil to prevent contamination. Supervision will be implemented during the handling of all dangerous materials. Impervious bunds, impermeable floors, secondary containments, and other containment techniques will be employed where hazardous materials are handled. All processes/works that includes hazardous materials will be conducted in accordance with the Hazardous Wastes Control Regulation.

Waste Oil

Waste oils will be stored separately in tanks, containers, or similar structures placed at temporary waste storage sites on impermeable surfaces. Waste oils generated at the facilities will be analyzed at the competent laboratories and will be classified according to their categories. Waste oils temporarily stored at the Project facilities will be collected and transported to licensed recovery facilities by licensed transfer vehicles in accordance with the Regulation on the Control of Waste Oils.

Medical Waste

Medical waste generated at the construction site infirmaries will be stored separately from other wastes types. Special storage bags and boxes will be used for this purpose. Medical waste will be

temporarily stored in sealed, labeled containers within a secured area of the infirmary facility until sent for disposal in accordance with Medical Waste Control Regulation. Unauthorized access to the areas where medical wastes are temporary stored will be prevented. Until final disposal, un-sharp wastes will be stored in specially designed red bags, marked with “International Bio-Hazards” symbols and labeled “Warning: Medical Waste” on both sides. Sharp medical wastes will be stored separately in containers designed to be puncture-resistant, tear-resistant, leak-proof, and tamper-proof, with visible labeling indicating “International Bio-Hazards” and “Warning: Sharp Medical Waste”. Temporary stored medical wastes will be transported using appropriate and licensed medical waste transport vehicles, in compliance with the Regulation on the Control of Medical Wastes.

Waste Batteries and Accumulators

Generated waste batteries and accumulators will be stored separately from other waste types Temporary stored battery and accumulator wastes will be transported by licensed vehicles, in accordance with Regulation on the Control of Waste Batteries and Accumulators.

Treatment Sludge

Generated treatment sludge at the package WWTPs will be analyzed in accordance with the National Waste Management Regulation in order to identify its characteristics (hazardous or non-hazardous). Depending on its characteristics, waste treatment sludge will be disposed of at a licensed waste disposal site by companies licensed from the Turkish Ministry of Environment, Urbanization and Climate Change.

All expected waste types to be generated are provided in Table VII.11, including their waste codes and descriptions. Required agreements will be established for the management of all potentially generated wastes.

Table VII.11. Wastes to be collected by the Contractor

Waste Code	Code Description
20 01 40	Metals (Scrap)
17 04 05	
15 01 10	Steel Barrel
	Tin
	Plastic
15 02 02	Cloth, Glove Filter Materials
16 01 07	Oil Filters
16 06 01	Accumulator
15 01 11	Pressure Vessels
20 01 21	Fluorescent and Mercury Containing Wastes
13 01 13	Hydraulic Oil
20 01 26	Vegetable Waste Oil
08 01 11	Waste Paint Varnish

Waste Code	Code Description
08 03 17	Cartridge - Toner
16 02 15	Discard Electronic Equipment
17 04 09	Contaminated Metal
16 05 06	Laboratory Chemicals
10 13 14	Concrete Mud

VII.4.2. Operation Phase

During the operation phase, measures proposed for the management of construction phase wastes will continue to be applied where applicable. Additional waste management measures to avoid/minimize waste production and manage unavoidable wastes during the operation phase are provided below:

- Chlorine free solvents and lead-free paints will be used within the scope of maintenance activities.
- Any waste identified or generated in the Motorway corridor as a result of the site cleanings, sediment removal, tree/shrub trimming, animal death and spill/scattering of waste tires, metal pieces, etc. will be immediately removed from the road surface and disposed of in accordance with the relevant national regulations within 7 days;
- Road resurfacing wastes will be prioritized for recycling wherever feasible, by using them as aggregate or base material for the pavement;
- Recyclable materials such as glass, scrap tires, certain types of slags and ashes will be added to the new asphalt and concrete mixes;
- Unused or partially consumed products (e.g. paint, herbicide) requiring disposal will be minimized through effective inventory management;
- Any obsolete product will be removed/managed in accordance with the national regulations, and international standards;
- The characteristics (hazardous or non-hazardous) of the sediments and sludge resulting from drainage system maintenance will be determined in accordance with the Waste Management Regulation. Disposal methods appropriate to the identified characteristics will then be applied;
- Vegetation waste will be composted for reuse as landscaping fertilizer where possible.

VII.5. Summary of Assessments and Residual Impacts

Table VII.12 provides a summary of this chapter. With proper implementation of good waste management practices, international standards and national regulations, use of resources and waste generation related to the Project would not cause any significant impact on the soil or water resources or on the ecosystem components that would bring associated risks to the health and safety of the community and/or Project personnel. Therefore, during both land preparation and construction, and operation phases of the Project, no significant impact is anticipated due to waste generation and management related to the Project facilities (including the Motorway) after implementation of necessary mitigation measures provided in this chapter.

Table VII.12. Summary of the Assessments Waste Management

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phase												
Incremental load on the capacities of the local waste management facilities due to Project-sourced municipal solid wastes.	Local solid waste infrastructure	Adverse	Local	Medium	Negligible	Long-term reversible	Continous	Restricted (C)	Low (1)	Low(C1)	• Cooperation will be established with licensed local service providers (e.g. municipal and/or private licensed waste transportation/recycling/ recovery firms) through written agreements/protocols to ensure regular and planned management/disposal of Project-sourced wastes. • The amount of wastes sent to off-site management will be minimized by implementation of the Solid Waste Management Procedure which incorporates and relies on the waste managament hierarchy. • Wastes will be collected systematically in closed containers and various types of wastes (non-hazardous, hazardous and special wastes) will be sorted for proper handling and disposal. • Recyclable wastes will be collected separately and sent to licensed recycling facilities. • The use of non-hazardous materials will be preferred whenever possible and feasible. If the use of hazardous materials is inavoidable, generated hazardous wastes will be segregated from non-hazardous wastes. Therefore, minimizing the amount of hazardous waste by preventing new formations. • No waste will be burned, illegally dumped or buried on site. • To prevent solid wastes from being blown away by the wind, wastes will be stored in closed containers and disposed of in a timely manner. Any garbage scattered due to wind, rain etc. will be cleaned daily. The cleanliness of the construction site areas, campsites and their surroundings will be maintained properly. • The Project personnel will be trained on proper waste management procedures. • Temporary storage areas will be established at the campsites for the storage of both hazardous and non-hazardous wastes. • Licensed waste transportation vehicles will be used to remove wastes temporarily stored at Project sites. Private companies and relevant municipalities will be consulted for this purpose. Potential management options will be evaluated in accordance with the relevant waste management regulations, and all actions will be documented and retained by Project Management. • All chemicals and hazardous materials will be stored in designated hazardous materials storage areas that have lean-to roof, concrete floor, secondary containment of at least 110% of the stored volume and proper drainage for spills/leaks. • The roof and sides of the storage area of chemicals and hazardous materials will be properly covered to prevent rainwater intrusion and the floor of the area will be sealed with either reinforced concrete or epoxy material to prevent contamination. In addition, drainage of the areas will be facilitated with the channels leading to blind sumps. • Access to storage areas of chemicals and hazardous materials will be controlled through gates equipped with proper locking systems. Necessary signs and boards will be properly placed; name and contact number of the personnel responsible from the area will be put on the boards. • Separate storage compartments will be provided for the storage of different types of chemicals and hazardous wastes. Leak-proof containment structures will be placed under the tanks/drums holding liquid wastes to prevent contamination from any potential spillage/leakage. • For the storage of liquid wastes greater than 220 liters, secondary containment will be provided with an available volume of at least 110% of the largest storage container or 25% of the total storage capacity,	Negiligible
Incremental load on the capacities of the local waste management facilities ue to Project-sourced municipal wastewater.	Local wastewater infrastructure	Adverse	Local	Medium	Negligable	Long-term reversible	Continous	Restricted (C)	Low (1)	Low (C1)		Negiligible
Incremental load on the capacities of the local waste management facilities due to Project-sourced hazardous and special wastes (hazardous, accumulator and battery, medical, oils, and treatment sludge wastes).	Local hazardous and special waste infrastructure	Adverse	Local	Medium	Negligable	Long-term reversible	Continous	Restricted (C)	Low (1)	Low (C1)		Negiligible

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											whichever is greater. Absorbents will be readily available to respond to potential leakage/spillage events. • Relevant fire-fighting equipment (i.e. mobile fire extinguishers) will be kept readily outside the storage areas of liquid chemicals and hazardous materials. Adequate ventilation will be provided in areas designated for storage of volatile hazardous and chemical wastes. • All the hazardous and non-hazardous temporary waste storage areas will be subject to regular visual inspections by assigned site personnel.	

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Operation Phase												
Incremental load on the capacities of the local waste management facilities due to Project-sourced municipal solid wastes.	Local solid waste infrastructure	Adverse	Local	Long	Negligable	Long-term reversible	Continous	Restricted (C)	Low (1)	Low (C1)	• Chlorine free solvents and lead-free paints will be used within the scope of maintenance activities. • Any waste identified or generated in the Motorway corridor as a result of the site cleanings, sediment removal, tree/shrub trimming, animal death and spill/scattering of waste tires, metal pieces, etc. will be immediately removed from the road surface and disposed of in accordance with the relevant national regulations within 7 days. • Road resurfacing wastes will be prioritized for recycling wherever feasible, by using them as aggregate or base material for the pavement. • Recyclable materials such as glass, scrap tires, certain types of slags and ashes will be added to the new asphalt and concrete mixes. • Unused or partially consumed products (e.g. paint, herbicide) requiring disposal will be minimized through effective inventory management. • Any obsolete product will be removed/managed in accordance with the national regulations, and international standards. • The characteristics (hazardous or non-hazardous) of the sediments and sludge resulting from drainage system maintenance will be determined in accordance with the Waste Management Regulation. Disposal methods appropriate to the identified characteristics will then be applied. • Vegetation waste will be composted for reuse as landscaping fertilizer where possible.	Negiligible
Incremental load on the capacities of the local waste management facilities due to Project-sourced municipal wastewater.	Local wastewater infrastructure	Adverse	Local	Long	Negligable	Long-term reversible	Continous	Restricted (C)	Low (1)	Low (C1)		Negiligible
Incremental load on the capacities of the local waste management facilities due to Project-sourced hazardous and special wastes (hazardous, accumulator and battery, medical, oils, and treatment sludge wastes).	Local hazardous and special waste infrastructure	Adverse	Local	Long	Negligable	Long-term reversible	Continous	Restricted (C)	Low (1)	Low (C1)		Negiligible

VIII. WATER RESOURCES

This Chapter identifies the existing water resources' characteristics (physical, biological, and chemical) and usage along the Motorway route and assesses the potential impacts of the Project on these aspects. Measures proposed to mitigate the potential impacts, and the residual impacts are also described in this Chapter.

VIII.1. Assessment Methodology and Data Sources

To assess the impacts to the water resources and possible water usage by the Project Sponsor, the main water resources in the area have been determined and evaluated by considering the physical and chemical characteristics of the resources. The data concerning the dam lakes near the project area has been obtained from State Hydraulic Works (DSI) database, Antalya Provincial Environmental Status Report prepared in 2023, and internet resources.

Sampling points for both surface water and groundwater resources have been carefully selected to represent areas where potential environmental impacts may occur. In addition to considering possible future water use, the selection of groundwater sampling locations also takes into account the distribution of different hydrogeological units. This approach helps to better characterize the spatial variability of groundwater quality in relation to the underlying geological formations. All water quality analyses have been carried out in accordance with relevant Turkish regulations, which are harmonized with EU standards. The results of this sampling and analysis campaign will serve as baseline data for both surface and groundwater resources, providing a scientific foundation for impact assessment studies.

Significance Criteria

The significance criteria for the impacts on water resources have been determined as high, medium, or low, based on the evaluation of the magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter 4 ("ESIA Methodology") are used to determine the magnitude of impact on the water resources. The sensitivity/value criteria to be used in the scope of impact assessment for the resources are based on the existing and potential use of the resource, existing quality, and expert judgment.

VIII.2. Baseline Conditions

The Motorway route crosses many surface water resources, including intermittent and perennial rivers and creeks. These resources may be affected by the Project activities in various ways during the construction and operation phases of the Project if not properly mitigated.

In general, the highway route passes through the Antalya River basin; it has river crossings with high flow rates, such as Köprüçay and Manavgat Stream. Hence, viaducts were included in the Motorway design.

An intensive baseline water quality sampling and analyses program (covering both surface and groundwater resources) has been conducted to characterize the baseline water quality conditions at such areas and other surface water bodies crossed by the Project. The program included in-situ measurements, sampling, and laboratory analyses. The interpretation of measurement results is done

in accordance with relevant national and international standards, and baseline conditions regarding surface and groundwater resources are provided in this Chapter.

VIII.2.1. Antalya Basin

The Antalya basin is surrounded by Sultan Mountains in the north, Alanya District and Toros Mountains in the east, Beydağları and Katrancık Mountains in the west, and is bordered by Antalya Bay in the south. There are Doğu Akdeniz and Konya Kapalı Basins to the east, the Batı Akdeniz and Burdur Basin to the west, and the Akarçay Closed Basin to the north in the region (see Figure VIII.1). The narrowest point in the east-west direction of the basin, which is approximately 200 km long and 170 km wide, is within the Eğirdir district of Isparta province and its width is approximately 30 km. Basin area is approximately 32,041 km^2 and covers approximately 4% of Türkiye's surface area. According to the population and area information in the Antalya Basin, the general population density is 109 people/km^2 and this value is above the 97 people/km^2 value determined by Turkstat for Türkiye *(TUBITAK MAM, 2013 & MoAF Web Site*).

Antalya Basin is located in the Mediterranean Region (south) of Türkiye, between the Western Mediterranean and Eastern Mediterranean, and covers the area where rivers Boğaçay, Düden Stream, Köprüçay, Aksu Stream, Karpuz, Alara, Kargı, Oba and Dim Streams flow into the Mediterranean Sea. In the upper part of the basin, there are mainly Pupa Stream, Hoyran Stream, Yalvaç Stream and Korkuteli Stream.

The main point and diffuse pollutant sources that create pressure in the Antalya Basin are generally untreated wastewater from urban sources, discharge waters from industries (discharge waters from rural septic tanks operating on the untreated wastewater of Isparta Stream (leatherworks, marble enterprises), leachate from irregular solid waste landfills, fertilizers and pesticides used in agricultural activities mixing with surface and groundwater, and pollution from livestock activities mixing with groundwater. In addition, tourism activities and climate change are also pressure factors affecting the Antalya basin.

In basin management studies, a sub-basin based management approach was adopted by considering the pressure factors in the basin. For this purpose, sub-basin delimitations were made by taking into consideration the hydromorphological and topographical status of the basin; similarities and differences of pressure factors; studies carried out by institutions and administrative status.

Antalya Basin Conservation Action Plan studies were divided into 5 sub-basins in accordance with the above principles. These sub-basins are;

- Dim Stream Sub-basin
- Düden Stream Sub-basin
- Manavgat Stream Sub-basin
- Köprüçay Sub-basin
- Aksu Stream Sub-basin.

The route passes through the Manavgat, Aksu and Dim stream sub-basins. Sub-basins map of Antalya Province is given in Figure VIII.2.

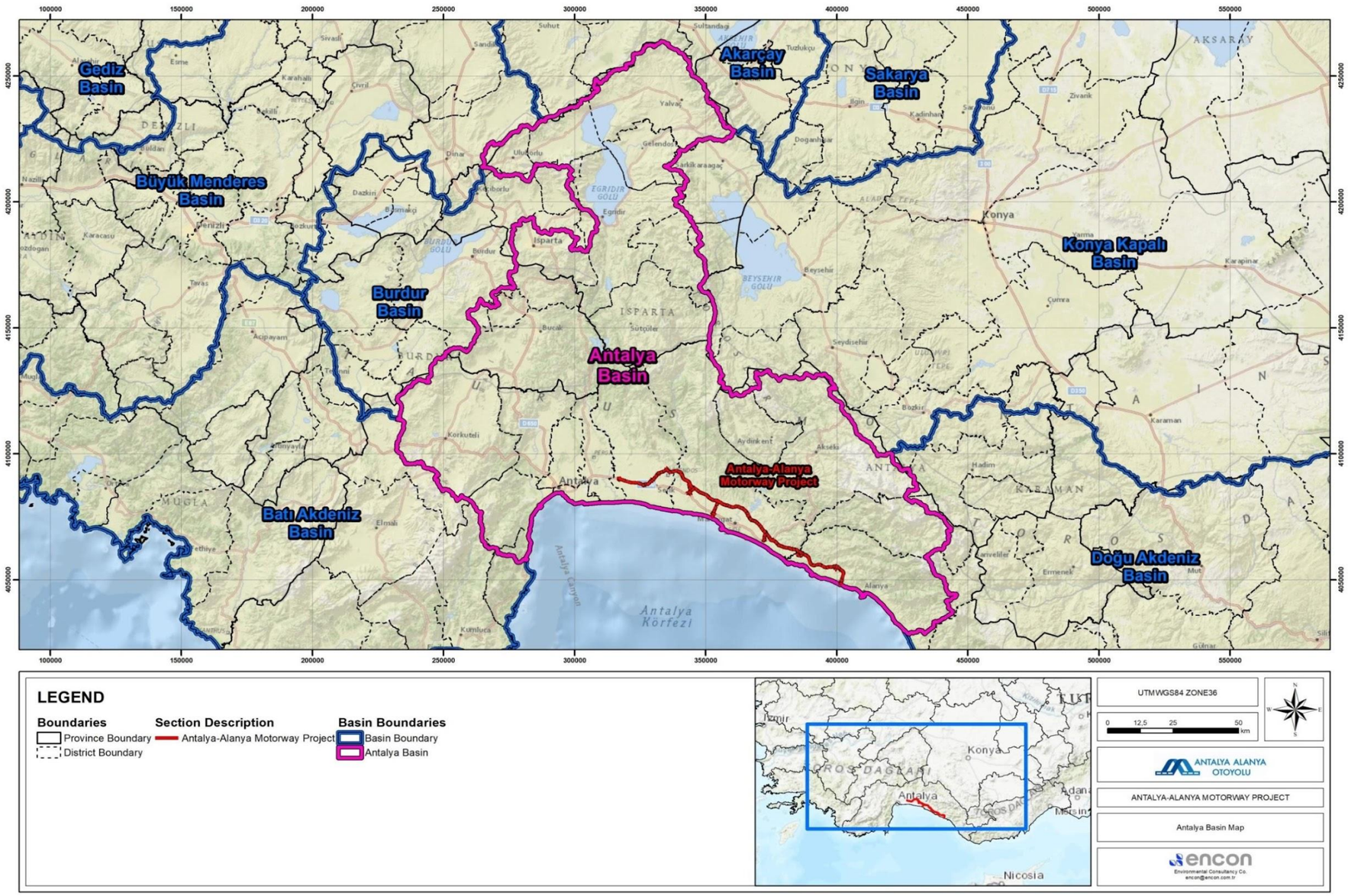


Figure VIII.1 Antalya Basin Map

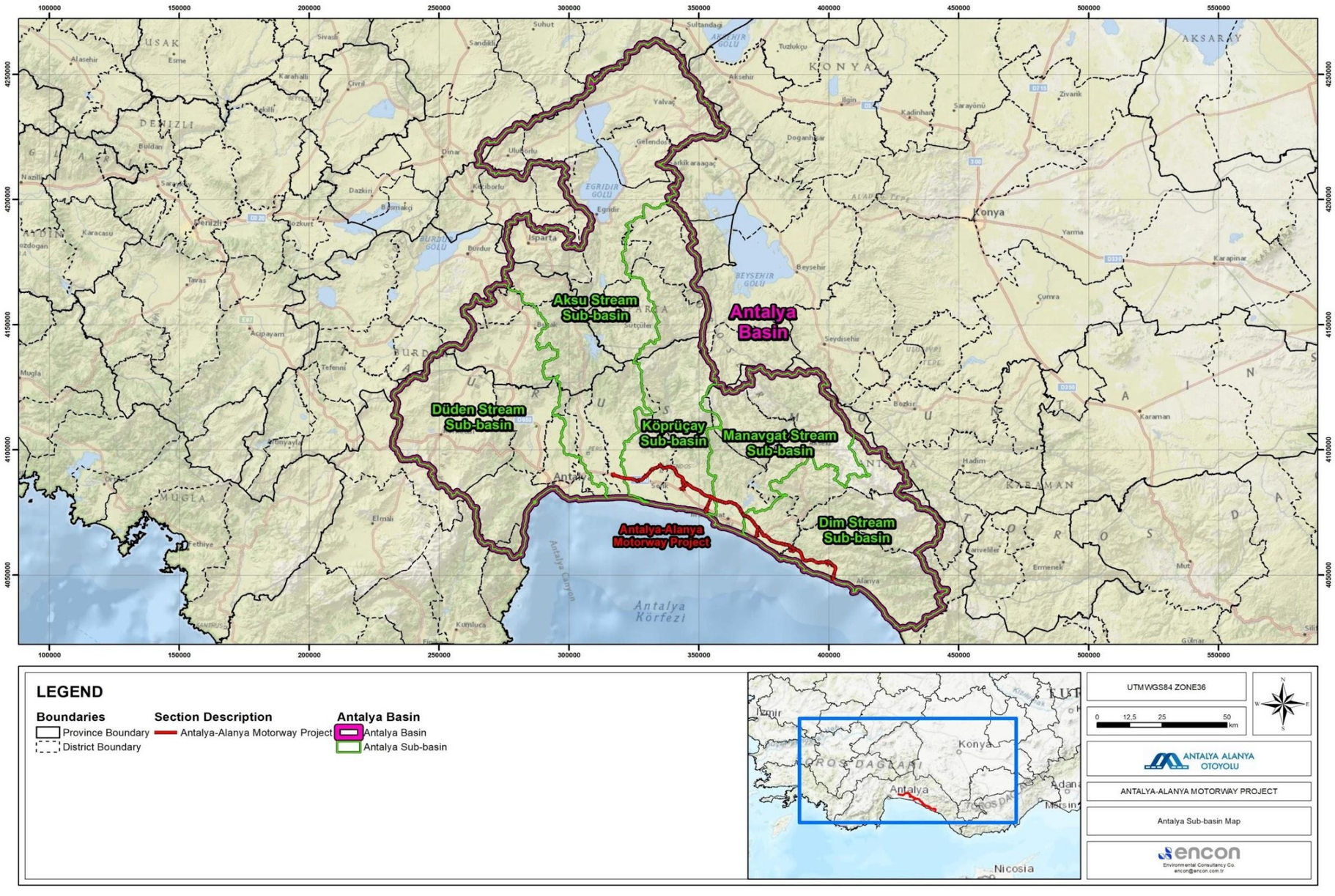


Figure VIII.2 Antalya Sub-basins Map

VIII.2.2.Water Resources

Antalya Basin is one of the richest regions of Türkiye in terms of water resources with 12,283.44 hm^3 of usable water potential. In order to identify and determine the surface water bodies in the Antalya Basin, a detailed assessment has been made. A total of 155 surface water bodies (109 rivers, 32 lakes, 11 transitional water bodies and 3 coastal water bodies) were identified[1].

VIII.2.2.1. Standing Water Bodies

Information on the dams in the Antalya Basin is presented in Table VIII.1 for each sub-basin and the drinking water.

Table VIII.1. Information on Dam Lakes in the Basin

No.	Dam Lake	Province	Surface Water	Area (ha)	Purpose
1	Karacaören -1 Dam Lake	Burdur	Aksu Stream	4,550	Irrigation, Energy, Flood
2	Karacaören 2 Dam Lake	Burdur	Aksu Stream	234	Irrigation, Energy, Flood
3	Sücüllü Dam Lake	Isparta	Sücüllü Stream	82	Irrigation
4	Uluborlu Dam Lake	Isparta	Pupa Stream	125	Irrigation
5	Alanya Dim Dam Lake	Antalya	Dim Stream	470	Irrigation, Energy, Drinking
6	Kokuteli Dam Lake	Antalya	Korkuteli Stream	220	Irrigation, Flood, Drinking
7	Onaç-2 Dam Lake	Burdur	Onaç Stream	356	Irrigation,
8	Oymapınar Dam Lake	Antalya	Manavgat Stream	470	Energy
9	Manavgat Barajı	Antalya	Manavgat Stream	860	Energy
10	Sorgun Dam Lake	Isparta	Sorgun Stream	122	Irrigation

The dams under construction in the basin and their construction start years are listed below (State Hydraulic Works Website).

- Manavgat Çardak Toksurlar Dam (2013),
- Serik Kırkgeçit Dam (2013),
- Küçük Aksu Dam (2013),
- Manavgat Yeşilbag Dam (2013),
- Alanya Yeniköy Dam (2015),
- Manavgat Çardak Dam (2018).

In addition to these dams in the Antalya Basin, the repair of the Manavgat Naras dam, which was commissioned for irrigation and flood services in 2014, will be started. (State Hydraulic Works Official Website)

[1] *MoEUCC, April 2024, River Basin Management Plan Strategic Environmental Assessment Scoping Report*

The construction of Manavgat Çaltepe Saçıdere pond, which was started to be constructed in 2013, continues. In addition, Manavgat Taşağıl Karabekir Dam, which was built for irrigation purposes and started operation in 2010, and Serik Akbaş Dam, which was built for irrigation and flooding and started operation in 2016, are the other dams in the basin[2].

Alanya Dim Dam Lake

The dam lake/reservoir is approximately 21.0 km east of the motorway route (see Figure VIII.3). The dam was constructed between 1977-1984 period for irrigation, energy and drinking purposes. The dam's height is about 135 m from the river bed, while reservoir water volume is 250,000,000 m^3 and reservoir surface area is 4.7 km^2 on normal water level.

Oymapınar Dam Lake

The dam lake/reservoir is approximately 8.8 km north of the motorway route (see Figure VIII.3). The dam was constructed between 1977-1984 period for energy purposes. The dam's height is about 185 m from the river bed, while reservoir water volume is 300,000,000 m^3 and reservoir surface area is 4.7 km^2 on normal water level.

Manavgat Dam Lake

The dam lake/reservoir is approximately 2.0 km north of the motorway route (see Figure VIII.3). The dam was constructed between 1986-1987 period for flood control and irrigation purposes. The dam's height is about 29 m from the river bed, while reservoir water volume is 88,980,000 m^3.

Manavgat Naras Dam Lake

The dam lake/reservoir is approximately 3.5 km north of the motorway route (see Figure VIII.3). In operation since 2014, the dam's height is about 116 m from the river bed while the reservoir water volume is 106,550,000 m^3.

As presented, there is one water resource used for drinking purposes within the project area (Alanya Dim Dam). The Regulation on the Protection of Drinking and Utility Water Basins describes the horizontal terrestrial area with a width of 300 m starting from the line between the maximum water level and land for artificial or natural lakes. The regulation has stringent provisions regarding this protection status restrictions can be summarized as follows:

- No activities causing water pollution are allowed within the area,
- These areas are only open for public use; no private operations shall be established,
- Disposal, transfer, or storage of solid wastes or treated/untreated wastewaters,
- Quarries,
- Fuel storage,

[2] *2023-2027 Strategy and Action Plan for Combating Agricultural Drought in Antalya Province; Antalya Provincial Directorate of Agriculture and Forestry*

- Agricultural activities,
- Urbanization/touristic facilities/industrial activities,
- Livestock breeding activities are not permitted within the area.

VIII.2.2.2. Running Water Bodies

There are 3 important rivers intersecting with the route in the Antalya basin. One of them is the 178 km long Köprüçay. Köprüçay carries 2840 hm³ of water per year. The river is fed by a total of 180 karst springs. Therefore, it continues to flow even in dry summers. The flow rate of the river increases with the increase in precipitation in winter and melting of snow in spring. Ayvalı stream and Karacahisar streams originating from Anamas (Güllüce) Mountain in the south-east of Lake Eğirdir merge to form Köprüçayı. It also receives Kocadere and Sağırini streams in its lower parts. First, the water flowing in the wide valley enters the narrow canyon in Bolhasan village. It meanders through the Serik plain and flows into the Mediterranean Sea. The canyon valley stretching between Bolasan village and Beşkonak town has been declared as Köprülü Canyon National Park. In the area where picnics and camping can be organized, fishing is also practiced. Köprülü Canyon has a length of 14 km and a side height of 100 m. It is one of the most important rafting areas in Türkiye.

Another important river crossing the route is the 93 km long Manavgat River with a flowrate of 4,020 hm³ of water per year. It is formed by the merger of the tributaries born between the Western Taurus mountain ranges. Heading south-west, it passes through narrow and steep-sided canyons and forms the Manavgat Waterfall. It flows into the sea from an alluvial coastal plain east of Manavgat district center. It is the river with the most regular flow regime in Türkiye and has Oymapınar and Manavgat dams on it. As a river of the Mediterranean climate with dry and hot summers, it passes 30-65 m³ of water per second on average from July to the end of October. During normal swells, 150-200 m³ of water per second passes through its bed.

Alara, also known as Ulugüney Stream, is 82 km long and its flow rate is 31.2 m^3/sec. The stream takes its source from Kuşak Mountain and Akdağ at an altitude of 2647 km. It is formed by the combination of Oğuz, Çakalsakmak, Alıkpazı and Yukarıbük streams in the southeast of Gündoğmuş district. The Alara Stream valley serves as a gateway connecting the western part of Alanya to the interior. There is Karpuz Stream in the west and Kargı Stream basin in the east. The stream, which generally flows in the east-west direction, flows north-south south of Güneycik and reaches the sea at the borders of Boztepe, Manavgat village.

The road route also intersects with Karpuz Stream. The stream, which has a lower flow rate (4.2 m^3/sec) and a length of 36 km compared to the other three streams, takes its source from 2,544 m high in the Toros Mountains. It receives Uludere between the villages of Cendeve and Geriş and a few streams near Murtiçi. It flows in the canyon valley between Kızılkaya neighborhood and Gürleğen Mountain and into the sea between Uzunlar, Manavgat and Taşkesiği, Manavgat, east of Manavgat.

Kargı Stream Valley is a deep valley located about 12 kilometres north of Alanya. The stream originating from Akdağ is approximately 45 km long and flows in the east-west direction. It flows into the Mediterranean Sea at Çiftliği. The river is used for agricultural irrigation.

Pressure factors and their impacts on resources have been identified for the rivers in the Antalya basin (*Basin Protection Action Plans; TUBITAK MAM*). The pressures and impacts of the rivers in the route impact area are presented in Table VIII.2. The hydrology map with water crossings along the project route is shown in Figure VIII.4

Table VIII.2 Pressures and Impacts on Rivers/Streams on the Route

River name (if available)	Pressure Factor	Pressure Type
Köprüçay Stream	Domestic Wastewater Discharges Tourism Facilities Fish Farms	Point, Diffused
Manavgat River	Domestic Wastewater Discharges Agriculture Activities	Point, Diffused
Alara (Ulugüney) Stream	Pollutants from agricultural activities Water use for agricultural purposes	Diffused
Karpuz Stream	Sand and gravel purchase	Diffused

(Basin Protection Action Plans; TUBITAK MAM)

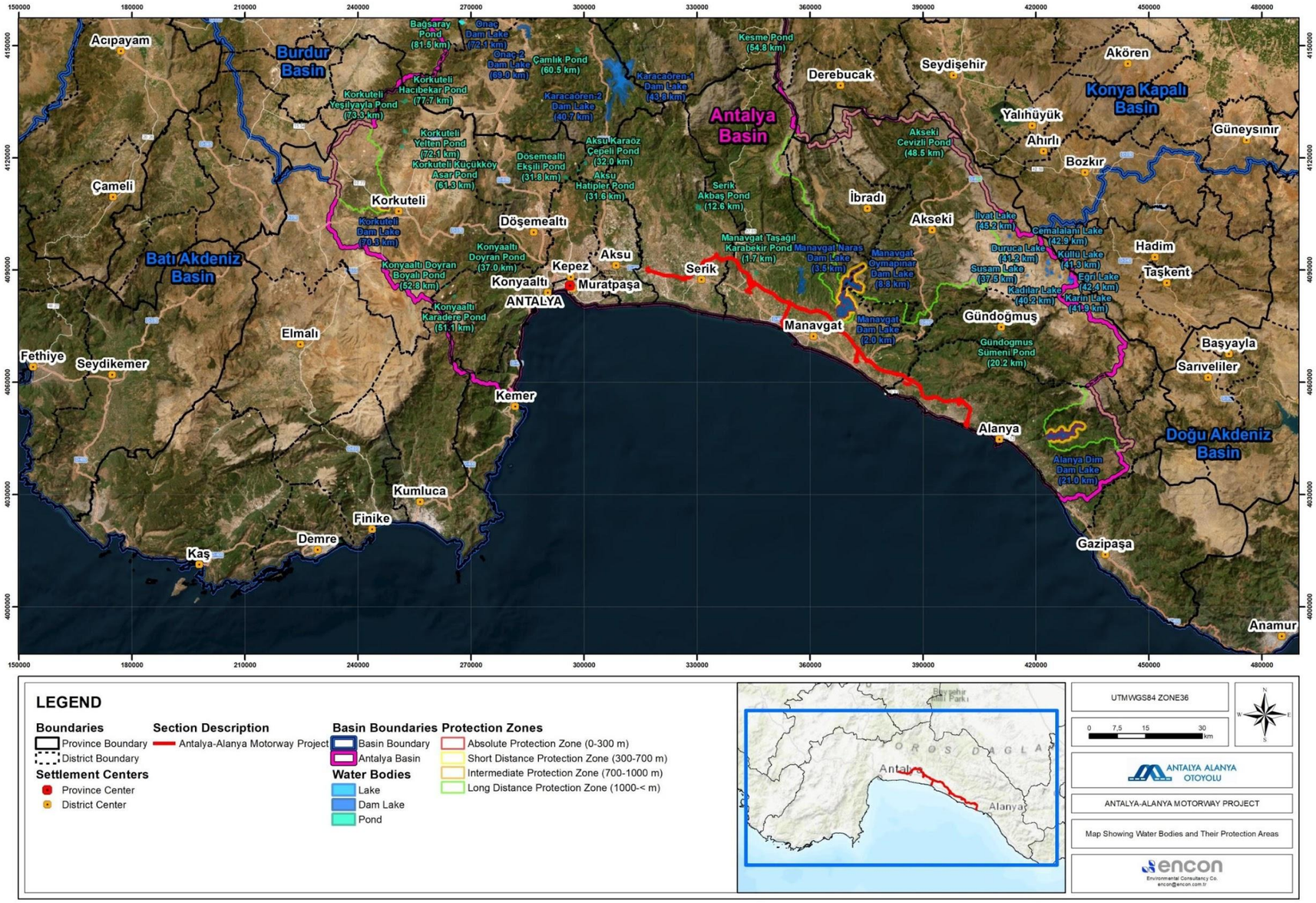


Figure VIII.3 Water Bodies Map of The Protection Area

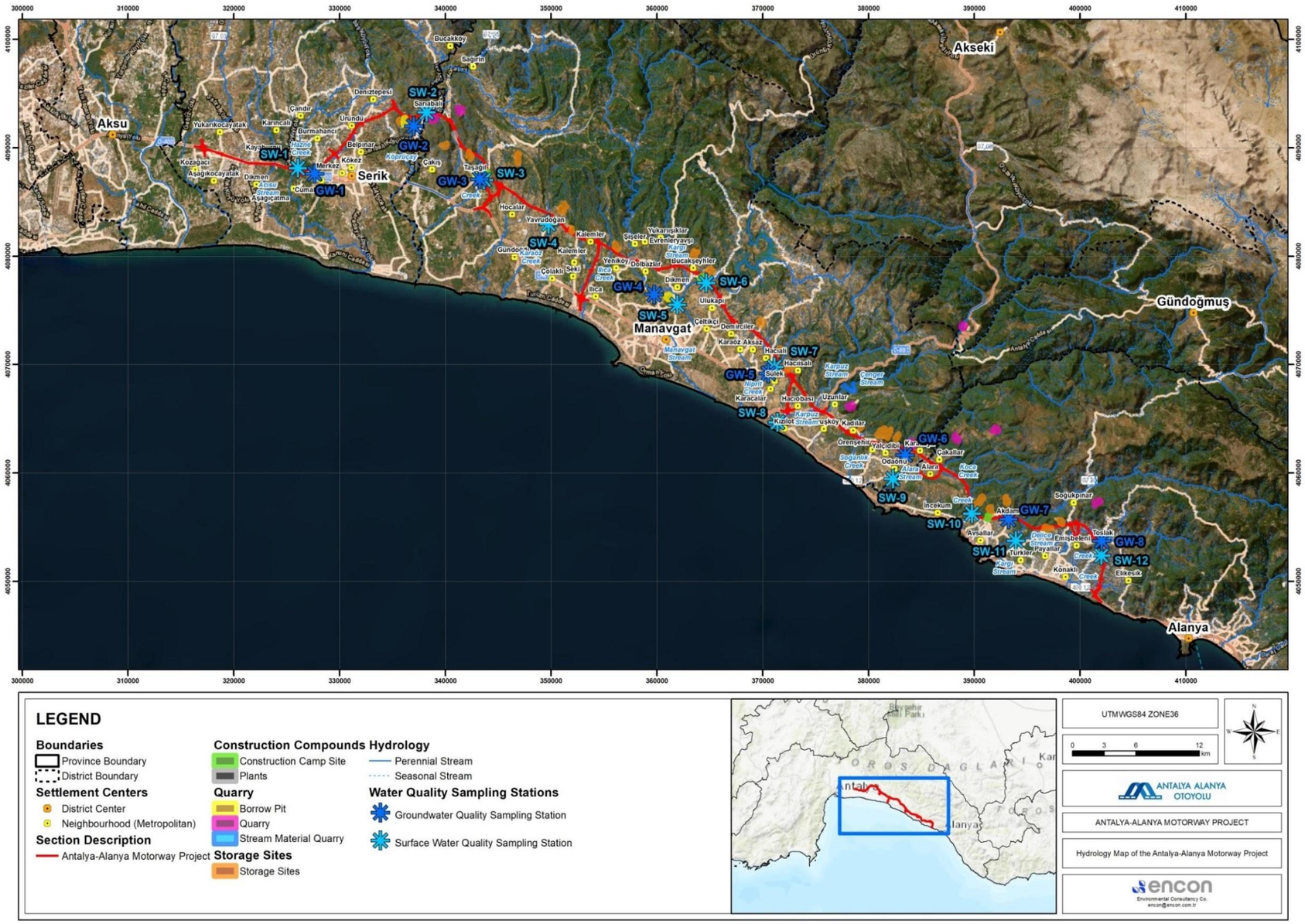


Figure VIII.4 Hydrology Map

Floods

Antalya Basin Flood Risk Management Plan, prepared in 2016 by the now-defunct General Directorate of Water Management under the former Ministry of Agriculture and Forestry, aimed to establish a structure focused on assessing and managing flood risks, and to reduce the adverse effects of floods on human health, the environment, cultural heritage, and economic activities.

Through this plan, it has been made possible to enhance Türkiye's administrative and technical capacity to a more advanced level in order to mitigate the negative consequences of floods; to ensure better coordination among various groups such as local authorities, industrial stakeholders, farmers, the tourism and construction sectors; and to raise awareness among the general public.

The province of Antalya is located within the Antalya Basin, one of the richest regions in Türkiye in terms of water resources.

Within the scope of the Antalya Basin Flood Risk Management Plan, the practices related to the assessment and management of flood risks in the basin were carried out by considering best practices. Accordingly, studies were conducted based on three different scenarios for the preparation of flood hazard and flood risk maps for the Antalya Basin. In these scenarios, hydrographs calculated for recurrence intervals of 50, 100, and 500 years were used as boundary conditions in the model, and flood simulations were performed. As a result of these studies, the hazard and risk status of different regions within the basin were determined based on water levels. The "Flood Hazard and Risk Maps" produced in this way provided insights into which areas are under threat, and these results were subsequently evaluated to conduct an intervention capacity analysis and a flood risk analysis.

The intersection areas of the project route and the 500-year recurring flood risk zones determined within the scope of the The Flood Risk Management Plan are shown in Figure VIII.5

Within the scope of this plan, Antalya Metropolitan Municipality and State Hydraulic Works (DSI) planned to implement various flood control measures in risky areas intersecting with the project route — on Manavgat Stream, northern part of Köprüçay and Alara Stream. Within this scope, measures such as improvement of irrigation channels and river connections and roads, reinforcement of dikes, regulation of river beds and construction of sea outlet structures have been completed between 2017 and 2022. An updated Flood Management Plan is expected to be published in recently 2025.

Culverts are drainage structures designed to allow water from natural channels—such as dry stream beds or small streams activated by rainfall—to pass beneath roads without causing damage. If culverts are not properly sized, intense rainfall can lead to excessive water accumulation in these channels, potentially overtopping the roadway. This may result in road closures, erosion of the embankment, and a reduction in the bearing capacity or stability of the embankment and its foundation. It is important to note that pavement deterioration around culverts—such as settlement or deformation—is often linked to insufficient culvert design. Furthermore, historical data shows that undersized culverts can contribute to downstream flooding. Therefore, drainage designs for highway systems must consider potential flood scenarios to ensure protection of the road infrastructure and nearby properties.

Within the scope of the project, a Hydraulic–Hydrological Study Report was prepared by Mega Mühendislik Müşavirlik A.Ş. in 2024.

According to the findings and planning framework outlined in the Hydraulic–Hydrological Study Report, the catchment area was delineated in the hydrologic studies, and floods with 10-,100, and 500 years were extracted with rational, synthetic unit hydrograph for 305 culverts. In the Hydraulic–Hydrological Study Report prepared within the scope of the Project, the bridges, viaducts and all culverts, the precipitation data of the region and the 10, 100 and 500 year recurring flow amounts of the river or stream bed on which each structure is located were calculated. As a result of these calculations, the relevant art structure was designed in such a way that the worst case maximum flow of the river bed to be crossed is not obstructed. The flow quantities used in the calculations and the flow quantities and maximum flows given in the Antalya Basin Flood Risk Management Plan were also used in the Hydraulic–Hydrological Study Report and the flood risk assessment of the Project was carried out in all art structures at all river and dry stream bed crossings. In addition in the desing stage of the Project, Hydraulic–Hydrological Study Report is approved by the General Directorate of DSİ and during this approval process, it is checked whether the design of the art structures (bridges, viaducts and culverts) in the design phase of the Project meets the worst case flow amount.

The Project design includes engineering structures such as tunnels, viaducts, underpasses, overpasses and culverts. All of these infrastructure units will be designed according to the Technical Specifications of General Directorate of Infrastructure Investments and other applicable standards including flood risks, as an internal adaptation.

In the scope of the Project;

- Consultations will be held with DSI and SYGM regarding the hydrological studies and any additional studies will be conducted upon the opinions of these institutions prior to the construction phase.
- during the construction phase, the surface drainage and site runoff, particularly in heavy rainy seasons will be properly managed by constructing temporarily or permanent channels which were designed to manage maximum flow capacity against the flood risk;
- at the construction areas without cover, ground will be seeded and the areas with highest slopes will be flattened to prevent erosion and sediment transport with surface run-off water;
- During operation it is essential that the water intake structures, canals and other structures be regularly inspected and be periodically maintained to ensure proper conveyance of water, avoid stagnation and prevent flooding and damages.

Moreover, Emergency Response Plans (ERP) will be prepared both for the construction phase and operation phases in order to prevent the damages that can be caused by flood. Also, necessary trainings related to flood will be given to the workers for both phases of the Project.



Figure VIII.5 Map Showing The Intersection of Q500 Flood Risk Maps And The Project Route

VIII.2.2.3. Groundwater

Groundwater is the water present beneath Earth's surface in soil pore spaces and the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water. Groundwater is recharged to the surface naturally; natural discharge often occurs at springs and seeps and can form oases or wetlands. Groundwater is usually withdrawn for agricultural, municipal, and industrial use by extraction wells.

Groundwater is often cheaper, more convenient, and less vulnerable to pollution than surface water. Therefore, it is commonly used for public water supplies. Groundwater is managed and controlled by State Hydraulic Works under the Ministry of Agriculture and Forestry in Türkiye.

According to the research of the State Hydraulic Works, according to the annual groundwater potential by basins, the groundwater operating reserve of the Antalya basin for 2020 was determined as 576.3 hm^3. The usable water potential of the basin is also found to be 12,9 $x10^9$ m^3/year considering the operational reserves of ~13 $x10^9$ m^3/year usable surface water and 576$x10^6$ m^3/year groundwater *(State Hydraulic Works, 2020*).

Antalya province exhibits a distinct karst character with Mesozoic aged limestones, which are widely observed around the Beydağları and Taşeli Plateau, especially in the southern foothills of the Western Taurus Mountains. These carbonate units, thanks to their high solubility potential, have formed advanced karst morphologies and consequently complex hydrogeologic systems. Karst aquifers are characterized by their high permeability and rapid groundwater flow, but are also highly susceptible to contamination due to their limited natural filtration capacity. Systems such as Kırkgöz, Düden and Kurşunlu, which are the main karst springs in Antalya, are of critical importance in both drinking water supply and protection of ecosystem integrity with their high flow rate and low mineralization waters. The high flow variability, sensitivity to precipitation regime and short hydraulic response times observed in these systems reveal the dynamic nature of karst aquifer behavior and necessitate effective monitoring of hydrogeological processes in the region. Those karstic formations described above have not the intersection with the main project route and the auxillary facilities needed for the realization of the project.

The hydrogeological properties of the geological units within the Project route vary depending on their lithological composition and structural status. In this context, while some units show important aquifer properties in terms of groundwater storage and transmission, some of them are weak aquifers or aquifers due to their low permeability. Groundwater fed from the mountainous regions in the north moves along the valleys and heads south towards the Mediterranean coast.

Ophiolitic Melange: The unit consisting of sandstone, claystone, micritic limestone, recrystallized limestone, oolitic limestone blocks and gabbro, diabase and altered serpentinites, has the ability to trap and transmit groundwater due to its fractured and fractured structure and is semi-permeable-permeable.

Sugözü Formation: The unit consists of shale and marbles and is impermeable-semi-permeable.

Aksu Formation: The unit consists of claystones, siltstones, sandstones and limestones; they are semi-permeable-impermeable because they have less fractured-fractured structure.

Çakallar Formation: The unit consisting of clayey limestone-limestones has semi-permeable-permeable properties due to its fractured-fractured structure and has the ability to trap and transmit groundwater within its structure.

Karpuzçay Formation: Consisting of clayey limestone-limestones, the unit has a fractured-fractured structure and has the characteristics of trapping and transmitting groundwater and is semi-permeable-permeable.

Eskiköy Formation: The unit consisting of pebbles, sandstones, fractured, fractured and granular structure has the characteristics of trapping and transmitting groundwater and is semi-permeable-permeable.

Yenimahalle Formation: The unit consisting of conglomerates, claystones, siltstones and sandstones is semi-permeable.

Slope Rubble: The unit consisting of clay, silt, sand, gravel-blocks and clay, silt, sand, gravel-blocks observed at the foot of steep slopes, has the characteristics of trapping and transmitting groundwater and is semi-permeable-permeable.

Alluvium: The unit, consisting of clay, silt, sand, gravel, and blocks, observed in the creek and valley floors, has the characteristics of both trapping and transmitting groundwater, and is semi-permeable to permeable.

Groundwater pollution most often results from improper disposal of wastes on land. Primary sources include industrial and household chemicals and landfill leachate, excessive fertilizers and pesticides used in agriculture, industrial waste lagoons, tailings and process wastewater from mines, leaking underground oil storage tanks and pipelines, sewage sludge and septic systems.

Considering that groundwater could be used as domestic water needs at campsite facilities the nearest groundwater resources were studied within the scope of this study. The quality of the groundwater is presented in the next section. The hydrogeology map and legend of the project are shown in Figure VIII.6 and Figure VIII.7, respectively.

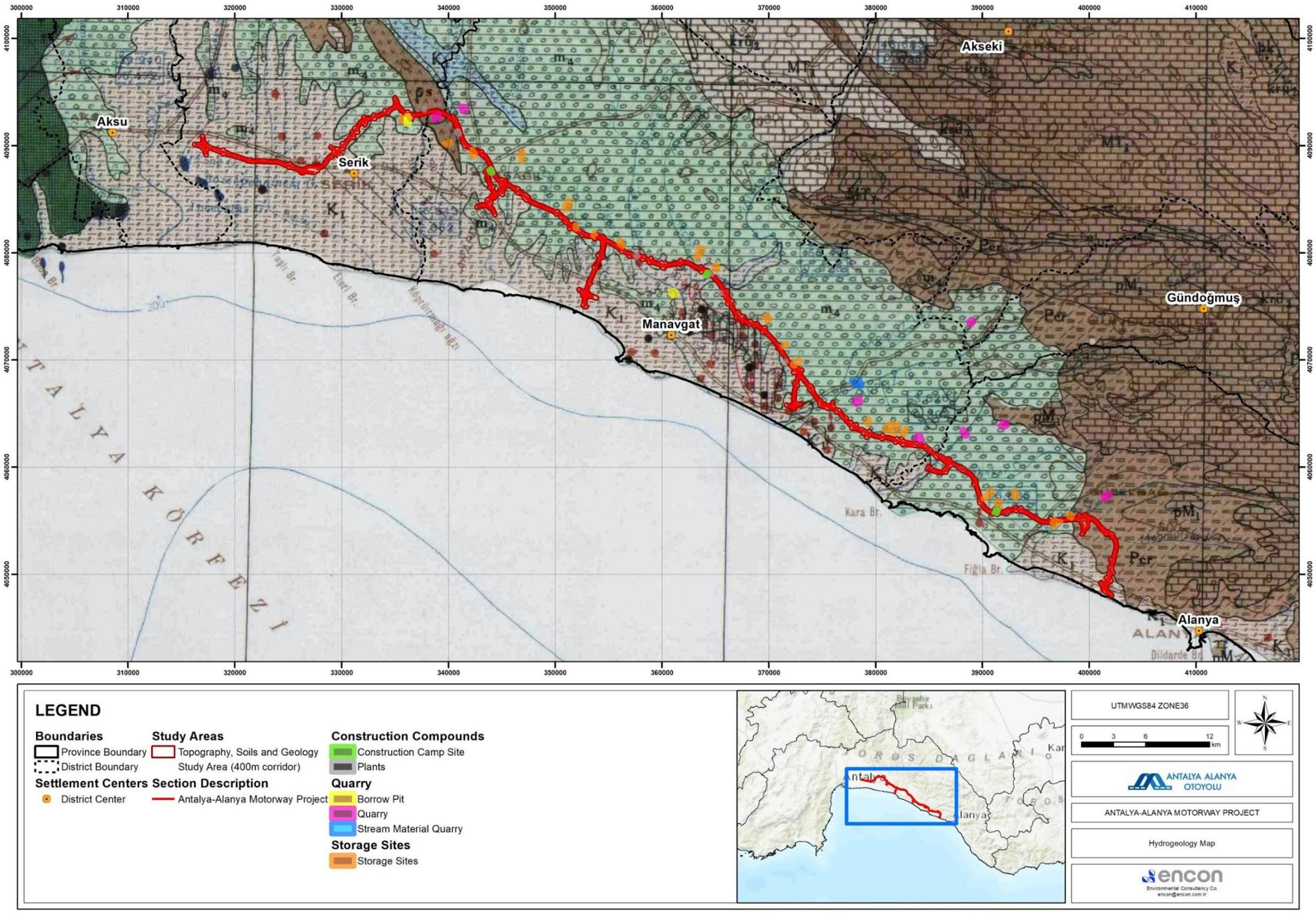


Figure VIII.6 Hydrogeology Map

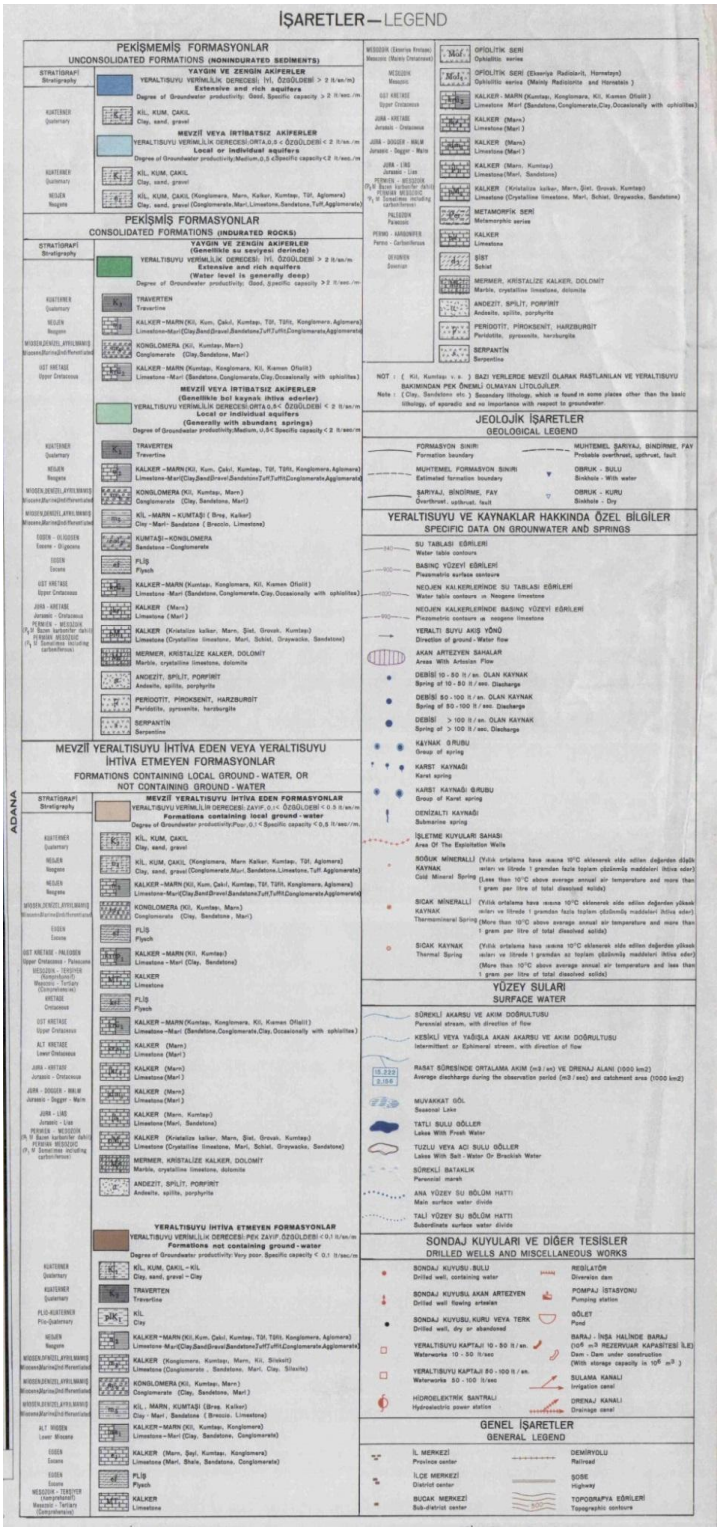


Figure VIII.7 Legend of the Hydrogeology Map

VIII.2.3.Field Surveys and Findings

A water quality assessment survey was undertaken in the scope of the ESIA studies to establish a description of the baseline conditions through Project route. In this regard, samples are taken, and relevant analyses were conducted by ENCON Laboratory Inc. in September and December 2024. The coordinates of the groundwater and surface water sampling points and corresponding KMs of the project route are given in Table VIII.3 and Table VIII.4, respectively.

Table VIII.3 Groundwater Quality Sampling Stations

Sampling Station	Location / Km	Coordinates	
		East	North
GW-1	Serik Interchange Access Road	327651	4087613
GW-2	Km 54+500	337029	4091993
GW-3	Taşağıl Interchange Access Road	343273	4087097
GW-4	Km 83+000	359757	4076456
GW-5	Km 99+000	370530	4069203
GW-6	Km 114+000	383471	4061640
GW-7	Km 126+500	393245	4055740
GW-8	Km 136+300	402068	4053737

Table VIII.4 Surface Water Quality Sampling Stations

Sections	River name	Location / Km	Coordinates (UTMWGS84 Zone35)	
			East	North
SW-1	Hazne Deresi	Serik Interchange Access Road	326069	4088123
SW-2	Köprüçay	Km 56+000	338242	4093265
SW-3	-	Taşağıl Interchange Access Road	343678	4087016
SW-4	Kızıllar Deresi	Km 72+000	349769	4082951
SW-5	Manavgat Çayı	Km 88+000	361921	4075517
SW-6	Manavgat Çayı	Km 88+250	364661	4077537
SW-7	Cevizler Deresi	Km 99+000	371120	4069787
SW-8	Karpuzçay	Manavgat East Access Road	371398	4064674
SW-9	Ulugüney Çayı	Km 114+000	382314	4059455
SW-10	-	Km 123+000	389801	4056234

Sections	River name	Location / Km	Coordinates (UTMWGS84 Zone35)	
			East	North
SW-11	Kargı Çayı	Km 128+000	393942	4053762
SW-12	-	Km 137+750	402044	4052394

Surface water sampling locations were selected from the main streams that intersect the project route, focusing on areas where the project activities may potentially influence water quality. Similarly, groundwater sampling points were determined based on the potential impact zones and with consideration of the local hydrogeological setting. In this context, the selection process took into account the permeable, semi-permeable, and impermeable lithologies along the project route, to ensure that different hydrostratigraphic units are adequately represented. This integrated approach aims to provide a comprehensive understanding of the baseline conditions of both surface water and groundwater resources, particularly in environmentally sensitive areas and at key water crossings. The locations of water quality sampling are presented in Figure VIII.8. and, locations of water quality sampling locations with hydrological and hydrogeological features map, is presented in Figure VIII.9

According to the Surface Water Quality Regulation, a water resource can be classified into one of the three classes provided in Annex-5, Table 2 (Quality Class Criteria of Inland Surface Water Resources According to General Chemical and Physicochemical Parameters), only if the measured values of all parameters comply with the criteria for that class. Consequently, the lowest water quality class observed for any parameter determines the overall class of the water resource, even if other parameters suggest higher quality (with Class III being the lowest).

The threshold values that define each water quality class, as specified in Annex-5, Table 2 of the Regulation, are presented in Table VIII.5 and Table VIII.6 below, alongside the measurement and analysis results for each parameter at the water quality sampling stations. Samples taken from locations SW-1 through SW-12 were analyzed for all relevant parameters listed in Annex-5, Table 2.

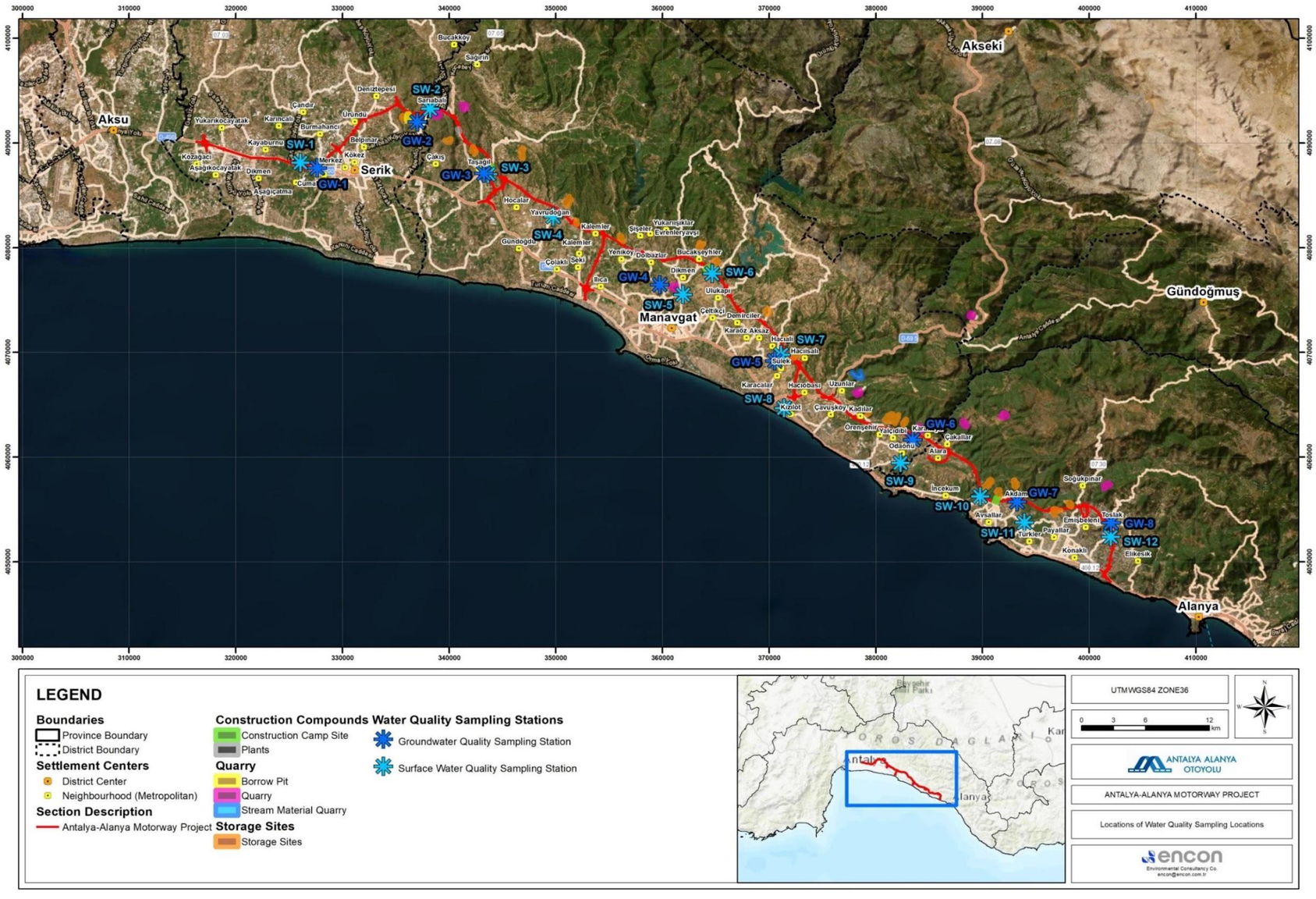


Figure VIII.8 Locations of Water Quality Sampling Locations

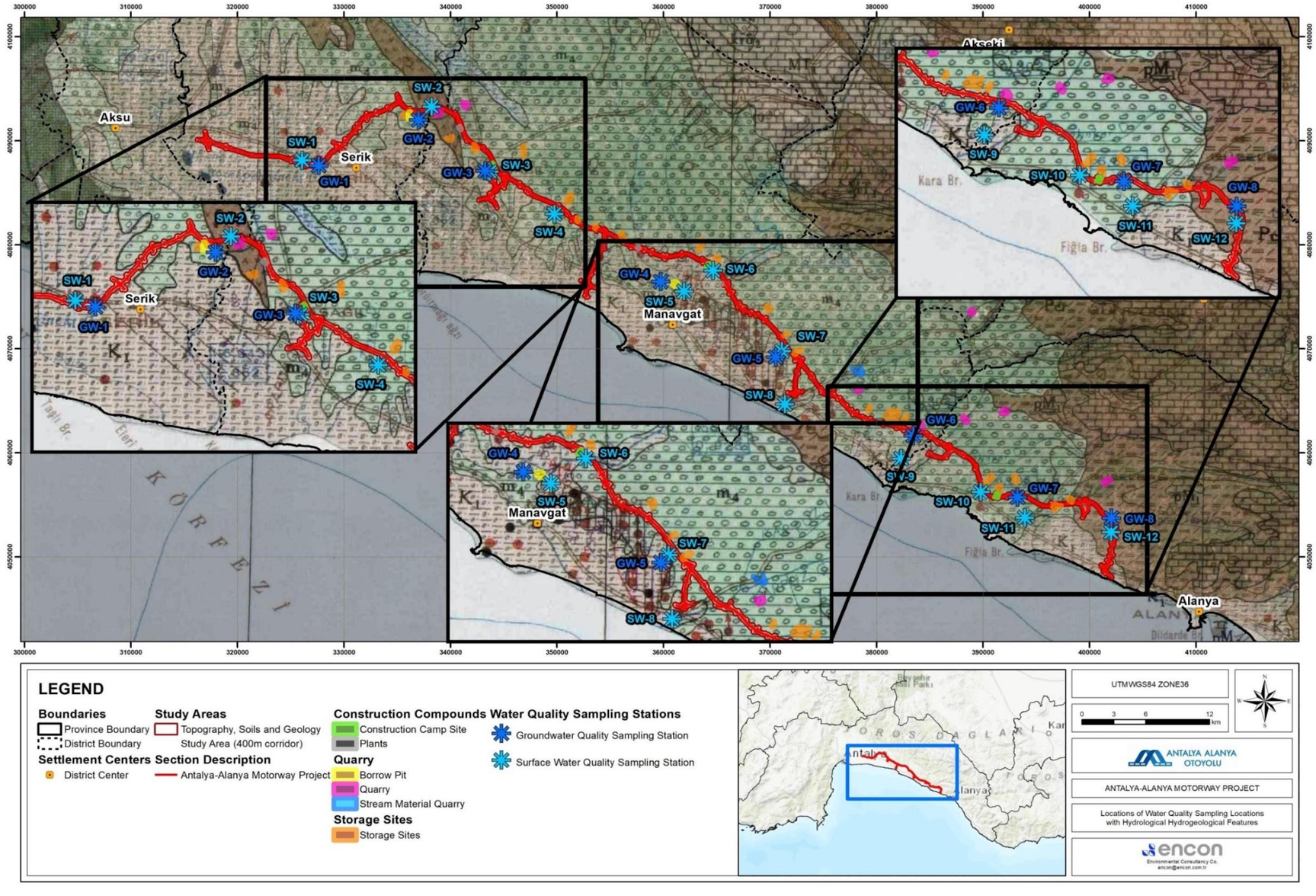


Figure VIII.9 Locations of Water Quality Sampling Locations with Hydrological and Hydrogeological Features Map

Table VIII.5 Results of Water Quality Analysis Based on Annex-5 Table 2 of Surface Water Quality Regulation

Parameters	Water Quality Classes			Unit	SW-1		SW-2		SW-3		SW-4	SW-5		SW-6		SW-7
	I	II	III		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024
Color	RES 436 nm: ≤ 1.5	RES 436 nm: 3	RES 436 nm> 4.3	m^{-1}	0.08	0.60	0.04	0.12	0.12	0.44	0.96	0.12	0.08	0.00	0.04	0.44
	RES 525 nm: ≤ 1.2	RES 525 nm: 2,4	RES 525 nm> 3.7		0.00	0.12	0.00	0.04	0.00	0.12	0.24	0.08	0.00	0.00	0.00	0.16
	RES 620 nm: ≤ 0.8	RES 620 nm: 1.7	RES 620 nm: 2.5		0.00	0.00	0.00	0.00	0.00	0.00	0.040	0.08	0.00	0.00	0.00	0.080
pH	6-9	6-9	6-9	-	9.14	8.29	9.61	8.23	9.03	8.01	8.45	9.28	8.17	9.46	8.02	8.24
Conductivity	< 400	1000	>1000	µS/cm	436	438	392	372	774	628	651	307	319	307	296	556
Oil and Grease*	< 0.2	0.3	>0.3	mg/L	0.600	0.200	0.800	1.20	0.600	1.40	1.00	0.40	1.80	0.200	1.40	2.20
Dissolved Oxygen	> 8	6	<6	mg/L	8.9	9.88	11.2	10.8	7.1	9.69	9.50	9.3	10.6	9.6	10.4	9.47
Chemical Oxygen Demand	< 25	50	>50	mg/L	< 5.0	25.9	< 5.0	28.1	< 5.0	26.2	31.3	< 5.0	20.5	< 5.0	18.5	22.3
Biochemical Oxygen Demand	< 4	8	>8	mg/L	< 3.0	7.84	< 3.0	9.28	< 3.0	7.56	10.4	< 3.0	6.36	< 3.0	5.80	5.48
Ammonium Nitrogen	< 0.2	1	>1	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.023	1.43	< 0.02	0.037	< 0.02	0.031	< 0.02
Nitrate Nitrogen	< 3	10	>10	mg/L	1.226	2.33	0.782	0.554	1.414	2.35	3.76	0.498	0.550	0.323	0.524	1.49
Total Kjeldahl Nitrogen (TKN)	< 0.5	1.5	>1.5	mg/L	1,49	1.91	0.942	0.743	1.428	0.685	4.74	0.657	< 0.5	0.600	0.343	1.31
Total Nitrogen	< 3.5	11.5	>11.5	mg/L	2.720	4.24	1.724	0.743	2.847	3.03	4.74	1.160	0.950	0.923	0.867	2.81
Orthophosphate Phosphorus	< 0.05	0.16	>0.16	mg/L	< 0.01	0.061	< 0.01	< 0.01	< 0.01	0.015	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Phosphorus	< 0.08	0.2	>0.2	mg/L	< 0.01	0.067	< 0.01	0.011	0.01	0.040	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.014
Fluoride	≤ 1,000	1,500	>1,500	µg/L	335.8	215.6	292.0	100.3	345.2	221.4	433.5	< 20	114.4	124.8	115.2	223.2
Sulphur (S^{-2})*	≤ 2	5	>5	µg/L	91	67	85	70	83	71	70	80	70	81	70	70
Selenium	≤ 10	15	>15	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.31	1.70	< 1.0	< 1.0	< 1.0	< 1.0	1.57
Manganese	≤ 100	500	>500	µg/L	22.63	1.95	< 1.0	< 1.0	39.05	2.94	8.34	2.18	2.08	2.46	4.66	4.42

Table VIII.6 Results of Water Quality Analysis Based on Annex-5 Table 2 of Surface Water Quality Regulation (continued)

Parameters	Water Quality Classes			SW-8		SW-9		SW-10		SW-11		SW-12
	I	II	III	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024
Color	RES 436 nm: ≤ 1.5	RES 436 nm: 3	RES 436 nm> 4.3	0.08	0.4	0.08	0.08	0.08	0.12	0.12	0.12	0.24
	RES 525 nm: ≤ 1.2	RES 525 nm: 2.4	RES 525 nm> 3.7	0.00	0.24	0.04	0.00	0.04	0.08	0.04	0.08	0.08
	RES 620 nm: ≤ 0.8	RES 620 nm: 1.7	RES 620 nm: 2.5	0.00	0.16	0.04	0.00	0.00	0.04	0.08	0.04	0.04
pH	6-9	6-9	6-9	9.16	7.93	9.26	8.26	9.26	8.19	9.22	8.3	8.14
Conductivity	< 400	1,000	>1,000	1403	611	331	341	304	468	359	433	386
Oil and Grease*	< 0.2	0.3	>0.3	1	2.6	0.6	2.8	1.6	0.6	2	0.4	0.4
Dissolved Oxygen	> 8	6	<6	7.1	8.7	8.1	9.9	7.1	10.4	9.3	10.4	10.3
Chemical Oxygen Demand	< 25	50	>50	6.3	18.6	< 5.0	16.9	7.09	15.90	< 5.0	16.5	16.3
Biochemical Oxygen Demand	< 4	8	>8	< 3.0	5.56	< 3.0	4.76	< 3.0	3.4	< 3.0	3.52	3.92
Ammonium Nitrogen	< 0.2	1	>1	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.06
Nitrate Nitrogen	< 3	10	>10	0.94	2.11	0.26	0.69	0.21	0.86	0.58	1.68	3.15
Total Kjeldahl Nitrogen (TKN)	< 0.5	1.5	>1.5	< 0.5	0.628	< 0.5	0.885	0.628	0.6	0.685	< 0.5	< 0.5
Total Nitrogen	< 3.5	11.5	>11.5	1.23	2.73	0.63	1.57	0.841	1.46	1.26	2.08	3.15
Orthophosphate Phosphorus	< 0.05	0.16	>0.16	< 0.01	0.022	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Phosphorus	< 0.08	0.2	>0.2	< 0.01	0.026	< 0.01	< 0.01	0.019	0.013	0.019	0.045	0.137
Fluoride	≤ 1,000	1,500	>1,500	535	222.4	130	105.5	143.1	173.2	114.4	171.2	141.1
Sulphur (S^{-2})*	≤ 2	5	>5	74	72	78	72	108	69	91	68	69
Selenium	≤ 10	15	>15	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.03
Manganese	≤ 100	500	>500	28.71	6.64	3.97	< 1.0	44.1	19.5	41.6	168	126

Table VIII.7 Water Quality Classes of the Sampled Water Resources

Sampling Station	Sampling Period	Water Quality Class	Determining Parameters
SW-1	September 2024	Class III	Oil and Grease, Sulphur
	December 2024	Class III	Total Kjeldahl Nitrogen, Sulphur
SW-2	September 2024	Class III	Oil and Grease, Sulphur
	December 2024	Class III	Oil and Grease, Biochemical Oxygen Demand, Sulphur,
SW-3	September 2024	Class III	Oil and Grease, Sulphur
	December 2024	Class III	Oil and Grease, Sulphur
SW-4	December 2024	Class III	Oil and Grease, Biochemical Oxygen Demand, Ammonium Nitrogen, Sulphur, Total Kjeldahl Nitrogen
SW-5	September 2024	Class III	Oil and Grease, Sulphur, Endosulfan
	December 2024	Class III	Oil and Grease, Sulphur, Endosulfan
SW-6	September 2024	Class III	Sulphur, Endosulfan
	December 2024	Class III	Oil and Grease, Sulphur
SW-7	December 2024	Class III	Oil and Grease, Sulphur
SW-8	September 2024	Class III	Conductivity, Oil and Grease, Sulphur, Endosulfan
	December 2024	Class III	Oil and Grease, Sulphur, Endosulfan
SW-9	September 2024	Class III	Oil and Grease, Sulphur, Endosulfan
	December 2024	Class III	Oil and Grease, Sulphur, Endosulfan
SW-10	September 2024	Class III	Oil and Grease, Sulphur, Endosulfan
	December 2024	Class III	Oil and Grease, Sulphur, Endosulfan
SW-11	September 2024	Class III	Oil and Grease, Sulphur, Endosulfan
	December 2024	Class III	Oil and Grease, Sulphur, Endosulfan
SW-12	December 2024	Class III	Oil and Grease, Sulphur, Endosulfan

When analysis results given in Table VIII.5 and Table VIII.6 are evaluated with respect to the standards provided in the Surface Water Quality Regulation, the water quality class of all samples, for September and December 2024 sampling periods, was determined as Class III. The details of the parameters defining the given water classes are provided in Table VIII.7.

As seen in Table VIII.7, all surface water samples collected in September and December 2024 fall under Class III according to the Surface Water Quality Regulation. The dominant parameters determining the classification are Oil and Grease and Sulphur, consistently observed across all sampling stations. This indicates a widespread, likely non-point source pollution pattern, potentially associated with diffuse agricultural or transportation-related runoff.

In particular, the presence of Total Kjeldahl Nitrogen, Ammonium Nitrogen, and Biochemical Oxygen Demand (BOD) at SW-1, SW-2, and SW-4, though limited, suggests intermittent organic or nutrient-based pollution inputs, possibly from nearby domestic or agricultural activities.

According to Table VIII.8 and Table VIII.9, when the parameters are evaluated based on the values specified in Table 5 of Annex-5 of the Regulation on Surface Water Quality, it is observed that the majority of the examined pollutants are below the environmental quality standards. In particular, Alachlor, Anthracene, Atrazine, Benzene, Diuron, and many pesticides were not detected at any of the sampling stations. However, concentrations of Lead (especially at SW-5, SW-6, SW-10, and SW-12), Mercury (at SW-6 and SW-8), and Nickel (at SW-2, SW-5, SW-6, SW-9, and SW-12) exceeded the threshold limits.

Table VIII.8 Results of Water Quality Analyses with respect to Primary Substances given in Annex-5, Table 5 of Surface Water Quality Regulation

Parameters	SW-EQS	SW-EQS	Unit	SW-1		SW-2		SW-3		SW-4	SW-5		SW-6		SW-7
	Rivers/Lakes	Coastal and Translational Water Bodies		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024
Alochlor	0.3	0.3	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	0.1	0.1	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Atrazine	0.6	0.6	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzene	10	8	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromic Diphenyl Ether*	-	-	µg/L	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14
Cadmium and Compounds*	0.08	0.2	µg/L	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chlorfenvinphos	0.1	0.1	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1.2Dichloroethane	10	10	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dicholoromethane	20	20	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diuron	0.2	0.2	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan	0.005	0.005	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Floranthene*	0.0063	0.0063	µg/L	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
Hexacholorobenzene*	-	-	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Parameters	SW-EQS	SW-EQS	Unit	SW-1		SW-2		SW-3		SW-4	SW-5		SW-6		SW-7
	Rivers/Lakes	Coastal and Translational Water Bodies		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024
Hexachloro-butadiene	-	-	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachloro-cyclohexane	0.02	0.02	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Isoproturon	0.3	0.3	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Lead and Compounds	1.2	1.2	µg/L	1.035	<0.5	< 0.5	<0.5	3.269	<0.5	<0.5	< 0.5	<0.5	15.424	<0.5	<0.5
Mercury and Compounds*	-	-	µg/L	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.141	< 0.07	< 0.07
Naphthalene	2	2	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel and Compounds	4	8.6	µg/L	1.078	5.14	< 1.0	<1	3.782	4.68	5.58	< 1.0	<1	4.349	<1	4.61
Pentachlorobenzene	0.007	0.0007	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	0.4	0.4	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Polycyclic Aromatic Hydrocarbons (PAH)	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	1.7 × 10^-4	1.7 × 10^-4	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g.h.i)preylene	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Parameters	SW-EQS	SW-EQS	Unit	SW-1		SW-2		SW-3		SW-4	SW-5		SW-6		SW-7
	Rivers/Lakes	Coastal and Translational Water Bodies		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024
Indeno (1.2.3-cd) pyrene	-	--	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichlorobenzenes	0.4	0.4	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tricholoromethane	2.5	2.5	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trifluarilin*	0.03	0.03	µg/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dicofol*	1.3 × 10^-3	1.3 × 10^-5	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Quinoxyfen	0.15	>0.015	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aclonifen	0.12	0.012	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bifenox*	0.012	0.0012	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sibutrin*	0.0025	0.0025	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dichlorvos*	6 × 10^-4	6 × 10^-5	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	2 × 10^-7	1 × 10^-8	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Terbutryn	0.065	0.0065	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Table VIII.9 Results of Water Quality Analyses with respect to Primary Substances given in Annex-5, Table 5 of Surface Water Quality Regulation (continued)

Parameters	SW-EQS	SW-EQS	Unit	SW-8		SW-9		SW-10		SW-11		SW-12
	Rivers/Lakes	Coastal and Translational Water Bodies		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024
Alochlor	0.3	0.3	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	0.1	0.1	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Atrazine	0.6	0.6	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzene	10	8	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromic Diphenyl Ether*	-	-	µg/L	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14
Cadmium and Compounds*	0.08	0.2	µg/L	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chlorfenvinphos	0.1	0.1	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1.2Dichloroethane	10	10	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dicholoromethane	20	20	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diuron	0.2	0.2	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan	0.005	0.005	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Floranthene*	0.0063	0.0063	µg/L	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
Hexacholorobenzene*	-	-	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachloro-butadiene	-	-	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachloro-cyclohexane	0.02	0.02	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Isoproturon	0.3	0.3	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Parameters	SW-EQS	SW-EQS	Unit	SW-8		SW-9		SW-10		SW-11		SW-12
	Rivers/Lakes	Coastal and Translational Water Bodies		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024
Lead and Compounds	1.2	1.2	µg/L	0.665	<0.5	1.024	<0.5	9.543	3.62	< 0.5	2.34	2.87
Mercury and Compounds*	-	-	µg/L	0.148	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07
Naphthalene	2	2	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel and Compounds	4	8.6	µg/L	< 1.0	2.01	< 1.0	<1	1.193	3.23	< 1.0	2.84	7.97
Pentachloro benzene	0.007	0.0007	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachloro phenol	0.4	0.4	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Polycyclic Aromatic Hydrocarbons (PAH)	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	1.7 × 10^-4	1.7 × 10^-4	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g.h.i) preylene	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno (1.2.3-cd) pyrene	-	-	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichlorobenzenes	0.4	0.4	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tricholoromethane	2.5	2.5	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

Parameters	SW-EQS	SW-EQS	Unit	SW-8		SW-9		SW-10		SW-11		SW-12
	Rivers/Lakes	Coastal and Translational Water Bodies		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	December 2024
Trifluarilin*	0.03	0.03	µg/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dicofol*	1.3 × 10^-3	1.3 × 10^-5	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Quinoxyfen	0.15	>0.015	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aclonifen	0.12	0.012	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bifenox*	0.012	0.0012	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sibutrin*	0.0025	0.0025	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dichlorvos*	6 × 10^-4	6 × 10^-5	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	2 × 10^-7	1 × 10^-8	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Terbutryn	0.065	0.0065	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

In September and December 2024, eight groundwater samples were collected along the Project route to assess the groundwater quality in the area, in addition to surface water samples. To evaluate baseline groundwater quality conditions, Annex-5, Table 2 of the Surface Water Quality Regulation was used, ensuring consistency in evaluating both surface and groundwater quality. The results of the groundwater analyses are provided in Table VIII.10 and Table VIII.11.

The analysis results for the groundwater monitoring stations, presented in Table VIII.10, were evaluated solely according to the environmental quality standards in Annex-5, Table 2 of the Surface Water Quality Regulation. Exceedances of Class III limits for parameters such as conductivity, oil and grease, total nitrogen, fluoride, and sulfur were noted at some stations; meanwhile, parameters such as color, pH, dissolved oxygen, COD, BOD, ammonium nitrogen, orthophosphate phosphorus, and total phosphorus predominantly fell within Class I and II ranges. Due to oil and grease and Sulphur parameters, the water quality of eight locations was defined as Class III.

The exceeding of water quality limits for certain parameters, such as conductivity, oil and grease, total nitrogen, fluoride, and sulfur, can be attributed to various factors. These include pollution from agricultural activities, such as the excessive use of fertilizers and pesticides, industrial discharges, urban runoff, and improper waste management.

In Table VIII.11, the limit values defined by national regulations (Regulation on Water Intended for Human Consumption; Regulation on the Protection of Groundwater Against Pollution and Deterioration), international standards (WHO Guidelines for Drinking-water Quality; EU Directive 2020/2184; Directive 2006/118/EC), and the project standard are shown, and the parameters exceeding these limits are indicated.

Detailed water quality analysis reports are presented in Annex-2.

Table VIII.10 Results Groundwater Quality Analysis Based on Annex-5 Table 2 of Surface Water Quality Regulation

Parameters	Water Quality Classes			Unit	GW-1		GW-2		GW-3		GW-4		GW-5		GW-6		GW-7		GW-8	
	I	II	III		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024
Color	RES 436 nm:≤ 1.5	RES 436 nm: 3	RES 436 nm> 4.3	m-1	0.08	0.04	0.04	0.12	0.00	0.04	0.00	0.00	0.00	0.08	2.96	1.96	0.04	0.08	0.00	0.04
	RES 525 nm: ≤ 1.2	RES 525 nm: 2.4	RES 525 nm> 3.7	m-1	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.04	1.28	0.88	0.04	0.08	0.00	0.04
	RES 620 nm: ≤ 0.8	RES 620 nm: 1.7	RES 620 nm: 2.5	m-1	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.44	0.04	0.08	0.00	0.04
pH	6-9	6-9	6-9	-	8.55	7.56	9.26	7.90	8.12	7.10	8.80	7.44	8.68	7.67	9.86	8.96	8.87	7.18	9.41	7.84
Conductivity	< 400	1,000	>1,000	µs/cm	801.00	718.00	462.00	516.00	904.00	1,037	588.00	648.00	496.00	458.00	1,786	1,876	338.00	704.00	524.00	633.00
Oil and Grease*	< 0.2	0.3	>0.3	mg/L	0.40	0.60	0.80	0.40	0.60	1.00	0.80	1.20	1.20	2.60	0.80	1.20	0.80	0.60	0.60	67.00
Dissolved Oxygen	> 8	6	<6	mg/L	3.70	12.60	6.50	9.34	4.90	5.39	5.80	5.19	6.50	8.85	5.20	3.61	6.20	8.88	8.80	10.00
Chemical Oxygen Demand	< 25	50	>50	mg/L	< 5.0	21.20	< 5.0	20.60	< 5.0	22.60	< 5.0	20.50	< 5.0	18.30	12.92	26.90	< 5.0	13.60	< 5.0	15.80
Biochemical Oxygen Demand	< 4	8	>8	mg/L	< 3.0	7.36	< 3.0	6.60	< 3.0	7.20	< 3.0	6.84	< 3.0	5.60	4.20	6.20	< 3.0	3.72	< 3.0	3.96
Ammonium Nitrogen	< 0.2	1	>1	mg/L	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.03	< 0.02	0.03	< 0.02	0.00	0.47	0.59	< 0.02	< 0.02	< 0.02	< 0.02

Parameters	Water Quality Classes			Unit	GW-1		GW-2		GW-3		GW-4		GW-5		GW-6		GW-7		GW-8	
	I	II	III		September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024
Nitrate Nitrogen	< 3	10	>10	mg/L	9.07	9.50	0.49	0.61	2.64	2.78	0.82	1.98	2.83	3.00	2.06	0.86	0.34	11.10	2.42	3.75
Total Kjeldahl Nitrogen (TKN)	< 0.5	1.5	>1.5	mg/L	< 0.5	0.80	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.00	0.34	2.20	1.60	0.57	< 0.5	1.54	0.34
Total Nitrogen	< 3.5	11.5	>11.5	mg/L	9.30	10.30	0.49	0.61	2.90	2.78	1.31	1.98	3.83	3.34	5.23	2.46	0.91	11.10	3.97	4.09
Orthophosphate Phosphorus	< 0.05	0.16	>0.16	mg/L	0.07	0.06	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.38	0.34	< 0.01	< 0.01	< 0.01	< 0.01
Total Phosphorus	< 0.08	0.2	>0.2	mg/L	0.06	0.12	< 0.01	< 0.01	< 0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.01	0.17	0.40	< 0.01	0.11	0.02	0.06
Fluoride	≤1,000	1,500	>1,500	µg/L	498.50	506.00	336.60	291.40	567.50	494.50	401.40	230.80	224.20	214.20	3,465	3,179	138.10	171.20	238.80	196.60
Sulphur (S^{-2})*	≤ 2	5	>5	µg/L	91	67	126	67	77	67	73	67	72	72	269	73	81	70	68	71
Selenium	≤ 10	15	>15	µg/L	1.84	< 1.0	< 1.0	1.14	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.21
Manganese	≤ 100	500	>500	µg/L	1.21	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.04	< 1.0	< 1.0	< 1.0	57.27	4.98	< 1.0	1,244	< 1.0	58.40

Table VIII.11 Assessment of Groundwater Sampling Locations Against Project Standards

Parameters	National Standards	International Standards	Project Standards	Unit	GW-1		GW-2		GW-3		GW-4		GW-5		GW-6		GW-7		GW-8	
					September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024
pH	6,5 - 9,5	6,5 - 9,5	6,5 - 9,5	-	8,55	7,56	9,26	7,90	8,12	7,10	8,8	7,44	8,68	7,67	9,86	8,96	8,87	7,18	9,41	7,84
Conductivity	2500	2500	2500	µs/cm	801	718	462	516	904	1037	588	648	496	458	1786	1876	338	704	524	633
Fluoride	1500	1500	1500	µg/L	498,5	506,0	336,6	291,4	567,5	494,5	401,4	230,8	224,2	214,2	3465,0	3179,0	138,1	171,2	238,8	196,6
Selenium	10,00	20,00	10,00	µg/L	1,84	< 1.0	< 1.0	1,14	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1,21
Manganese	50,00	50,00	50,00	µg/L	1,21	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4,04	< 1.0	< 1.0	< 1.0	57,27	4,98	< 1.0	1244	< 1.0	58,4
Alochlor	0,50		0,50	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Atrazine	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzene	1,00	1,00	1,00	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Cadmium and Compounds*	5,00	3,00	3,00	µg/L	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	4,22	< 0.08	< 0.08
Chlorfenvinphos	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1,2Dichloroethane	3,00	3,00	3,00	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diuron	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan	0,50		0,50	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexacholorobenzene*	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Parameters	National Standards	International Standards	Project Standards	Unit	GW-1		GW-2		GW-3		GW-4		GW-5		GW-6		GW-7		GW-8	
					September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024
Hexachloro-cyclohexane	0,50		0,50	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Isoproturon	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Lead and Compounds	10,00	5,00	10,00	µg/L	15,956	<0.5	5,055	<0.5	< 0.5	<0.5	3,981	<0.5	2,867	<0.5	1,704	<0.5	< 0.5	7,09	4,995	4,65
Mercury and Compounds*	1,00	6,00	1,00	µg/L	0,178	< 0.07	0,141	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07
Nickel and Compounds	20,00	20,00	20,00	µg/L	17,502	2,14	1,635	<1	2,899	5,16	2,909	<1	< 1.0	1,36	6,423	3,91	< 1.0	3,45	< 1.0	6,46
Polycyclic Aromatic Hydrocarbons (PAH)	0,10	0,10	0,10	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	0,01	0,01	0,01	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trifluarilin*	0,50		0,50	µg/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dicofol*	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Quinoxyfen	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aclonifen	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bifenox*	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sibutrin*	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dichlorvos*	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Parameters	National Standards	International Standards	Project Standards	Unit	GW-1		GW-2		GW-3		GW-4		GW-5		GW-6		GW-7		GW-8	
					September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024	September 2024	December 2024
Heptachlor	0,50		0,50	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Terbutryn	0,50		0,50	µg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite Nitrogen				mg/L	< 0.005	< 0,020	< 0.005	< 0,020	< 0.005	< 0,020	< 0.005	< 0,020	< 0.005	< 0,020	0,975	< 0,020	< 0.005	< 0,020	< 0.005	< 0,020
Chloride	250,00	250,00	200-300	mg/L	30,30	24,3	16,75	18,4	54,77	51,2	36,23	22,5	19,05	68,5	69,58	62,9	6,82	27,1	14,26	22,5
Sulfate	250,00	250,00	250,00	mg/L	78,56	82,7	23,76	23,3	224,22	238	30,11	70,7	25,69	16,7	123,10	155	18,76	37,5	60,96	106

According to Table VIII.11, the values exceeding the parameters as follows,

- The Lead and Compounds parameter exceeded the permissible limit at GW-1 in September 2024.
- The Manganese parameter exceeded the permissible limit at GW-6 in September 2024.
- The pH parameter exceeded the permissible limit at GW-6 in September 2024.
- The Fluoride parameter exceeded the permissible limit at GW-6 in both September and December 2024.
- The Manganese parameter exceeded the permissible limit at GW-7 in December 2024.
- The Cadmium and Compounds parameter exceeded the permissible limit at GW-7 in September 2024.
- The Manganese parameter exceeded the permissible limit at GW-8 in September 2024.

Hydrogeochemical Study

In order to understand the water-rock interactions and the fundamental hydrogeochemical characteristics of the basin, hydrochemical analyses were conducted on groundwater samples. In hydrogeochemical studies, various graphical methods are employed to represent the concentration or relative abundance of ions in individual water samples, providing insight into the origin and classification of the waters. Among these, the Piper diagram is one of the most widely used approaches. This diagram consists of three separate fields: the cation triangle, in which the relative abundances of $Na^+ + K^+$, Ca^{2+}, and Mg^{2+} (expressed in %meq/L and summing to 100%) are plotted; the anion triangle, which reflects the proportions of $HCO_3^- + CO_3^{2-}$, Cl^-, and SO_4^{2-}; and a central diamond-shaped field where projections from the two triangles intersect to define a compositional point. Through this diagram, groundwater samples can be classified into hydrochemical facies.

In this study, to evaluate the chemical characteristics of the groundwater, major cations (Calcium – Ca^{2+}, Magnesium – Mg^{2+}, Sodium – Na^+, and Potassium – K^+) and major anions (Carbonate – CO_3^{2-}, Bicarbonate – HCO_3^-, Sulfate – SO_4^{2-}, and Chloride – Cl^-) were analyzed and interpreted using Piper and Schoeller diagrams.

Piper Diagram

The results of the analysis of the sample points are shown in the Piper Diagram in Figure VIII.10

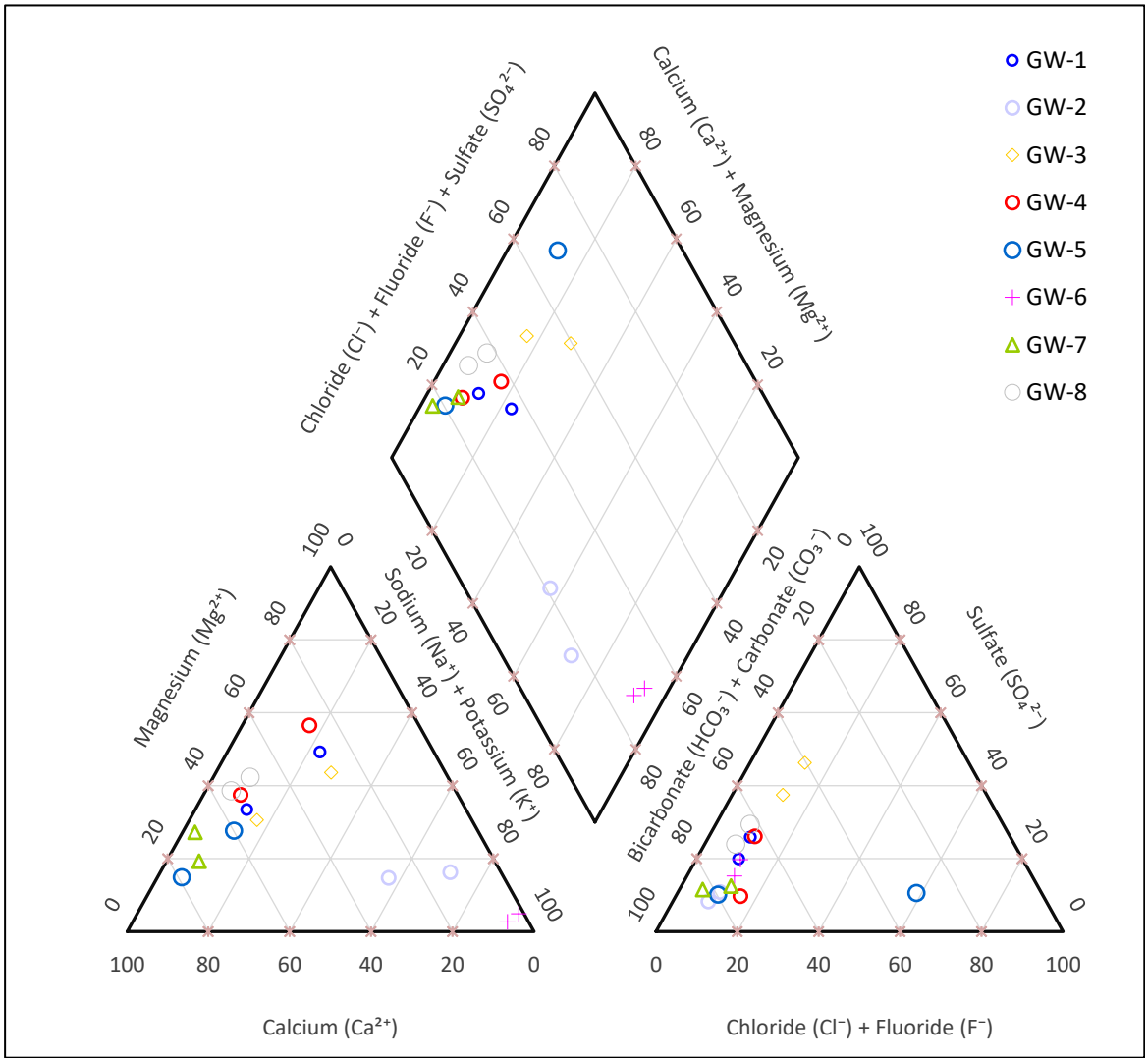


Figure VIII.10 Piper Diagram

GW-1

September, 2024
Cations: Ca^{2+} 53.78%, Mg^{2+} 33.48%, Na^{+} 11.98%, K^{+} 0.76%Anions: HCO_3^{-} 73.74%, SO_4^{2-} 17.25%, Cl^{-} 9.01%Facies: Ca–HCO_3
Interpretation: Classified as a Ca–HCO_3 water type, indicating recharge dominated by carbonate dissolution.

December, 2024
Cations: Mg^{2+} 49.22%, Ca^{2+} 27.92%, Na^{+} 21.38%, K^{+} 1.49%Anions: HCO_3^{-} 68.27%, SO_4^{2-} 22.69%, Cl^{-} 9.03%Facies: Mg–HCO_3
Interpretation: Mg–HCO_3 facies, pointing to dolomitic influence or longer residence time.

GW-2

September, 2024
Cations: Na^+ 56.72%, Ca^{2+} 28.38%, Mg^{2+} 14.70%, K^+ 0.21%Anions: HCO_3^- 82.00%, SO_4^{2-} 9.21%, Cl^- 8.79%Facies: Na–HCO_3
Interpretation: Na–HCO_3 facies is clear, indicating ion exchange or deep groundwater influence.

December, 2024
Cations: Na^+ 70.96%, Mg^{2+} 16.25%, Ca^{2+} 12.42%, K^+ 0.37%Anions: HCO_3^- 85.62%, Cl^- 7.43%, SO_4^{2-} 6.95%Facies: Na–HCO_3
Interpretation: Strong Na–HCO_3 ; dominant sodium reflects advanced ion exchange processes.

GW-3

September, 2024
Cations: Ca^{2+} 52.77%, Mg^{2+} 30.62%, Na^+ 15.85%, K^+ 0.76%Anions: HCO_3^- 55.03%, SO_4^{2-} 33.79%, Cl^- 11.18%Facies: Ca–HCO_3 with secondary SO_4
Interpretation: Ca–HCO_3 facies dominates; elevated SO_4 reflects minor influence from evaporite dissolution.

December, 2024
Cations: Mg^{2+} 41.17%, Ca^{2+} 26.41%, Na^+ 25.35%, K^+ 1.08%Anions: HCO_3^- 45.89%, SO_4^{2-} 41.46%, Cl^- 12.65%Facies: Mixed Mg–HCO_3–SO_4
Interpretation: Mixed facies trending toward Mg–SO_4–HCO_3 zone, consistent with sulfate enrichment.

GW-4

September, 2024
Cations: Ca^{2+} 52.02%, Mg^{2+} 36.53%, Na^+ 10.49%, K^+ 0.24%Anions: HCO_3^- 74.86%, Cl^- 13.08%, SO_4^{2-} 12.06%Facies: Ca–HCO_3
Interpretation: Classic Ca–HCO_3 facies indicates fresh recharge dominated by carbonate dissolution.

December, 2024
Cations: Mg^{2+} 54.71%, Ca^{2+} 25.90%, Na^+ 15.35%, K^+ 4.04%Anions: HCO_3^- 67.32%, SO_4^{2-} 22.81%, Cl^- 9.87%Facies: Mg–HCO_3
Interpretation: Facies shift to Mg–HCO_3 dolomitic water-rock interaction.

GW-5

September, 2024
Cations: Ca^{2+} 76.78%, Mg^{2+} 14.46%, Na^+ 7.41%, K^+ 1.35%Anions: HCO_3^- 78.50%, SO_4^{2-} 13.24%, Cl^- 8.26%Facies: Strong Ca–HCO_3
Interpretation: Ca–HCO_3, consistent with recently recharged, unpolluted groundwater.

December, 2024
Cations: Ca^{2+} 62.05%, Mg^{2+} 28.66%, Na^+ 8.76%, K^+ 0.53%Anions: Cl^- 50.19%, HCO_3^- 32.00%, SO_4^{2-} 17.81%Facies: Ca–Cl
Interpretation:Ca–Cl ; likely due to saline intrusion or anthropogenic influence.

GW-6

September, 2024
Cations: Na^+ 92.55%, Ca^{2+} 4.59%, Mg^{2+} 2.39%, K^+ 0.47%Anions: HCO_3^- 78.83%, SO_4^{2-} 10.83%, Cl^- 10.34%Facies: Na–HCO_3
Interpretation: Strong Na–HCO_3 dominance, indicating ion exchange and deeper circulation.

December, 2024
Cations: Na^+ 93.40%, Mg^{2+} 4.28%, Ca^{2+} 1.11%, K^+ 1.21%Anions: HCO_3^- 72.65%, SO_4^{2-} 18.08%, Cl^- 9.27%Facies: Na–HCO_3
Interpretation: Na–HCO_3 type remains dominant; SO_4 rise confirms mineral dissolution.

GW-7

September, 2024
Cations: Ca^{2+} 65.49%, Mg^{2+} 25.76%, Na^+ 2.66%, K^+ 6.08%Anions: HCO_3^- 82.48%, SO_4^{2-} 12.82%, Cl^- 4.70%Facies: Ca–HCO_3
Interpretation:Ca–HCO_3 type with fresh recharge characteristics.

December, 2024
Cations: Ca^{2+} 60.99%, K^+ 16.21%, Mg^{2+} 16.22%, Na^+ 6.59%Anions: HCO_3^- 74.09%, SO_4^{2-} 16.08%, Cl^- 9.83%Facies: Ca–HCO_3
Interpretation: Ca–HCO_3 facies; elevated K remains secondary.

GW-8

September, 2024
Cations: Ca^{2+} 51.25%, Mg^{2+} 36.01%, Na^+ 5.70%, K^+ 7.04%Anions: HCO_3^- 70.63%, SO_4^{2-} 23.01%, Cl^- 6.36%Facies: Ca–HCO_3
Interpretation: Ca–HCO_3 dominance with minor SO_4.

December, 2024
Cations: Ca^{2+} 44.24%, Mg^{2+} 38.60%, Na^+ 7.78%, K^+ 9.38%Anions: HCO_3^- 63.03%, SO_4^{2-} 30.02%, Cl^- 6.95%Facies: Ca–HCO_3–SO_4 transitional
Interpretation: Shift toward Ca–SO_4–HCO_3 zone, likely reflecting increased mineral interaction.

Schoeller Diagram

The Schoeller diagram is a graphical method used to classify groundwater based on its chemical characteristics and intended use, facilitating the interpretation of water origin and similarity. One of its key applications is the estimation of aquifer lithology within a groundwater system, essentially identifying the rock types with which groundwater has interacted. According to Schoeller (1955), waters are classified based on the concentrations of chloride, sulfate, and carbonate plus bicarbonate ions.

In the construction of the Schoeller semi-logarithmic diagram, ion concentrations (in milliequivalents per liter, meq/L) are plotted on the vertical logarithmic axis, while the ions themselves are evenly spaced along the horizontal axis. The chemical composition of groundwater is primarily controlled by the geochemical properties of the rocks it contacts. Waters originating from the same reservoir or recharge

area, and having similar lithological interaction, tend to display comparable patterns or “peaks” on the diagram.

The Schoeller Diagram thus provides a means to compare and classify waters by plotting the concentrations of major cations and anions—typically Mg^{2+}, Ca^{2+}, Na^{+}, K^{+}, Cl^{-}, HCO_3^{-}, and SO_4^{2-}—on a semi-logarithmic scale. Each water sample produces a distinct profile based on its ionic composition, enabling clear visualization and comparison of chemical similarities or differences between samples. When profiles overlap or show similar trends, it suggests a common hydrogeochemical origin or similar aquifer conditions. The results of the analysis of the sample points are shown in the Schoeller Diagram in Figure VIII.11.

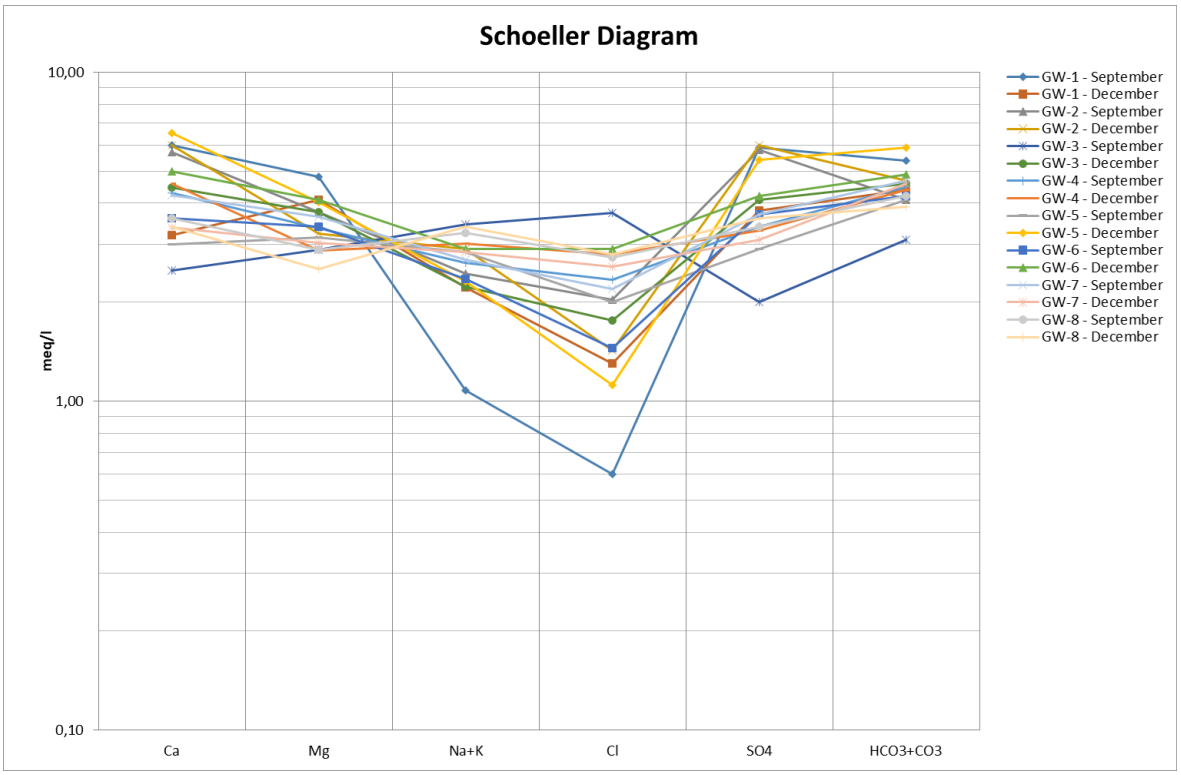


Figure VIII.11 Schoeller Diagram

This Schoeller diagram reveals that the hydrogeochemical types of the samples are mostly of the Ca-Mg-HCO_3 type, with no major seasonal variation. The similarities in the diagram suggest that the water comes from the same aquifer or similar geological units.

US Salinity Diagram

Groundwater may contain excessive amounts of undesirable substances such as salts, and thus should be evaluated prior to its use for irrigation purposes. High concentrations of dissolved ions in irrigation water can adversely affect both plants and agricultural soils through various physical and chemical interactions, ultimately leading to reduced crop yield. Although numerous parameters influence irrigation

water quality, their impacts can vary—some may not affect certain plant species, while others can have detrimental effects. For example, sodium ions (Na^+) present in saline water can replace calcium ions (Ca^{2+}) in the soil matrix, reducing soil permeability and aeration. This, in turn, hinders plant growth. Therefore, assessing the quality of irrigation water is essential for maintaining agricultural productivity. In this study, the classification of water samples was conducted using the 'U.S. Salinity Laboratory Diagram' developed by Richards (1954). This diagram is based on two key parameters: Electrical Conductivity (EC) measured in µS/cm at 25°C, and the Sodium Adsorption Ratio (SAR). The SAR values in this study were calculated using the formulas provided below.

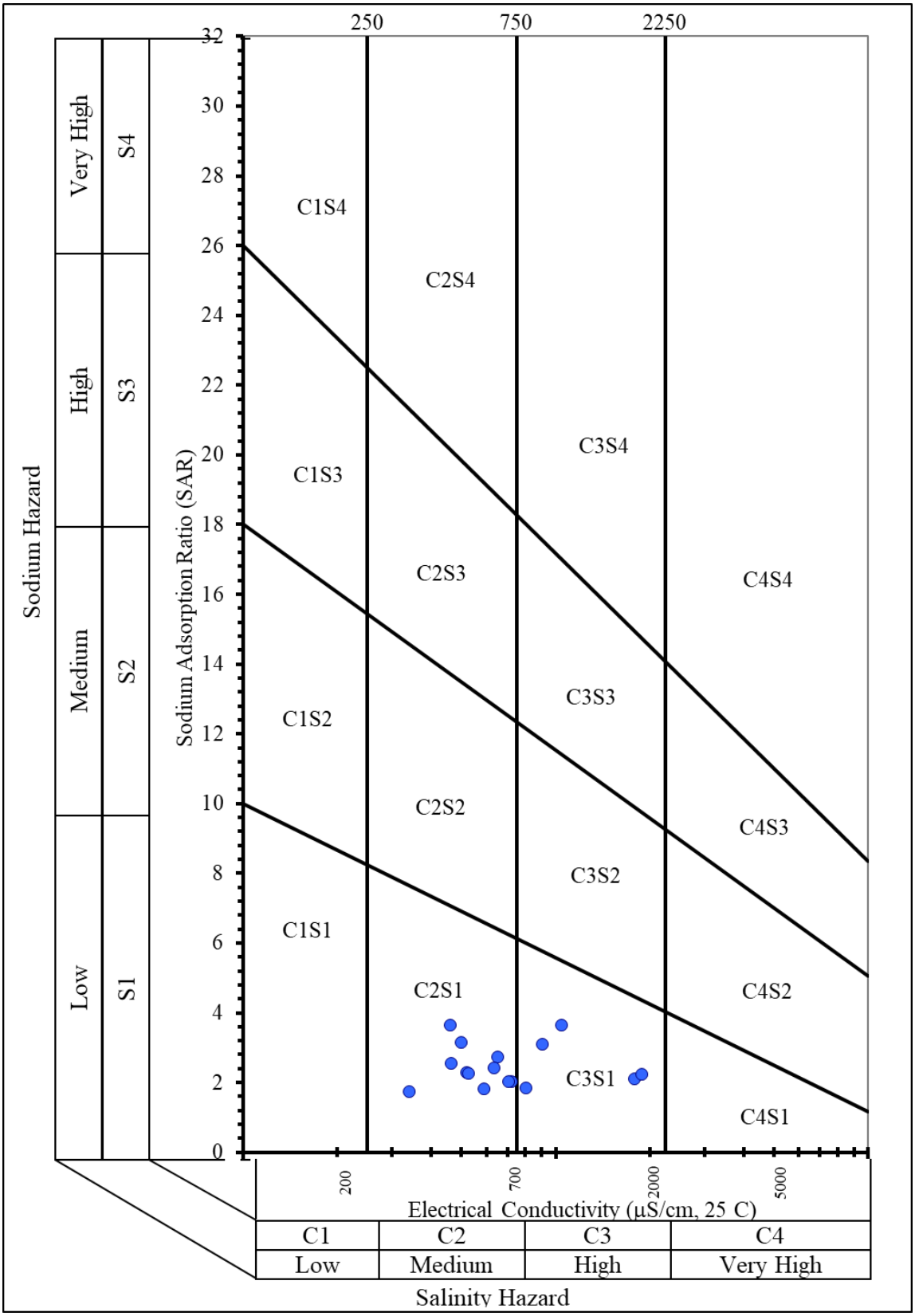

250
750
2250
Very High
High
Medium
Low
S4
S3
S2
S1
Sodium Hazard
Sodium Adsorption Ratio (SAR)
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
C1S4
C2S4
C3S4
C1S3
C2S3
C4S4
C3S3
C1S2
C2S2
C4S3
C3S2
C1S1
C2S1
C4S2
C3S1
C4S1
200
700
2000
5000
Electrical Conductivity (µS/cm, 25 C)
C1
C2
C3
C4
Low
Medium
High
Very High
Salinity Hazard

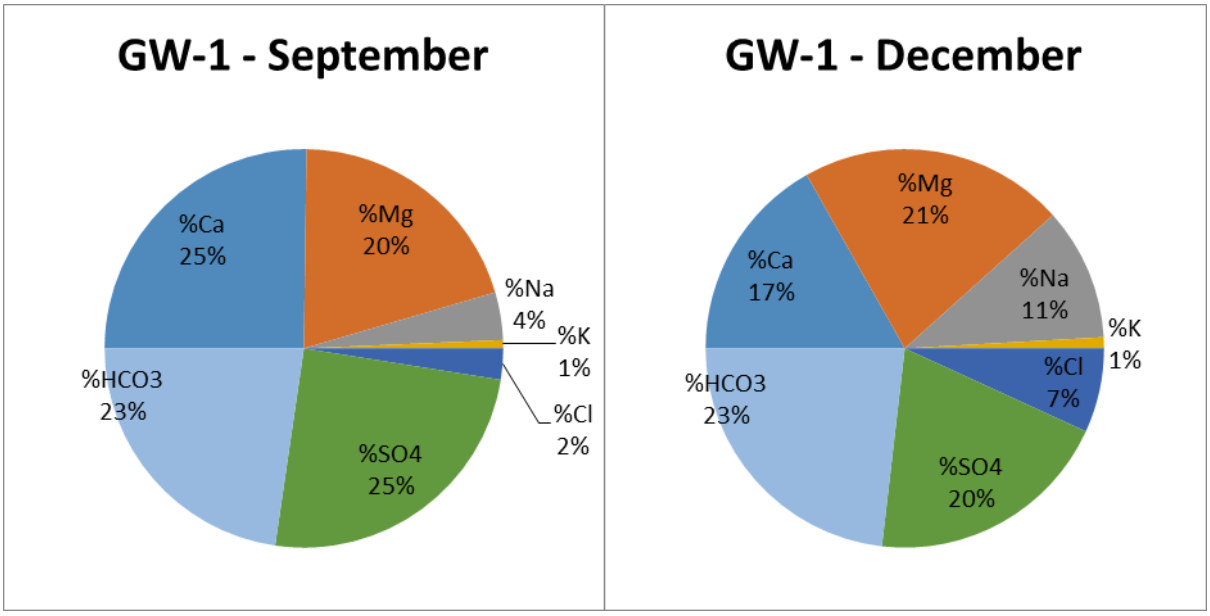
Figure VIII.12 US Salinity Diagram

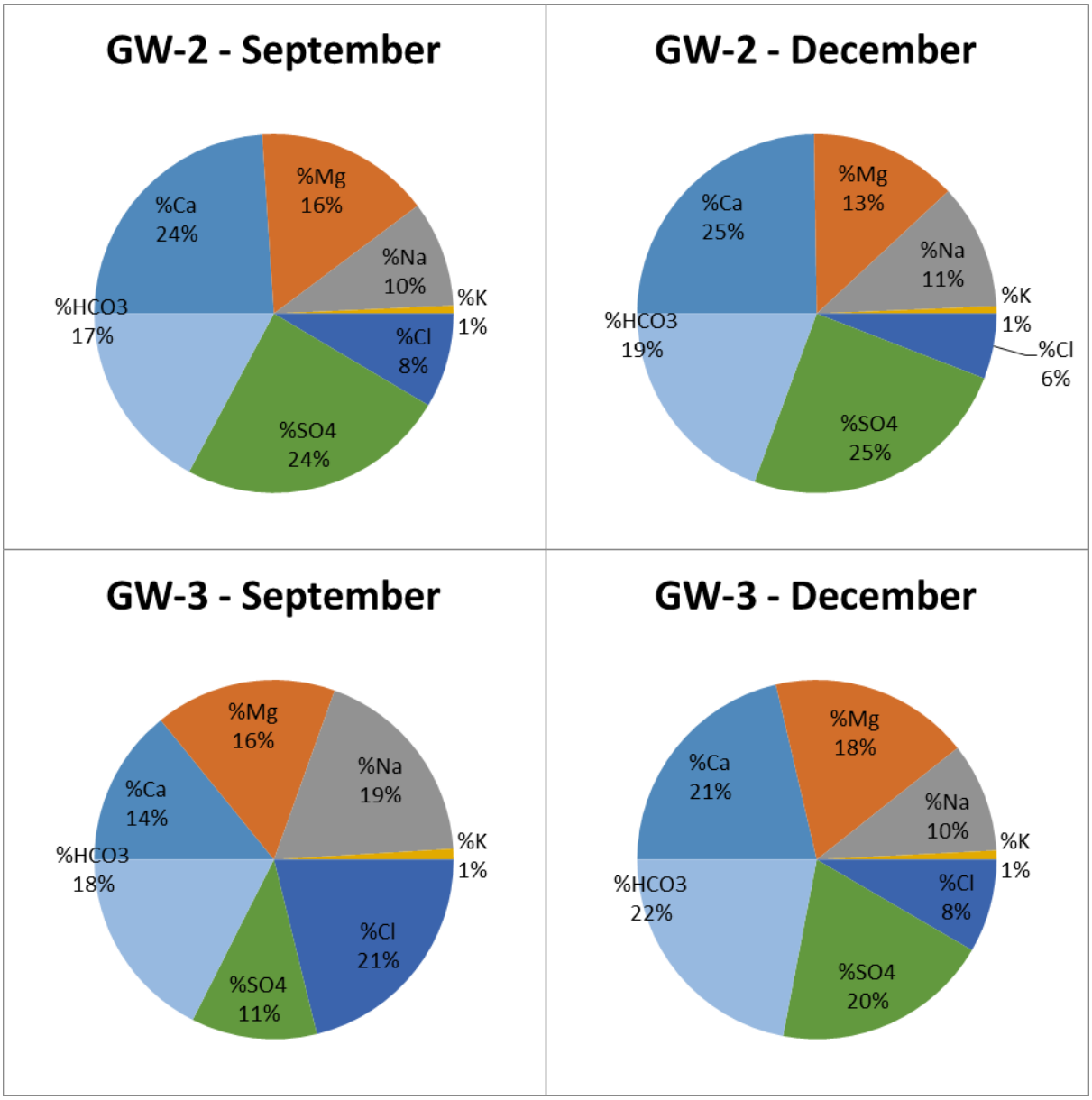
According to the Figure VIII.12, all water samples were located in the C2S1 and C3S1 zones. This indicates that the studied waters are generally of suitable quality for irrigation purposes. The samples in the C2S1 zone are waters with moderate salinity and low sodium hazard. Such waters are agriculturally safe as they do not carry the risk of sodium accumulation in the soil and can be easily used for irrigation of various crops. However, regular monitoring is recommended to ensure that soil salinity does not increase over time.

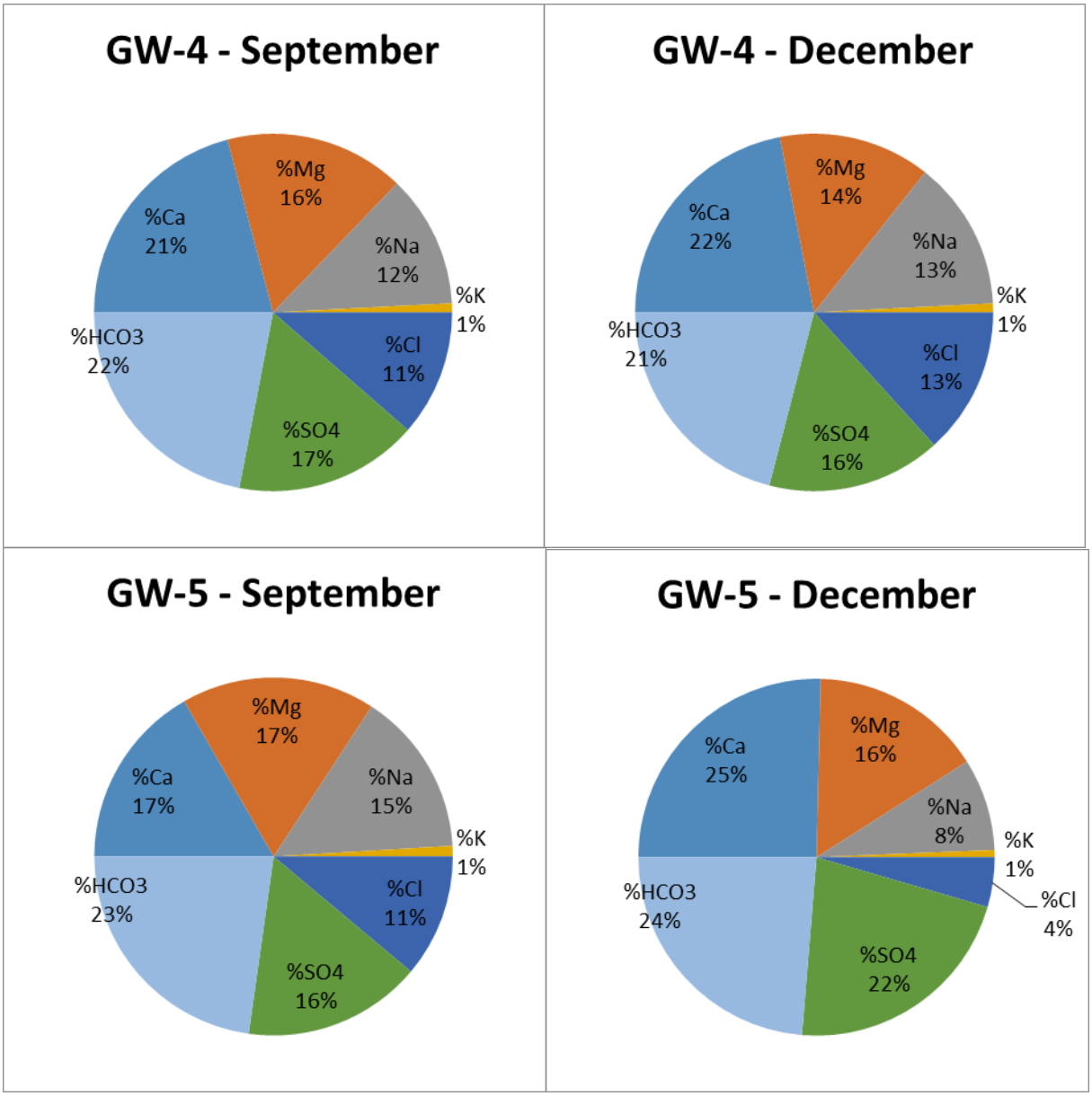
The samples in the C3S1 zone have higher salinity levels but still contain low sodium content. These waters are particularly suitable for crops with high salt tolerance (e.g. barley, cotton, corn). However, due to the high salinity, good drainage conditions should be ensured in lands irrigated with these waters and salt accumulation in the soil should be monitored regularly. Otherwise, soil fertility may decrease over time.

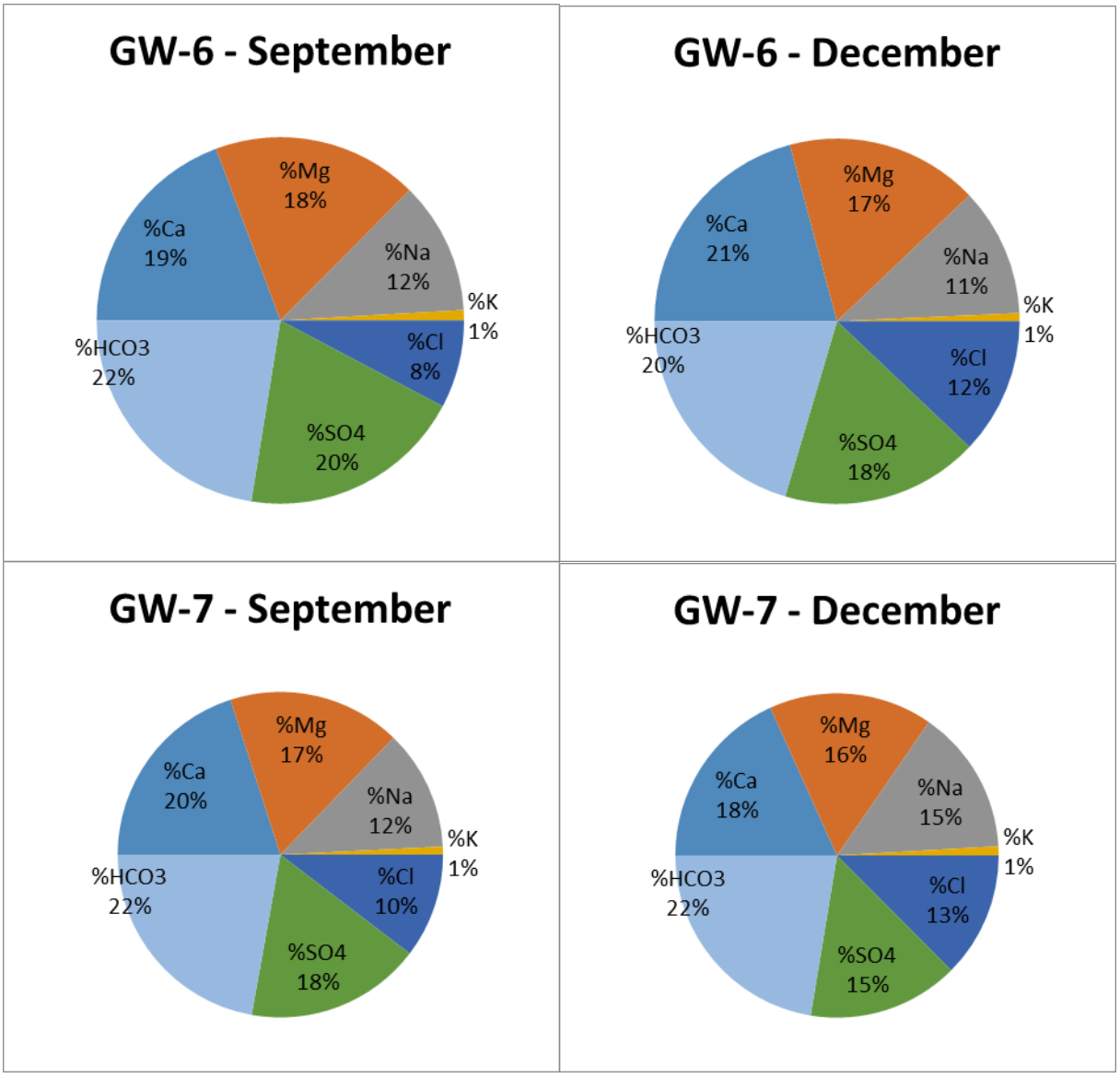
Overall, both groups have low risk for sodium and therefore low potential for soil structure degradation. Therefore, the vast majority of available water samples can be safely used for irrigation purposes, but caution is recommended for plants with high salt sensitivity and regular analysis of soil and water.

Charts showing the anion and cation distributions of the groundwater samples is shown in Figure VIII.13




GW-2 - September
%Mg 16%
%Na 10%
%K 1%
%Cl 8%
%SO4 24%
%HCO3 17%
%Ca 24%
GW-2 - December
%Mg 13%
%Na 11%
%K 1%
%Cl 6%
%SO4 25%
%HCO3 19%
%Ca 25%
GW-3 - September
%Mg 16%
%Na 19%
%K 1%
%Cl 21%
%SO4 11%
%HCO3 18%
%Ca 14%
GW-3 - December
%Mg 18%
%Na 10%
%K 1%
%Cl 8%
%SO4 20%
%HCO3 22%
%Ca 21%


GW-4 - September
%Mg 16%
%Na 12%
%K 1%
%Cl 11%
%SO4 17%
%HCO3 22%
%Ca 21%
GW-4 - December
%Mg 14%
%Na 13%
%K 1%
%Cl 13%
%SO4 16%
%HCO3 21%
%Ca 22%
GW-5 - September
%Mg 17%
%Na 15%
%K 1%
%Cl 11%
%SO4 16%
%HCO3 23%
%Ca 17%
GW-5 - December
%Mg 16%
%Na 8%
%K 1%
%Cl 4%
%SO4 22%
%HCO3 24%
%Ca 25%


GW-6 - September
%Mg 18%
%Na 12%
%K 1%
%Cl 8%
%SO4 20%
%HCO3 22%
%Ca 19%
GW-6 - December
%Mg 17%
%Na 11%
%K 1%
%Cl 12%
%SO4 18%
%HCO3 20%
%Ca 21%
GW-7 - September
%Mg 17%
%Na 12%
%K 1%
%Cl 10%
%SO4 18%
%HCO3 22%
%Ca 20%
GW-7 - December
%Mg 16%
%Na 15%
%K 1%
%Cl 13%
%SO4 15%
%HCO3 22%
%Ca 18%

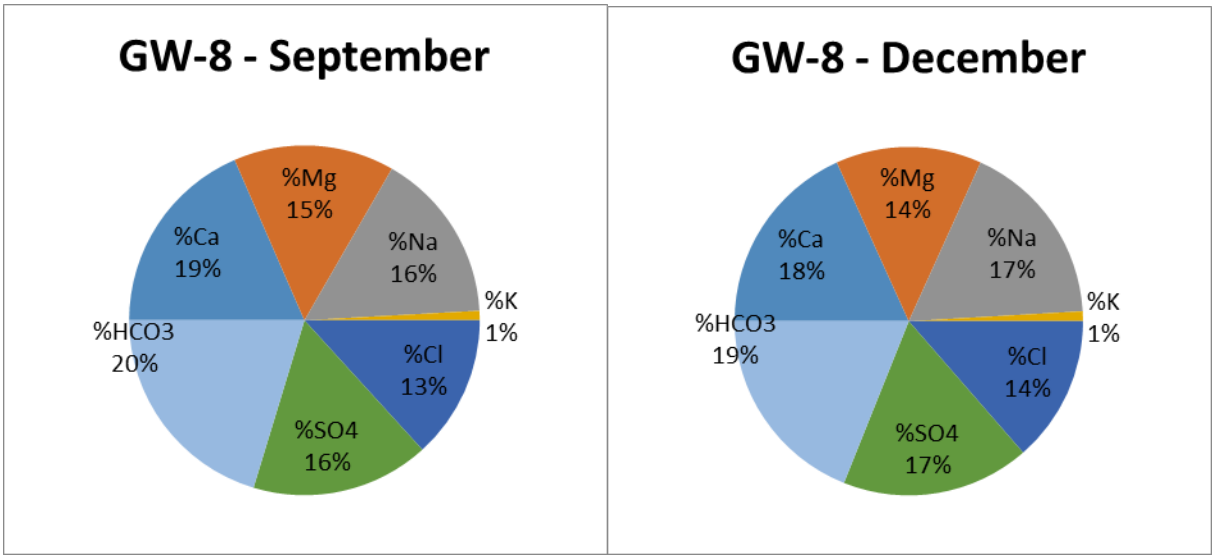


Figure VIII.13 Anions and Cations distribution charts

VIII.2.4.Wastewater Management

During the land preparation and construction activities, wastewater will be generated from construction sites and accommodation facilities for workers (campsite, kitchen, cafeteria, etc.). The basic approach will be to reuse the wastewater generated by project activities in the activity cycle during construction. This approach will not require any water discharge to environmental media. Especially for the reuse of wastewater generated in concrete batching plants, three-compartment settling ponds will be constructed. In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary pools and installations will be constructed for the reuse of water at these stations.

For the areas where reusing will not be an option, water should be treated to reduce or eliminate the contaminants before being discharged to receiving environment.

According to the data published by TurkStat (2022), the daily average municipal wastewater generation by a person is 197 L/capital/day in Türkiye, 318 L/capital/day in Antalya. Assuming that the wastewater consumption at the construction site is 70% of the consumption under normal conditions, the wastewater produced by one person per day is calculated as 223 liters. The number of people planned to be employed during the construction period of the project is 3300, and it is accepted that 1100 people will work on a construction site. In this context, Table VIII.12 indicates the total amount of wastewater will generated during the construction phase.

Table VIII.12 Amount of Wastewater to be produced in the Construction Phase

Location	Maximum Personnel* (persons)	**Total Amount of Daily Wastewater Generation (L/day)
1.Camp Site	1,250	250,875

2.Camp Site	1,250	250,875
3.Camp Site	1,250	250,875
Total	**3,750**	**752,625**

** Number of Maximum Personnel Anticipated including contractor and sub-contractors (provided by Project Sponsor).*
***Detailed calculations are provided in Chapter IX Use of Resources and Waste Management.*

Throughout the project construction phase, package Wastewater Treatment Plants (WWTP) and non-leaking septic tanks were planned and to be constructed for each construction campsite. Although it is accepted that 1,100 people are planned to work in a campsite during the construction period of the project, each package WWTP will have a capacity equivalent to the maximum number of people, 1,250 people (including personnel of contractor and sub-contractors). Therefore, no significant impact is expected due to domestic wastewater discharges.

All the permits related to WWTP and environmental has applied as of June/2025 and waiting for the approvals. Discharge points of WWTP's permit approval has been granted from Turkish State Hydraulic Works (DSİ).

Treated wastewater shall be analyzed in order to ensure that the quality and quantity of the wastewater to be discharged will be in compliance with the limit values indicated in national and international regulations. In addition, necessary permits will be obtained from regulating administrations. The quality of the wastewater will be in compliance with the limit values indicated in Regulation on of Control Water Pollution and IFC standards, which are given in Table VIII.13. It is planned to reuse treated water to prevent dusting.

Table VIII.13 Domestic Wastewater Discharge Requirements

Parameter	Turkish Legal Requirement ([a])	IFC ([b])
	2-hr Composite Sampling	
Biochemical Oxygen Demand (BOD_5) (mg/L)	50	30
Chemical Oxygen Demand (COD) (mg/L)	160	125
Total Suspended Solids (TSS) (mg/L)	60	50
pH	6-9	6-9
Total Nitrogen (mg/L)	-	10
Total Phosphorus (mg/L)	-	2
Oil and Grease (mg/L)	-	10
Total Coliform Bacteria MPN([c])/100 ml	-	400

([a]) Water Pollution Control Regulation, Table 21.1 Domestic Wastewater Discharges (Class 1: BOD load 5-120 kg/day, Population: 84-2000)
([b]) Table 1.3.1-Indicative Values for Treated Sanitary Sewage Discharges, IFC Environmental, Health, and Safety General Guidelines, April 30, 2007.
([c]) MPN: Most Probable Number

In operation phase, rest and maintenance areas and toll booth area will be the sources of wastewater generation. Generated wastewater may contain organic and inorganic pollutants, suspended solids,

heavy metals or toxic materials, etc. Wastewater will be either discharged into the local/municipal sewage network or treated prior to discharge to the suitable receiving environment or collected onsite and transported by tanker for disposal at the local sewage treatment works There is no planned discharge to the riverbeds (dry or running) that are used for the drinking water supply to the settlements. The total amount of wastewater expected to be generated during the operation phase will be calculated by the project sponsor after sharing the number of employees and visitors during the operation period. How to calculate the amount of wastewater to be generated in the facilities to be used during the operation period is presented in Chapter VII.

VIII.3. Potential Impacts

In order to assess potential impacts of the Project on water resources, the project is considered in two phases: Land Preparation and Construction Phase and Operation Phase. In this way, relevant impacts are evaluated separately for each phase since the project activities and potential releases from these activities are different for each phase.

VIII.3.1. Land Preparation and Construction Phase

Potential impacts on water resources during the land preparation and construction phase are generally expected to be more significant than the ones during operation phase for motorway projects. The main sources of land preparation and construction phase impacts of a motorway project on water resources are typically suspended sediment in runoff waters from the work sites and accidental spillages of hazardous materials from construction activities and machinery.

VIII.3.1.1. Impacts on Surface Water

Potential impacts on surface water bodies and quality can mostly be considered temporary.

These impacts can be listed as follows:

- Construction activities on existing surface water bodies, such as rivers, creeks, drainage systems, or irrigation channels, may lead to the permanent alteration or destruction of these water features if proper design and construction management precautions, including reinstatement measures, are not implemented.
- Silty, soiled, and high turbidity water would arise from construction activities, which might contaminate surface waters. Main construction activities that may cause these impacts are;
    - excavation
    - soil stockpiling
    - quarry activities
    - plant and wheel washing
    - road construction
    - washing of finished road surfaces to remove accumulated soil

- Spills of hazardous substances including fuel, oils, lubricants and cement might take place at construction sites, refueling site or storage depot and reach to close by surface and groundwater. These would affect the water quality such that aquatic life (mainly fish) and downstream users might also be affected.
- Bitumen and materials used for waterproofing of concrete surfaces will be used during the construction phase of the Project. These materials are also a contamination source for surface water, especially when they are mixed with surface runoff upon precipitation and reach a surface water body.
- All wastewaters from construction activities (sanitary or process) pose a risk to the water environment if not treated before discharge.

VIII.3.1.2.

VIII.3.1.3. Impacts on Groundwater

The potential impacts on groundwater would be on both water quality and water quantity (groundwater levels) in the area. These can be listed as follows:

- Some deeper excavation works may require permanent dewatering of a groundwater component.
- During earthworks and other soil-related activities; in sections cut into the bedrock or shallow overburden, any fissure permeability is at risk of blockage by infiltrating sediment/fines.
- Especially on areas with shallow overburden, accidental discharges of hazardous materials to the ground can contaminate aquifers.
- Site clearance, earthwork, spillages/leakages from construction sites, and refueling vehicles may contaminate aquifers.
- All wastewaters from construction activities (sanitary or industrial) pose a risk to the water environment if not treated before discharge.

VIII.3.2.Operation Phase

Potential impacts on water resources during the operation/use of the motorway are generally more limited than construction phase, and there are temporary, one-time and long term impacts.

VIII.3.2.1. Impacts on Surface Water

Impacts on Surface Water Quality

- Maintenance activities like using de-icing agents may affect surface water quality if they reach any close surface water, but this impact will be temporary.
- During the operation of the motorway, spills during road accidents and from filling stations might be of concern. This type of water pollution risk is high within all road sections close to surface water bodies. However, this type of impact would be temporary since accidents and/or spillages should be considered as one-time events.
- Routine deposits (tire and brake deposits, hydrocarbons from engines, liquid exhaust emissions etc.) of vehicles travelling on motorway and leakage of road body itself (tar soils) and road marking materials have the possibility to impact nearby surface water quality. As these events are continuous, such impacts would be considered as permanent.

Structural Impacts on Surface Water

- Construction of viaducts, culverts, etc. might change the hydrological regime with potential impacts on the beds and banks of rivers (scour, erosion, deposition etc.).
- In case of inappropriate design, physical interference of a stream by the installation of culverts and roadways has the possibility to impact the hydrological regime of a stream.

Impacts on Drainage and Flooding

- The final structure of a motorway will increase the impermeable surface area because of its nature. That situation leads to an increase in the rate of surface water runoff, and high storm water flow rates can lead to erosion and flooding.

- During flood times, culverts, and diversion channels may impede flow. This situation causes an increase in the water level at the upstream of relevant structures.

VIII.3.2.2. Impacts on Groundwater

Impacts on Groundwater Quality

- Runoff from the road pavement is likely to contain some degree of silt/dust and pollutants from atmospheric deposition, vehicle emission, litter, and general road maintenance, as well as from possible accidental road spillage incidents. This runoff has the possibility to infiltrate into the groundwater and contaminate it.
- In areas where groundwater wells are located down-gradient and short distances from fill sections, and at fill sections where the subsoil thickness is shallow, surface water runoff has the potential to infiltrate into the subsoil and migrate to the groundwater.

Impacts on the Groundwater Table

- Deep cuttings are a necessity for Project in some areas. Deep cuttings may have impacts on the groundwater regime and also have subsequent impacts on groundwater abstraction wells.
- Groundwater recharge may decrease because of sealing of surfaces of motorway.

VIII.4. Mitigation Measures

Relevant mitigation measures according to potential impacts identified are described in this section. Impacts of the project should be mitigated by measures to be taken at different phases of project development and implementation. Therefore, mitigation measures to be considered are categorized into three phases, namely, design, land preparation and construction, and operation.

VIII.4.1. Design Phase

- General hydrological considerations/design of the Project will be in accordance with KGM design standards and AASHTO Highway Drainage Principles. In this regard, generally, 100-year flood flow will be taken into account on stream passage designs (Ref. State Highways Technical Requirements, Item 9.3). Minimum dimensions of all culverts will be 2m x 2m except discharge culverts. Culverts will be designed with one outlet whenever possible. Any change in the project design will be implemented once approved by KGM.
- Project elements will be located such that risks on groundwater would be minimized. Groundwater use for project activities would be planned to be limited and would be done only after getting relevant permissions from the authorities.
- In case of a need, new or replacement of irrigation structures will be constructed.
- In order to minimize changes in the hydrology and flow of water courses, design of structures will be done accordingly. The design will also ensure an appropriate capacity for culverts through embankments when flood plains are cut off.
- The design will be done in a way to minimize the risks of flooding. During the operation phase, Emergency Preparedness and Response Plan (See Annex-3) will be used to mitigate flood events.

- Storm water management practices that slow peak runoff flow, reduce sediment load, and increase infiltration, including vegetated swales (planted with salt-resistant vegetation), filter strips, terracing, detention ponds or basins, and infiltration trenches, will be planned.
- In order to limit the volume of water requiring specialized treatment (during land preparation and construction, and operation phases), segregation of liquid effluents, principally along industrial, sanitary, and stormwater categories, will be planned.
- Fish and terrestrial animal passages will be located in design where necessary.
- Appropriate designs and structures, such as viaducts will be used for stream and river crossings.
- Drainage projects have been developed to collect surface runoff along the Motorway by means of ditches and diversion of the collected water to the nearest receiving water bodies. The design criteria for the drainage system are in accordance with motorway standards.
- Pleas refer to Chapter 7 about the details of the drainage network.

VIII.4.2. Land Preparation and Construction Phase

VIII.4.2.1. Mitigation Measures for Surface and Groundwater Quality

- Equipment and vehicles will get their fuels at designated areas.
- Hazardous materials will not be stored within excavated areas. Handling of all hazardous materials will be supervised. Impervious bunds and other containment techniques will be used where hazardous materials are handled.
- Throughout the project construction phase, package Wastewater Treatment Plants (WWTP) and non-leaking septic tanks were planned and to be constructed for each construction camp site. All wastewater discharges from all components of construction will comply with relevant legal requirements.
- All wastewater discharges will comply with relevant Turkish legal requirements (Water Pollution Control Regulation 2004, No. 25687) and Project Standards before disposal, and relevant permits and monitoring shall in place.
- Wastewater from all construction compounds and the associated buildings will either be discharged into the local/municipal sewage network or treated on site before discharge to a suitable receiving environment (as allowed for under permit conditions) or collected on site and transported by tanker for disposal at the local sewage treatment works and wastewater discharge permit according to the provisions of the “Environmental Permit and License Regulation” (Official Gazette: 10.09.2014-29115) will be secured before operation of the plant.
- All wastewater produced during construction activities will be temporarily stored on site in suitable, leakage-proof and spill-proof above-ground storage tanks or similar containers based on available technology (non-corrosive and suitable for storing wastewater) and periodically collected by licensed companies appointed by AAOAİŞ and trucked to appropriate and licensed wastewater treatment/disposal facility authorized according to national regulations.
- The disposal of the wastewater collected by the vacuum trucks will be carried out at appropriate district municipal treatment facilities under a contractual agreement which contractual agreement will be reached before the installation of septic tanks. The frequency of vacuum truck wastewater removal will be recorded.
-
- Package wastewater treatment plants designed for the maximum number of employees will be used in construction campsites.
- The regular cleaning, maintenance, and inspection of package wastewater treatment plants will be ensured.
- The pipeline from the wastewater source to the package wastewater treatment plant will be robust enough to withstand heavy vehicle loads. This will prevent blockages and/or leaks.

- All wastewater discharges from all components of construction will comply with relevant legal requirements. Treated water will be reused where possible and feasible.
- For facilities with a small number of workers where a treatment plant is not feasible, septic tanks will be used, and these tanks will be frequently emptied by vacuum trucks.
- The disposal of the wastewater collected by the vacuum trucks will be carried out at appropriate district municipal treatment facilities under a contractual agreement. The frequency of vacuum truck wastewater removal will be recorded.
- When water quality criteria allow, stormwater will be managed as a resource for meeting the Project's water needs whenever feasible.
- Drainage water from excavations will be collected and treated to remove contaminants before discharging. Perimeter drains will be constructed around all working areas to collect potentially contaminated run-off and direct it to a system of settlement tanks before discharge in accordance with required permits. Direct discharge of contaminated run-off from work sites will not be allowed.
- Channels, bunds, and sandbag barriers will be used to provide direct run-off to the collection system.
- Biodegradable cleaning agents will be used to remove the asphalt residues.
- High sediment generating activities will be avoided, exposed surfaces and stored materials covered, if necessary, to reduce sediment erosion and reach surface waters.
- For any emergency during construction, Emergency Preparedness and Response Plan will be implemented.
- Exposure of areas of the open ground will be kept at a minimum in size and duration.
- All details related to wastewater management, including records, maintenance, cleaning frequencies, inspections, and responsible personnel, will be defined in the Water Quality, Wastewater and Stormwater Management Procedure.
- In case of groundwater utilization within the scope of the Project, necessary permits and approvals will be obtained from the General Directorate of State Hydraulic Works (DSİ), taking into account the adequacy and sustainability of the water resource. A detailed hydrogeological study will be carried out within the scope of the Project.
- Calculation of radius of impact on groundwater abstraction and discharge on natural flow system, groundwater dependent ecosystems and groundwater users will be analysed if applicable.
- Groundwater will not be used in areas at risk of contamination; in such cases, surface water sources or outsourced water sources will be used as an alternative.

VIII.4.2.2. Mitigation Measures for Surface Water Bodies and Channels

- Whenever and wherever possible, construction of viaducts, retaining walls, and other structures will be done during dry water season months.
- Fencing will be used in sensitive areas of rivers and drains for protection.
- Isolation techniques such as berming or diversion during construction to limit the exposure of disturbed sediments to moving water will be used during in-stream works.
- In order to protect small drains within construction areas, they will be covered with metal plates that construction machines can pass over.
- Stream crossing works will be carried out from the banks above the channel and avoiding direct intervention in the watercourse unless existing bank reinforcement needs to be replaced. The works will be undertaken during periods of low flow, and the duration of in-stream activities will be restricted.
- Use of grass turf from adjacent areas to cover the soil surface, use of erosion control blankets or mats, and other relevant soil erosion prevention measures will be implemented after the finalization of an earthwork.

VIII.4.2.3. Mitigation Measures for Water Ingress into the Tunnels

- The volume of water expected to enter the tunnels will be calculated before the construction area layout is finalized, and water management strategies will be based on this data.
- Tunnel water settling basins will be appropriately sized, taking into account these calculations and best practice guidance for settling basin design.
- Measures to prevent cement contamination of tunnel water will be clearly defined and described in detail. Water exiting the tunnels will be directed to settling basins with sufficient capacity to receive all surface runoff.
- After passing through the settling basins, the effluent will be discharged if the measured parameters meet discharge standards. If needed, and after achieving the required quality standards, the water will be reused within the system(e.g., for dust suppression, construction activities, etc.).

VIII.4.2.4. Mitigation Measures for Water Usage

- The water use of project activities would be planned to be limited and would be done only after getting relevant permissions from the authorities.
- For the reuse of wastewater generated in concrete batching plants, three-compartment settling ponds will be constructed.
- In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary settlement pools and installations will be constructed for the reuse of water at these stations. It is planned to reuse treated water to prevent dusting. Water used in concrete plants will be filtered in watertight sedimentation ponds and reused. These ponds will be frequently cleaned by the responsible person(s) according to the plan, thus preventing overflow.
- To reuse of wastewater generated in concrete batching plants, three-compartment settling ponds that each compartment will be 1 m depth, 2 m width and 3 m length should be constructed. The settlements in the settling ponds will be removed bi-weekly. In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary pools and installations should be constructed for the reuse of water at these stations.
- Treated wastewater will be analyzed to ensure compliance with relevant quality limit as defined in regulatory frameworks. The Project's approach to water management focuses on minimizing adverse environmental impacts and ensuring that all discharges meet established regulatory thresholds.

VIII.4.3. Operation Phase

VIII.4.3.1. Mitigation Measures for Surface and Groundwater Quality

- Sealed basement and bunds with a capacity of the 100% of the storage capacity of the largest tank will be used at fuel stores and other harmful substance stores.
- In case of any large-scale spill, absorbent materials within spill response kits will be used. The kits will be available at relevant centers and locations and will be used by trained personnel.

- Sand layers as filters in seepage pits (detritus basins in the form of a shallow pit connected to drain trenches) would be used, allowing hardly any harmful substance to percolate into deeper soil layers or into the groundwater.
- Inspection and maintenance of permanent erosion and runoff control features will be done regularly.
- Oil separators will be installed at fuel stations.
- Facilities designed according to the maximum number of people at the operational sites will be used, and the reuse of the effluent or its connection to the city sewer network will be planned.
- Motorway will be paved in dry weather to prevent runoff of asphalt or cement materials.
- In need of deicing, mechanical deicing methods (sweepers and plows) will be used at first. It will be complemented by chemical means if necessary. In addition to that, anti-icing and deicing agents will be selectively applied based on expected pavement temperatures and the use of road weather information systems. Furthermore, employees applying anti-icing and deicing agents will be trained to use these at optimum rates and times. Anti-icing and deicing agents will be selected based on the potential environmental impacts of the particular agent.

VIII.4.3.2. Mitigation Measures for Groundwater Flow Regime

- Measures will be developed to ensure that no indirect impacts on any important groundwater resource take place. Where medium to long-term or permanent dewatering is required, the water would not be drained to the Motorway drainage system but to a near surface water course.
- Infiltration will be promoted if water depletion arises in areas of groundwater wells to ensure the supply, especially in urban settings.

VIII.5. Summary of Assessment and Residual Impacts

Table VIII.14 provides a summary on water resources assessment. The significance of the identified impacts before and after the implementation of mitigation measures are summarized in this table. With proper implementation of good water management practices, water pollution risks would not cause any significant impact on the ecosystem or bring associated risks on the health and safety of the community and/or Project personnel.

Table VIII.14 Summary of the Assessments on Water Resources

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phase												
Disturbance of surface water bodies and irrigation channels due to construction activities		Adverse	Restricted	Medium	Medium	Irreversible	One-off	Modarate (B)	Medium (2)	Medium (B2)	● General hydrological considerations/design of the Project will be in accordance with KGM design standards and AASHTO Highway Drainage Principles. ● In case of a need; new or replacement of irrigation structures will be constructed. ● In order to minimize changes in the hydrology and flow of water courses, design of structures will be done accordingly. ● Fish and terrestrial animal passages will be located in design where necessary. ● Appropriate designs and structures, such as viaducts and bridges will be used for stream and river crossings once approved by KGM.	Low
Contamination of surface waters with silt/soil.		Adverse	Local	Long	Low	Short-term reversible	One-off	Modarate (B)	Medium (2)	Medium (B2)	● Drainage water from excavations will be collected and treated to remove contaminants before discharging. ● In order to provide direct run-off to the collection system; channels, bunds and sandbag barriers will be used. ● In order to remove asphalt residues, biodegradable cleaning agents will be used. ● High sediment generating activities will be avoided and exposed surfaces and stored materials covered, if necessary, to reduce erosion and reaching of sediments to surface waters. ● Water used in concrete plants will be filtered in watertight sedimentation ponds and reused. These ponds will be frequently cleaned by the responsible person(s) according to the plan, thus preventing overflow. ● A separate vehicle washing station will be established, and the used water will be reused after passing through a sedimentation pond. The cleaning of the sediment that accumulates at the bottom of this pond will be scheduled.	Low
Contamination of surface waters with hazardous materials	Surface Water	Adverse	Local	Long	Medium	Long-term reversible	One-off	Modarate (B)	High (3)	High (B3)	● Equipments and vehicles will get their fuels at designated areas. ● Hazardous materials will not be stored within excavated areas. ● In order to remove asphalt residues, biodegradable cleaning agents will be used. ● For any emergency during construction, Emergency Preparedness and Response Plan will be implemented ● Exposure of areas of open ground will be kept at minimum in size and duration. Isolation techniques such as berming or diversion during construction to limit the exposure of disturbed sediments to moving water will be used during in-stream works	Low
Contamination of surface waters due to wastewater discharge or leakage.		Adverse	Local	Long	Medium	Long-Time reversible	One-off	Modarate (B)	High (3)	High (B3)	● In order to limit the volume of water requiring specialized treatment (during land preparation and construction, and operation phases) segregation of liquid effluents, principally along industrial, sanitary and stormwater categories, will be planned. ● Package wastewater treatment plants designed for the maximum number of employees will be used in construction campsites. ● The regular cleaning, maintenance, and inspection of package wastewater treatment plants will be ensured. ● The pipeline from the wastewater source to the package wastewater treatment plant will be robust enough to withstand heavy vehicle loads. This will prevent blockages and/or leaks. ● All wastewater discharges from all components of construction will comply with relevant legal requirements. Treated water will be reused where possible and feasible. ● For facilities with a small number of workers where a treatment plant is not feasible, septic tanks will be used, and these tanks will be frequently emptied by vacuum trucks. ● Wastewater will be temporarily stored on site in leak-proof, non-corrosive containers and collected periodically. ● The disposal of the wastewater collected by the vacuum trucks will be carried out at appropriate district municipal treatment facilities under a contractual agreement. The frequency of vacuum truck wastewater removal will be recorded. ● In case of groundwater utilization within the scope of the Project, necessary permits and approvals will be obtained from the General Directorate of State Hydraulic Works (DSİ),	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											taking into account the adequacy and sustainability of the water resource. A detailed hydrogeological study will be carried out within the scope of the Project. Calculation of radius of impact on groundwater abstraction and discharge on natural flow system, groundwater dependent ecosystems and groundwater users will be analysed if applicable.	
Water Ingress into the Tunnels		Adverse	Local	Long	Medium	Long-term reversible	One-off	Modarate (B)	High (3)	High (B3)	● The volume of water expected to enter the tunnels will be calculated before the construction area layout is finalized, and water management strategies will be based on this data. ● Tunnel water settling basins will be appropriately sized, taking into account these ● Calculations and best practice guidance for settling basin design. ● Measures to prevent cement contamination of tunnel water will be clearly defined and described in detail. Water exiting the tunnels will be directed to settling basins with sufficient capacity to receive all surface runoff. ● After passing through the settling basins, the effluent will be discharged if the measured parameters meet discharge standards. If needed, and after achieving the required quality standards, the water will be reused within the system(e.g., for dust suppression, construction activities, etc.).	
Water Usage	Surface Water	Adverse	Local	Long	Medium	Long-term reversible	One-off	Modarate (B)	High (3)	High (B3)	● The water use of project activities would be planned to be limited and would be done only after getting relevant permissions from the authorities. ● For the reuse of wastewater generated in concrete batching plants, three-compartment settling ponds will be constructed. ● In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary settlement pools and installations will be constructed for the reuse of water at these stations. It is planned to reuse treated water to prevent dusting. Water used in concrete plants will be filtered in watertight sedimentation ponds and reused. These ponds will be frequently cleaned by the responsible person(s) according to the plan, thus preventing overflow. ● To reuse of wastewater generated in concrete batching plants, three-compartment settling ponds that each compartment will be 1 m depth, 2 m width and 3 m length should be constructed. The settlements in the settling ponds will be removed bi-weekly. In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary pools and installations should be constructed for the reuse of water at these stations. ● Treated wastewater will be analyzed to ensure compliance with relevant quality limit as defined in regulatory frameworks. The Project's approach to water management focuses on minimizing adverse environmental impacts and ensuring that all discharges meet established regulatory thresholds.	
Permanent dewatering of groundwater resources due to deep excavation	Groundwater	Adverse	Local	Short	Medium	Irreversible	One-off	Modarate (B)	High (3)	High (B3)	● Measures will be developed to ensure that no indirect impacts on any important groundwater resource take place. Where medium to long-term or permanent dewatering is required, the water would not be drained to the Motorway drainage system but to a near surface water course. ● Project elements will be located to minimize risks on groundwater. Groundwater use for project activities would be planned to be limited and would be done only after getting relevant permissions from the authorities.	Low
Contamination of groundwater resources with hazardous substances due to accidents and leakages		Adverse	Local	Short	Medium	Irreversible	One-off	Modarate (B)	High (3)	High (B3)	● Hazardous materials will not be stored within excavated areas. Supervision will be used during handling of all hazardous materials. Impervious bunds and other containment techniques will be used where hazardous materials are handled.	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Contamination of surface waters with wastewater discharge.		Adverse	Local	Long	Medium	Long-Time reversible	One-off	Modarate (B)	High (3)	High (B3)	● The effluent from the package treatment plants to be established at construction sites will meet discharge criteria, and this water will be reused. ● For facilities with a small number of workers where a treatment plant is not feasible, septic tanks will be used, and these tanks will be frequently emptied by vacuum trucks. ● The disposal of the wastewater collected by the vacuum trucks will be carried out at appropriate district municipal treatment facilities under a contractual agreement. The frequency of vacuum truck wastewater removal will be recorded. This will ensure that underground discharge will not occur. ● In order to provide direct run-off to the collection system; channels, bunds and sandbag barriers will be used. ● For any emergency during construction, Emergency Preparedness and Response Plan will be implemented.	
Blockage of permeable layers by infiltrating sediment/fines.		Adverse	Local	Short	Low	Irreversible	One-off	Modarate (B)	Low (1)	Low (B1)	● Stormwater management practices that slow peak runoff flow, reduce sediment load and increase infiltration; including vegetated swales (planted with salt-resistant vegetation), filter strips, terracing, detention ponds or basins, and infiltration trenches will be planned.	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Operation Phase												
Contamination of surface waters with de-icing material	Surface Water	Adverse	Local	Short	Low	Short-term reversible	Intermittent	Minor (C)	Low (1)	Low (C1)	● In need of deicing, mechanical deicing methods (sweepers and plows) will be used firstly, it will be complemented by chemical means if necessary. In addition to that, anti-icing and deicing agents will be selectively applied based on expected pavement temperatures and the use of road weather information systems. Furthermore, employees in the application of anti-icing and deicing agents will be trained to use these at optimum rates and times. Anti-icing and deicing agents will be selected based on the potential environmental impacts of the particular agent.	Low
Contamination of surface waters with hazardous materials due to spills from stations		Adverse	Local	Short	Medium	Short-term reversible	One-off	Minor (C)	High (3)	Medium (B2)	● Sealed basement and bunds with a capacity of the 100% of the storage capacity of the largest tank will be used at fuel stores and other harmful substance stores. ● For case of any large scale spill, absorbent materials within spill response kits will be used. They kits will be available at relevant centers and locations and will be used by trained personnel. ● Sand layers as filters in seepage pits (detritus basins in the form of a shallow pit connected to drain trenches) would be used allowing hardly any harmful substance to percolate into deeper soil layers or into the groundwater. ● Oil separators will be installed at fuel stations.	Low
Contamination of surface waters due to dumped waste from vehicles		Adverse	Local	Long	Medium	Long-term reversible	Continuous	Modarate (B)	Low (1)	Low (B1)	● In order to provide direct run-off to the collection system; channels, bunds and sandbag barriers will be used.	Low
Contamination of surface waters due to wastewater discharge.		Adverse	Local	Long	Medium	Long-Time reversible	One-off	Modarate (B)	High (3)	High (B3)	● Package treatment plants designed according to the maximum visitor capacity anticipated for the highway service areas will be used. ● Package treatment plants will be used for facilities with continuous operations.	
Increase on the rate of surface water runoff and high storm water flow rates can lead erosion and flooding		Adverse	Wide	Long	Moderate	Long-Time reversible	Continuous	Major (A)	High (3)	High (A3)	● In order to limit the volume of water requiring specialized treatment (during land preparation and construction, and operation phases) segregation of liquid effluents, principally along industrial, sanitary and stormwater categories, will be planned. ● All wastewater discharges from all components of construction must comply with relevant legal requirements. Treated water will be reused where possible and feasible.	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Contamination of groundwater by possible contaminated runoff from road pavement	Groundwater	Adverse	Local	Short	Low	Irreversible	One-off	Modarate (B)	High (3)	High (B3)	● Measures will be developed to ensure that no indirect impacts on any important groundwater resource take place. Where medium to long-term or permanent dewatering is required, the water would not be drained to the Motorway drainage system but to a near surface water course. ● Project elements will be located to minimize risks on groundwater. Groundwater use for project activities would be planned to be limited and would be done only after getting relevant permissions from the authorities.	Low
Contamination of groundwater resources with hazardous substances due to accidents and leakages		Adverse	Local	Short	Medium	Irreversible	One-off	Modarate (B)	High (3)	High (B3)	● Hazardous materials will not be stored within excavated areas. Supervision will be used during handling of all hazardous materials. Impervious bunds and other containment techniques will be used where hazardous materials are handled.	Low
Infiltration of surface water run-off to groundwater		Adverse	Local	Short	Low	Irreversible	One-off	Modarate (B)	Low (1)	Low (B1)	● Stormwater management practices that slow peak runoff flow, reduce sediment load and increase infiltration; including vegetated swales (planted with salt-resistant vegetation), filter strips, terracing, detention ponds or basins, and infiltration trenches will be planned.	Low
Contamination of ground water due to wastewater discharge.		Adverse	Local	Long	Medium	Long-Time reversible	One-off	Modarate (B)	High (3)	High (B3)	● The water exiting the wastewater treatment plants will first be planned for reuse, and if discharge is necessary, it will be connected to the city sewerage system.	
Decrease of groundwater recharge due to expending impermeable surface area		Adverse	Local	Long	Low	Irreversible	Continuous	Moderate (B)	Low (1)	Low (B1)	● Infiltration will be promoted if water depletion will arise in areas of groundwater wells to ensure the supply, especially in urban settings.	Low

IX. ECOLOGY AND BIODIVERSITY

This chapter of the ESIA report describes the ecological characteristics of the Antalya-Alanya Motorway Project Area. Furthermore, it identifies the potential impacts on the biological environment arising from the Project activities.

In the scope of the biological studies for the Antalya-Alanya Motorway Project, biological environment studies that included terrestrial flora and fauna, aquatic flora and fauna, and protected areas have been conducted with desktop studies and field surveys, which are described in detail in the following sections. The assessment follows the recommendations and requirements of the IFC Performance Standard 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources.

Biological environment field studies conducted in July 6-22 2024 in the summer, September 28 – October 12 2024 in the autumn, January 10-29 2025 in the winter and February 28 – March 31 2025 in the spring. Within these field studies, terrestrial and aquatic flora-fauna studies were carried out at the selected sampling points. The team members that conducted the field study are listed below.

Table IX.1. Biodiversity Field Study Team Members

Name	Profession	Occupation
Prof. Erdoğan Çiçek	Hydrobiologist / Ecologist	Prof. at Nevşehir Hacı Bektaş Veli University
Prof. Ferhat Celep	Botanist	Prof. at Kırıkkale University
Dr. Medine Münevver Koçum	Botanist	Hana R&D and Consulting Ltd. Co.
Assoc. Prof. Hakan Karaardıç	Zoologist / Ornithologist	Assoc. Prof. at Alanya Alaaddin Keykubat University
Assoc. Prof. Yasin Ünal	Zoologist / Mammalogist	Assoc. Prof. at Isparta University of Applied Sciences
Assoc. Prof. Sevil Sungur	Zoologist / Hydrobiologist	Assoc. Prof. at Nevşehir Hacı Bektaş Veli University
Assist. Prof. Mert Karış	Zoologist / Herpetologist	Assist. Prof. at Nevşehir Hacı Bektaş Veli University
Expert Biologist Mehmet Gül	Biodiversity Expert	Biocon Environmental and Ecological Consulting
Assoc. Prof. Kubilay Toyran	Mammalogist	Biocon Environmental and Ecological Consulting

To evaluate the Project's potential impacts on the biological environment and various species inhabiting natural habitats within and around the Project Area, terrestrial and aquatic ecosystems were studied to identify the existing biological conditions. As a result, the Ecology and Biodiversity Chapter was prepared in accordance with two main lines of studies as terrestrial and aquatic on the biological environment.

IX.1. Baseline Data Collection

A study area is defined within a 400 m buffer along the length of the route for terrestrial studies. In the scope of the terrestrial field studies, sampling points representing different habitat types and natural and/or sensitive areas chosen by analyzing appropriate satellite imagery, and field surveys were carried out within and in the vicinity of those sampling points (see Figure IX.1 and Figure IX.2). Within the context of aquatic studies, rivers crossing on the motorway route and some streams were

chosen according to importance by hydrobiology experts. General information about methodologies is described in the following topics.

Within the scope of the field studies, a review of existing information was undertaken, and the ecological composition of the Motorway routes in terms of terrestrial and aquatic flora and fauna elements, potential sensitive areas, and critical species were identified.

The information gathered included information on:

- Internationally Recognized Areas (KBAs, IBAs, RAMSAR sites)
- Biological components of terrestrial environment
    - Terrestrial flora and ecosystems
        - Vegetation and habitats
    - Terrestrial fauna components
        - Amphibians and reptiles
        - Birds
        - Mammals
- Biological components of aquatic environment

IX.2. Legal Framework and Reference Standards

The observation and sampling locations are identified based on the previous knowledge regarding the area, expert's opinion and the available maps, images and information in hand. The aim of the data review was to collect existing baseline information on ecological receptors potentially present in the study areas (including designated sites, habitats and species). This was then used to inform the scope and design of the detailed methodologies for the field survey work. The data review also provided contextual information about the status of ecological receptors (e.g. local, regional and global distribution, population size and level of extinction risk) and ecological information about the receptors (e.g. habitat requirements and behaviour of species) to assist with the valuation and assessment of potential impacts. The data review included an extensive review of published scientific literature, websites and other sources.

The ecology assessment has considered relevant Turkish (national) legislation, applicable standards and guidelines for international finance, and international agreements to which Türkiye is a signatory. Applicable policy and legislation relevant to the ESIA are presented in Chapter 2 ("Institutional and Legal Framework") with those of particular relevance to ecology summarized below.

Internationally accepted criteria are considered while choosing sampling points in the study area together with the species characteristic and habitat needs. This were done by overlaying the Project Area with the distribution of species of conservation concern; with sites identified as globally important for migratory species (e.g. IBAs, RAMSAR sites); with national parks, protected areas, and key biodiversity areas.

IX.2.1. International Agreements

In evaluating the threat/protection status of species; CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), Bern Convention, and IUCN (International Union for Conservation of Nature) Red List Database were used. Additionally, hunting status of all fauna

elements was determined according to 2024-2025 Decision of the Central Hunting Commission (CHC) of Türkiye.
Species covered in CITES are given under three different appendices according to their conservation status. Appendix I cover the species, which are under the threat of extinction. Trade in the specimens of these species is not allowed except extraordinary circumstances. Appendix II includes species, which are not threatened with extinction, but trade in specimens is restricted in order to prevent utilization incompatible with their survival. Appendix III includes species, for which other parties of CITES is applied for assistance in controlling trade and which are conserved at least in one country.

Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention) provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Türkiye became a contracting party in 1994.

BERN Convention aims at conserving and promoting biodiversity, developing national policies for the conservation of wild flora and fauna and their natural habitats, protection of the wild flora and fauna from the planned development and pollution, developing trainings for protection practices, promoting and coordinating the research made regarding this subject. It has been signed by 26 member states of the European Council (as well as Türkiye) with the aim of conserving the wildlife in Europe. Species that are protected under the Bern Convention are classified according to the following categories:

- Appendix I: Strictly protected flora species.
- Appendix II: Strictly protected fauna species.
- Appendix III: Protected fauna species.

All the nations, which are party to the BERN Convention, have signed the Convention on Biological Diversity as well. These parties are responsible from ensuring sustainable use of resources in line with their national development trends and conserving threatened species.
To determine the threatening status of species IUCN classifications are also used, which are used in Turkish classification as well. IUCN Red List is published to highlight those species that are facing a risk of extinction. A species may be listed in IUCN Red List after studies on its population decrease. Thus, since IUCN List is based on research (annual updates are being made for species lists of countries), many countries attach more importance to species taking place in IUCN list than species taking place in Bern List.

The IUCN categories were updated in 2001 as ver. 3.1 (previous one was 1994 as ver. 2.3) and are provided below:

Table IX.2. International Union for Conservation of Nature (IUCN) Categories

IUCN Red List Categories and Criteria, 1994 (ver. 2.3)		IUCN Red List Categories and Criteria, 2001 (ver. 3.1)	
EX	: Extinct	**X**	: Extinct
EW	: Extinct in Wild	**EW**	: Extinct in Wild
CR	: Critically Endangered	**CR**	: Critically Endangered
EN	: Endangered	**EN**	: Endangered
VU	: Vulnerable	**VU**	: Vulnerable
LR	: Low Risk		
	cd : conservation dependent	**NT**	: Near Threatened
	nt : near threatened	**LC**	: Least Concern
	lc : least concern		
DD	: Data Deficient	**DD**	: Data Deficient
NE	: Not Evaluated	**NE**	: Not Evaluated

As an environmental treaty of the United Nations, CMS provides a global platform for conserving and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range.
As the only global convention specializing in the conservation of migratory species, their habitats, and migration routes, CMS complements and co-operates with a number of other international organizations, NGOs, and partners in the media as well as in the corporate sector.

Migratory species threatened with extinction are listed in Appendix I of the Convention. CMS Parties strive to strictly protect these animals, conserve or restore the places where they live, mitigate obstacles to migration, and control other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species.

Migratory species that need or would significantly benefit from international cooperation are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional agreements.

IX.2.2. Turkish Legal Requirements

It is the responsibility of the Ministry of Agriculture and Forestry (MoAF), together with the MoEUCC and their affiliated organizations to formulate policies concerning the conservation of biodiversity in Türkiye designate and manage protected areas, to develop and implement plans and programmes, to carry out activities in this scope and to provide coordination among all relevant institutions.

The affiliated organizations of the MoAF are the Special Environmental Protection Agency, the General Directorate of Forestry, the General Directorate of the State Meteorological Service, and the General Directorate of State Hydraulic Works. The provincial organization of the MoAF consists of the Provincial Directorates of Agriculture and Forestry, as well as the regional directorates of the affiliated organizations.

The MoAF's unit with primary authority and responsibility for the conservation and sustainable use of biological diversity is the General Directorate of Nature Conservation and National Parks, which is also the CBD focal point. The General Directorate of Nature Conservation and National Parks is the principal unit responsible for the management of protected areas designated under the National Parks Law, for the conservation of wildlife and for the regulation and supervision of terrestrial hunting.

The Central Hunting Commission (CHC) is established under the Terrestrial Hunting Law and includes members from MoAF and General Directorate of Nature Conservation and National Parks, Directorate of Hunting and Wildlife, universities, Ministry of Food, Agriculture and Livestock, non-governmental organizations, hunting associations and Gendarmerie General Command. CHC prepares a resolution every year and this resolution is published in the official gazette. The recent resolution covers the hunting season for 2024-2025. These resolutions define hunting periods, limits (in terms of number of individuals that can be hunted and dates for hunting), areas where hunting is banned, as well as the species that can and cannot be hunted. Thus, CHC resolutions provide some measure of regulation over the exploitation of wildlife within Türkiye. In this regard, according to 2024 and 2025 Resolutions of the CHC appendixes are as follows:

- Appendix I; Includes game animals which are protected by the CHC.
- Appendix II; Includes game animals which are allowed to be hunted in seasons predefined by CHC.

The legislations listed in Chapter 2, provide some areas protection status based on the presence of significant biological diversity, local endemics of importance, and threatened species. These designations include Natural Protected Sites, National Parks, Nature Protection Areas, Wildlife Protection and Development Sites and Specially Protected Areas.

Activities in such designated areas are also covered various regulations, but these areas are not specifically provided a protection status. In Türkiye, there is no conservation status for habitats as defined by a specific vegetation as there is provided in European Union (EU) countries where the EU Habitats Directive applies. In Türkiye, there is no specific habitat compensation requirement. There is only a policy regarding forested areas, which aims to replant at least as much of the forest area that is lost due to development activities.

There are also laws and regulations that are in effect to protect other environmental components, as well as to minimize pollution, promote sustainable development and management of natural resources. Legislation relating to air quality, environmental management and permitting, health and safety, management of chemicals and other dangerous substances, noise, soil quality, water quality and waste management, also provide management of issues that might have secondary impacts on biodiversity components. Environmental laws and regulations that do not primarily relate to ecology will be referenced in the relevant chapters of the ESIA.

In addition some national to the public were used for to collect existing baseline information. Birds of the study area were assessed according to national threat categories defined in the Red Data Book of Birds of Türkiye (Kiziroglu, 2009) according to the categories defined in Table IX.3.

Table IX.3. National Threat Categories for Bird Species

Category A		
A.1.2	(CR)	Critically endangered and breeding species in Türkiye
A.2	(EN)	Endangered and breeding species in Türkiye
A.3	(VU)	Vulnerable and breeding species in Türkiye
A.3.1	(D)	Declining, vulnerable and breeding species in Türkiye
A.4	(NT)	Near Threatened, breeding species not facing risk now, but are likely to qualify for threatened category in the near future in Türkiye
A.5	(LC)	Least Concern, breeding species that are widespread in Türkiye
A.6	(DD)	Data Deficient, breeding species on which there is deficient information in Türkiye
A.7	(NE)	Not evaluated, breeding species which have not been evaluated in Türkiye
Category B		
B.1.2	(CR)	Critically endangered and non-breeding species in Türkiye
B.2	(EN)	Endangered and non-breeding species in Türkiye
B.3	(VU)	Vulnerable and non-breeding species in Türkiye
B.3.1	(D)	Declining, vulnerable and non-breeding species in Türkiye
B.4	(NT)	Near Threatened, non-breeding species not facing risk now, but are likely to qualify for threatened category in the near future in Türkiye
B.5	(LC)	Least Concern, non-breeding species that are widespread in Türkiye
B.6	(DD)	Data Deficient, non-breeding species on which there is deficient information in Türkiye
B.7	(NE)	Not Evaluated, non-breeding species which have not been evaluated in Türkiye

In determining threat statuses of flora species identified within the study area Red Data Book for Turkish Plants (Ekim et al., 2000), which was prepared in accordance with 1994 IUCN Red List Categories and Criteria was utilized, and the evaluations will be presented in the Annex-10 of the ESIA Report.

Law No. 3573 on Olive Cultivation and Grafting of Wild Species provides protection for olive groves in Türkiye. It defines olive-growing areas broadly and prohibits cutting or removing olive trees without official approval. The law also restricts industrial facilities within 3 km of olive groves to preserve agricultural and environmental values.

IX.2.3. Standards and Guidelines for International Requirements

The Project is committed to implementing the IFC Performance Standards (PS) in order to manage social and environmental risks and impacts. IFC PS6 covers areas of biodiversity conservation, ecosystem services and sustainable management of living resources, which are all fundamental to achieve sustainable development. The objectives of PS6 are outlined as follows:

- To protect and conserve biodiversity.
- To maintain the benefits from ecosystem services; and

- To promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.

The requirements of PS6 are applied to projects:

i. Located in modified, natural, and critical habitats;
ii. that potentially impact on or are dependent on ecosystem services over which the client has direct management control or significant influence;
iii. or that includes the production of living natural resources (e.g. agriculture, animal husbandry, fisheries and forestry) based on the risks and impacts identification process.

Ecosystem Services Review (ESR)

Ecosystem Services Review (ESR) was prepared in relation to the IFC Biodiversity Conservation and Sustainable Management of Living Natural Resources Guidance Note 6 requirements to determine ecosystem services to The Project.

Biodiversity and ecosystems are closely related concepts. Biodiversity is defined by the Convention on Biological Diversity as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (United Nations 1992:Article 2). Ecosystem Services (ES) which are the goods provided by ecosystems upon are the benefits that people obtain from ecosystems (MA 2003). For example, a stand of trees can reduce air pollution, purify the water supply, reduce the likelihood of floods and help regulate the climate by capturing and storing carbon. It might also provide timber for buildings, a space for recreation and improve the aesthetic qualities of the landscape.

The environment provides mankind with the food, water and air that are essential for life and with the minerals and raw materials for industry and consumption. Less obviously, it provides the processes that purify air and water, and which sequester or break down wastes. These services that the environment provides as all ecosystem services which require the existence of living organisms for their delivery, but in many cases it is not the diversity of the organisms that is important, but the presence of a viable population of at least one species representing a particular functional group and the delivery of many ecosystem services requires a non-trivial amount of biodiversity, but not necessarily the maximum amount possible in that environment. Also recreation and health are found in which human culture finds its roots and sense of place are included in ecosystem services. Taking into consideration overall ecosystem services are the many different benefits that ecosystems provide to people (MA, 2005). Therefore, both ecological and socio-economic studies support to identification ecosystem services of Motorway Project Area in the line with IFC Performance Standards and the initial literature studies.

The overall aim of the ecosystem service concept is to bring a holistic approach to environmental decision-making by valuing the environment in terms of the benefits people obtain from ecosystems. It is practical and pragmatic, focusing on goals that provide greatest environmental benefit at least cost to society and the natural environment with the aim of avoiding taking decisions with unintended secondary consequences that may be costly, increase risk or be detrimental to ecosystems and human well-being. The evaluation of the effects, both desirable and undesirable, of approaches to landscape management on the delivery of ecosystem services allow for a broader assessment of the true costs and benefits of actions and policies.

Ecosystem service principles and/or cost-benefit analyses are enshrined in European environmental protection legislation and policies such as the Environmental Liability Directive (2004/35/EC), the Habitats Directive (92/43/EEC), the Water Framework Directive (2000/60/EC) and the REACH Directive (1907/2006). Recent initiatives such as the United Nations Millennium Ecosystem Assessment (2004), UK National Ecosystem Assessment (2011) and The Economics of Ecosystems and Biodiversity (TEEB, 2010) have built on concepts and methods developed over more than 20 years in the United States to deal with legacy contamination (US Natural Resource Damage Act). Many of the US approaches have informed more recent European initiatives on environmental liability, habitat banking, biodiversity offsetting, life cycle assessment (foot printing), strategic planning, operational risk reduction and now product registration. ES are depicted within four service subset categories as follows:

- Provisioning Services are ecosystem services that describe the material or energy outputs from ecosystems. They include food, water and other resources.
- Regulating Services are the services that ecosystems provide by acting as regulators e.g. regulating the quality of air and soil or by providing flood and disease control.
- Cultural, Spiritual, and Recreational Services are provide that benefits which are non-material obtains include recreational facilities and tourism, aesthetic appreciation, inspiration, a sense of place, and educational value.
- Supporting Services are necessary for the production of all other ecosystem services such as soil formation nutrient cycling and primary production. They differ from provisioning, regulating, and cultural services in that their impacts on people are either indirect or occur over a very long time, whereas changes in the other categories have relatively direct and short-term impacts on people.

In addition, when the projects may affect ecosystem services of relevance to local people, Affected Communities attached to biodiversity and ecosystem services will participate in the determination of priority ecosystem services in accordance with the stakeholder engagement process which is one of the key means to understanding impacts on biodiversity and identifying appropriate responses to such impacts as defined in IFC Performance Standard.

The IFC Performance Standards which is in line with the definition provided by the Millennium Ecosystem Assessment are covered divide Ecosystem services into two priority types:

Priority 1: Provisioning, regulating, cultural and supporting ecosystem services, over which the client has direct management control or significant influence, and where impacts on such services may adversely affect communities.

Priority 2: Provisioning, regulating, cultural and supporting ecosystem services, over which the client has direct management control or significant influence, and on which the Project directly depends for its operations.

Within the scope of the Motorway Project, the ecosystem services that are relevant to the Project AoI and categories them according to either priority 1 or priority 2 are summarized in “9.8. Ecosystem Services” section.

IX.3. Ecological Baseline Research

Ecological studies related to the Motorway were carried out in collaboration with subject-matter experts, covering both terrestrial and aquatic environments. As a result, the biological environment field study was carried out 06-22 July 2024 in the summer, 28 September-12 October 2024 in the autumn, 10-29 January 2025 in the winter and February 28 – March 31 2025 in the spring. These field studies carried out terrestrial and aquatic flora-fauna studies at the selected sampling points.

An additional Bat survey has been conducted as a pre-construction survey on August 21-22-23 2025 for day and night surveys. This survey and its finding have been added to this ESIA.

All ecological research was conducted with desk-based and field studies to determine the baseline conditions in the study area. These baseline data/information collections were provided with an overall picture of the conditions and sensitivities in the area that will be considered in the assessment of potential impacts and the development of relevant mitigation measures for design.

For terrestrial environment studies, it is not practical to survey the entire route. Therefore, the locations chosen by experts were visited by survey team according to the representativeness of each habitat type within the study area. These locations are named as sampling points. These sampling points can be revised according to the result of the field surveys observations. Sampling points were chosen to ensure that each habitat type displayed in the European Nature Information System (EUNIS) habitat classification was visited. All of the different habitats were ground-truthed in the study area.

During the flora and fauna studies, surveys were conducted along nine distinct transect lines based on habitats and vegetation composition. Observations were carried out along each line, with adjustments made based on changes in habitat characteristics.

Bird surveys were conducted over a period of 30 days each during the autumn migration period of 2024 (August–November) and the spring migration period of 2025 (March–June). Bird survey activities have been completed in June 6^{th,} 2025. Surveys were carried out along nine transect lines, in addition to point count surveys. Furthermore, data from the bird ringing studies conducted during both migration periods at the Boğazkent Bird Ringing Station were incorporated into the assessment.

A sound recording device (Batcorder) was used for bat surveys. Based on interviews conducted with the local village governance, the device was installed on trees near buildings used as barns in six pre-determined villages. In each village, the Batcorder recorded continuously for a minimum of 24 hours before being retrieved. Bat monitoring studies were also conducted in the area designated as 7. Karakaya TO. As part of these studies, rocky areas were surveyed to identify potential bat nesting and roosting sites. Although no cave formations were detected, wide cracks and fissures were observed within the rock structures. A Batcorder device was deployed in this area for duration of seven days. Additionaly pre-construction surveys have been carried out in 2 bat survey locations (between KM104+000 – 105+000) identified within the scope of baseline surveys conducted before.

Additionally, aquatic studies that cover both desk-based and field studies to determine the baseline conditions in the study area were conducted. River crossings with the well-conditioned flow during the field studies along the motorway route were determined and studied according to suitable methodologies during the aquatic field surveys.

The overall approach to determine the baseline conditions in the context and objectives provide above included the following data collection and interpretation means:

- Review of pertinent literature and previous works,
- Field studies carried out in the Project Area,
- Satellite image interpretation, as available,

- Communication with the inhabitants in the study area during the field studies,
- Consultation with nature conservation administration and related agencies and institutions concerned.

In the scope of the ESIA report, based on the assessed impacts, significant relevant measures for mitigating adverse impacts were developed. The importance/sensitivity of the habitats and species were given special attention in reporting, and detailed data such as identified species list, their habitats, endemism, and protection status were included.

IX.3.1. Definition of the Study Area and Area of Influence

The study area definition was made for both terrestrial and aquatic environments. In this context for terrestrial environment studies, the survey encompassed as much of the habitat along the proposed Motorway route and facility areas used in the scope of the Project as access and topography allowed. Thus, at each sampling point and their vicinity, the features of the landscape and environment include the dominant habitats and species of note. In addition, 200 m buffers on either side of the route were used to guide the habitat survey to ensure a suitable habitat sample was covered. “Study area” is defined as a 400 m buffer zone.

In addition to investigations conducted within the project corridor, field studies were also carried out in the expropriation corridor of the Project. These components include:

- Quarry and fill areas
- Temporary construction sites, campsites, and material storage zones
- Soil dumping sites and landfill areas
- Service roads and temporary transportation routes

Furthermore, faunal monitoring activities extended beyond the stations with predefined coordinates. These studies aimed to assess the potential presence of species anticipated from literature and site survey data but not previously observed within the main project corridor or designated side areas.

For instance, to assess the distribution range of *Lyciasalamandra atifi*—a species endemic to the region—targeted field investigations were conducted in the suitable habitats for the species approximately 5 kilometers north of the proposed motorway alignment.

400 m buffer along the length of the route for terrestrial studies, there are 36 sampling locations for fauna and flora studies and 14 for the aquatic environment according to different habitat types (see Table IX.4). The observation points which batcorder device used was for bat surveys are given in Table IX.5.

In the scope of the Project terrestrial and aquatic environment site, surveys were carried out in vegetation periods by experts. As a result, terrestrial and aquatic flora-fauna observation and sampling points and transect lines are given in Figure IX.1,Figure IX.2,
Figure IX.3,
Figure IX.4,
Figure IX.**5**, Figure IX.6, Figure IX.7. Studies were also carried out at wider project components such as storage areas Table IX.6, quarries and borrow pits Table IX.7.

The Project's Biodiversity Area of Influence (AoI) is defined as the geographic area where the Project's direct, indirect, and cumulative impacts on biodiversity and ecosystem services are reasonably expected to occur. This includes the direct footprint of the motorway, incorporating carriageways, interchanges, viaducts, tunnels, and associated infrastructure, where permanent land take and habitat conversion will occur. It also includes a zone of influence beyond the footprint where indirect impacts may arise, such as habitat fragmentation, edge effects, species disturbance, alteration of surface water and groundwater regimes, and increased accessibility to previously undisturbed areas.

Temporary facilities such as construction camps, borrow pits, spoil disposal areas, and access roads are considered part of the AoI due to their potential to generate short- and medium-term impacts on habitats and species. Therefore for terrestrial and aquatic habitats, flora, mammals, herpetofauna and birds a 400m buffer zone was identified as a study area (not including transect locations) and a 2 km perimeter was decided around each project component designated as AoI. As transect locations, at some points the study area was extended as seen necessary (e.g. 5 km for Transect 15 and 2.5 km for D-7 storage area). The map for Area of Influence is given in Figure IX.8.

The overall corridor of the Antalya–Alanya Highway was defined by the General Directorate of Highways (KGM) prior to the Project Company's involvement. Within this fixed corridor, the Project design was further refined by the Project Company and EPC to address local topographic, geotechnical, and environmental conditions.

This included the use of viaducts around the Köprüçay Basin Natural Protected Area to cross the riparian zone without in-channel works, as well as adjustments to the location of temporary facilities to avoid sensitive habitats where feasible. Two examples of such adjustments include:

Dikmen Borrow Pit (Km 83+000): Initially planned in the vicinity of the Manavgat Waterfall, this location was changed to avoid potential disturbance to the adjacent stream and riparian zone.

Storage Area D-23 (Km 110+820): The layout of this temporary area was refined to prevent habitat loss and disturbance to nearby forest and riverside ecosystems.

Within the fixed corridor, further route-level changes were screened but found not feasible given corridor restrictions and land acquisition implications.

In line with the IFC Performance Standards, the principle of avoidance will continue to guide the Project throughout all design and construction stages — not only during initial planning. Any future design modifications will be reviewed by the Project's biodiversity specialists, and where sensitive habitats are identified, the hierarchy of avoidance, minimisation and restoration will be applied. Avoidance will remain the preferred approach wherever technically and spatially feasible, with mitigation measures implemented only when avoidance cannot reasonably be achieved.

Figures regarding the locations of Dikmen Borrow Pit and Storage Area D-23 are given in Annex 11C of this ESIA report.

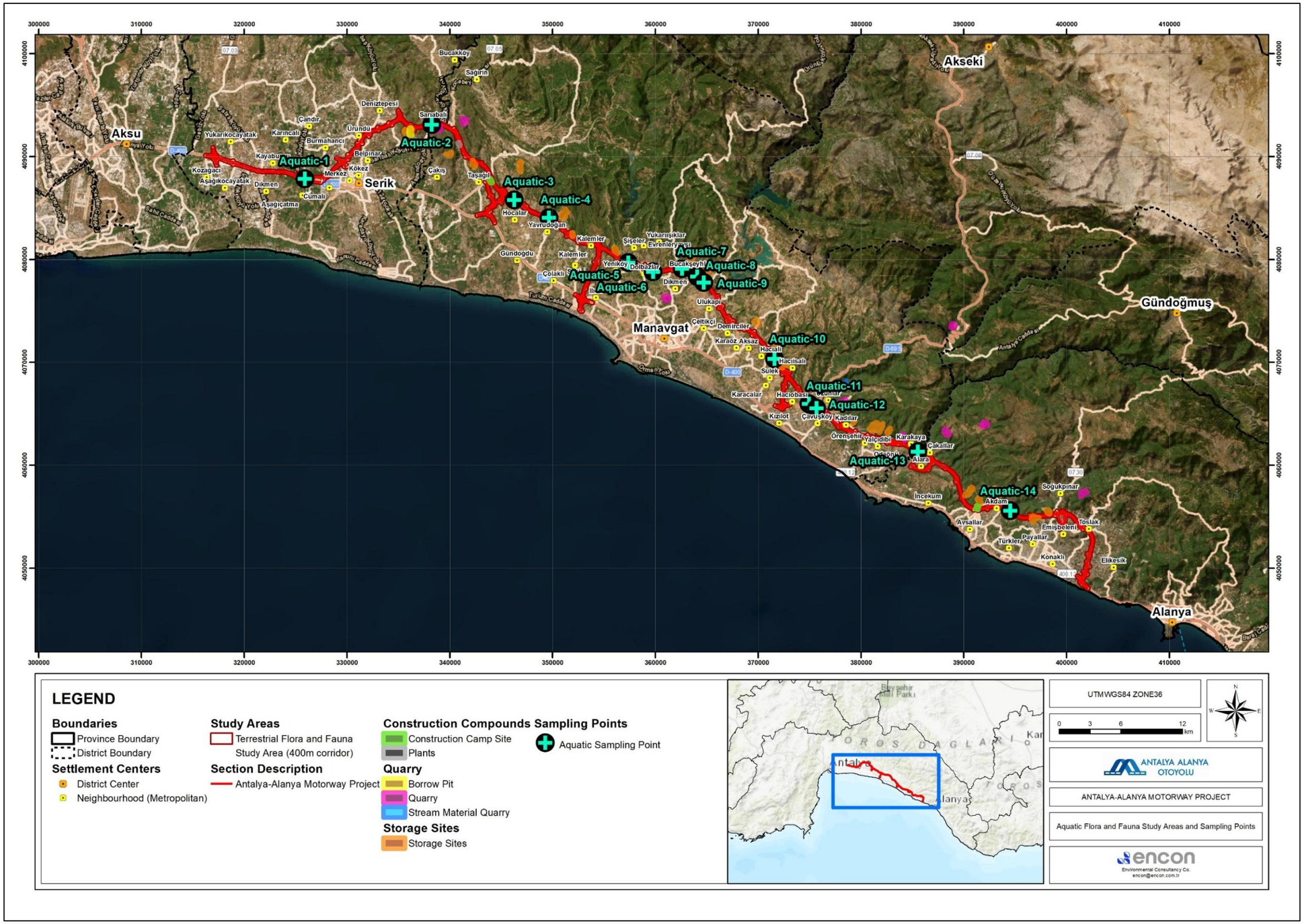


Figure IX.1. Aquatic Environment Sampling Points

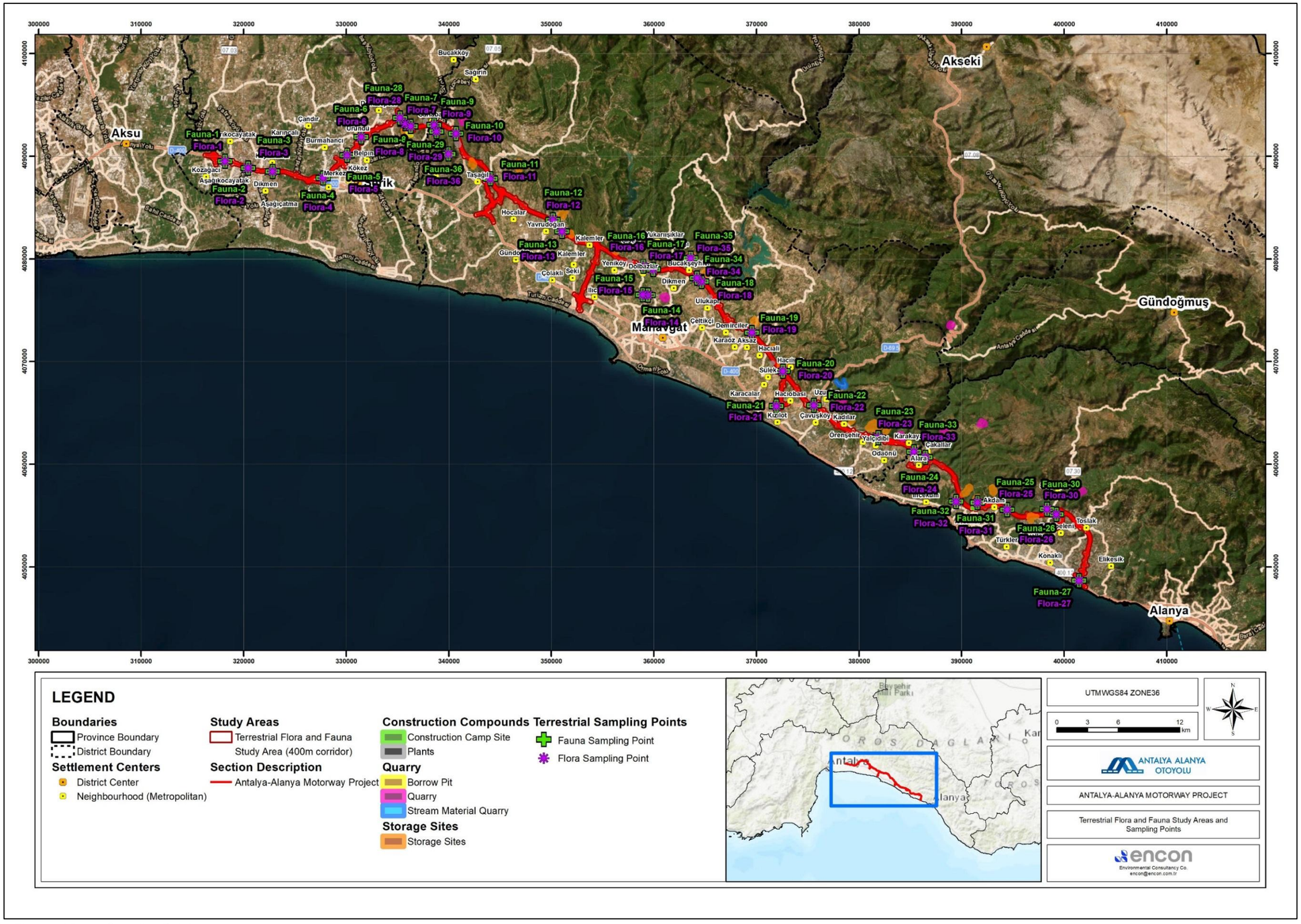


Figure IX.2. Terrestrial Flora and Fauna Sampling Points

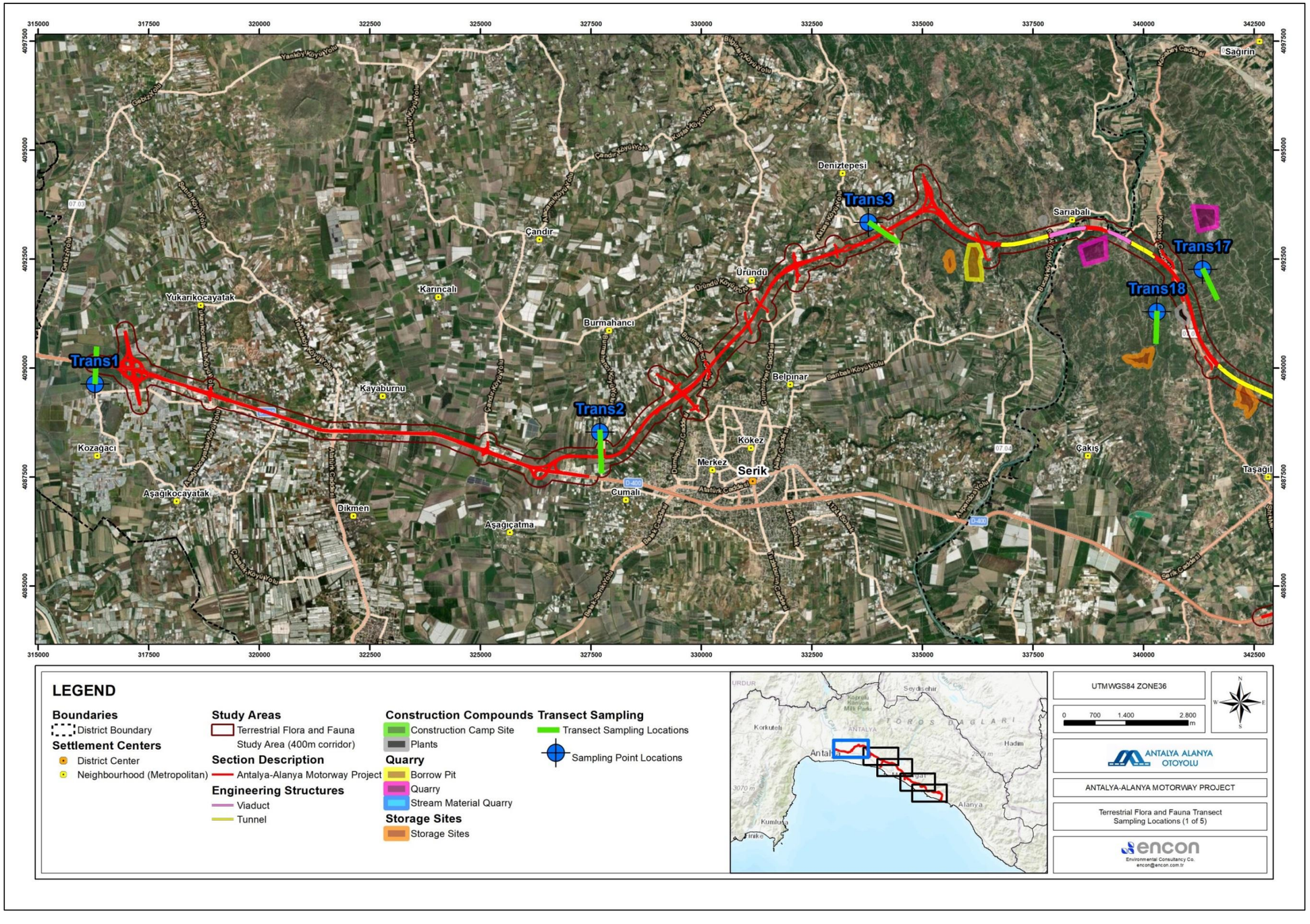


Figure IX.3 Terrestrial Transect/Point Count Locations

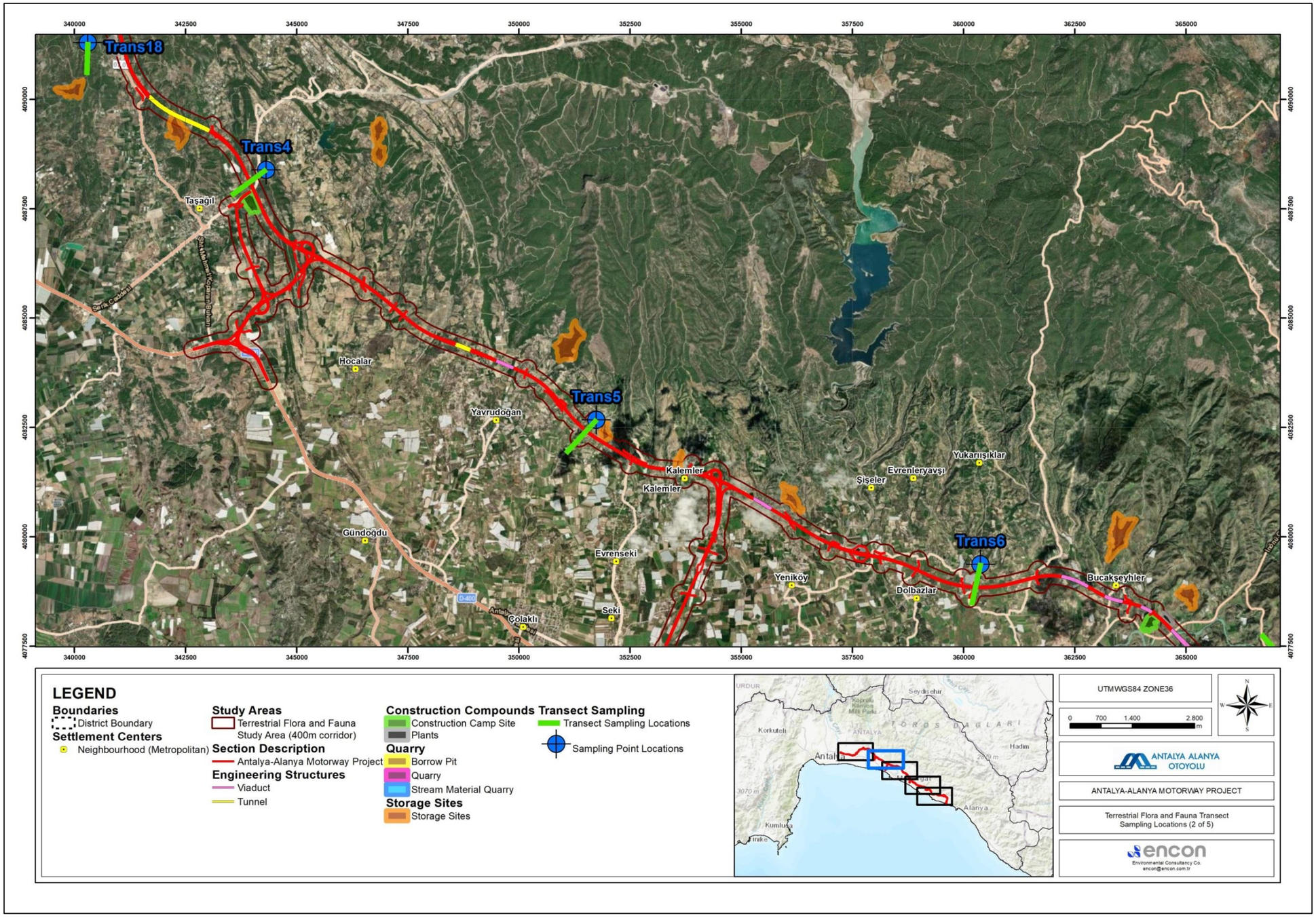


Figure IX.4 Terrestrial Transect/Point Count Locations

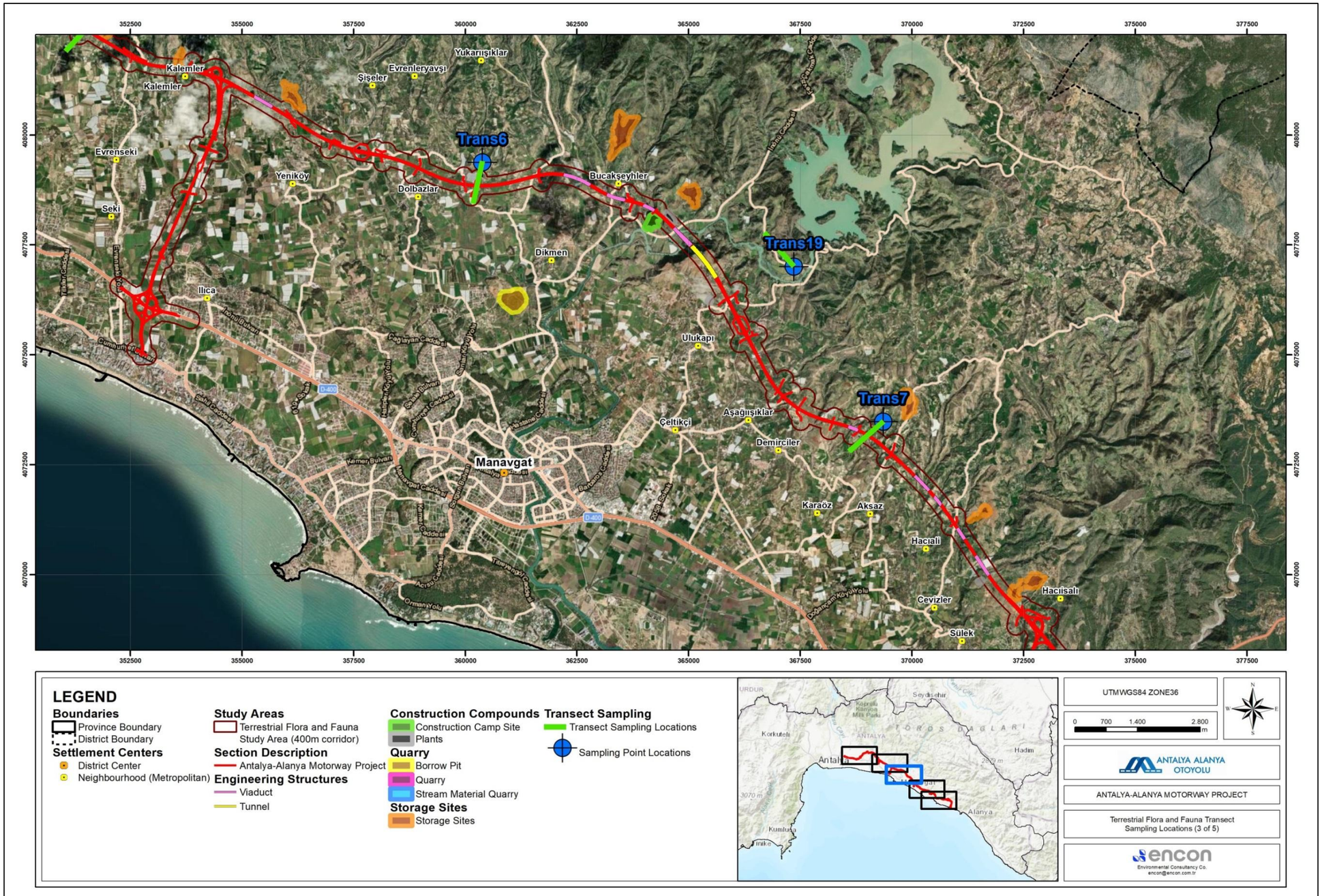


Figure IX.5 Terrestrial Transect/Point Count Locations

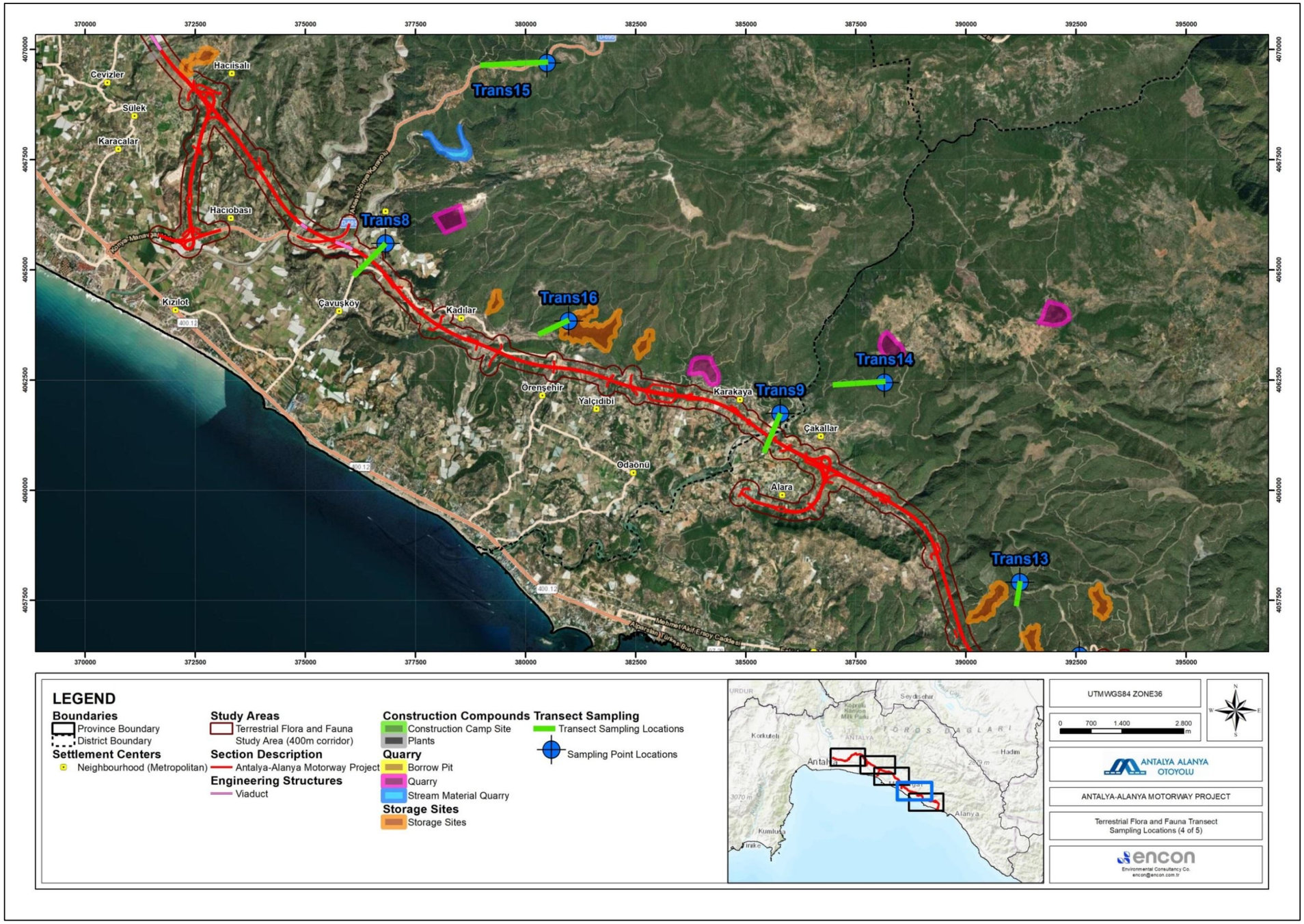


Figure IX.6 Terrestrial Transect/Point Count Locations

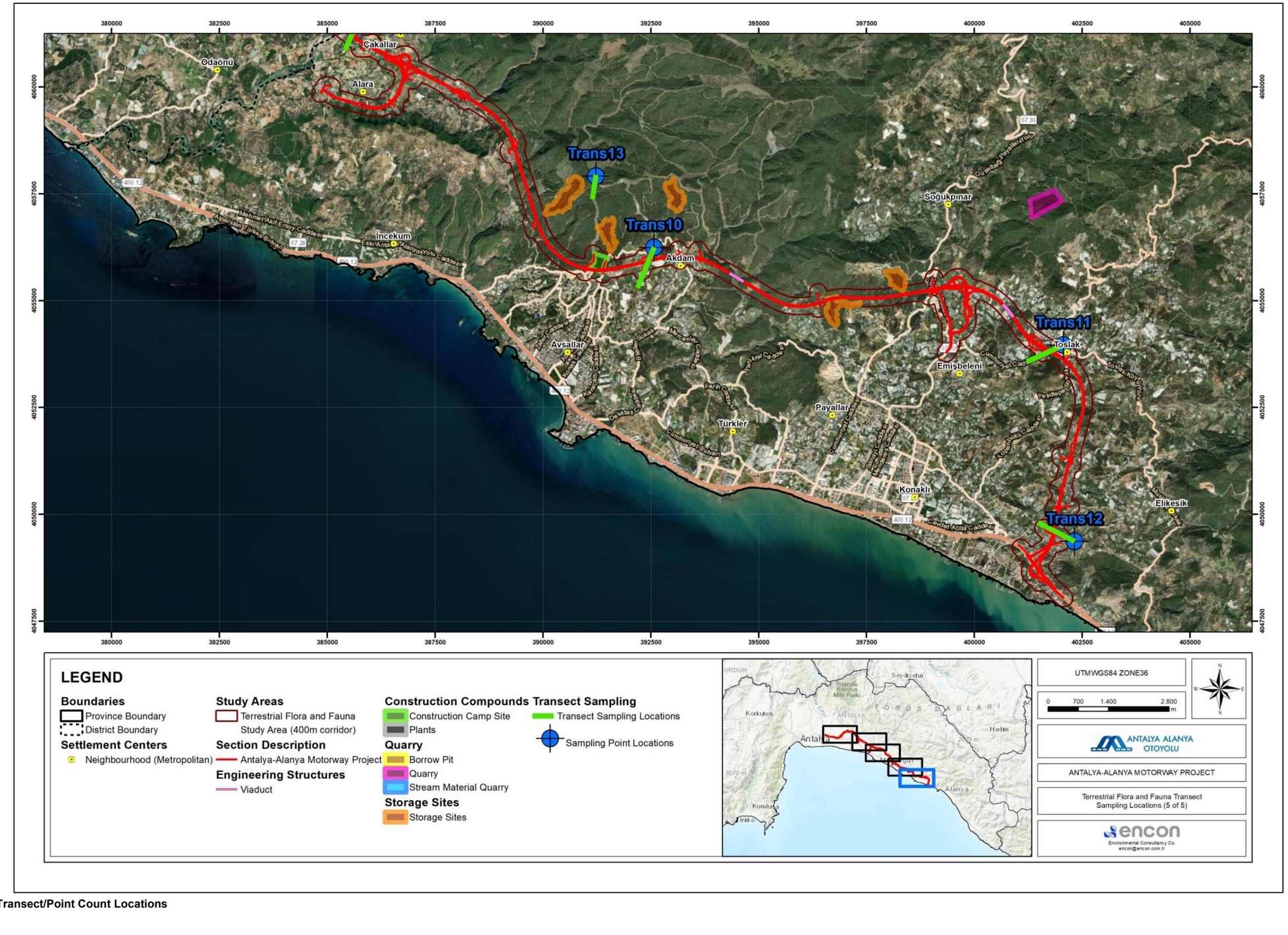


Figure IX.7 Terrestrial Transect/Point Count Locations

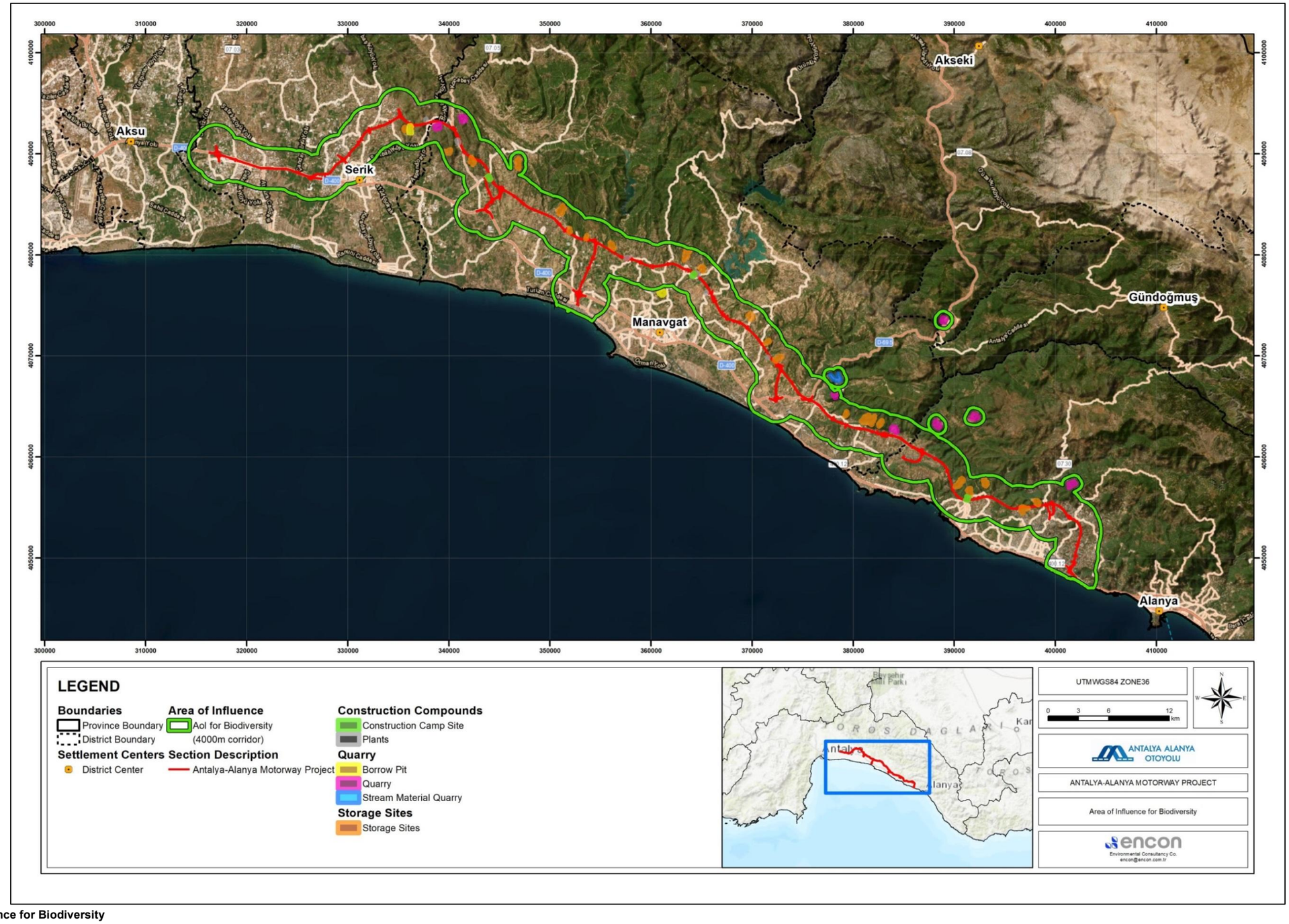


Figure IX.8 Area of Influence for Biodiversity

Table IX.4. Observation and Sampling Points of Antalya-Alanya Motorway Project Route

Survey Area Code	Closest Settlement	Coordinates (UTM WGS84)	
		X	Y
Flora Sampling Points			
Flora-1	Yukarıkocayatak	318198	4089516
Flora-2	Yukarıkocayatak	320461	4088851
Flora-3	Kayaburnu	322855	4088523
Flora-4	Cumalı	327769	4087898
Flora-5	Burmahancı	330115	4090101
Flora-6	Üründü	331486	4091862
Flora-7	Sarıabalı	335769	4093160
Flora-8	Sarıabalı	336307	4092909
Flora-9 (Uğurçay Quarry)	Çakış	338585	4093050
Flora-10	Taşağıl	340722	4092208
Flora-11 (Construction Site-1)	Taşağıl	344079	4087799
Flora-12	Yavrudoğan	350172	4083805
Flora-13	Yavrudoğan	351069	4082679
Flora-14 (Borrow Pit)	Sarılar	359436	4076495
Flora-15 (Borrow Pit)	Sarılar	358941	4076503
Flora-16	Evrenleryavşı	358986	4079277
Flora-17	Yukarıışıklar	359948	4078983
Flora-18 (Construction Site-2)	Bucakşeyhler	364686	4077797
Flora-19	Aksaz	369565	4072820
Flora-20	Hacıisalı	372608	4069075
Flora-21	Hacıobası	371961	4065664
Flora-22	Uzunlar	375610	4065733
Flora-23	Yalçıdibi	381893	4062593
Flora-24	Çakallar	386490	4060686
Flora-25	Akdam	394464	4055587
Flora-26	Soğukpınar	399276	4055128
Flora-27	Konaklı	401462	4048662
Flora-28	Deniztepesi	335259	4093731
Flora-29 (Çakış Quary)	Çakış	338820	4092398
Flora-30	Soğukpınar	398339	4055632
Flora-31	Avsallar	391566	4056270
Flora-32	İncekum	389481	4056358

Survey Area Code	Closest Settlement	Coordinates (UTM WGS84)	
		X	Y
Flora-33	Alara	385374	4061220
Flora-34	Bucakşeyhler	364220	4078144
Flora-35	Bucakşeyhler	363607	4080065
Flora-36	Çakış	339991	4090218
Fauna Sampling Points			
Fauna-1	Yukarıkocayatak	318198	4089516
Fauna-2	Yukarıkocayatak	320461	4088851
Fauna-3	Kayaburnu	322855	4088523
Fauna-4	Cumalı	327769	4087898
Fauna-5	Burmahancı	330115	4090101
Fauna-6	Üründü	331486	4091862
Fauna-7	Sarıabalı	335769	4093160
Fauna-8	Sarıabalı	336307	4092909
Fauna-9 (Uğurçay Quarry)	Çakış	338585	4093050
Fauna-10	Taşağıl	340722	4092208
Fauna-11 (Construction Site-1)	Taşağıl	344079	4087799
Fauna-12	Yavrudoğan	350172	4083805
Fauna-13	Yavrudoğan	351069	4082679
Fauna-14 (Borrow Pit)	Sarılar	359436	4076495
Fauna-15 (Borrow Pit)	Sarılar	358941	4076503
Fauna-16	Evrenleryavşı	358986	4079277
Fauna-17	Yukarıışıklar	359948	4078983
Fauna-18 (Construction Site-2)	Bucakşeyhler	364686	4077797
Fauna-19	Aksaz	369565	4072820
Fauna-20	Hacıisalı	372608	4069075
Fauna-21	Hacıobası	371961	4065664
Fauna-22	Uzunlar	375610	4065733
Fauna-23	Yalçıdibi	381893	4062593
Fauna-24	Çakallar	386490	4060686
Fauna-25	Akdam	394464	4055587
Fauna-26	Soğukpınar	399276	4055128
Fauna-27	Konaklı	401462	4048662
Fauna-28	Deniztepesi	335259	4093731
Fauna-29 (Çakış Quary)	Çakış	338820	4092398
Fauna-30	Soğukpınar	398339	4055632

Survey Area Code	Closest Settlement	Coordinates (UTM WGS84)	
		X	Y
Fauna-31	Avsallar	391566	4056270
Fauna-32	İncekum	389481	4056358
Fauna-33	Alara	385374	4061220
Fauna-34	Bucakşeyhler	364220	4078144
Fauna-35	Bucakşeyhler	363607	4080065
Fauna-36	Çakış	339991	4090218
Aquatic Sampling Points			
Aquatic-1	Hazne Creek	325903	4087849
Aquatic-2	Köprüçay River	338246	4093085
Aquatic-3	Karaboynuz Creek	346252	4085768
Aquatic-4	Kızıllar Creek	349633	4084052
Aquatic-5	Kargıçayı Creek	357350	4079689
Aquatic-6	Bezirgan Creek	359763	4078791
Aquatic-7	Değirmen Creek	362589	4079107
Aquatic-8	Yerköprü Creek	364071	4078337
Aquatic-9	Manavgat River	364696	4077760
Aquatic-10	Cevizler Creek	371571	4070349
Aquatic-11	Narpuz Stream	374937	4065967
Aquatic-12	Çenger Stream	375663	4065549
Aquatic-13	Alara (Ulugüney) Stream	385527	4061310
Aquatic-14	Kargı Stream	394516	4055575

Table IX.5. Observation Points for Bat Surveys

Survey Area Code	Closest Settlement	Coordinates (UTM WGS84)	
		X	Y
Bat Observation Points			
Bat Survey-1	Taşağıl	342090	4088067
Bat Survey-2	Bucakşeyhler	363444	4079092
Bat Survey-3	Kadılar	378556	4063649
Bat Survey-4	Karakaya	384590	4061801
Bat Survey-5	Akdam	393252	4055810
Bat Survey-6	Soğukpınar	399361	4057352

Table IX.6 Storage Areas

Location	Description of the Site	Capacity Information (m^3)	Planned Capacity

				Usage (m³)
Km 52+544	Antalya, Serik	D-2	736,660.28	470,850.34
Km 59+580	Antalya, Serik	D-3	2,111,705.36	56,553.44
Km 61+500	Antalya, Manavgat	D-6	4,378,853.62	156,734.25
Km 64+160	Antalya, Manavgat	D-7	3,327,945.41	615,670.09
Km 71+800	Antalya, Manavgat	D-10	7,516,026.00	184.77
Km 74+360	Antalya, Manavgat	D-11	1,037,880.08	149,039.49
Km 76+240	Antalya, Manavgat	D-14	371,940.90	160,175.41
Km 78+790	Antalya, Manavgat	D-15	1,261,077.59	223,457.91
Km 86+340	Antalya, Manavgat	D-16	4,869,058.60	1,050,435.77
Km 87+800	Antalya, Manavgat	D-17	2,504,385.12	262,361.54
Km 95+410	Antalya, Manavgat	D-18	1,124,258.46	73,868.29
Km 95+410	Antalya, Manavgat	D-19	1,522,633.16	162,563.18
Km 98+290	Antalya, Manavgat	D-20	711,115.13	41,87.43
Km 100+000	Antalya, Manavgat	D-21	1,648,102.37	2,174.86
Km 107+850	Antalya, Manavgat	D-22	1,222,720.44	301,963.83
Km 110+820	Antalya, Manavgat	D-23	20,093,692.94	584,686.39
Km 113+050	Antalya, Manavgat	D-24	2,552,495.14	205,287.40
Km 123+000	Antalya, Alanya	D-26	5,638,396.17	871,743.65
Km 124+250	Antalya, Alanya	D-27	1,926,864.50	1,297,126.46
Km 127+000	Antalya, Alanya	D-28	3,763,723.90	383,579.61
Km 130+400	Antalya, Alanya	D-29	1,991,642.98	1,625,062.08
Km 132+720	Antalya, Alanya	D-30	3,307,202.05	2,132,211.56

Table IX.7. Locations of the Borrow Pits/Quarries and Plants

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)
Km 53+800	Antalya	Serik	Sarıabalı	Sarıabalı (AO-1) Borrow Pit	249,000
Km 55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1	13,946
Km 56+500	Antalya	Manavgat	Çakış	Çakış (TOY4a) Quarry	250,000
Km 58+500	Antalya	Manavgat	Taşağıl	Kuruçay (TOY4b) Quarry	243,000
Km 59+400	Antalya	Manavgat	Taşağıl	Concrete Plant-2	66,450
				Mechanical Plant-1	

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)
				Asphalt Plant-1	
Km 64+400	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)	
Km 80+400	Antalya	Manavgat	Yeniköy	Concrete Plant-3	15,000
Km 83+000	Antalya	Manavgat	Sarılar	Dikmen Borrow Pit	245,000
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2	
Km 87+700	Antalya	Manavgat	Bucakşeyhler	Concrete Plant-4	
				Mechanical Plant-2	42,371
				Asphalt Plant-2	
Km 89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a	11,665
Km 99+200	Antalya	Manavgat	Sülek	Concrete Plant-5	11,977
Km 104+750	Antalya	Manavgat	Gençler	Bademliyar (TO2) Quarry	179,000
Km 105+000	Antalya	Manavgat	Uzunlar	Çengel Stream Material Quarry	190,000
Km 106+000	Antalya	Manavgat	Uzunlar	Uzunlar (TOY5) Quarry	247,000
Km 114+200	Antalya	Manavgat	Karakaya	Karakaya Quarry	250,000
Km 117+000	Antalya	Alanya	Saburlar	Saburlar Quarry	250,000
Km 119+500	Antalya	Alanya	Karamanlar	Karamanlar Quarry	250,000
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3	
				Concrete Plant-6	
				Mechanical Plant-3	85,000
				Asphalt Plant-3	
Km 134+000	Antalya	Alanya	Soğukpınar	Soğukpınar Quarry	251,000

IX.3.2. Internationally Recognized Areas within the Region of the Project Area

Internationally Recognized Areas are located in the surroundings of the Project Area located in the provinces of Antalya, and Mersin. These areas include Key Biodiversity Areas (KBA), Important Bird Areas (IBA) and Important Plant Areas (IPA). KBAs are the most critical areas according to their characteristics in terms of supporting biological components. There are 33 internationally Recognized areas found, and there are no RAMSAR areas within or around the Project Area. The studies determined that a portion of Antalya Plains KBA and IBA is within the Project Area. The total area and the part remaining within the Project's Study Area of this KBA/IBA are given in Table IX.8.

Table IX.8. Internationally Recognized Areas within the Region of the Project Area

Internationally Recognized Areas	Total Area (ha)	within the Study Area (400 m corridor)	
		ha	%
Antalya Plains KBA, IBA	27,039	277	1.02

The Internationally Recognized Areas included in the provinces covered in the Project Area are shown in Figure IX.9. Distance of the regions from the Project Area and the provinces located are summarized in Table IX.10.

The Project also intersects with Belek Special Environmental Protected Area (SEPA) and Köprüçay Basin Natural Protected Area, which are nationally protected areas. The total area and the part remaining within the Project's Study Area of this SEPA are given in

Table IX.9 Nationally Recognized Areas within the Region of the Project Area

Nationally Protected Areas	Total Area (ha)	Within the Study Area (400 m corridor)	
		ha	%
Belek SEPA	11,320	140.06	1.25
Köprüçay Basin Natural Protected Area	4,019	47.44	1.18

Designation criteria of SEPAs are based on the relevant Biodiversity Protocols of the Barcelona Convention, Bern Convention, Ramsar Convention and the Convention of Biodiversity commitments for endangered species, etc.

Table IX.10. Distances of Internationally Recognized Areas from the Project Area

Internationally Recognized Areas	Province	Distance from the Project Area (km)
Antalya Plains KBA, IBA	Antalya	Partially Inside
Belek SEPA	Antalya	Partially Inside
Köprüçay Basin Natural Protected Area	Antalya	Partially Inside

Internationally Recognized Areas	Province	Distance from the Project Area (km)
Kızılot KBA	Antalya	1.2
Köprüçay Valley KBA, IBA	Antalya, Isparta, Konya	5.9
Kargı River Valley KBA	Antalya	6.8
Akseki and İbradı Forests KBA, IBA	Antalya, Konya	11.4
Dimçay Valley KBA, IBA	Antalya	13.8
Geyik Mountains KBA	Antalya, Konya, Mersin	17.7
Güllük Mountain KBA, IBA	Antalya	27.2
Gazipaşa - Anamur Coast KBA	Antalya, Mersin	27.9
Tahtalı Mountains KBA, IBA	Antalya	29.8
Gevne Valley and Gokbel Highlands KBA	Antalya, Konya, Karaman	38.6
Bey Mountains KBA, IBA	Antalya	44.6
Taşeli Plateau KBA	Antalya, Konya, Mersin	50.4
Aksu Valley KBA	Isparta, Burdur	50.6
Dedegöl Mountains KBA	Isparta, Konya	51.6
Kızıldağ KBA	Konya, Antalya	56.6
Ermenek Valley KBA	Karaman, Mersin	63.9
Beyşehir Lake KBA, IBA	Konya, Isparta	68.2
Kumluca KBA	Antalya	88.8
Kıbrısçık KBA	Antalya	90.9
Çığlıkara Forests (and Avlan Lake) KBA, IBA	Antalya	92.0
Karataş Lake KBA, IBA	Burdur	96.0
Girdev Lake and Akdağlar KBA, IBA	Muğla, Antalya	102.7
Kale KBA	Antalya	107.0
Eastern Boncuk Mountains KBA	Burdur, Muğla	110.8
Kekova KBA	Antalya	117.3
Salda Lake KBA, IBA	Burdur	124.9
Kaş - Kalkan Coast KBA	Antalya	141.5
Gölgeli Mountains KBA	Denizli	146.9
Baba Mountain KBA	Muğla	152.7
Patara KBA	Antalya	154.8
Fethiye KBA	Muğla	155.3
Sandras Mountain KBA	Muğla, Denizli	164.0

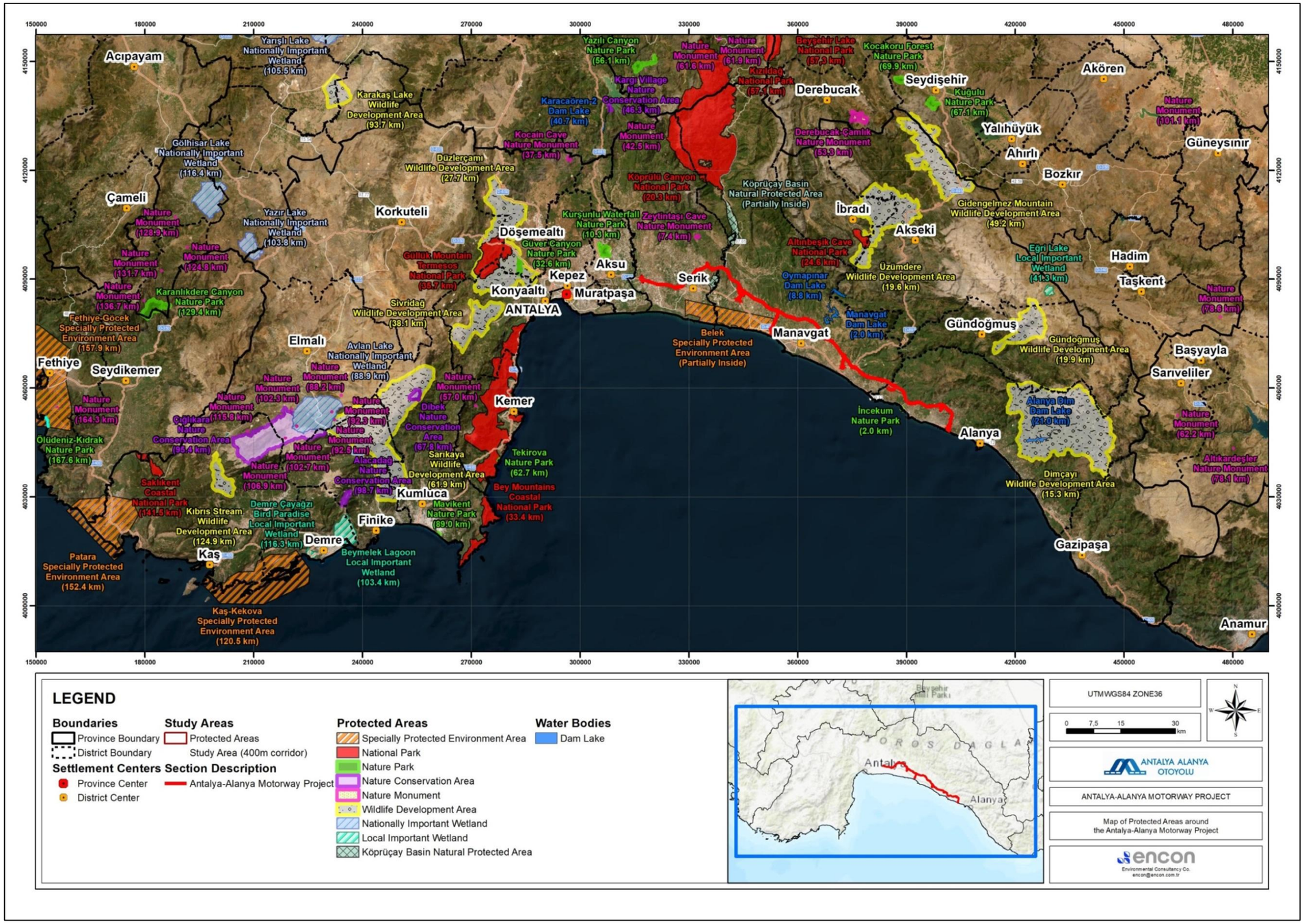


Figure IX.9. The Internationally Recognized Areas within the Region of the Project Area

IX.4. Methodology of Biodiversity Surveys

IX.4.1. Terrestrial Biodiversity

This section revealed terrestrial flora, fauna, ecosystem structures, and habitat features at the Motorway Project Area.

This baseline data/information collection provided an overall picture of the conditions and sensitivities in the area that were considered in assessing potential impacts and development of relevant mitigation measures for the design, construction, and operation phases of the Project. Terrestrial biodiversity studies investigated as following parts.

Population, ecology, and reproductive biology of the threatened and endemic flora-fauna species likely to occur within the study area of interest were studied. In addition, the literature survey was intended to give information on the identification of endemic, endangered, and rare species and species defined under the national and international conservation classes. Accordingly, species at risk of being affected due to the Project and, therefore, require special attention, and protection measures were determined.

The species identified during the field studies were recorded systematically to establish a species inventory for the baseline conditions and a description of the habitats. Also, endemic, protected, and restricted-range flora-fauna species were determined as the target species within the scope of the study. The most important area for these species is in natural habitats. The Project Area covers mostly plantation habitats and agricultural lands. Potential target species of each habitat were identified as a result of the literature review, and the identified target species were confirmed through field studies.

IX.4.1.1. Terrestrial Habitats and Flora Survey

Field surveys were carried out in order to determine the habitat and flora species present along the proposed route. Surveys were conducted for four seasons between 06-22 July 2024, 28 September-12 October 2024, 10-29 January 2025 in the winter and February 28 – March 31 2025 in the spring. Baseline surveys were conducted by Prof. Ferhat Celep and Dr. Medine Münevver Koçum.

Terrestrial habitats within the baseline study area are categorized as modified, natural, or critical habitats, according to IFC (2019). The definition of critical habitats depends on the presence of endemic, threatened, restricted-range species. As a result, distribution of the endemic, threatened, restricted-range species and EUNIS Level 3 habitat distribution within the Project Area were obtained.

The habitat classification follows the EUNIS habitat type classification. This comprehensive pan-European system facilitates the harmonized description and collection of data across Europe, including Türkiye, using habitat identification criteria. The preliminary habitat distribution in the study area is determined based on EUNIS Level 3 habitat type classification. A variety of habitat types were determined by analyzing appropriate satellite imagery and aerial photos (most of the territory of the Republic of Türkiye is covered by satellite imagery available through Google Earth). Since there are different habitat types within the study area, the European Nature Information System (EUNIS) habitat classification determines the number of different habitat types.

The habitats within the Motorway were determined with desktop studies according to EUNIS Habitat Classifications used satellite imagery. After the field studies, habitat types were verified and revised by expert observations.

Within the scope of the terrestrial flora studies, the flora and vegetation types within the study area were identified and served as a basis for determining the impacts of the Project on biological resources and developing appropriate mitigation measures, where necessary. In this context, floristic studies were conducted, including both desk-based and field studies, to determine the baseline conditions in the study area.
The objectives of the desktop study are to review and organize the existing information on terrestrial flora, habitats, and ecosystems within the study area. Therefore, potential species of conservation concern natural habitats and critical habitats present in the study area were determined before the field study and examined during field visits. As a result, terrestrial flora studies were carried out light on the following key baseline issues:

- To determine the flora species spreading on the Antalya-Alanya Motorway route,
- To identify habitat typesalong the route,
- Developing mitigation measures (in-situ and ex-situ) for rare, locally endemic or endangered species (CR, EN, and VU according to IUCN) that may be affected by construction and operation on the Antalya-Alanya Motorway route,
- If there are critical habitats in the Project Area, to provide habitat protection and development measures and suggestions so that these habitats will be affected by the project at least or not at all
- It is to identify the adverse effects that the project may have on the flora, develop mitigation measures to minimize these effects,
- To prepare a comprehensive flora report by IFC standards.

To determine the flora and vegetation structure on the Antalya-Alanya Motorway route, to determine if there are critically distributed plant species or habitats on the route, and to minimize the impact of the activity on these species and habitats, firstly, the number of sampling points to represent each habitat was determined on satellite images. The sampling points are planned to include both the areas representing the natural habitats on the route and the quarries where stone and gravel will be taken to be used in construction activities. Considering the effects that may occur on both sides of the road during the activity, 400 meter buffer zone was determined. Accordingly, 36 different sampling points and 19 transect lines representing different habitats were determined on the 117.8 km long motorway route. While determining the sampling points, priority was given to natural habitats and areas where critically distributed species were distributed.

Field studies were carried out in vegetation periods to study the stations determined on the route. The habitats determined during the field study were examined in detail, and the field notes were recorded in the field book. The habitat-based species in the floristic list were prepared based on the findings and observations obtained during the field trip.



Figure IX.10 Terrestrial Flora Field Studies

Floristic list; ferns (Pteridophyta), gymnosperms (Gymnospermae), and angiosperms (Angiospermae) are given, respectively. Families in each group are presented in phylogenetic order.

The plants collected from the Project Area were identified by "Flora of Türkiye and East Aegean Islands" (Davis, 1965-1985; Davis et al., 1988; Güner et al., 2000), Flora Europaea (Tutin et al., 1964-1980), Botanical Latin Basic sources such as (Stearn, 1966), Dictionary of Plant Science Terms (Altınayar, 1987) and Türkiye Plants List (Güner et al., 2012). In addition, sources such as Tubives (2022), Bizimbitkiler (2022), Euro+Med PlantBase (2022), ThePlantList (2022), The International Plant Names Index (2022), Kew (2022), GBIF (2022) were also used. The Turkish names of the detected plants were prepared using "Great Plants Guide" (Akalın, 1952), "Turkish Plant Names" (Baytop, 1997), "Plants in Anatolian Culture" (Akaydın et al., 2014) and "Our Natural Plants" (Akaydın, 2008). While determining the danger categories of endemic plants, the "Red Book of Plants of Türkiye" prepared by Prof. Tuna Ekim and his friends was used as the primary reference work, and these danger categories were reinterpreted considering the population of endemic species in the area and threat factors determined according to IUCN criteria.

In addition, in-situ and ex-situ protection measures related to locally or regionally distributed endemic, rare, or internationally protected species and critical habitats among the species identified in the project route are evaluated.

IX.4.1.2. Terrestrial Fauna Survey

Field surveys were conducted in order to determine the terrestrial fauna species present along the proposed route for four seasons between 06-22 July 2024, 28 September-12 October 2024, 10-29 January 2025 in the winter and February 28 – March 31 2025 in the spring. Baseline surveys were

conducted by Dr. Hakan Karaardıç (Ornithology expert), Dr. Yasin Ünal (Mammalogy expert) and Dr. Mert Karış (Herpetology expert).

The study areas were identified in collobration with flora expert and were located in the same positions as the flora survey areas in order to cover all habitat types along the proposed route.

The main objective of fauna studies is to identify the fauna elements (amphibians, reptiles, birds, mammals, and terrestrial invertebrates) of the study area, define the habitats these fauna elements inhabit and evaluate fauna and ecological characteristics of the study area. Terrestrial fauna field studies were conducted in a 400 m buffer which experts determined with desktop studies according to different habitat types. Twenty sampling points and 19 transect lines were based on during the site visits for fauna species. The expert have investigated and reported each fauna group as amphibian-reptiles, birds, and mammals during the terrestrial fauna field studies.

Besides these, objectives of the terrestrial fauna survey within the study area were described as follows;

- To determine the characteristics and importance of the Project Area in terms of terrestrial fauna species,
- To determine the critical and sensitive habitats and critical fauna species,
- To determine the protection status of the fauna species according to national and international conventions, decisions, and requirements.
- To determine potential impacts of motorway project on terrestrial fauna components.
- To determine mitigation measures to minimise offset- eliminate impacts on terrestrial fauna components.
- To determine the necessary measures to be taken to reduce the possible effects of the project activities (during construction and operation periods), especially on the breeding, migratory, and wintering fauna species, and to determine the faunistic monitoring study areas and times that will be carried out in the future periods,
- To determine the places/numbers of culverts that provide fauna passage.

In the Motorway route with the stated objectives, faunistic and ecological field studies were carried out.

- A total of 36 fauna study areas have been identified on the motorway line, representing different habitat types, suitable feeding, sheltering, and breeding areas for fauna species.
- In addition, habitats along the route, if any, in nearby areas that may be suitable for fauna were also included during the field studies.
- According to observation, literature, and habitat suitability, bird species were detected and included in the lists.
- “Line-transect method” was applied to determine fauna species and densities. In the study area, 400 m buffer were investigated.
- The presence of habitats suitable for the preferences of birds, traces of fauna (nests-cubs, feathers, footprints, vomit and feces, identifiable bone fragments), and feeding signs were also used to identify fauna species.
- Interviews and surveys were also conducted with the local people and the hunters in the region about the fauna elements in the study areas.
- In addition, the literature information obtained from the studies of this region in the past years was also used.

- In the species list tables, the systematic categories (Ordo - Familya) scientific names, Turkish - English names, threatened categories, and evaluations / recommendations of each species.
- Türkiye Vertebrates and Birds Red Lists (Ali Demirsoy - 2009-Kiziroglu 2009) and Central Hunting Commission Decisions 2021-2022 were used to determine the species' national hazard categories.
- The IUCN Red List, the Bern Convention, the CMS Convention, and CITES were used to determine the species' international hazard categories.
- It has been used in field studies advanced optical instruments (Binoculars and monocular telescopes) for avifauna and mammal observations and batcorder (bat sound recorder) device was used to record bat vocalizations. Additionally, camera traps have been used for mammal studies.



Figure IX.11 A Camera Trap Device Installed Within The Project Site

IX.4.1.3. Bat Surveys

Bat surveys were conducted using static detectors deployed for two nights between February 28 – March 31 2025. Survey locations chosen focused mainly around the quarries. These areas are located in the potentially important habitats for bats, due to the presence of caves and rocky formations.

A batcorder was used to record the bats' vocalizations in the survey locations. The vocalization data were analyzed to identify the potential species present within these habitats.

Additional bat surveys will be carried out in key habitats pre-construction to enhance understanding of bat species presence and distribution within the project area, and to ensure compliance with IFC Performance Standard 6 (PS6).

One pre-construction bat survey have already been carried out between August 21 2025, August 22 2025, and August 23 2025 for day and night surveys.

IX.4.2. Aquatic Environment

Field surveys were conducted in order to determine the terrestrial fauna species present along the proposed route for four seasons between 06-22 July 2024, 28 September-12 October 2024, 10-29 January 2025 in the winter and February 28 – March 31 2025 in the spring. Baseline surveys were conducted by Prof. Erdoğan Çiçek at 14 sampling points which were identified in correspondence of permanent or seasonal waterbodies crossed by the Project.

Within the scope of the Antalya-Alanya Motorway Project, the effects of the Project on the stream and river crossing areas on aquatic ecosystems were studied.

Fish species were evaluated within the scope of the monitoring since they are the indicator group that will be primarily affected by the motorway construction works. Investigations were made at 14 different stations where water was in the streambed based on the above. The availability, relative abundance, and conservation status of the fish caught were evaluated. In addition, the effects of the motorway transit points on the aquatic ecosystems and the precautions to be taken with the results were assessed.

The temporary or permanent streams along the motorway route will be crossed via bridges and viaducts. Since the bridge piers will be constructed on land, no intervention will be made in the riverbed. Therefore, it was not deemed necessary to plan a study on phytoplankton, zooplankton, and macrobenthic invertebrates in the aquatic ecosystem. A study was conducted on fish populations in the aquatic ecosystem within the Project Area.
During the construction of the Antalya-Alanya Motorway Project route, it may cause some effects on the aquatic ecosystem in the areas where aquatic ecosystem transitions will be made. It is important to know the reactions of aquatic organisms exposed to these effects and the precautions to be taken. For this purpose, aquatic organisms at the determined stations were examined, and the effects and precautions to be taken were given.

Accordingly, the following studies were carried out within the scope of aquatic studies:

- Habitat assessment of the aquatic stations where the motorway passes was made according to EUNIS.
- Sampling and laboratory studies were carried out for fish species from aquatic stations.
- National and international protection status and endemism status of the species were stated.
- The Project's effects on aquatic environments and the measures to be taken were defined.

IX.4.2.1. Aquatic Habitat Assessment

The assessment of habitat quality of the aquatic environment is based on the important physical characteristics of the water body and the surrounding terrains, particularly the catchment areas of the investigated site. All habitat parameters evaluated are related to aquatic life use and are a potential source of limitation of the aquatic environments.

The matrix used for assessing habitat quality of aquatic environments is based on the important physical characteristics of the water body and the surrounding terrain, particularly the catchment area of the investigated site. All habitat parameters evaluated are related to aquatic life use and are a potential source of limitation of the aquatic environment. The parameters used in habitat assessments mainly consist of epifauna substrate and its properties, velocity and depth conditions, sedimentation, stream bed width, occupancy conditions, riparian zone stability, and cover condition.

Sampling of Aquatic Organisms

Freshwater Fishes

Freshwater fishes were sampled using electrofisher and cast nets on the motorway axis to determine fish species in the Project Area (see
Figure IX.12). The captured specimens were placed in a bucket filled with water and sedated using MS-222 before species identification was performed. Species identification was conducted using various morphological, metric, and meristic characteristics.

In cases where morphometric methods were insufficient for species identification, small tissue samples (weighing 1-2 g) were taken from the caudal fins in a way that would not affect the individuals' survival. After taking live photographs of the species, all individuals were returned to their original capture locations.



Figure IX.12 Aquatic Ecosystem Sampling Studies

Fish species were identified according to Geldiay and Balık (2007), Kuru (2004), Fricke et al. (2007), Kottelat and Freyhof (2007), Kuru et al. (2014), and Çiçek et al. (2015, 2020, 2023). For systematic classifications, Nelson et al. (2016), Tan and Armbruster (2018), and van der Laan et al. (2023) were followed, and the latest status of the species was verified using the Catalog of Fishes database (Fricke et al., 2024).

IX.4.3. Significance Criteria

The significance criteria for the impacts on ecology and biodiversity were determined, as high, moderate or low, based on the evaluation of magnitude of impact and sensitivity/value of the receptors/resources. The criteria presented in Chapter 4 ("ESIA Methodology") are described the significance criteria used while sensitivity/value criteria to be used in the scope of ecological impact assessment is summarized in Table IX.11. Detailed explanation of the sensitivity components for each ecosystem component is provided in the following sections.

The IFC Performance Standard 6, Biodiversity Conservation and Sustainable Living Revenue Natural Resource Management rules were used to identify Critical Living Area in the study area. IFC criteria for identifying Critical Habitats include:

Criterion 1: Habitats important for critical and/or endangered species;
Criterion 2: Habitats of significant importance to endemic and/or restricted species;
Criterion 3: Habitats containing significant intensive species or migrating species and/or indigenous species in the global sense;
Criterion 4: Highly threatened and/or unique ecosystems;
Criterion 5: Key evolutionary processes.

Based on these criteria, sensitivity criteria for ecological components within the scope of the Project have been determined as follows:

Table IX.11. Criteria for Sensitivity/Value of Resource/Receptor

Ecosystem Component	Sensitivity/Value Level		
	High (3)	Medium (2)	Low (1)
Designated Areas	Internationally Recognised Areas (e.g. UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, and wetlands designated under the Convention on Wetlands of International Importance (Ramsar Convention)).	Nationally designated areas.	N/A
Habitats	Habitats that triggers under the following IFC PS6 Criteria: • Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species; • Criterion 2: Endemic and/or restricted-range species; • Criterion 3: Migratory and/or congregatory species. • Criterion 4: Highly threatened and/or unique; and/or ecosystems • Criterion 5: Key evolutionary processes Habitats that support species of High sensitivity	Areas of habitat that represent >1% distribution within Türkiye or are threatened at a national level. Habitats that support species of Medium sensitivity.	Modified habitats that do not meet the criteria for either medium or high sensitivity. Habitats that support species of Low sensitivity.
Species	Critically Endangered (CR) and/or Endangered (EN) species; Endemic and/or restricted-range species; Migratory and/or congregatory species.	Nationally/regionally important concentrations of a Vulnerable (VU) species, or locally important concentrations of Critically Endangered (CR) and/or Endangered (EN) species. Locally important populations of endemic / rangerestricted species. Populations of migratory species that represent >1 % of the national (Turkish) population.	Locally important populations of Near Threatened (NT) or Vulnerable (VU) species, or locally important populations of species listed on Annexes to the Bern Convention.

IX.4.4. Critical Habitat Assessment Process

Critical habitats are areas with high biological diversity value. Their identification is based on the following key criteria:

i. Habitats supporting Critically Endangered and/or Endangered species.
ii. Habitats of significance for endemic and/or range-restricted species.
iii. Habitats that support globally important populations of migratory species and/or are crucial for migratory corridors.
iv. Highly threatened and/or unique ecosystems.
v. Areas associated with key evolutionary processes.

These criteria are essential for determining critical habitats and ensuring their protection and conservation within the scope of ecosystem assessments and environmental management planning.

The criteria for critical habitats are defined according to IFC PS6, 2019, as follows:

Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species.
Criterion 2: Endemic and/or restricted-range species.
Criterion 3: Migratory and/or congregation species.
Criterion 4: Highly threatened and/or unique ecosystems.
Criterion 5: Key evolutionary processes.

Projects located in areas with high biological diversity value, recognized at the national and/or international level, may require a critical habitat assessment. These areas include:

- IUCN Protected Area Categories: Ia (Strict Nature Reserves), Ib (Wilderness Areas), and II (National Parks).
- Key Biodiversity Areas (KBA) and Important Bird and Biodiversity Areas (IBA).

A critical habitat assessment is vital to ensure that project activities do not adversely affect ecologically important areas and that appropriate conservation measures are incorporated into project planning and execution.

To support informed decision-making, numerical thresholds have been established for four key criteria:

- Presence of Critically Endangered (CR) or Endangered (EN) species, endemic, or range-restricted species.
- Occurrence of migratory species or large aggregations.
- Existence of threatened ecosystems.
- Identification of unique ecosystems.

These thresholds, drawn from the IUCN Global Standard for Key Biodiversity Area Identification, serve as guiding indicators and are not prescriptive. There is no universally automatic formula for critical habitat designation; instead, professional judgment and case-specific analysis are required.

Given frequent limitations in biodiversity data, expert input and site-specific assessments are essential. The critical habitat assessment within the Project Area has been carried out in accordance with these criteria, as defined in IFC 2019 GN6.

To comply with IFC Performance Standard 6 (PS6) requirements and to conduct a critical habitat assessment, an ecologically reasonable analysis unit has been defined for each biodiversity component using Ecologically Appropriate Area of Analysis (EAAA).

Ecologically Appropriate Area of Analysis (EAAA) defines geographical boundaries based on the natural distribution and interaction areas of species, habitats and ecosystems to assess the potential impacts of a project.

In this context, data collection carried out with monitoring studies along the motorway route and in the 400 m buffer zone.

IX.4.5. Ecologically Appropriate Area of Analysis (EAAA)

Assessments conducted within the framework of the Ecologically Appropriate Area of Analysis (EAAA) have successfully evaluated the ecological sensitivities and conservation priorities across the broader project influence area. Preliminary findings have been established, and ongoing biodiversity monitoring is continuing to enhance the understanding of the area's ecological dynamics.

Presence of Critical Habitat

The assessment confirmed the presence of one species of high conservation concern within the Study Area:

Habitat Fragmentation Risk

The project currently demonstrates a low potential to disrupt habitat connectivity within the EAAA. While initial evaluations suggest minimal fragmentation risk, further detailed analysis was conducted to:

- Identify species and ecological zones vulnerable to fragmentation
- Assess movement corridors and maintain ecological connectivity
- Develop and implement adaptive mitigation strategies to prevent habitat disruption during construction and operational phases

These outcomes will inform an Adaptive Management Plan designed to mitigate fragmentation impacts effectively.

Cumulative Impact Considerations

Within the EAAA—spanning the region between Alanya and Antalya—the study addressed cumulative ecological pressures arising from multiple linear infrastructure projects, including existing highways. The cumulative impact assessment incorporated:

- Interactions between the project and other ongoing or planned developments
- Combined effects on habitat quality, species viability, and ecosystem services

The integration of spatial and ecological datasets has allowed for a comprehensive understanding of cumulative impacts, which will inform strategic management and conservation planning.

Compatibility with Species Life Cycles

Seasonal monitoring within the EAAA assessed project compatibility with the life cycles of key migratory and resident species. This analysis facilitated:

- Identification of critical periods and biologically sensitive areas for feeding, breeding, and sheltering
- Adjustment of construction timelines and conservation interventions to avoid disruption during key ecological windows
- Enhancement of mitigation measures in alignment with IFC PS6 requirements and biodiversity conservation goals

IX.5. Findings for Ecology and Biodiversity

IX.5.1. Natural and Modified Habitats

IFC PS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources) defines Natural Habitats as areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions.

Key principles related to Natural Habitats under PS6:

- Projects should avoid significant conversion or degradation of natural habitats.
- If avoidance is not possible, mitigation measures should be implemented, following the mitigation hierarchy: Avoid, Minimize, Restore, Offset.

Modified Habitats are areas that have been significantly altered by human activity. These habitats may contain a mix of native and non-native species, and their ecological structure and functions have been heavily transformed due to development, agriculture, or resource extraction.

Typical characteristics of Modified Habitats:

- Substantial human influence: Examples include urban areas, industrial zones, agricultural lands, and plantation forests.
- Reduced native biodiversity: Native species may be present but often in fragmented or altered populations.
- Ecological processes changed: Natural hydrology, nutrient cycles, and other processes may be altered or suppressed.

While these areas are often less ecologically valuable than Natural or Critical Habitats, they can still provide important ecosystem services and serve as refugia or corridors for biodiversity.

IFC PS6 guidance for Modified Habitats:

- Projects in these areas are expected to minimize further degradation and enhance biodiversity where possible.
- Where feasible, promote the restoration of ecological functions and support sustainable land use practices.

The Natural and Modified Habitats within the study area were identified through a combination of literature review, satellite imagery analysis using Google Earth and CORINE 2018 data, and comprehensive field surveys conducted by qualified flora and fauna experts. Natural Habitats, as defined by IFC Performance Standard 6 (PS6), are areas composed of viable assemblages of native species where ecological processes and functions are largely intact and human-induced modifications are minimal or absent. Within the study area, these habitats support self-sustaining populations of plants and animals of predominantly native origin and maintain essential ecological functions such as nutrient cycling, soil stabilization, and habitat connectivity. Modified habitats, by contrast, may exhibit some level of human alteration but may still retain significant ecological value, supporting native species and contributing to the overall biodiversity of the landscape.

During field surveys, certain areas within the study site were identified as Critical Habitat in accordance with IFC PS6, which defines Critical Habitat as follows:

- Habitat of significant importance to Critically Endangered and/or Endangered species;
- Habitat of significant importance to endemic and/or restricted-range species;
- Habitat supporting globally significant concentrations of migratory species and/or congregatory species;
- Highly threatened and/or unique ecosystems; and/or
- Areas associated with key evolutionary processes. These areas provide essential ecological functions and refuge for species that trigger Critical Habitat Criterions of PS6, making their protection a priority in project planning and impact mitigation.

The Antalya-Alanya Motorway route, where the Project will be carried out, features a vegetation structure shaped by the Mediterranean climate. Natural vegetation in the area includes maquis and coniferous natural forest habitats. The Project corridor passes through a variety of terrestrial ecosystems, including degraded forest areas, scrub, agricultural land, vineyards and gardens, greenhouse areas, and residential zones. It is observed that the Project Area encompasses six natural habitat types and six modified habitat type. The areas and percentages of EUNIS habitat types within the project study area are given in Table IX.12. Maps showing the habitat types in the project area are given in Figure IX.13, Figure IX.14, Figure IX.15, Figure IX.16, and Figure IX.17

Table IX.12. EUNIS Habitat Types and Their Respective Areas within the Project Study Area

EUNIS Habitat Code	EUNIS Habitat Type	Antalya-Alanya Motorway Project		
		Area (m2)	Area (ha)	Percent (%)
Natural Habitats				
C2	Surface running waters	366,990	37	0.5
S5	Maquis, arborescent matorral and thermo-Mediterranean scrub	3,471,732	347	5.1
S6	Garrigue	4,468,176	447	6.5
S7.211	Aegean Sarcopoterium phrygana	1,711,883	171	2.5
T3	Coniferous forest	10,920,452	1,092	15.9
T14	Mediterranean and Macaronesian riparian forest	938,560	94	1.4
Total Natural habitats		**21,510,803**	**2,188**	**31.8**

EUNIS Habitat Code	EUNIS Habitat Type	Antalya-Alanya Motorway Project		
		Area (m2)	Area (ha)	Percent (%)
Modified Habitats				
J2.1	Scattered residential buildings	3,652,374	365	5.3
J2.3	Rural industrial and commercial sites still in active use	1,547,256	155	2.3
J4.2	Disused road, rail and other constructed hard-surfaced areas	1,037,945	104	1.5
V1	Arable land and market gardens	16,700,514	1,670	24.4
V1	Arable land and market gardens (Greenhouse)	8,967,905	897	13.1
V12	Mixed crops of market gardens and horticulture	14,777,540	1,478	21.6
Total Modified Habitats		**46,683,534**	**4669**	**68.2**
TOTAL		**68,561,327**	**6,856**	**100**

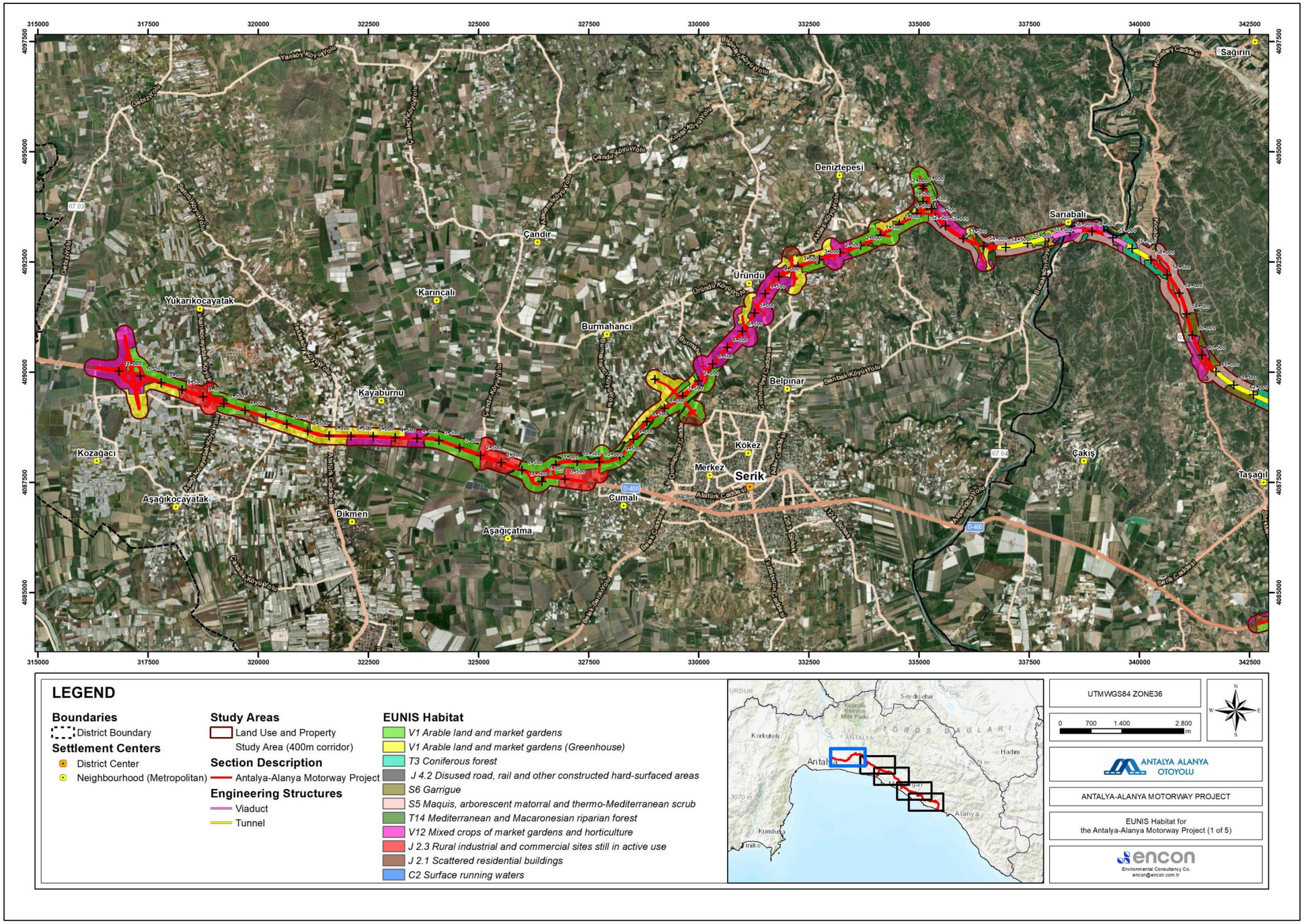


Figure IX.13. EUNIS Habitat Types within the Project Area (Part 1 of 5)

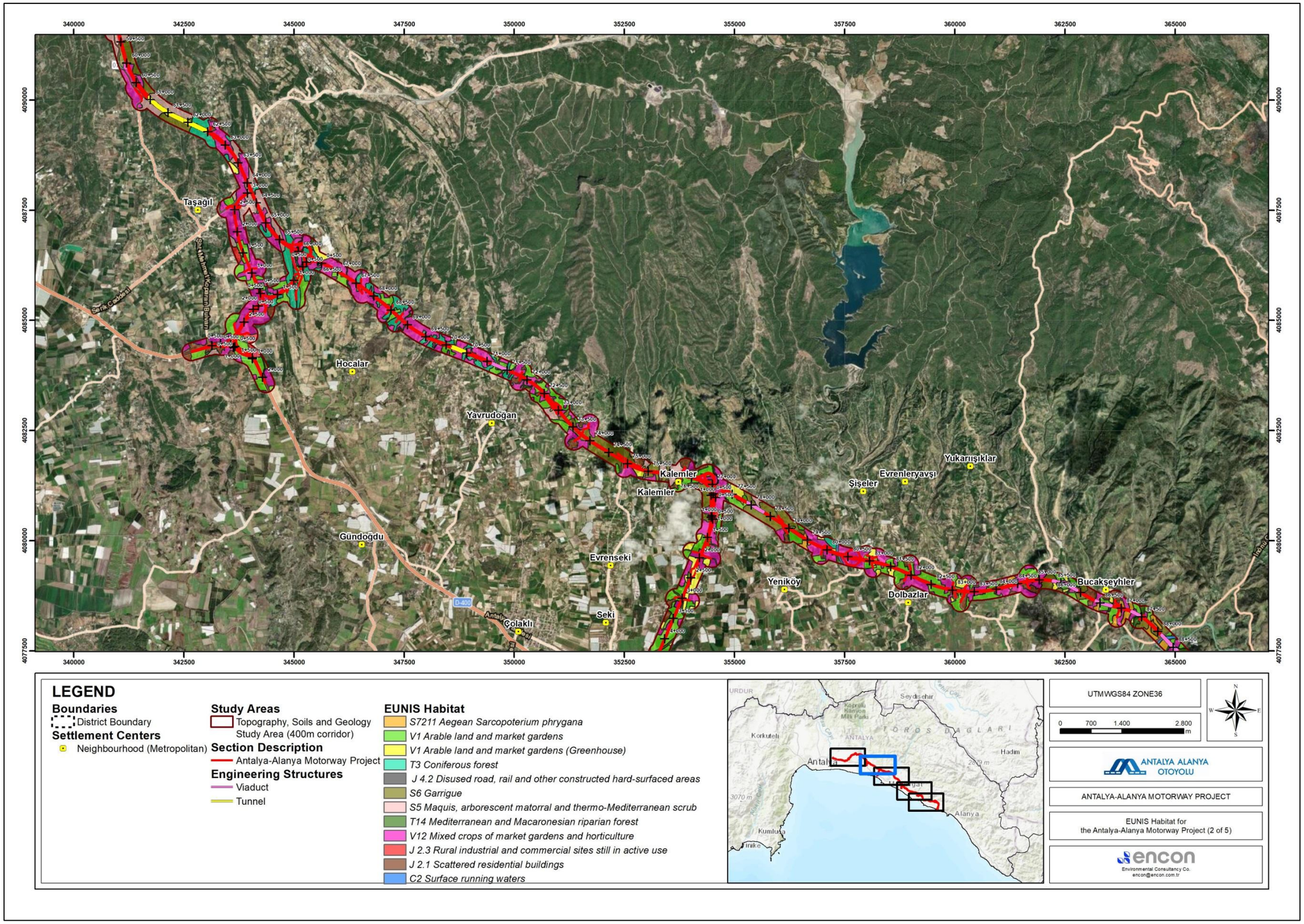


Figure IX.14. EUNIS Habitat Types within the Project Area (Part 2 of 5)

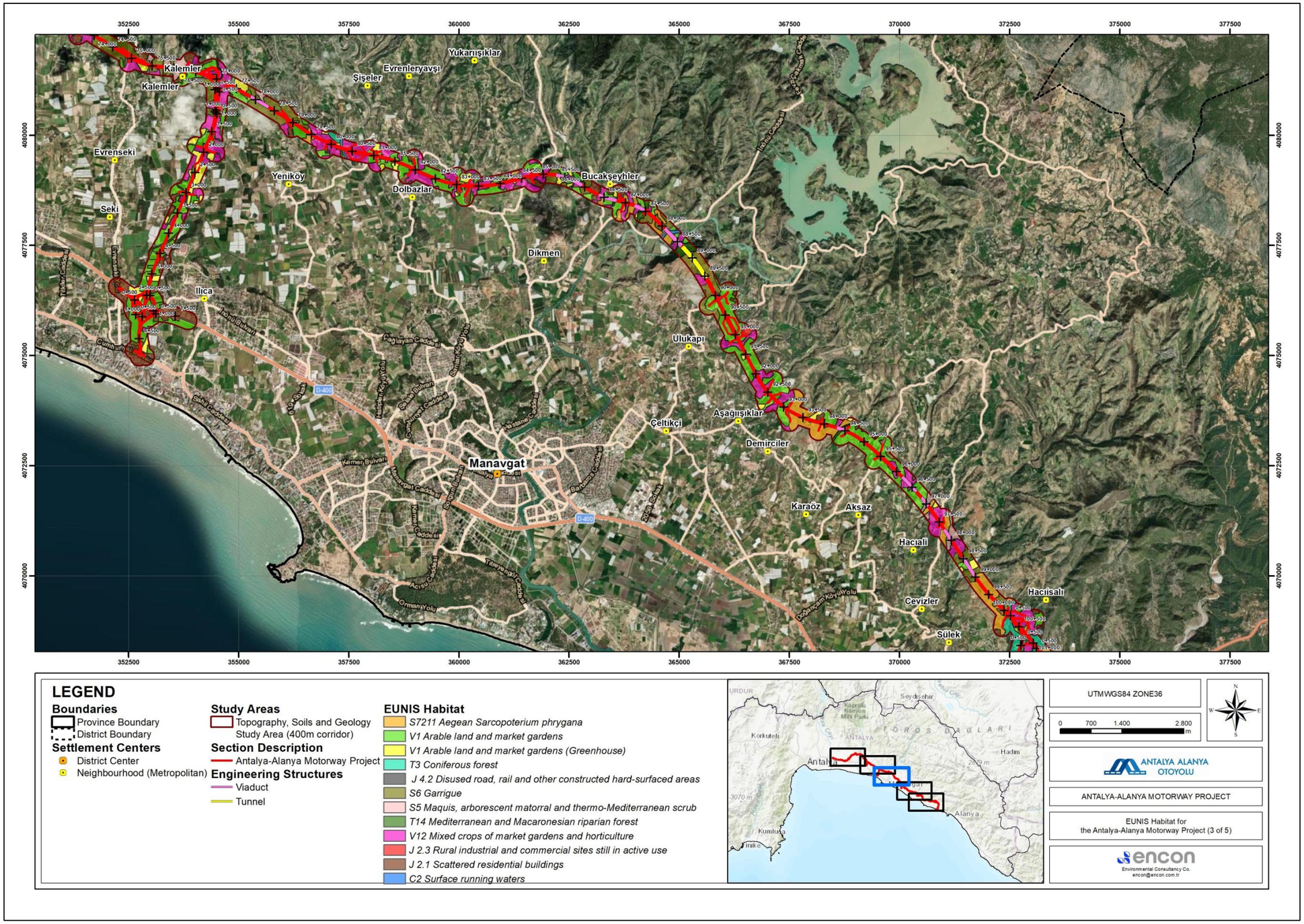


Figure IX.15. EUNIS Habitat Types within the Project Area (Part 3 of 5)

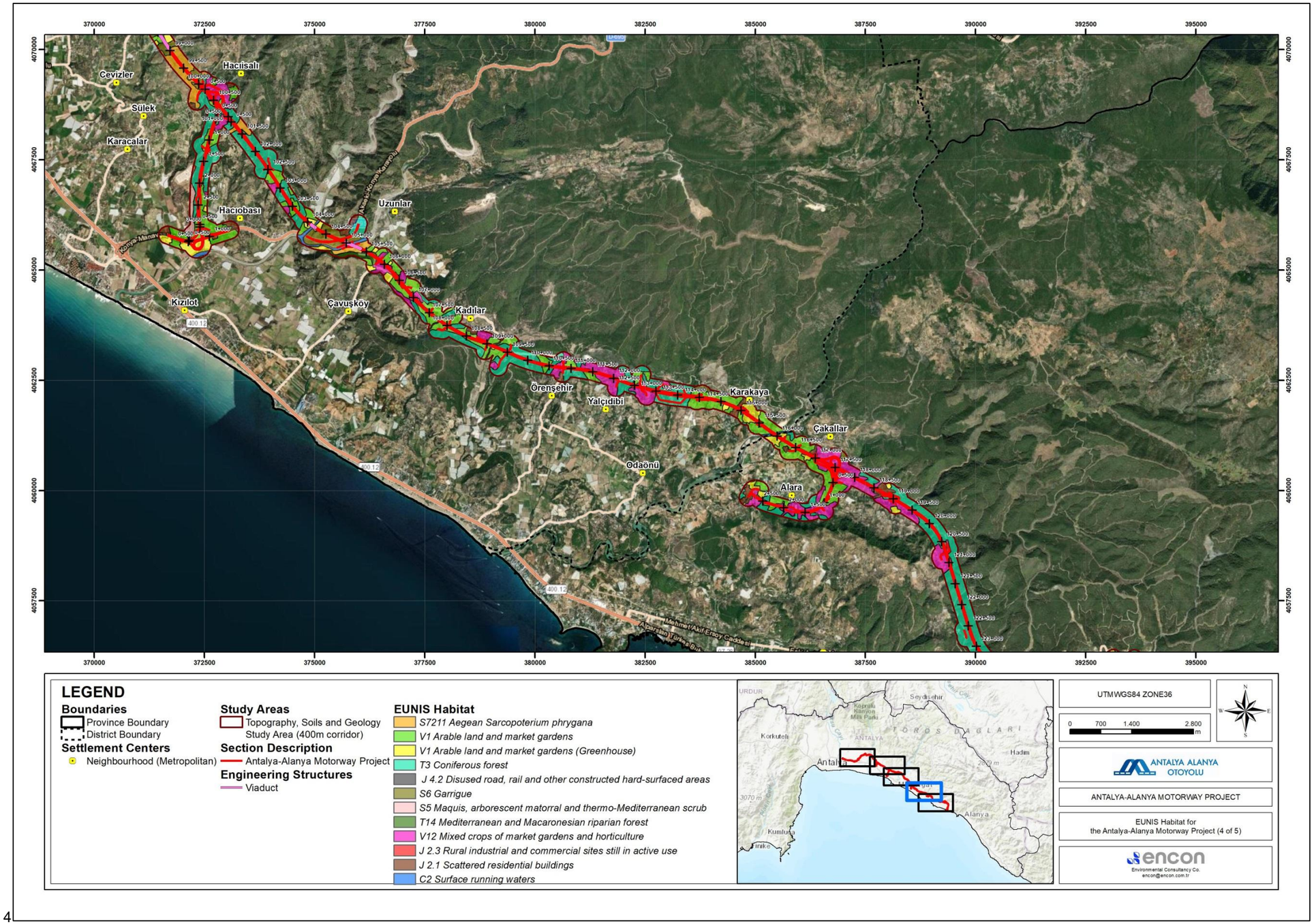


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Figure IX.16. EUNIS Habitat Types within the Project Area (Part 4 of 5)

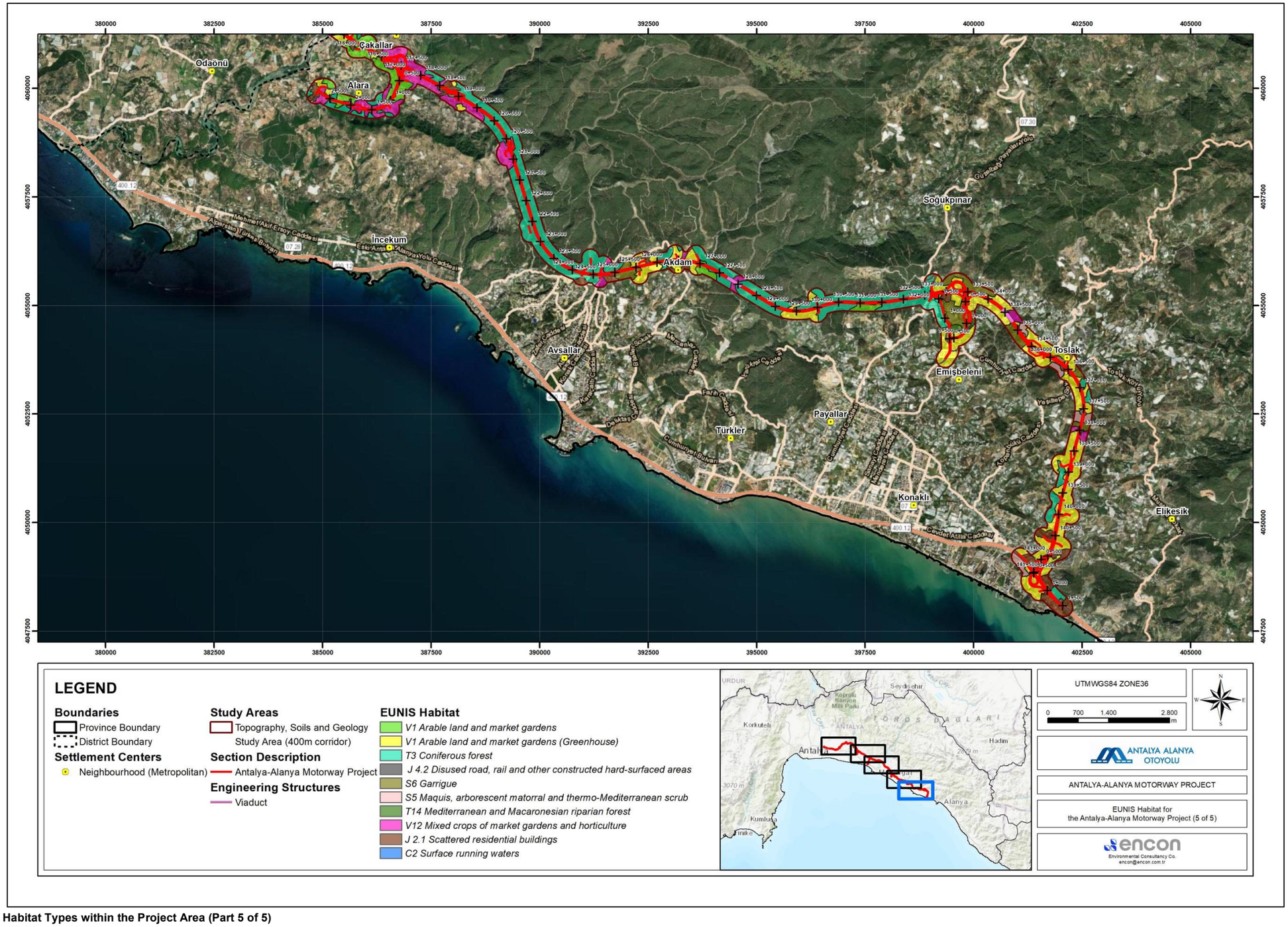

Figure IX.17. EUNIS Habitat Types within the Project Area (Part 5 of 5)

Photographs of habitat types are presented in Figure IX.18 to Figure IX.22.

C2 - Surface running waters: Running waters, including springs, streams and temporary water courses.

G1.1 - Riparian and Gallery Forests Dominated by *Alnus, Betula*, *Populus*, or *Salix* Genera: Riparian woods of the boreal, boreo-nemoral, nemoral and submediterranean and steppe zones, with one or few dominant species, typically *Alnus*, *Betula*, *Populus* or *Salix*. Includes woods dominated by narrow-leaved willows *Salix alba*, *Salix elaeagnos*, *Salix purpurea*, *Salix viminalis* in all zones including the mediterranean. Excludes riverine scrub of broad-leaved willows, e.g. *Salix aurita*, *Salix cinerea*, *Salix pentandra.*



Figure IX.18 C2 and G1.1 Habitats in the Project Area

S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub: Evergreen sclerophyllous or lauriphyllous shrub vegetation, with a closed or nearly closed canopy structure, having nearly 100% cover of shrubs, with few annuals and some vernal geophytes; trees are nearly always present, some of which may be in shrub form. Shrubs, sometimes tall, of *Arbutus*, *Cistus*, *Cytisus*, *Erica*, *Genista*, *Lavandula*, *Myrtus*, *Phillyrea*, *Pistacia*, *Quercus* and *Spartium* are typical. These include pseudomaquis, in which the dominants are mixed deciduous and evergreen shrubs.



Figure IX.19. S5 Habitat in the Project Area

S6 - Garrigue: Evergreen sclerophyllous or lauriphyllous shrub vegetation, with an open canopy structure and some bare ground, usually with many winter annuals and vernal geophytes. Low shrubs of *Cistus*, *Lavandula*, *Rosmarinus* and *Stoechas* are usually present, and there may be some larger shrubs and scattered trees. Garrigue is found mostly in the Mediterranean, Macaronesian and Pontic regions, where it typically derives from degradation or regrowth of broad-leaved evergreen forests (T2), but it extends into deciduous forest areas in the supra-Mediterranean zone and sub-Mediterranean zones and into steppe areas in Anatolia. Additionally, it includes scrubby land with mainly herbaceous vegetation and a large component of unpalatable non-vernal monocots (*Asphodelus*, *Urginea*) and thistles, provided that shrub cover exceeds 10%.



Figure IX.20 S5 and S6 Habitats in the Project Area

S7.211 - Aegean *Sarcopoterium phrygana*: *Sarcopoterium spinosum*-dominated formations, by far the commonest *phrygana* facies, widespread in the Aegean archipelagoes and Crete, with local outposts in peninsular Greece, the Ionian islands and coastal Anatolia.
T3 - Coniferous forest: Forest dominated by coniferous trees, mainly evergreen (*Abies*, *Cedrus*, *Picea*, *Pinus*, *Taxus*, and Cupressaceae) but also deciduous *Larix*. This also includes forest with mixed coniferous and deciduous broadleaved trees, if the cover by coniferous trees exceeds that of deciduous trees. Old plantations which have many of the characteristics of natural or semi-natural forests are included, more intensively managed, and less natural, forests are included in vegetated man-made habitats.



Figure IX.21. T3 Habitat in the Project Area

T14 - Mediterranean and Macaronesian riparian forest: Deciduous broadleaved forest, most commonly dominated by poplars (*Populus*), willows (*Salix*) or oriental plane (*Platanus orientalis*), on periodically flooded alluvia or gravel terraces and streamsides in humid localities 39 in the Mediterranean and Macaronesia. Also includes streamside forests with *Rhododendron ponticum* and *Betula pendula* var. *fontqueri* in Spain.

V1 - Arable land and market gardens: Croplands planted for annually or regularly harvested crops other than those that carry trees or shrubs. They include fields of cereals, of sunflowers and other oil seed plants, of beets, legumes, fodder, potatoes and other forbs. Croplands comprise intensively cultivated fields as well as traditionally and extensively cultivated crops with little or no chemical fertilisation or pesticide application. Faunal and floral quality and diversity depend on the intensity of agricultural use and on the presence of borders of natural vegetation between fields.



Figure IX.22. V1 Habitat in the Project Area

IX.5.2. Terrestrial Flora

As a result of the studies carried out along the Antalya-Alanya Motorway route, 214 species and subspecies taxa belonging to 58 families were identified. Among these, 7 species are endemic taxa (*Eryngium kotschyi, Phlomis leucophracta, Phlomis lycia, Phlomis monocephala, Phlomis nissolii, Pyrus serikensis and Sideritis congesta*) which are considered restricted.

The general floristic structure of Antalya province is composed of maquis vegetation, which is the basic element of the Mediterranean coastal ecosystem. This vegetation is dominant along the Mediterranean coast of Türkiye.

As a result of the field study, 221 plant species belonging to 60 families were identified. Among the species that make up the flora of the area, the Asteraceae family is the most dominant with 29 species (13.1%), followed by Lamiaceae, Fabaceae, and Poaceae families, each with 18 taxa (8.1%). The Brassicaceae family follows with 15 taxa (6.8%), the Apiaceae family with 10 taxa (4.7%), and the Boraginaceae family with 9 taxa (4.1%). Other families, such as Rosaceae with 6 taxa (2.7%) and Caryophyllaceae and Ranunculaceae with 5 taxa (2.3%) each, are also represented. Other families are represented by four or fewer taxa. The top five families with the most taxa in the Project Area are also among the top 10 families with the most taxa in Türkiye's flora.

Photographs of some of the plant species identified during the monitoring studies carried out in and around the Project Area and as a result of observations made in and around the site in Annex-10.
As a result of the literature and field study, 7 endemic plants were found among the 221 plant taxa identified in the Project Area and its immediate vicinity. These are; *Eryngium kotschyi, Phlomis leucophracta, Phlomis lycia, Phlomis monocephala, Phlomis nissolii, Pyrus serikensis and Sideritis congesta*. There are no non-endemic but rare plant species in the area. Except for *Pyrus serikensis*,

these species have been observed as having a “Moderate” amount of individuals (20-100) around the study area. *Pyrus serikensis* assessed as having a “Low” relative abundance. Field observations recorded approximately 20 individuals of *Pyrus serikensis* (20 is the expected number at the moment maximum individual number is 10) in localized patches within the maquis habitat, with possibility of more. More detail in this regard is given in IX.7.

Among the plant taxa identified in and around the Project Area, *Pyrus serikensis* falls under the EN (Endangered) category, four species (*Eryngium kotschyi*, *Phlomis lycia*, *Phlomis monocephala*, and *Sideritis congesta*) are categorized as LC (Least Concern) and two species (*Phlomis leucophracta* and *Phlomis nissolii*) as NE (Not Evaluated). Therefore, considering the IUCN category, it was determined that apart from *Pyrus serikensis*, there are no endangered species in the area.

The IUCN category of *Phlomis monocephala* and *Sideritis congesta* species, which are regional endemic species identified from the area as a result of the fieldwork carried out in the Project Area, is “Least Concern, LC”. The IUCN Red List category for the widespread endemic species *Eryngium kotschyi* is “LC”. The list of flora elements identified from the area within the scope of the Project is given in Annex-10.

According to the CITES Convention, among the 221 taxa identified in the Project Area and its surrounding environment, only *Barlia robertiana* is listed in Appendix II. The remaining 220 species are not listed in any CITES appendix.

According to the Bern Convention, none of the 221 taxa identified in the Project Area and its surrounding environment are listed in the convention's appendices.

According to the Habitat Directive, there are no listed species among the 221 taxa identified in the Project Area and its immediate vicinity.

Relative abundance and presence species information regarding terrestrial flora is given in Table IX.13.

Table IX.13 Relative Abundance and Presence for Terrestrial Flora Species

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)
Terrestrial Flora	*Pyrus serikensis*	Low	Y
	Eryngium kotschyi	Moderate	Y
	Phlomis leucophracta	Moderate	Y
	Phlomis lycia	Moderate	Y
	Phlomis monocephala	Moderate	N
	Phlomis nissolii	Moderate	Y
	Sideritis congesta	Moderate	Y
	Barlia robertiana	Moderate	Y

IX.5.3. Terrestrial Fauna

IX.5.3.1. Amphibians

Along the Motorway route, there are many different habitat types such as agricultural areas, forest areas, maquis vegetation, streams and degraded areas. Rivers within the Project Area provide areas suitable for the breeding of amphibians. In addition, keeping the soil constantly moist due to agricultural irrigation and irrigation ponds provide suitable habitats for the reproduction of amphibians.

As a result of literature and field studies, five amphibian species belonging to four families of the Anura order were identified along the Motorway route. Regarding the species identified in the Project Area information can be found in Annex-10 as a table. Photographs of the amphibian species identified in the area are also presented in Annex-10.

Lyciasalamandra atifi is endemic to the region among the five species of amphibian identified in and around the Project Area as a result of literature and fieldwork. *Lyciasalamandra atifi* -Associated with the T3 - Coniferous Forest habitat type- has a highly restricted regional distribution and occurs at higher altitudes outside the direct project footprint. Monitoring studies for this species were conducted at an elevation where the motorway is ecologically suitable for ecological habitat, taking into account the natural distribution area of the species. No individuals were found in most of the identified areas. Only specimens were found 5 km north of the motorway at an altitude of 500 m.

There are no non-endemic but rare species in the area.

Among the amphibians identified in and around the Project Area, one species is categorized as EN, three species are categorized as LC, and no assessment has been made yet for the *Hyla orientalis* (NE). Considering the IUCN category, it is understood that *Lyciasalamandra atifi* which is endemic to the area, is a threatened species.

According to the CITES Convention, there are no species included in the relevant lists among the species detected in the Project Area and its immediate surroundings.

According to the Habitat Directive, there are no listed species among the amphibian species identified in the Project Area and its immediate vicinity.

Among the amphibian species encountered in the area, there are species listed under Assessment According to Central Hunting Commission Decisions (CHCD). These species, like other fish species in Türkiye, are considered under protection by the Ministry of Agriculture and Forestry.

Among the amphibian species identified in the Project Area and its immediate surroundings, there is no endangered species other than *Lyciasalamandra atifi*, which is endemic and endangered species according to IUCN, included in Bern and CITES conventions and Habitat Directive. Therefore, monitoring studies should be carried out for this species. This land salamander, which is endemic to Türkiye, is in the EN category and is under threat for many reasons such as climate change, collection, habitat destruction, alien species, and urbanization. Although the motorway corridor falls within its broader natural distribution range, no individuals have been recorded in suitable habitats within the Project Area. In February-March 2025, the species was observed in northern sections of the Project Area, outside the altitudinal range of its known distribution. Regarding *Lyciasalamandra atifi*, only 4 individuals were recorded during surveys, and all of them were outside of the Study Area. Other amphibian species in and around the Project Area have been assessed as having a wide distribution in general. Observation method and observed stations for amphibians is given in Table IX.14 and fauna sampling points are given in Figure IX.2.

Table IX.14 Observation Method and Observed Stations for Amphibians

Scientific Name	Observation Method	Observed Stations
Lyciasalamandra atifi (Başoğlu, 1967)	L	L
Pelophylax bedriagae (Camerano, 1882)	O+L	All Fauna Sampling Stations
Bufo verrucosissimus Pallas, 1814	O+L	All Fauna Sampling Stations
Bufotes viridis (Laurenti, 1768)	O+L	All Fauna Sampling Stations
Hyla orientalis Bedriaga, 1890	O+L	All Fauna Sampling Stations

** O: Observed, L: Literature*

IX.5.3.2. Reptiles

Field studies conducted in areas within the project application area and ecological impact boundaries and interviews with local people were evaluated together with literature data and the reptile species existing in the area were determined. As a result of observations and interviews in the field, 25 species belonging to 14 families from the Testudines and Squamata orders were identified in the Project Area and ecological impact areas. These include two turtle species, 13 lizards and 10 snake species (Annex 10, Table 9.6).

When the distribution of species according to families is analyzed, Colubridae is the most dominant family, represented by 5 species (20.0%), followed by Lacertidae with four species (16.0%), Scincidae with three species (12.0%), and Gekkonidae and Natricidae, each represented by two species (8.0%). The remaining families are each represented by a single species.

Among the reptile species identified within the Project Area and its vicinity, out of the 25 species with a potential distribution in the area, *Testudo graeca* is classified as VU according to IUCN conservation status, 20 species are categorized as LC, and four species have not yet been evaluated (NE).

Testudo graeca, which is considered to be under threat (VU), has a wide distribution in Türkiye. There are also healthy populations in the regions where it is distributed in Türkiye. The category determined for this species was made considering European populations. However, since the threat category has not been determined for Türkiye, this species should be monitored and whether the motorway project will pose any threat to the species and, if so, the measures to eliminate this threat should be determined and implemented by the contractor.

Among the reptile species that are likely to be encountered in the area, two species are listed in Appendix II of the CITES Convention.

All of the reptile species identified in the area are listed under the Bern Convention, with 8 species included in Annex II and 17 species in Annex III.
According to the EU Habitat Directive, 12 of the 25 reptile species identified in and around the Project Area are listed in Annex 10.

Among the reptile species encountered in the area, there are no species listed under CHCD. These species, like other fish species in Türkiye, are considered under protection by the Ministry of Agriculture and Forestry.

Among the 25 reptile species identified in the Project Area and its surrounding environment, there are four endemic lizard species: *Ablepharus anatolicus*, *Anatololacerta İbrahimi*, *Lacerta pamphylica*, and *Blanus aporus*.

Additionally, there are non-endemic species that are considered rare. It was observed that all the reptile species identified along the project route are species with wide distributions. Most of the reptile species in and around the Project Area have been assessed as having a "Low" relative abundance with wide distributions. More details are presented regarding this in section IX.7.

Relative abundance and species presence information regarding amphibians and reptile species is given in Table IX.16. Observation stations and observation method for reptiles is given in Table IX.15.

Table IX.15 Scientific Name, Observation Method, and Observed Stations

Scientific Name	Observation Method	Observed Stations
Testudo graeca Linnaeus, 1758	O+L	All Fauna Sampling Stations
Mauremys rivulata (Valenciennes, 1833)	L	L
Hemidactylus turcicus (Linnaeus, 1758)	L	L
Mediodactylus danilewskii (Satrauch, 1887)	L	L
Laudakia stellio (Linnaeus, 1758)	O+L	All Fauna Sampling Stations
Chamaeleo chamaeleon (Linnaeus, 1758)	O+L	All Fauna Sampling Stations
Pseudopus apodus (Pallas, 1775)	O+L	All Fauna Sampling Stations
Anatololacerta ibrahimi (Eiselt & Schmidtler 1987)	L	L
Lacerta pamphylica Schmidtler, 1975	O+L	All Fauna Sampling Stations
Ophisops elegans Ménétriés, 1832	O+L	All Fauna Sampling Stations
Phoenicolacerta laevis (Gray, 1838)	O+L	All Fauna Sampling Stations
Ablepharus anatolicus Schmidtler, 1997	L	L
Heremites auratus (Linnaeus, 1758)	L	L
Heremites vittatus (Olivier, 1804)	L	L
Blanus aporus Werner, 1898	L	L
Xerotyphlops vermicularis (Merrem, 1820)	L	L
Dolichophis jugularis (Linnaeus, 1758)	L	L
Eirenis modestus Martin, 1838	O+L	All Fauna Sampling Stations
Hemorrhois nummifer (Reuss, 1834)	L	L
Platyceps najadum (Eichwald, 1831)	O+L	All Fauna Sampling Stations
Telescopus fallax (Fleischmann, 1831)	L	L
Natrix natrix (Linnaeus, 1758)	O+L	All Aquatic Sampling Locations
Natrix tessellata (Laurenti, 1768)	L	L
Malpolon insignitus (Geoffroy De St-Hilaire, 1809)	O+L	All Fauna Sampling Stations
Montivipera xanthina (Gray, 1849)	L	L

** O : Observed, L: Literature*

Table IX.16 Relative Abundance and Presence of Species for Reptile and Amphibian Species

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)
Amphibians and Reptiles	*Lyciasalamandra atifi*	Low	N
	Testudo graeca	Moderate	Y
	Lacerta pamphylica	Low	N
	Anatololacerta ibrahimi	Low	N
	Ablepharus anatolicus	Low	N
	Blanus aporus	Low	N
	Other herpetofauna species	Moderate	Y

IX.5.3.3. Birds

The area where the project is located generally consists of agricultural areas and maquis habitats. During the field study conducted in the area, it was determined that bird species that prefer these habitats are dominant. In addition, it has been determined that aquatic habitats in the areas where streams are located in the area are important for semi-aquatic water birds. This depends on what the birds use the area for.

As a result of observations and interviews in the field, it was determined that a total of 124 bird species belonging to 33 families from nine orders live in the Project Area and ecological impact areas (Annex 10, Table 9.7). There are no endemic bird species among the possible bird species identified by field work in the area and mentioned in previous studies, and all of their species have been observed to consist of species that can be considered as widely distributed and cosmopolitan. When looking at the distribution of species, it is observed that 88 species (71.0%) recorded in the field are passerine birds (Passeriformes). The orders that include species migrating by soaring (Accipitriformes, Falconiformes, and Ciconiiformes) consist of 16 species in total, which corresponds to 12.9% of the species count (Figure IX.23).

As a result of bird observations and literature searches along the motorway route, the majority of the species (88 species; 71%) were found to belong to the order Passeriformes followed by Accipitriformes (10 species, 8.1%), Strigiformes (five species, 4.0%), Columbiformes and Falconiformes (four species each, 3.2%), and Cuculiformes (three species, 2.4%).

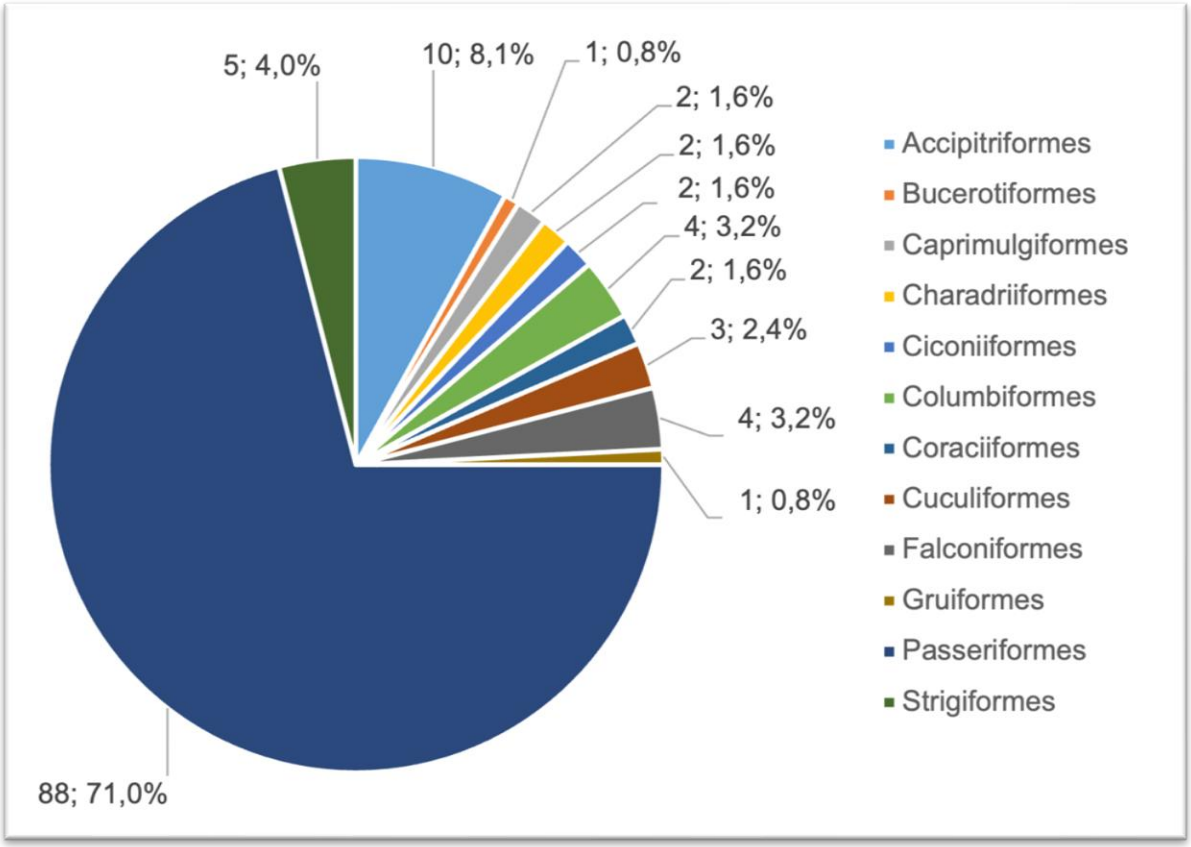

Figure IX.23 Distribution of number of bird species based on orders

When the distribution of species according to families is analyzed, Muscicapidae is the most dominant family, represented by 14 species (11.3%), followed by Motacillidae (11 species, 8.9%), Accipitridae (nine species, 7.3%), Sylviidae and Fringillidae (eight species each, 6.5%), Acrocephalidae (seven species, 5.6%), and Emberizidae, Hirundinidae, and Strigidae (five species each, 4.0%)

Photographs of some of the bird species observed during the monitoring studies carried out in the Project Area and its immediate surroundings and as a result of the monitoring studies carried out in the area and its surroundings in the past are given in Annex-10. The table regarding the bird species found and likely to be found in the Project Area and its immediate surroundings, along with their conservation status is presented in Annex-10.

Among the 124 bird species recorded in the Project Area and its surroundings, their IUCN conservation statuses are as follows: 1 species classified as Endangered (EN) (*Neophron percnopterus*), 1 species classified as Vulnerable (VU) (*Streptopelia turtur*), 1 species classified as Near Threatened (NT) (*Circus macrourus*), 1 species classified as Not Evaluated (NE) (*Corvus cornix*) and the remaining 120 species fall under the Least Concern (LC) category.

Considering the presence of *Streptopelia turtur* and *Neophron percnopterus*, which are listed in threatened categories, it has been determined that the Project Area does not serve as a critical site for breeding, feeding, or wintering for these species.

In the evaluation made according to the 2008 Red List for Birds of Türkiye (=RDB), 15 species among the bird species determined to be distributed in the plantation area and areas within its impact area are A1.2; 37 species A.2; 38 species A.3; 16 species A.3.1; 5 species A.4; 6 species A.5; two species A.6; one species A.7; one species B.1.2, two species falls into the B.3 category and one species falls into the B.6 category.

Among the birds that are likely to be encountered in the area, it has been determined that two species are listed in Annex I, 18 species are listed in Annex-II and one species is listed in Annex-III within the scope of the CITES agreement.

Among the 124 species identified in the Project Area and its immediate surroundings, there are no species listed according to the Bern Convention. Of the bird species identified in the area, 81 are listed in Annex-II and 40 in Annex III, within the scope of the Bern Convention.

According to the EU bird directive, among the 124 bird species identified in and around the Project Area, 18 species are listed in Annex I, two species in Annex II/A, and six species in Annex II/B. Among the bird species that are likely to be encountered in the area, 16 species are listed in Annex-I (Game Animals Protected by CHCD) and six bird species are listed in Annex-II (Species Allowed to Hunt in Certain Periods).

According to the occurrence of 124 bird species listed in Türkiye in Annex 10 - Table 9.7; 38 species are classified as native (N), 21 species as winter visitors (WV), 28 species as summer visitors (SV) and 37 species as transit migrants (T).

Based on literature reviews and field studies, none of the 124 bird species identified in the Project Area and its surroundings are endemic. Additionally, no non-endemic but rare bird species were recorded. The majority of the species identified consist of widely distributed cosmopolitan species. Observation method for birds is given in Table IX.17

Table IX.17 Scientific Name and Type of Detection for Birds

Scientific Name	Common Name	Type of Detection
Accipitridae		
Accipiter nisus (Linnaeus, 1758)	Eurasian Sparrowhawk	O+L
Aquila chrysaetos (Linnaeus, 1758)	Golden Eagle	L
Buteo buteo (Linnaeus, 1758)	Eurasian Buzzard	O+L
Buteo rufinus (Cretzschmar, 1827)	Long-Legged Buzzard	O+L
Circaetus gallicus (Gmelin, 1788)	Short-Toed Snake-Eagle	O+L
Circus aeruginosus (Linnaeus, 1758)	Western Marsh-Harrier	O+L
Circus cyaneus (Linnaeus, 1766)	Hen Harrier	L
Circus macrourus (Gmelin, 1770)	Pallid Harrier	L
Neophron percnopterus (Linnaeus, 1758)	Egyptian Vulture	L
Pandionidae		
Pandion haliaetus (Linnaeus, 1758)	Osprey	L
Scolopacidae		
Actitis hypoleucos Linnaeus, 1758	Common Sandpiper	O+L

Tringa glareola Linnaeus, 1758	Wood Sandpiper	O+L
Upupidae		
Upupa epops Linnaeus, 1758	Common Hoopoe	O+L
Apodidae		
Apus apus (Linnaeus, 1758)	Common Swift	O+L
Tachymarptis melba (Linnaeus, 1758)	Alpine Swift	O+L
Ciconiidae		
Ciconia ciconia (Linnaeus, 1758)	White Stork	O+L
Ciconia nigra (Linnaeus, 1758)	Black Stork	L
Columbidae		
Columba livia Gmelin, 1789	Rock Dove	O+L
Spilopelia senegalensis (Linnaeus, 1766)	Laughing Dove	O+L
Streptopelia decaocto FrivaULszky, 1838	Eurasian Collared-Dove	O+L
Streptopelia turtur (Linnaeus, 1758)	European Turtle-Dove	O+L
Alcedinidae		
Alcedo atthis (Linnaeus, 1758)	Common Kingfisher	O+L
Coraciidae		
Coracias garrulus Linnaeus, 1758	European Roller	O+L
Cuculidae		
Clamator glandarius (Linnaeus, 1758)	Great Spotted Cuckoo	O+L
Cuculus canorus Linnaeus, 1758	Common Cuckoo	L
Meropidae		
Merops apiaster Linnaeus, 1758	European Bee-Eater	O+L
Falconidae		
Falco columbarius Linnaeus, 1758	Merlin	L
Falco peregrinus Tunstall, 1771	Peregrine Falcon	L
Falco subbuteo Linnaeus, 1758	Eurasian Hobby	L
Falco tinnunculus Linnaeus, 1758	Common Kestrel	O+L
Rallidae		
Gallinula chloropus (Linnaeus, 1758)	Common Moorhen	O+L
Acrocephalidae		
Acrocephalus arundinaceus (Temminck & Schlegel, 1847)	Great Reed-Warbler	O+L
Acrocephalus melanopogon (Temminck, 1823)	Moustached Warbler	L
Acrocephalus palustris (Bechstein, 1798)	Marsh Warbler	L
Acrocephalus schoenobaenus (Linnaeus, 1758)	Sedge Warbler	L
Acrocephalus scirpaceus (Hermann, 1804)	Common Reed-Warbler	O+L

Hippolais icterina (Vieillot, 1817)	Icterine Warbler	L
Iduna pallida (Ehrenberg, 1833)	Olivaceous Warbler	O+L
Alaudidae		
Calandrella brachydactyla (Leisler, 1814)	Greater Short-Toed Lark	O+L
Galerida cristata (Linnaeus, 1758)	Crested Lark	O+L
Lullula arborea (Linnaeus, 1758)	Woodlark	L
Melanocorypha calandra (Linnaeus, 1766)	Calandra Lark	O+L
Corvidae		
Corvus corax Linnaeus, 1758	Common Raven	O+L
Corvus cornix Linnaeus, 1758	Hooded Crow	O+L
Garrulus glandarius (Linnaeus, 1758)	Eurasian Jay	O+L
Emberizidae		
Emberiza caesia Cretzschmar, 1828	Cretzschmar's Bunting	L
Emberiza calandra Linnaeus, 1758	Corn Bunting	O+L
Emberiza cia Linnaeus, 1766	Rock Bunting	L
Emberiza hortulana Linnaeus, 1758	Ortolan Bunting	L
Emberiza melanocephala Scopoli, 1769	Black-Headed Bunting	L
Fringillidae		
Carduelis carduelis (Linnaeus, 1758)	European Goldfinch	O+L
Chloris chloris (Linnaeus, 1758)	European Greenfinch	O+L
Coccothraustes coccothraustes (Linnaeus, 1758)	Hawfinch	L
Fringilla coelebs Linnaeus, 1758	Common Chaffinch	O+L
Fringilla montifringilla Linnaeus, 1758	Brambling	L
Linaria cannabina (Linnaeus, 1758)	Common Linnet	L
Serinus serinus (Linnaeus, 1766)	European Serin	O+L
Serinus spinus (Linnaeus, 1758)	Eurasian Siskin	L
Hirundinidae		
Cecropis daurica Linnaeus, 1771	Red-Rumped Swallow	O+L
Delichon urbicum (Linnaeus, 1758)	Northern House Martin	O+L
Hirundo rustica Linnaeus, 1758	Barn Swallow	O+L
Riparia riparia Linnaeus, 1758	Collared Sand Martin	O+L
Ptyonoprogne rupestris Scopoli, 1769	Eurasian Crag Martin	L
Laniidae		
Lanius collurio Linnaeus, 1758	Red-Backed Shrike	O+L
Lanius minor Gmelin, 1788	Lesser Grey Shrike	L
Lanius nubicus Lichtenstein, 1823	Masked Shrike	O+L

Lanius senator Linnaeus, 1758	Woodchat Shrike	O+L
Locustellidae		
Locustella fluviatilis (Wolf, 1810)	River Warbler	L
Locustella luscinioides (Savi, 1824)	Savi's Warbler	L
Locustella naevia (Boddaert, 1783)	Common Grasshopper-Warbler	L
Motacillidae		
Motacilla alba Linnaeus, 1758	White Wagtail	O+L
Motacilla cinerea Tunstall, 1771	Grey Wagtail	L
Motacilla citreola Pallas, 1776	Citrine Wagtail	L
Motacilla flava Linnaeus, 1758	Western Yellow Wagtail	O+L
Anthus campestris Linnaeus, 1758	Tawny Pipit	L
Anthus cervinus Pallas, 1811	Red-Throated Pipit	L
Anthus godlewskii Taczanowski, 1876	Blyth`S Pipit	L
Anthus pratensis Linnaeus, 1758	Meadow Pipit	L
Anthus richardi Vieillot, 1818	Richard's Pipit	L
Anthus spinoletta Linnaeus, 1758	Water Pipit	L
Anthus trivialis Linnaeus, 1758	Tree Pipit	L
Muscicapidae		
Luscinia luscinia (Linnaeus, 1758)	Thrush Nightingale	L
Luscinia megarhynchos (Brehm, 1831)	Common Nightingale	O+L
Luscinia svecica (Linnaeus, 1758)	Bluethroat	L
Monticola saxatilis (Linnaeus, 1776)	Rufous-Tailed Rock-Thrush	L
Monticola solitarius (Linnaeus, 1758)	Blue Rock-Thrush	L
Oenanthe deserti (Temminck, 1825)	Desert Wheatear	L
Oenanthe finschii (Heuglin, 1869)	Finsch's Wheatear	L
Oenanthe hispanica (Linnaeus, 1758)	Black-Eared Wheatear	O+L
Oenanthe isabellina (Temminck, 1829)	Isabelline Wheatear	O+L
Oenanthe oenanthe (Linnaeus, 1758)	Northern Wheatear	O+L
Phoenicurus ochruros (Gmelin, 1774)	Black Redstart	O+L
Phoenicurus phoenicurus (Linnaeus, 1758)	Common Redstart	L
Saxicola rubetra (Linnaeus, 1758)	Whinchat	L
Saxicola torquatus (Linnaeus, 1766)	Common Stonechat	O+L
Paridae		
Cyanistes caeruleus (Linnaeus, 1758)	Eurasian Blue Tit	L
Parus major Linnaeus, 1758	Great Tit	O+L
Periparus ater (Linnaeus, 1758)	Coal Tit	O+L

Passeridae		
Passer domesticus (Linnaeus, 1758)	House Sparrow	O+L
Passer hispaniolensis (Temminck, 1820)	Spanish Sparrow	L
Passer montanus (Linnaeus, 1758)	Eurasian Tree Sparrow	L
Phylloscopidae		
Phylloscopus collybita (Vieillot, 1817)	Common Chiffchaff	O+L
Phylloscopus orientalis (Brehm, 1855)	Eastern Bonelli's Warbler	L
Phylloscopus sibilatrix (Bechstein, 1793)	Wood Warbler	L
Phylloscopus trochilus (Linnaeus, 1758)	Willow Warbler	O+L
Pycnonotidae		
Pycnonotus xanthopygos (Ehrenberg, 1833)	White-Spectacled Bulbul	O+L
Sittidae		
Sitta neumayer Michahelles, 1830	Western Rock Nuthatch	O+L
Scotocercidae		
Cettia cetti (Temminck, 1820)	Cetti's Warbler	O+L
Sturnidae		
Sturnus vulgaris Linnaeus, 1758	Common Starling	O+L
Sylviidae		
Curruca cantillans (Pallas, 1764)	Subalpine Warbler	L
Curruca communis Latham, 1787	Common Whitethroat	O+L
Curruca crassirostris (Gmelin, 1789)	Eastern Orphean warbler	L
Curruca curruca (Linnaeus, 1758)	Lesser Whitethroat	O+L
Curruca melanocephala (Gmelin, 1789)	Sardinian Warbler	O+L
Curruca nisoria (Bechstein, 1795)	Barred Warbler	O+L
Sylvia atricapilla (Linnaeus, 1758)	Eurasian Blackcap	O+L
Sylvia borin (Boddaert, 1783)	Garden Warbler	L
Turdidae		
Turdus merula Linnaeus, 1758	Eurasian Blackbird	O+L
Turdus philomelos Brehm, 1831	Song Thrush	L
Strigidae		
Athene noctua (Scopoli, 1769)	Little Owl	O+L
Asio otus (Linnaeus, 1758)	Northern Long-Eared Owl	L
Otus scops (Linnaeus, 1758)	Eurasian Scops-Owl	L
Strix aluco Linnaeus, 1758	Tawny Owl	L
Tyto alba (Scopoli, 1769)	Common Barn-Owl	L

** O: Observed, L: Literature*

Among the bird species detected in the Project Area and its immediate surroundings, those that are found to have a natural distribution within the Project Area are endemic, rare or endangered according to IUCN (CR: Critical; EN: Endangered; VU: Vulnerable), When considering a species included in the Bern and CITES conventions and Habitat Directive, monitoring of *Streptopelia turtur* (VU) and *Neophron percnopterus* (EN) is recommended. It is essential to assess the population status of these species in the Project Area, along with factors such as habitat use, feeding, and other bioecological characteristics, to evaluate the potential impacts of the Project activities. Birds in and around the Project Area populations have been assessed as “Low” and “Moderate” on a species base. Relative abundance and presence of species for birds is given in Table IX.18

Table IX.18 Relative Abundance and Presence of Species for Birds

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)
Birds	*Neophron percnopterus*	Low	N
	Streptopelia turtur	Low	Y
	Accipiter nisus	Low	Y
	Aquila chrysaetos	Low	N
	Buteo buteo	Low	Y
	Buteo rufinus	Low	Y
	Circaetus gallicus	Low	Y
	Circus aeruginosus	Low	Y
	Circus cyaneus	Low	N
	Circus macrourus	Low	N
	Ciconia ciconia	Low	Y
	Ciconia nigra	Low	N
	Falco columbarius	Low	N
	Falco peregrinus	Low	N
	Falco subbuteo	Low	N
	Falco tinnunculus	Low	Y
	Other bird species	Moderate	Y

Transition Routes within the Project Area and Its Surroundings

Ornithological monitoring studies conducted in the Project Area and its immediate surroundings, along with previous monitoring studies in nearby areas and literature reviews, have identified that migratory species such as the White Stork (*Ciconia ciconia*), Black Stork (*Ciconia nigra*), and Egyptian Vulture (*Neophron percnopterus*) pass over the region during migration periods. Both the bird migration route map and field observations have determined that the region is not located on any significant bird migration route (Figure IX.24).

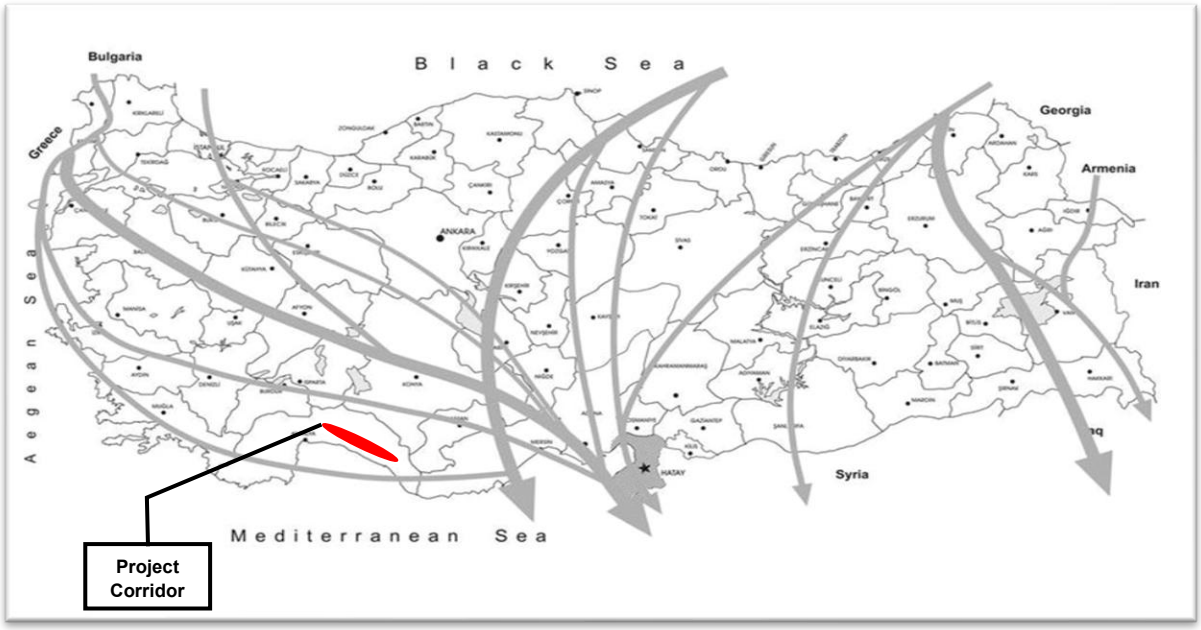

Figure IX.24 Bird migration routes map of Türkiye

IX.5.3.4. Mammals

While creating a table of mammal species found in the area, the existing fauna along with the natural ecosystem features of the area are listed. Because vertebrate animals, thanks to their ability to move, can occasionally enter and exit areas that have acquired anthropogenic characteristics, and even adapt. The Project Area and its surroundings are covered with steppe vegetation. Considering its zoogeographical location and habitat characteristics, the area hosts large mammal species in addition to common rodent species. It has been observed that the Project Area is not suitable for nesting and breeding of large mammal species due to its proximity to agricultural lands and anthropogenic activities.

As a result of observations and interviews in the field, it was determined that there was a possibility of a total of 46 mammal species belonging to 17 families from five orders in the Project Area and ecological impact areas. The table of mammal species found and likely to be found in the Project Area and its immediate surroundings, along with their conservation status, is presented in Annex 10, Table 9.8.

As a result of mammal observations and literature searches along the Motorway route, nearly half of the species (20 species; 43.5%) of the identified species belong to the order Chiroptera (bats), followed by Rodentia (12 species; 26.1%), Carnivora (nine species; 19.6%), Cetartiodactyla and Eulipotyphla (two species each; 4.3%), and Lagomorpha, represented by a single species (Figure IX.25).

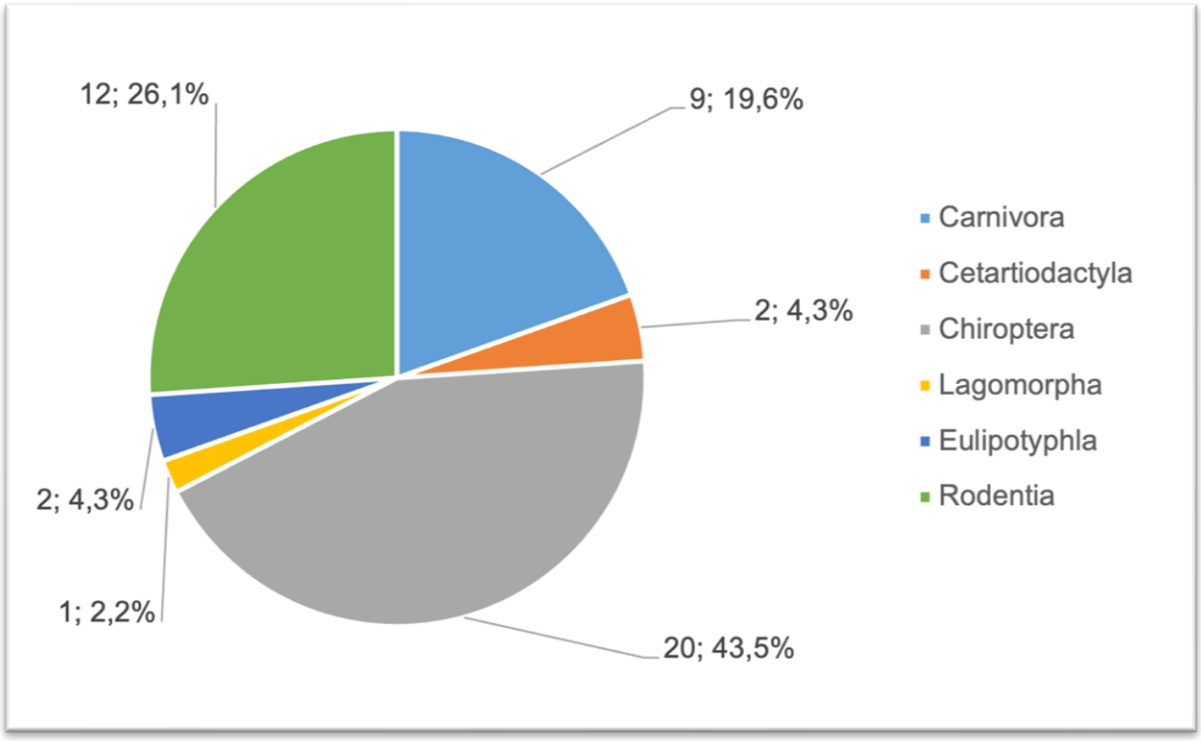

Figure IX.25 Distribution of number of mammal species based on orders

When the distribution of species according to families is examined, Vespertilionidae is the most dominant family with 13 species (28.3%), followed by Muridae (six species; 13.0%), Rhinolophidae and Mustelidae (five species each; 10.9%), Canidae (three species; 6.3%), and Sciuridae and Cricetidae (two species each; 4.3%). The remaining 10 families are represented by one species each.

Photographs of some of the mammal species observed during the monitoring studies carried out in and around the Project Area and as a result of the monitoring studies carried out in and around the site in the past are given in Annex 10.

Field surveys for bats should focus on caves, tree hollows, abandoned buildings, and agricultural structures near the Project Area, as these sites may serve as potential roosting locations for bats.To assess bat diversity, detectors (batcorder) were deployed at night along the motorway route, and the recorded bat calls were analyzed. Some bat calls in the phylogenetic tree analysis lacked sufficient distinguishing characteristics, preventing species-level identification. However, frequency analysis confirmed the presence of three bat species in the area: *Pipistrellus kuhlii*, *Pipistrellus pipistrellus*, and *Rhinolophus ferrumequinum*.

Among the 46 mammal species with potential distribution in the area, according to IUCN conservation statuses, two species are classified as VU (*Rhinolophus mehelyi* and *Myotis capaccinii*), four species as NT, two species as DD, one species as NE, and the remaining 37 species are classified as LC. Considering the identified species, it has been determined that the area is not used specifically by mammal species to meet their biological needs such as breeding, feeding, or wintering.

Among the mammal species that are likely to be encountered in the area, 30 species are included in the Bern Convention lists. Of these, 24 species are listed in Appendix II and six species are listed in Appendix III.

According to the EU Habitat Directive, 11 of the 46 mammal species identified in the Project Area and its immediate vicinity are listed in Appendix II. Among those listed in Appendix II, 10 species are also listed in Appendix IV, and one species is listed in Appendix V. Additionally, 13 species are listed in Appendix IV, and one species is listed in Appendix V.

Among the mammal species that are likely to be encountered in the area, according to CHCD, two species are listed in Annex-I (Game Animals Protected by CHCD) and 8 species are listed in Annex-II (Species Allowed to Hunt in Certain Periods).

The field survey conducted in the area identified mammal species with potential distributions previously reported in the literature; however, no endemic species were recorded. Nevertheless, *Capra aegagrus*, a non-endemic but rare species, was documented in the region. Given that this species primarily inhabits rocky terrains, its occurrence within the study area is considered incidental, with only occasional sightings. The relative abundance for mammal species except for bats is assessed as “Moderate”, which roughly estimates as 20-100 individuals. More details regarding this can be found in section IX.7. Observed sampling points and observation method for mammals is given in Table IX.19, fauna sampling points are given in Figure IX.2.

Table IX.19 Observation Method, and Species Presence in Sampling Points for Mammals

Scientific Name	Observation Method	Species Presence in Sampling Points
Canis Aureus Linnaeus, 1758	O+L	All Fauna Sampling Points
Canis Lupus Linnaeus, 1758	L	L
Vulpes Vulpes (Linnaeus, 1758)	O+L	All Fauna Sampling Points
Caracal Caracal (Schreber, 1776)	O+L	All Fauna Sampling Points
Felis Silvestris Schreber, 1777	O+L	All Fauna Sampling Points
Lynx Lynx (Linnaeus, 1758)	O+L	4, 9
Lutra Lutra (Linnaeus, 1758)	L	L
Martes Foina (Erxleben, 1777)	O+L	2, 8, 13
Martes Martes (Linnaeus, 1758)	L	L
Meles Meles (Linnaeus, 1758)	L	L
Mustela Nivalis Linnaeus, 1758	L	L
Capra Aegagrus Erxleben, 1777	O+L	7
Sus Scrofa Linnaeus, 1758	O+L	All Fauna Sampling Points
Tadarida Teniotis (Rafinesque, 1814)	O+L	All Fauna Sampling Points
Rousettus Aegyptiacus (E. Geoffroy, 1810)	O+L	All Fauna Sampling Points
Rhinolophus Blasii Peters, 1867	L	L
Rhinolophus Euryale Blasius, 1853	L	L
Rhinolophus Ferrumequinum (Schreber, 1774)	L	L
Rhinolophus Hipposideros (Bechstein, 1800)	L	L
Rhinolophus Mehelyi Matschie, 1901	L	L
Eptesicus Anatolicus Felten, 1971	L	L

Eptesicus Serotinus Schreber, 1774	L	L
Myotis Blythii (Tomes, 1857)	L	L
Myotis Capaccinii (Bonaparte, 1837)	L	L
Myotis Davidi (Peters, 1869)	L	L
Myotis Emarginatus (É. Geoffroy, 1806)	L	L
Myotis Hoveli Harrison, 1964	L	L
Myotis Myotis (Borkhausen, 1759)	L	L
Myotis Nattereri (Kuhl, 1817)	L	L
Pipistrellus Pipistrellus (Schreber, 1774)	L	L
Pipistrellus Kuhlii (Kuhl, 1817)	L	L
Pipistrellus Nathusii (Keyserling & Blasius, 1839)	L	L
Plecotus Kolombatovici Dulic, 1980	L	L
Erinaceus Concolor Martin, 1837	O+L	All Fauna Sampling Points
Neomys Milleri Mottaz, 1907	O+L	All Fauna Sampling Points
Lepus Europaeus Pallas, 1778	O+L	All Fauna Sampling Points
Microtus Anatolicus Krystufek & Kefioglu, 2002	L	L
Microtus Guentheri (Danford & Alston, 1880)	L	L
Hystrix Indica Kerr, 1792	O+L	All Fauna Sampling Points
Apodemus Mystacinus (Danford & Alston, 1877)	L	L
Apodemus Witherbyi (Thomas, 1902)	L	L
Mus Macedonicus Petrov & Ruzic, 1983	L	L
Mus Musculus Linnaeus, 1758	L	L
Rattus Norvegicus (Berkenhout, 1769)	L	L
Rattus Rattus (Linnaeus, 1758)	L	L
Sciurus Anomalus Gmelin, 1778	O+L	All Fauna Sampling Points
Nannospalax Xanthodon (Nordman, 1840)	O+L	5, 8, 21, 24

** O: Observation, L:Literature*

Table IX.20 Relative Abundance and Presence of Species for Mammals (Bats)

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)
Mammals (Bats)	*Myotis capaccinii*	Low	N
	Rhinolophus mehelyi	Low	N
	Other bat species	Moderate	Y

IX.5.3.5. Terrestrial Invertebrate

A comprehensive terrestrial invertebrate desk study has been conducted for the Project area, drawing on up-to-date national and international databases, peer-reviewed literature, and relevant grey

literature sources. The assessment identified a total of 139 species that are potentially present within the Project's impact area. Among these, two species, *Onychogomphus assimilis* and *Brachythemis fuscopalliata*, are classified as Vulnerable (VU) on the IUCN Red List, with *Brachythemis fuscopalliata* also listed in Annex II of the Bern Convention, highlighting its international conservation importance. The taxonomic composition of the species indicates that Lepidoptera dominate the assemblage, with 102 species recorded, followed by Odonata with 33 species and Diptera with three species.

The prominence of Odonata is particularly significant, as species in this order are widely recognized as reliable indicators of wetland habitat quality and hydrological integrity. These findings suggest that wetland and riparian habitats along the Motorway route support a sensitive and functionally important invertebrate community. The presence of conservation-listed species and the high proportion of wetland indicator taxa underscore the need for targeted avoidance, minimization, and habitat management measures during construction, including preservation of riparian buffers, careful planning of watercourse crossings.

In the study, due to a lack of habitat suitability for two "VU" species, it was determined that there's no need for terrestrial invertebrate monitoring.

IX.5.4. Aquatic Environment

During habitat assessments, parameters such as existing cover, burial characteristics of ground stones, substrate characteristics of standing water environments, flow velocity, depth, structure of standing water environments, sedimentation, bottom cover of streams/creeks, variability of the river bottom, geomorphological condition of the river bottom, stability of the river banks and vegetation cover of the river banks will be considered. After all field studies are completed, aquatic habitat assessment will be carried out with the data obtained.

Freshwater Algae

Algae communities generally have relatively rich species diversity compared to other aquatic groups. Each species has its unique tolerance and preferences for environmental factors. Thus, the whole association offers a wealth of information for environmental indicators.

As a result of the literature studies and field observation studies, it was determined that there was no need for a sampling study for the detection of algae.

Zooplanktonic Organisms

Zooplanktonic organisms are mostly displaced by the movement of water and live in stagnant water habitats. Their availability in fast flowing parts of streams is very limited. However, in some groups, they can be seen as psammophiles, that is, as species that can live under stones in fast-flowing streams. Species belonging to the Rotifera group often utilize rocky substrates, which help mitigate the adverse effects of current velocity.

Zooplanktonic organisms, like phytoplankton, prefer stagnant environments with little flow. Zooplanktonic organisms must be fed with phytoplanktonic organisms in order to continue their development. Therefore, they prefer areas where this nutrient is abundant and other physical and chemical factors are optimum for them. Rivers and streams are not suitable habitats for these organisms. In these areas, the phytoplanktonic organisms they use as food are low, and the river current is an important limiting factor. Due to their very small size, they can easily be dragged to death. For this reason, it was determined that there is no need for sampling of zooplankton.

Benthic Invertebrates

Benthic organisms are among the preferred groups in biological monitoring studies due to their stated characteristics (Rosenberg and Resh, 1992). Some of the reasons benthic organisms are preferred in such a study are as follows.

- Although there are many different environments in aquatic systems, they have adapted to every environment.
- A wide variety of species groups respond across a broad spectrum, depending on the severity of environmental pressure.
- It generally depends on the areas where it is located. They cannot escape from environmental change and polluting effects.

Literature studies suggest that benthic organisms are important in determining pollution in aquatic environments. In the field study, it was determined that there is no need for benthic invertebrates monitoring.

Fishes

Throughout the route of the Motorway route, there are temporary or permanent streams. These streams originate from the Taurus Mountains and flow into the Mediterranean. Due to the route's proximity to the sea, both freshwater and marine fish are present in these streams. In a study by Küçük and İkiz (2004) on the fish fauna of streams flowing into the Antalya Gulf, 24 species from 12

families were reported. Some of these species were recorded from streams outside the Motorway route.

In a study conducted by İnnal (2012) in the lower reaches of the Köprüçay River, 23 species were identified, with half of them being marine fish. Küçük&Friends (2020) reported 20 taxa from nine families in the Manavgat River as part of a study examining changes in the fish fauna over a 25-year period from 1995 to 2020. "Field surveys identified 20 species from seven families. Thus, based on both literature data and fieldwork, information on 30 fish species from 10 orders and 16 families identified in the Project Area is provided in Table 9.3 in Annex 10.

In the field studies conducted for the project, 29 species from seven families were identified. Based on field studies and literature reviews of aquatic ecosystems along the motorway route, it has been determined that half of the identified species (14 species, 48.3%) belong to the Cypriniformes order, followed by Mugiliformes with 13.8% (four species), and Salmoniformes and Cyprinodontiformes with 6.7% each (two species). The remaining orders are represented by a single species each (Figure IX.26).

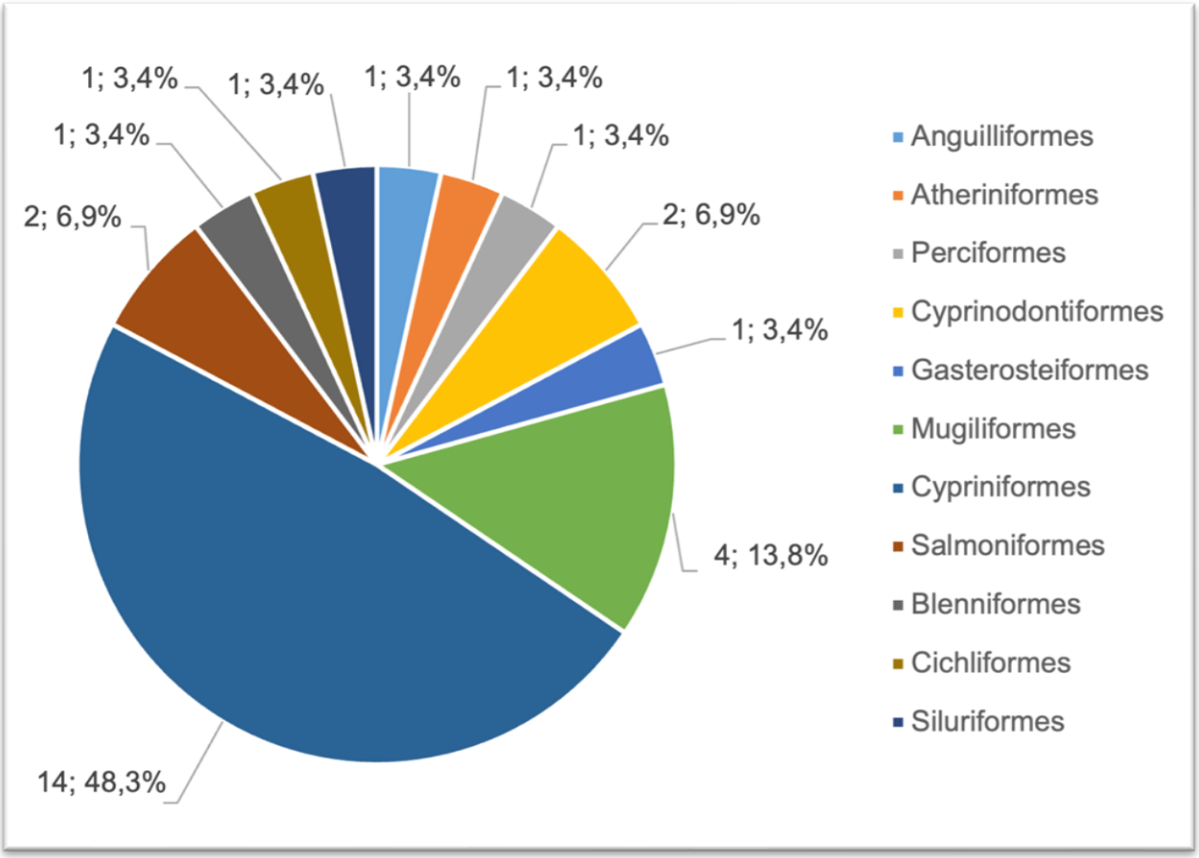

Figure IX.26 Distribution of Number of Fish Species based on Orders

When examining the distribution of species by family, Leuciscidae is the most dominant family with seven species (24.1%), followed by Cyprinidae and Mugilidae, each with four species (13.8%). The Salmonidae family has two species (6.9%). The remaining families are each represented by one species. Photographs of the species encountered during field studies are presented in Annex 10. The locations of the fish observation stations determined during aquatic ecosystem sampling studies are presented in Table 9.4 in Annex 10.

Photographs of some of the identified fish species observed during the monitoring studies carried out in and around the Project Area are given in Annex 10.

According to IUCN criteria, there are six species that are endangered or near-threatened (CR:Critical; EN: Endangered; VU: Vulnerable). Among the 29 species, *Anguilla anguilla* is listed in Appendix II of the CITES Convention, whereas no species have been recorded in the additional appendices of the Bern Convention in relation to the Project Area..

The *Anguilla anguilla* (CR), which is considered endangered, is an anadromous species and grows and develops in streams and reproduces in Sargossa Bay. Project activities are not expected to have any impact on this species. *Cyprinus carpio* (VU), which is considered to be under threat, was evaluated by IUCN considering the European populations. The species in question is used for fish farming in many aquatic ecosystems in Türkiye and is one of the most commercially caught species. For this reason, it is not recommended to monitor both species.

According to the CITES Convention, among the fish species identified in the Project Area and its immediate surroundings, only *Anguilla anguilla* is listed in Appendix II.

Among the 29 fish species identified in the Project Area and its immediate surroundings, none are listed under the Bern Convention.

According to the Habitats Directive, none of the fish species identified in the Project Area and its immediate surroundings are listed.

Among the fish species encountered in the area, there are species listed under the Central Hunting Commission Decisions (CHCD). These species, like other fish species in the country, are considered to be under protection by the Ministry of Agriculture and Forestry.

There are 11 endemic species among the fish species identified in the Project Area and its immediate surroundings. These species are distributed in the rivers in the Project Area as well as in regions outside this area. In addition, some species (*Salmo ekmekciae*) are distributed in certain sections of the stream, not in the entire stream. 29 fish species are listed in the list created based on literature and field work. For this reason, it is not possible for all species to be distributed in the Project Area. Among these species, there are no local endemic species that are distributed only in the Project Area.

As a result of the field studies, considering the species in both endemic and threatened categories, it has been observed that the area where activities will be carried out within the scope of the Project Area and determined as the impact area does not exhibit an essential and critical habitat feature for the species in question.

However, it was concluded that it is necessary to monitor endemic species declared to be endangered during the construction of the Project. For this reason, the existence and population status of three species, namely *Capoeta antalyensis* (VU), *Alburnus baliki* (EN) and *Pseudophoxinus fahrettini* (EN), should be monitored once a month with field work between May and August.

Species observation location for fishes is given in Table IX.21 and locations for stations is given in Figure IX.1. While relative abundance and species presence is given in Table IX.22.

Table IX.21 Species Observation Stations and Type of Detection for Fishes

Scientific Name	Type of Detection	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Anguilla anguilla	O+L	-	+	-	-	-	-	-	-	+	-	+	+	+	+
Cobitis battalgilae	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxynoemacheilus eregliensis	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carassius gibelio	O+L	-	-	-	-	-	-	-	-	+	-	+	+	+	+
Cyprinus carpio	O+L	-	-	-	-	-	-	-	-	+	-	+	+	+	+
Capoeta antalyensis	O+L	-	+	-	-	-	-	-	-	+	-	-	-	-	-
Capoeta caelestis	O+L	-	-	-	-	-	-	-	-	+	-	+	+	+	+
Pseudorasbora parva	O+L	-	+	-	-	-	-	-	-	+	-	-	-	-	-
Alburnus baliki	O+L	-	+	-	-	-	-	-	-	+	-	-	-	-	-
Alburnus escherichii	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pseudophoxinus battalgilae	O+L	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Pseudophoxinus fahrettini	O+L	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Squalius anatolicus	L	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Squalius fellowesii	O+L	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Vimba vimba	O+L	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Clarias gariepinus	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oncorhynchus mykiss	O+L	-	+	-	-	-	-	-	-	+	-	-	+	+	-
Salmo ekmekciae	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oreochromis aureus	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atherina boyeri	O+L	-	+	-	-	-	-	-	-	+	-	+	+	+	+
Gambusia holbrooki	O+L	-	+	-	-	-	-	-	-	+	-	+	+	+	+
Aphanius mento	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelon auratus	O+L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelon labrosus	O+L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelon ramada	O+L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelon auratus	O+L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salaria fluviatilis	O+L	-	+	-	-	-	-	-	-	+	-	-	+	+	-
Gasterosteus aculeatus	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dicentrarchus labrax	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* O: Observation, L:Literature

Table IX.22 Relative Abundance and Presence of Species for Fishes

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)
Fishes	*Anguilla anguilla*	Moderate	Y
	Alburnus baliki	Moderate	Y
	Capoeta antalyensis	Moderate	N
	Pseudophoxinus fahrettini	Moderate	Y
	Pseudophoxinus battalgilae	Moderate	Y
	Cyprinus carpio	Moderate	Y
	Capoeta caelestis	Moderate	Y
	Cobitis battalgilae	Low	N
	Oxynoemacheilus eregliensis	Low	Y
	Alburnus escherichii	Low	N
	Squalius anatolicus	Moderate	N
	Squalius fellowesii	Moderate	Y
	Salmo ekmekciae	Low	N
	Other fish species	Moderate	Y

Locations regarding sensitive biodiversity has been presented in Figure IX.27, Figure IX.28, Figure IX.29, Figure IX.30, and Figure IX.31.**Error! Reference source not found.**

IX.5.5. Locations of Sensitive Biodiversity Flora-Fauna

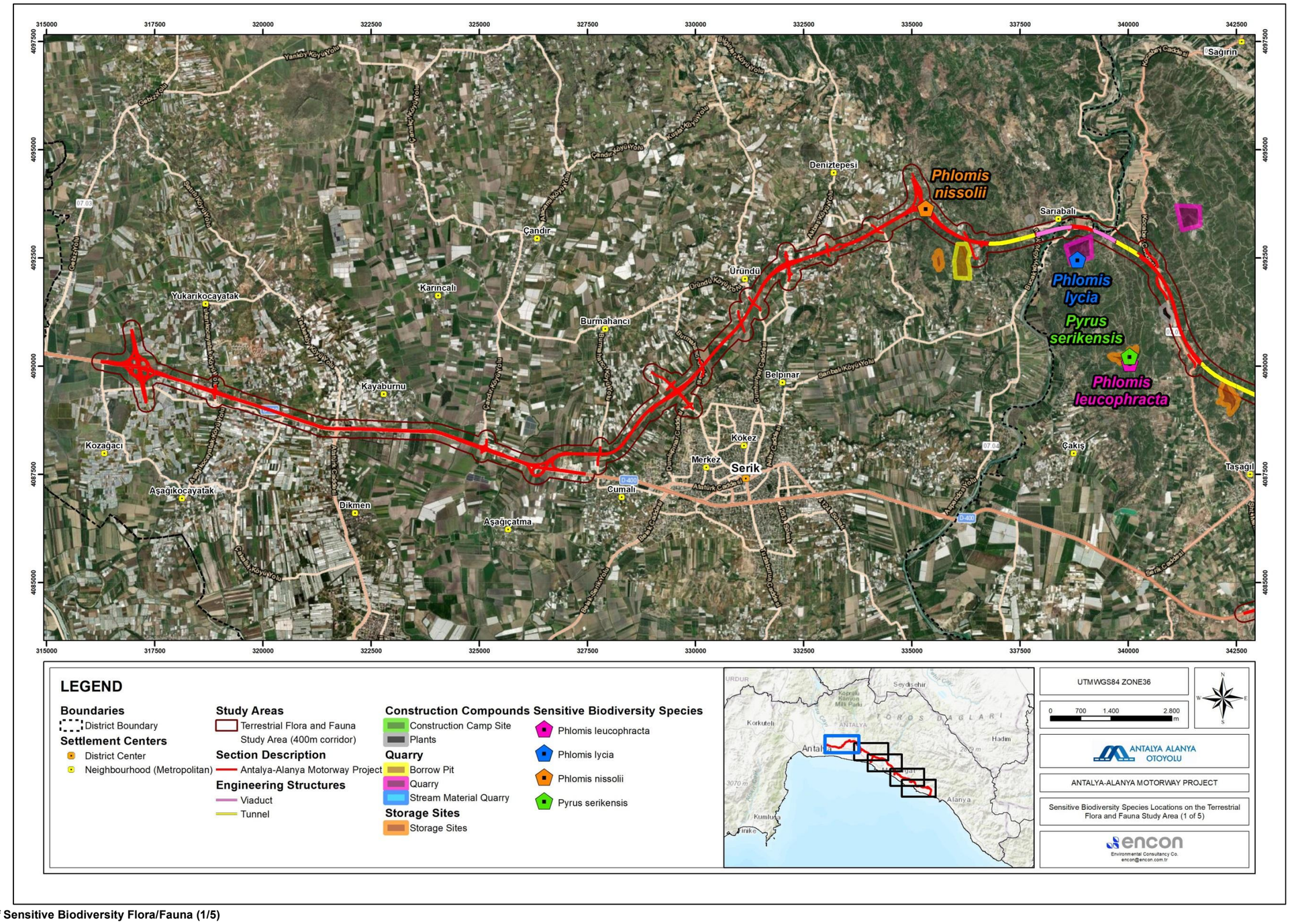

Figure IX.27 Locations of Sensitive Biodiversity Flora/Fauna (1/5)

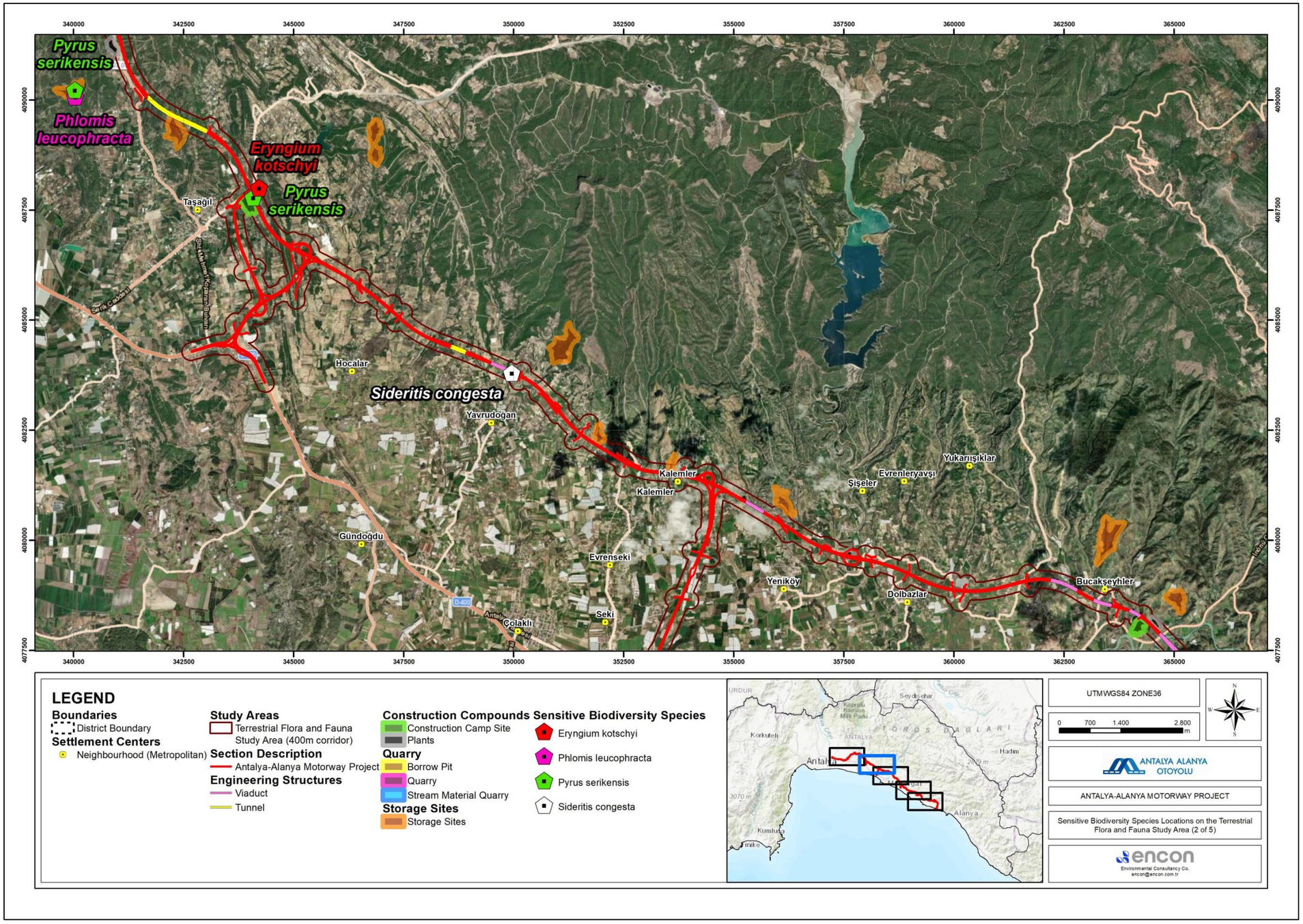

Figure IX.28 Locations of Sensitive Biodiversity Flora/Fauna (2/5)

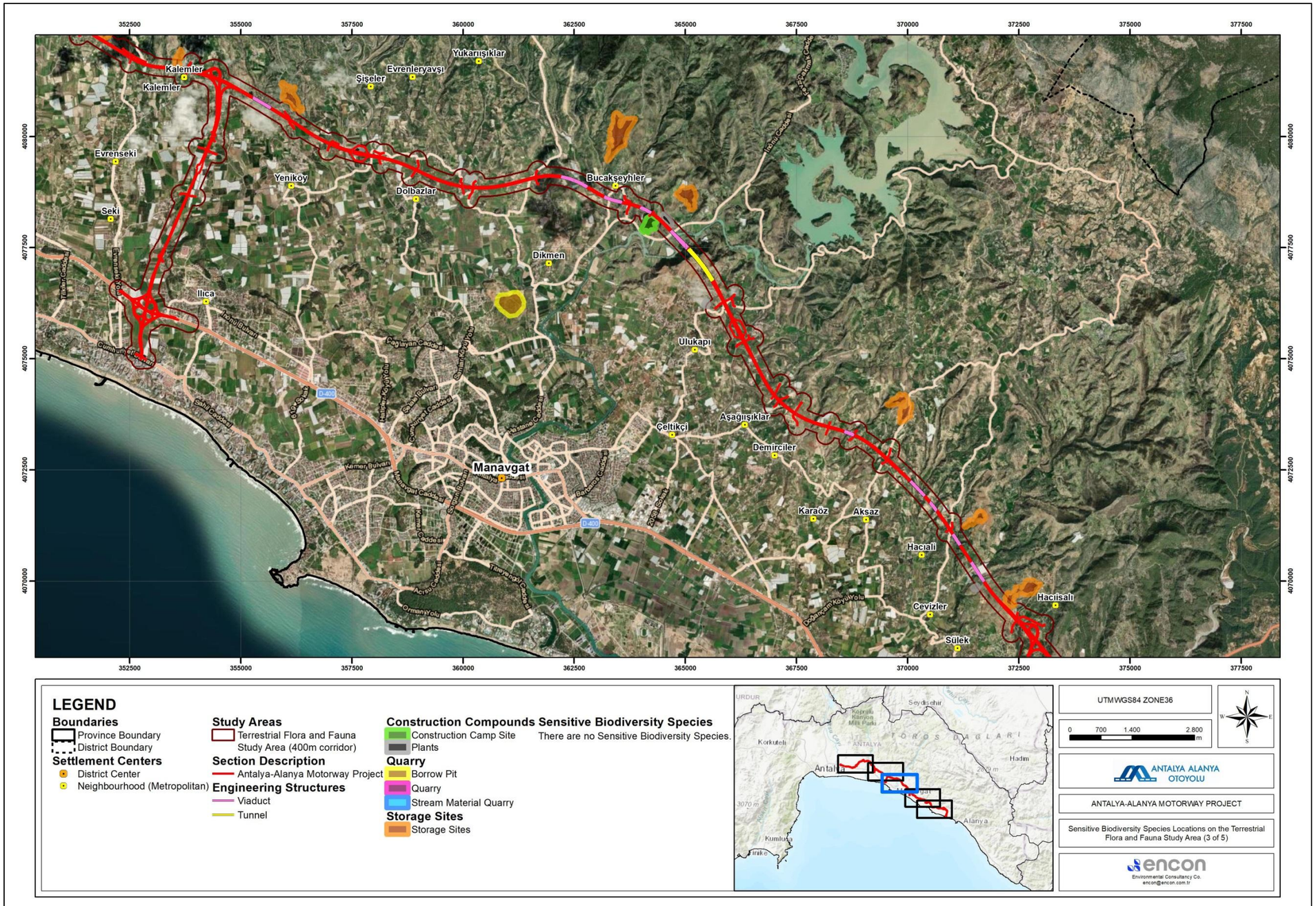

Figure IX.29 Locations of Sensitive Biodiversity Flora/Fauna (3/5)

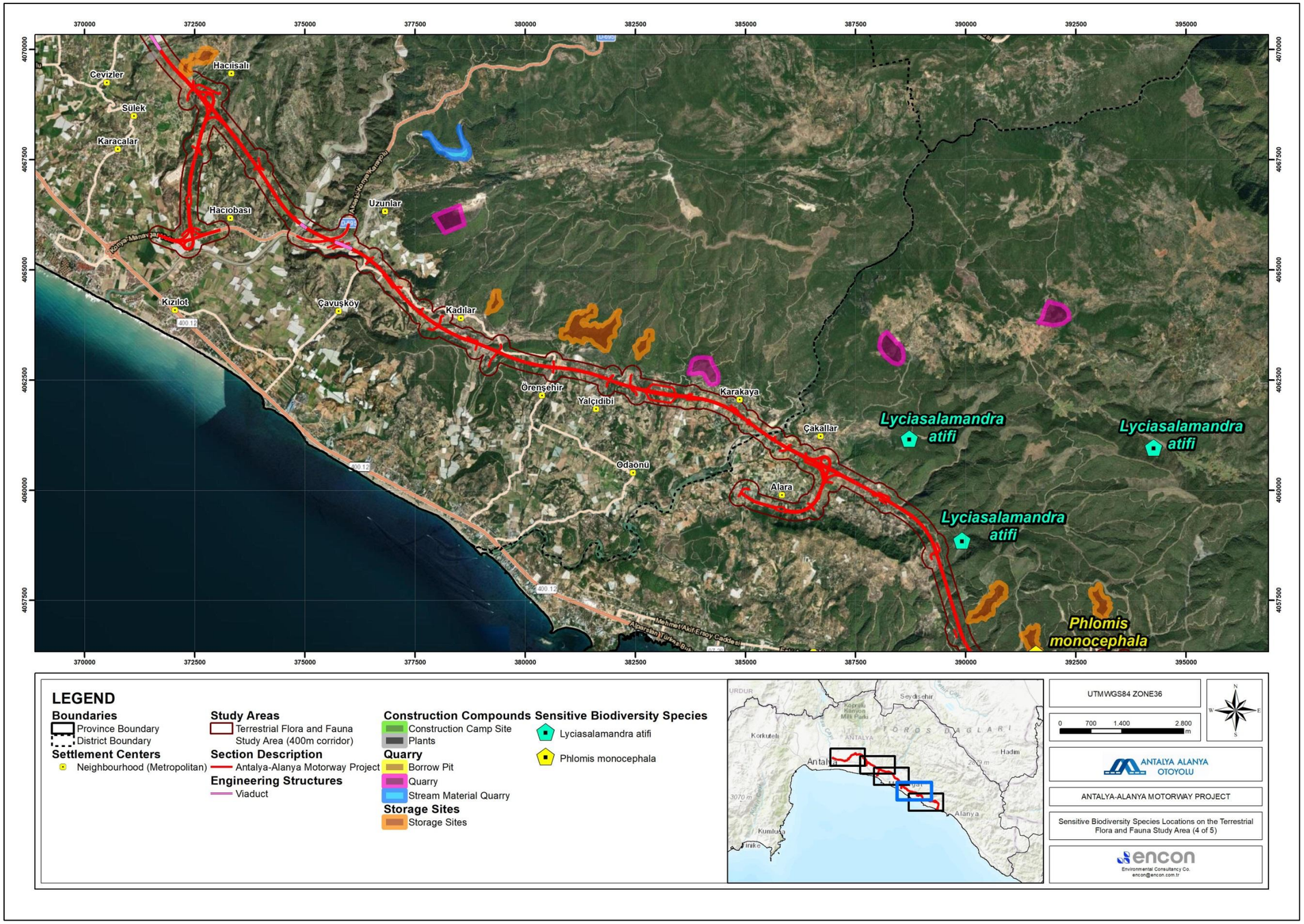

Figure IX.30 Locations of Sensitive Biodiversity Flora/Fauna (4/5)

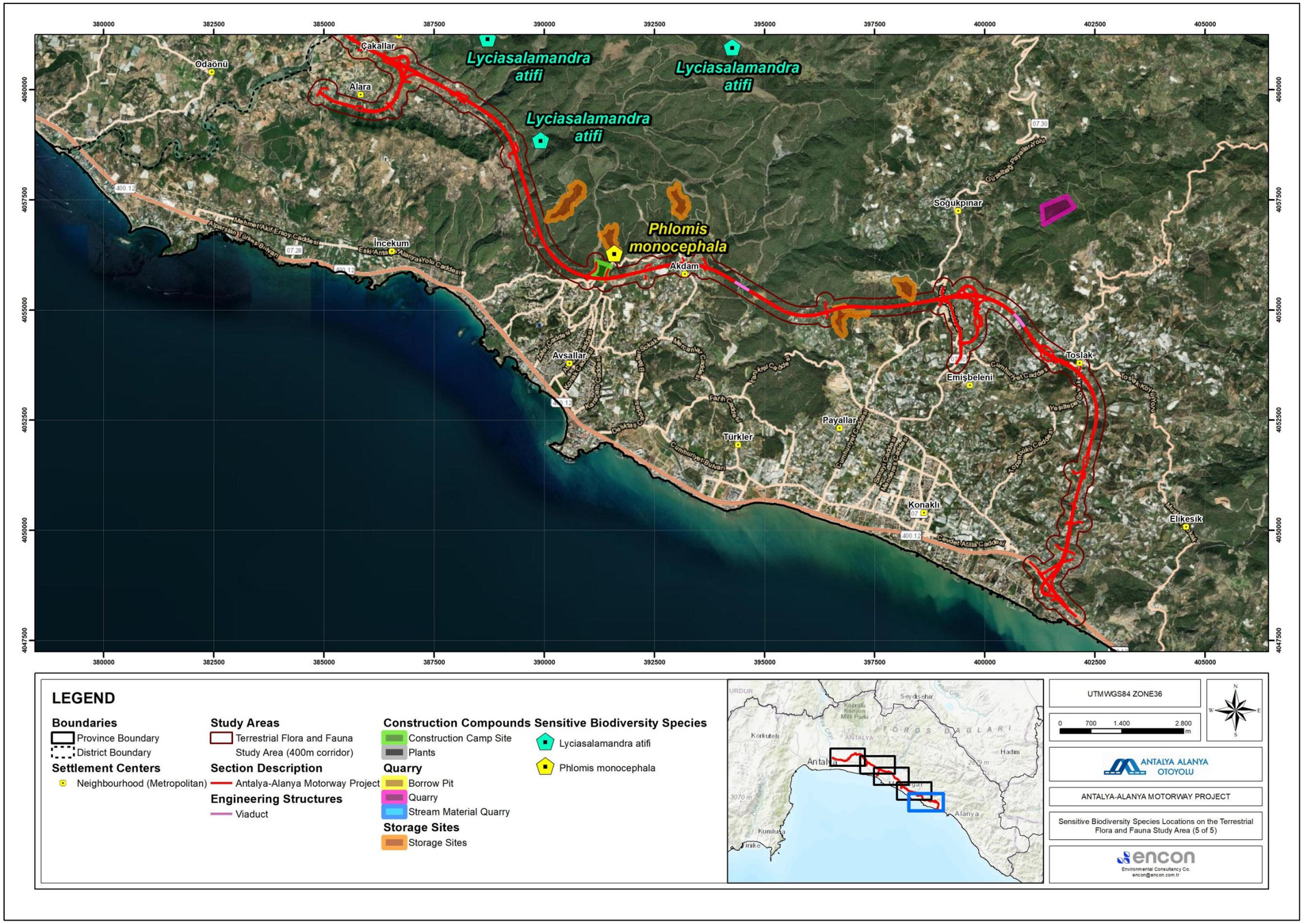

Figure IX.31 Locations of Sensitive Biodiversity Flora/Fauna (5/5)

IX.5.6. Invasive Species

No invasive plant, amphibian, reptile, bird, or mammal species were detected within the Project Study Area. The only invasive species recorded were freshwater fish species. These species are:

- *Pseudorasbora parva*
- *Oncorhynchus mykiss*
- *Carassius gibelio*
- *Oreochromis aureus*

Mitigation measures in accordance with IFC standards will be implemented to manage all invasive species identified within the project area or introduced to the site. Additionally, preventative actions will be undertaken to avoid the introduction and further spread of these species into the surrounding environment.

IX.6. Critical Habitat Assesment

To assess the potential presence of Critical Habitat, an Ecologically Appropriate Area of Analysis (EAAA) was prepared for each species. This analysis considers the species' distribution—both within and, where applicable, beyond the Project's Area of Influence—as well as the ecological processes, features, and functions essential to the species' persistence. The boundaries of each species-specific EAAA may encompass catchments, major river systems, or relevant geological features. These defined EAAAs are intended to provide a functional basis for evaluating the applicability of Critical Habitat criteria and associated thresholds.

More detailed information on critical habitat analysis and evaluations is provided in the standalone Critical Habitat Assessment (CHA) report.

C1: Critically endangered and/or endangered species

For Criterion-1, species classified as Critically Endangered (CR) or Endangered (EN) under the IUCN Red List were assessed. Where global assessments were unavailable (e.g., Not Evaluated or Data Deficient), national sources such as the Turkish Red Data Book were used. An expert reviewed and updated threat statuses using the most recent data on species distributions.

Out of 221 plant taxa recorded in the region, only *Pyrus serikensis* (EN) meets the IUCN threat criteria. This species is found within the maquis ecosystem near the Serik district. As it is estimated to represent at least 5% of the extent of occurence, the area qualifies as critical habitat under Criterion-1. Accordingly, maquis habitats along the project route have been designated as critical habitat.

Among five amphibian species identified, *Lyciasalamandra atifi* (EN) has not been observed within the Project Area. However, due to its secretive nature and seasonal activity, its absence cannot be definitively confirmed. Although the species has been observed in suitable areas (EAAA) at higher altitudes outside the Project Area, these potential habitats have not been classified as critical habitats because the species has not been observed in the study area and the possible EAAA do not overlap with the Project Area. As it typically occupies higher elevations, continued monitoring is recommended. If future surveys confirm its presence, relevant areas will require critical habitat designation.

Bird diversity is high, with 124 species recorded. *Neophron percnopterus* (EN) was identified but does not meet Criterion-1 thresholds for critical habitat designation based on regional assessment (EAAA).

Of 29 fish species recorded from 10 orders and 16 families, three are listed as threatened: *Anguilla anguilla* (CR), *Alburnus baliki* (EN), and *Pseudophoxinus fahrettini* (EN).

Species classified as Vulnerable (VU) are broadly distributed and are not expected to meet the Criterion-1 thresholds for critical habitat designation.

A summary of species evaluated under Criterion-1 is presented in Table IX.23. Species considered to potentially trigger critical habitat—based on literature records or insufficient field data—are categorized as Potential Critical Habitat. Conversely, where the presence of a qualifying species has been confirmed through direct observation, the area is designated as Critical Habitat.

Table IX.23 Critical Habitat Assessment According to Criterion-1

Species	IUCN	EAAA > 0.5% EOO	Criteria Assessment	Critical Habitat Assessment
Pyrus serikensis	EN	yes	Cover C1. Distribution areas have been determined as critical habitat.	CH
Lyciasalamandra atifi	EN	yes*	Monitoring should continue to determine the presence of the species in the Project Area.	PCH
Neophron percnopterus	EN	no	Not trigger C1	Not Critical Habitat
Anguilla anguilla	CR	no	Not trigger C1	Not Critical Habitat
Alburnus baliki	EN	no	Not trigger C1	Not Critical Habitat
Pseudophoxinus fahrettini	EN	no	Not trigger C1	Not Critical Habitat

* EAAA of *Lyciasalamandra atifi* does not overlap with the Project Area

C2: Endemic and/or restricted-range species

The Criterion-2 assessment focuses on the presence of endemic or restricted-range species. These are defined as having an extent of occurrence (EOO) less than 50,000 km² for terrestrial vertebrates and plants, or a global range of 500 km or less in linear extent for aquatic species not exceeding 200 km in width at any point.

A total of 221 plant taxa from 60 families were recorded within the Project Area. Among them, seven species are endemic to Türkiye: *Eryngium kotschyi*, *Phlomis leucophracta*, *Phlomis lycia*, *Phlomis monocephala*, *Phlomis nissolii*, *Pyrus serikensis*, and *Sideritis congesta*. Except for *Pyrus serikensis*, these endemic species have relatively wide distributions. *Pyrus serikensis* is not estimated to represent 10% of its global population within the maquis habitats along the project route, thereby does not meet Criterion-2.

Five amphibian species were recorded, with *Lyciasalamandra atifi* being the only endemic species. Although not observed within the Project Area during spring surveys, its presence in nearby suitable habitats suggests potential occurrence. Given its specific ecological requirements and the dry, mild conditions during surveys, its absence may not be definitive. Continued monitoring is recommended. If confirmed, the species may qualify the area as Critical Habitat under Criterion-2.

Lyciasalamandra atifi is highly sensitive to changes in hydrological and climatic conditions, which are key factors in its Endangered status. Its seasonal and habitat-specific activity patterns make early spring the most appropriate time for further surveys.

Among reptiles, four endemic lizard species were identified: *Ablepharus anatolicus*, *Anatololacerta ibrahimi*, *Lacerta pamphylica*, and *Blanus aporus*. While *Lacerta pamphylica* has a relatively narrow distribution and is present within the Project Area, none of these species are considered to trigger Criterion-2 due to the scale of their population representation in the area.

Of the 29 fish species identified, 11 are endemic, including *Capoeta antalyensis*, *Pseudophoxinus battalgilae*, and *Pseudophoxinus fahrettini*, which are more regionally confined. However, no species meets the Criterion-2 thresholds for population concentration along the project route. Therefore, no Critical Habitat has been designated for fish species under this criterion.

A summary of the evaluation of species falling under Criterion-2 is provided in Table IX.24.

Table IX.24 Critical Habitat Assessment According to Criterion-2

Species	IUCN	EAAA > 10% EOO	Criteria Assessment	Critical Habitat Assessment
Eryngium kotschyi	LC	no	Not trigger C2	Not Critical Habitat
Phlomis leucophracta	-	no	Not trigger C2	Not Critical Habitat
Phlomis lycia	LC	no	Not trigger C2	Not Critical Habitat
Phlomis monocephala	LC	no	Not trigger C2	Not Critical Habitat
Phlomis nissolii	LC	no	Not trigger C2	Not Critical Habitat
Pyrus serikensis	EN	no	Not trigger C2	Not Critical Habitat
Sideritis congesta	LC	no	Not trigger C2	Not Critical Habitat
Lyciasalamandra atifi	EN	no	Not trigger C2	Not Critical Habitat
Anatololacerta ibrahimi	-	no	Not trigger C2	Not Critical Habitat
Ablepharus anatolicus	-	no	Not trigger C2	Not Critical Habitat
Blanus aporus	LC	no	Not trigger C2	Not Critical Habitat
Lacerta pamphylica	LC	no	Not trigger C2	Not Critical Habitat
Cobitis battalgilae	LC	no	Not trigger C2	Not Critical Habitat
Oxynoemacheilus eregliensis	NT	no	Not trigger C2	Not Critical Habitat
Capoeta antalyensis	VU	no	Not trigger C2	Not Critical Habitat
Capoeta caelestis	LC	no	Not trigger C2	Not Critical Habitat
Alburnus baliki	EN	no	Not trigger C2	Not Critical Habitat
Alburnus escherichii	LC	no	Not trigger C2	Not Critical Habitat
Pseudophoxinus battalgilae	LC	no	Not trigger C2	Not Critical Habitat
Pseudophoxinus fahrettini	EN	no	Not trigger C2	Not Critical Habitat
Squalius anatolicus	LC	no	Not trigger C2	Not Critical Habitat
Squalius fellowesii	LC	no	Not trigger C2	Not Critical Habitat

Species	IUCN	EAAA > 10% EOO	Criteria Assessment	Critical Habitat Assessment
Salmo ekmekciae	-	no	Not trigger C2	Not Critical Habitat

C3: Habitats supporting globally significant migratory or congregatory species

This assessment considered the presence of Key Biodiversity Areas (KBAs), Important Bird and Biodiversity Areas (IBAs), and Ramsar Wetlands of International Importance (criteria 5 or 6), with a focus on migratory and congregatory species.

Within the Project Area, the Antalya Plains (KBA/IBA) is the only internationally recognized site of biodiversity importance. Species that qualify this KBA/IBA (*Halcyon smyrnensis* and *Prinia gracilis*) were not observed in surveys conducted in the project study area and its surroundings.

No migratory or herd-forming species were identified among the amphibians, reptiles, or mammals recorded in the Project Area. Therefore, no critical habitat has been designated for these taxa under Criterion-3.

Although the Project Area does not lie along a primary or secondary migration corridor for soaring birds in the Mediterranean, both field observations and BirdLife International data confirm the presence of 20 soaring bird species in the area. However, their observed population densities are below the thresholds required to trigger Criterion-3. As a result, no critical habitat has been designated for avian species.

The European eel (*Anguilla anguilla*), a catadromous fish species, is known to occur in rivers within the Project Area, which flow into the sea. While *A. anguilla* meets the general definition of a migratory species, it does not fulfill either of the specific sub-criteria required to trigger Criterion-3. Therefore, no critical habitat has been designated for this species.

A summary of the evaluation of species falling under Criterion-3 is provided in Table IX.23.

Table IX.25 Critical Habitat Assessment According to Criterion-3

Species	IUCN	EAAA > 1% EOO	Criteria Assessment	Critical Habitat Assessment
Accipiter nisus	LC	no	Not trigger C3	Not Critical Habitat
Aquila chrysaetos	LC	no	Not trigger C3	Not Critical Habitat
Buteo buteo	LC	no	Not trigger C3	Not Critical Habitat
Buteo rufinus	LC	no	Not trigger C3	Not Critical Habitat
Circaetus gallicus	LC	no	Not trigger C3	Not Critical Habitat
Circus aeruginosus	LC	no	Not trigger C3	Not Critical Habitat
Circus cyaneus	LC	no	Not trigger C3	Not Critical Habitat
Circus macrourus	LC	no	Not trigger C3	Not Critical Habitat
Neophron percnopterus	EN	no	Not trigger C3	Not Critical Habitat
Ciconia ciconia	LC	no	Not trigger C3	Not Critical Habitat
Ciconia nigra	LC	no	Not trigger C3	Not Critical Habitat
Falco columbarius	LC	no	Not trigger C3	Not Critical Habitat
Falco peregrinus	LC	no	Not trigger C3	Not Critical Habitat
Falco subbuteo	LC	no	Not trigger C3	Not Critical Habitat
Falco tinnunculus	LC	no	Not trigger C3	Not Critical Habitat
Anguilla anguilla	CR	no	Not trigger C3	Not Critical Habitat

C4: Highly-threatened and unique ecosystems

Criterion-4 recommends the use of the IUCN Red List of Ecosystems (RLE) where available. However, no formal RLE assessments have been conducted in Türkiye, as confirmed by the IUCN RLE Database. In the absence of national RLE data, the European Red List of Habitats (EU, 2016) was used as an alternative framework to assess ecosystem threat status.

None of the habitats identified within the Project Area are listed as priority habitats under Annex I of the EU Habitats Directive or recognized as threatened in the European Red List of Habitats. Additionally, none of the EUNIS-classified habitats identified through photointerpretation, mapping, and field validation are categorized as Critically Endangered (CR) or Endangered (EN), nor are they considered unique ecosystems. Expert evaluations also did not report any unique or threatened habitats within the Local Study Area (LSA).

River crossings along the motorway route will be implemented via bridges, with impacts expected to be temporary and limited to the construction phase. Mitigation measures will be employed, and no significant or lasting impact on river ecosystems is anticipated.

The Project Area is located along Türkiye's Western Mediterranean Coast. The corridor lacks habitat characteristics essential for supporting the biological needs—such as breeding, feeding, or wintering—of endemic, rare, or threatened species.

In conclusion, the Project Area does not contain any ecosystems that meet the criteria for unique or threatened ecosystems under Criterion-4.

C5: Key evolutionary processes

Criterion-5 evaluates areas with landscape features that support ecological and evolutionary processes, such as those promoting genetic diversity, adaptation, or long-term species persistence. This includes habitats with high spatial heterogeneity, edaphic transitions, or areas of significance for climate change adaptation.

Within the Project Area, no landscapes with high spatial heterogeneity, edaphic interfaces, or recognized significance for climate adaptation were identified. Additionally, the area is not considered a biological corridor nor of proven importance for evolutionary processes.

Based on current data and expert input, the habitats within the Study Area do not meet the conditions outlined under Criterion-5. Therefore, no critical habitat has been designated under this criterion.

IX.6.1. Summary of Critical Habitat Features

Based on the findings of the Critical Habitat Assessment carried out for the Project, the following features have been identified as meeting the criteria to be classified as Critical Habitat.

- *Pyrus serikensis* is in “Endangered – EN” category according to IUCN and found primarily within the maquis ecosystem surrounding the project area, with known populations located near the Serik district, thus meeting critical habitat assessment criteria. Maquis habitats where *Pyrus serikensis* is present along the project route have been designated as critical habitats.

- Amphibian species *Lyciasalamandra atifi* is in “Endangered – EN” category according to IUCN and meeting critical habitat assessment criteria. However, this species typically inhabits higher elevations and was not observed in the study area.

- Considering the overall distribution ranges of all endemic reptile species, there is no critical habitat within the project area as defined by critical habitat assessment criteria.

- No bird species meets critical habitat assessment criteria based on their population status. Considering the population densities of migratory bird species present in the area, it has been determined that their populations are not at a level that meets critical habitat assessment criteria. Consequently, no critical habitat has been designated for birds within the project area.

- Since the global population densities of the bat species are unknown and no significant populations were observed in the area, they do not meet critical habitat assessment criteria.

- Since no freshwater fish species meet the critical habitat assessment criteria, no critical habitat has been designated.

- Since only modified habitats occur within the portion of the Antalya Plains KBA/IBA intersecting the Project Area, the Project's impact on this protected area is considered minimal.

- Since only modified habitats occur within the portion of the Belek SEPA intersecting the Project Area, the Project’s impact on this protected area is considered minimal. Therefore no critical habitat has been designated.

- Since the intersecting parts of Köprüçay Basin is a very small portion and the impacts on these parts are expected to be minimal, no critical habitat has been designated.

Table IX.26. Critical Habitat Assessment Results

Criteria	Habitat /Species triggered
Criterion 1: Critically endangered and/or endangered species	Maquis, arboreal matorral, and thermo-mediterranean scrub (EUNIS code S5) • *Pyrus serikensis*

IX.6.2. Ecology of Species Triggering Critical Habitat

- ***Pyrus serikensis*** **(EN, Regional Endemic)**

Scientific Name: *Pyrus serikensis*
Common Name: Serik Pear
Family: Rosaceae

Pyrus serikensis is a deciduous tree species reaching up to 10–15 meters in height. It is characterized by ovate to broadly elliptic leaves with serrated margins and a smooth, glabrous upper surface. The flowers are white, five-petaled, and hermaphroditic, arranged in corymbs. Fruits are globose to subglobose pomes, generally smaller than those of cultivated pears, and turn yellowish-green when mature.



Figure IX.32 *Pyrus serikensis*

Habitat and Distribution: This species is endemic to southwestern Türkiye, primarily restricted to the Serik district in Antalya Province. It is typically found in mixed deciduous forest ecosystems, often in

rocky, limestone-rich soils at elevations ranging from 100 to 600 meters. *P. serikensis* favors areas with a Mediterranean climate characterized by hot, dry summers and mild, wet winters.

Ecology: As a wild relative of cultivated pears, *Pyrus serikensis* plays an important ecological role in maintaining genetic diversity within the genus Pyrus. It serves as a potential genetic resource for disease resistance and drought tolerance. Flowering occurs in early spring, with pollination facilitated by a range of insect species, primarily bees.

Conservation Status: Due to its narrow endemic range and habitat degradation caused by agricultural expansion, urbanization, and forestry activities, *Pyrus serikensis* is considered at risk. Its population is fragmented and declining. Conservation efforts are essential to protect its natural habitats and prevent further loss of genetic diversity within the genus.

This species is associated with the S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub EUNIS habitat category.

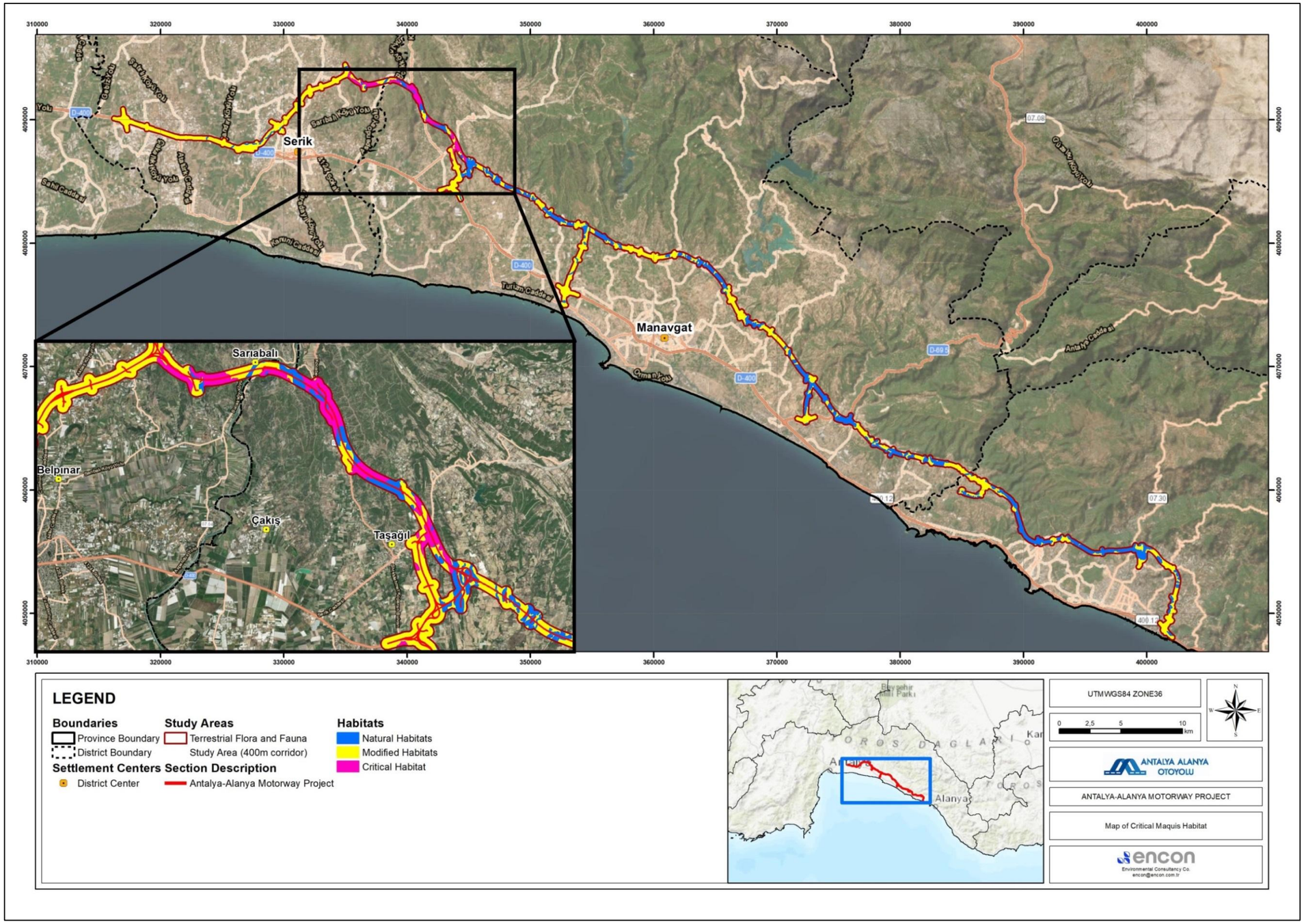

Figure IX.33. Critical, Natural and Modified Habitats in the Study Area

IX.1. Habitats and Species of Conservation Importance

As a result of the comprehensive assessments conducted during the biodiversity studies, the selection criteria for habitats and species to be addressed in the biodiversity conservation action plans - developed as part of this document- were defined as follows.

Species of conservation concern, for the purposes of this assessment, are defined according to the following criteria:

- Species classified as Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) on the IUCN Red List;
- Species that are globally, nationally, or regionally threatened;
- Endemic species to the area;
- Species listed under Resolution No. 6 of the Bern Convention;
- Range-restricted species;
- Migratory species for which the local population represents more than 1% of the global population.

It is important to note that, as Turkey is not a member state of the European Union, Priority Biodiversity Features and Critical Habitat (CH) associated with the EU Habitats and Birds Directives are not applicable in this context.

The subsections below present the species of conservation concern identified as potentially occurring within the Study Area, based on the outcomes of the Environmental and Social Impact Assessment (ESIA) and according to the criteria outlined above.

Habitat types and species identified as having high priority and conservation importance listed in Table IX.27. The conservation of these species required specific actions to be implemented within the scope of the Project.

Table IX.27. Priority habitats and species of conservation importance

Biodiversity Component		Status
Habitat	Maquis, arboreal matorral, and thermo-mediterranean scrub (EUNIS code S5)	Critical Habitat
Species	*Pyrus serikensis*	Regional endemic and EN category in the IUCN Red List
	Lyciasalamandra atifi	Local endemic and EN category in the IUCN Red List
	Lacerta pamphylica	Local endemic
	Testudo graeca	VU category in the IUCN Red List
	Neophron percnopterus	EN category in the IUCN Red List
	Streptopelia turtur	VU category in the IUCN Red List
	Myotis capaccinii	VU category in the IUCN Red List
	Rhinolophus mehelyi	VU category in the IUCN Red List
	Alburnus baliki	Endemic and EN category in the IUCN Red List
	Capoeta antalyensis	Regional Endemic and VU category in the IUCN Red List
	Oxynoemacheilus eregliensis	VU category in the IUCN Red List
	Pseudophoxinus fahrettini	Regional Endemic and EN category in the IUCN Red List

IX.7. Impact Assessment

The Antalya-Alanya Motorway project consist a range of both linear and area-based impacts on biodiversity. These impacts are primarily linked to the construction and operation of the motorway, including associated connecting roads and bridges. Additional biodiversity pressures are anticipated from supporting infrastructure such as quarries, construction sites, campsites, service roads, and temporary transportation routes.

The Study Area of the Project is located in a region where Modified Habitats, mainly agricultural land, make up 68% of the landscape. The remaining 32% consists of Natural Habitats, mostly maquis and coniferous forests.

Critical Habitats identified within the Study Area are triggered by different flora and fauna species as assessed in Section IX.5.6

Potential direct and indirect impacts have been evaluated for Modified Habitats, Natural Habitats, and Critical Habitats. The level of residual impact differs depending on the specific characteristics of each habitat type.

A full Critical Habitat Assessment and a Biodiversity Action Plan (BAP) have been developed as standalone documents.

The impact assessment for biodiversity follows the semi-quantitative method described in Chapter IV.

All proposed mitigation measures to be implemented on-site are detailed within the Biodiversity Management Plan (BMP), which serves as the guiding document for minimizing ecological impacts during project execution

The construction and operation of the Motorway Project will involve a wide range of activities that have the potential to affect the ecology. Impacts of project activities can be further divided into the target group of biological elements as terrestrial and aquatic. Important impacts of motorway construction and operation activities on the biological environment are mainly habitat fragmentation. Habitat fragmentation can be described as splitting natural habitats and ecosystems into smaller, more isolated patches. The process of fragmentation is connected to many different factors, of which the direct loss and isolation of natural habitat are the most important.

The ecological effects of transportation include disturbance in terms of noise and visual nuisance, and pollution, which reduce the suitability of adjacent areas for wildlife. The infrastructure itself contributes significantly towards habitat fragmentation by creating barriers to animal movement. This may result in the isolation and extinction of vulnerable species. The steady increase in the number of animal casualties associated with roads further indicates the fragmentation effect. Fauna mortality, in particular, has helped raise the public perception of the problem due to the inherent link to traffic safety.

During the planning, construction, or upgrading of transportation infrastructure, all possible efforts will be made to maintain or restore ecological structures and connect habitats and populations. Particular attention will be paid to rivers, streams, riparian forests, wooded corridors, networks of hedges and dikes, etc., which provide ecological corridors for growth, expansion of the range, and/or migration of wildlife populations and can often be the last refuge for many species in an intensively man-used landscape.

Best practice dictates that project planning and design aim to avoid ecological damage, especially to protect or sensitive habitats and/or species. The avoidance of fragmentation will be considered before resorting to mitigation measures. Following articles are general principles to consider against habitat fragmentation:

- The fragmentation of natural habitats by transportation infrastructure is a problem that can only be solved by accepting the issue at a policy level. Only an interdisciplinary approach involving planners, economists, engineers, ecologists, landscape architects, etc., can provide the necessary tools for successfully addressing fragmentation. Public involvement is also essential to ensure the success of the chosen solutions.
- Habitat connectivity is a vital property of landscapes and is especially important for sustaining animal movement across the landscape. The preservation of habitat connectivity will be a strategic goal in the environmental policy of the transport sector.
- Avoiding and mitigation will be applied from the start of the planning process.

The construction and operation of the Project will involve a wide range of activities that have the potential to affect the ecology. The relevant activities of the Project likely to give rise to impacts on receptors are summarized in Table IX.28, along with the possible pathway of the impacts.

Table IX.28 Overview of Potential Impacts of the Project on Biological Environment

Phase of the Project Activities	Activity	Potential Impact
Construction	Vegetation clearance	Damage or loss of habitats Loss of important plant species Direct incidental killing of fauna Loss of habitat for faunal species Increase in noise, visual and vibration which may cause disturbance or displacement of fauna Invasive species Loss of ecosystem services
	Campsites, storage areas and quarries	Damage or loss of habitat Increase in noise, visual and vibration which may cause disturbance or displacement of fauna
	Construction of culverts, bridges and viaducts	Damage or loss of habitat Increase in noise, and vibration and disturbance on fauna Disruption of ecological connectivity Loss of ecosystem services
	Presence of site preparation and construction vehicles	Increase in noise, visual and vibration which may cause disturbance or displacement of fauna Damage or loss of flora and /or fauna
Operation	Operational traffic	Increase in noise, visual and vibration which may cause disturbance or displacement of fauna Damage and/or loss of fauna Barrier effects Ecosystem Services

IX.7.1. Significant Receptors

The significant receptors, including protected areas, habitats and species, was assessed based on the significance criteria outlined in IFC Performance Standard 6 (PS 6). The sensitivities of these receptors were determined in order to calculate the overall impact on ecology.

IX.7.1.1. Internationally Recognized Areas and Nationally Protected Areas

The list of Internationally Recognized Areas in and around the impact area of the Project is provided in Table IX.10. IFC PS6 states that internationally and/or nationally recognized areas of high biodiversity value are likely to qualify as critical habitats, including KBAs, IBAs and IPAs. Therefore, all within and in the vicinity of the Project Area internationally recognized areas are highly sensitive.
There are 16 internationally Recognized areas found near the Project Area. There are no RAMSAR areas within or around the Project Area. The studies determined that a portion of Antalya Plains (KBA and IBA) is within the Project Area.

The portion of the Antalya Plains KBA/IBA intersecting the Project Area comprises exclusively modified habitats, which have been significantly altered by human activities and generally support lower biodiversity value compared to natural habitats. According to IFC Performance Standard 6, areas of modified habitat present low biodiversity sensitivity, and thus, the risk of significant adverse impacts on biodiversity values is reduced.

Given that the habitats within the project footprint do not include natural ecosystems or habitats critical for threatened or endemic species, the project's potential impacts on the biodiversity values of this protected area are expected to be minimal.

The Project also intersects with a portion of Belek SEPA. However this portion only consists of modified habitats such as agricultural lands and access roads, which makes about 44.5% of Belek SEPA's area. Belek SEPA is considered a nationally protected area due to it's natural beaches that *Caretta caretta* and *Chelonia mydas* species uses for nesting. It is not expected that the Project will have any impact on these areas. *Pyrus serikensis* which is also an important species for Belek SEPA is already considered and evaluated for this project, there are no individuals in the area that the Project and Belek SEPA intersects, however this species is present in other areas of the Projects area of impact.

The Project also intersect a small portion of Köprüçay Basin Natural Protected Area. This portion includes parts of the natural habitat and a viaduct is planned to be constructed above. The drilling activities are expected to have an impact of vibration for 5 meters and then reach extinction, and the distance for the nearest viaduct pier is 15 meters. Therefore the construction impacts on this protected area is to be minimal and general mitigations are expected to minimise the impact significance for this protected area.

IX.7.1.2. Habitats, Terrestrial Flora and Fauna Species

Biodiversity indicators and their sensitivities were assessed and categorized as high, medium, or low, considering the habitats and species present in the Project Area (Table IX.30).

In this assessment, species and habitat abundance within the Project Area have been classified into qualitative categories of "Low", "Moderate", and "High" to support the evaluation of potential impacts and the determination of magnitude. These categories reflect the expected relative abundance or density of individuals within the survey area, rather than precise population counts. Approximate numerical ranges for relative abundance, where "Low", "Moderate", "High" roughly correspond to the number of individuals or density observed in the impact area have been presented in Table IX.29. These are not exact counts however they are presented as a qualitative ratings.

Table IX.29 Relative Abundance Categories

Relative Abundance	Approximate Number of Individuals / Unit Area	Notes
Low	• Rarely observed or restricted species. • <15 individuals in the surveyed area or per hectare	• Rarely encountered, scattered, or restricted populations
Moderate	• Locally common but not dominant species • 20-100 individuals in the surveyed area or per hectare	• Locally common, • Detectable in surveys, • Not dominant but persistent
High	• Widespread or abundant species • >100 individuals per hectare	• Widespread and frequently observed • May dominate certain habitat patches

Table IX.30 Sensitivity of biodiversity receptors

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)	Sensitivity	Rationale
Habitats	S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub	Moderate	Y	High	Natural habitats that qualify as Critical Habitat due to their high biodiversity value, ecological integrity, and presence of restricted-range and endemic species. These habitats provide essential ecosystem services, contribute to habitat connectivity, and are sensitive to fragmentation and disturbance.
	G1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix T3 - Coniferous forest T14 - Mediterranean and Macaronesian riparian forest S7.211 - Aegean *Sarcopoterium phrygana* S6 - Garrigue C2 - Surface running waters	Moderate	Y	Medium	Natural habitats of medium sensitivity that, although not qualifying as Critical Habitat under IFC PS6 thresholds, support native biodiversity, function as dispersal and feeding areas, and provide ecosystem services. These habitats are moderately resilient but remain vulnerable to degradation and fragmentation from construction activities.
	J1 - Buildings of cities, towns and villages V1 - Arable land and market gardens	Moderate	Y	Low	Modified habitats of low sensitivity, dominated by human activities. These areas provide little to no conservation value, are not important for threatened species, and do not qualify as natural or critical habitats under IFC PS6. Their biodiversity value is limited to common or disturbance-tolerant species.
Terrestrial Flora	*Pyrus serikensis*	Low	Y	High	Regional endemic and IUCN Endangered species with a highly restricted distribution. Its limited range and small population size increase vulnerability to habitat loss and fragmentation. Any impact on this species is considered highly significant given its conservation status and ecological importance.
	Eryngium kotschyi	Moderate	Y	Low	Endemic species with relatively wide ranges in Türkiye. Although they are locally common and resilient to disturbance, their endemic status warrants monitoring. Sensitivity is considered low because they do not meet thresholds for restricted range or Critical Habitat under IFC PS6.
	Phlomis leucophracta	Moderate	Y	Low	Endemic species with relatively wide ranges in Türkiye. Although they are locally common and resilient to disturbance, their endemic status warrants monitoring. Sensitivity is considered low because they do not meet thresholds for restricted range or

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)	Sensitivity	Rationale
					Critical Habitat under IFC PS6.
	Phlomis lycia	Moderate	Y	Low	Endemic species with relatively wide ranges in Türkiye. Although they are locally common and resilient to disturbance, their endemic status warrants monitoring. Sensitivity is considered low because they do not meet thresholds for restricted range or Critical Habitat under IFC PS6.
	Phlomis monocephala	Moderate	N	Low	Endemic species with relatively wide ranges in Türkiye. Although they are locally common and resilient to disturbance, their endemic status warrants monitoring. Sensitivity is considered low because they do not meet thresholds for restricted range or Critical Habitat under IFC PS6.
	Phlomis nissolii	Moderate	Y	Low	Endemic species with relatively wide ranges in Türkiye. Although they are locally common and resilient to disturbance, their endemic status warrants monitoring. Sensitivity is considered low because they do not meet thresholds for restricted range or Critical Habitat under IFC PS6.
	Sideritis congesta	Moderate	Y	Low	Endemic species with relatively wide ranges in Türkiye. Although they are locally common and resilient to disturbance, their endemic status warrants monitoring. Sensitivity is considered low because they do not meet thresholds for restricted range or Critical Habitat under IFC PS6.
	Barlia robertiana	Moderate	Y	Low	Orchid species listed in CITES Appendix II. Although not globally threatened, it is protected under international conventions due to collection pressures. Sensitivity is low as the species is not range-restricted, but it requires monitoring where present.
Amphibians and Reptiles	*Lyciasalamandra atifi*	Low	N	High	Endangered salamander with a highly restricted range and dependence on specific microhabitats. Although not observed in the project area, its conservation status and declining population makes it highly sensitive to any potential habitat disturbance.
	Testudo graeca	Moderate	Y	Medium	Vulnerable species widely distributed in Türkiye. Despite its IUCN status, it remains relatively abundant and adaptable to various habitats. Sensitivity is medium, reflecting its global conservation concern but regional commonness.
	Lacerta pamphylica	Low	N	High	Local endemic lizard with a narrow distribution, not observed in the project area and not globally threatened. Sensitivity is high due to its restricted range and dependence on specific habitats,

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)	Sensitivity	Rationale
					even if no direct project presence is confirmed.
	Anatololacerta ibrahimi	Low	N	Low	Regional endemic reptile with limited distribution but relatively stable populations. Sensitivity is low as they are not globally threatened and are generally tolerant of habitat variation.
	Ablepharus anatolicus	Low	N	Low	Regional endemic reptile with limited distribution but relatively stable populations. Sensitivity is low as they are not globally threatened and are generally tolerant of habitat variation.
	Blanus aporus	Low	N	Low	Regional endemic reptile with limited distribution but relatively stable populations. Sensitivity is low as they are not globally threatened and are generally tolerant of habitat variation.
	Other herpetofauna species	Moderate	Y	Low	Widespread amphibians and reptiles assessed as LC by IUCN with no special national protection status. These species are resilient to disturbance, resulting in low sensitivity.
Birds	*Neophron percnopterus*	Low	N	High	Endangered vulture species with a declining population globally. Not observed in the project area, but its conservation status and wide-ranging ecology mean that even potential disturbance is highly sensitive.
	Streptopelia turtur	Low	Y	Medium	Vulnerable migratory bird with declining populations due to hunting and habitat loss. Recorded in the project area, sensitivity is medium due to conservation status and use of agricultural/rural habitats
	Accipiter nisus	Low	Y	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Aquila chrysaetos	Low	N	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Buteo buteo	Low	Y	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Buteo rufinus	Low	Y	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)	Sensitivity	Rationale
					stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Circaetus gallicus	Low	Y	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Circus aeruginosus	Low	Y	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Circus cyaneus	Low	N	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Circus macrourus	Low	N	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Ciconia ciconia	Low	Y	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Ciconia nigra	Low	N	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Falco columbarius	Low	N	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Falco peregrinus	Low	N	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Falco subbuteo	Low	N	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)	Sensitivity	Rationale
					stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Falco tinnunculus	Low	Y	Low	Migratory species of least concern or near threatened status. Their use of the project area is transitory (migration flyway or stopover), not for breeding or nesting. Sensitivity is low, except where globally threatened species occur.
	Other bird species	Moderate	Y	Low	Species of LC or NT conservation status, without national protection, commonly occurring in anthropogenic-modified and natural habitats. Sensitivity is low.
Mammals	Mammal species except bats	Moderate	Y	Low	Common mammals assessed as LC or NT on the IUCN Red List. These species are resilient, widely distributed, and not of conservation concern. Sensitivity is low.
Mammals (Bats)	*Myotis capaccinii*	Low	N	Medium	Vulnerable bat species listed by IUCN. Although not recorded during surveys, they are cave-dwelling bats potentially vulnerable to disturbance, roost destruction, and changes in hydrology. Sensitivity is medium given global decline trends and specific roosting requirements.
	Rhinolophus mehelyi	Low	N	Medium	Vulnerable bat species listed by IUCN. Although not recorded during surveys, they are cave-dwelling bats potentially vulnerable to disturbance, roost destruction, and changes in hydrology. Sensitivity is medium given global decline trends and specific roosting requirements.
	Other bat species	Moderate	Y	Low	Other bat species present are widespread LC/NT taxa, generally tolerant of habitat modification, and without specific conservation concern. Their sensitivity is assessed as low
Fishes	*Anguilla anguilla*	Moderate	Y	High	Critically Endangered migratory fish with global population declines due to overfishing, barriers to migration, and habitat loss. Its occurrence in project waters confers high sensitivity
	Alburnus baliki	Moderate	Y	High	Endangered, range-restricted endemic species with small populations. Presence in project area increases sensitivity, as impacts may have significant consequences for its survival.
	Capoeta antalyensis	Moderate	N	High	Regional endemic and IUCN Vulnerable species. Although not observed in the project area, its restricted range and conservation status confer high sensitivity to potential impacts in its distribution range.

Biodiversity Receptor		Relative Abundance	Presence in Impact Area (Y/N)	Sensitivity	Rationale
	Pseudophoxinus fahrettini	Moderate	Y	High	Regional endemics, threatened (EN). Occurrence in project streams indicates high sensitivity due to restricted range, small populations, and dependence on freshwater integrity.
	Pseudophoxinus battalgilae	Moderate	Y	High	Regional endemics, threatened (EN). Occurrence in project streams indicates high sensitivity due to restricted range, small populations, and dependence on freshwater integrity.
	Cyprinus carpio	Moderate	Y	Medium	Vulnerable species, but widespread and abundant in natural and artificial habitats. Sensitivity is medium given global status but regional commonness.
	Capoeta caelestis	Moderate	Y	Medium	Endemic to southern Türkiye with a relatively wide distribution. Locally common and adaptable to different freshwater habitats. Not globally threatened. Sensitivity assessed as medium, reflecting its regional endemic status but absence of site-specific restriction.
	Cobitis battalgilae	Low	N	Medium	Endemic loach with a distribution extending beyond the project area. Although of conservation interest, it remains widespread in its range and is not considered globally threatened.
	Oxynoemacheilus eregliensis	Low	Y	Medium	Endemic to central and southern Türkiye and assessed as Vulnerable by the IUCN. Despite its status, it is not confined to the project area. Sensitivity assessed as medium, given conservation concern but wider distribution.
	Alburnus escherichii	Low	N	Medium	Freshwater endemic with a relatively broad distribution across Türkiye. Populations are not restricted to the project area, and the species is not globally threatened.
	Squalius anatolicus	Moderate	N	Medium	Endemic species with a wide distribution in Anatolia. It remains relatively common where suitable habitats occur.
	Squalius fellowesii	Moderate	Y	Medium	Endemic to southwestern Türkiye with populations present within the project area. The species is locally common and not of elevated global concern.
	Salmo ekmekciae	Low	N	Medium	Regional endemic trout with a limited but not project-specific distribution. While of ecological importance, it is not globally threatened.
	Other fish species	Moderate	Y	Low	Common LC or NT fishes without conservation concern or national protection. These species are tolerant of habitat disturbance.

Habitat Loss

The proposed motorway will require permanent land take and temporary occupation of land during construction. This will result in the direct loss of terrestrial and aquatic habitats along the alignment and in associated infrastructure areas.

Baseline surveys have identified 12 habitat types within the Project footprint, comprising both natural and modified habitats, with some areas meeting Critical Habitat criteria.

The total area of habitat loss has been quantified using a habitat hectare approach, which combines the area of each habitat with its condition score, distinctiveness, and strategic importance to provide a measure of biodiversity value. Predicted losses of natural habitats and critical habitat is given in Table IX.31 with their condition scores, distinctiveness, and strategic importance.

Table IX.31 Habitat Types, Covered Areas, Losses and Habitat Assessment Scores in the Project Area

Habitat Type	Total Study Area (ha)	Net Loss (ha)	Habitat Assessment Score		
			Distinctiveness	Condition	Strategic Importance
C2 Surface running waters	37	1.22	6	2	1
S5 Maquis, arborescent matorral and thermo-Mediterranean scrub	88	13.43	6	2	1
S5 Maquis, arborescent matorral and thermo-Mediterranean scrub *(Critical Habitat)*	259	58.76	6	2	1
S6 Garrigue	447	132.95	6	3	1
S7.211 Aegean *Sarcopoterium phrygana*	171	37.37	6	3	1
T3 Coniferous forest	1092	317.40	6	3	1
T1.4 Mediterranean and Macaronesian riparian forest	94	17.96	6	3	1

The losses include both permanent impacts (within the motorway carriageway footprint, embankments, and permanent facilities) and temporary losses during construction (e.g. site compounds, laydown areas), some of which will be reinstated post-construction.

The magnitude and significance of habitat losses vary depending on:

- Conservation value of the habitat
- Condition score of the habitat prior to impact
- Functional role in supporting key species
- Irreplaceability and potential for restoration

In addition to total habitat area lost, the motorway will create habitat fragmentation, isolating remaining habitat patches and potentially reducing ecological connectivity.

Terrestrial Flora

Türkiye has very rich plant diversity, with about 12,000 taxa, of which approximately 4,000 are endemic, meaning they grow only in Türkiye. Several factors contribute to Türkiye's plant richness,

including its diverse climate types, geological and topographical structure, and the presence of various rich habitats such as steppes, maquis, forests, rocks, wetlands, and beaches. Additionally, Türkiye is located at the intersection of the Euro-Siberian, Irano-Turanian, and Mediterranean phytogeographic regions. Beyond species richness, Türkiye's flora is also significant for containing the natural ancestors of many grains, legumes, and various fruits used as food products.

Through field surveys and literature reviews, the presence of 221 vascular plant taxa was identified within the project implementation area and its surroundings. Most of these species are widely distributed. Among them, seven species (*Eryngium kotschyi, Phlomis leucophracta, Phlomis lycia, Phlomis monocephala, Phlomis nissolii, Pyrus serikensis and Sideritis congesta*) are endemic. Considering their distribution patterns and the requirements for maintaining healthy populations, the Project Area does not possess critical habitat characteristics essential for these endemic taxa.

Amphibians

Based on observations and literature, it was determined that five amphibian species are distributed in the Project Area and the nearby region considered as the impact zone. Among these species, *Lyciasalamandra atifi* is endemic, while the remaining four species are widely distributed. According to the IUCN conservation status, one of the five species in the area is categorized as Endangered (EN), three are categorized as Least Concern (LC), and one species has not yet been evaluated (NE). *Lyciasalamandra atifi*, a land salamander endemic to Türkiye, is under threat due to factors such as climate change, collection, habitat destruction, the introduction of alien species, and urbanization.

Reptiles

Field studies conducted within the Project Area and its ecological impact boundaries, along with interviews with local people and literature data, have identified a total of 25 reptile species that could potentially inhabit the area. Among these, four species are endemic. The remaining 21 species are generally widely distributed and considered tolerant.

Regarding IUCN conservation status, it was determined that none of the reptile species in the area fall into a threatened category, except for *Testudo graeca*, which is categorized as Vulnerable (VU). The other species are classified as Least Concern (LC) or Not Evaluated (NE). *Testudo graeca*, despite being listed as VU, has a wide distribution across Türkiye, with healthy populations in the regions where it is found. The VU classification for this species is based on European populations.

Birds

The Project Area is located in a region with a high population density and various habitats, including aquatic ecosystems, agricultural areas, maquis, and forest areas. Based on field studies and literature, a total of 124 bird species have been identified in the Project Area and its immediate surroundings. None of the identified bird species are endemic, and all are widely distributed, cosmopolitan species. Most of these species are native to terrestrial habitats.

According to the IUCN conservation status, *Neophron percnopterus* (Egyptian vulture) is categorized as Endangered (EN), and *Streptopelia turtur* (European turtle dove) is categorized as Vulnerable (VU), *Circus macrourus (Pallid Harrier)* is categorized as Near Threatened (NT) and *Corvus cornix* (Hooded Crow) is Not Evaluated (NE). The remaining 120 species are classified as Least Concern (LC).

Mammals

It has been determined that 46 mammal species can be encountered in the immediate vicinity of the Project Area. Among these, two bat species (*Myotis capaccinii* and *Rhinolophus mehelyi*) are classified as “Vulnerable – VU “according to the IUCN Red List. Other mammal species identified in the Project Area and its surroundings are are classified as Least Concern (LC) and do not have critical sensitivity. None of the identified mammal species are endemic.

Fishes

It has been determined that 29 fish species are likely to be present in the streams along the motorway route. Among these, 11 species are endemic. Some of these endemic species are widely distributed. For those endemic species with a relatively narrow distribution, the Project Area and its impact zone do not exhibit critical habitat characteristics.

IX.7.2. Construction Phase Impacts on Ecology

The potential impacts on biodiversity are associated with the following impact factors:

- Vegetation and topsoil removal
- Habitat loss and habitat fragmentation
- Water pollution
- Noise and dust pollution
- Increase in vehicular traffic
- Light disturbance
- Invasive species

For the construction phase, the Project footprint was defined as a corridor along the Motorway Route, encompassing the motorway width (35.5 m), the minimum expropriation corridor (55 m), and extensions of up to 450 m at locations such as interchanges, large embankments and cut sections, and service areas. In addition to the main route, the impact assessment also considers wider project components including access roads, construction camps, material storage areas, borrow pits, quarries, and disposal sites, some of which are located outside the designated expropriation corridor. The effects identified for each section in relation to construction activities are summarized below.

Vegetation and Topsoil Removal

The Project's construction phase will require the removal of the majority of vegetation within the Project Area, and this is a direct adverse impact that is permanent and irreversible. The loss of vegetation will also cause fragmentation to the remaining areas of habitats in the Project Area. Construction activities including vegetation clearance and topsoil stripping, creation of campsites, storage areas and quarries, creation of culverts, bridges and viaducts, presence of site preparation, and construction vehicles have the potential to cause indirect adverse impact to surrounding habitats from runoff and dust.

On the other hand, cuttings and embankments change landscape topography and often induce large-scale changes in hydrology. Cuttings may increase soil erosion and drain aquifers, and Embankments may change the water regime producing either drier or wetter conditions. These changes will affect vegetation, e.g., in wetlands and riparian habitats.

Habitat Loss and Habitat Fragmentation

The assessment of habitat impact (removal of vegetation cover) is related to the structural value of the habitat for fauna and does not consider the species composition of the removed vegetation cover. Flora experts evaluated the species components of the vegetation cover and the threatening conditions.

The Project Area is predominantly comprised of maquis vegetation and agricultural lands, with occasional patches of degraded forest habitats. The construction of the motorway is not anticipated to significantly impact biodiversity in agricultural areas. However, some sections of maquis vegetation may experience alterations to their natural structure, and selecting natural forest areas for soil deposition could lead to negative effects on biodiversity. To mitigate these potential impacts, post-construction rehabilitation measures should be carried out to restore the natural characteristics of the affected habitats. Provided that appropriate conservation strategies are implemented, it is unlikely that the project will result in permanent habitat loss for plants.

One of the primary ecological concerns associated with motorway projects is habitat fragmentation. To maintain genetic diversity and ensure wildlife movement, it is crucial to facilitate connectivity between both sides of the road. Ecological overpasses should be strategically placed to support animal movement. However, due to the region's topography and the presence of rivers, the motorway will incorporate 16 viaducts, 22 bridges, and at-grade crossings, which are expected to serve this purpose. Additionally, because the motorway runs parallel to the Mediterranean coast at a low elevation (10-160 m), no north-south migrating species have been identified in the area. The southern side of the motorway also lacks continuous habitats, reducing the likelihood of significant habitat fragmentation. Furthermore, since the southern side of the Motorway does not have contiguous habitats, the Project is expected to cause minimal habitat fragmentation. 305 culverts will be constructed along the motorway to reduce the residual effects of habitat fragmentation, the relevant maps are presented in Annex 11C of this ESIA report.

Water Pollution

Violation of the vegetation cover and the natural environment of the region will cause degradation or destruction of habitats in these regions. The construction of motorways will affect rivers damaged by excavation and blasting, the construction of artificial structures, the smoothing of beds of stream flows, and the activities of flood areas. Construction and excavation work in the coastal regions of waterways affect aquatic organisms, water-supported habitats, and fauna species. Contamination of pollution during activities and increasing water blurring will inevitably occur. If the mitigation measures are not taken, this contamination can result in reduction or destruction settlement of the basin gradual and natural biosynthetic reservoirs.

Noise and Dust Pollution

The effects of the construction activities will include dust, noise, and vibration. These effects may impact indigenous mammalian species, but none of these effects will have a lasting impact on species. After the construction activity is over, it is expected that the composition of the fauna species will return to its original state in time.

Increase in Vehicular Traffic

During the construction phase, an increase in vehicular traffic is anticipated within the construction site and across various project facilities. As a result, there is a potential for direct impacts, including accidental collisions with wildlife. The Project will primarily utilize existing roads for transportation. However, the increased traffic volume may also lead to indirect negative impacts, such as habitat degradation, which could adversely affect wildlife populations that are dependent on specific habitat conditions.

In general, traffic can significantly influence wildlife behavior and distribution patterns, potentially leading to displacement or avoidance of affected areas.

Introduction and Spreading of Invasive Species

The removal of natural vegetation cover and soil disturbance during the construction phase may facilitate the spread of invasive alien (non-native) species. These species can be inadvertently introduced via construction vehicles, trucks, and heavy machinery operating within the project area.

Invasive alien species often thrive in disturbed ecosystems and, once established, may alter habitat functionality and species composition. This includes potential adverse effects on priority biodiversity species.

Applying a precautionary approach, a 100-meter buffer around all Project facilities has been considered for assessing the risk and potential impact of invasive species introduction and spread.

IX.7.2.1. Internationally Recognized Areas

The magnitude of the construction impacts in internationally recognized areas intersecting with the Project Area is evaluated as significant for more than 3% of the intersection area. The areas smaller than 3% of the intersection areas are considered negligible. Within the scope of the Project, only Antalya Plains and Belek SEPA, and Köprüçay Basin intersects with the Motorway. Total intersection areas have been determined and is given inTable IX.8 and Table IX.9.

The assessment will include the habitat loss calculations due to construction activities. Given the distance, predicting any adverse indirect impacts from changes in air quality, the introduction of invasive species or disturbances during the construction phase is challenging, making a comprehensive assessment in this regard difficult to provide.

IX.7.2.2. Impacts on Natural and Modified Habitats

Most significant impact due to the construction phase of the Project is the habitat fragmentation. The loss of vegetation will also cause fragmentation to the remaining areas of habitats in the vicinity of the Project Area. For this reason, the quality of the habitat and the biodiversity of the habitat will be adversely affected.

The Project's construction phase will require the removal of the majority of vegetation, and it is a direct adverse impact that is permanent and irreversible.

The magnitude of construction impacts on terrestrial habitat types evaluated and given inTable IX.32.

Table IX.32 The magnitude of Construction Impacts on Terrestrial Habitats

Habitat	Potential Impact	Magnitude of Impacts
S5 - Maquis, Arboreal Matorral, and Thermo-Mediterranean Scrub	Habitat loss and habitat fragmentation Vegetation and topsoil removal Noise and dust pollution	Medium (Adverse)
G1.1 - Riparian and Gallery Forests Dominated by Alnus, Betula, Populus, or Salix Genera		
T14 - Mediterranean and Macaronesian Riparian Forest		
S7.211 - Aegean Sarcopoterium phrygana		
S6 - Garrigue		
T3 - Coniferous Forest		
J1 - Urban, Town, and Village Buildings		
V1 - Arable Land and Market Gardens		
C2 - Surface Flowing Waters	Habitat loss and habitat fragmentation Water pollution	

Construction activities including vegetation clearance and topsoil stripping, creation of campsites, storage areas and quarries, construction of culverts, bridges, and viaducts, and presence of site preparation and construction vehicles have the potential to cause indirect adverse impact to surround habitats from runoff and dust. Runoff can introduce silt, nutrients, chemical contaminants, and non-native species without mitigation. In addition, construction activities, the importation of fill, and the movement of people and vehicles can introduce invasive species that may impact the remaining adjacent habitats before implementing mitigation measures.

In order to accurately quantify habitat loss resulting from the direct impacts of construction activities, certain structures and areas were excluded from the final loss caculations. These include infrastructure such as viaducts, and tunnels that do not cause habitat fragmentation, as well as temporarily affected areas such as campsites that are scheduled for rehabilitation.. Each habitat has been aveluated individually for net loss/gain and necessary details are given in Table IX.33.

Table IX.33. Net Loss of Natural Habitats Within Study Area

Habitat	Total Study Area (ha)	Net Loss (ha)	% of Loss by Total Study Area
C2 Surface running waters	37	1.22	3.3
S5 Maquis, arborescent matorral and thermo-Mediterranean scrub	88	13.43	15.3
S5 Maquis, arborescent matorral and thermo-Mediterranean scrub *(Critical Habitat)*	259	58.76	22.7
S6 Garrigue	447	132.95	29.7
S7.211 Aegean *Sarcopoterium phrygana*	171	37.37	21.9
T3 Coniferous forest	1,092	317.40	29.1
T1.4 Mediterranean and Macaronesian riparian forest	94	17.96	19.1
Total	**2,188**	**579.09**	**26.5**

IX.7.2.3. Impacts on Flora and Fauna

Terrestrial Flora

Baseline surveys identified seven endemic plant species within the Project Area: *Eryngium kotschyi, Phlomis leucophracta, Phlomis lycia, Phlomis monocephala, Phlomis nissolii, Pyrus serikensis,* and *Sideritis congesta.* Among these, *Pyrus serikensis* is of particular importance as a regional endemic with a restricted distribution and conservation concern. Field observations recorded approximately 20 individuals of *Pyrus serikensis* in localized patches within the maquis habitat, with possibility of more. Loss of these individuals, combined with removal of associated soil seed banks, would represent a notable proportion of the local population, leading to a Medium (Adverse) impact magnitude prior to mitigation.

The other six endemic species were found to be widespread across multiple habitat types, often occurring with low individual densities but broad distribution within the study area. Given their wider ecological tolerance, given that these species relative abundance was assessed as moderate (which quantifies as 20-100 individuals in the area), the impact of habitat clearance and construction disturbance is expected to result in localized losses but not threaten population viability at the regional level,.. Therefore, construction impacts on these species are classified as Low–Medium (Adverse) prior to mitigation. The magnitude of construction impacts on flora species of conservation importance within the project scope is provided in Table IX.34.

Table IX.34. The magnitude of Construction Impacts on Plant Species

Species	Potential Impact	Magnitude
Pyrus serikensis	Vegetation and topsoil removal Habitat loss and habitat fragmentation Noise and dust pollution	Medium (Adverse)
Eryngium kotschyi		Low-Medium (Adverse)
Phlomis leucophracta		
Phlomis lycia		
Phlomis monocephala		
Phlomis nissolii		
Sideritis congesta		

Amphibians and Reptiles

Baseline herpetofauna surveys identified one amphibian species of conservation concern, *Lyciasalamandra atifi*, and several reptile species within and/or around the Project Area.

Lyciasalamandra atifi was observed outside of Project Area with a total of 4 individuals recorded. Given its localized distribution and habitat specificity, the loss of vegetation and topsoil removal will result in localized habitat loss but not a significant reduction in the species' wider population, leading to a Low (Adverse) impact rating.

Testudo graeca populations were recorded more frequently, across the Project Area. No individual numbers were recorded for this species as this species is quite widespread and has a stable population in Türkiye. Consequently, the magnitude of impacts on this species is considered Low (Adverse) prior to mitigation.

The remaining reptile species present in the area were observed at moderate densities (20-100 individuals) across multiple habitat types. Altough vegetation clearance will cause direct mortality and local population reductions, their wider distribution and higher reproductive capacity indicate that regional populations are unlikely to be significantly affected. Therefore, these species are assessed as Low (Adverse) prior to mitigation.

The magnitude of construction impacts on amphibian and reptiles species of conservation importance within the Project scope is provided in Table IX.35.

Table IX.35. The magnitude of Construction Impacts on Amphibian and Reptiles

Species	Potential Impact	Magnitude
Lyciasalamandra atifi	Habitat loss and habitat fragmentation	Low (Adverse)
Testudo graeca	Vegetation and topsoil removal Habitat loss and habitat fragmentation	
Lacerta pamphylica		
Anatololacerta ibrahimi		
Ablepharus anatolicus		
Blanus aporus		

Birds

The forest, riparian habitats, and wet meadows in natural habitats on the route are susceptible for birds as feeding, breeding, and sheltering areas. For this reason, the water regime of riparian and wet meadow habitats outside of the Motorway route, which motorway construction can affect, mitigations will be taken. Otherwise, if the water regime of these sensitive habitats is diminishing and/or discontinued, the feeding and sheltering habitats for birds will disappear that are directly and/or indirectly dependent on the aquatic environment. The motorway corridor where the Project will be implemented does not exhibit specialized habitat characteristics that uniquely support these species for breeding, feeding, or wintering. Due to their ability to fly, bird species are not expected to be destroyed, therefore no individual losses are expected, as they can relocate to alternative habitats. Therefore, significant adverse effects on birds species due to the Project activities are not expected.

The magnitude of construction impacts on bird species of conservation importance within the Project scope is provided in Table IX.36

Table IX.36. The magnitude of Construction Impacts on Birds

Species	Potential Impact	Magnitude
Neophron percnopterus	Vegetation and topsoil removal Habitat loss and habitat fragmentation	Low (Adverse)
Streptopelia turtur		
Accipiter nisus		
Aquila chrysaetos		
Buteo buteo		
Buteo rufinus		
Circaetus gallicus		
Circus aeruginosus		
Circus cyaneus		
Circus macrourus		
Ciconia ciconia		
Ciconia nigra		
Falco columbarius		
Falco peregrinus		
Falco subbuteo		

Species	Potential Impact	Magnitude
Falco tinnunculus		

Mammals

The construction phase of the Project will eliminate most of the vegetation within the Project Area, including habitats that support mammal species. The removal of vegetation is also expected to cause fragmentation of the remaining habitats around the Project Area. Due to disturbances from construction noise and activities, large mammal species are expected to relocate to suitable habitats during the construction activities.

Baseline surveys documented several mammal species within and around the Project Area, with bats (*Myotis cappaccinii, Rhinolophus mehelyi*) representing the most conservation-sensitive group, identified from literature. Non-volant mammals such as *Vulpes vulpes*, *Lepus europaeus*, and *Erinaceus concolor* were recorded opportunistically, while larger mammals such as *Canis aureus* were also noted by tracks and local reports, confirming their occasional presence but indicating they are not resident in high numbers. All of the mammal species around the Project Area are considered to have 20-100 individuals, however only a few individuals were recorded during surveys. Non-volant mammals are generally wide-ranging and adaptable to disturbance. Construction-phase impacts on these species will largely be limited to localized habitat displacement and temporary disturbance, with no expected population-level consequences due to them leaving the construction site because of the disturbance, therefore the planned project is not expected to have a direct impact on them.

The most common mammal group in and around the Project Area is bats, most of them being identified from literature studies. Bats may be observed flying during feeding or migration periods. Bat species generally use caves, tree holes, or buildings for nesting. Quarries located in the Project Area are examples of these nesting areas and there is a possibility that the species may nest there. As a result, the magnitude of construction impacts on mammal species of conservation importance within the Project scope is provided inTable IX.37.

Table IX.37. The magnitude of Construction Impacts on Mammals

Species	Potential Impact	Magnitude
Myotis capaccinii	Vegetation and Topsoil Removal Habitat Loss and Habitat Fragmentation	Medium (Adverse)
Rhinolophus mehelyi		

Fishes

When the literature data and field studies were evaluated according to the IUCN conservation status, it was found that five species are under threat. It is well known that anthropogenic effects can have numerous negative impacts on fish species, the most significant being changes in water quality and habitat degradation. During field surveys, occasional individuals were recorded, indicating migratory use rather than resident populations. Most native cyprinids are relatively tolerant to disturbance but remain vulnerable to water pollution. Endemic species are more sensitive to localized habitat changes however considering the Project does not have significant effects on aquatic habitats, impacts on all fish species and populations are expected to to be Low (Adverse).

The Project is not expected to cause water quality deterioration. No negative effects are anticipated if the recommended measures to prevent habitat degradation during the construction of bridges and viaducts are implemented.

In conclusion, it has been observed that the activities to be carried out as part of the Project will not impact the distribution and population density of fish species. The magnitude of construction impacts on fish species within the Project scope is provided in Table IX.38.

Table IX.38. The magnitude of Construction Impacts on Fishes

Species	Potential Impact	Magnitude
Anguilla anguilla	Habitat Loss and Habitat Fragmentation Water Pollution	Low (Adverse)
Alburnus baliki		
Capoeta antalyensis		
Pseudophoxinus fahrettini		
Pseudophoxinus battalgilae		
Cyprinus carpio		
Capoeta caelestis		
Cobitis battalgilae		
Oxynoemacheilus eregliensis		
Alburnus escherichii		
Squalius anatolicus		
Squalius fellowesii		
Salmo ekmekciae		

IX.7.3. Operation Phase Impacts on Ecology

The potential impacts on biodiversity are associated with the following impact factors:

- Presence of new buildings and infrastructures
- Disturbance and pollution
- Motorway traffic
- Invasive species

For the operational phase, the project footprint was defined to include the Project route with a 20-meter buffer on each side. This footprint also encompasses permanent infrastructure such as stations, switchyards, bridges, overpasses, underpasses, and viaducts.

Temporary facilities, including construction camps, concrete and precast plants, and storage areas, borrow sites, quarries, and the basalt quarry, were excluded from the operational footprint. These facilities are planned to be fully rehabilitated following the completion of the construction phase.

Indirect impacts during the operational phase were conservatively assessed within buffer zones extending 100 to 300 meters from the edges of the defined project footprint and temporary facilities.

Since the construction period effects are long-term effects, the duration of the operation period is also included. Therefore, the magnitude of the construction phase impacts will also be valid for the operating period for some species.

There will be several potential impacts for ecological components along the Motorway route during the operation phase. These impacts include operational traffic and noise and visual disturbance, damage and/or loss of fauna, barrier effect, changes in air quality (pollution), and surface and groundwater quality (pollution). Relating surface and groundwater quality and air quality are described in Chapter 8 ("Water Resources") and Chapter 10 ("Air Quality and Climate Change"), respectively.

It will be noted that the baseline may have shifted considerably from conditions pre-construction after construction. As such, impacts on species have been predicted, adopting a precautionary approach that assumes species are still present along the Motorway.

Presence of new buildings and infrastructures

The areas affected by this impact factor will be limited to the Project footprints, including permanent facilities. Temporary facilitates such as quarries, borrow sites, storage area for excess excavated material, blasting areas are planned to be reclaimed after the construction phase. However, the rehabilitation of these areas must be carefully monitored to make sure the target is met.

Barrier effects: The barrier effect of roads is probably their most significant negative ecological impact. The dispersal ability of individual organisms is one of the critical factors in species survival. The ability to move around a landscape in search of food, shelter, or mate is negatively impacted by barriers that cause habitat isolation. Impacts on individuals affect population dynamics and often threaten species' survival. The only way to avoid the barrier effect is to make infrastructure more permeable to wildlife through fauna passages, adapt engineering works, or manage traffic flows. Carefully selecting the road route through the landscape can minimize the barrier problem.

Due to the habitat fragmentation effect, the barrier effect is the most significant adverse effect for small and large mammal species. Impacts on individuals affect population dynamics and often threaten species' survival. The barrier affects can investigate in two points as follow:

- *Physical barrier:* Transport infrastructure becomes a complete barrier for larger mammals only if fenced or if traffic intensity is high. For smaller animals, especially invertebrates, the road surface and verge impose a more substantial barrier because the substrate is barren or the disturbance is too great.
- *Behavioral barrier:* Many larger wildlife species avoid areas near roads related to the degree of human disturbance (traffic density, secondary development). Wild reindeer in Norway, for example, under-utilize their grazing resources within 5 km of roads. Other animals, such as small mammals and some forest birds exhibit behavioral avoidance patterns when crossing large open spaces.

Table IX.39. The relationship between road traffic density and the barrier effect on mammals

Traffic density	Permeability
Road with traffic below 1000 vehicles/day	Permeable to most wildlife species
Roads with 1000 to 4000 vehicles/day	Permeable to some species but avoided by more sensitive species.

Roads with 4000 to 10000 vehicles/day	Strong barriers, noise, and movement will repel many individuals. Many trying to cross the road become road casualties.
Motorways with traffic levels above 10000 vehicles/day	Impermeable to most species.

Within the scope of motorway projects, traffic flow can be impenetrable for mammal species. However, recommended culverts will be used as animal passes, preventing mortality due to the traffic flow. For the Antalya-Alanya Motorway Project, it's been assessed as no medium to large mammal species uses the Project area as a passage, however considering the Annual Average Daily Traffic is expected to be approximately 25000 vehicles/day and the impermeability in Table IX.39 additional measures such as culverts, underpasses, viaducts and/or bridges will be implemented to ensure safe passages and to reduce barrier effects.

If mitigation measures are not taken for noise control, noise impacts would be disturbed a large area of terrestrial habitats. While smaller species of mammals may not be significantly affected by disturbance, larger and more reclusive species such as wild cats are likely to avoid the vicinity of the motorway.

Disturbance and pollution

Road development and operation alter the ecological characteristics of adjacent habitats, which may induce changes in the way they are used by wildlife. Many of these changes can affect habitat quality at a significant distance from the infrastructure development.

The following are the main types of disturbance associated with transport infrastructure:

- Chemical pollution:
  - A wide range of pollutants are derived from road traffic and the road surface.
  - Motor exhausts give rise to, for example, carbon monoxide, nitrogen oxides, sulphur dioxide, hydrocarbons, including polycyclic aromatic hydrocarbons (PAH), dioxins, and particles.
  - Vehicles are sources of heavy metals such as lead, zinc, copper, and cadmium. Sodium and chloride pollution comes from de-icing salt.
  - The chemicals pollute surface and groundwater, soil and vegetation along roads.
  - Compounds containing nitrogen and sulphur contribute to acidification and eutrophication.
  - Pollutants can disrupt biological functions at multiple levels of organization, ranging from cellular processes to individual organisms and entire populations.

- Noise and vibration:
  - The disturbance from noise is mainly influenced by traffic, traffic intensity, road surface properties, topography, rail type, and the structure and type of the adjacent vegetation.
  - Geological and soil characteristics influence the magnitude and spread of vibrations.
  - Some species avoid noise-disturbed areas. For example, in the Netherlands, bird densities declined where the traffic noise exceeded 50 dBA, whereas woodland birds were sensitive to noise levels as low as 40 dBA.

- Some species maintain moderate population densities in disturbed habitats; however, their reproductive success is significantly reduced under such conditions.

- Lighting and visual disturbances:
  - Artificial lighting, such as overhead streetlights, can affect growth regulation in plants, disturb breeding and foraging behaviour in birds or influence the behaviour of nocturnal amphibians.
  - "Artificial lighting, particularly from mercury vapor lamps, can attract large numbers of insects, which may lead to increased local bat activity along roads and consequently elevate the risk of bat mortality due to vehicle collisions..

Motorway Traffic

Fauna casualties: Mortality is probably the best-known impact of traffic on wildlife. Millions of individuals of a wide range of wildlife species are killed on roads mostly. Large numbers of fauna casualties may not necessarily imply a threat to populations but indicate that the species involved are locally abundant and widespread.

Traffic mortality will be considered responsible for just a small proportion (1-4%) of the total mortality of common species (rodents, rabbits, foxes, sparrows, blackbirds, etc.). However, unless mitigation measures are taken, traffic can cause mortality and significantly affect local population survival for more sensitive species.

Invasive Species

Motorway corridors often undergo habitat changes, as their verges typically differ in structure and composition from the surrounding landscape, while remaining relatively uniform along the motorway. These altered habitats can be exploited by generalist species and opportunistic individuals, which may use the verges as movement corridors or temporary shelters.

Such conditions can also facilitate the establishment and spread of invasive species, further altering local biodiversity dynamics and potentially impacting native species and ecosystem functionality.

Terrestrial Flora

During the operation phase, the primary impacts on flora are expected to stem from barrier effects, pollution, and the facilitation of invasive species spread along disturbed corridors.These impacts are more subtle than those during construction but can lead to long-term population decline in sensitive or narrowly distributed species.

Among the seven recorded endemics, *Pyrus serikensis* is of particular concern due to its very restricted distribution. Baseline surveys confirmed only small and scattered populations. Making it more vulnerable than other species regarding barrier effects and soil chemistry alteration.

Other endemics occur more widely, but nonetheless sensitive to pollution (dust, exhaust emissions), and to competition from invasive plants that may occur by road edges. These species are more tolerant but still face risks from localized impacts.

Overall while operational impacts may not cause immediate losses, they can gradually reduce population viability over time, especially for species with restricted ranges such as *Pyrus serikensis.* Considering the endemic species being widespread in the region no significant population loss is expected to occur during the operation phase. With the sensitivity of *Pyrus serikensis* in mind, the magnitude of operation impacts on terrestrial flora species within the Project scope is provided in Table IX.40.

Table IX.40. The magnitude of Operational Impacts on Plant Species

Species	Potential Impact	Magnitude
Pyrus serikensis	Noise and dust pollution Alteration of soil chemistry	Medium (Adverse)
Eryngium kotschyi		Low (Adverse)
Phlomis leucophracta		
Phlomis lycia		
Phlomis monocephala		
Phlomis nissolii		
Sideritis congesta		

Amphibians and Reptiles

During the operational phase, amphibians and reptiles are mainly threatened by habitat fragmentation and barrier effects, which hinder seasonal movements between foraging, breeding, and overwintering habitats. Amphibians are particularly vulnerable due to their dependence on humid microhabitats and relatively low dispersal capacity.

Species such as *Lyciasalamandra atifi*, already restricted in range, may suffer localized population declines due to vehicle collisions during migration or post-rain activity. However considering that this species is not present in the Project Area, it is not expected that this impact will be significant.

The magnitude of operation impacts on amphibian and reptile species within the Project scope is provided in Table IX.41.

Table IX.41. The magnitude of Operational Impacts on Amphibian and Reptiles

Species	Potential Impact	Magnitude
Lyciasalamandra atifi	Mortality due to vehicle collisions	Low (Adverse)
Testudo graeca	Mortality due to vehicle collisions	
Lacerta pamphylica		
Anatololacerta ibrahimi		
Ablepharus anatolicus		
Blanus aporus		

Birds

During the operational phase of the motorway, birds may be impacted by continuous noise and light disturbance, which can interfere with breeding behavior, and territory establishment, particularly for songbirds and nocturnal species. The presence of fast-moving vehicles increases the risk of collisions, especially for low-flying or ground-nesting species. Additionally, changes in vegetation structure along road verges and increased human activity can create unsuitable conditions for sensitive or specialist bird species.

Baseline surveys indicate that most species in the Project Area are wide-ranging species, migratory birds, or generalist woodland species, capable of relocating to alternative habitats in the vicinity. Although some edge effects may occur along road verges, the overall availability of suitable habitats outsite the corridor is sufficient to maintain populations, limiting long-term population-level impacts.

As a result, all operational phase impacts are assessed as Low (Adverse). The magnitude of operation impacts on bird species within the Project scope is provided in Table IX.42.

Table IX.42. The magnitude of Operational Impacts on Birds

Species	Potential Impact	Magnitude
Neophron percnopterus	Mortality due to vehicle collisions Disturbance from light/noise	Low (Adverse)
Streptopelia turtur		
Accipiter nisus		
Aquila chrysaetos		
Buteo buteo		
Buteo rufinus		
Circaetus gallicus		
Circus aeruginosus		
Circus cyaneus		
Circus macrourus		
Ciconia ciconia		
Ciconia nigra		
Falco columbarius		
Falco peregrinus		
Falco subbuteo		
Falco tinnunculus		

Mammals

During the operational phase of the project, mammals may experience impacts due to habitat fragmentation, increased mortality risk from vehicle collisions, and distruption of established movement corridors and commuting routes.

Survey results show that no big or medium size mammals use the motorway corridor as a regular movement corridor, so impacts on these species are limited to minor disturance in adjacent habitats. No permanent population losses are expected for wide-ranging species. Light pollution due to artifical lighting along the motorway can alter foraging behavior, deter species from using traditional paths, or

attract them to hazardous areas with high traffic activity, especially for nocturnal species and bats. Noise pollution and the creation of edge habitats may reduce habitat quality for both bats and terrestrial mammals, potentially leading to long-term population declines and reduces genetic connectivity. However these impacts are not expected to be significant for terrestrial mammals. The magnitude of operation impacts on mammal species within the Project scope is provided in Table IX.43.

Table IX.43. The magnitude of Operational Impacts on Mammals

Species	Potential Impact	Magnitude
Myotis capaccinii	Mortality due to vehicle collisions Light pollution Noise pollution	Medium (Adverse)
Rhinolophus mehelyi		

Fishes

Fish populations may be affected by alterations in water quality and hydrology caused by runoff containing pollutants such as oil, heavy metals, and road salts entering nearby water bodies, potentially leading to habitat degradation, reduced oxygen levels, and increased stress or even mortality. Changes to stream flow patterns from culverts or drainage structures can distrupt spawning grounds and migration routes, particularly for species that depend on specific flow conditions for reproduction. Baseline surveys indicate that most fish species in the Project Area are relatively widespread or tolerant of moderate disturbance. Provided that bridge and viaduct construction ensures fish passage, impacts on fish populations are expected to remain Low (Adverse).

In conclusion, it has been observed that the activities to be carried out as part of the Project will not impact the distribution and population density of fish species. The magnitude of operation impacts on fish species within the Project scope is provided in Table IX.44.

Table IX.44. The magnitude of Operational Impacts on Fishes

Species	Potential Impact	Magnitude
Anguilla anguilla	Water Pollution	Low (Adverse)
Alburnus baliki		
Capoeta antalyensis		
Pseudophoxinus fahrettini		
Pseudophoxinus battalgilae		
Cyprinus carpio		
Capoeta caelestis		
Cobitis battalgilae		
Oxynoemacheilus eregliensis		
Alburnus escherichii		
Squalius anatolicus		
Squalius fellowesii		
Salmo ekmekciae		

IX.8. Mitigation Measures

The following section details the mitigation measures are detailed the following sections to avoid, reduce and offset potential impacts for ecology and biodiversity from the Project. These measures are described under two headings: the construction and operation phases.

IX.8.1. Construction Phase

The general measures to be taken to the effects on the biologic environment from the Project activities during the construction phase are given below.

General Mitigations

General mitigation measures will be implemented during the construction phase to protect ecological receptors as follow:

- Study areas will be clearly defined before vegetation clearance, where construction activities will occur.
- Access roads will be clearly defined before the onset of construction activities not to harm flora elements outside the construction sites.
- Project construction sites and access roads will be separated from other areas with appropriate signboards, signs, and fences. Therefore, staff and vehicle access to the area will be limited to the construction site.
- Vegetation clearance will take place gradually, so fauna elements will be allowed to leave construction sites align with the construction work programme
- During vegetation clearance, equipment will be selected not to harm plant roots
- The intrusion of any invasive species into the Project Area and its surroundings will be prevented. For this purpose, vehicles used for vegetation clearance and/or plant transfer will be checked beforehand.
- Construction waste generated due to project activities will be stored at designated storage areas, and then disposed of solid waste will not be allowed to be left in natural habitats.
- The construction phase will be carried out with a biodiversity specialist or adequately trained personnel to take mitigation measures and interfere with some impacts from construction activities taken where necessary.
- Measures to reduce noise are provided in Chapter 11 (“Noise and Vibration”) for details.
- Measures to reduce dust and air pollution are provided in Chapter 10, (“Air Quality and Climate Change”).
- Project workers will not be allowed to bring any live animals or plants into the construction site to avoid the risk of pest/invasive species establishing in the Project Area.
- No ecological bridges are recommended as there’s no suitable wildlife passage that occurs within the fragmented habitats. Culverts, viaducts, and tunnels are recommended at suitable locations. Details are given in Biodiversity Management Plan in greater detail.
- Pre-blasting surveys will be carried out by the Biodiversity Specialist.

Terrestrial Habitats and Flora

The majority of the Project Area is composed of maquis vegetation and agricultural lands, with some patches of degraded forest habitats. The construction of the motorway is not expected to have a substantial impact on biodiversity within agricultural areas. However, certain sections of maquis vegetation may experience a loss of natural structure, and the selection of natural forest areas for soil deposition may lead to negative biodiversity consequences. To mitigate these potential impacts, post-construction rehabilitation efforts shall be undertaken to restore the natural characteristics of the affected habitats. With appropriate conservation strategies in place, it is unlikely that the project will result in permanent habitat destruction for vascular plants.

While the project site and surrounding areas are not considered critical for plant biodiversity in Türkiye, minimizing human-induced disturbances and adhering to conservation guidelines remain essential for preserving local biodiversity and ensuring its sustainability.

To ensure the conservation of endemic plant species (*Eryngium kotschyi, Phlomis leucophracta, Phlomis lycia, Phlomis monocephala, Phlomis nissolii, Pyrus serikensis, Sideritis congesta*) it is crucial to monitor this species, assess potential threats, and implement habitat restoration measures, including planting them in suitable environments. This strategy aims not only to prevent population decline but also to enhance population density in the region.

Seeds collected from endemic species in the region will initially be delivered to a seed bank. During the biorestoration phase, the excess collected seeds will be planted in suitable vegetation areas for in-situ conservation purposes.

Terrestrial Fauna

The following mitigation measures are to minimize the potential impacts of the Project on terrestrial fauna:

- Habitat loss, noise, dust, and vehicle-human traffic will be managed by implementing construction activities gradually to provide birds with the necessary time and energy to leave the area.
- Forest and maquis habitats are important breeding, nesting, and feeding areas for large mammals, forest bird species, and turtles. Therefore, it has been deemed appropriate and beneficial to construct culverts in the forested sections of the motorway where the topography is suitable for the passage of large mammals and other species.
- Nesting birds in the Project Area and its surroundings will be monitored during the construction and operational phases, particularly in spring and autumn. After the construction period, checks will be made to see if nesting occurs again in previously occupied areas.
- To prevent the entry of fauna into construction areas, the sites will be fenced. Additionally, traffic will be restricted within the Project Area, except on pre-designed routes, to prevent harm to animals.

Amphibians: *Lyciasalamandra atifi*, an endemic terrestrial salamander, is found in isolated populations along the Taurus Mountains between Alanya and Serik, at elevations ranging from 190 to 1,400 meters. Although field surveys did not detect this species within the Project Area, potentially suitable habitats exist, and as a precautionary measure, *Lyciasalamandra atifi* has been included in the species list. Given that the project corridor lies below its typical elevation range (10-160 meters), it is not considered part of the species' natural distribution. However, due to its endemic status, if the species is detected within the Project Area, a qualified biologist will conduct surveys prior to any surface stripping, excavation, or filling activities. Any individuals found will be safely collected and relocated to appropriate nearby habitats.

Reptiles: The region does not provide critical habitats for breeding, feeding, or sheltering for reptile species. Reptiles are likely to use the area primarily for daily foraging activities, and some species may hibernate in suitable locations. Due to their tendency to avoid human activity, reptiles are expected to move away from construction sites during motorway construction. Additionally, similar habitats are available nearby, ensuring the survival of these species. However, hibernating species that burrow underground could be impacted by surface stripping, excavation, and filling operations. To mitigate this risk, such activities will be avoided during the hibernation period (December–February). If construction is necessary during winter, a qualified biologist or expert will monitor the site and relocate any hibernating individuals to safe areas outside the construction zone.

Birds: The motorway corridor encompasses a variety of habitat types, supporting 124 bird species, the majority of which are migratory. No critical breeding, feeding, or wintering habitats for birds have been identified within the corridor. Most species primarily use the area for foraging. While the project site does not provide specialized habitats for birds, some species with high ecological tolerance may still nest in the area. With the implementation of the recommended mitigation measures, the project is not expected to have a negative impact on bird populations.

Mammals: The predominant mammalian species in the Project Area are rodents, which include both subterranean and semi-subterranean species, such as blind moles and field mice. These rodents are highly adaptable ecologically and have high reproductive rates, resulting in large population densities. However, their distribution is currently restricted by agricultural practices like soil tilling and pesticide application. While construction activities may cause temporary displacement of some individuals, the availability of comparable habitats nearby indicates that the impact will be minimal. Furthermore, given that rodent species naturally re-establish their underground burrows, it is anticipated that their populations will recover following the completion of the project.

Bats: The Project Area hosts the threatened bat species *Myotis capaccinii* and *Rhinolophus mehelyi*. As the rocky sections designated for quarrying offer suitable roosting habitats, it is crucial to conduct pre-construction monitoring to assess the presence of these species. If individuals are detected, appropriate measures will be taken to ensure their safe relocation prior to the commencement of stone crushing operations.

Aquatic Environment

During the construction of transition structures on aquatic systems, the bridge piers will be designed to not come into the stream beds. In this case, there will be no direct interference with aquatic habitats. However, there may be interventions on both the riparian areas and beds of aquatic systems during these works for various reasons. To create the necessary sensitivity against such situations that may occur, it is recommended to take the measures given below and related to the aquatic ecosystem.

The following mitigation measures are to minimize the potential impacts of the Project on aquatic habitats and species:

- Excavation materials will not be dumped onto a riverbed.
- Mixing any chemical substances used in the construction area, in the waterbed, and/or aquatic ecosystems will be prevented.
- Viaduct or bridge construction activities will be conducted in months other than April-May, which is the breeding period, as turbidity can have lethal effects on fish eggs. If the activity has to be carried out, it will be done after determining whether there are breeding fish species in the area.
- The natural structure of the riparian vegetation will be preserved, which forms the spawning and sheltering area for many aquatic organisms.

If the bridge construction piers are built inside the stream bed or on the bank part, excessive sediment loading and destruction of the aquatic ecosystem may occur during construction. Downstream and in working areas, the fish spawning grounds may be destroyed. Excessive sediment loading can clog fish gills, hindering their respiratory function. For this reason, bridge piers will not be built inside stream beds or banks.

The planned interventions are expected to increase the sediment load in the river and creek systems. Especially in rainy periods, the increase in sediment due to erosion is very high, and aquatic organisms are used to this seasonally. There will be no interference to the stream bed under normal operating conditions. However, sedimentation that may occur as a result of unexpected effects may have some negative consequences. This increase in sediment has a particularly negative impact on fish. The sediment flowing to the lower parts of the activity area damages the fish's gills and deaths may occur due to insufficient respiration. Malnutrition and growth disorders can also be seen. In addition, undesirable results can be seen in terms of aquatic plants and phytoplankton organisms that cannot photosynthesize because intense sedimentation prevents sunlight from entering the water body for a certain period.

April and May are the breeding seasons of aquatic organisms. During this period, interference with aquatic systems will be minimized and/or avoided to the extent possible. The sediment that will be mixed with the stream due to an intervention in these months may cause some negativity. If the construction activities are carried out in the water body without changing the river bed, sediment traps give positive results. Apart from this, if it is necessary to intervene in the bed, it will be preferred to work on dry ground by changing the bed of the rivers and streams where the transitions will take place. If the geographical conditions allow, work will be done on dry ground by changing the direction of the river and stream in the transition zone. In this way, no damage will be done to the downstream part of the river and stream systems. After the transition process is completed, the flow direction of the river and stream will be given back to its old bed.

During the breeding season of fish species (April, May), no work will be conducted in creek beds; however, if it becomes necessary, the sensitivities of the region will be taken into account. These sensitivities will be clarified upon completion of all field studies, and the measures will be updated accordingly.

Machinery used in construction works will not go beyond a certain route, and unnecessary destruction will not be allowed because the strong vegetation in the riparian area is also important for many terrestrial organisms, especially amphibians and reptiles. In addition, plant communities and stony areas in riparian vegetation are suitable habitats for many organisms. Due to the dense bank vegetation of some stream and river systems, which are also given in the habitat descriptions, special attention will be paid during the breeding season. In areas where intervention is inevitable, it will be essential to take the precautions defined in the flora section regarding these areas.

The transition zones in the stream/river systems of the motorway route do not have steep slopes, and the riparian vegetation is relatively well known; therefore, no bank zone could cause erosion. However, the relevant personnel will give necessary information and warnings so that the machines do not cause bank disruption. In addition, after the completion of the transition construction, reinforcement works with rock blocks and/or other appropriate construction techniques will be applied to ensure the stability of the bank area if applicable

IX.8.2. Operation Phase

The main impact of the motorway projects during the operation phase is barrier effects and collisions. A variety of measures is designed to reduce the number of animals killed on or around transport infrastructure and eliminate the barrier effect. Measures to be taken for impacts on ecology and biodiversity during the operation phase are presented below.

Viaducts: Viaducts are particularly valuable to preserve ecosystems. They are favorable for invertebrates and small vertebrates, strongly linked to particular vegetation types, and hardly use underpasses without plant cover.

Culverts: Culverts for animals are primarily constructed as safe crossing points for mammals. They are a suitable solution, particularly in hilly areas or where the infrastructure is built on an embankment. Target species are usually mammals, and smaller mammals may also readily use these culverts. It has been determined that the culverts to be built within the Project's scope are suitable for mammal passages.

Fences: Fences will be built to prevent moving fauna species from entering the roads. They will mainly be constructed to reduce accidents due to collisions between large mammals and cars and reduce the number of smaller animals killed on the roads. The disadvantage of fences is that they increase the barrier effect. Therefore, where fences or other barriers are erected, it has to be ensured that the species concerned have enough opportunities to cross the road. In most cases, fences must therefore be combined with wildlife passages. They fulfil an essential role in guiding animals to the crossing points in these cases. When traffic safety is not an issue, fences will only be erected where animal mortality might threaten a population; otherwise, the barrier effect might have worse effects on the survival of the populations in the long term than the mortality due to traffic.

In general, wildlife fences will be only in places where the number of animals killed is high or a high risk of accidents involving wildlife. This is primarily the case along high-speed roads. Density fences will only be erected at high-risk spots on ordinary roads with low traffic.

Fences will always be built on both sides of a road. This is because the ends of the fences are danger points: animals may go round the end of the fence and get trapped on the road. Fences will therefore end at structures like bridges. Although only a stretch of the road is fenced in, they will be extended 500 m or more beyond the danger area. On roads with relatively little traffic, openings in fences can be provided at locations where animals can easily cross and where crossing animals are well visible to drivers.

For traditional wildlife fences, the lower half or lower third of the fence will have smaller mesh sizes to prevent small animals from passing through. Recommended spacing is as follows:

- Horizontal wire spacing: Bottom: 50-150 mm, Top: 150-200 mm
- Vertical wire spacing: 150 mm
- Wire thickness: At least 2.5 mm, made of rust-resistant material
- Bottom wire: Shall be secured to the ground to prevent animals from burrowing underneath. If the ground is uneven, it will be leveled to eliminate gaps.

Culverts and ditches along the fence shalll be carefully designed to prevent gaps that animals could pass through.

Within the scope of the Motorway Projects, fences will be used under the practices mentioned above to prevent animals from colliding with other vehicles on the road, especially in areas where vehicle traffic will be heavy. Fences will be implemented under General Directorate of Highways (KGM) approval to prevent wildlife-vehicle collisions

Warning Signs: Warning signs aim at influencing drivers' behaviour to reduce the number and severity of collisions between large mammals and cars. In addition, standard traffic signals will be

placed in areas where collisions often occur. Warning signs will be made with the approval of the General Directorate of Highways (KGM).

Lights: Road lights often attract insects and, consequently, bats or nocturnal birds that hunt them. This results in high mortality for the insects and their predators. Insensitive areas, the need to establish road lights will therefore be balanced against the consequences for nature. To prevent collisions of insects, sodium lights will be used.

IX.8.3. Risk-Impact-Measure Matrix

The potential risks and corresponding mitigation strategies for the Project is given in Table IX.47. This table outlines the necessary precautions for identified threats. However, unforeseen risks may arise during the project, making it essential to consult an expert in ecology throughout the Project's pre-construction, construction and operation phases.

In summary, in light of this information, the risks have been identified and mitigation measures have been developed following the United Nations Environmental Programme (UNEP) approach, which emphasizes developing conservation strategies that do not hinder economic growth and development. Provided that the recommended mitigation measures and precautions are properly implemented, the motorway project is not expected to have irreversible or unmanageable impacts on terrestrial and aquatic ecosystems.

IX.8.4. Monitoring

The effects of the activity on biodiversity and the mitigations taken are defined in this report. However, monitoring species and habitats' presence and population status is also essential. In this context, the biodiversity monitoring plan for the Motorway route is given in this section.

During monitoring, habitat losses under the Project will be assessed holistically, not only in terms of physical area contraction, but also in terms of structural integrity (e.g. stratigraphy, soil structure) and ecological functions (shelter, reproduction, pollination, ecological corridor role). Thus, not only quantitative but also qualitative losses will be analyzed and more effective strategies will be developed to prevent and/or compensate for impacts.

Ecosystem monitoring: It is necessary to determine the current situation by monitoring the effects of the motorway project on the ecosystem along its route. The most obvious effect of motorways on the ecosystem is habitat fragmentation. Therefore, it is necessary to determine whether the motorway project causes habitat fragmentation for any species. If such a situation is detected, this problem should be eliminated by adding an ecosystem bridge to the project. For this reason, a two-day field study is required three times a year (in spring, summer and autumn) during the project and for the 5-year period following the commissioning of the motorway.

Species monitoring: It is expected that rare and endangered species, especially endemic species, will be negatively affected during the implementation of the motorway project. It is necessary to decide whether the project had an impact on important species in the region, if so, to what extent these impacts are and whether any protection measures will be taken. For this reason, an evaluation was made by taking into consideration issues such as IUCN criteria, endemicity, international agreements, rarity, etc. Although two fish species (*Anguilla anguilla* - CR; *Cyprinus carpio* - VU) are under threat according to IUCN criteria, monitoring is not recommended because they are commercially fished species.

Among the species identified in the Project Area, seven plant species (*Eryngium kotschyi*, *Phlomis leucophracta, Phlomis lycia, Phlomis monocephala, Phlomis nissolii, Pyrus serikensis, Sideritis congesta*), one amphibian species (*Lyciasalamandra atifi*), two reptile species (*Lacerta pamphylica*; *Testudo graeca*), two bird species (*Neophron percnopterus*; *Streptopelia turtur*) two bat species (*Myotis capaccinii* and *Rhinolophus mehelyi*) and four fish species (*Capoeta antalyensis*; *Oxynoemacheilus eregliensis*; *Alburnus baliki*; *Pseudophoxinus fahrettini*) are recommended for monitoring (Table IX.45).

Further details regarding the specific areas where species monitoring will be conducted, as well as the duration of monitoring activities, are outlined in the Biodiversity Monitoring Plan (BMP) under the Biodiversity Monitoring and Evaluation Programme (BMEP)

Table IX.45 Recommended Monitoring Activities for Plant and Animal Species

Species	Status	Observation	Recommended Action	Time Period	Target	Indicator
Pyrus serikensis	Regional endemic; EN category in the IUCN List	Direct observation	The population status of the species in the field and its immediate surroundings will be monitored.	Monitoring activities will be conducted between April and September during the construction phase and for five years during the operational phase.	Reduce direct and indirect negative impacts	Conservation of the species and its habitat
Endemic Plant Species (*Eryngium kotschyi, Phlomis leucophracta, Phlomis lycia, Phlomis monocephala, Phlomis nissolii, Pyrus serikensis, Sideritis congesta*)	Regional endemic	Direct observation	The population status of the species in the field and its immediate surroundings will be monitored.	Monitoring activities will be conducted between April and September during the construction phase and for five years during the operational phase.	Preventing direct and indirect negative impacts	Conservation of the endemic species and its habitat
Lyciasalamandra atifi	EN category in the IUCN List	Direct observation	The population status of the species in the field and its immediate surroundings will be monitored. • In case of negative effects observed as a result of monitoring studies, recommendations and additional conservation strategies will be prepared.	Monitoring activities will be conducted between February and June during the construction phase.	Preventing direct and indirect negative impacts	Conservation of the species and its habitat
Lacerta pamphylica	Local endemic; LC in the IUCN List	Direct observation	The population status of the species in the field and its immediate surroundings will be monitored.	Monitoring activities will be conducted between March and September during the construction phase.	Preventing direct and indirect negative impacts	Conservation of the species and its habitat
Testudo graeca	VU category in the IUCN List	Direct observation	The population status of the species in the field and its immediate surroundings will be monitored. • In the first year of the operational phase, monitoring will be carried out, and based on the collected data; a decision will be made on whether to continue monitoring.	Monitoring activities will be conducted between March and September during the construction phase.	Preventing direct and indirect negative impacts	Conservation of the species and its habitat
Neophron percnopterus	EN category in the IUCN List	Direct observation	Monitoring the presence of the species within the site and its surroundings and determining its habitat use (transition, feeding, accommodation, reproduction, wintering, etc.).	Monitoring activities will be conducted between March and September during the construction	Preventing direct and indirect negative impacts	Conservation of the species and its habitat

Species	Status	Observation	Recommended Action	Time Period	Target	Indicator
				phase.		
Streptopelia turtur	VU category in the IUCN List	Direct observation	Monitoring the presence of the species within the site and its surroundings and determining its habitat use (transition, feeding, accommodation, etc.).	Monitoring activities will be conducted between March and September during the construction phase.	Preventing direct and indirect negative impacts	Conservation of the species and its habitat
Myotis capaccinii *Rhinolophus mehelyi*	VU category in the IUCN List	Direct observation	Monitoring the presence of the species within the site and its surroundings and determining its habitat use (e.g., migration, foraging, roosting, etc.). • In case of negative effects observed as a result of monitoring studies, recommendations and additional conservation strategies will be prepared.	Monitoring activities will be conducted in the quarry site and soil deposition areas during the construction phase, between March and October, when air temperatures exceed 15°C.	Preventing direct and indirect negative impacts	Conservation of the species and its habitat
Alburnus baliki *Capoeta antalyensis* *Oxynoemacheilus eregliensis* *Pseudophoxinus fahrettini*	Endemic (*Alburnus baliki, Oxynoemacheilus eregliensis)* Regional endemic (*Capoeta antalyensis, Pseudophoxinus fahrettini)* EN category in the IUCN List (*Alburnus baliki, Pseudophoxinus fahrettini)* VU category in the IUCN List (*Capoeta antalyensis, Oxynoemacheilus eregliensis)*	Direct observation	The population status of the species in the field and its immediate surroundings will be monitored.	Monitoring activities will be conducted between March and September during the construction phase.	Preventing direct and indirect negative impacts	Conservation of the species and its habitat

In line with IFC PS6 and international best practices, spring and autumn migration periods are critical for migratory birds. The current four-season dataset does not fully capture short-term stop-over or transit species. To address this, expanded monitoring of birds and bats is recommended throughout breeding, migration, and wintering periods. Monitoring should:

- Identify species presence and habitat use (e.g., passage, feeding, breeding).
- Inform adaptive management and protection measures.
- Guide decisions on which species require continued monitoring.

At the end of each monitoring year, findings should be evaluated to update management plans and scientifically justify any changes in monitoring priorities. This ensures effective, evidence-based biodiversity conservation throughout the project lifecycle.

IX.8.4.1. Migratory Bird Monitoring

In accordance with the International Finance Corporation's Performance Standard 6 (IFC PS6) and international best practices, the spring and autumn migration periods are recognized as critical timeframes for migratory bird species. While a four-season biodiversity dataset has been compiled, it presents limitations in adequately capturing transient species and short-term stopover populations that utilize the area primarily during these key migratory periods.

To address this gap, continued ornithological monitoring is planned during both the construction and operational phases of the project. This extended monitoring will specifically target the spring (March–June) and autumn (August–November) migration periods and will include:

- A total of 60 days of targeted ornithological monitoring per year (30 days in spring and 30 days in autumn).
- Implementation of fixed-point observations, mobile transect surveys, and flight monitoring using thermal imaging or binoculars, with a particular focus on raptor species.
- Evaluation of migratory species' area use, passage density, and habitat preferences during these periods.
- Additional assessment of breeding bird species, identification of breeding habitats, and an analysis of their spatial relationship with the highway alignment.

This expanded monitoring approach is designed to ensure comprehensive documentation of avian biodiversity and inform mitigation strategies in alignment with IFC PS6 requirements.

IX.8.4.2. Bat Monitoring

Monitoring of bat populations, particularly species listed as Vulnerable (VU) such as Rhinolophus mehelyi and Myotis capaccinii, is a critical component of biodiversity assessment for the project. These species are of conservation concern, and monitoring efforts must be designed to assess their distribution, population status, and habitat use in line with IFC Performance Standard 6 (PS6) and EUROBATS guidelines.

Bat monitoring activities will be focused on key habitats that may support roosting, foraging, or breeding populations. These habitats were given in Table IX.46.

Table IX.46 Habitats and Methods for Bat Monitoring

Habitat Type	Method
Quarry Areas	Acoustic transects; visual shelter control
Dump Sites	Insect abundance and feeding activity (Acoustic monitoring with batcorder)
Natural Caves	Guano/roost trace detection; sound recording with batcorder
Rock Crevices	Habitat use mapping; sound recording with batcorder
Stream Beds	Habitat use mapping; sound recording with mobile transects and batcorder

In accordance with IFC PS6, seasonal monitoring will be conducted during periods of peak bat activity to ensure accurate and meaningful ecological assessment. Monitoring will occur during at least two different seasons—preferably spring–summer and autumn—and will continue through both the construction and operation phases of the project. The monitoring program will be reviewed and updated using an Adaptive Management approach, allowing for responsive conservation actions based on emerging data.

As per EUROBATS Guidelines, the optimal monitoring window is between April and October, with peak bat activity typically occurring from May to August. The monitoring protocol will include the following components:

- Nighttime Acoustic and Visual Surveys: Monitoring will be conducted during twilight and nighttime hours, with data collection over a minimum of three consecutive nights at each monitoring location.
- Reproductive Colony Surveys (Late May – Early July): These surveys aim to identify maternity roosts and track the presence of lactating females and juvenile bats to determine breeding success and colony structure.
- Autumn Activity and Dispersal Surveys (August – October): These will evaluate post-breeding dispersal and potential migratory behavior, as well as habitat use during the late activity season.
- Wintering Habitat Assessment (January – February): Investigations during winter will focus on identifying critical hibernation sites such as caves and other subterranean refuges.

This comprehensive and seasonally-structured monitoring strategy will ensure that the ecological requirements of sensitive bat species are effectively integrated into project planning and management, in line with international conservation standards.

IX.8.5. Summary of Assessment and Residual Impacts

The assessment of impacts on natural habitats demonstrates that, altough moderate adverse effects are anticipated during the construction phase, these do not result in significant residual impacts once mitigation and habitat recovery measures are applied. Several factors contribute to this conclusion:

Limited Spatial Extent of Habitat Loss

The habitats within the Project footprint represent small proportions of the wider regional distribution. Maquis, garrigue, and coniferous forests especially are widespread across Antalya Province, and riparion corridors along major streams extend well beyond the Project Area. The proportions of these habitats directly affected by construction and operation activities are therefore minor relative to their availability in the wider landscape, reducing the permanent ecological fragmentation.

Low Level of Secondary Impacts

The air quality modelling prepared for the Project indicates that predicted concentrations of PM10, PM 2.5 and other pollutants during both construction and operation phases remain below national and IFC guideline threshold by a significant margin at the nearest natural habitats. This demonstrates that edge effects from dust, and emissions are negligible, and will not significantly degrade habitat quality.

Mitigation and Habitat Recovery Measures

As described in the Mitigation Measures section, a suite of measures will be implemented, including:

- Topsoil conservation and reuse to support natural regeneration of natural habitats.
- Where necessary active replanting with native species to accelerate recovery and stabilize soils.
- Habitat connectivity measures such as avoiding unnecessary fragmentation
- Pollution prevention controls
- Long-term ecological monitoring with adaptive management to address invasive species and ensure habitat recovery trajectories.

Ecological Resilience of Affected Habitat Types

The ecological characteristics of these Mediterranean habitats (all of them but especially maquis, garrigue, and phrygana) make them inherently resilient to disturbance. They are adapted to natural drivers such as grazing, fire, and drought, and exhibit strong regenerative capacity when topsoil and seed banks are preserved. As such, even temporary disturbances can be expected to regenerate to functional habitat conditions within a relatively short period following construction. The resilience of these habitats has been demonstrated over time, as they have repeatedly regenerated following frequent fires characteristic of the Mediterranean region, where such disturbances form a natural stage in their ecological succession cycle.

Much of the surrounding landscape remains continuous natural vegetation, and the motorway alignment with the protection areas consists of only modified habitats. Therefore, considering the relative scale of habitat disturbance in the regional context, the low levels of secondary effects confirmed by air quality modelling, the strong regenerative capacity of Mediterranean habitats, and the robust package of mitigation and recovery measures, the impacts on natural habitats are assessed as not significant after mitigation. Only maquis vegetation impact significance is evaluated as Medium (B2) due to the endangered species *Pyrus serikensis*.

Table IX.47 provides a summary of the ecology and biodiversity assessments. The significance of the identified impacts before and after mitigation measures are summarized in this table.

Table IX.47. Summary of the Ecology and Biodiversity Assessments

Impacted Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts	Reason for Decrease in Significance
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude					
Land Preparation and Construction														
Terrestrial Habitats	S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub	Habitat loss and habitat fragmentation Vegetation and topsoil removal Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	High	High (B3)	• The intrusion of any invasive flora species into the Project Area and its surroundings will be prevented. For this purpose, vehicles used for vegetation clearance and/or plant transfer will be checked beforehand. • Project workers will not be allowed to bring any live animals or plants into the construction site to avoid the risk of pest/invasive species establishing in the Project Area. • Measures to reduce noise, dust, and air quality will be taken. • Project construction sites and access roads will be separated from other areas with appropriate KGM approved signboards, signs, and fences. Therefore, staff and vehicle access to the area will be limited to the construction site. • Construction waste generated due to project activities will be stored at designated storage areas, and then disposed of solid waste will not be allowed to be left in natural habitats. • Vegetation clearance will take place gradually, so fauna elements will be allowed to leave construction sites. • Topsoil storage and reuse for vegetation reinstatement. • Conduct post-construction rehabilitation to restore the natural structure of affected maquis and forest habitats. • Ecological restoration of disturbed areas post construction • Collect seeds from endemic species and deliver to a seed bank for ex-situ conservation. • Minimize human-induced disturbances and adhere to conservation guidelines throughout the Project Area.	Medium (B2)	Mitigation measures (invasive species control, phased clearance, fencing, waste management, topsoil reuse, and replanting) reduce disturbance and ensure restoration, making impacts temporary and localized.
	G1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix T3 - Coniferous forest T14 - Mediterranean and Macaronesian riparian forest S7.211 - Aegean *Sarcopoterium phrygana* S6 - Garrigue	Habitat loss and habitat fragmentation Vegetation and topsoil removal Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	Medium	Medium (B2)		Low (B1)	Mitigation measures (invasive species control, phased clearance, fencing, waste management, topsoil reuse, and replanting) reduce disturbance and ensure restoration, making impacts temporary and localized. Therefore, significance is reduced from Medium to Low..
	J1 - Buildings of cities, towns and villages V1 - Arable land and market gardens	Habitat loss and habitat fragmentation Vegetation and topsoil removal Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	Low	Low (B1)		Low	Impacts are already minor by nature. Mitigation keeps them controlled and ensures they do not escalate, so the rating stays Low.
Aquatic Habitats	C2 - Surface running waters	Habitat loss and habitat fragmentation Water pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	Medium	Medium (B2)	• During construction, mixing any chemical substances that is used in the construction area, in aquatic ecosystems will be prevented • Excavation materials will not be dumped onto riverbeds	Low (B1)	Risk of water contamination and habitat alteration reduced throuh strict waste/chemical controls and no dumping policy. Impacts become limited and reversible.
(Flora)	*Pyrus serikensis*	Vegetation and topsoil removal Habitat loss and habitat fragmentation Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	High	High (B3)	• Seeds of the species will be collected and delivered to the Seed Gene Bank. • Monthly monitoring between April and August will be conducted in the flowering period for these species	Medium (B2)	Mitigation reduces the risk of permanent loss. Lowering significance from High to Medium.
	Eryngium kotschyi *Phlomis leucophracta* *Phlomis lycia* *Phlomis monocephala* *Phlomis nissolii* *Sideritis congesta* *Barlia robertiana*	Vegetation and topsoil removal Habitat loss and habitat fragmentation Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	Low	Low (B1)		Low	Impacts are already minor, mitigation ensures they remain controlled, so the rating stays low.
(Amphibians)	*Lyciasalamandra atifi*	Habitat loss and habitat fragmentation	Adverse	Widespread	Long	Low	Irreversible	One-off	Moderate (B)	High	High (B3)	• Due to habitat loss, noise, dust formation, and vehicle-human traffic, construction activities will be carried out gradually to provide birds and mobile fauna species with time and energy to leave the area. • At-grade crossings will be established to facilitate movement between the fragmented habitats. • The construction sites will be fenced to prevent the entry of fauna species. In	Medium (B2)	Gradual works, safe crossings, fencing, restricted traffic and monitoring reduce mortality and habitat fragmentation, lowering significance from High to Medium.
(Reptiles)	*Testudo graeca*	Vegetation and topsoil removal	Adverse	Widespread	Long	Low	Irreversible	One-off	Moderate (B)	Medium	Medium (B2)		Low (B1)	Mitigation limits disturbance and ensures impacts remain localized and reversible, reducing significance from Medium to Low.

Impacted Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts	Reason for Decrease in Significance
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude					
	Lacerta pamphylica	Habitat loss and habitat fragmentation								High	High (B3)	addition, traffic will be restricted in the Project Area, except for pre-designed roads, to avoid animal destruction. • Construction activities involving ground disturbance will ideally be scheduled outside the hibernation period or conducted with caution in areas where hibernating reptiles may be present. • Warning signs will be used along the Motorway with the approval of KMG. • To prevent collisions of insects the use of sodium lights will be used. • Bird nests, and moist habitats will be monitored during the construction and operation phases, and additional measures will be determined if necessary. • Monitoring will be done during the construction and operation. • Project personnel will be informed and trained in the aquatic environment. • Confirming species presence for *Lacerta pamphylica*, relocating individuals pre-construction.	Low (B2)	Scheduling, fencing, and species-specific measures reduce long-term risks. Considering species population being stable and IUCN category being "LC", these measures are bringing significance down from High to Low.
	Anatololacerta ibrahimi *Ablepharus anatolicus* *Blanus aporus*									Low	Low (B1)		Low	Already minor; mitigation ensures no escalation, so significance remains Low.
(Birds)	*Neophron percnopterus*	Vegetation and topsoil removal Habitat loss and habitat fragmentation	Adverse	Widespread	Long	Low	Irreversible	One-off	Moderate (B)	High	High (B3)		Low (B2)	Targeted measures (crossings, fencing, monitoring) effectively reduce major risks, lowering significance from High to Low.
	Streptopelia turtur		Adverse	Widespread	Long	Low	Irreversible	One-off	Minor (C)	Medium	Low (C2)		Low (C1)	Impacts are already small; controls and monitoring reduce them further, shifting significance from Low (C2) to Low (C1).
	Accipiter nisus *Aquila chrysaetos* *Buteo buteo* *Buteo rufinus* *Circaetus gallicus* *Circus aeruginosus* *Circus cyaneus* *Circus macrourus* *Ciconia ciconia* *Ciconia nigra* *Falco columbarius* *Falco peregrinus* *Falco subbuteo* *Falco tinnunculus*								Minor (C)	Low	Low (C1)		Low	Impact is negligible; mitigation maintains low level with no change.
(Mammals)	*Myotis capaccinii* *Rhinolophus mehelyi*	Vegetation and Topsoil Removal Habitat Loss and Habitat Fragmentation	Adverse	Widespread	Long	Low	Irreversible	One-off	Moderate (B)	Medium	Medium (B2)		Low (B1)	Mitigation minimizes extent and duration of impacts, reducing significance from Medium to Low.
(Freshwater species)	*Anguilla anguilla* *Alburnus baliki* *Capoeta antalyensis* *Pseudophoxinus fahrettini* *Pseudophoxinus battalgilae*	Habitat Loss and Habitat Fragmentation Water Pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Minor (C)	High	Medium (C3)	• Excavation materials will not be dumped onto a riverbed. • Mixing any chemical substances used in the construction area, waterbed, and/or aquatic ecosystems will be prevented. • The natural structure of the riparian vegetation will be preserved, which forms the spawning and sheltering area for many aquatic organisms.	Low (C2)	Strict controls on waste, chemicals, and sediment, plus seasonal restrictions and riparian protection, significantly reduce risks to aquatic habitats, lowering significance from High to Low.

Impacted Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts	Reason for Decrease in Significance
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude					
	Cyprinus carpio *Capoeta caelestis* *Cobitis battalgilae* *Oxynoemacheilus eregliensis* *Alburnus escherichii* *Squalius anatolicus* *Squalius fellowesii* *Salmo ekmekciae*									Medium	Low (C2)	• Especially during the breeding season of fish species (April and May), any intervention on riverbeds will be prevented. Viaduct or bridge construction activities will be conducted in months other than April-May, as turbidity can have lethal effects on fish eggs. If the activity has to be carried out, it will be done after determining whether there are breeding fish species in the area. • Sediment traps will be used to prevent the negative impact of the sediment that construction activities will generate. • Strengthening works will be done with certain rock blocks to ensure the stability of the coast. • Project activities will be limited to designated areas to avoid direct impacts. • Monitoring will be done during the construction and operation. • Project personnel will be informed and trained in the aquatic environment.	Low (C1)	Mitigation limits pollution and disturbance, protecting aquatic species and spawning areas, reducing significance from Medium to Low.
Operation														
Terrestrial Habitats	S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub	Noise and pollution Alteration of soil chemistry	Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	High	High (B3)	• Maintaining vegetation buffers to reduce noise/light disturbance • Monitor and control of any invasive species • Ecological restoration of disturbed areas post construction • Topsoil storage and reuse for vegetation reinstatement	Medium (B2)	Vegetation buffers and invasive species control reduce disturbance, lowering significance from High to Medium.
	G1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix T3 - Coniferous forest T14 - Mediterranean and Macaronesian riparian forest S7.211 - Aegean *Sarcopoterium phrygana* S6 - Garrigue	Noise and pollution Alteration of soil chemistry	Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	Medium	Medium (B2)		Low (B1)	Noise/light impacts are localized and controlled by vegetation buffers, reducing significance to Low.
	J1 - Buildings of cities, towns and villages V1 - Arable land and market gardens	Noise and pollution Alteration of soil chemistry	Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	Low	Low (B1)		Low (B1)	Already minor; mitigation maintains impacts at Low.
Aquatic Habitats	C2 - Surface running waters	Water pollution	Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	Medium	Medium (B2)	• Prevent chemical runoff	Low (B2)	Runoff prevention minimizes water pollution risk, keeping impacts Low.
(Amphibians)	*Lyciasalamandra atifi*	Mortality due to vehicle collision Light and noise disturbance	Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	High	High (B3)	• Installing culverts, underpasses, overpasses, viaducts, and bridges for safe crossing and fences to prevent fauna to enter the motorway • Warning signs will be used along the Motorway with the approval of KMG. • To prevent collisions of insects the use of sodium lights will be used. • Bird nests, and moist habitats will be monitored during the construction and operation phases, and additional measures will be determined if necessary. • Monitoring will be done during the construction and operation.	Low (B2)	Culverts, fencing, and monitoring reduce collision risk and habitat fragmentation, lowering significance from High to Low.
(Reptiles)	*Testudo graeca*	Mortality due to vehicle collision	Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	Medium	Medium (B1)		Low (B2)	Culverts, fencing, and monitoring reduce collision risk and habitat fragmentation, lowering significance from Medium to Low.
	Lacerta pamphylica		Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	High	High (B3)		Low (B2)	Safe crossing structures and fencing minimize severe risks, reducing significance from High to Low.
	Anatololacerta ibrahimi *Ablepharus anatolicus* *Blanus aporus*		Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	Medium	Medium (B2)		Low (B1)	Crossing measures reduce residual mortality and fragmentation, lowering significance to Low.
(Birds)	*Neophron percnopterus*	Mortality due to vehicle collision Disturbance from light/noise	Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	High	High (B3)		Low (B1)	Use of sodium lights prevents insect attraction and by this, preventing birds attraction and reduces disturbance, lowering significance to Low.
	Streptopelia turtur		Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	Low	Low (B1)		Low (B1)	Use of sodium lights prevents insect attraction and by this, preventing birds attraction and reduces disturbance, keeping the significance Low.

Impacted Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts	Reason for Decrease in Significance
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	Accipiter nisus *Aquila chrysaetos* *Buteo buteo* *Buteo rufinus* *Circaetus gallicus* *Circus aeruginosus* *Circus cyaneus* *Circus macrourus* *Ciconia ciconia* *Ciconia nigra* *Falco columbarius* *Falco peregrinus* *Falco subbuteo* *Falco tinnunculus*								Minor (C)	Low	Low (C1)		Low	Already minor; culverts and fencing maintain low-level impacts.
(Mammals)	*Myotis capaccinii* *Rhinolophus mehelyi*	Mortality due to vehicle collision Light pollution Noise pollution	Adverse	Widespread	Long	Medium	Irreversible	Continuous	Minor (C)	Medium	Medium (C2)	• Installing culverts and/or underpasses for safe crossing • Monitoring of bat species populations • Usage of sodium lights • Reporting of fauna casualties	Low (C1)	Crossing structures, monitoring, and lighting reduce collision and disturbance risks, lowering significance from Low (C2) to Low (C1).
(Freshwater species)	*Anguilla anguilla* *Alburnus baliki* *Capoeta antalyensis* *Pseudophoxinus fahrettini* *Pseudophoxinus battalgilae*	Water Pollution	Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	Low	Low (C1)	• Prevent chemical runoff	Low (C1)	Runoff prevention avoids water pollution, maintaining already minor impacts at Low.
	Cyprinus carpio *Capoeta caelestis* *Cobitis battalgilae* *Oxynoemacheilus eregliensis* *Alburnus escherichii* *Squalius anatolicus* *Squalius fellowesii* *Salmo ekmekciae*		Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	Medium	Low (C2)	• Prevent chemical runoff	Low (C1)	Preventing chemical runoff further reduces pollution risks, shifting significance from Low (C2) to Low (C1).

Even with careful site planning and the proposed mitigation measures, some residual impacts remain for maquis habitat, *Pyrus serikensis*, and *Lyciasalamandra atifi*.

The maquis habitat qualifies as Critical Habitat due to its high biodiversity value, ecological integrity, and the presence of restricted-range and endemic species. It provides essential ecosystem services and contributes to habitat connectivit. Even after the mitigations applied, some fragmentation and degradation for this habitat remains regarding sensitive species such as *Pyrus serikensis.*

For *Pyrus serikensis*, its limited range and small population size increase its vulnerability to habitat loss and fragmentation, considering the declining population of the species and the loss of suitable habitat for it, mitigations cannot fully reduce residual impacts.

For *Lyciasalamandra atifi*, an endangered species with a highly restricted range and dependence on specific karstic microhabitats, residual risk persists. Although not recorded directly within the project area, its conservation status and declining population make it highly sensitive to even small-scale habitat disturbance.

Further details on these residual effects and species-specific measures are provided in the BAP document.

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IX.9. Ecosystem Services

Ecosystem services are the many and varied benefits provided to people by the natural environment and healthy ecosystems. The services provided by each ecosystem are unique and vary. According to the 2006 Millennium Ecosystem Assessment (MA), ecosystem services are the benefits that people derive from ecosystems. The MA also defined four categories of ecosystem services (support, provision, regulation, and cultural) discussed below.

Table IX.48. Ecosystem Services

Provisioning Services	**Relevance to Study Area**
Agricultural lands and fruit gardens provide services for people to feed	Priority 1
Flowing and stagnant water supplies provide water for both natural animals, and these waters are used to irrigate agricultural areas. In addition, these water resources regulate the water regime in the region.	Priority 1, Priority 2
Natural and plantation forests constitute both feeding, nesting and breeding areas for many birds, mammals, reptiles and insect species.	Priority 1, Priority 2
Regulating Services	**Relevance to Study Area**
Plant cover contributes to the prevention of floods by controlling erosion.	Priority 2
Due to the vegetation cover, rainwater does not flow into the stream, helping to submerge the water, at the same time reducing sediment transport to the lake and the seas.	Priority 2
Cultural Spiritual, and Recreational Services	**Relevance to Study Area**
Natural wooded areas are suitable for people to rest.	Priority 2
Natural forests provide lovely landscaping views.	Priority 2
Meadow-pasture areas provide grazing for livestock.	Priority 2
Cultural Spiritual, and Recreational Services	**Relevance to Study Area**
Using carbon dioxide through plant cover and trees, the oxygen needed for mankind is produced.	Priority 1, Priority 2
As natural habitats form the habitats of critical species, they have a very important mission in terms of species sustainability.	Priority 1, Priority 2

IX.9.1. Provisioning Services

A portion of the area designated for motorway construction under the project is currently used for food production. However, the area is not utilized for other supply services such as water and wood, genetic resources, or medicinal purposes. A part of the land where the motorway will be built will lose its agricultural function, including fields, gardens, and greenhouses, as it will be covered with asphalt and concrete. However, since only a very small portion of the agricultural area will be lost, it can be argued that the resulting loss of supply services is negligible.
Additionally, some forested and shrubland areas have been selected for the storage of excavation materials. As these areas will be used for this purpose, they will lose their natural characteristics. However, these areas are considered to be poor in terms of genetic resources and medicinal and aromatic flora elements. Therefore, it can be argued that the Project Area has low importance in terms of providing supply services. Furthermore, considering that only a very small area will lose its natural characteristics due to the project, it can be asserted that the project will not create a significant negative impact on supply services.

IX.9.2. Regulating Services

A large portion of the area designated to be converted into a motorway consists of anthropogenically altered agricultural lands. The regulatory ecosystem services in these areas, such as climate regulation, pollination, flood control and other natural disaster regulation, and water purification, have already been disrupted. Therefore, no significant loss in terms of regulating services is expected in these areas due to the implementation of the project.

A part of the Project Area is located in natural environments. Due to the temporary or permanent loss of the natural characteristics of these areas, the ability to provide support services will be eliminated or disrupted. Therefore, if the areas not covered by asphalt or concrete are rehabilitated and restored to their former state, the loss in support services can be compensated. The region has a rapid renewal capacity in terms of its climatic and floral characteristics. Therefore, if a good rehabilitation plan is prepared and implemented, the loss of ecosystem regulation services may be compensated.

IX.9.3. Cultural Services

Türkiye's Mediterranean coastline holds high value in terms of cultural services. Indeed, due to these characteristics, it is one of the most popular regions for both domestic and international tourists. Antalya province hosts over 15 million foreign tourists annually. A large portion of the area along the project route consists of agricultural lands. However, the remaining natural areas are not among the preferred regions in terms of cultural, recreational, and aesthetic values. Therefore, during the construction and operation of the motorway, it is unlikely that it will cause any negative impact in terms of cultural services.

IX.9.4. Supporting Services

Supporting services are related to the self-sustaining functions of habitats and, consequently, affect survival. These services include photosynthesis, the water cycle, and nutrient cycles. If the project is implemented, a portion of the area will be covered with asphalt and concrete, leading to a negative impact on these services. Additionally, the loss of natural characteristics in forested and shrubland areas designated for soil storage will result in a decline in supporting services.

To compensate for this loss, it is possible to mitigate the negative impact by implementing a rehabilitation program to restore the degraded areas to their original state. Therefore, identifying species lists in degraded areas and using these species for rehabilitation will help restore the ecosystem’s supporting services.

IX.10. Summary of Ecology and Biodiversity

Based on the habitat structure in and around the Project Area, it was determined that the area hosts 221 plant species, 29 fish species, five amphibians, 25 reptiles, 124 bird species (both native and migratory), and 46 mammal species, representing the area's biodiversity.

While some degree of habitat degradation is anticipated in the natural areas surrounding the Project Area, the overall impact on natural habitats is expected to be low. This is primarily due to the limited presence of vegetation other than cultivated plant species, as the land is predominantly used for agricultural purposes. Thus, it is determined that the change in the habitat quality of the area will cause some habitat loss in terms of shelter and feeding of animal species that constitute wildlife.

Considering the location and ecological characteristics of the motorway route, the plant species within the Project Area, along with the fish, amphibians, reptiles, birds, and mammals observed in the region, are generally composed of widely distributed species. However, some endemic species are also present, although they are not considered to be strictly dependent on the Project Area for their survival.

Considering the size and location of the Project Area, the overall environmental impact to limit the life of fauna elements during the activities, preventing their feeding, breeding and movement is expected to be low. This is primarily because the habitat along the motorway route closely resembles that of the surrounding areas, minimizing the potential for significant ecological disruption. Habitat similarity creates an alternative and advantage for faunistic species. Most of the fauna elements move to safe habitats as soon as possible due to their mobility. To mitigate habitat fragmentation resulting from the motorway construction, the implementation of wildlife crossings has been proposed. These structures are designed to maintain ecological connectivity by allowing animals to safely traverse the roadway, thereby reducing the risk of wildlife-vehicle collisions and supporting biodiversity conservation.

Since a large portion of the project site consists of agricultural land, where vegetation is either absent or highly modified, minor contraction of natural habitats in the surrounding area is anticipated. Therefore, some habitat loss is expected for wildlife species dependent on vegetation for shelter or food.

However, certain sections of the motorway pass through partially degraded or intact maquis and forested areas, making some biodiversity impacts inevitable for the habitats and some species. To address this, potential impacts for these ecological components have been identified, and mitigation measures have been developed. By implementing risk assessment matrices and mitigation strategies, it is possible to reduce potential impacts on ecology during both the construction and operational phases of the project.

In addition, by taking into account the risk assessment matrices and recommendations, possible impacts on the ecosystem during the installation and operation phases of the Project will be reduced. Recommended monitoring studies will ensure detection of residual impacts and negative effects that may arise during the process and intervention to eliminate the negativities.

Detailed mitigation measures and Biodiversity Monitoring and Evaluation Programme (BMEP) regarding priority habitats and species are given in the Biodiversity Management Report (BMP). Biodiversity net loss and net gain calculations which given in detail within the scope of Biodiversirty Action Plan (BAP), indicate that the project will result in net biodiversity loss. To compensate for this loss, additional mitigation and offset strategies have been developed and implemented, ensuring that the Project's impact is managed based on scientific principles. With such strategies it's possible to achieve no net loss and even net gain.

X. AIR QUALITY AND CLIMATE CHANGE

In this section, the potential impacts of the Project on air quality of the region and two-way relationship between the Project and climate change are assessed. Within this scope, the construction and operation phases of the Project are taken into consideration and impacts are evaluated separately. Air quality modeling studies have been conducted to assess the impacts on air quality. This chapter includes/will include the following:

- National (Turkish), EU (directives and regulations), and international (IFC Performance Standards) air quality requirements and standards
- Baseline air quality,
- Assessment and quantification of potential emissions related to the Project,
- Air quality modeling with AERMOD software for the construction and operation phases of the Project taking into account local meteorological data and topography of the region,
- Assessment of potential impacts on air quality,
- Mitigation measures regarding air quality,
- Residual impacts on air quality,
- Meteorological and climatic conditions of the Project Area,
- Assessment of potential impacts regarding climate change and relevant mitigation measures.

X.1. Air Quality

Air pollution can be defined as pollutants emitted from various sources reaching the level that affects human health and the environment negatively. Main sources that result in air pollution are anthropogenic sources such as vehicle traffic, industrial activities, domestic heating and overuse of natural resources.

Main pollutants emitted from motorway projects are nitrogen oxides (NO_x, combination of NO_2 and NO), particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), carbon dioxide (CO_2), and volatile organic compound (VOC). PM_{10} and $PM_{2.5}$ are expected to be emitted mainly during construction phase of the Project as a result of material extraction and supply, cut and fill operations and storage/retrieval of excavated material.

Particles can vary in size and composition. PM_{10} (particulate matter with aerodynamic diameter smaller than 10 µm) standard is set to define the particles that people are likely to inhale, and PM_{10} has become the general measure of particulate matter. In this sense, generally limit values are defined for PM_{10}. In addition to PM_{10}, IFC standards also have limitations for $PM_{2.5}$ (particulate matter with aerodynamic diameter smaller than 2.5 µm) parameter.

Other potential pollutants such as NO_X, CO, CO_2, and VOC are expected to arise from the operation of construction machinery and equipment during construction phase and traffic flow during operation phase of the Motorway. These pollutants are predominantly generated from fossil fuel usage for energy needs.

X.1.1. Assessment Methodology and Data Sources

X.1.1.1. Regulatory Framework

Regulation on Assessment and Management of Air Quality (RAMAQ)

Regulation on Assessment and Management of Air Quality was published on 06.06.2008 in Official Gazette No 26898. The purpose of this regulation is to define and set air quality targets in order to prevent or mitigate the negative impacts of air pollution on human health and environment, to assess air quality with defined methods and criteria, to sustain existing conditions in areas where air quality is good, to gather information about air quality and to inform the public about warning threshold levels.

In this regulation, short and long term limit values of various pollutants are defined for the harmonization to European Union (EU) environmental legislation. However, a transition period is proposed for the application of these limit values. In addition to the limit values, warning threshold levels for air pollutants are identified.

Industrial Air Pollution Control Regulation (IAPCR)

The Industrial Air Pollution Control Regulation, published on 03.07.2009 in Official Gazette No 27277, aims to control emissions in form of smoke, dust, gas, vapor and aerosol generated as a result of industrial activities and energy generation, to protect human and environment from pollution in receiving environment, to prevent negative impacts of air pollution on public and ensure that these effects do not arise.

According to the regulation, the limit values from stack and non-stack sources that require the calculation of the contribution values to air pollution in case of exceeding are provided. According to IAPCR Appendix 2 Table 2.1 for dust emissions the limit value from stack sources is 10 kg/hr, from non-stack sources 1 kg/hr. If the dust emissions exceed this limit value, the air quality contribution value should be calculated.

Emissions generated from the Project activities will be calculated and compared with the regulatory limits. If the calculated emission amount exceeds the regulatory limit value, modeling study will be conducted and the air quality contribution value will be estimated.

Regulation on Monitoring of Greenhouse Gas Emissions

The Regulation on Monitoring of Greenhouse Gas Emissions was published on 17.05.2014 in Official Gazette No 29003. The purpose of the regulation is to define procedures and principles for monitoring, reporting and verification of greenhouse gas emissions for a list of activities considered within the scope of the regulation.

X.1.1.2. Air Quality Standards

This subsection provides an overview of the national and international ambient air quality standards applicable to the assessment of air quality.

Turkish Legal Requirements

Ambient air quality is regulated in Türkiye by the Regulation on Assessment and Management of Air Quality (RAMAQ). Appendices I and I-A of this regulation provide limit values for various pollutant. The transition intervals to reach the target values are also defined in these appendices.

Air quality standards are defined in the Regulation on Assessment and Management of Air Quality (RAMAQ) published on 06.06.2008 in Official Gazette No 26898 and Industrial Air Pollution Control Regulation (IAPCR) published on 03.07.2009 in Official Gazette No 27277 (Amendment: Date, 06.10.2020; Official Gazette No, 31296). Ambient air quality limit values for various pollutants defined in Turkish regulations are presented in Table X.1. The standards in Table X.1 are the target values for 2024 and further years.

Table X.1 Turkish Regulations: Ambient Air Quality Limit Values

Parameter	Duration	Unit	Limit Value*
SO_2	Hourly (cannot be exceeded more than 24 times in a year)	**($\mu g/m^3$)**	350
	24 hour (cannot be exceeded more than 3 times in a year)	**($\mu g/m^3$)**	125
	Long term limit	**($\mu g/m^3$)**	60
	Annual and winter season (from 1 October to 31 March)	**($\mu g/m^3$)**	20
NO_2	Hourly (cannot be exceeded more than 18 times a year)	**($\mu g/m^3$)**	200
	Annual	**($\mu g/m^3$)**	40
PM_{10}	24 hour (cannot be exceeded more than 35 times a year)	**($\mu g/m^3$)**	50
	Annual	**($\mu g/m^3$)**	40
CO	8 hour daily maximum	**($\mu g/m^3$)**	10,000
Total VOC**	Hourly	**($\mu g/m^3$)**	280
	24-hour	**($\mu g/m^3$)**	70
In the settled dust	Pb and its compounds (long term limit value)	**mg/m^2day**	250
	Cd and its compounds (long term limit value)	**mg/m^2day**	3.75
	Tl and its compounds (long term limit value)	**mg/m^2day**	5

* *Regulation on Assessment and Management of Air Quality (RAMAQ)*
** *Industrial Air Pollution Control Regulation (IAPCR)*

IFC Standards

IFC standards and requirements will apply to the Project. The IFC General EHS Guidelines – Environmental Air Emissions and Ambient Air Quality (2007) refer to the World Health Organization (WHO) Ambient Air Quality Guidelines for recommended limit values. These limit values are presented in Table X.2.

Table X.2. IFC Standards: Ambient Air Quality Limit Values

Parameter	Duration	Guideline Value (µg/m³)*
SO_2	10 minute	500
	24 hour	20
NO_2	Hourly	200
	Annual	40
PM_{10}	24 hour	50
	Annual	20
$PM_{2.5}$	24 hour	25
	Annual	10

** Environmental, Health and Safety Guidelines, General EHS Guidelines: Environmental, Air Emissions and Ambient Air Quality*

EU Regulations

EU air quality standards and requirements will apply for the Project. The EU Ambient Air Quality Directives – Directive 2008/50/EC and Directive 2004/107/EC – establish legally binding limit values and target values for key air pollutants to protect human health and the environment. These standards apply over different averaging periods. In addition, the newly adopted Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (see Table 2) strengthens and updates the existing framework by setting more stringent air quality standards and reinforcing provisions on public information and air quality plans. The relevant EU air quality limit values are presented in Table X.3.

Table X.3 EU Regulations: Ambient Air Quality Limit Values*

Parameter	Duration	Guideline Value (µg/m3)*	Permitted Exceedances / Notes
Particulate Matter (PM_{10})	24-hour average	50 µg/m³	Not to be exceeded more than 35 times/year
	Annual average	40 µg/m³	
Particulate Matter ($PM_{2.5}$)	Annual average	25 µg/m³	
Nitrogen Dioxide (NO_2)	1-hour average	200 µg/m³	Not to be exceeded more than 18 times/year
	Annual average	40 µg/m³	To be reduced to 20 µg/m³ by 2030
Sulfur Dioxide (SO_2)	1-hour average	350 µg/m³	Not to be exceeded more than 24 times/year
	24-hour average	125 µg/m³	Not to be exceeded more than 3 times/year
Carbon Monoxide (CO)	Maximum daily 8-hour mean	10 mg/m³	
Lead (Pb)	Calendar Year	0,5 µg/m³	
Cadmium (Cd)	Calendar Year	5,0 ng/m³	

*http://data.europa.eu/eli/dir/2024/2881/oj

X.1.1.3. Significance Criteria

The significance criteria for the impacts on air quality will be determined, as high, medium or low, based on the evaluation of magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter IV ("ESIA Methodology") are used for the determination of the magnitude of impact on the air quality, while sensitivity/value criteria to be used in the scope of impact assessment is summarized in Table X.4.

Table X.4. Criteria for Sensitivity/Value of Resource/Receptor

Ecosystem Component	Sensitivity/Value Level		
	High (3)	Medium (2)	Low (1)
Human Receptors	Areas densely populated with residences and have poor air quality*.	Areas densely populated with residences and have good air quality* Dams for drinking water purpose.	Areas with dense work places/ industrial areas and/or not densely populated with residences. Dams for irrigation and energy production purpose.
Ecological Receptors	-**	Forests with ecological function	Forests with social and cultural and economic function,

** Good and poor air quality of receptors is determined according to baseline air quality measurements.*

***For high sensitivity, "National/Internationally Protected Areas" was evaluated and it's been determined that air impacts have minimal effects for this receptors. Therefore this cell was left empty.*

Evaluation of magnitude of impacts will be based on percentage of exceedance of air quality standards defined in the Regulation on Assessment and Management of Air Quality. Magnitude of impact is defined as low, medium, and high according to the results of modeling study's comparisons with the Turkish air quality limit values (see Table X.5). This approach applies to the exceedance of any pollutant for which the air quality standard is set, meaning that if the modeled concentration of PM_{10}, $PM_{2.5}$, NO_2, SO_2, CO, Settled Dust and VOC or any regulated pollutant exceeds its respective limit, the magnitude of impact is classified according to the percentage of exceedance.

Table X.5. Impact Magnitude Criteria

Magnitude of Impact	Exceedance of Air Quality Standard
Low	0-25 %
Medium	25-50 %
High	>50 %

X.1.1.4. Air Quality Modeling

In this study, the latest version of the AERMOD dispersion model (version 19191), published by the US EPA, was used. AERMOD is an internationally recognized model widely used by researchers and regulatory authorities to estimate air pollutant concentrations. The modeling was carried out using the BREEZE interface (version 7.7), which supports predictions of hourly, daily, and annual Ground Level Concentrations (GLCs) based on dynamic input data. AERMOD handles various emission sources—including point, volume, and area sources and considers factors such as turbulence, terrain

complexity, and meteorological conditions. The "Emission Estimation Technique Manual for Mining (Version 3.1)," prepared for the Australian National Pollutant Inventory, was referenced for the calculation of dust emissions. As a specific national set of emission factors for these activities is not available in Türkiye, an internationally accepted methodology was utilized.

The referenced Australian manual was chosen because it uses the globally recognized US EPA AP-42 standard as its foundational source—drawing most of its emission factors directly from AP-42 as stated in its appendix—while also validating and improving upon that baseline with actual field measurements.

The grid area defined as the study area for this study was determined by reference to the domain specified in IAPCR for the modeling study. In accordance with the Regulation on the Control of Industrial Air Pollution (IAPCR), the “facility impact area” is defined as the area within a radius equivalent to 50 times the stack height from the emission source, or, for sources with an effective emission height less than 30 meters, as a 2 km × 2 km square area centered on the source. For area sources with a surface distribution greater than 0.04 km², the impact area is also defined as a square with a 2 km edge length, centered on the source.

The model operates within a user-defined grid system and performs calculations at the corner points of each grid cell. It uses four main input data types: hourly surface meteorological data, upper atmospheric sounding data, terrain and land use data for the receptor grid, and detailed emission source parameters. AERMET and AERMAP are used for meteorological and terrain preprocessing, respectively. Model outputs are suitable for creating distribution maps to assess air quality under different scenarios (e.g., varying emission sources, fuel qualities, or seasonal conditions).

The modeling process involves defining the dispersion area, dividing it into 250×250 m grids, assigning receptor points, and inputting one year of meteorological data. After inputting this data, the model calculates pollutant concentrations in ambient air on an hourly, daily, and annual basis.

Air quality modeling was carried out under multiple scenarios to assess the dispersion and ground-level concentrations of pollutants emitted during both the construction and operation phases of the motorway project. Air Quality Modeling Report is given in Annex 6. Each scenario corresponds to a specific section of the route and pollutant type, as outlined below:

Construction Phase:

- Scenario 1: PM_{10} emissions from construction activities in Section 1, including blasting, material handling at quarries, and operations at nearby facilities (concrete, asphalt, and mechanical plants).
- Scenario 2: PM_{10} emissions from construction activities in Section 2, involving the same types of sources as in Section 1.
- Scenario 3: Represents $PM_{2.5}$ emissions during the construction of Section 1, including emissions from blasting, material handling in quarries, and operations at associated facilities such as concrete, asphalt, and mechanical plants located along this section.
- Scenario 4: Represents $PM_{2.5}$ emissions during the construction of Section 2, with the same emission sources as Scenario 3 blasting, quarry activities, and operations in nearby supporting facilities.
- Scenario 11: PM_{10} emissions arising solely from controlled blasting activities in Section 1 of the project area were assessed. To account for spatial and meteorological variability, seven distinct blasting scenarios were simulated within this section. The highest ground-level concentration observed across all simulations was selected to represent the worst-case condition for impact assessment.
- Scenario 12: This scenario evaluates PM_{10} emissions resulting exclusively from controlled blasting activities in Section 2 of the project area. As in Section 1, seven different blasting configurations were modeled. The maximum ground-level concentration from these simulations was used in the impact assessment to ensure a conservative evaluation of potential air quality impacts.
- Scenario 13: NO_2 emissions from construction machinery operating along Section 1 during the construction phase.
- Scenario 14: CO emissions from construction machinery operating along Section 1 during the construction phase.
- Scenario 15: NO_2 emissions from construction machinery operating along Section 2 during the construction phase.
- Scenario 16: CO emissions from construction machinery operating along Section 2 during the construction phase.
- Scenario 17: Settled dust emissions generated during the construction phase of the section1, including emissions from blasting activities, material handling in quarries, and operations in other related facilities (e.g., concrete, asphalt, and mechanical plants) located along this section.
- Scenario 18: Settled dust emissions generated during the construction phase of the section2, including emissions from blasting activities, material handling in quarries, and operations in other related facilities (e.g., concrete, asphalt, and mechanical plants) located along this section.

Operation Phase:

- Scenario 5: NO_2 emissions from traffic in Section 1.
- Scenario 6: CO emissions from traffic in Section 1.
- Scenario 7: VOC emissions from traffic in Section 1.
- Scenario 8: NO_2 emissions from traffic in Section 2.
- Scenario 9: CO emissions from traffic in Section 2.

- Scenario 10: VOC emissions from traffic in Section 2.

Meteorological Parameters

AERMOD utilizes a meteorological data preprocessor AERMET. Hourly surface and upper air meteorological data inputs are processed by AERMET which generated SFC and PFL extended files for AERMOD. First, number of wind blows recorded in Manavgat Meteorological Station (Station Number: 17954) last 10 (ten) years (2015-2024) were compared with the average of the wind blow numbers recorded between 1960-2024 and the representative year was determined as 2022. Wind direction distribution analysis for 1960–2024, last 10 (ten) years, and 2022 are presented in Figure X.1

Following the determination of the representative meteorological year, hourly meteorological data and upper air observations were obtained from the meteorological stations best representing the project area. For this purpose, hourly surface data including humidity, pressure, temperature, precipitation, wind speed and direction were obtained from the Manavgat Meteorological Station (Station No: 17954). However, since cloud cover data were not available from this station, cloud cover and cloud ceiling height data were obtained from the nearest alternative station, the Alanya Meteorological Station (Station No: 17130). Upper air data were sourced from the Isparta Regional Meteorological Station (Station No: 17120). The collected data were processed using AERMET to generate the SFC and PFL files, which were subsequently used in AERMOD. According to the wind rose analysis presented in Figure X.1, the prevailing wind direction in the project area is the northern sector (N, NNW, NW, NNE). Winds from these directions occur with considerably higher frequency compared to other directions. In contrast, winds from the southern and western sectors are recorded at relatively lower frequencies. The wind speed distributions indicate that winds from the northern sector are predominantly concentrated within the medium to high-speed ranges.

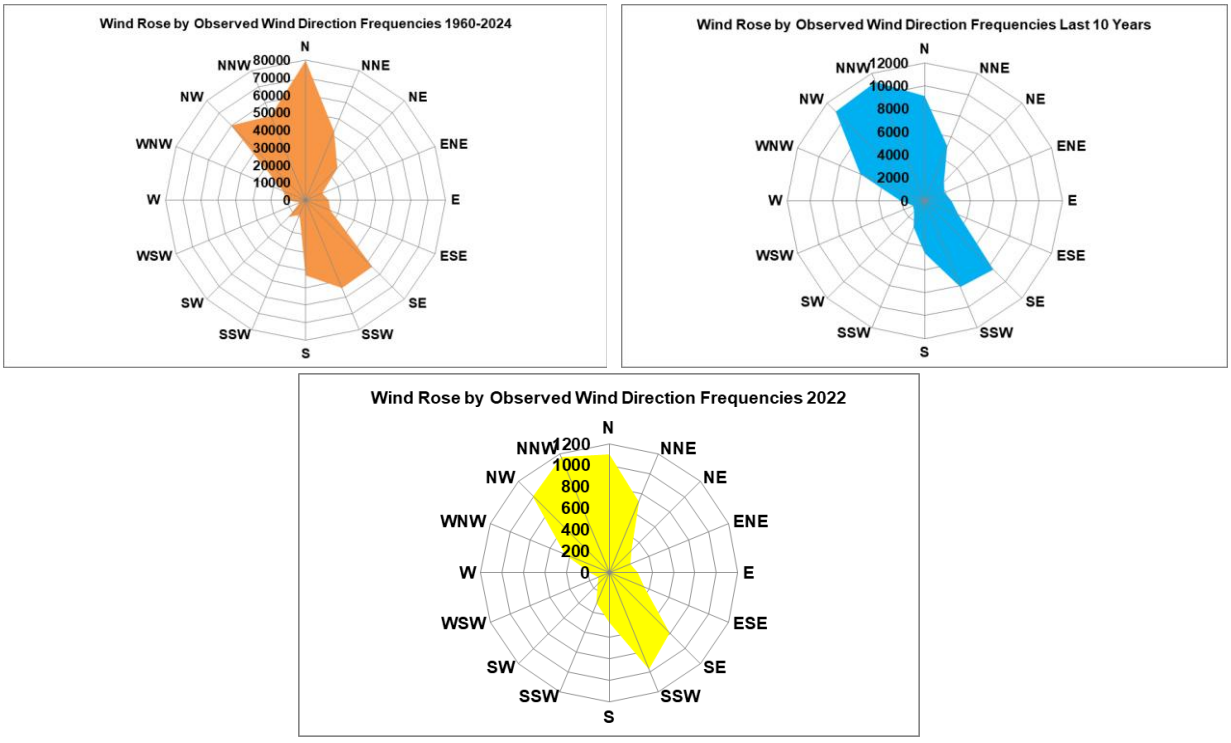

Figure X.1 Wind Direction Distribution Analysis for 1960–2024, Last 10 (ten) Years, and 2022

X.1.2. Baseline Conditions

Air quality measurements in Antalya province are performed regularly in air quality measurement station located in various point throughout the city. This station works under automatic data recording system, and the records are transferred to the National Air Quality Monitoring Network of Republic of Türkiye Ministry of Environment, Urbanization and Climate Change (MoEUCC). Air Quality Measurement Station representative for the Project in the province was selected and the measurement results for 2025 are presented in Table X.6.

Table X.6 Results of Air Quality Measurements in Antalya Province (2025)

Station Location	Distance to Project Route (km)	Parameters and Annual Measurement Results (µg/m^3)				
Antalya		**PM_{10}**	**SO_2**	**CO**	**NO_2**	**NO_x**
Serik	1.0	13.00	8.00	444.00	29.00	-
Manavgat	6.0	27.00	4.00	-	39.00	-
Alanya	8.0	26.00	-	-	11.00	-

Source: Republic of Türkiye, Ministry of Environment, Urbanization and Climate Change
https://sim.csb.gov.tr/Services/AirQuality

According to the limit values defined in the Regulation on Assessment and Management of Air Quality and Industrial Air Pollution Control Regulation, results for 2025 do not exceed the limit values at the station.

As part of the ESIA studies, air quality baseline measurements were conducted during the first week of September 2024 to determine the air quality along the Motorway route and its surrounding environment. These measurements included $PM_{2.5}$, PM_{10}, heavy metals in settled dust, settled dust, SO_2, NO_2 and VOC parameters, and were conducted at multiple locations. The selection of air quality measurement points prioritized sensitive areas such as settlements, quarries and areas with heavy urban traffic. Maps showing the air quality measurement locations are provided in Figure X.2. Laboratory reports are presented in Annex-2. Proximity of Residential and Sensitive Areas to the Project Route and its assessment is shown on Table X.7.

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Table X.7 Proximity of Residential and Sensitive Areas to the Project Route

Neighborhood	Coordinates	Corresponding Motorway (KM)	Nearest Project Components	Receptor Type	Distance to Project Alignment (m)	PM_{10} (24 h)	$PM_{2.5}$ (24 h)	Settled Dust (2 months)	SO_2 (1 month)	NO_2 (1 month)
Akdam	393414/4055623	127+000	Greenhouses, residential areas, a school, and a mosque near a road with vehicle traffic	Rural/Countryside	380	04-05.10.2024	04-05.10.2024	04.09.2024-04.11.2024	-	-
Avsallar	389720/4055765	123+400	Greenhouses, residential areas, and hotels near a road with vehicle traffic.	Touristic/Residential	640	05-06.10.2024	05-06.10.2024	05.09.2024-05.11.2024	-	-
Bademliyar	389655/4072729	115+000	The Bademliyar quarry is located near the receptor along the Konya-Manavgat D695 highway	Rural	11,980	21-22.09.2024	21-22.09.2024	21.07.2024-21.09.2024	-	-
Bucakşeyhler	363395/4078780	86+500	Residential areas, tourism facilities, and greenhouses near a road with vehicle traffic.	Rural	190	24-25.09.2024	24-25.09.2024	24.07.2024-24.09.2024	-	-
Çakallar	386572/4060940	117+100	Residential areas and roads	Rural	230	06-07.10.2024	06-07.10.2024	06.08.2024-06.10.2024	-	-
Deniz Tepesi	334640/4094389	52+000	Greenhouses and residential areas near a road with vehicle traffic.	Countryside	350	17-18.09.2024	17-18.09.2024	17.07.2024-17.09.2024	-	-
Emişbeleni	399364/4055198	133+000	Greenhouses and residential areas near a road with vehicle traffic.	Residential	75	03-04.10.2024	03-04.10.2024	03.08.2024-03.10.2024	-	-
Hacıali	370544/4070725	97+750	Greenhouses, residential areas, and a school near a road with vehicle traffic.	Rural	560	18-19.09.2024	18-19.09.2024	18.07.2024-18.09.2024	-	-
Hacıobası	373104/4065985	Manavgat East Access Road 1+000	Greenhouses and residential areas near a road with vehicle traffic.	Residential	100	01-02.10.2024	01-02.10.2024	01.08.2024-01.10.2024	01.09.2024-01.10.2024	01.09.2024-01.10.2024
Kalemler	353691/4080989	76+300	Greenhouses and residential areas near a road with vehicle traffic.	Rural	490	23-24.09.2024	23-24.09.2024	23.07.2024-23.09.2024	-	-
Karakaya	385356/4061872	115+500	Greenhouses and residential areas near a road with vehicle traffic.	Rural/Countryside	410	02-03.10.2024	02-03.10.2024	02.08.2024-02.10.2024	-	-
Konaklı	401287/4049717	140+600	Greenhouses and residential areas near a road with vehicle traffic.	Touristic/Residential	550	07-08.10.2024	07-08.10.2024	07.08.2024-07.10.2024	07.09.2024-07.10.2024	07.09.2024-07.10.2024
Köprüçay	339819/4095932	56+700	Greenhouses, Köprüçay stream, and residential areas near a road with vehicle traffic.	Countryside	2,860	22-23.09.2024	22-23.09.2024	22.07.2024-22.09.2024	-	-
Sağırin	341974/4097230	57+250	Residential areas, tourism facilities, a school, and a river near a road with vehicle traffic.	Rural	4,890	27-28.09.2024	27-28.09.2024	27.07.2024-27.09.2024	-	-
Sarılar	360448/4076493	83+500	Greenhouses and residential areas near a road with vehicle traffic.	Residential	2,335	25-26.09.2024	25-26.09.2024	25.07.2024-25.09.2024	25.09.2024-25.10.2024	25.09.2024-25.10.2024
Sarıabalı	337884/4093014	55+400	Greenhouses, Köprüçay stream, and residential areas near a road with vehicle traffic.	Rural	0	26-27.09.2024	26-27.09.2024	26.07.2024-26.09.2024	-	-
Serik	330608/4089427	Serik Access Road 7+000	Greenhouses and residential areas near a road with vehicle traffic.	Urban/Residential	690	16-17.09.2024	16-17.09.2024	16.07.2024-16.09.2024	16.09.2024-16.10.2024	16.09.2024-16.10.2024
Sülek	371900/4068786	100+000	Residential areas near a road with vehicle traffic.	Rural/Countryside	620	28-29.09.2024	28-29.09.2024	28.07.2024-28.09.2024	-	-
Taşağıl	343326/4087476	Taşağıl Access Road 2+500	Antalya-Konya D687 highway and residential areas	Residential	310	19-20.09.2024	19-20.09.2024	19.07.2024-19.09.2024	19.09.2024-19.10.2024	19.09.2024-19.10.2024
Ulukapı	365551/4075913	90+300	Greenhouses and residential areas near a road with vehicle traffic.	Rural	425	20-21.09.2024	20-21.09.2024	20.07.2024-20.09.2024	-	-
Uzunlar	376876/4066570	105+400	Greenhouses, Çenger stream, and residential areas near a road with vehicle traffic.	Rural	1,330	30.09.2024-01.10.2024	30.09.2024-01.10.2024	30.07.2024-30.09.2024	-	-

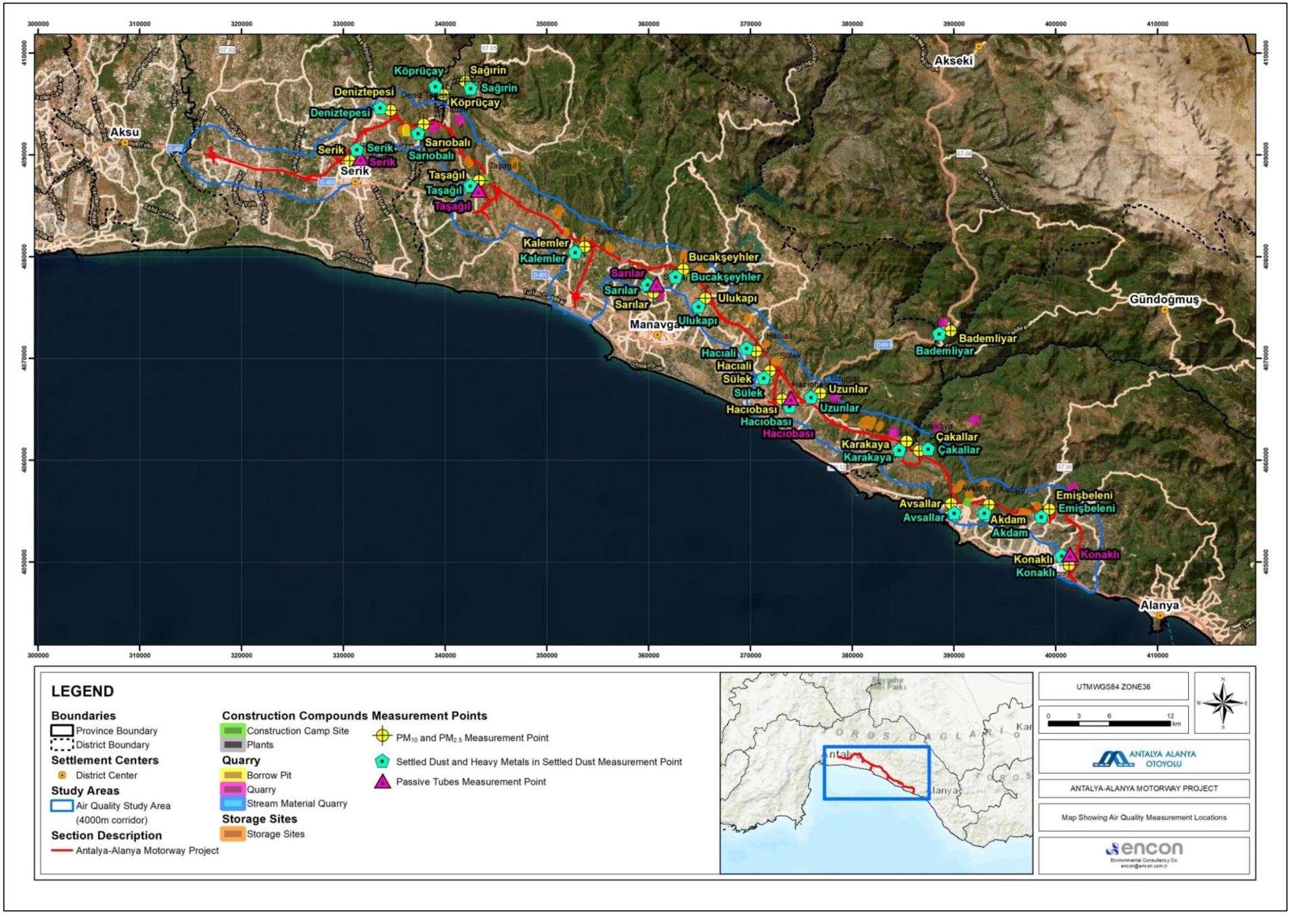


Figure X.2 Map Showing Air Quality Measurement Locations

Ambient air quality measurements were conducted at 21 locations during September–October 2024. The campaign covered PM_{10}, $PM_{2.5}$, settled dust, and heavy metals in settled dust. PM measurements were taken over 24-hour periods at each location, consistent with IFC's Environmental, Health and Safety (EHS) Guidelines for Air Emissions and Ambient Air Quality, which recommend 24-hour averaging periods for particulate matter to ensure comparability with WHO and national standards.

Although PM_{10} and $PM_{2.5}$ data were collected on a single day at each location, the following factors support the adequacy and representativeness of this approach in the context of IFC PS3:

- The monitoring campaign was conducted under normal operational conditions with no exceptional emission sources (e.g., construction works, or accidental releases) observed during the measurement days. Local activities and emission sources were stable and typical for the season.
- Weather conditions during the campaign (e.g., wind speed and direction, temperature, humidity) reflected seasonal averages and did not include any meteorological extremes. This ensured that dispersion conditions were typical and data were not biased by anomalies such as inversions or dust storms.
- The 21 sampling points were carefully selected to capture spatial variability, including background areas, residential zones, roadside locations, and areas near potential emission sources. This wide coverage compensates for the temporal limitation and provides a robust spatial profile of ambient air quality across the project area.
- Short-term baseline assessments with targeted 24-hour sampling campaigns are recognized under the IFC EHS Guidelines as appropriate for infrastructure projects, particularly where long-term seasonal variation is not a dominant factor.

In summary, the design and implementation of the air quality baseline campaign conform to IFC Performance Standard 3 and associated technical guidelines. The collected data are representative of typical ambient conditions and sufficient to assess potential impacts and inform mitigation strategies for the expressway project.

Measurements were conducted at 21 different points. Settled dust was measured over a 2-month period, while PM_{10} and $PM_{2.5}$ were measured over 24-hour periods. The results are presented in Table X.8.

Table X.8 Results of PM_{10}, $PM_{2.5}$,Settled Dust and Heavy Metals in Settled Dust Measurements (September- October 2024)

District	Corresponding Motorway (KM)	Coordinates	PM_{10} Results (µg/m³)	Settled Dust Measurement Results (mg/m².day)	$PM_{2.5}$ Results (µg/m³)	Heavy Metals in Settled Dust		
						Cadmium (mg/kg)	Lead (mg/kg)	Thallium (mg/kg)
Akdam	127+000	393414/4055623	19.6	12.33	15.8	<0.002	<0.002	<0.002
Avsallar	123+400	389720/4055765	< 6.0	32.07	< 6.0	<0.006	<0.006	<0.006
Bademliyar	115+000	389655/4072729	10.7	54.84	9.27	<0.0004	<0.0004	<0.0004
Bucakşeyhler	86+500	363395/4078780	< 6.0	31.31	< 6.0	<0.0006	<0.0006	<0.0006
Çakallar	117+100	386572/4060940	12	60.53	9.99	<0.0003	<0.0003	<0.0003
Deniz Tepesi	52+000	334640/4094389	19.4	12.33	13.6	<0.002	<0.002	<0.002
Emişbeleni	133+000	399364/4055198	12.2	56.55	11.8	<0.0004	<0.0004	<0.0004
Hacıali	97+750	370544/4070725	45.9	92.98	30.5	<0.0002	<0.0002	<0.0002
Hacıobası	Manavgat East Access Road 1+000	373104/4065985	8.54	45.35	6.17	<0.0004	<0.0004	<0.0004
Kalemler	76+300	353691/4080989	14	65.28	12.2	<0.0003	<0.0003	<0.0003
Karakaya	115+500	385356/4061872	11.2	56.17	10.4	<0.0004	<0.0004	<0.0004
Konaklı	140+600	401287/4049717	15.1	73.06	13.1	<0.0003	<0.0003	<0.0003
Köprüçay	56+700	339819/4095932	17.4	72.30	11.6	<0.0003	<0.0003	<0.0003
Sağırin	57+250	341974/4097230	< 6.0	29.60	< 6.0	<0.0007	<0.0007	<0.0007
Sarılar	83+500	360448/4076493	12.3	64.71	11.8	<0.0003	<0.0003	<0.0003
Sarıabalı	55+400	337884/4093014	16.5	73.06	10.2	<0.0003	<0.0003	<0.0003
Serik	Serik Access Road 7+000	330608/4089427	29.2	74.38	7.84	<0.0003	<0.0003	<0.0003
Sülek	100+000	371900/4068786	7.09	42.13	6.17	<0.005	<0.005	<0.005
Taşağıl	Taşağıl Access Road 2+500	343326/4087476	11.3	55.41	8.18	<0.0004	<0.0004	<0.0004
Ulukapı	90+300	365551/4075913	20.4	73.62	16.7	<0.0003	<0.0003	<0.0003
Uzunlar	105+400	376876/4066570	16.8	72.49	12.2	<0.0003	<0.0003	<0.0003
Turkish Air Quality Standards[1]			**50.0**	**210.0**	**-**			
IFC Air Quality Standards[2]			**50.0**		**25**		**-**	
European Directives[3]			**50.0**		**25**		**-**	

[1] Regulation on Control of Industrial Air Pollution (Dated 03.07.2009 and Numbered 27277) and Regulation on Assessment and Management of Air Quality (Dated 06.06.2008 and Numbered 26898)
[2] IFC General Environmental, Health, and Safety (EHS) Guidelines (WHO stands for World Health Organization) (Dated 30 April 2007)
[3] Directive 2008/50/EC, 21 May 2008, ambient air quality

As seen above, all results comply with the Air Quality Assessment and Management Regulation, the Regulation on the Control of Industrial Air Pollution, IFC standards and EU Regulations; however, the PM_{10} value at Hacıali should be monitored closely, as it is near the daily limit value 50 µg/m³. The potential contributing factors to this elevated PM_{10} concentration include the high traffic density in the Hacıali neighborhood.

Heavy metal concentrations in settled dust (Cadmium, Lead, and Thallium) were found to be below detection limits in all sampled neighborhoods. Although certain limit values related to settled dust and ambient air quality are defined in Turkish regulations (Table X.1) and EU directives (Table X.3), the results indicate that there is no significant pollution. These findings are consistent with the general principles of the Regulation on Air Quality Assessment and Management, the Regulation on the Control of Industrial Air Pollution, and relevant EU air quality directives.

Since no specific limit values are defined under the EU or IFC standards for settled dust, the measurement results have been evaluated in accordance with the limit values set by the Regulation on Air Quality Assessment and Management and the Regulation on the Control of Industrial Air Pollution. The results were found to be below the applicable limits defined in these national regulations.

The measurement results are below the limit values defined in the IFC standards (24-hour limit value), except for the Hacıali neighborhood, where the $PM_{2.5}$ concentration appears to be higher than the regulatory limit values. This can be explained by the high traffic load in Hacıali neighborhood and their immediate surroundings.

SO_2 and NO_2 were monitored using passive sampling over a one-month period between September 21 and October 21, 2024, at the five selected locations. VOC measurements were conducted on October 17, 2024.

Baseline monitoring for PM_{10}, $PM_{2.5}$, and settled dust was conducted at 21 locations to capture local variability influenced by site-specific conditions such as surface activities, unpaved roads, and nearby construction or traffic.

In contrast, gaseous pollutants such as SO_2, NO_2, and VOCs were measured at five representative locations. This decision was based on the following technical and methodological considerations:

- Unlike particulate matter, which exhibits significant micro-scale variation due to local dust-generating activities, gaseous pollutants tend to have broader dispersion characteristics. Pollutants like NO_2 and SO_2 are emitted primarily from combustion sources (e.g., vehicles), and their ambient concentrations over regional scales are relatively stable and homogeneous—especially in the absence of strong point sources. Therefore, a smaller number of well-distributed sampling points is sufficient to characterize background levels and inform modeling inputs.
- The five selected locations—Hacıobası, Konaklı, Sarılar, Serik, and Taşağıl—were chosen to represent a cross-section of relevant environmental settings, including residential areas, proximity to the highway alignment, agricultural zones, and receptor-sensitive areas. This ensures that spatial diversity is adequately captured despite the smaller sample size.
- SO_2 and NO_2 were measured using passive diffusion tubes deployed over a one-month period. This method, while highly effective for capturing average ambient concentrations, requires manual installation and retrieval, as well as laboratory analysis. As per best practice and IFC-aligned methodologies, passive sampling is typically conducted at fewer, but more representative locations to balance cost, feasibility, and data quality.

- VOC sampling requires active sampling equipment and laboratory coordination, which is often focused on areas with potential human exposure or suspected hydrocarbon emissions. In this context, the selected five locations provide sufficient spatial coverage given the anticipated low emission profile of VOCs in the area.
- IFC's Air Emissions and Ambient Air Quality guidance recognizes that the extent of monitoring should be proportional to the project's potential for emissions and environmental risk. In the absence of significant industrial sources or dense urban activity, the chosen five-site gaseous monitoring network is deemed proportionate, representative, and sufficient for baseline characterization.

Table X.9 Results of Passive Measurements

Neighbourhood	Corresponding Motorway (KM)	UTM WGS84 ZONE 36 Coordinates	VOCs (µg/m³)	SO_2 (µg/m³)	NO_2 (µg/m³)
Hacıobası	Manavgat East Access Road 1+000	373104/4065985	2.0	<10.27	<4.24
Konaklı	140+600	401287/4049717	2.0	<10.27	<4.24
Sarılar	83+500	360448/4076493	1.0	24.21	<4.24
Serik	Serik Access Road 7+000	330608/4089427	1.0	<10.27	<4.24
Taşağıl	Taşağıl Access Road 2+500	343326/4087476	1.0	<10.27	<4.24
Turkish Air Quality Standards			**70**	**125.0**	**200.0**
IFC Air Quality Standards			**-**	**20.0**	**40.0**
European Directives			**70**	**125.0**	**40.0**

The results, presented in Table X.9, generally remained below the limit values set by the EU Directives, the Regulation on Air Quality Assessment and Management, and the Regulation on the Control of Industrial Air Pollution. However, some SO_2 concentrations measured in the Sarılar neighborhood exceeded the IFC guideline value of 20 µg/m³, despite remaining below the IFC Interim Targets of 125 µg/m³ (Target 1) and 50 µg/m³ (Target 2). This exceedance is considered to be related to the presence of greenhouse and residential areas in close proximity to roads open to vehicular traffic.

X.1.3. Potential Impacts

Emissions during construction phase of the Project will consist of $PM_{2.5}$, PM_{10}, heavy metals in settled dust, settled dust, SO_2, NO_2, VOCs from construction machinery and equipment. During the operation phase of the Motorway, similar to the other combustion processes, emissions from vehicles include CO, NOx, SO2, PM and VOCs[4]. Within this context, main air pollutants of concern regarding the Project are described below:

Particulate Matter (PM)

PM stands for particulate matter (also called particle pollution): the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen. Others can only be detected using an electron microscope. Particulate matter

[4] IFC General Health and Safety Guidelines on Air Emissions and Ambient Air Quality

includes PM_{10} inhalable particles, with diameters that are generally 10 micrometers and smaller; and $PM_{2.5}$; fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller[5].

Particulate matter come in many sizes and shapes and can be made up of hundreds of different chemicals. Some are emitted directly from a source, such as construction sites, unpaved roads, fields, smokestacks or fires. Most particles form in the atmosphere as a result of complex reactions of other pollutants such as sulfur dioxide and nitrogen oxides.

Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into lungs, and some may even get into the bloodstream.

Particles can vary according to size and composition. PM_{10} (particulate matter with aerodynamic diameter smaller than 10 μm) standard is set to define the particles that people are likely to inhale and PM_{10} has become the general measure of particulate matter.

Settled Dust

Settled dust consists of airborne particles that settle onto the ground or other surfaces due to gravity. These particles can originate from construction activities, quarries, excavation, road works, and other land preparation operations. Settled dust varies in size and composition and may contain heavy metals or other pollutants. From a health perspective, the inhalable fraction of dust (especially PM10 and PM2.5) can cause respiratory problems and affect lung and heart function. Environmentally, settled dust can accumulate on plants, water bodies, and cultural structures, potentially causing adverse effects.

Carbon monoxide (CO)

Carbon monoxide (CO) is a colorless, odorless gas that can be harmful when inhaled in large amounts. It is formed both naturally and human activities such as in complete burning of fossil fuels, and it is important to note that natural processes produce relatively small amounts of CO when compared to anthropogenic sources. Main sources of CO in outdoor air can be accepted as cars, trucks and other vehicles and machinery that burn fossil fuels. Therefore, it can be said that CO levels in urban areas is closely related with traffic density. Other anthropogenic sources of the pollutant are power stations and waste incinerators.

Human inhalation of air with high CO concentration is known to reduce the amount of oxygen carrying capacity of blood stream as CO is rapidly absorbed by blood. Very high levels are generally associated with indoor pollution however; significant health problems for vulnerable individuals can be observed when CO levels are elevated outdoors.

CO is considered as a relatively stable compound and takes part slowly in atmospheric chemical reactions. CO reacts with other pollutants in air to form ozone. This forms ground level ozone which does not have significant environmental impacts at a global level. On the other hand, CO contributes indirectly to greenhouse effect by depleting hydroxyl radicals and slowing destruction of methane.

Sulfur Dioxide (SO_2)

Sulfur Dioxide (SO_2) is one of a group of gases called sulfur oxides (SO_x). While all of these gases are harmful to human health and the environment, (SO_2) is of greater concern. Other gaseous SO_x (such as SO_3) are found in the atmosphere at concentrations much lower than (SO_2). The largest sources of

[5] https://www.epa.gov/pm-pollution

(SO_2) emissions are from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of (SO_2) emissions include: industrial processes such as extracting metal from ore; natural sources such as volcanoes; and transportation via locomotives, ships and other vehicles and heavy equipment that burn fuel with high sulfur content.

SO_2 can affect both health and the environment. Short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult. Children, the elderly, and those who suffer from asthma are particularly sensitive to effects of SO_2.

SO_2 emissions that lead to high concentrations of pollutants in the air generally also lead to the formation of other sulfur oxides (SO_x). SO_x can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter (PM) pollution: and cause additional health problems and reduce visibility (haze). Deposition of particles can also damage stone and other materials, including culturally important objects. In addition, at high concentrations, gaseous SO_x can harm trees and plants by damaging foliage and decreasing growth. SO_2 and other sulfur oxides can contribute to acid rain which can harm sensitive ecosystems *(https://www.epa.gov/so2-pollution).*

Nitrogen Dioxide (NO_2)

Nitrogen Dioxide (NO_2) is one of a group of highly reactive gases called nitrogen oxides (NO_x). While all of these gases are harmful to human health and the environment, NO_2 is of greater concern. Other nitrogen oxides include nitrous acid and nitric acid. NO_2 primarily gets in the air from the burning of fuel. NO_2 forms from emissions from cars, trucks and buses, power plants, and off-road equipment.

Breathing air with a high concentration of NO_2 can irritate airways in respiratory system. Such exposures over short periods can cause respiratory diseases such as asthma, leading to respiratory symptoms such as coughing, or difficulty in breathing. Longer exposures to elevated concentrations of NO_2 may contribute to the development of serious health problems. NO_2 reacts with other chemicals in the air to form both particulate matter and ozone. Both of these are also harmful when inhaled due to effects on the respiratory system *(https://www.epa.gov/no2-pollution).*

NO_2 and other NO_x interact with water, oxygen and other chemicals in the atmosphere to form acid rain. Acid rain harms sensitive ecosystems such as lakes and forests. The nitrate particles that result from NO_x make the air hazy and decrease visibility. In addition, NO_x in the atmosphere contributes to nutrient pollution in coastal waters.

Volatile Organic Compounds (VOCs)

VOCs are organic compounds containing one or more carbon atoms that have high vapor pressures and therefore evaporate readily to the atmosphere. There are thousands of compounds that meet this definition. VOCs play a significant role in the formation of ozone and fine particulates in the atmosphere. Under sunlight, VOCs react with nitrogen oxides emitted mainly from vehicles, power plants and industrial activities to form ozone, which in turn helps the formation of fine particulates. The accumulation of ozone, fine particulates and other gaseous pollutants results in smog that reduces visibility. Smog is particularly severe under stagnant weather conditions.
Smog can irritate eyes, nose and throat, or can worsen existing heart and respiratory problems such as asthma. People with heart and lung problems, the elderly and children whose respiratory systems are still developing are most at risk. Prolonged exposure to severe smog condition may cause

permanent damage to lung tissue and affects the human immune system. In addition, smog impairs visibility[6].

Abovementioned pollutants are expected to be emitted during land preparation, construction and operation phases of the motorway project. In order to determine the potential impacts of project emissions on air quality, the sources of pollutants are clearly defined and amounts of pollutants emitted from each source are quantified. Sources and amounts of project emissions are described in detail for land preparation and construction and operation phases of the Project separately in the following parts.

X.1.3.1. Land Preparation and Construction Phase

Construction phase activities are expected to result in dust emissions during land preparation, cut-fill operations and activities of quarries operated in the scope of the Project. In addition, exhaust emissions such as PM_{10}, $PM_{2.5}$, settled dust, NO_x, CO, SO_2, VOC, benzene, NH_3 and N_2O are also expected. Asphalt plants and concrete plants are considered as other emission sources of construction activities. Campsites, concrete plants, asphalt plants, mechanical plants, quarries, material storage sites/borrow pits to be operated during the construction phase are presented in Figure X.3.

[6] *http://www.epd.gov.hk/epd/english/environmentinhk/air/prob_solutions/vocs_smog.html*

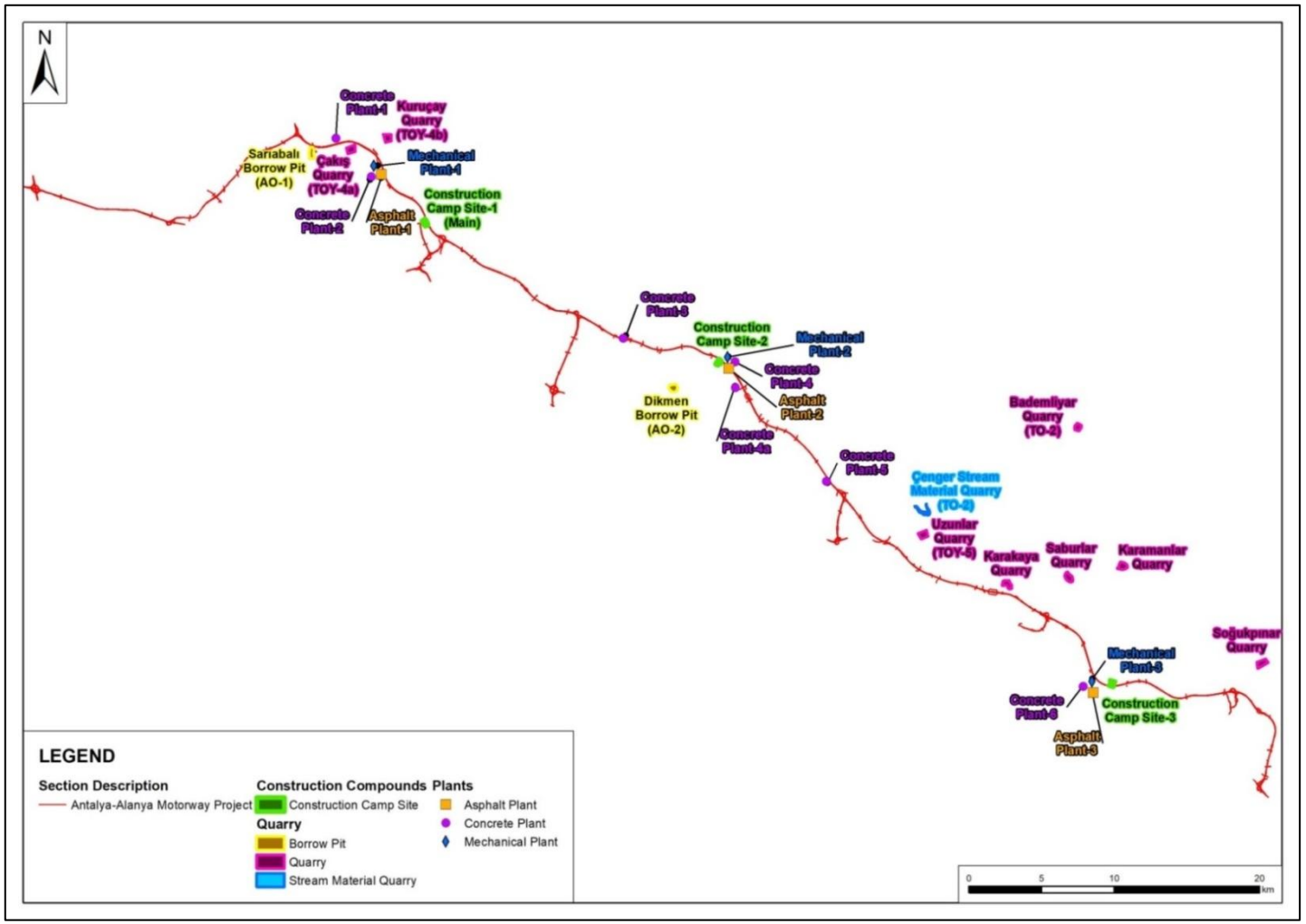


Figure X.3 Related Project Components to be Utilized during Construction Phase of the Project

According to the Project schedule, it is planned that the construction works will last at most three years. Within this scope, top-soil stripping will be followed by excavation, fill and leveling. Next, bridges, underpass and overpass bridges, culverts and viaducts, will be established accordingly.

Modeling studies were carried out for NO_2, VOC, CO and SO_2 parameters, and each pollutant under 2 different scenarios (Section 1, Section 2) and the possible effects of pollutant sources on local air quality were examined in accordance with each scenario.

Section 1 corresponds to the segment between kilometers Km: 52+000 and Km: 97+000 of the planned motorway, while Section 2 covers the segment between kilometers Km: 97+000 and Km: 142+000. Excavation (cut) and fill (embankment) amounts for Section 1 and Section 2 are presented in Chapter VII.

In the scope of road construction works, excavated materials are planned to be used in the fill operations wherever the properties and the quality of the materials are suitable. When there is a surplus of excavated materials, excess material will need to be stored at designated storage areas. If there is a need for supply of construction material, it will be supplied from nearby licensed quarries to the extent possible.

Materials will be sourced from ten different quarries, mines, and facilities. Material extracted from the quarries will be transferred to crushers located nearby. According to the KGM Technical Specifications, crushers shall operate in enclosed areas and be equipped with dust suppression systems. Excess material from excavation will be stored in designated storage areas. Detailed information on the quarries, storage areas, and facilities is provided in Annex 6.
Emission factors defined in Industrial Air Pollution Control Regulation will be used to calculate the dust emissions from excavation and fill operations. These emission factors are presented in Table X.10. Uncontrolled emission factors represent the case in which the activities are performed without any measures taken, while controlled emission factors represent the case when measures such as watering, usage of closed transportation systems, keeping the material moisturized and performing loading and unloading of materials without scattering are taken. A detailed breakdown of dust emissions related to the Project is provided in Annex 6 of the Air Quality Modeling Report.

Table X.10. Emission Factors for Dust Emissions

Sources	Emission Factors		Unit
	Uncontrolled	Controlled	
Excavation	0.025	0.0125	kg/ton
Loading	0.010	0.005	
Unloading	0.010	0.005	
Primary Crusher	0.243	0.0243	
Secondary Crusher	0.585	0.0585	
Tertiary Crusher	0.585	0.0585	
Transportation (round-trip total distance)	0.7	0.35	kg/km-vehicle
Storage	5.8	2.9	kg dust/ha.day

Source: Industrial Air Pollution Control Regulation, Annex-12

Air Quality Modeling for Land Preparation and Construction Phase

Dust emissions are expected during construction activities within the Project Area. Emissions for the facility's operation phase have been estimated using emission factors from the Emission Estimation Technique Manual for Mining, published by the Australian Government Department of the Environment. These factors are primarily based on the U.S. EPA's AP-42 – Compilation of Air Pollutant Emission Factors. Although the project is located in Türkiye, it is common practice in environmental impact assessments conducted there to utilize internationally recognized emission factors—especially when local factors are either too generalized or do not adequately reflect the specific types of activities involved. In this context, Australian emission factors were selected due to their relevance to construction-related operations and their alignment with widely accepted international modeling standards. The emission factors used in the calculations are detailed in Table X.11.

This study covers emission estimates from excavation and filling works related to road construction, as well as emissions from quarries, concrete batching plants, mechanical plants, and asphalt plants planned along the project route. These sources represent material extraction, processing, and handling activities during both construction and operation phases. Details on the locations, types, and operation capacities of the facilities included in the modeling are provided in **Error! Reference source not found.**.

In this study, motorway construction emissions were calculated based on the year 2026, during which the highest material production volumes were scheduled according to the construction plan. A daily working duration of 20 hours was assumed to represent two active shifts, and this assumption was directly applied in the estimation of hourly emissions.

For detailed calculations of the emissions caused by each emission source mentioned in this section, such as excavation and fill operations, storage areas, asphalt plants, construction machinery and equipment, refer to the Annex-6 Air Quality Modeling Report.

Table X.11 Default Emission Factors for Various Operations at Mines

Activity	PM_{10} Default Emission Factor	Unit
Excavators/Shovels/Front-end loaders (on overburden).	0.012	kg/t
Excavators/Shovels/ Front-end loaders (on coal).	0.014	kg/t
Scrapers (removing topsoil)	0.0073	kg/t
Material loading-unloading	0.0043	kg/t
Blasting	$0.00114 \times A^{1.5}$	kg/blast
Wheel generated dust from unpaved roads at industrial sites	1.25	kg/VKT
Wind Erosion	0.2	kg/ha/hour
Primary crusher	0.02	kg/t

Reference: Australian Government, EET for mining, version 3.1, Table 2
A=blasting area,m^2

In order to assess the potential impacts of the Project's construction activities, air quality modeling studies were conducted for PM_{10}, $PM_{2.5}$, settled dust, NO_2, and CO parameters. The Air Quality

Modeling Report has been submitted as an annex to this report. As part of the modeling studies, daily and annual PM_{10} concentrations and $PM_{2.5}$ levels were determined and compared with the air quality limit values defined in the Regulation on the Assessment and Management of Air Quality, the Regulation on the Control of Industrial Air Pollution, EU directives, and IFC standards (see Table X.1, Table X.2, and Table X.3).

For each pollutant, modeling was carried out under a single scenario, and the potential effects of emission sources on local air quality were evaluated in accordance with this scenario.

PM_{10} Concentrations at Ground Level

According to the scenarios defined for the construction phase, the ground-level concentration (GLC) values of PM_{10} expected to occur around the existing facilities are presented in Table X.12. In addition, maximum daily and annual emission distribution maps for PM_{10} are provided in Figure X.4, through Figure X.11.

Table X.12 Results of ground-level PM_{10} concentrations observed in different scenarios

Scenario	PM_{10} Highest Daily ($\mu g/m^3$)	Number of Exceedances	PM_{10} Highest Annual ($\mu g/m^3$)	UTM WGS 84 ZONE 36 Coordinates (Daily / Annual)	Distance (m)	Direction (from Emission Source to GLC)
Scenario 1 Construction-Section1	413.31	30	20.56	Daily: (337884, 4093014) / Annual: (360491, 4077639)	25 / 1,200	Southeast / South
Scenario 2 Construction-Section2	968.81	33	23.2	Daily: (391106, 4054935) / Annual: (391106, 4054935)	770 / 770	South / South
Scenario 11 Blasting-Section1	456.72	17	5.64	Daily: (335487, 4092726) / Annual: (334987, 4094226)	530 / 60	Southwest / West
Scenario 12 Blasting-Section2	1614.84	17	11.49	Daily: (383419, 4061430) / Annual: (380419, 4063430)	555 / 625	Southeast / North
IAPCR Limit Values	**50**	**Max 35 exceedances/year**	**40**	**-**	**-**	**-**
IFC Standards	**50**	**-**	**20**	**-**	**-**	**-**
EU Directives	**50**	**Max 35 exceedances/year**	**40**	**-**	**-**	**-**

As presented in Table X.12, PM_{10} measurements indicate that daily concentrations exceed the IAPCR, IFC, and EU limits in certain scenarios. However, when considering the maximum number of exceedances allowed per year, all scenarios remain within the permissible limits. The term “Number of exceedances” refers to the maximum number of days in a year on which the 24-hour limit can be exceeded; that is, out of 365 days in a year, the 24-hour limit may be exceeded on a maximum of 35 days.

Scenario 1 (Construction-Section1): Daily PM_{10} concentrations exceed the 24-hour limits of IAPCR, IFC, and EU standards, while the annual averages remain below all regulatory thresholds. The number of exceedance days is within the annual maximum allowed. The elevated daily values are associated with construction activities and material handling in this section.

Scenario 2 (Construction-Section2): Similar to Scenario 1, daily PM_{10} concentrations surpass all regulatory limits, whereas annual concentrations remain below the IAPCR and EU limits but approach the IFC annual threshold. The daily exceedances remain within the permitted annual count. The higher values compared to Scenario 1 are linked to more intensive construction and traffic activities in this section.

Scenario 11 (Blasting-Section1): Daily PM_{10} values are above the 24-hour limits, while annual averages remain well within all regulatory limits. The lower daily exceedances compared to construction scenarios reflect the intermittent nature of blasting operations.

Scenario 12 (Blasting-Section2): This scenario shows the highest daily PM_{10} concentrations, exceeding all 24-hour limits. Although annual averages meet the IAPCR and EU thresholds, they slightly exceed the IFC annual limit. The daily exceedance count, however, is still within the allowed maximum. The elevated values are primarily due to blasting operations combined with material transport.

In areas with the highest pollutant concentrations, targeted mitigation measures, as detailed in Section X.1.4.1, will be implemented to reduce emissions and ensure compliance with applicable air quality standards. These measures aim to control dust generation from construction, blasting, and material handling activities, thereby protecting nearby sensitive receptors.

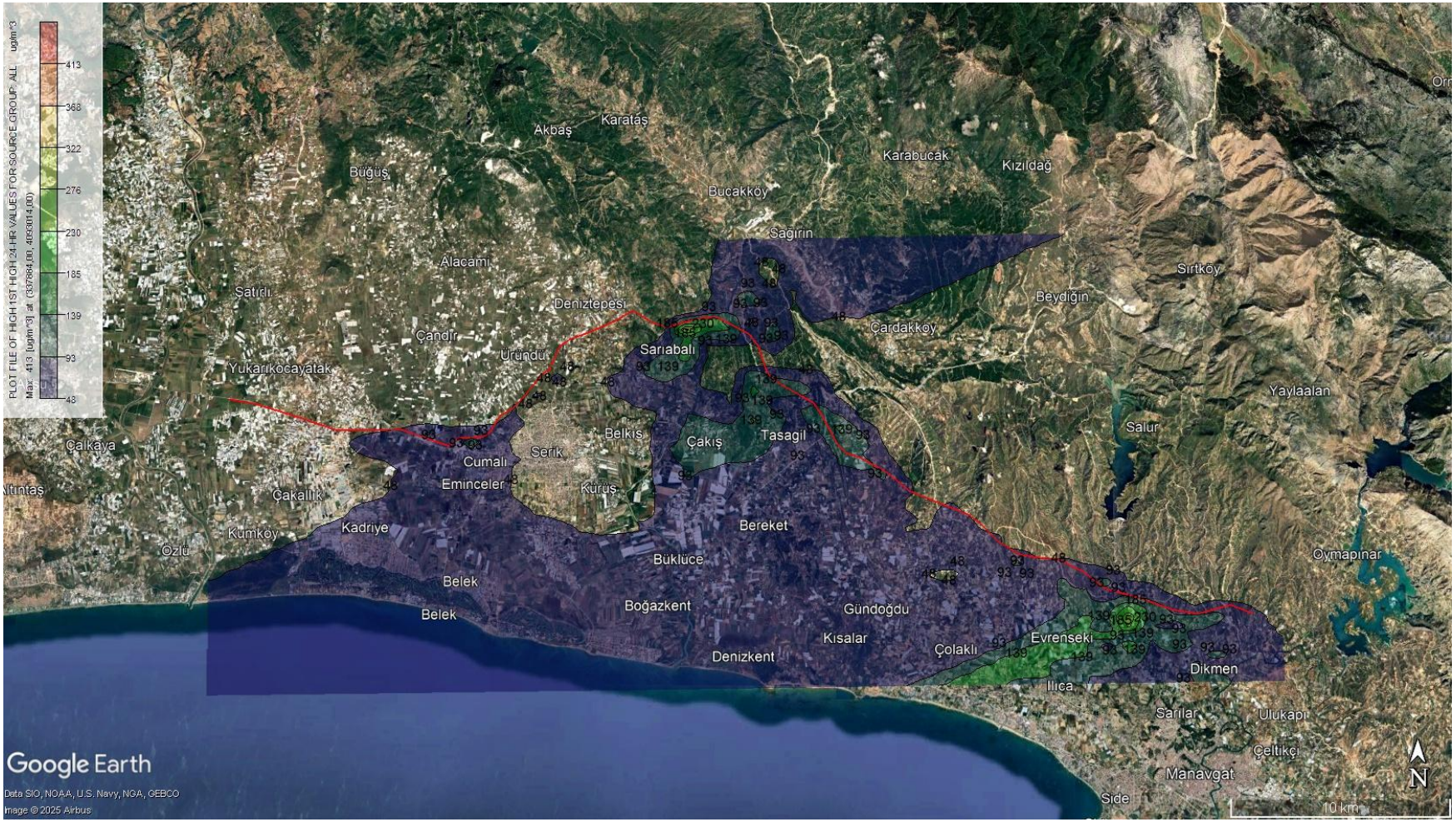


Figure X.4 Maximum daily PM_{10} emission distribution- Section 1 - Construction (µg/m^3)

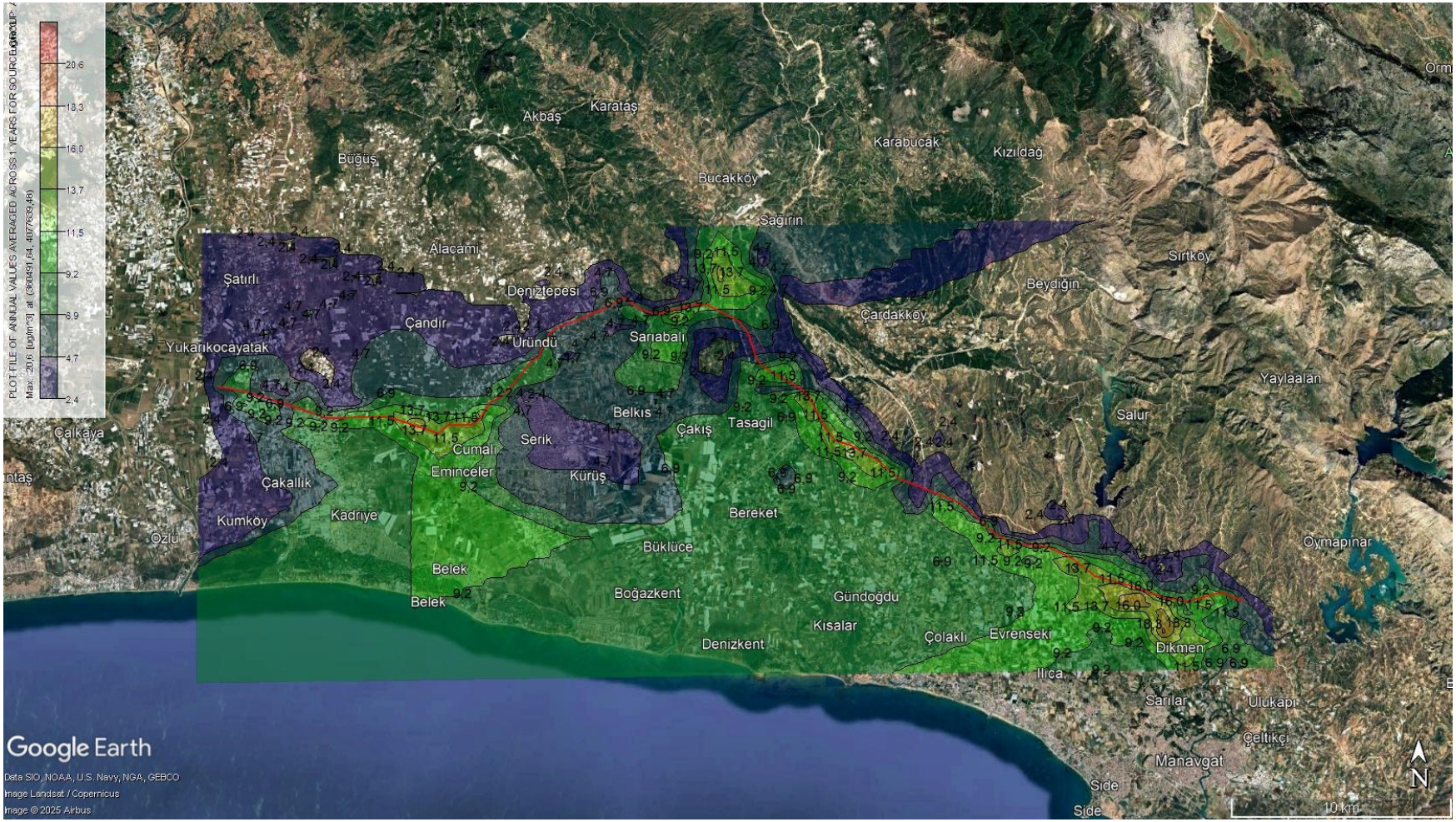


Figure X.5 Maximum annual PM_{10} emission distribution-Section 1 - Construction (µg/m^3)

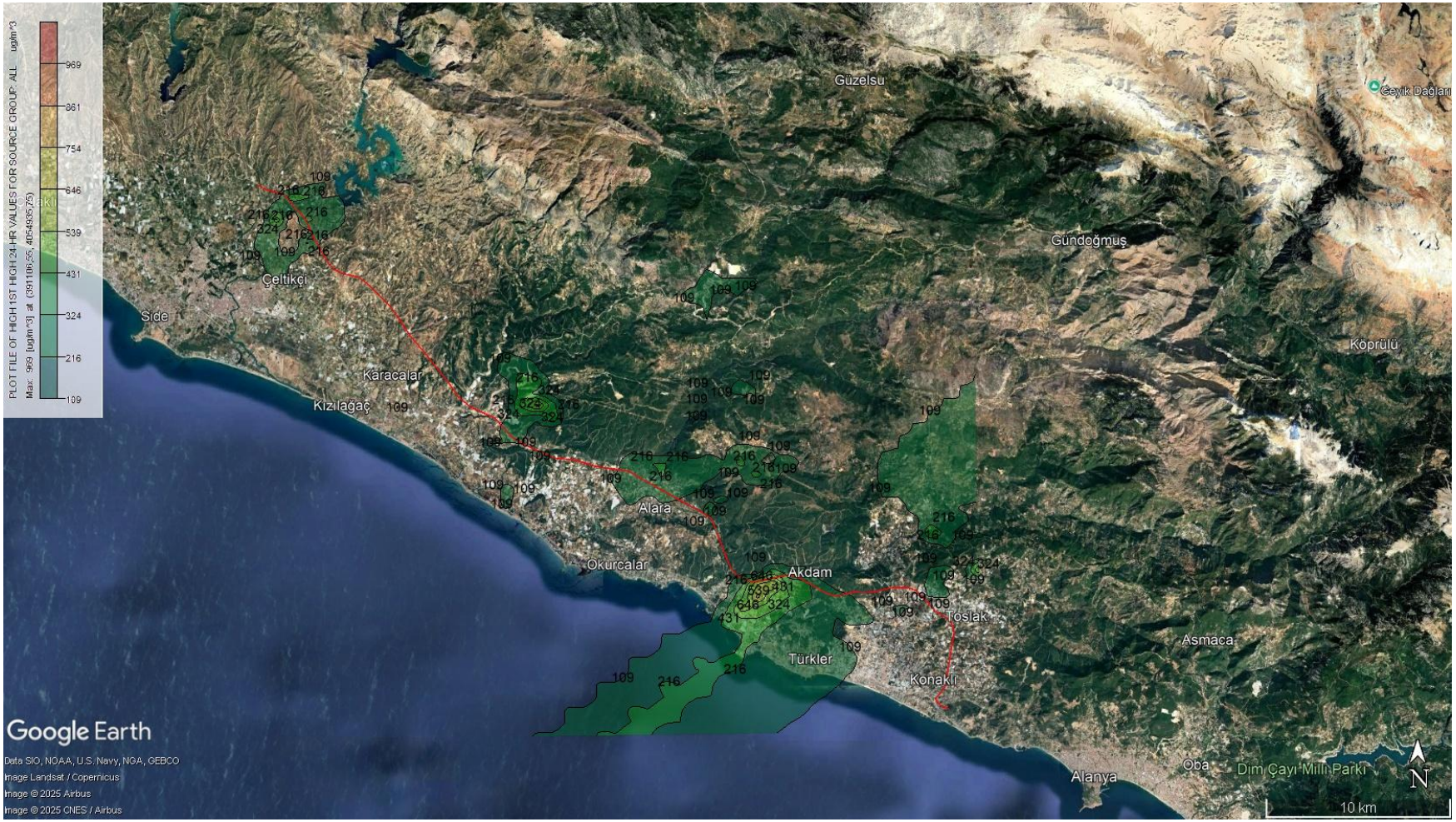


Figure X.6 Maximum daily PM_{10} emission distribution- Section2 - Construction (µg/m^3)

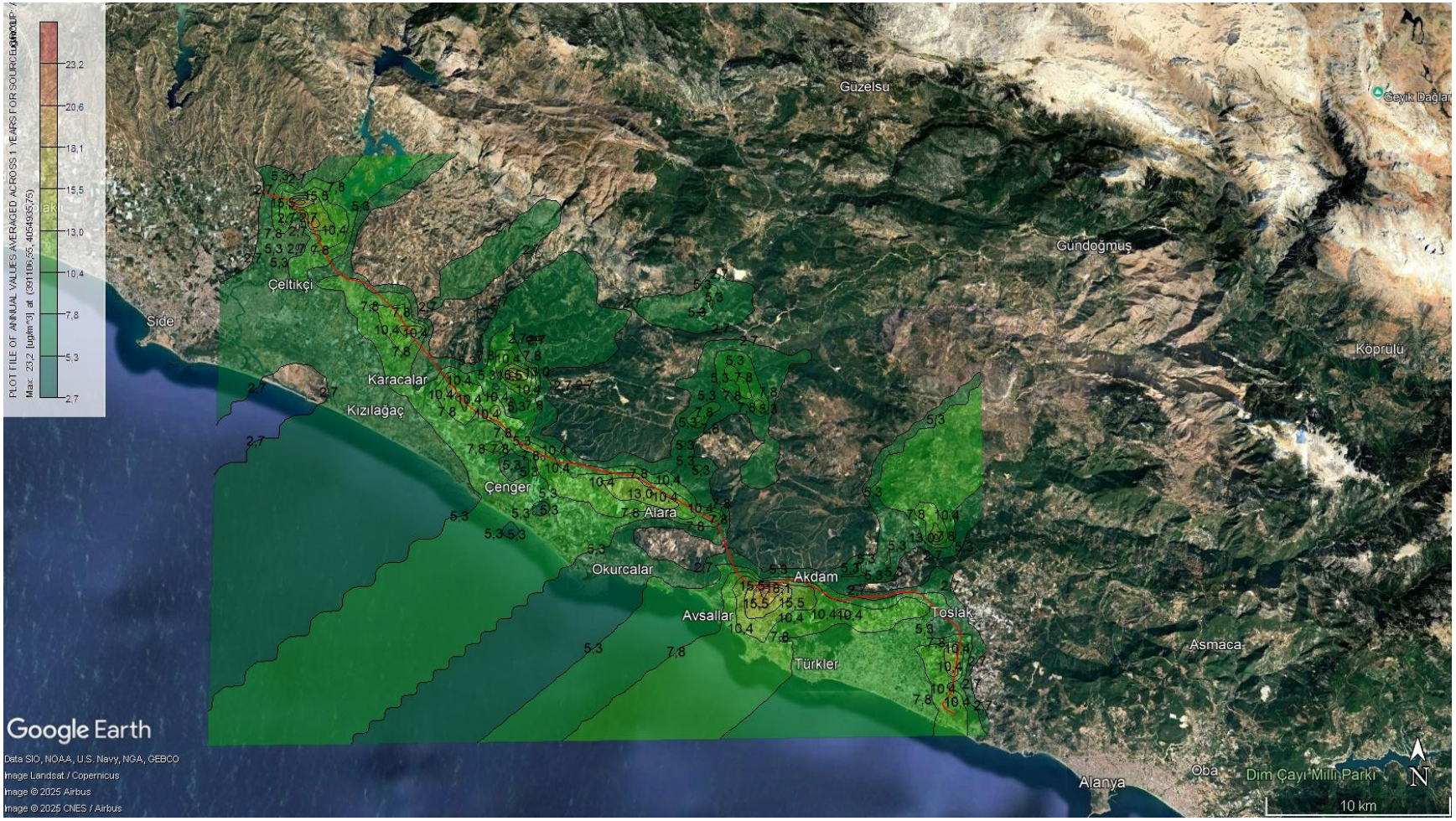


Figure X.7 Maximum annual PM_{10} emission distribution-Section 2- Construction (µg/m^3)

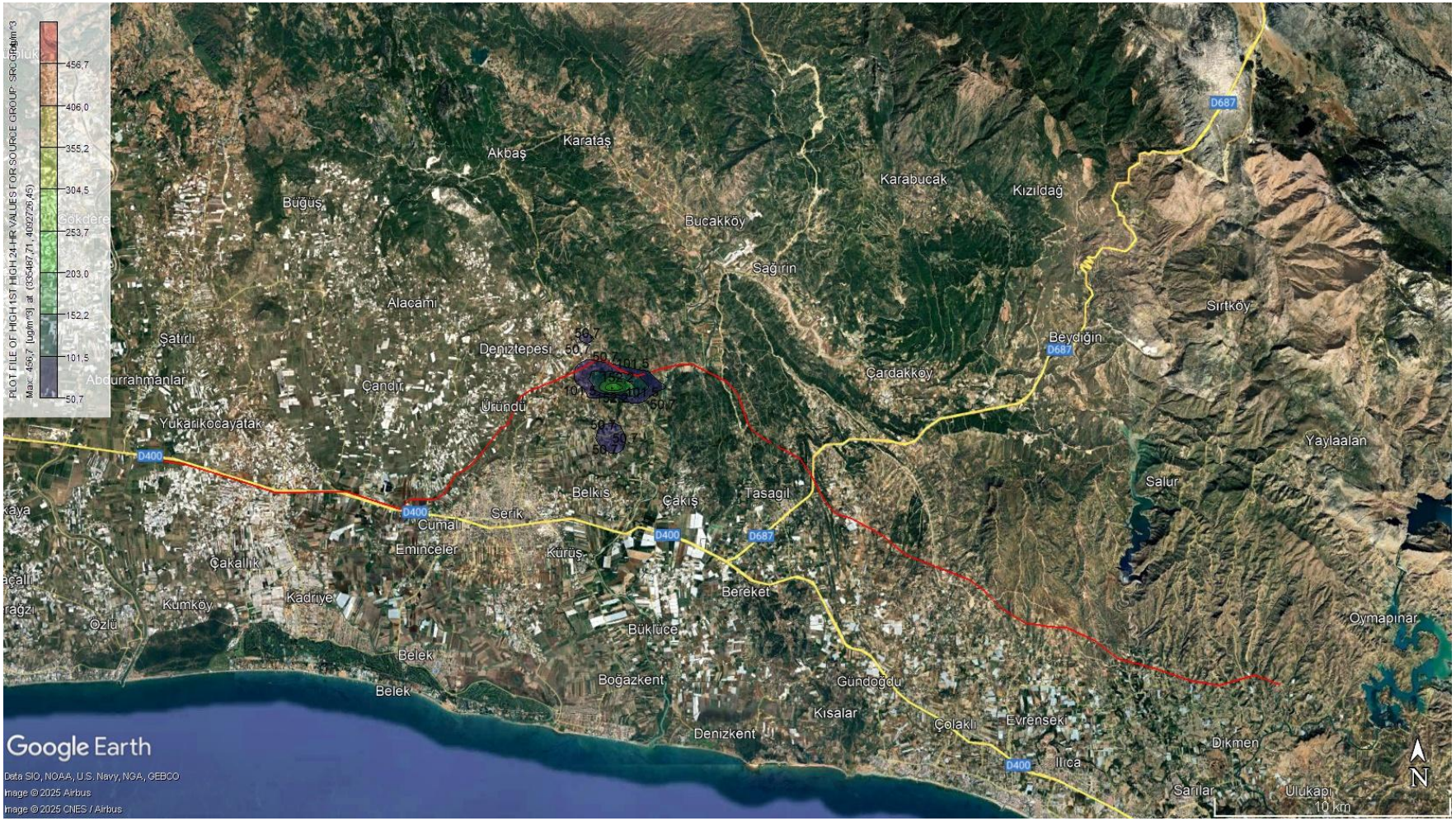


Figure X.8 Maximum daily PM_{10} emission distribution- Section1-Blasting (µg/m³)

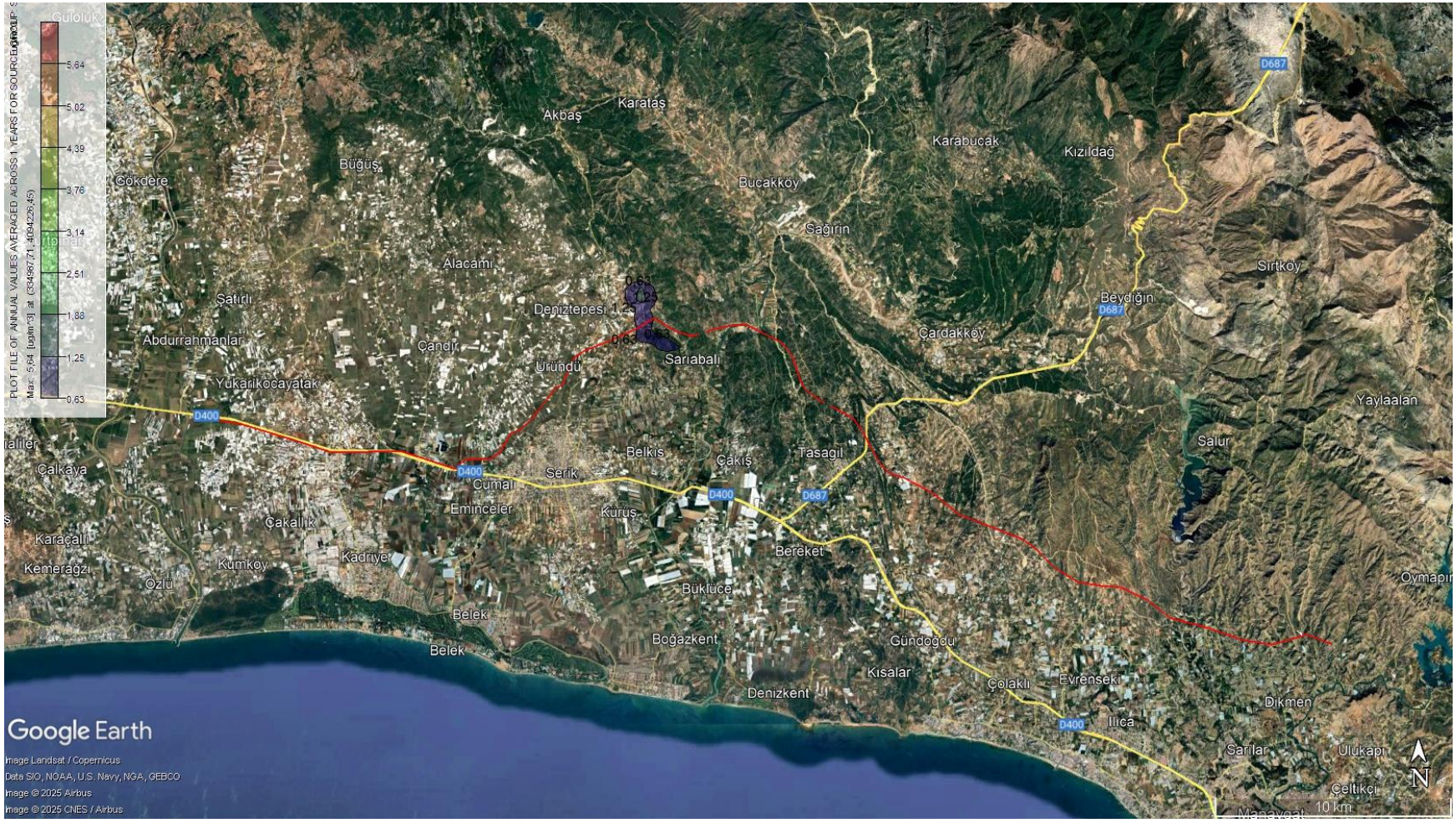


Figure X.9 Maximum annual PM_{10} emission distribution-Section1-Blasting (µg/m^3)

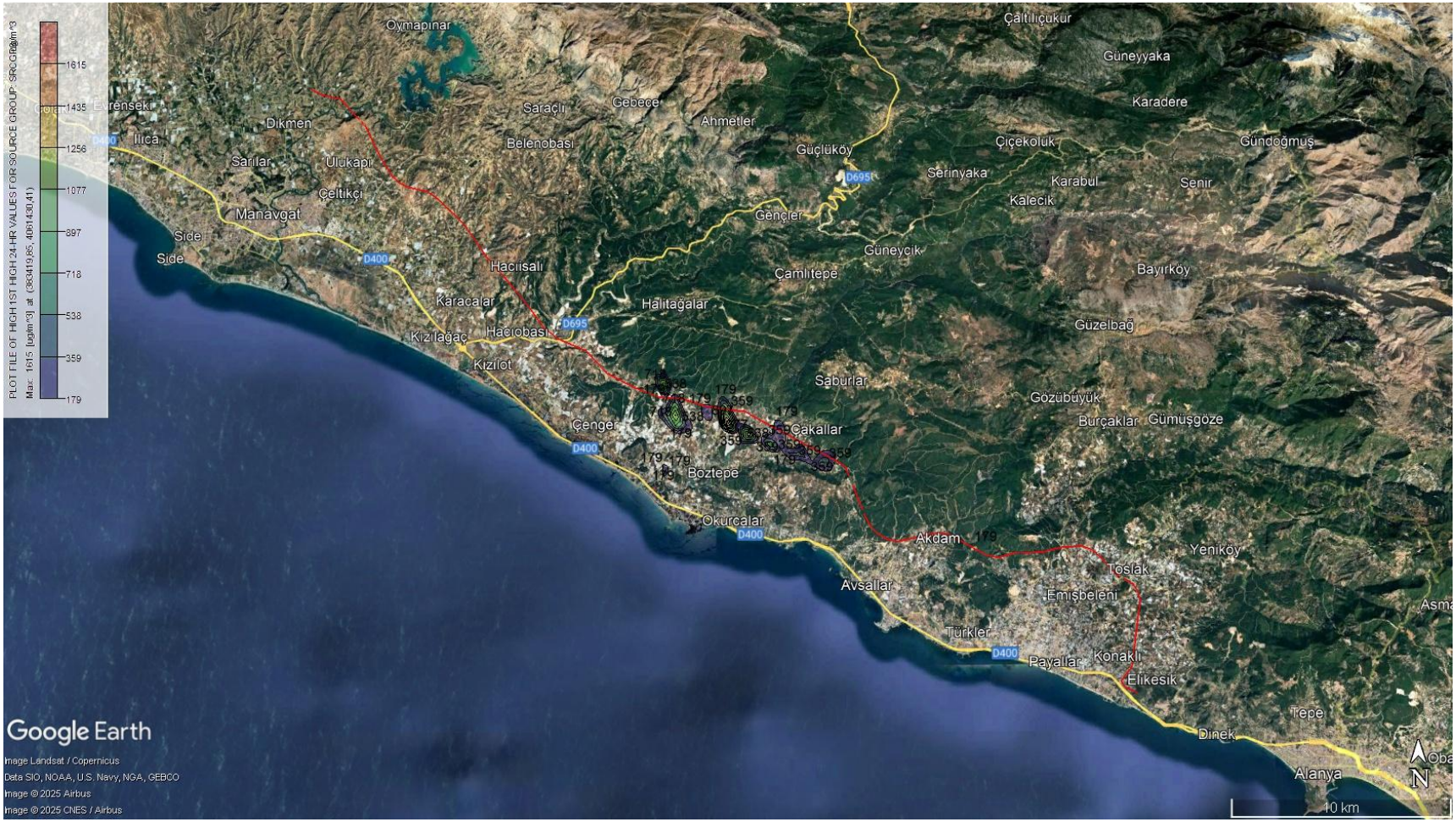


Figure X.10 Maximum daily PM10 emission distribution- Section2-Blasting (µg/m^3)

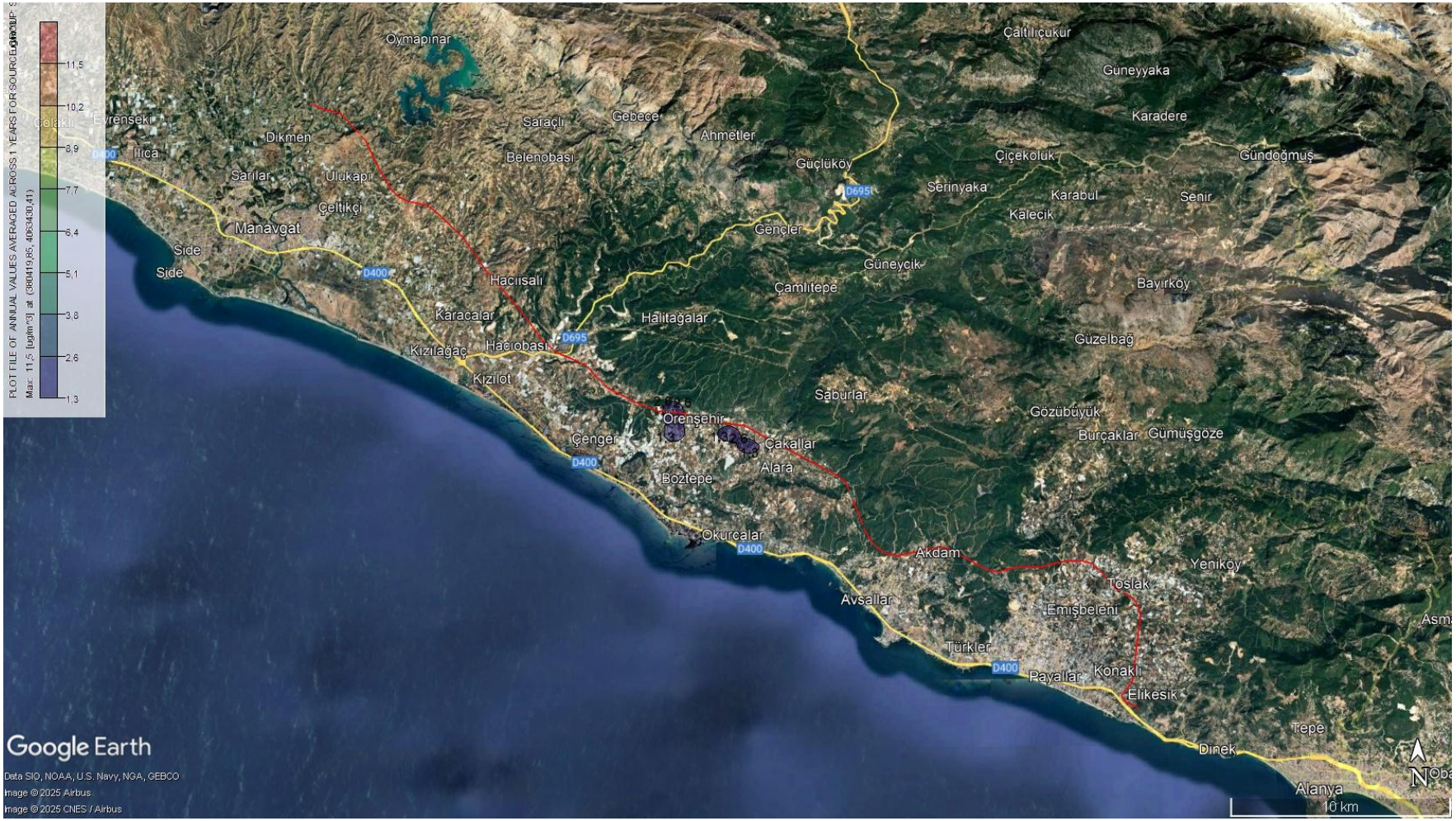


Figure X.11 Maximum annual PM_{10} emission distribution-Section2-Blasting (µg/m^3)

The study assessed cumulative PM_{10} concentrations by adding measured background values to the maximum daily modeled emissions at each location (see Table X.13). The highest concentration occurred in Sarıabalı at 429.81 µg/m³, with 413.31 µg/m³ originating from project activities. Despite this, the site remained compliant with regulatory exceedance limits (33 days/year).

Other key locations also stayed within allowable limits:

- Akdam: 266.49 µg/m³, 19 exceedances – compliant
- Karakaya: 185.64 µg/m³, 11 exceedances – compliant
- Köprüçay: 111.38 µg/m³, 26 exceedances – compliant
- Ulukapı: 58.10 µg/m³, 3 exceedances – compliant

Serik, Sülek, and Deniz Tepesi recorded low cumulative values and no significant exceedances.

However, Hacıali stands out with 248 exceedance days/year, far exceeding legal thresholds. The location already had a high pre-project background level (45.9 µg/m³), indicating existing air quality issues exacerbated by the project.

To mitigate impacts in Hacıali, the following actions are recommended:

- Restrict dust-generating activities during poor dispersion conditions
- Apply water spraying, soil stabilization, and road paving
- Cover all transport vehicles
- Use wind barriers or vegetation buffers
- Relocate dust-intensive activities where feasible
- Implement PM_{10} monitoring in the area

Most locations comply with IAPCR, EU, and IFC standards. While temporary exceedances may occur, especially in Hacıali, the overall impact is not expected to cause lasting degradation of air quality if proposed mitigation measures are properly implemented.

Table X.13 Cumulative Impact Assessment with Maximum PM_{10} GLC Values Measurement Points

District	Baseline Measurements PM_{10} Results (µg/m³)	Scenario 1-2 Max Daily Model Result (µg/m³)	Cumulative PM_{10} (µg/m³)	Number of Exceedances
Akdam	19.6	246.89	266.49	19
Avsallar	< 6.0	80.24	86.24	8
Bademliyar	10.7	133.74	144.44	4
Bucakşeyhler	< 6.0	78.79	84.79	3
Çakallar	12	90.93	102.93	6
Deniz Tepesi	19.4	38.05	57.45	2
Emişbeleni	12.2	51.49	63.69	8
Hacıali	45.9	48.05	93.95	248
Hacıobası	8.54	51.78	60.32	4
Kalemler	14	68.25	82.25	6
Karakaya	11.2	174.44	185.64	11
Konaklı	15.1	55.47	70.57	6
Köprüçay	17.40	93.98	111.38	26
Sağırin	< 6.0	50.65	56.65	2
Sarılar	12.3	75.15	87.45	17
Sarıabalı	16.5	413.31	429.81	33
Serik	29.2	7.97	37.17	0
Sülek	7.09	23.56	30.65	0
Taşağıl	11.3	71.11	82.41	8
Ulukapı	20.4	37.70	58.1	3
Uzunlar	16.8	40.21	57.01	3

$PM_{2.5}$ Concentrations at Ground Level

Maximum ground-level PM2.5 concentrations (GLC) were calculated based on the defined scenarios for the area surrounding the existing facilities, and the resulting data were evaluated. The spatial distribution of modeled PM2.5 concentrations is presented in Figure X.14 and Figure X.15. The analysis indicates that in areas with intensive construction activities, the IFC daily limit of 25 µg/m³ is exceeded. As shown in Table X.14, under Scenario 4, the daily PM2.5 concentration reaches 142.58 µg/m³, which significantly exceeds the applicable threshold. In contrast, annual average concentrations generally remain below both the EU annual limit of 25 µg/m³ and the more stringent IFC limit of 10 µg/m³. These findings suggest that PM2.5 impacts are primarily short-term and localized, with limited long-term effects. In areas where the daily limits are exceeded, particularly near construction sites, the implementation of effective dust suppression and emission control measures is essential (see Section X.1.4.1).

Table X.14 Results Of Ground-Level $PM_{2.5}$ Concentrations Observed in Different Scenarios

Scenario	$PM_{2.5}$ Highest Daily (µg/m³)	$PM_{2.5}$ Highest Annual (µg/m³)	UTM WGS 84 ZONE 36 Coordinates (Daily / Annual)	Distance (m)	Direction (from Emission Source to GLC)
Scenario 3 Construction-Section1	62.03	3.95	Daily (337884, 4093014) / Annual (353991, 4082139)	25 / 690	Southeast / North
Scenario 4 Construction-Section2	142.58	3.7	Daily (379419, 4065930) / Annual (371919, 4070430)	810 / 415	West / Northeast
EU Directive Limit Values	**-**	**25**	**-**	**-**	**-**
IFC Standards	**25**	**10**	**-**	**-**	**-**

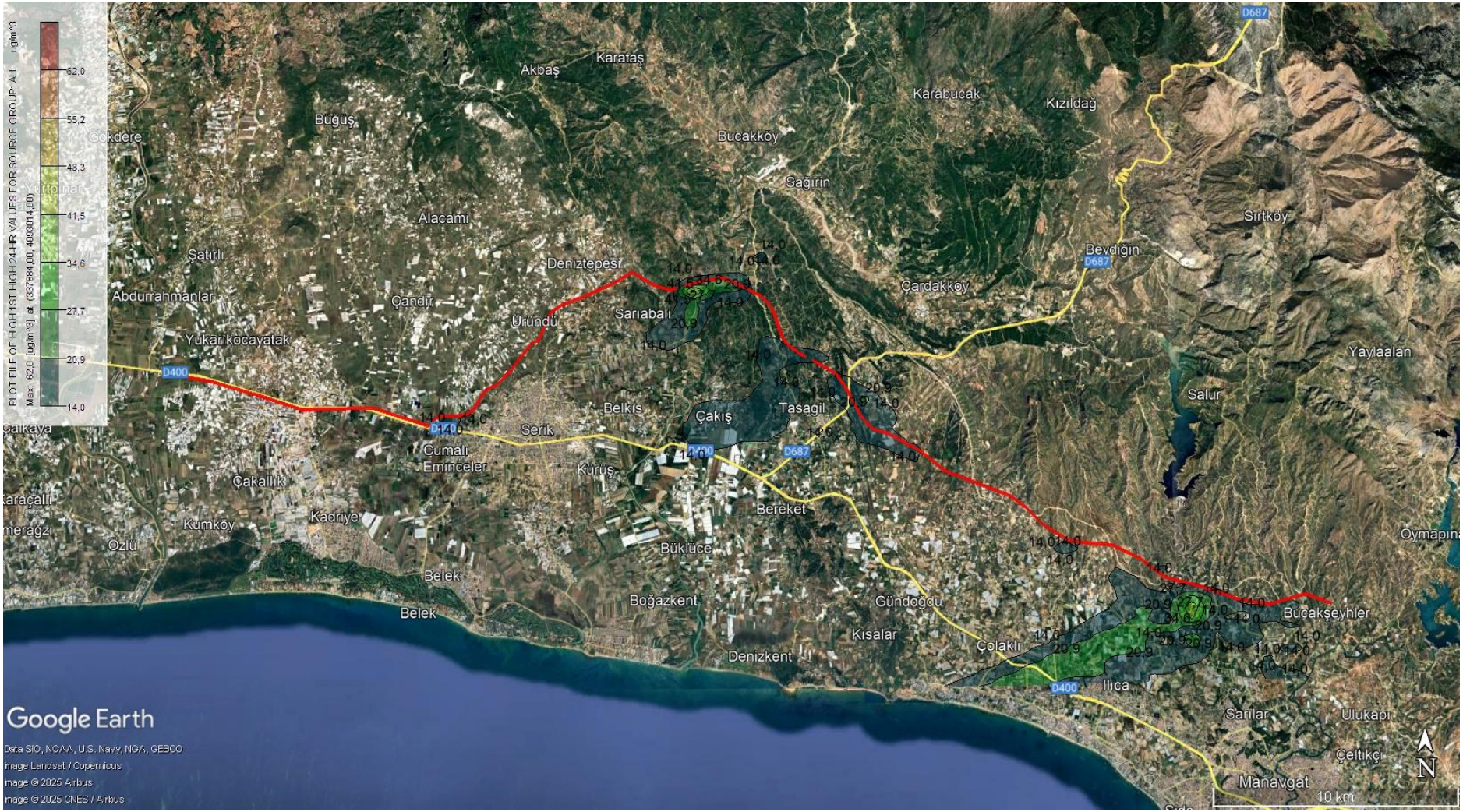


Figure X.12 Maximum Daily $PM_{2.5}$ emission distribution-Section1 (µg/m³)

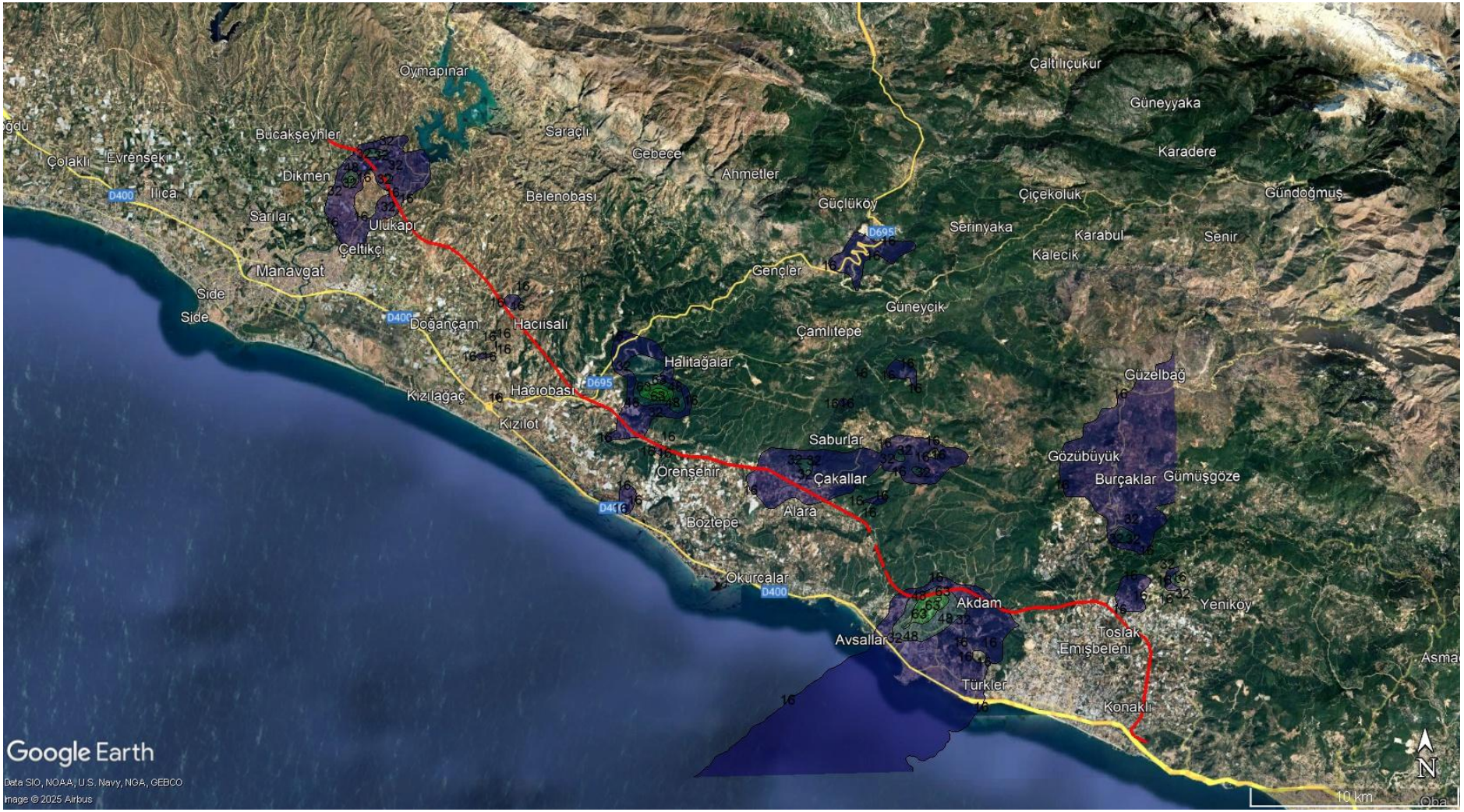


Figure X.13 Maximum daily $PM_{2.5}$ emission distribution-Section2 (µg/m³)

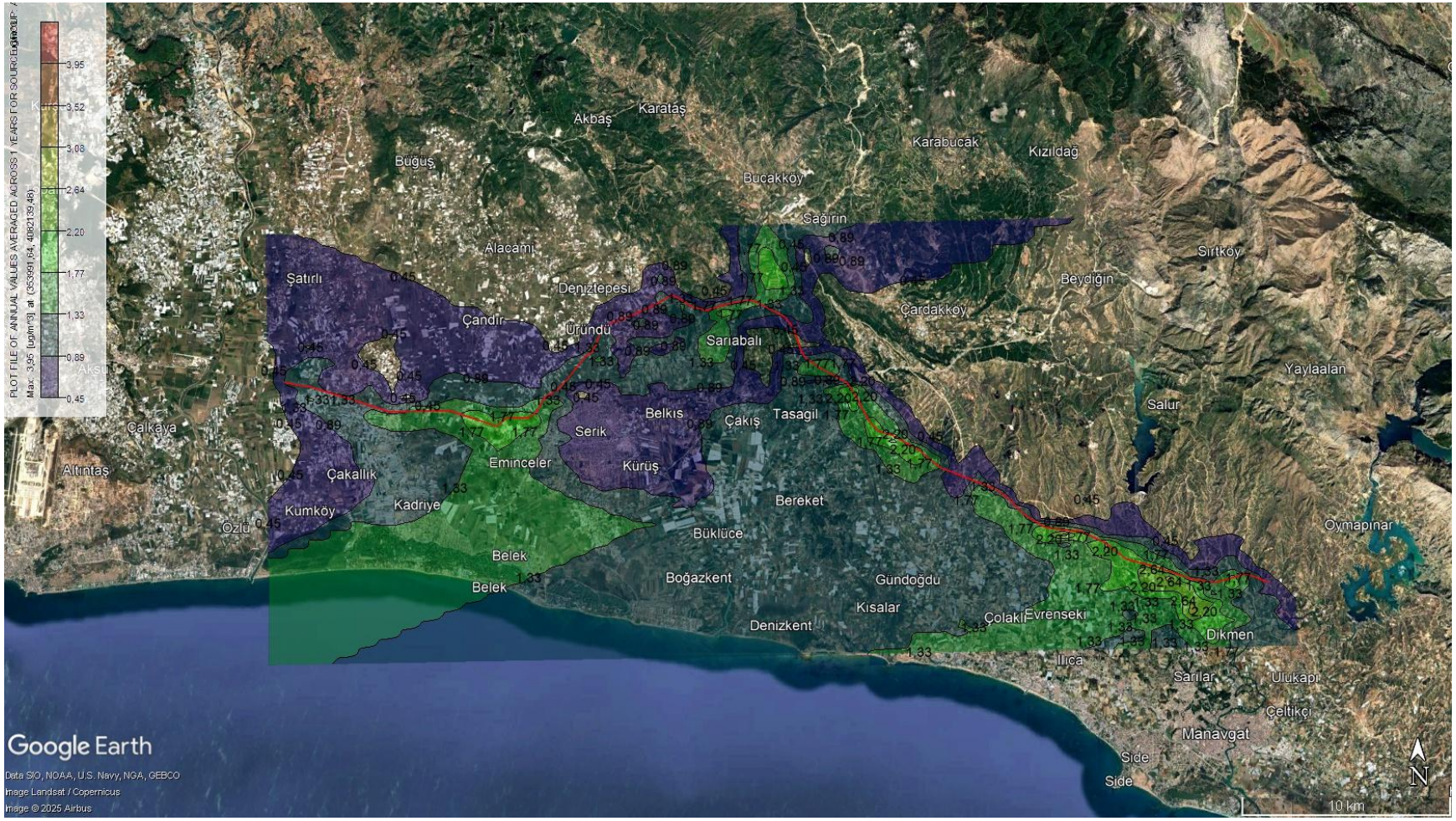


Figure X.14 Maximum annual $PM_{2.5}$ emission distribution-Section1 (µg/m^3)



Figure X.15 Maximum annual $PM_{2.5}$ emission distribution-Section2 (µg/m^3)

This study evaluated the cumulative impact of the project on ambient $PM_{2.5}$ concentrations by combining background measurements with maximum annual modeled values (Scenarios 3–4) at each monitoring location (see Table X.15).

An assessment of the cumulative impacts of the project on ambient air quality reveals that at most monitoring locations, the annual total PM2.5 concentrations remain below both EU and IFC thresholds. However, at the Hacıali monitoring station, due to high baseline concentrations, the total annual PM2.5 level reaches 32.22 µg/m³ despite the project's relatively minor contribution, thereby exceeding both regulatory limits. As presented in Table X.15, at the Sarıabalı station, the project's maximum daily contribution is 62.04 µg/m³, and when combined with background levels, the total daily concentration could reach 72.24 µg/m³—nearly three times the IFC daily limit. Similarly, at Akdam and Karakaya, project-related daily contributions are calculated as 27.24 µg/m³ and 28.44 µg/m³, respectively, both of which exceed the IFC's daily standard.

Mitigation measures to reduce construction-related $PM_{2.5}$ emissions are provided in detail in Section X.1.4.1.

Table X.15 Cumulative Impact Assessment with Maximum $PM_{2.5}$ GLC Values Measurement Points

District	Baseline Measurements $PM_{2.5}$ Results (µg/m³)	Scenario 3-4 Max Daily Result (µg/m³)	Scenario 3-4 Max Anuual Result (µg/m³)	Cumulative Results (µg/m³)-Daily	Cumulative Results (µg/m³)-Annual
Akdam	15.8	27.24	1.55	43.04	17.35
Avsallar	< 6.0	11.66	1.56	17.66	7.56
Bademliyar	9.27	20.07	0.61	29.34	9.88
Bucakşeyhler	< 6.0	10.77	1.29	16.77	1.29
Çakallar	9.99	13.53	0.82	23.52	10.81
Deniz Tepesi	13.6	5.7	0.87	19.3	14.47
Emişbeleni	11.8	6.66	1.20	18.46	13
Hacıali	30.5	7.42	1.72	37.92	32.22
Hacıobası	6.17	7.77	0.99	13.94	7.16
Kalemler	12.2	10.25	1.52	22.45	13.72
Karakaya	10.4	28.44	0.98	38.84	11.38
Konaklı	13.1	7.9	1.57	21	14.67
Köprüçay	11.6	14.74	1.71	26.34	13.31
Sağırin	< 6.0	12.85	0.98	6.98	0.98
Sarılar	11.8	11.34	1.73	23.14	13.53
Sarıabalı	10.2	62.04	2.98	72.24	13.18
Serik	7.84	1.08	0.13	8.92	7.97
Sülek	6.17	3.25	0.52	9.42	6.69
Taşağıl	8.18	12.45	1.27	20.63	9.45
Ulukapı	16.7	5.4	0.44	22.1	17.14

District	Baseline Measurements $PM_{2.5}$ Results (µg/m³)	Scenario 3-4 Max Daily Result (µg/m³)	Scenario 3-4 Max Anuual Result (µg/m³)	Cumulative Results (µg/m³)-Daily	Cumulative Results (µg/m³)-Annual
Uzunlar	12.2	6.03	1.05	18.23	13.25

Settled Dust Concentrations at Ground Level

Settled (deposited) dust emissions were also evaluated for the construction-phase scenarios (Scenario 17 and 18) to assess the potential for particulate accumulation at ground level. According to the modeling results presented in Table X.16, the maximum daily settled dust concentration reached 203.53 mg/m²day in Section 1 and 324.66 mg/m²day in Section 2. The corresponding maximum annual average concentrations were calculated as 24.82 mg/m²day and 25.35 mg/m²day, respectively. Additionally, the spatial distributions of modeled settled dust emission under all scenarios are illustrated in Figure X.16 to Figure X.19.

All modeled values remain well below the national IAPCR limit values of 390 mg/m²day for daily and 210 mg/m²day for annual settled dust concentrations. These results indicate that, although visible particulate deposition may occur near active construction zones, the overall impact of settled dust remains within permissible regulatory thresholds, supporting the conclusion that the project is unlikely to cause excessive ground-level dust accumulation under the modeled conditions.

Table X.16 Results of ground-level Settled dust concentrations observed in different scenarios

Scenario	Highest Daily Concentration (mg/m²·day)	UTM WGS 84 ZONE 36 Coordinates (Daily)	Highest Annual Concentration (mg/m²·day)	UTM WGS 84 ZONE 36 Coordinates (Annual)	Distance (m)	Direction (from Emission Source to GLC)
Scenario 17 Construction-Section1	203.53	(337884, 4093014)	24.82	(335987, 4093226)	25 / 160	Southeast / Northeast
Scenario 18 Construction-Section2	324.66	(365419, 4075930)	25.35	(377919, 4066430)	545 / 205	Southwest / Northwest
Limit Values (IAPCR)	**390**	-	**210**	-	-	-



Figure X.16 Maximum daily settled dust emission distribution - Section1 - Construction (mg/m²day)



Figure X.17 Maximum annual settled dust emission distribution - Section1 - Construction (mg/m^{2}day)

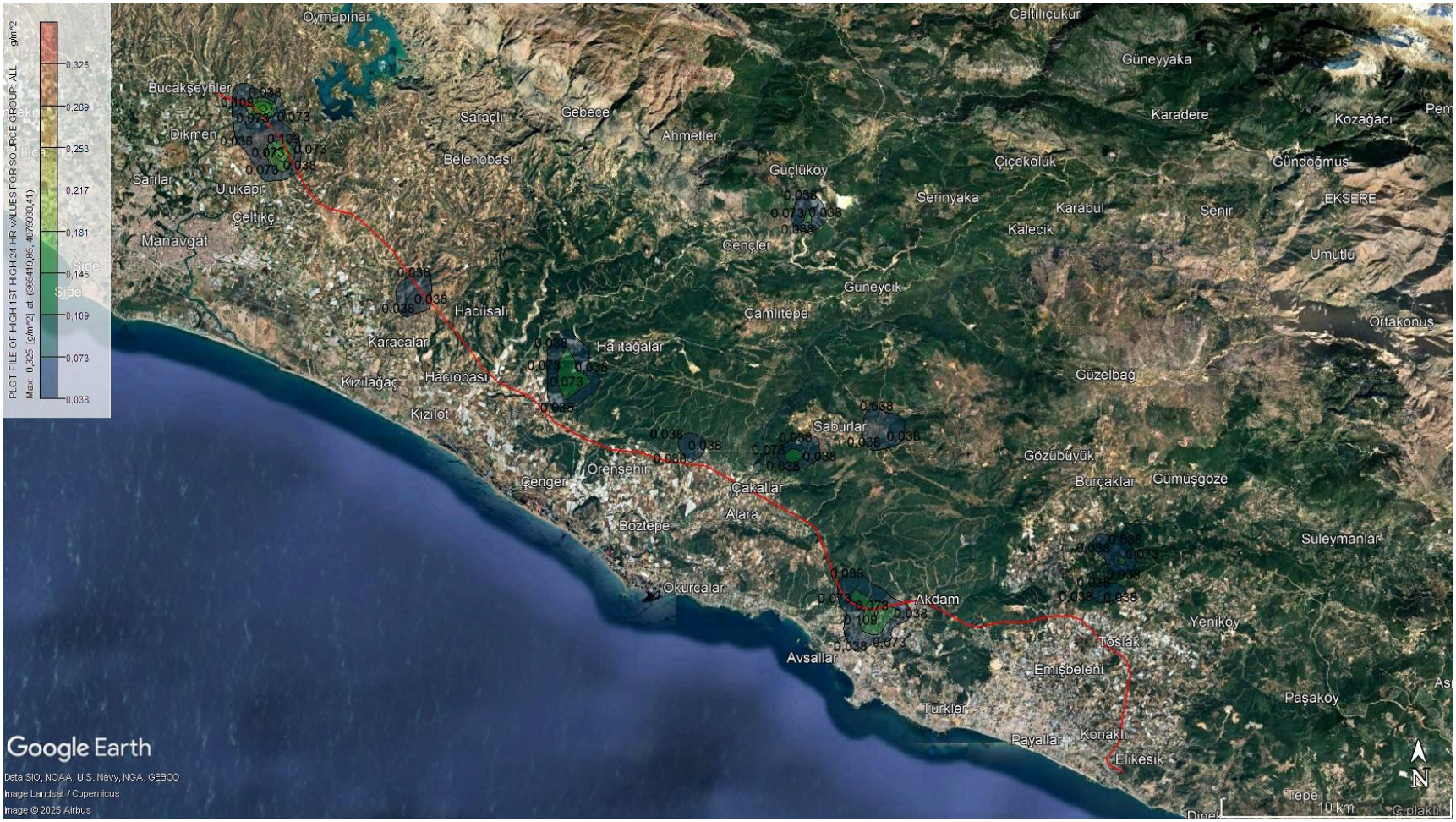


Figure X.18 Maximum daily settled dust emission distribution - Section2 - Construction (mg/m^{2}day)



Figure X.19 Maximum annual settled dust emission distribution - Section2 - Construction (mg/m²day)

The cumulative impact of the project on settled dust concentrations was also evaluated for each monitoring location under Scenarios 17 and 18, as presented in Table X.17. The results reveal spatial variability in deposition levels, reflecting the proximity to active construction areas and unpaved haul roads.

The highest cumulative settled dust concentrations were observed in Sarıabalı (276.59 mg/m²·day), followed by Ulukapı (218.19 mg/m²·day) and Hacıali (112.48 mg/m²·day). These locations are either directly adjacent to intense earthmoving operations or located downwind of major activity centers. While the daily maximum settled dust concentrations at individual receptor points in Sarıabalı (203.53 mg/m²·day) and Ulukapı (144.57 mg/m²·day) remain well below the IAPCR daily limit of 390 mg/m²·day, they represent the highest localized exposure.

Even in the most affected settlements, such as Sarıabalı, Ulukapı, and Hacıali, cumulative concentrations remained below regulatory thresholds. This indicates that construction-related settled dust emissions are not expected to cause long-term air quality degradation or regulatory non-compliance. Overall, these results confirm that, under the modeled scenarios, the project complies with national standards for settled dust, and the anticipated impacts are localized, temporary, and manageable with routine dust suppression measures.

Table X.17 Cumulative Impact Assessment with Maximum Settled Dust GLC Values Measurement Points

District	Baseline Measurements Settled Dust Results (mg/m^2day)	Scenario 17-18 Max Daily Model Result (mg/m^2day)	Cumulative Results (mg/m^2day)
Akdam	12.33	20.80	33.13
Avsallar	32.07	22.00	54.07
Bademliyar	54.84	35.68	90.52
Bucakşeyhler	31.31	4.09	35.40
Çakallar	60.53	15.74	76.27
Deniz Tepesi	12.33	12.66	24.99
Emişbeleni	56.55	15.82	72.37
Hacıali	92.98	19.50	112.48
Hacıobası	45.35	5.34	50.69
Kalemler	65.28	4.50	69.78
Karakaya	56.17	20.23	76.40
Konaklı	73.06	11.46	84.52
Köprüçay	72.3	6.45	78.75
Sağırin	29.6	3.77	33.37
Sarılar	64.71	44.29	109.00
Sarıabalı	73.06	203.53	276.59
Serik	74.38	2.04	76.42
Sülek	42.13	13.16	55.29
Taşağıl	55.41	5.45	60.86
Ulukapı	73.62	144.57	218.19
Uzunlar	72.49	17.15	89.64

NO_2 Concentrations at Ground Level

The GLC values of NO_2 for the defined scenarios are presented in Table X.18, with spatial distributions shown in Figure X.20 through Figure X.23.

The NO_2 measurements conducted under Scenario 13 (Construction – Section 1) and Scenario 15 (Construction – Section 2) remain well below all relevant national (IAPCR), international (EU Directives), and IFC standards. The maximum hourly concentrations recorded were 175.32 µg/m³ and 126.10 µg/m³ respectively, both below the 200 µg/m³ legal limit, with no exceedances observed in either case. Additionally, the maximum annual average concentrations 5.41 µg/m³ for Scenario 13 and 3.28 µg/m³ for Scenario 15 are significantly lower than the 40 µg/m³ threshold. These results indicate that the construction activities do not pose a significant risk to air quality in terms of NO_2 emissions and are fully compliant with applicable environmental standards. Therefore, NO_2 emissions are not anticipated to cause any adverse effects on the ambient air quality or public health in the surrounding environment.

Table X.18 Results of ground-level NO_2 concentrations observed in different scenarios

Scenario	Maximum Hourly Concentration (µg/m³)	UTM WGS 84 ZONE 36 Coordinates (Hourly)	Number of Exceedances	Maximum Annual Concentration (µg/m³)	UTM WGS 84 ZONE 36 Coordinates (Annual)	Distance (m)	Direction (from Emission Source to GLC)
Scenario 13 Construction-Section1	175.32	(356991, 4080639)	0	5.41	(349491, 4084639)	715 / 590	Northeast / North
Scenario 15 Construction-Section2	126.1	(378919, 4062930)	0	3.28	(401919, 4049430)	385 / 110	South / East
IAPCR Limit Values	**200**	**-**	**Not exceeded more than 18 times/year**	**40**	**-**	**-**	**-**
EU Directives	**200**	**-**	**Not exceeded more than 18 times/year**	**40**	**-**	**-**	**-**
IFC Standards	**200**	**-**	**-**	**40**	**-**	**-**	**-**

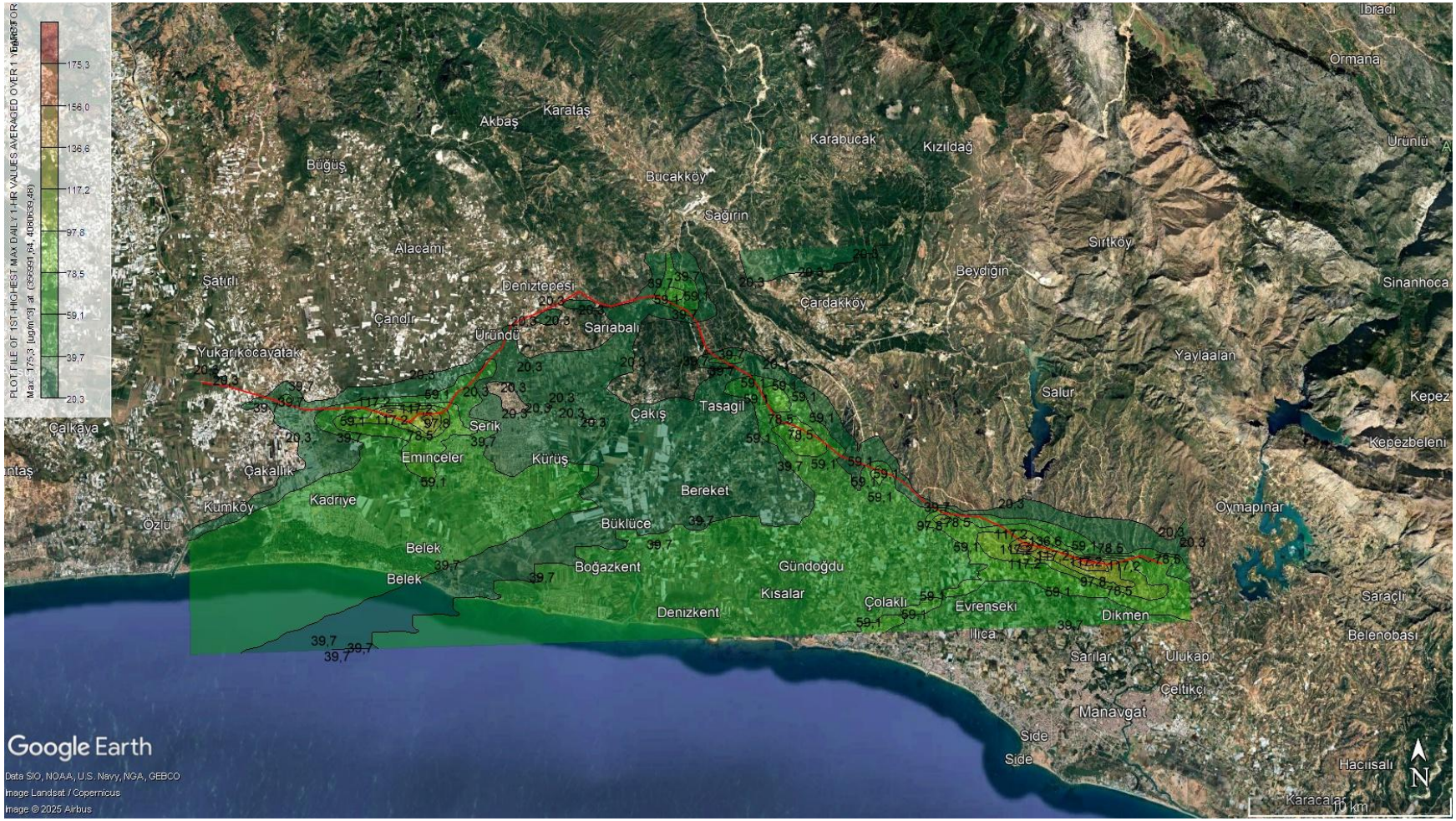


Figure X.20 Maximum hourly NO_2 emission distribution Section 1- Construction (µg/m^3)

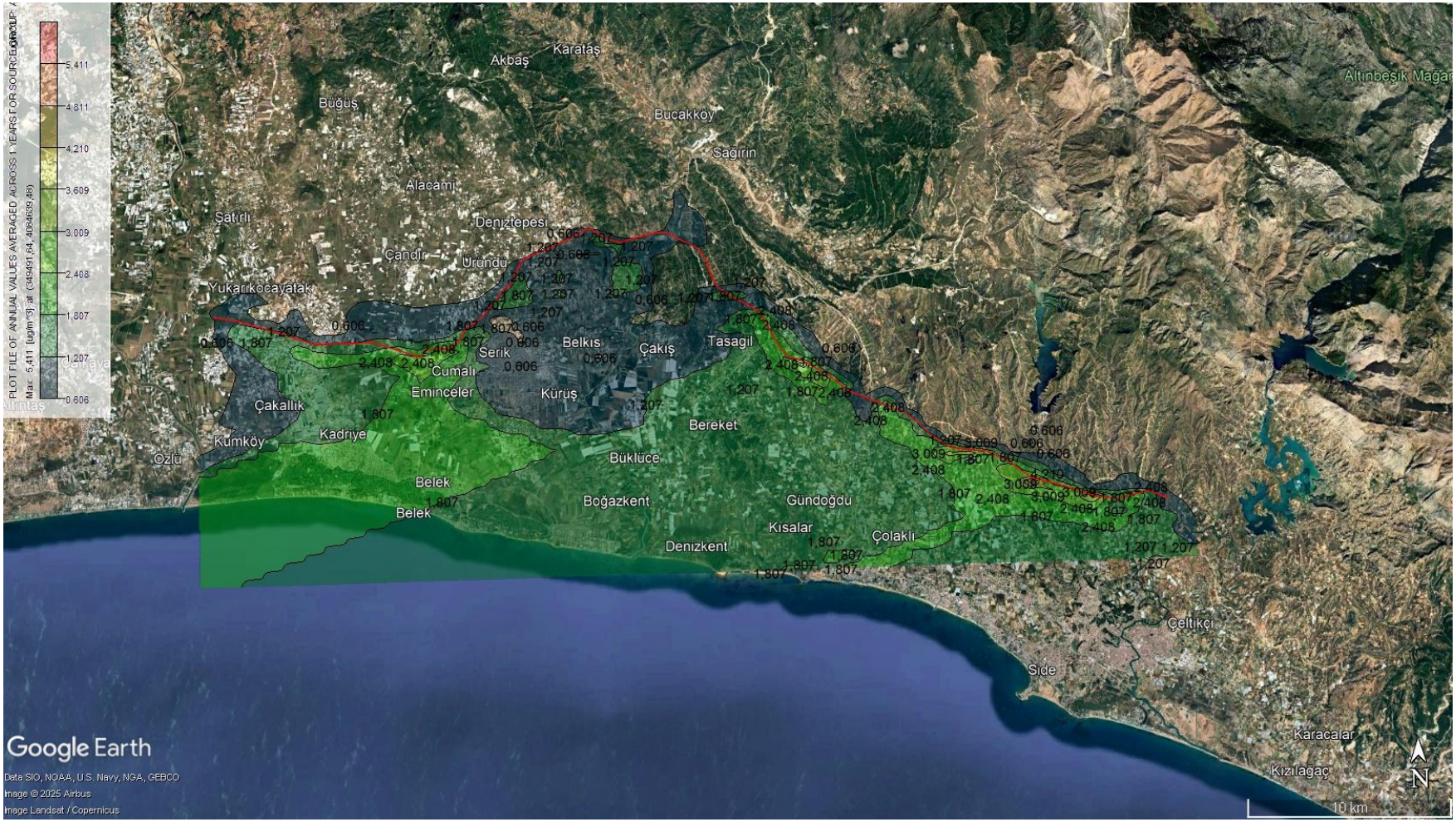


Figure X.21 Maximum annual NO_2 emission distribution Section 1- Construction (µg/m^3)



Figure X.22 Maximum hourly NO_2 emission distribution Section 2- Construction (µg/m^3)

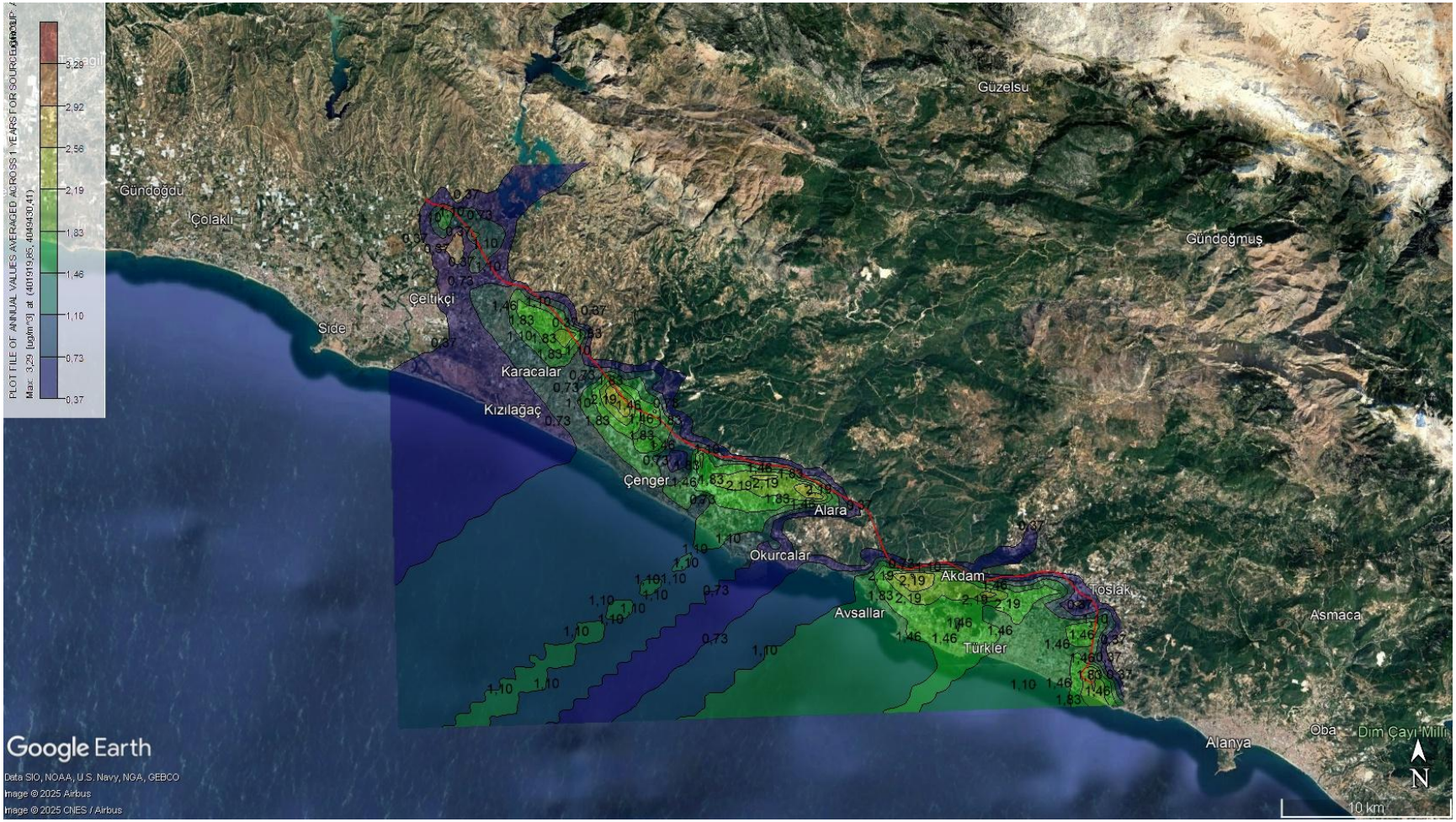


Figure X.23 Maximum annual NO_2 emission distribution Section 2- Construction (µg/m³)

As previously noted, background air quality measurements were conducted at multiple locations across the region. Cumulative NO_2 concentrations were then calculated by combining these background values with the maximum hourly modeled concentrations. Results are provided in Table X.19 (construction phase).

Similarly, Table X.19 shows that during the construction phase, cumulative NO_2 concentrations including emissions from non-road mobile construction machinery also stay below the 200 µg/m³ limit. The highest recorded value was 44.55 µg/m³ in Taşağıl, and no exceedances occurred at any receptor point.

In both phases, the cumulative concentrations confirm compliance with applicable NO_2 standards, and no exceedance of regulatory thresholds is anticipated at any of the assessed locations.

Table X.19 Impact Assessment with Maximum NO_2 GLC Values-Measurement Points Construction Phase

District	Baseline Measurements NO_2 Results (µg/m³)	Scenario 13-15 Max Hourly Model Result (µg/m³)	Cumulative Results (µg/m³)	Number of Exceedances
Hacıobası	<4.24	31.79	36.03	0
Konaklı	<4.24	31.28	35.52	0
Sarılar	<4.24	3.83	8.07	0
Serik	<4.24	10.51	14.75	0
Taşağıl	<4.24	40.31	44.55	0

CO Concentrations at Ground Level

The GLC values of CO for the defined scenarios are presented in Table X.20, with spatial distributions shown in Figure X.24 and Figure X.25.

For the construction phase, Scenario 14 (Section 1) showed a maximum CO concentration of 1,082.06 µg/m³, and Scenario 16 (Section 2) showed 670.32 µg/m³. All values are significantly lower than the legal threshold, with no exceedances recorded.

In conclusion, modeled CO concentrations from both traffic and construction activities remain far below national air quality limits, and CO emissions are not expected to adversely impact ambient air quality or human health.

Table X.20 Results of ground-level CO concentrations observed in different scenarios in Construction Phase

Scenario	UTM WGS 84 ZONE 36 Coordinates		CO	Distance (m)	Direction (from Emission Source to GLC)
	X	Y	Highest Daily 8-Hour Average (µg/m³)		
Scenario 14 (Construction-Section1)	349491	4084639	1,082.06	590	North
Scenario 16 (Construction - Section2)	378919	4062930	670.32	385	South
Limit Values (EU Directives and IAPCR)			**10,000**	-	-

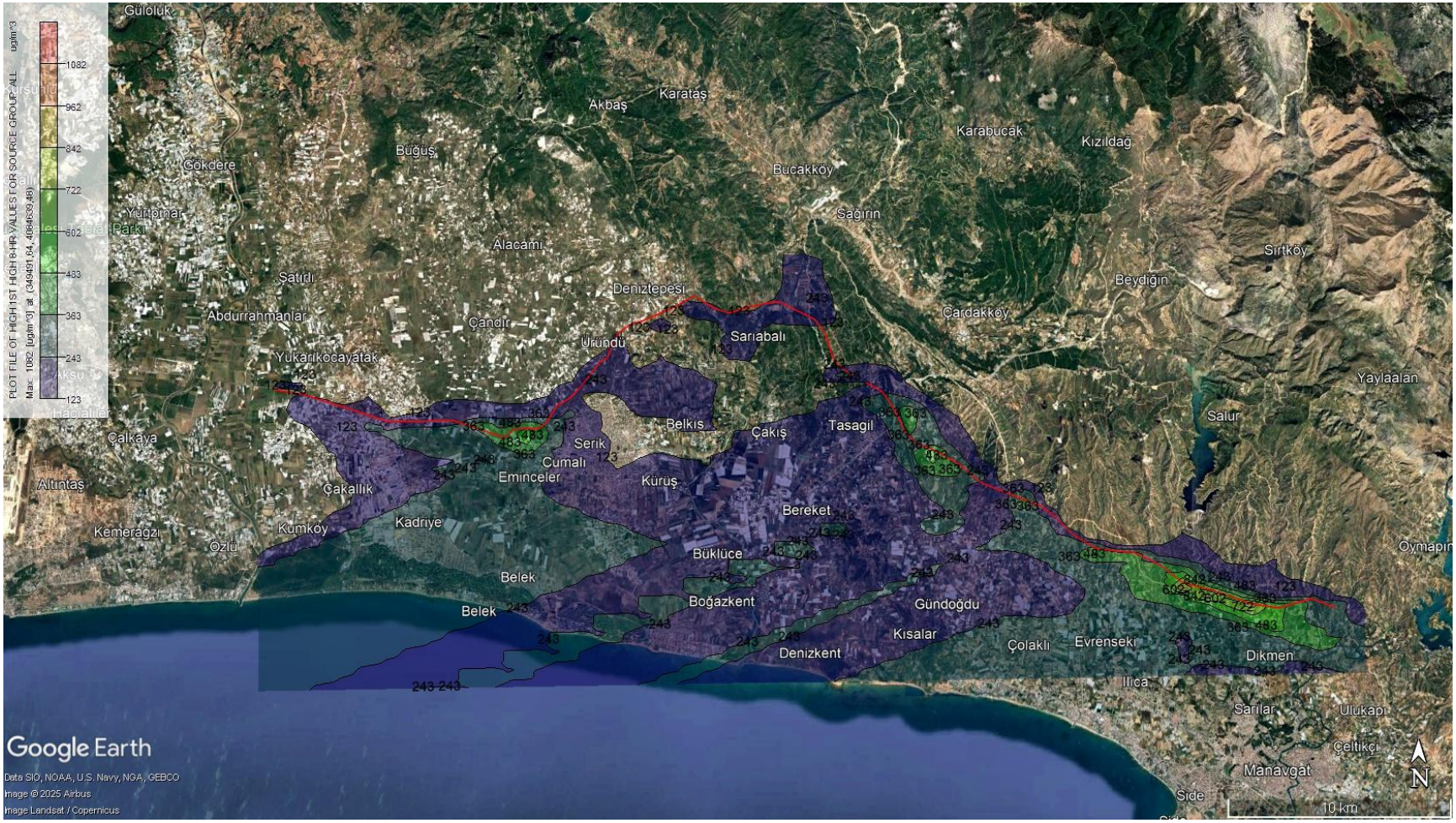


Figure X.24 Maximum 8-hour CO emission distribution Section 1- Construction (µg/m^3)

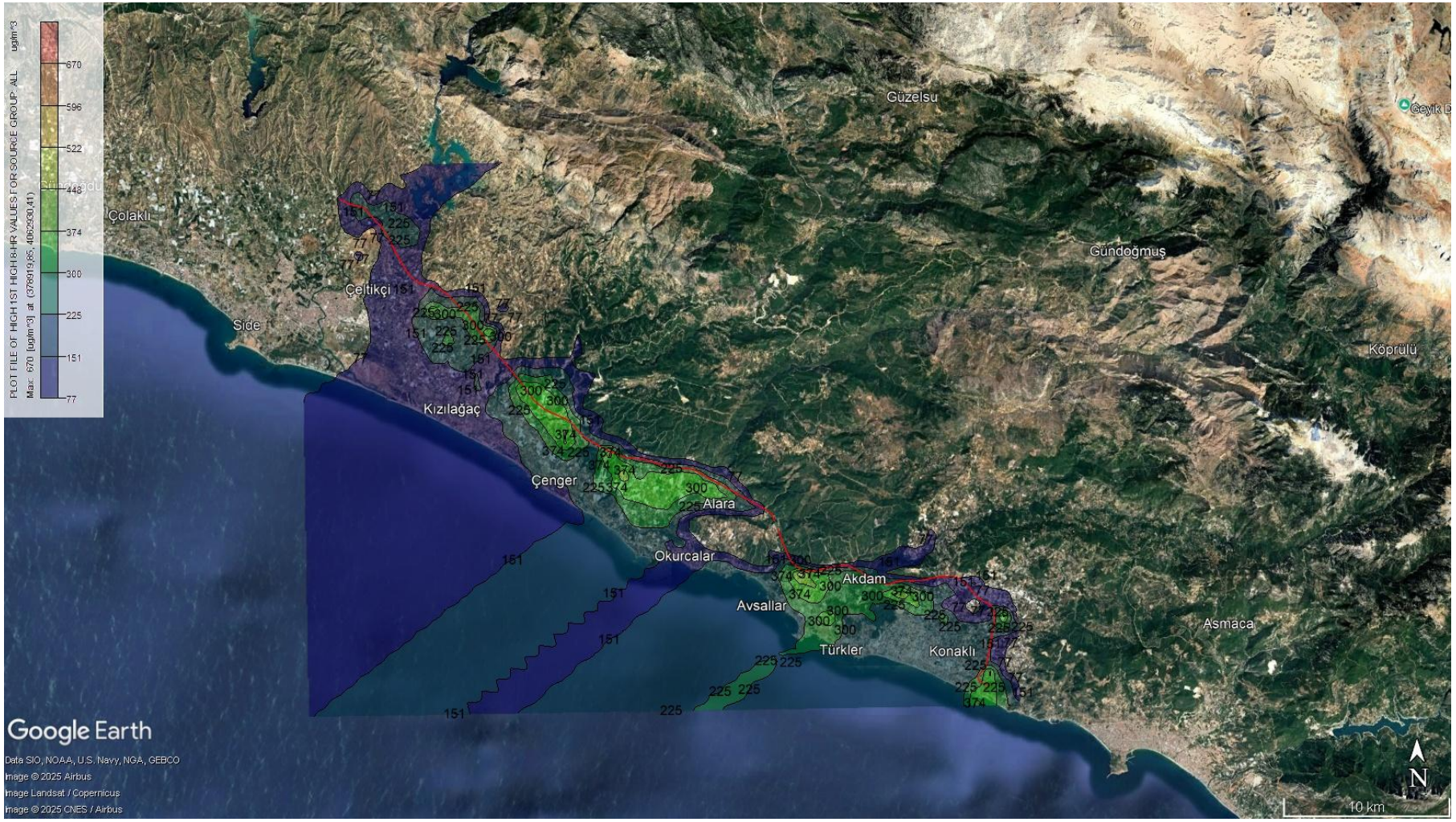


Figure X.25 Maximum 8-hour CO emission distribution Section 2- Construction (µg/m^3)

X.1.3.2. Operation Phase

This section summarizes the emissions expected during the operation phase of the planned project, along with the mitigation measures intended to minimize them. Due to the AERMOD model's 50 km spatial limitation and the linear extent of the project, the motorway was modeled in two segments referred to as Section 1 and Section 2 throughout the report.

Operational emissions of NO_2, CO, PM_{10}, and VOCs are primarily associated with vehicle traffic on the motorway. These emissions were estimated using emission factors provided in the EMEP/EEA 1.A.3.b.i–iv Road Transport Guidebook, detailed in Table X.22 through Table X.26 for various vehicle categories. Although the project is located in Türkiye, internationally recognized emission factors were used—specifically, Australian emission factors—due to their applicability to construction-related conditions and their consistency with global modeling practices. This approach reflects standard practice in Turkish EIA studies, particularly when local factors are either generalized or not representative of specific activities.

Vehicle traffic projections for the year 2040 the worst-case scenario in terms of traffic volume were used as the basis for emission calculations. Dust emissions were not modeled in the operation phase, as they are significantly lower than those in the construction phase. According to guidance from the UK Standards for Highways (LA 105, 2024)[7], where air quality thresholds for particulate matter are not exceeded in the base year, detailed modeling of PM_{10} or $PM_{2.5}$ during the operation phase is generally not required. Given that vehicle movements occur on fully paved surfaces and fugitive dust generation is minimal, operation-phase dust modeling is considered unnecessary for this project.

SO_2 emissions were excluded from the dispersion modeling, as they are considered negligible. This is based on the assumption that all vehicles will comply with Euro V or later standards and will use ultra-low sulfur diesel (<10 ppm sulfur), in line with the EMEP/EEA Guidebook. Accordingly, exhaust-related SO_2 emissions are not expected to significantly contribute to ambient concentrations.

Emission estimations by vehicle type and traffic volume, using the aforementioned emission factors, are detailed in the subsequent section.

[7] https://www.standardsforhighways.co.uk/search/html/af7f4cda-08f7-4f16-a89f-e30da703f3f4?standard=DMRB

Table X.21 Traffic Projection for Antalya Alanya Motorway Project (Annual Average Daily Traffic) - 2028-2040

Type	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Car	13,937	17,406	20,614	22,047	23,278	24,473	25,792	27,188	28,730	30,230	31,886	33,639	35,574
S-TR	4,375	5,453	6,445	6,880	7,251	7,610	8,007	8,427	8,891	9,342	9,841	10,369	10,952
BUS	738	876	939	989	1,040	1,088	1,141	1,197	1,259	1,318	1,383	1,451	1,526
Truck	3,314	3,932	4,215	4,443	4,669	4,886	5,125	5,376	5,652	5,917	6,209	6,516	6,854
Other	2,643	3,135	3,361	3,542	3,723	3,896	4,086	4,286	4,507	4,718	4,951	5,196	5,465
Total AADT PCU	**25007**	**30,802**	**35,574**	**37,902**	**39,961**	**41,952**	**44,151**	**46,474**	**49,039**	**51,525**	**54,269**	**57,170**	**60,372**

As part of the air quality dispersion modeling, the year 2040 was selected to represent the peak operational emissions scenario based on projected traffic activity. The projected AADT (Annual Average Daily Traffic) is 60,372 PCU (Passenger Car Units), distributed across five vehicle categories: cars, small trucks (S-TR), buses, trucks, and other vehicles.

To ensure accurate emissions estimates, the modeling incorporated a realistic and policy-aligned projection of vehicle and fuel type distributions for 2040. Although not based on an official government forecast, the scenario reflects strategic decarbonization goals, technological trends, and national statistical data.

Aligned with Türkiye's 2053 carbon neutrality target, the assumed 2040 fleet composition adopts a cautious yet evidence-based approach. For example, a 40% electric vehicle (EV) share is assumed for passenger cars—lower than SHURA's projection of 50% EV share by 2035—to account for possible delays in infrastructure and adoption. For urban buses, a 60% EV share was used, consistent with EU targets and domestic electrification trends in public transport.

Petrol-fueled cars are expected to maintain a substantial share of the fleet. Reflecting current data from TÜİK (2023–2025), petrol vehicles are projected to represent 35% of passenger cars in 2040, especially in mid-range and aging vehicle segments. Diesel remains dominant in freight and utility transport due to its efficiency and durability. Diesel shares are assumed to be 20% for passenger cars, 65% for small trucks, 90% for trucks, 40% for buses, and 95% for off-road vehicles.

Although the share of LPG vehicles is expected to decline with electrification, a residual 5% LPG share is retained for passenger cars, considering ongoing use in cost-sensitive market segments and legacy vehicles.

The detailed propulsion-type and fuel distribution assumptions are presented in Table X.22. These values are not forecasts but rather plausible planning assumptions, based on current statistics (TÜİK, EMRA), national climate strategies (MoEUCC), and international sources such as SHURA, ICCT, and IEA. They aim to balance policy ambition with technical and market realities in Türkiye's evolving transportation landscape.

Table X.22 Projected 2040 Vehicle Fleet Composition and Fuel Type Distribution by Category

Vehicle Type	2040 Total	EV	%EV	Petrol	%Petrol	Diesel	%Diesel	LPG	%LPG
Car	35,574	14,230	40.0	12,451	35.0	7,115	20.0	1,779	5.0%
S-TR	10,952	2,190	20.0%	1,643	15.0	7,119	65.0	—	—
Bus	1,526	916	60.0	—	—	610	40.0	—	—
Truck	6,854	685	10.0	—	—	6,169	90.0	—	—
Other	5,465	273	5.0	—	—	5,192	95.0	—	—

Table X.23 Emission Factors for Car[1]

Pollutant /Fuel Type	Emission Factor- Car (LV) (g/km)

	Petrol Small	Petrol Medium	Petrol Large	Diesel Small	Diesel Medium	Diesel Large	LPG
CO	1.6025	1.3600	1.1538	0.0522	0.1962	0.1962	2.3617
NO_2	0.1281	0.1428	0.1369	1.9513	4.6739	4.9949	0.4589
$PM10^2$	0.0016	0.0016	0.0016	0.0076	0.0486	0.0486	0.0018
VOC	0.3003	0.3281	0.2943	0.0325	0.0558	0.0675	0.6121

1-EMEP/EEA Road Transport Table 3-17– Average of all technologies
2- EMEP/EEA Road Transport Table 3-18– Average of all technologies

Table X.24 Emission Factors for Light Commercial Vehicle[1]

Pollutant /Fuel Type	Emission Factor- Light Commercial Vehicle (LHV) (g/km)	
	Petrol	Diesel
CO	5.8300	0.4047
NO_2	0.4813	0.9794
PM_{10}^2	0.0026	0.0792
VOC	0.5838	0.3269

1-EMEP/EEA Road Transport Table 3-19 – Average of all technologies
2- EMEP/EEA Road Transport Table 3-20 – Average of all technologies

Table X.25 Emission Factors for Buses[1]

Pollutant	Emission Factor- Buses (g/km)
	Urban Buses Standard
CO	1.8028
NO_2	7.048
PM_{10}^2	0.2132
VOC	1.6488

1-EMEP/EEA Road Transport Table 3-23 – Average of all technologies
2- EMEP/EEA Road Transport Table 3-24 – Average of all technologies

Table X.26 Emission Factors for Trucks[1]

Pollutant /Fuel Type	Emission Factor- Trucks (HHV) (g/km)				
	Petrol >3.5 t	Diesel <=7.5 t	Diesel 7.5 - 16 t	Diesel 16 - 32 t	Diesel >32 t
CO	59.5	0.477	0.6635	0.8463	1.0143
NO_2	6.60	2.1404	3.5965	4.9068	5.8605
PM_{10}[2]	0.0001	0.0753	0.0952	0.1313	0.1563
VOC	5.2717	0.3901	0.3913	0.8929	0.8563

1-EMEP/EEA Road Transport Table 3-21 – Average of all technologies
2- EMEP/EEA Road Transport Table 3-22 – Average of all technologies

Air Quality Modeling for Operation Phase

In order to evaluate the potential operation phase impacts of the Project, air quality modeling was carried out for NO_2, VOC, SO_2 and CO parameters. The Air Quality Modeling Report was presented as an Annex of this report. Within the scope of the modeling studies, hourly and annual concentrations were determined and compared with air quality limit values defined in the Regulation on Assessment and Management of Air Quality, Industrial Air Pollution Control Regulation, and IFC standards (see Table X.1, Table X.2 and Table X.3).

For each pollutant, modeling studies will be carried out under various scenarios and the possible effects of pollutant sources on local air quality will be examined according to each scenario. Based on the determined scenarios for operation phase, the ground level concentration (GLC) values of the measured parameters along the route will be provided in this subsection.

Emissions of Car type vehicles

In this study, category-specific assumptions were made using Türkiye's 2040 projections, which reflect trends in electrification and alternative fuels.For passenger cars, the projected 2040 fuel distribution is as follows:

- Electric Vehicles (EV): 40.0%
- Petrol: 35.0%
- Diesel: 20.0%
- LPG: 5.0%

The total daily vehicle count and its breakdown by subcategory used for emission factor calculations are shown in Table X.27, and the resulting emission rates are provided in Table X.28. To model traffic-related emissions during the operation phase, pollutant-specific emission rates were calculated for each vehicle type based on projected annual traffic data and corresponding emission factors. These rates were then converted to per-second values and adjusted using a spatial normalization factor, allowing them to be used as area sources in the dispersion model. This method ensures accurate and consistent representation of traffic emissions across the modeling area.

Table X.27 Daily Total Vehicle Count- Car

Daily Total Vehicle Count - Car						
Petrol Small (%20)	**Petrol Medium (%10)**	**Petrol Large (%10)**	**Diesel Small (%10)**	**Diesel Medium (%10)**	**Diesel Large (%10)**	**LPG (%30)**
6,225	3,113	3,113	2,372	2,372	2,372	1,779

Table X.28 Emission Rate for Car

Pollutant	**Car -Emission Rate (g/s-km)- Emission Factor (g/km) x Daily Total Vehicle Count x (day/86400 s)**						
	Petrol Small	**Petrol Medium**	**Petrol Large**	**Diesel Small**	**Diesel Medium**	**Diesel Large**	**LPG**
CO	0.1155	0.0490	0.0416	0.0014	0.0054	0.0054	0.0486
NO_2	0.0092	0.0051	0.0049	0.0536	0.1283	0.1371	0.0094
PM_{10}	0.0001	0.0001	0.0001	0.0002	0.0013	0.0013	0.0000
VOC	0.0216	0.0118	0.0106	0.0009	0.0015	0.0019	0.0126

Emissions of Light Commercial Vehicles

For light commercial vehicles (S-TR), fuel type assumptions were revised using 2040 projections. The projected distribution is as follows:

- Electric: 20.0%
- Petrol: 15.0%
- Diesel: 65.0%

The number of vehicles, based on these assumptions, is presented in Table X.29 for both the first and second sections. Emission values calculated using the vehicle counts and corresponding fuel types are provided in Table X.30.

Table X.29 Daily Total Vehicle Count- LHV

Daily Total Vehicle Count- LHV		
Petrol (%15)	**EV(%20)**	**Diesel (%65)**
1,643	2,190	7,119

Table X.30 Emission Rate for LHV

Pollutant	**LHV -Emission Rate (g/s-km)- Emission Factor (g/km) x Daily Total Vehicle Count x (day/86400 s)**	
	Petrol	**Diesel**
CO	0.1109	0.0333

NO_2	0.0092	0.0807
PM_{10}	0.0000	0.0065
VOC	0.0111	0.0269

Emissions of Buses

For buses, the 2040 vehicle fleet includes:

- Electric Buses: 60.0%
- Diesel Buses: 40.0%

Table X.31 gives the emission values calculated according to the number of vehicles and different fuel types.

Table X.31 Daily Total Vehicle Count - Buses

Daily Total Vehicle Count – Buses EV	Daily Total Vehicle Count – Buses Diesel
916	610

Table X.32 Emission Rate for Buses

Pollutant	Buses-Emission Rate (g/s-km)- Emission Factor (g/km) x Daily Total Vehicle Count x (day/86400 s)
	Urban Buses Standard
CO	0.0127
NO_2	0.0498
PM_{10}	0.0067
VOC	0.0015

Emissions of Trucks

In the 2040 vehicle projection data used for this study, freight vehicles are divided into two categories: “Truck” and “Other”, to apply weight-specific emission factors accurately during modeling.

The “Truck” category includes light and medium-duty freight vehicles with a gross vehicle weight of 7.5 tons or less, such as local delivery trucks and service vehicles.

The “Other” category consists of heavy-duty vehicles over 7.5 tons, including long-haul trucks, construction vehicles, and high-capacity freight haulers.

Fuel Type Distribution (2040 Projections for Türkiye):

Truck (≤7.5 t):

- Electric: 10%
- Diesel: 90%

Other (>7.5 t):

- Electric: 5%
- Diesel: 95%

Vehicle counts based on these assumptions are shown in Table X.33, and the corresponding emission values by fuel type are presented in Table X.34.

Table X.33 Daily Total Vehicle Count - Trucks

Daily Total Vehicle Count - Trucks		
Petrol >3.5 t (%30)	**Diesel <=7.5 t (%70)**	**Diesel 7.5 - 16 t (%100)**
1,851	4,318	5,192

Table X.34 Emission Rate for Trucks

Pollutant	**Trucks -Emission Rate (g/s-km)- Emission Factor (g/km) x Daily Total Vehicle Count x (day/86400 s)-**		
	Petrol >3.5 t	**Diesel <=7.5 t**	**Diesel 7.5 - 16 t**
CO	0.00354	0.00013	0.00022
NO_2	0.00039	0.00025	0.00043
PM_{10}	0.00000	0.00001	0.00001
VOC	0.00031	0.00005	0.00005

NO_2 Concentrations at Ground Level

Table X.35 presents the ground-level NO_2 concentrations (GLC) for each scenario, with distribution maps shown in Figure X.26 to Figure X.29. In Scenario 5 (Operational – Section 1), The NO_2 measurements for Scenario 5 (Operational – Section 1) and Scenario 8 (Operational – Section 2) are well within the limits set by national (IAPCR), EU, and IFC standards. In Scenario 5, the maximum hourly concentration is 11.81 µg/m³ and the maximum annual average is 0.36 µg/m³; in Scenario 8, the hourly and annual values are 8.54 µg/m³ and 0.22 µg/m³, respectively. No exceedances of the hourly limit (200 µg/m³) were recorded in either scenario, and the annual concentrations are far below the 40 µg/m³ threshold. These findings indicate that operational activities contribute minimally to NO_2 levels and fully comply with environmental air quality standards. These results demonstrate that project-related NO_2 emissions during operation will remain well within legal thresholds and are not expected to negatively impact air quality or public health.

Table X.35 Results of ground-level NO_2 concentrations observed in different scenarios

Scenario	NO_2 Maximum Hourly Concentration (µg/m³)	Number of Exceedances	NO_2 Maximum Annual Concentration (µg/m³)	UTM WGS 84 ZONE 36 Coordinates (Hourly / Annual)	Distance (m)	Direction (from Emission Source to GLC)
Scenario 5 Operational-Section1	11.81	0	0.36	Hourly: (356991, 4080639) / Annual: (349491, 4084639)	715 / 590	Northeast / North
Scenario 8 Operational-Section2	8.54	0	0.22	Hourly: (378919, 4062930) / Annual: (401919, 4049430)	385 / 110	South / East
IAPCR Limit Value	200	Max 18 exceedances per year	40	-	-	-
EU Directives	200	Max 18 exceedances per year	40	-	-	-
IFC Standards	200	-	40	-	-	-



Figure X.26 Maximum hourly NO_2 emission distribution Section 1 - Operation (µg/m^3)



Figure X.27 Maximum annual NO_2 emission distribution Section 1 - Operation (µg/m^3)



Figure X.28 Maximum hourly NO2 emission distribution Section 2 - Operation (µg/m^3)



Figure X.29 Maximum annual NO_2 emission distribution Section 2- Operation (µg/m³)

As detailed in Table X.36, cumulative NO_2 concentrations were calculated by adding background measurements to the modeled maximum hourly values. All locations recorded values well below the IAPCR hourly limit of 200 µg/m³, with no exceedances observed. The highest concentration was in Taşağıl at 6.96 µg/m³, which is significantly lower than the regulatory threshold. Other locations ranged between 4.50 and 6.39 µg/m³, confirming that the project's impact on NO_2 levels is minimal and fully compliant with air quality standards.

Table X.36 Impact Assessment with Maximum NO_2 GLC Values-Measurement Points

District	Baseline Measurements NO_2 Results (µg/m³)	Scenario 5-8 Max Hourly Model Result (µg/m³)	Cumulative Results (µg/m³)	Number of Exceedances
Hacıobası	<4.24	2.15	6.39	0
Konaklı	<4.24	2.12	6.36	0
Sarılar	<4.24	0.26	4.50	0
Serik	<4.24	0.71	4.95	0
Taşağıl	<4.24	2.72	6.96	0

CO Concentrations at Ground Level

Table X.37 presents the modeled CO concentrations for each scenario, with spatial distributions shown in Figure X.30 and Figure X.31. In Scenario 6 (Operational – Section 1), the maximum 8-hour average CO concentration was 3.55 µg/m³, while in Scenario 9 (Operational – Section 2), it was 2.21 µg/m³. Both values are far below the IAPCR limit of 10,000 µg/m³ (8-hour average), and no exceedances were observed. These results show that CO emissions from project-related traffic and operations are minimal and pose no risk to air quality or public health.

Table X.37 Results of ground-level CO concentrations observed in different scenarios

Scenario	UTM WGS 84 ZONE 36 Coordinates		CO	Distance (m)	Direction (from Emission Source to GLC)
	X	Y	Highest Daily 8-Hour Average (µg/m³)		
Scenario 6 (Operational-Section1)	349491	4084639	3.55	590	North
Scenario 9 (Operational-Section2)	378919	4062930	2.21	385	South
EU & IAPCR Limit Values			**10,000**	**-**	**-**



Figure X.30 Maximum 8-hour CO emission distribution Section 1 (µg/m³)



Figure X.31 Maximum 8-hour CO emission distribution Section 2 (µg/m³)

Ground Level VOC Concentrations

Table X.38 shows that the highest modeled VOC concentrations are well below IAPCR limits. In Scenario 7 (Operational – Section 1), the maximum hourly value was 2.43 µg/m³ and the daily value was 0.35 µg/m³. For Scenario 10 (Operational - Section 2), the hourly and daily concentrations were 1.76 µg/m³ and 0.22 µg/m³, respectively. All values fall significantly below the regulatory thresholds of 280 µg/m³ (hourly) and 70 µg/m³ (daily). VOC distribution maps are shown in Figure X.32 through Figure X.35. These results confirm that VOC emissions from project operations will not negatively impact air quality or public health.

Table X.38 Ground-level TVOC concentration results observed in different scenarios

Scenario	Description	Maximum Hourly Concentration (µg/m³)	Maximum Daily Concentration (µg/m³)	UTM WGS 84 ZONE 36 Coordinates (Hourly / Daily)	Distance (m)	Direction (from Emission Source to GLC)
Scenario 7	Operational-Section1	2.43	0.35	Hourly: (356991, 4080639) / Daily: (349491, 4084639)	715 / 590	Northeast / North
Scenario 10	Operational-Section2	1.76	0.22	Hourly: (378919, 4062930) / Daily: (390419, 4055430)	385 / 495	South / Southwest
Limit Values		280	70	-	-	-

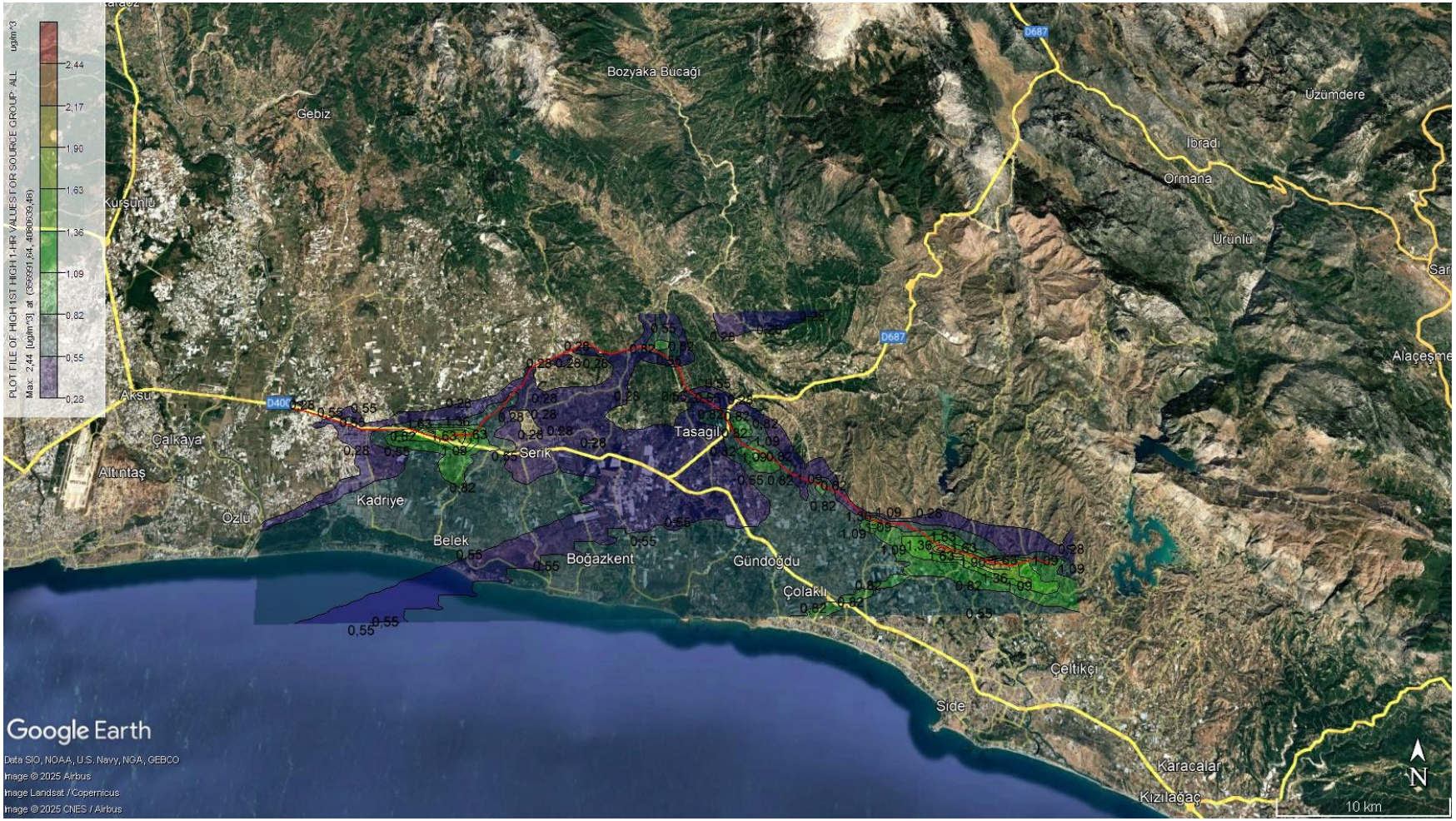


Figure X.32 Maximum hourly VOC emission distribution Section 1 (µg/m³)



Figure X.33 Maximum daily VOC emission distribution Section 1 (µg/m^3)

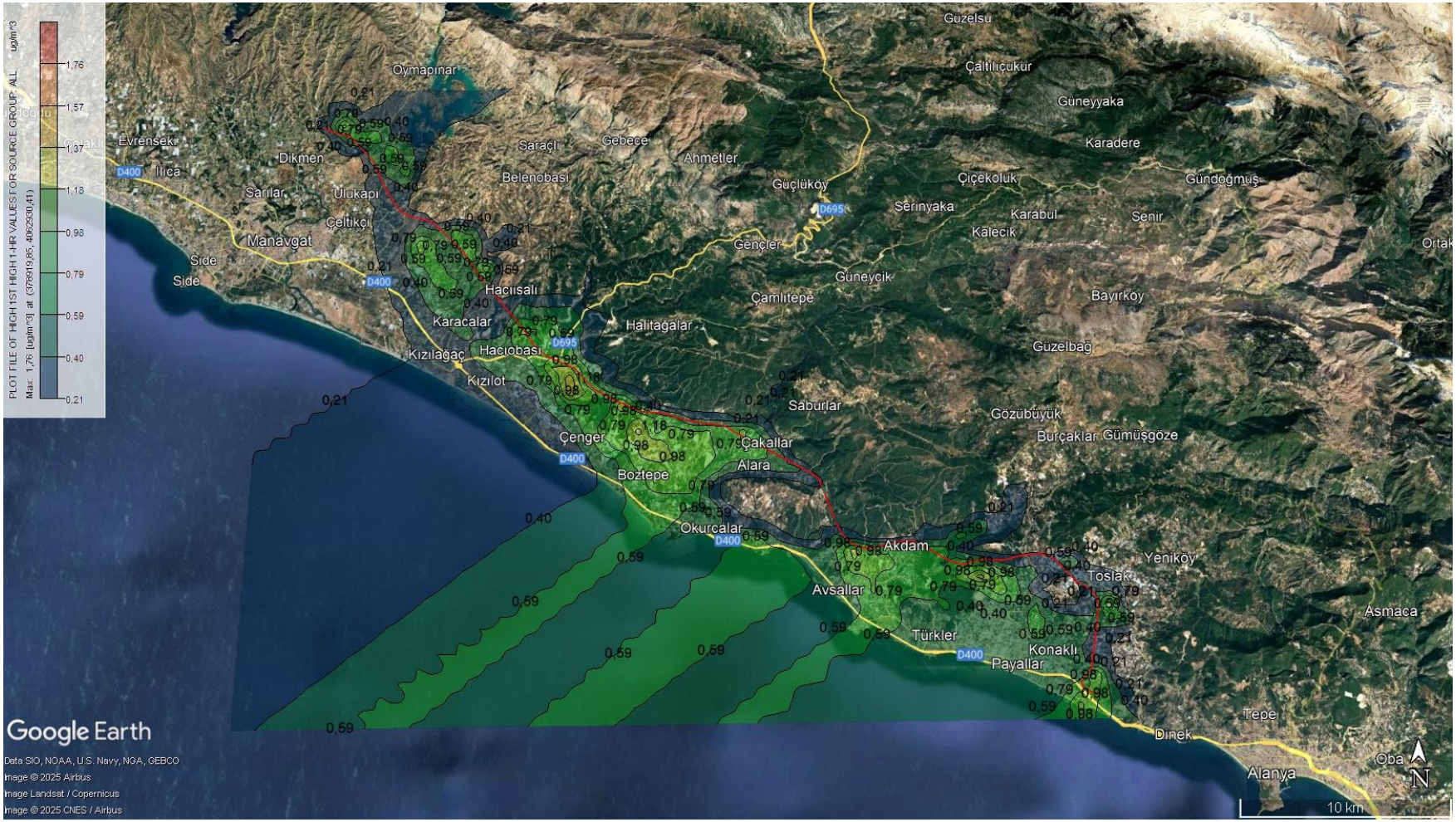


Figure X.34 Maximum hourly VOC emission distribution Section 2 (µg/m³)

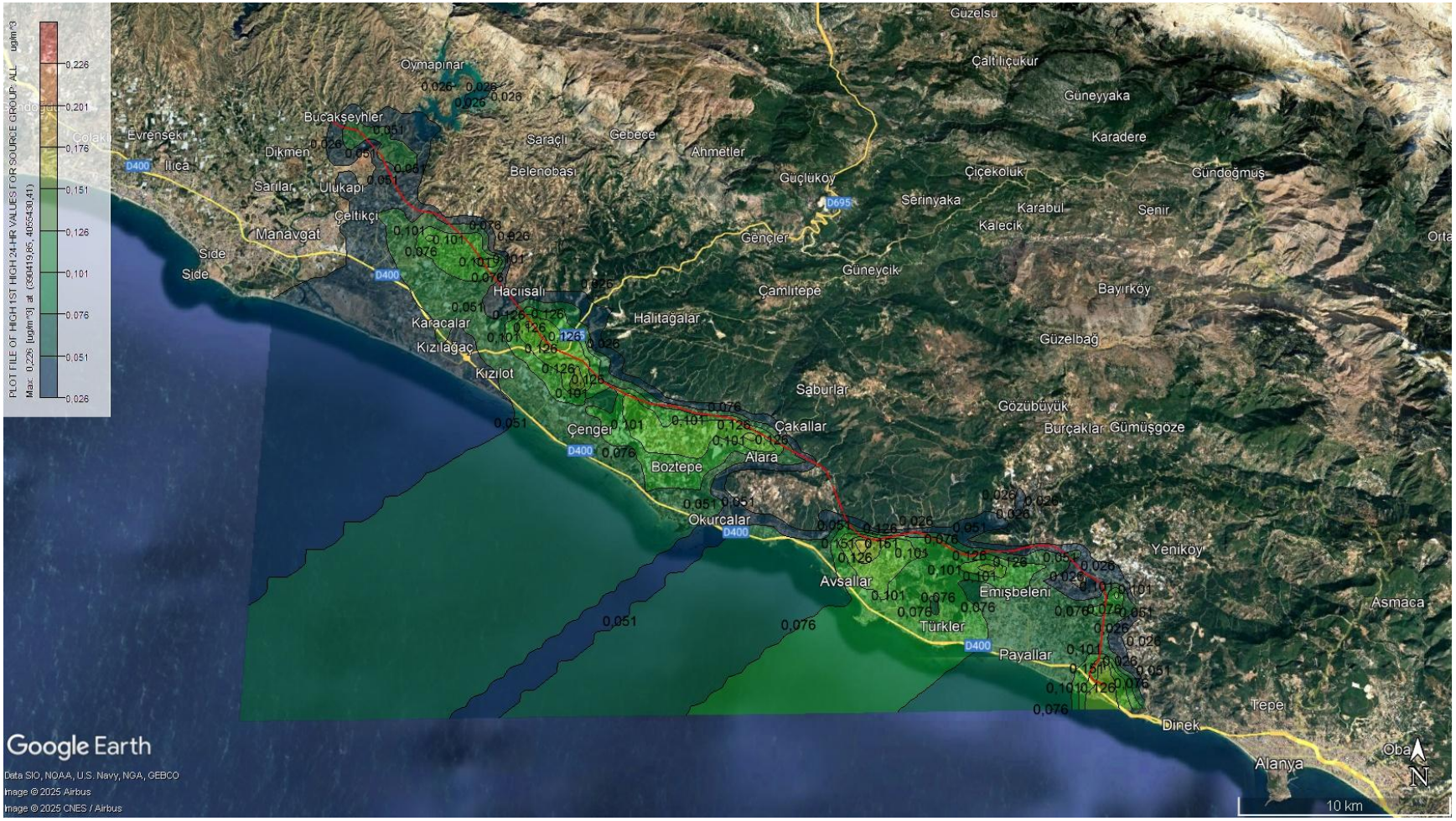


Figure X.35 Maximum daily VOC emission distribution Section 2 (µg/m^3)

This study used the AERMOD dispersion model to assess the short- and long-term air quality impacts of emissions from both the construction and operation phases of the Antalya–Alanya Motorway Project, focusing on PM_{10}, $PM_{2.5}$, settled dust, NO_2, CO, and VOCs under eighteen different scenarios.

Conclusion

In this study, air quality modeling was conducted to assess the short- and long-term impacts of emissions from both the construction and operation phases of the Antalya-Alanya Motorway Project. The dispersion of pollutants (PM_{10}, $PM_{2.5}$, settled dust, NO_2, CO, VOC) was simulated using the AERMOD model under eighteen different scenarios.

During the construction phase, the highest daily PM_{10} concentrations reached 1,219.87 µg/m³ (Section 2) and 559.07 µg/m³ (Section 1). Despite these high short-term peaks in localized areas, the number of daily exceedances (34 and 33 days) remained within the legal threshold of 35 days/year (IAPCR), and annual averages were well below the 40 µg/m³ limit. This indicates that construction-related dust emissions are temporary, localized, and compliant with regulations.

Annual $PM_{2.5}$ concentrations were low (max 3.34 µg/m³ in Section 2), significantly below the 20 µg/m³ limit. However, in Hacıali, where the background concentration was already 30.5 µg/m³, the project's contribution raised the cumulative value to 32.22 µg/m³, exceeding the regulatory limit. This suggests that Hacıali is a pre-existing air quality hotspot.

The maximum daily settled dust concentration was calculated as 203.53 mg/m²day in Scenario 17 (Construction – Section 1) and 324.66 mg/m²day in Scenario 18 (Construction – Section 2). Corresponding maximum annual average concentrations were 24.82 mg/m²day and 25.35 mg/m²day µg/m³, respectively. All modeled values remained well below the IAPCR regulatory thresholds of 390 mg/m²day for daily and 210 mg/m²day for annual settled dust concentrations. These results indicate that, under both construction scenarios, settled dust levels do not pose a risk of long-term accumulation or regulatory exceedance.

The highest cumulative settled dust concentration was observed in Sarıabalı, with a total of 276.59 mg/m²day, followed by Ulukapı (218.19 mg/m²day) and Hacıali (112.48 mg/m²day). These locations are either directly adjacent to intense earthmoving operations or located downwind of major activity centers. Although the daily maximum settled dust concentrations at individual receptor points in Sarıabalı (203.53 µg/m³) and Ulukapı (144.57 mg/m²day) remain well below the IAPCR daily limit of 390 mg/m²day.

NO_2 hourly and annual concentrations during both phases remained well below the legal thresholds (200 µg/m³ hourly, 40 µg/m³ annual), with no exceedances. Emissions during the operation phase were even lower, confirming minimal contribution to NO_2 pollution.

CO concentrations remained very low in both phases, with maximum 8-hour values far below the 10,000 µg/m³ limit, indicating negligible health risk.

VOC levels were also minimal (≤1.05 µg/m³), and although no specific regulatory threshold applies, these concentrations are not expected to impact air quality or health.

In conclusion, the project's emissions are within national and international air quality standards. Apart from localized and short-term peaks during construction, particularly in areas with already high background levels like Hacıali, the overall environmental impact is limited.

Recommendations:

- Implement dust suppression measures (e.g., water spraying, truck covering, activity limits in dry/windy weather), particularly in high PM_{10} zones.
- Establish continuous air quality monitoring in areas such as Hacıali to track cumulative impacts and inform mitigation.

X.1.4. Mitigation Measures

The following sections describe the actions and strategies designed to avoid, minimize or offset the potential adverse air quality impacts of the Project, or to enhance potential Project benefits.

X.1.4.1. Land Preparation and Construction Phase

As outlined in the preceding sections, construction activities will result in dust emissions due to excavation, filling, and material handling and storage, as well as exhaust emissions from diesel-powered construction machinery and equipment. To minimize and control these air emissions, the following measures will be implemented during the land preparation and construction phases, in accordance with applicable Turkish regulations, EU Directives, IFC Standards, and KGM's Technical Specifications for Motorways.

Baseline air quality monitoring studies have been assessed as sufficient, with detailed explanations and evaluations provided in Section X.1.2 of the ESIA Report. These studies meet the requirements of IFC Performance Standards and relevant environmental regulations. Furthermore, regular air quality monitoring will be carried out throughout the construction phase. Accordingly, no additional pre-construction air quality monitoring is considered necessary. The air quality monitoring approach—including the parameters to be measured and the monitoring frequency—is described in detail in the Monitoring Plan section (Chapter XX) of the ESIA Report.

Material Handling and Process Emissions

- Dust emissions from sources such as conveyors, bins, and crushing-screening plants will be controlled through enclosures, covers, and dedicated dust suppression systems (e.g., water sprays, baghouse filters, or cyclones).
- All dust-emitting units within crushing-screening operations will be placed in enclosed structures equipped with appropriate dust control systems.
- The drop height of fine or dusty materials during loading/unloading will be minimized to reduce airborne dust.
- Loading and unloading operations will be conducted without scattering or throwing materials.

Open Area and Road Dust Controls

- Open sources such as material stockpiles will be managed using covers, enclosures, or by maintaining adequate moisture content.

- Dust suppression measures including regular watering using water trucks or pressurized spraying systems will be applied on construction sites, service roads, access roads, and at quarry or storage areas. These measures will be enforced as needed, including nights, weekends, and non-working days.
- Speed limits for all construction vehicles will be established and enforced to minimize dust resuspension.
- Project roads, especially those accessing quarries, will be upgraded and widened where necessary to support safe, low-dust vehicle movement.
- If nearby roads are actively used by traffic, continuous dust suppression will be applied to maintain safety and visibility. On unused roads, dust control will focus on residential and commercial areas.

Transport and Vehicle Controls

- All trucks transporting excavated or raw materials will be covered with nylon tarpaulin.
- Construction vehicles will not be permitted to idle unnecessarily on- or off-site.
- Only well-maintained vehicles and machinery will be used. A regular maintenance program will be in place to ensure engine efficiency and minimize emissions.
- Preference will be given to locally licensed quarries to reduce transportation distances and related emissions.
- Driving through residential settlements will be avoided when alternative routes exist.
- Exhaust emission measurements of the vehicles will be conducted periodically every three months.

Blasting Activities

- Blasting operations will be conducted in full compliance with applicable regulations and aligned with industry best practices to minimize short-term dust releases.

Dust Barrier and Wind Protection

- Windbreaks, fences, or vegetative barriers will be installed around material storage areas and other emission-prone zones to reduce dust dispersion.

Monitoring and Compliance

- Air quality management will comply with the “Regulation on the Control of Industrial-Sourced Air Pollution” and the “Regulation on the Assessment and Management of Air Quality.”
- PM_{10} measurements will be carried out in or near sensitive areas, particularly in Hacıali (monthly monitoring and more frequent monitoring if needed, depending on the intensity of construction work, weather conditions, etc.); this will enable rapid response to exceedances and the development of adaptive dust management strategies.

Site-Specific Measures for Hacıali

Given the already high background PM concentrations and projected exceedance levels in Hacıali, additional targeted mitigation is required:

- Dust-generating activities will be limited during stagnant meteorological conditions (e.g., inversions or low wind scenarios).
- Intensive dust-producing operations will be relocated away from Hacıali where technically and logistically feasible.
- Road paving and soil stabilization techniques will be employed to reduce dust lift-off.
- The use of wind barriers or vegetation buffers will be prioritized between emission sources and residential receptors in Hacıali.
- Any verified environmental damage due to insufficient dust control will be subject to compensation and corrective action.
- An air quality monitoring station will be established in Hacıali neighborhood to monitor potential impacts.

X.1.4.2. Operation Phase

At the service areas, a green buffer strip will be formed between the outer lane of the Motorway and the facilities. This strip will be properly planted (e.g. with shrubs that start growing from the base and are resistant to dust and gaseous emissions) to form a barrier against dust to be sourced from the Motorway's vehicle traffic.

The application of automatic toll systems along the Motorway will contribute to an optimization of traffic flows and thus lower emissions.

X.1.5. Summary of Assessments and Residual Impacts

Table X.70 provides a summary on the air quality assessments. Significance of the identified impacts before and after the implementation of mitigation measures are summarized in this table. As can be seen from the Table, potential impacts on local communities are assessed as low during land preparation and construction phase of the motorway while it is anticipated that these impacts would be lower with mitigation measures to be applied. During operation of the motorway, medium and high level impacts are anticipated to result in residual impacts of medium and low with relevant mitigation measures. Furthermore, already existing traffic load on alternative roads will shift on to Antalya-Alanya Motorway and it is anticipated that emissions from these roads will decrease. It should also be noted that high impact significance (for sensitive receptors) is mainly attributed to the baseline air quality measured at sensitive receptors which reflect exceedance of air quality standards. In this context, additional site-specific mitigation and continuous monitoring will be implemented in Hacıali, where baseline concentrations are already elevated.

X.2. Climate Change

This subsection focuses on the two-way relationship between the Project and climate change. First, the section assesses the potential impacts of the Project on greenhouse gas emissions and consequently, on climate change. Second, the section evaluates the potential vulnerabilities of the Project due to the effects of the changing climate. The Project Sponsor has determined a total of 15

years, 3 years for construction and 12 years for operation and after it will post-handover to the Turkish General Directorate for Highways (KGM) until it's end of life likely after 2051 which 0% carbon emission in Türkiye takes place.

The Project's Impact on Climate Change

The Project's contribution to the climate change will primarily result from the emissions of greenhouse gases (GHGs). During the construction phase, the majority of GHG emissions will be generated by the use of construction machinery and equipment. However, during operation phase of the Project most vehicle traffic will be diverted to the new Motorway from existing roads, except in areas where access to new regions will be enhanced by the Project, the overall change in GHG emissions due to vehicle traffic is expected to be minimal. Still, GHG emissions are expected from operation phase facilities such as toll plazas, service and maintenance areas, and weigh stations, roadside assistance centers. These emissions mainly stem from shuttle services for personnel transportation, emergency, repair and maintenance tools, equipment and vehicles (angle grinder, asphalt paver, bitumen kettle, stone cutter, emergency generators, all combustion engine vehicles etc.) and energy consumption of the operation phase facilities, including electricity and heating.

The ultimate source of CO_2 emissions involves three primary contributors: fuel combustion, material combustion, and the introduction of carbon-containing substances from combustion engine exhausts to the atmosphere (EMEP/EEA Air Pollutant Emission Inventory Guide 2016). Global warming potential factors are used to convert GHG emissions to CO_2 emissions in order to assess the global warming potential of a GHG in units of CO_2-eq. This approach is developed to allow more accurate, easier and objective evaluation of GHGs by bringing them to a common unit, CO_2 equivalent of the GHG (CO_2-eq).

Climate Change's Impact on the Project

The effects of climate change vary across geographical regions. The changes cause permanent flooding from elevated water levels or heightened risks of flash floods due to changes in precipitation regime in certain areas, while marginal temperature increase, fires, drought and desertification in others. Therefore, the Project location is determined as the most important parameter for the effects of climate change on the Project and the assessment was made specific to the Project location. In this subsection, following the assessment of the Project's impact on climate change, an assessment of the potential impacts of climate change on the Project location, and thus on the Project itself, over its lifespan was provided. The assessment utilizes data and information from the World Bank Climate Change Portal. Based on the credible information provided, a "Project Climate Vulnerability Assessment" was provided with possible climate change impacts on the Project and mitigation measures were outlined to mitigate and/or minimize the potential effects.

X.2.1. Assessment Methodology and Data Sources

The Project is considered having the potential to emit one or more of the greenhouse gases (GHGs). GHG assessment for the land preparation and construction phase, and operation phase of the Motorway is carried out in this subsection.

X.2.1.1. Greenhouse Gases

Contribution of Project activities to climate change is evaluated by estimation of the amount of greenhouse gas emissions. Greenhouse gas emissions will be generated during both construction and operation phases of the Project.

Mobile sources and transportation account for a large fraction of fossil fuel combustion in most countries. Internal combustion engines derive energy from burning of hydrocarbon fuel in air, generating carbon dioxide (CO_2) and water vapor (H_2O). During combustion, some amount of the fuel is either not burnt or partially burnt. This results in generation of carbon monoxide (CO), volatile organic compounds (VOCs) and particulate matter (PM).

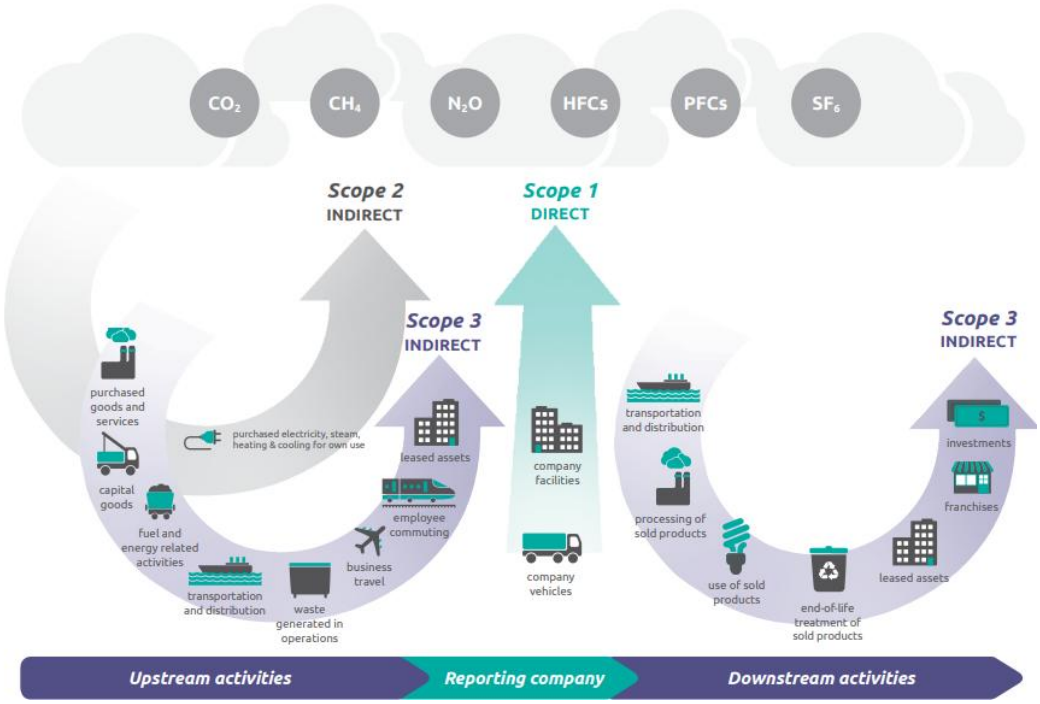
In addition, at the high temperatures and pressures found in the combustion chamber, some of the nitrogen in the air and fuel is oxidized, forming mainly nitric oxide (NO) with a small amount of nitrogen dioxide (NO_2). By convention, the sum total of oxides of nitrogen (i.e. NO + NO_2) is abbreviated as NO_x. To summarize, CO, VOCs, NO_x and PM, have normally been regarded as the pollutants of most concern, and rates of emission are legally restricted in many countries. CO_2, being a major contributor to global warming, is now also considered to be an atmospheric pollutant.

Beyond local air pollution, vehicle emissions also contribute to regional air quality degradation, with greenhouse gases like CO_2, posing long-term environmental challenges on a global scale.

GHG emissions are calculated by applying established emission factors, which are standardized values that associate greenhouse gas emissions with specific activity levels at a given emission source.

Building on this approach, the organizational boundaries for the GHG assessment were defined using the "control principle" outlined in the ISO 14064-1 standard. According to this principle, all emissions from assets and activities under the organization's control must be included in the assessment. In practical terms, this means that only emissions stemming from operations, facilities, or activities directly managed or influenced by the organization; whether through ownership, operational control, or other forms of control, are considered in the GHG inventory. This ensures that the assessment accurately captures the organization's environmental impact.

The operational boundaries for greenhouse gas (GHG) assessment within a corporation are defined by the direct and indirect emissions generated by the Project. These boundaries are classified into three categories: Scope 1, Scope 2, and Scope 3 (Figure X.36).



Source: Corporate Value Chain (Scope 3) Accounting and Reporting Standard

Figure X.36 Overview of GHG Protocol scopes and emissions across the value chain

Scope 1: Direct Emissions

Covers direct emissions from sources owned or controlled by a company.

- Emissions from company-owned vehicles.
- Emissions from fuel burned in facilities, machinery, or heating systems.
- Emissions from on-site waste treatment or industrial processes.

Scope 2: Indirect Emissions from Energy Consumption

These are the emissions that are indirectly caused by a company while producing the energy it imports or purchases and uses.

- Emissions resulting from the electricity consumed in office buildings or production facilities.
- Emissions from purchased heating or cooling used for operations.

Scope 3: Other Indirect Emissions

Includes all other indirect emissions occurring in the value chain that are not produced by the company itself and are not the result of activities arising from assets it owns or controls.

- Emissions from the production of purchased goods and services in the supply chain.

- Emissions from employee business travel or commuting.
- Emissions linked to the transportation of goods or the disposal of waste.

Transition Risks

Transition risks refer to potential challenges the Project may face due to the global and national shift toward a low-carbon and climate-resilient economy. These risks arise from changes in climate-related policies, technologies, market conditions, and stakeholder expectations

They can affect an organization's costs, asset values, business models, and long-term viability, particularly if the entity is slow to adapt to evolving climate requirements or public expectations.

The following Transition Risks may impact the Project:

Regulation Risks:

Changes in laws, regulations or enforcement practices can impact or delay the Project. It can affect the Projects costs, operational requirements, and compliance obligations.

Technology Risk:

Potential losses the Project might face due to technological changes or limitations. These might be due to adopting new technologies, falling behind in a technological way or the technological change of the current system.

Legal Risk:

Potential financial, operational, or reputational impact to the Project resulting from legal actions, non-compliance with applicable laws, and changes in legal and regulatory frameworks.

Market Risk:

Potential financial and operational impacts the Project might face due to changes of the market condition.

Workforce Risk:

Potential challenges that the Project might face due to the availability, capacity, safety, and stability of the labor force.

X.2.1.2. Regulatory Framework

Turkish Legal Requirements

Türkiye became a party of the United Nations Framework Convention on Climate Change in 2004. In the 7th Conferences of the Parties (COP7) meeting held in Marrakech in 2001, the special conditions of Türkiye which has a different position than the other countries in the Annex-I list of the Convention, were recognized and it was decided that its name will remain on the Annex-I while it will be removed from the Annex-II list.

The process that is started when Türkiye is recognized as an Annex-I country having special conditions different from the other parties of the Convention, has affected and accelerated the country's political decision of being a party of the Kyoto Protocol. Around five years after becoming a part of the Convention, in February 2009, "The law on the convenience of Türkiye's entrance to the Kyoto Protocol for the United Nations Framework Convention on Climate Change" came into force, in May 2009; Türkiye's entrance to the Kyoto Protocol was documented and sent to the General Secretariat of the United Nations. The whole ratification process of the Protocol was completed in 26 August 2009.

As a country that ratified the UN Convention Framework on Climate Change and the Kyoto Protocol, Türkiye has taken the responsibilities described under UNFCCC, that are related to the adaptation to the effects of the climate change which are imposed to the parties. The issues of some of the international UN conventions that Türkiye is a party are also indirectly related with the adaptation to the effects of the climate change. These are; Convention to Combat Desertification, Convention on Biological Diversity, Bern Convention on the Conservation of European Wildlife and Natural Habitats, Conventions for the Protection of Mediterranean Sea and the Black Sea Against Pollution and its additional protocols *(Ministry of Environment, Urbanization and Climate Change, 2021).*

Within this scope, adaptation to climate change and actions towards mitigation of potential impacts of climate change are regulated through a variety of national legislation including topics such as disaster risk management, conservation of biodiversity, water safety and security, food safety and security.

IFC Standards

IFC has established the Performance Standards on Environmental and Social Sustainability and relevant guidance notes. IFC Performance Standard (PS) 3 on Resource Efficiency and Pollution Prevention states that; for projects that are expected to or currently produce more than 25.000 tons of CO_2-eq annually, the client will quantify direct emissions from the facilities owned or controlled within the physical project boundary, as well as indirect emissions associated with the off-site production of energy used by the project (IFC PS3, 2012). It suggests the client to consider alternatives and implement technically and financially feasible and cost-effective options to reduce project related GHG emissions during the design and operation of the project which may include, but not limited to, alternative project locations, adoption of renewable or low carbon energy sources, sustainable agricultural, forestry and livestock management practices, the reduction of fugitive emissions and the reduction of gas flaring. Another requirement of PS 3 is quantification of GHG emissions which will be conducted by the client annually in accordance with internationally recognized methodologies and good practice.

Equator Principles IV

The Equator Principles (EP) provides a framework for managing environmental and social risks in project finance. Equator Principle IV on Climate Change specifies that for projects with the potential for significant greenhouse gas (GHG) emissions, the client must conduct a climate change risk assessment. This assessment should evaluate both the project's direct and indirect GHG emissions, as well as its vulnerability to climate-related risks, such as the physical impacts of climate change and transition risks arising from the shift to a low-carbon economy (Equator Principles, 2020).

"The EPFI will require the client to report publicly on an annual basis on GHG emission levels (combined Scope 1 and Scope 2 Emissions) and GHG efficiency ratio, as appropriate, during the operation phase for Projects emitting over 100,000 tons of CO_2 equivalent annually. Clients will be encouraged to report publicly on Projects emitting over 25,000 tons. Public reporting requirements can be satisfied via host country regulatory requirements for reporting or environmental impact assessments, or voluntary reporting mechanisms such as the Carbon Disclosure Project, where such reporting includes emissions at Project level.

For all Projects, in all locations, when combined Scope 1 and Scope 2 Emissions are expected to be more than 100,000 tons of CO_2 equivalent annually. Consideration must be given to relevant Climate Transition Risks (as defined by the TCFD) and an alternatives analysis completed which evaluates lower Greenhouse Gas (GHG) intensive alternatives." (Equator Principles, 2020).

In summary, the principle requires the client to consider and implement technically and financially feasible measures to reduce GHG emissions during the project's design and operation. These measures may include, adopting energy-efficient technologies, utilizing renewable energy sources, optimizing resource use, and incorporating climate-resilient design. Additionally, for projects emitting more than 100,000 tons of CO_2-equivalent annually, the client must quantify and report GHG emissions annually in accordance with internationally recognized methodologies and best practices.

As part of the this methodology, both Transition Risks (such as regulatory, legal, technological, market, and workforce challenges) and Physical Risks (climate-related hazards) must be identified and evaluated to ensure comprehensive climate risk management aligned with global climate goals.

Transition Risks

Transition risks refer to potential challenges the Project may face due to the global and national shift toward a low-carbon and climate-resilient economy. These risks arise from changes in climate-related policies, technologies, market conditions, and stakeholder expectations

They can affect an organization's costs, asset values, business models, and long-term viability, particularly if the entity is slow to adapt to evolving climate requirements or public expectations.

The following Transition Risks may impact the Project:

Regulation Risks: Changes in laws, regulations or enforcement practices can impact or delay the Project. It can affect the Projects costs, operational requirements, and compliance obligations.

Technology Risk: Potential losses the Project might face due to technological changes or limitations. These might be due to adopting new technologies, falling behind in a technological way or the technological change of the current system.

Legal Risk: Potential financial, operational, or reputational impact to the Project resulting from legal actions, non-compliance with applicable laws, and changes in legal and regulatory frameworks.

Market Risk: Potential financial and operational impacts the Project might face due to changes of the market condition.

Workforce Risk: Potential challenges that the Project might face due to the availability, capacity, safety, and stability of the labor force.

Physical Risks

Physical risks refer to the potential adverse impacts of climate change on the Project due to climate-related hazards, and are determined by three key dimensions: hazard, exposure, and vulnerability. These risks can disrupt project operations, damage assets, affect health and safety, and result in financial losses if not properly assessed and managed. Understanding the interaction between these components is essential to ensure effective climate adaptation strategies.

The following aspects define the Physical Risks relevant to the Project:

Hazard: The climate-related events or trends that could potentially cause harm. This includes extreme weather events such as floods, storms, and heatwaves, as well as long-term climatic changes such as rising temperatures, sea level rise, and changing rainfall patterns.

Exposure: The presence of assets, infrastructure, people, or ecosystems in locations that could be adversely affected by climate hazards. Projects located in coastal areas, flood plains, drought-prone zones, or regions experiencing temperature extremes may face heightened exposure.

Vulnerability: The susceptibility of the Project to be adversely affected by climate hazards, based on factors such as infrastructure resilience, adaptive capacity, socioeconomic conditions, and institutional readiness. Projects with outdated infrastructure or lacking contingency plans are typically more vulnerable.

An effective climate risk assessment must evaluate these three dimensions to understand the Project's physical risk profile and to develop appropriate adaptation and resilience measures, ensuring long-term sustainability and alignment with climate-resilient development objectives.

International Requirements

There are some international agreements on combating climate change. These international agreements ensure that countries make common commitments to combat climate change. These agreements may include efforts to reduce greenhouse gas emissions, increase the use of renewable energy, and adapt to climate change. International agreements are mentioned below:

The Paris Agreement is an international climate change agreement adopted in 2015 in the capital of France, Paris, under the United Nations Framework Convention on Climate Change (UNFCCC). This agreement represents a significant step worldwide for limiting global warming and combating climate change. Türkiye ratified the Paris Agreement on October 6, 2021, after signing it on April 22, 2016. Türkiye's goals regarding the Paris Agreement are as follows:

- Reduction of Greenhouse Gas Emissions: Türkiye has committed to reducing greenhouse gas emissions by 41% by 2030. And also, Türkiye has set a net-zero emissions target for 2053
- Renewable Energy: According to Türkiye's NDC[8] (National Determined Contribution), the country aims to increase its renewable energy capacity to 90 GW by 2035. This goal includes investments in renewable energy sources such as wind, solar, hydroelectric, and biomass.
- Energy Efficiency: Türkiye aims to achieve a 16% improvement in energy efficiency by 2030 according to its NDC. This goal involves improving energy efficiency in industrial facilities, implementing energy-saving measures in buildings, and using more efficient

[8] United Nations Framework Convention on Climate Change - https://unfccc.int/sites/default/files/NDC/2023-04/T%C3%9CRK%C4%B0YE_UPDATED%201st%20NDC_EN.pdf

systems in transportation. Technical loss in energy distribution, which is currently at 12% is targeted for reduction, and energy efficiency is a key pillar of Türkiye's Climate Change Mitigation Strategy and Action Plan (2024–2030).

- Conservation of Forests: Türkiye has achieved its goal of increasing its forest cover to 30% by 2023. Türkiye will now focus on sustainable forest management, afforestation, and reforestation under the Twelfth Development Plan (2024–2028) and the Strategic Plan for Climate Change Adaptation in Forestry to boost carbon sequestration.
- Climate Change Adaptation: Türkiye's Climate Change Adaptation Strategy and Action Plan (2024–2030) focuses on building resilience across sectors like agriculture, water management, health, infrastructure, and ecosystems.

These goals represent Türkiye's commitments under the Paris Agreement and outline the country's roadmap in combating climate change. Various policies, projects, and collaborations are being implemented to achieve these objectives.

The Kyoto Protocol was adopted in Kyoto, Japan, in 1997 under the United Nations Framework Convention on Climate Change (UNFCCC). It stands as the first international agreement aimed at reducing greenhouse gas emissions. Under the Kyoto Protocol, industrialized countries and economies were expected to reduce their greenhouse gas emissions with specific targets. These targets are mostly based on emissions levels from the year 1990 and are usually expressed in percentage terms. The Protocol primarily targeted the reduction of greenhouse gases such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (NO_x).

The Kyoto Protocol includes flexible mechanisms like emissions trading (cap and trade), Clean Development Mechanism (CDM), and carbon credits. These mechanisms encourage trade and cooperation among countries to achieve emission reduction targets in a cost-effective manner. The Protocol targeted industrialized and emission-responsible countries, including major economies like the European Union, the United States, Japan, Canada, and Australia.

The Protocol organized emission reduction commitments into specific periods. The first period covered the years 2008-2012, while the second period covered 2013-2020. The Protocol conducts regular reviews and evaluations to monitor member countries' commitments and progress.

Türkiye signed the Kyoto Protocol but did not complete the ratification or commitment process. Therefore, Türkiye is not officially a party to the Kyoto Protocol and has not undertaken the emission reduction targets set under this protocol. Later on, Türkiye became a party to a more comprehensive climate change agreement like the Paris Agreement.

TCFD stands for Task Force on Climate-related Financial Disclosures. It is a global initiative established by the Financial Stability Board (FSB), an international organization that monitors and provides recommendations for the global financial system. TCFD aims to guide companies in providing consistent disclosures of climate-related financial risks to investors, lenders, insurers, and other stakeholders. It was launched in December 2015 as a voluntary framework. The TCFD framework aims to enhance transparency and enable investors, lenders, insurers, and other stakeholders to make more informed decisions regarding climate-related risks and opportunities. It has had a significant global impact, with many companies and financial institutions adopting TCFD recommendations in their reporting practices to demonstrate their commitment to climate-related financial disclosure and transparency.

The IPCC (Intergovernmental Panel on Climate Change) is a scientific organization established jointly by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988. Its purpose is to assess and share scientific information related to climate change with policymakers.

The IPCC evaluates and synthesizes current scientific data on climate change contributed by thousands of scientists worldwide. IPCC reports include assessments of the causes, impacts, possible scenarios, and solutions related to climate change. These reports serve as guidance for policymakers and other stakeholders globally. The IPCC's scientific assessments play a significant role in shaping and implementing climate change policies for governments and international organizations. By disseminating scientific data, findings, and recommendations, the IPCC educates governments, media, academic institutions, and the public, raising awareness about climate change.

X.2.2. Baseline Conditions

X.2.2.1. Meteorological and Climatic Characteristics

In this subsection, properties of the Project area were evaluated regarding its climatic and meteorological properties.

The Project is located in the Akdeniz (Mediterranean) region of Türkiye. In Antalya, as is typical of hot-summer Mediterranean climate regions, summers are hot and dry, and winters are warm and rainy. The Taurus Mountains' lies parallel to the sea, trapping the humid air between them and the coastal area, significantly affects precipitation and temperature patterns in the province. This topographic structure, combined with climate change, contributes to the sudden and heavy rainfall observed in the city. Average summer temperatures are between 28 - 36 °C, and snow is an extremely rare occurrence in the coastlines. Heat waves affecting the region lead to anomalies, altering the typical hot and dry summer conditions by causing temperature fluctuations, and variations in rainfall patterns. These changes result in prolonged droughts and decreased precipitation, which are expected to reduce future water availability, posing serious challenges. Another anticipated effect of climate change in Antalya and its surrounding areas is the potential damage to ecosystems. Increase in droughts is predicted to pose a significant threat to endemic species of the region. Additionally, agricultural areas may also suffer, with adverse impacts on the ecological and socio-economic impacts of the climate change *(Antalya Metropolitan Municipality – Sustainable Energy and Climate Action Plan, 2022).*

The meteorological conditions of the project area were evaluated with long-term statistical data obtained from the 17954 Manavgat Meteorological Station operated by the General Directorate of Meteorology within the provincial borders.

Pressure Distribution

Annual mean local pressure measured in Manavgat Meteorology Station is 1,008.5 hPa. During the whole observation period, minimum pressure is recorded as 983 hPa in March and maximum pressure is recorded as 1,036.3 hPa in February. Monthly average, maximum and minimum pressure values recorded in the station are provided in Figure X.37 and Table X.39.

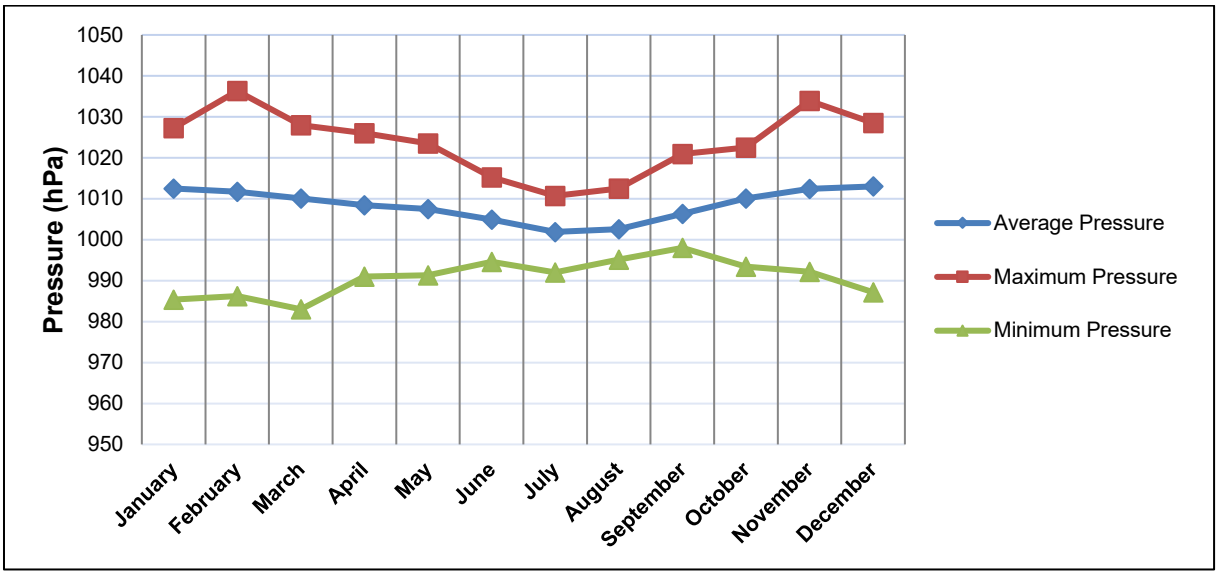


Figure X.37 Monthly Average, Maximum and Minimum Pressure Values of Manavgat Meteorology Station

Table X.39 Monthly Average, Maximum and Minimum Pressure Values of Manavgat Meteorology Station

Months	Average Pressure (hPa)	Maximum Pressure (hPa)	Minimum Pressure (hPa)
January	1,012.5	1,027.3	985.4
February	1,011.7	1,036.3	986.2
March	1,010.1	1,028	983
April	1,008.4	1,026	991
May	1,007.5	1,023.5	991.3
June	1,004.9	1,015.2	994.6
July	1,001.9	1,010.7	992
August	1,002.6	1,012.5	995.1
September	1,006.3	1,020.9	998
October	1,010.1	1,022.5	993.4
November	1,012.4	1,033.9	992.2
December	1,013	1,028.5	987.2
Annual	**1,008.5**	**1,036.3**	**983**

Temperature Distribution

According to Manavgat Meteorology Station records, annual average temperature is 18.9 °C. The highest temperature is recorded as 44.9ºC in June. The lowest temperature is recorded as –2.8ºC in February. The graphical and tabular representation of the average, maximum, minimum temperature records and maximum average and minimum average temperature records measured in this station are given in Figure X.38 and Table X.40, respectively.

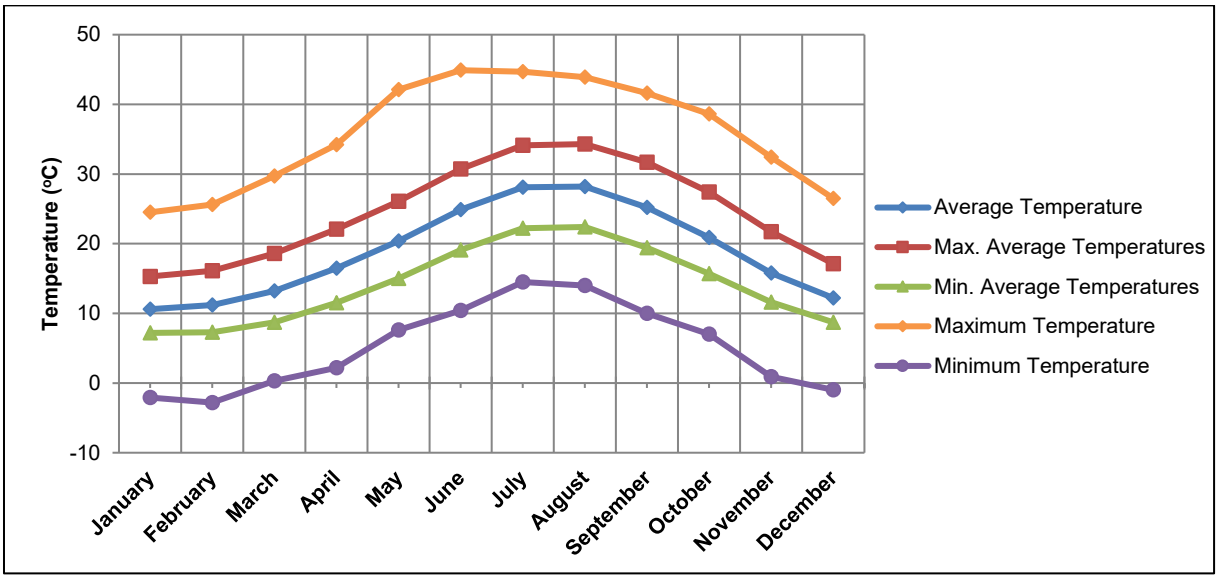


Figure X.38 Average Temperature, Maximum Average Temperature, Minimum Average Temperature of Manavgat Meteorology Station

Table X.40 Temperature Values of Manavgat Meteorology Station

Months	Average Temperature (ºC)	Max. Average Temperatures (ºC)	Min. Average Temperatures (ºC)	Maximum Temperature (°C)	Minimum Temperature (°C)
January	10.6	15.3	7.2	24.5	-2.1
February	11.2	16.1	7.3	25.6	-2.8
March	13.2	18.6	8.7	29.7	0.3
April	16.5	22.1	11.5	34.2	2.2
May	20.4	26.1	15	42.1	7.6
June	24.9	30.7	19.1	44.9	10.4
July	28.1	34.1	22.2	44.7	14.5
August	28.2	34.3	22.4	43.9	14
September	25.2	31.7	19.4	41.6	10
October	20.9	27.4	15.7	38.6	7
November	15.8	21.7	11.6	32.4	0.9
December	12.2	17.1	8.7	26.5	-1
Annual	**18.9**	**24.6**	**14.1**	**44.9**	**-2.8**

Precipitation Distribution

According to Manavgat Meteorology Station records, annual average total precipitation is 1,110.9 mm. Average total precipitation is maximum in December with 237.8 mm and minimum in July with 4.2 mm. During long time records, monthly maximum precipitation is recorded as 204.0 mm in January. Average monthly precipitation and daily maximum precipitation amounts are given graphically in
Figure X.39 and tabulated in Table X.41.

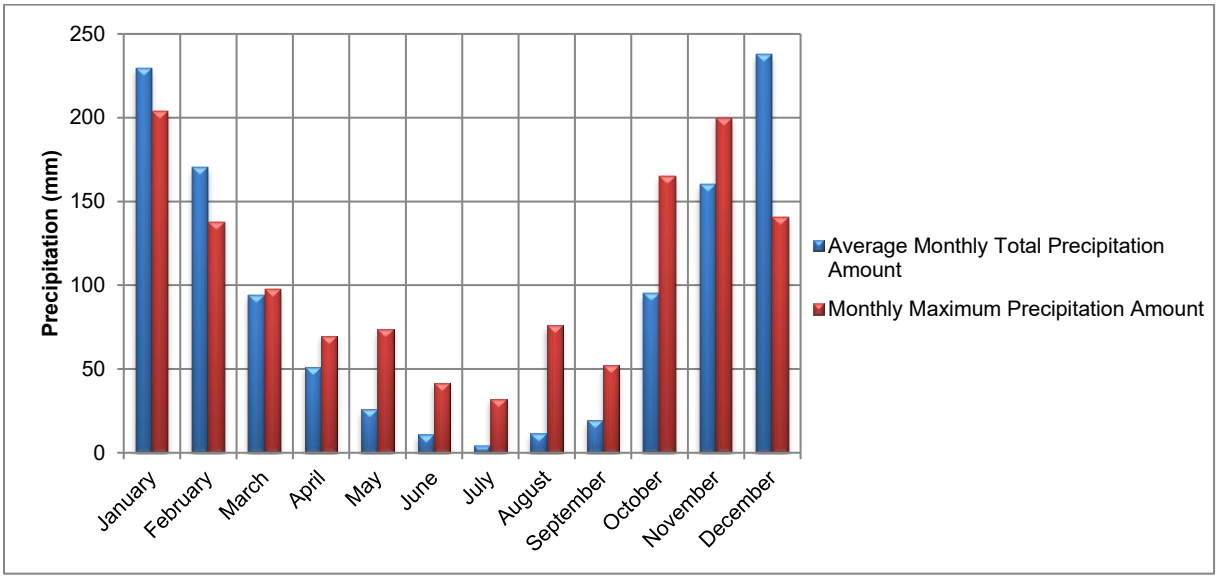


Figure X.39 Average Monthly Precipitation and Daily Maximum Precipitation of Manavgat Meteorology Station

Table X.41 Average Monthly Precipitation and Daily Maximum Precipitation of Manavgat Meteorology Station

Months	Average Monthly Total Precipitation (mm)	Monthly Maximum Precipitation (mm)
January	229.6	204.0
February	170.7	137.7
March	94.3	97.3
April	51.2	69.7
May	26.0	73.7
June	10.7	41.8
July	4.2	32.1
August	11.5	75.9
September	19.5	52.1
October	95.1	165.1
November	160.3	199.9
December	237.8	140.6
Annual	**1,110.9**	**204.0**

Humidity Distribution

According to Manavgat Meteorology Station records, average annual humidity is 63.5%. Minimum monthly relative humidity is recorded in October (59.1%) and maximum relative humidity is recorded in April (67.5%). The monthly average, minimum and maximum relative humidity values are given graphically in Figure X.40 and in tabular format in Table X.42.

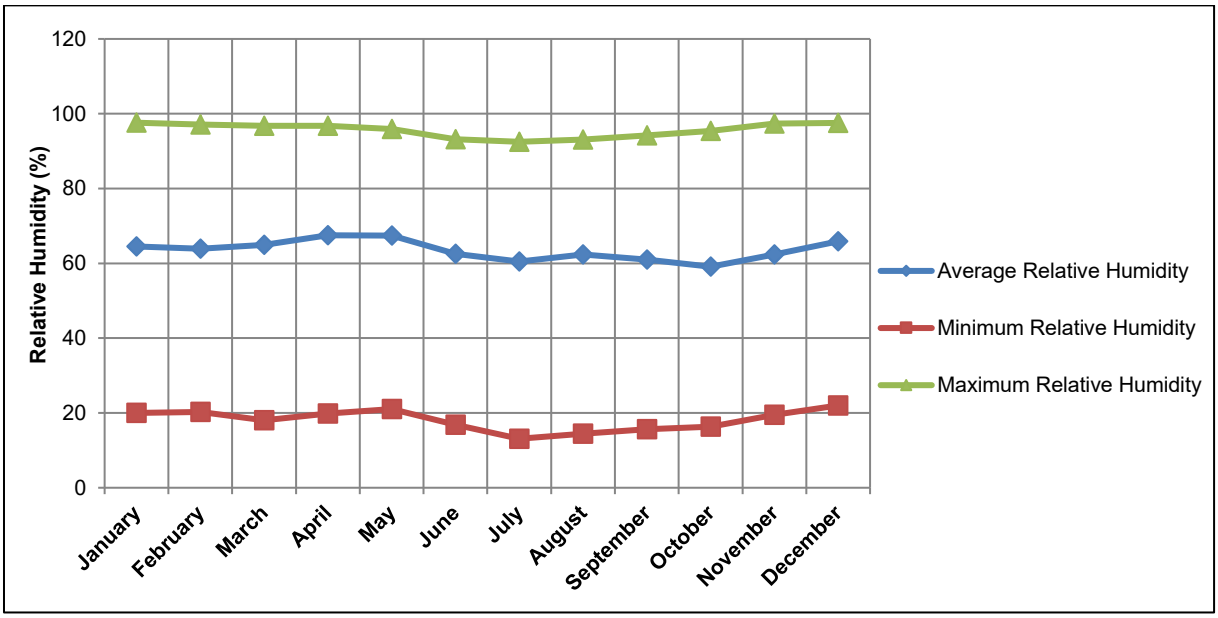


Figure X.40 Average and Minimum Relative Humidity Values of Manavgat Meteorology Station

Table X.42 Average and Minimum Relative Humidity Values of Manavgat Meteorology Station

Months	Average Relative Humidity (%)	Minimum Relative Humidity (%)	Maximum Relative Humidity (%)
January	64.5	20.0	97.6
February	63.9	20.3	97.1
March	64.9	18.0	96.8
April	67.5	19.8	96.8
May	67.4	21.0	95.9
June	62.5	16.8	93.2
July	60.5	13.1	92.5
August	62.4	14.4	93.1
September	61.0	15.6	94.2
October	59.1	16.3	95.4
November	62.4	19.5	97.4
December	65.9	22.0	97.5
Annual	**63.5**	**18.1**	**95.6**

Evaporation

According to Manavgat observation records monthly maximum open surface evaporation is 19.2 mm, measured in July. Annual total average open surface evaporation is 1,541.3 mm. Monthly maximum and average open surface evaporation values are provided graphically in Figure X.41 and in tabular format in Table X.43.

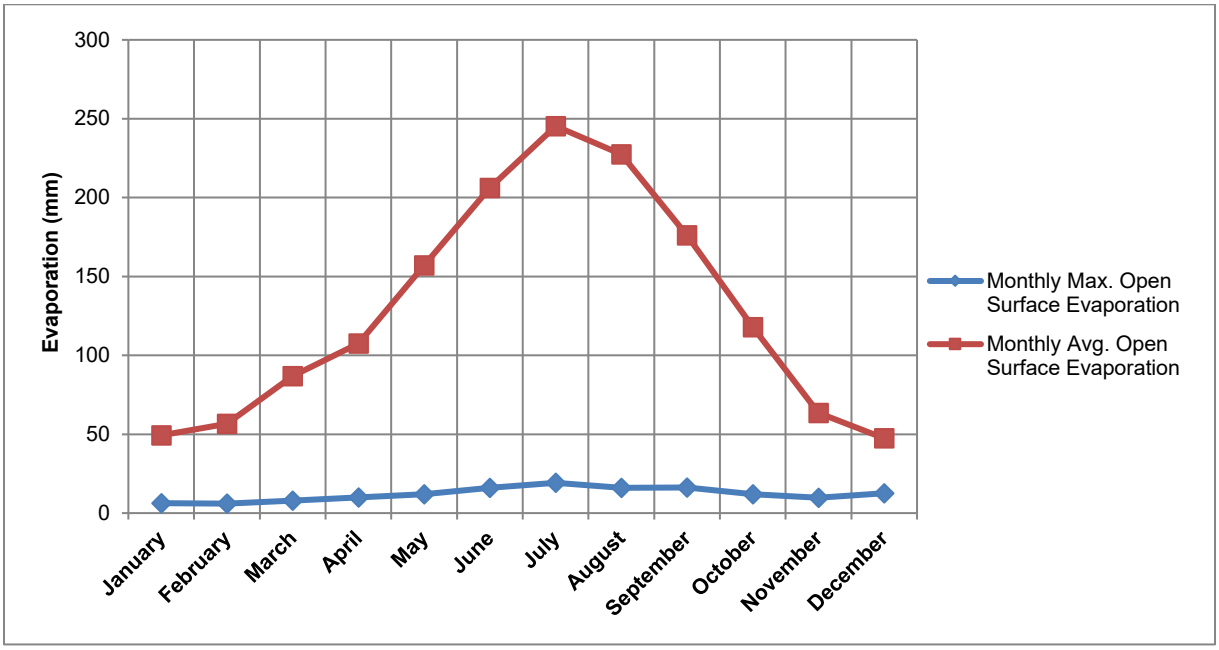


Figure X.41 Monthly Maximum and Monthly Average Open Surface Evaporation of Manavgat Meteorology Station

Table X.43 Monthly Maximum and Monthly Average Open Surface Evaporation of Manavgat Meteorology Station

Months	Monthly Max. Open Surface Evaporation (mm)	Monthly Avg. Open Surface Evaporation (mm)
January	6.3	49.3
February	6.0	56.7
March	8.0	86.8
April	10.0	107.6
May	12.0	157.0
June	16.0	206.2
July	19.2	245.3
August	16.0	227.4
September	16.2	176.2
October	12.0	117.8
November	9.8	63.6
December	12.6	47.4
Annual	**19.2**	**1,541.3**

Cloud Cover

Annual average number of clear days (cloud cover: 1.0-2.0) in Manavgat Meteorology Station is 179.7. Annual average number of partly cloudy days (cloud cover: 3.0-4.0) is 173.3 and annual average number of cloudy days (cloud cover: 5.0-8.0) is 25.8. Average numbers of clear, partly cloudy and cloudy numbers of days are given in graphically in Figure X.42 and in tabular format in Table X.44.

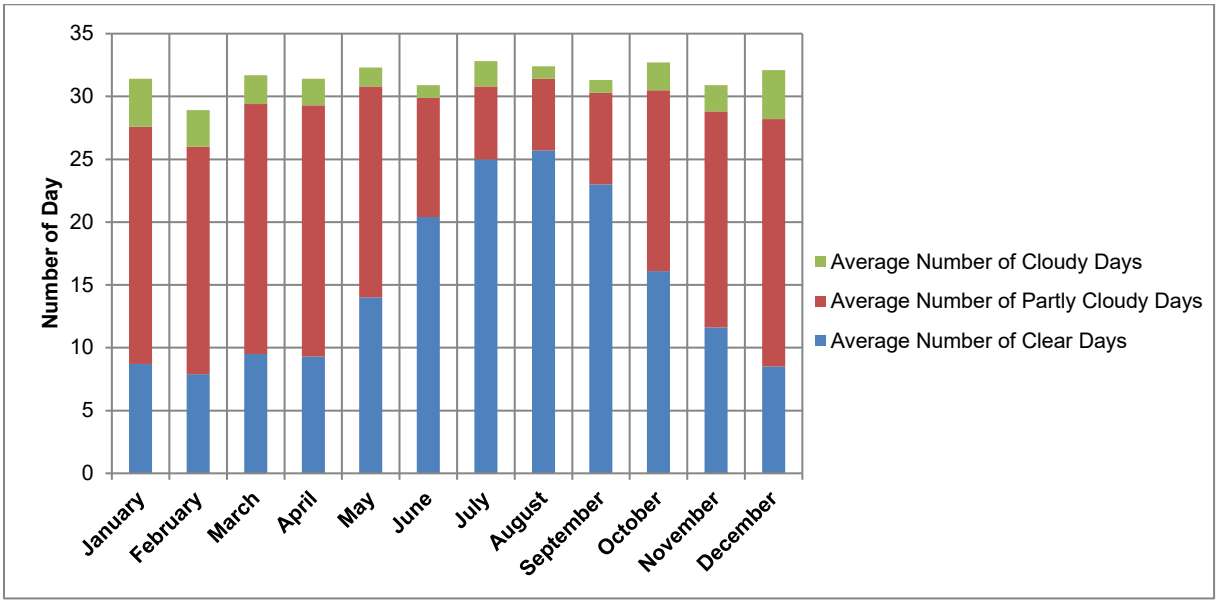


Figure X.42 Average Number of Clear, Partly Cloudy and Cloudy Days of Manavgat Meteorology Station

Table X.44 Average Number of Clear, Partly Cloudy and Cloudy Days of Manavgat Meteorology Station

Months	Avg. Number of Clear Days	Avg. Number of Partly Cloudy Days	Avg. Number of Cloudy Days
January	8.7	18.9	3.8
February	7.9	18.1	2.9
March	9.5	19.9	2.3
April	9.3	20.0	2.1
May	14.0	16.8	1.5
June	20.4	9.5	1.0
July	25.0	5.8	2.0
August	25.7	5.7	1.0
September	23.0	7.3	1.0
October	16.1	14.4	2.2
November	11.6	17.2	2.1
December	8.5	19.7	3.9
Annual	**179.7**	**173.3**	**25.8**

Foggy, Snowy, Hail, Frosty and Stormy Days Distribution

According to Manavgat Meteorology Station records, the number of annual average snowy days is 0.13 and annual average number of days with snow covered is 0.02. Monthly distribution of average foggy, snowy, snow covered, hail, and stormy days are given in Figure X.43 and Table X.45.

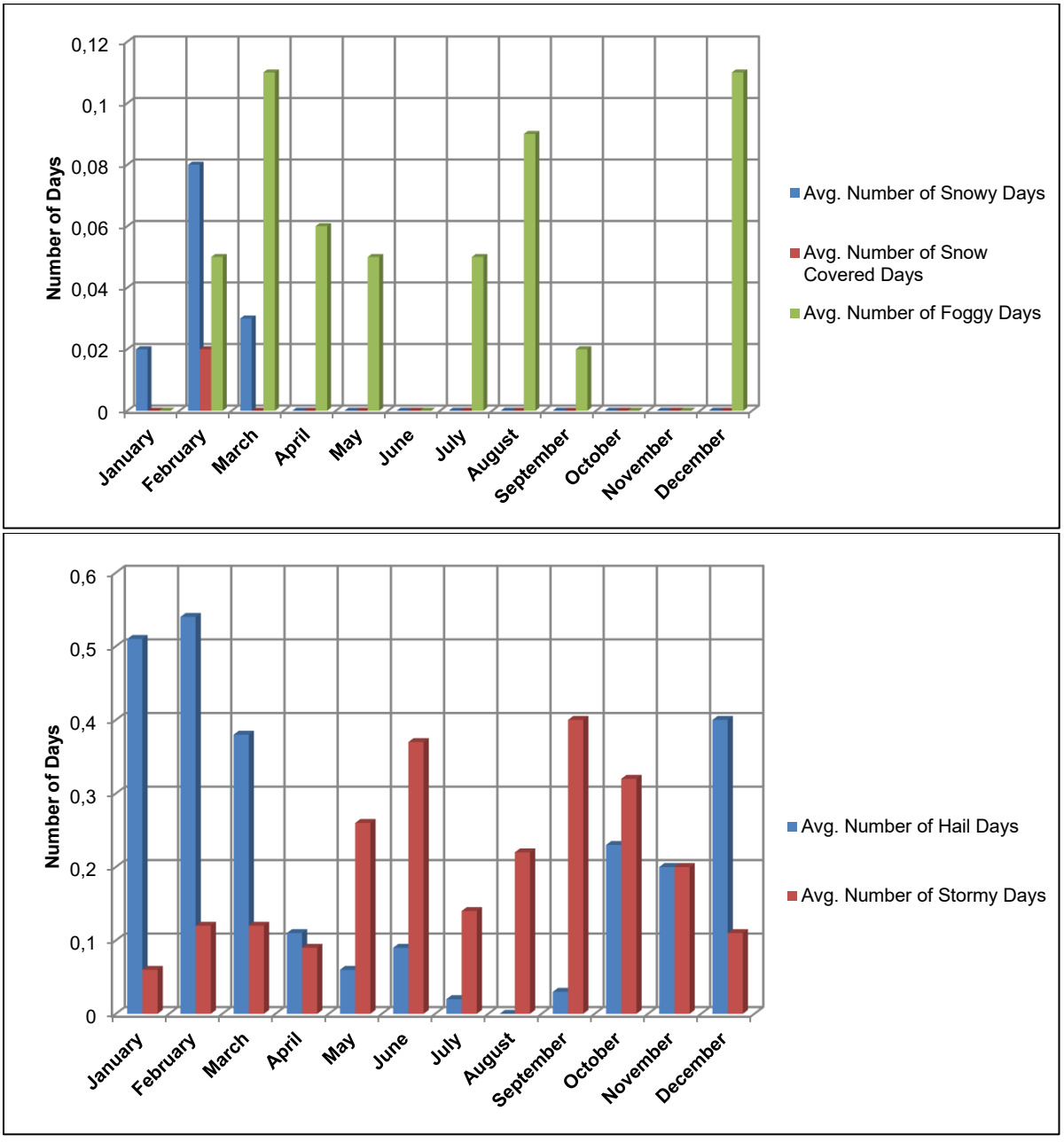


Figure X.43 Snowy, Hail, Frosty and Stormy Days Distribution of Manavgat Meteorology Station

Table X.45 Monthly Average Foggy, Snowy, Snow Covered, Hail, and Stormy Days Distribution of Manavgat Meteorology Station

Months	Avg. Number of Snowy Days	Avg. Number of Snow Covered Days	Avg. Number of Foggy Days	Avg. Number of Hail Days	Avg. Number of Stormy Days
January	0.02			0.51	0.06
February	0.08	0.02	0.05	0.54	0.12
March	0.03		0.11	0.38	0.12
April			0.06	0.11	0.09
May			0.05	0.06	0.26
June				0.09	0.37
July			0.05	0.02	0.14
August			0.09		0.22
September			0.02	0.03	0.4
October				0.23	0.32
November				0.2	0.2
December			0.11	0.4	0.11
Annual	0.13	0.02	0.54	2.57	2.41

Maximum Snow Depth

According to Manavgat Meteorology Station records, monthly distribution of maximum snow cover depths recorded are presented in Table X.46. According to the Manavgat Meteorology Station records, the maximum snow cover depth is 4 cm in February.

Table X.46 Monthly Distribution of Maximum Snow Cover Depths of Manavgat Meteorology Station

Months	February	Annual
Maximum Snow Depth (cm)	4	**4**

Wind Distribution

The monthly, yearly and seasonally distribution of wind blow numbers and wind speeds recorded in Manavgat Meteorological Station are given in Table X.47, Table X.48. Table X.49, Table X.50 and graphical representations are provided in Figure X.44, Figure X.45 and Figure X.46. According to annual wind blow numbers, 1st dominant wind direction is N (north). 2nd dominant wind direction is NW (north-west). 3rd dominant wind direction is SSE (south-southeast) and 4th dominant wind direction is SE (south- east).

Table X.47 Manavgat Meteorology Station Distribution of Monthly and Yearly Wind Blow Numbers According to Directions (1960-2024)

Months	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
January	9,953	4,820	2,824	1,088	1,292	1,151	3,066	2,114	2,388	566	1,037	307	918	1,356	5,654	5,619
February	8,405	4,327	2,301	873	1,063	1,044	2,689	2,659	2,603	640	1,123	294	871	1,297	5,560	4,810
March	7,131	3,221	2,544	908	1,260	1,175	3,591	3,889	3,384	776	1,540	403	1352	1,528	6,513	4,924
April	5,646	2,321	1,758	717	990	1,281	5,100	4,908	4,293	853	1,352	375	1,171	1,349	5,359	3,897
May	4,907	2,551	1,822	731	1,044	1,251	6,062	6,162	5,025	1,051	1,263	301	1,008	1,146	3,984	3,421
June	4,616	2,505	1,887	707	1,200	1,419	6,479	6,361	4,823	669	855	261	821	917	3,488	2,723
July	4,488	2,990	2,159	827	1,263	1,685	7,277	6,877	4,235	556	812	190	743	811	3,308	2,741
August	5,338	2,800	1,917	801	1,122	1,824	6,263	7,195	3,818	783	1,112	258	603	780	3,510	2,936
September	5,919	3,012	1,627	846	954	1,263	4,902	5,661	3,931	941	1,201	279	701	961	4,688	3,770
October	6,603	4,379	2,191	877	857	1,055	3,068	3,965	3,476	1,004	1,431	374	925	1,362	5,973	5,172
November	7,534	4,419	2,166	882	940	1,086	2,347	2,505	2,831	721	1,221	337	968	1,319	6,411	5,863
December	9,025	5,066	2,485	984	1,152	1,095	2,980	2,066	2,224	455	856	274	835	1,202	5,773	6,169
Annual	**79,565**	**42,411**	**25,681**	**10,241**	**13,137**	**15,329**	**53,824**	**54,362**	**43,031**	**9,015**	**13,803**	**3,653**	**10,916**	**14,028**	**60,221**	**52,045**

Table X.48 Manavgat Meteorology Station Distribution of Monthly and Yearly Average Wind Speeds According to Directions (m/sec) (1960-2024)

Months	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
January	2.2	2.2	1.9	1.8	2	2.2	3	2.7	3	1.5	1.7	1.2	1.5	1.3	1.8	1.9
February	2.2	2.2	2	1.6	1.8	2.1	2.8	2.7	2.7	1.5	1.8	1.2	1.5	1.3	1.7	1.9
March	1.9	1.8	1.8	1.5	1.7	1.9	2.6	2.5	2.6	1.7	2.1	1.4	1.9	1.3	1.6	1.6
April	1.6	1.5	1.5	1.4	1.6	1.8	2.6	2.6	2.6	1.5	2	1.3	1.5	1.2	1.5	1.4
May	1.3	1.3	1.4	1.2	1.4	1.6	2.5	2.6	2.6	1.5	1.8	1.1	1.3	1.1	1.3	1.3
June	1.5	1.6	1.6	1.2	1.4	1.6	2.6	2.7	2.7	1.6	1.9	1.2	1.4	1.1	1.3	1.3
July	1.9	2	1.9	1.2	1.2	1.4	2.4	2.7	2.7	1.4	1.8	1.1	1.6	1	1.3	1.4
August	1.7	1.7	1.6	1.2	1.2	1.4	2.3	2.7	2.6	1.6	1.9	1	1.2	1	1.2	1.3
September	1.7	1.6	1.5	1.3	1.4	1.6	2.3	2.5	2.5	1.6	1.8	1.2	1.5	1.1	1.3	1.4
October	1.8	1.9	1.7	1.4	1.5	1.6	2.1	2.1	2.3	1.5	1.8	1.2	1.3	1.2	1.5	1.6
November	1.9	1.8	1.6	1.4	1.5	1.7	2.2	2.2	2.4	1.2	1.7	1	1.3	1.2	1.7	1.8
December	2.1	1.9	1.8	1.6	1.8	2.1	2.9	2.5	2.6	1.2	1.6	1	1.2	1.2	1.7	1.8
Annual	**1.8**	**1.8**	**1.7**	**1.4**	**1.5**	**1.8**	**2.5**	**2.5**	**2.6**	**1.5**	**1.8**	**1.2**	**1.4**	**1.2**	**1.5**	**1.6**

Table X.49 Manavgat Meteorology Station Seasonal Distribution of Wind Blow Numbers According to Directions (1960-2024)

Season	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
Winter	27,383	14,213	7,610	2,945	3,507	3,290	8,735	6,839	7,215	1,661	3,016	875	2,624	3,855	16,987	16,598
Spring	17,684	8,093	6,124	2,356	3,294	3,707	14,753	14,959	12,702	2,680	4,155	1,079	3,531	4,023	15,856	12,242
Summer	14,442	8,295	5,963	2,335	3,585	4,928	20,019	20,433	12,876	2,008	2,779	709	2,167	2,508	10,306	8,400
Autumn	20,056	11,810	5,984	2,605	2,751	3,404	10,317	12,131	10,238	2,666	3,853	990	2,594	3,642	17,072	14,805

Table X.50 Manavgat Meteorology Station Seasonal Distribution of Average Wind Speeds According to Directions (m/sec) (1960-2024)

Season	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
Winter	2.2	2.1	1.9	1.7	1.9	2.1	2.9	2.6	2.8	1.4	1.7	1.1	1.4	1.3	1.7	1.9
Spring	1.6	1.5	1.6	1.4	1.6	1.8	2.6	2.6	2.6	1.6	2.0	1.3	1.6	1.2	1.5	1.4
Summer	1.7	1.8	1.7	1.2	1.3	1.5	2.4	2.7	2.7	1.5	1.9	1.1	1.4	1.0	1.3	1.3
Autumn	1.8	1.8	1.6	1.4	1.5	1.6	2.2	2.3	2.4	1.4	1.8	1.1	1.4	1.2	1.5	1.6

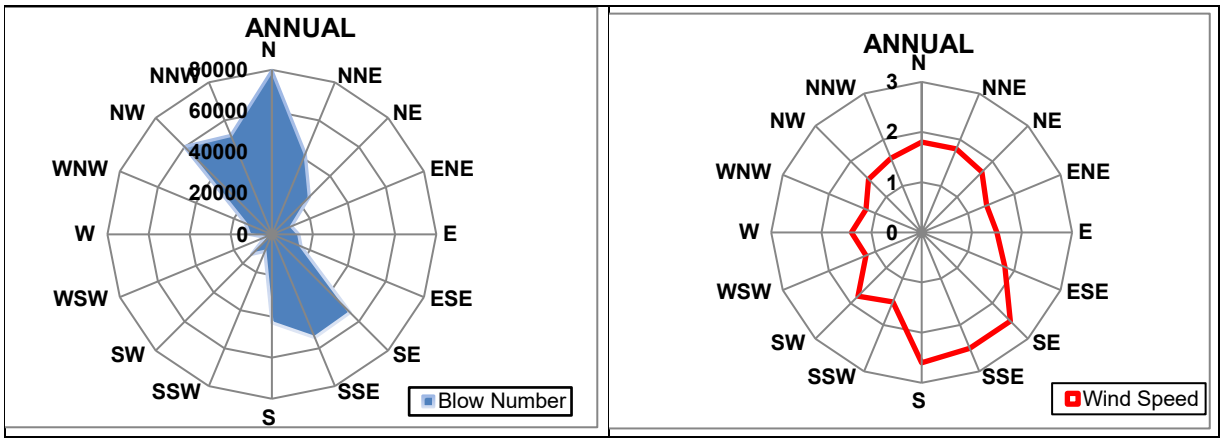


Figure X.44 Manavgat Meteorology Station Annual Wind Diagram of Wind Blow Numbers and Average Wind Speeds

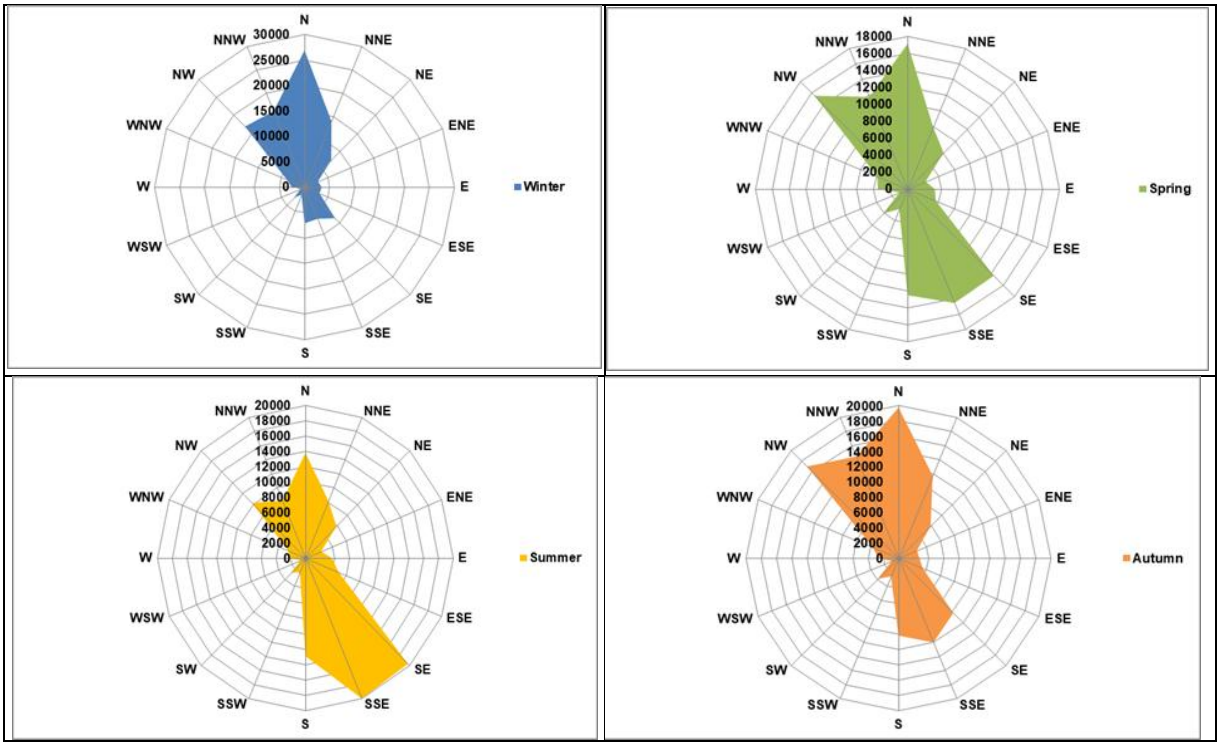


Figure X.45 Manavgat Meteorology Station Seasonal Wind Diagram of Wind Blow Numbers

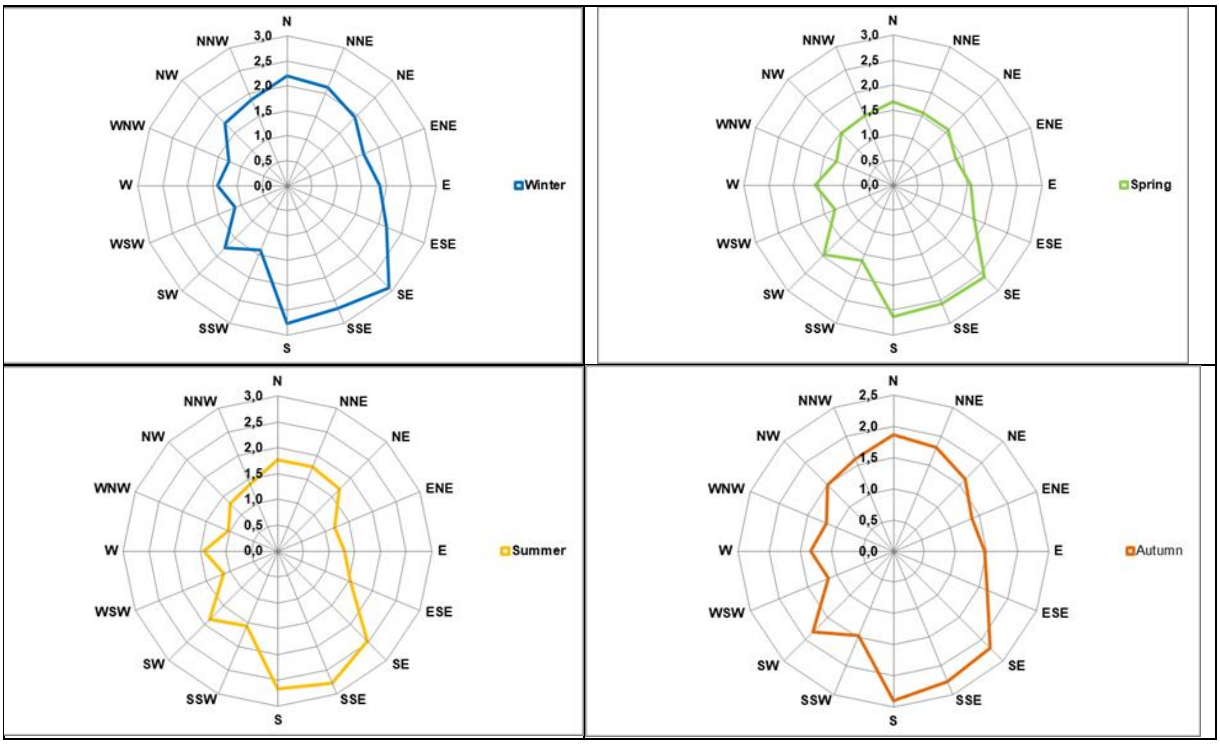


Figure X.46 Manavgat Meteorology Station Seasonal Wind Diagram of Average Wind Speeds (m/sec)

Average Wind Speed Distribution

According to Manavgat Meteorology Station records, annual average wind speed is 2.1 m/sec. Monthly average wind speeds are given in Table X.51 and graphically in Figure X.47.

Table X.51 Manavgat Meteorology Station Monthly Average Wind Speeds

Months	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Average
Avg. Speed (m/sec)	2.4	2.4	2.1	2.0	1.9	2.1	2.2	2.0	1.9	1.8	1.9	2.2	2.1

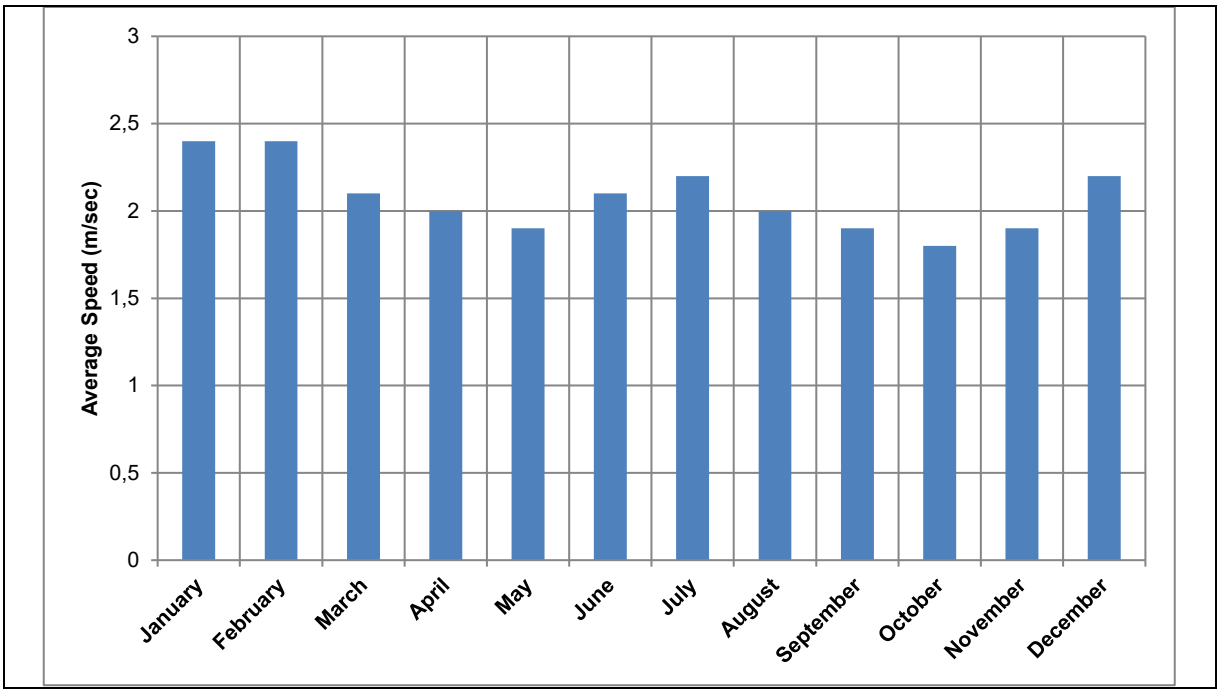


Figure X.47 Manavgat Meteorology Station Monthly Average Wind Speeds

Wind Speed According to Directions and Speed & Direction of the Maximum Wind and Average Number of Stormy Days and Strong Windy Days

According to Manavgat Meteorology Station records, the direction of the highest wind speed is south-southeast (SSE) with 33.2 m/sec. According to Manavgat Meteorology station records, number of annual average stormy days is 54.1 and number of annual average strong windy days is 13.6 Maximum wind speeds and directions and average stormy and strong windy day numbers are provided in Table X.52 with graphical representations in Figure X.48. and Figure X.49.

Table X.52 Manavgat Meteorology Station Maximum Wind Speeds and Directions. Average Numbers of Stormy and Windy Days (1960-2024)

Months	Direction of Max. Wind	Max. Wind Speed (m/sec)	Avg. Number of Stormy Days*	Avg. Number of Strong Windy Days**
January	S	29.0	5.93	2.52
February	SSE	33.2	5.02	2.55
March	S	26.7	5.36	1.45
April	SSE	23.2	4.12	0.57
May	N	23.5	3.00	0.29
June	NNE	20.6	4.57	0.29
July	N	26.7	5.12	0.43
August	NNE	20.6	3.57	0.21
September	NNW	26.4	3.29	0.45
October	S	24.9	4.31	0.74
November	S	29.2	4.02	1.64
December	SE	30.6	5.12	2.17

** Wind Speed >= 17.2 – 20.7 m/sec.*
*** Wind Speed: 10.8 – 13.8 m/sec*

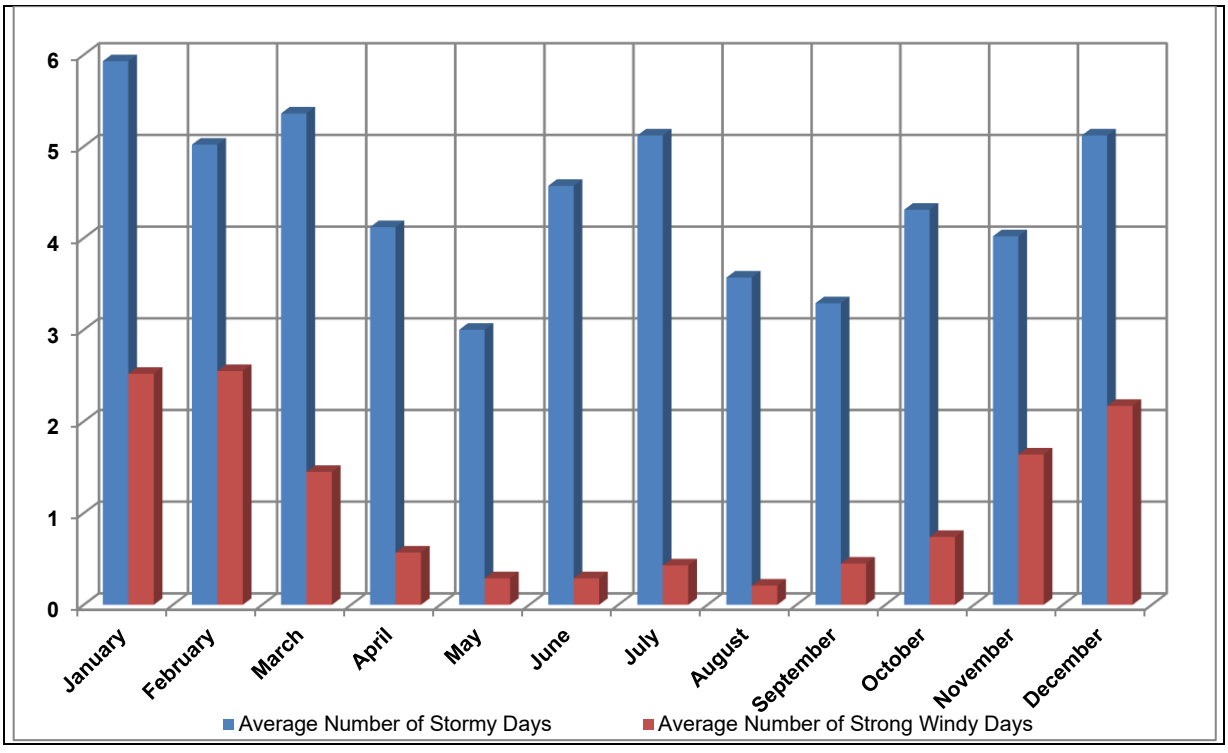


Figure X.48 Manavgat Meteorology Station Average Number of Stormy Days and Strong Windy Days

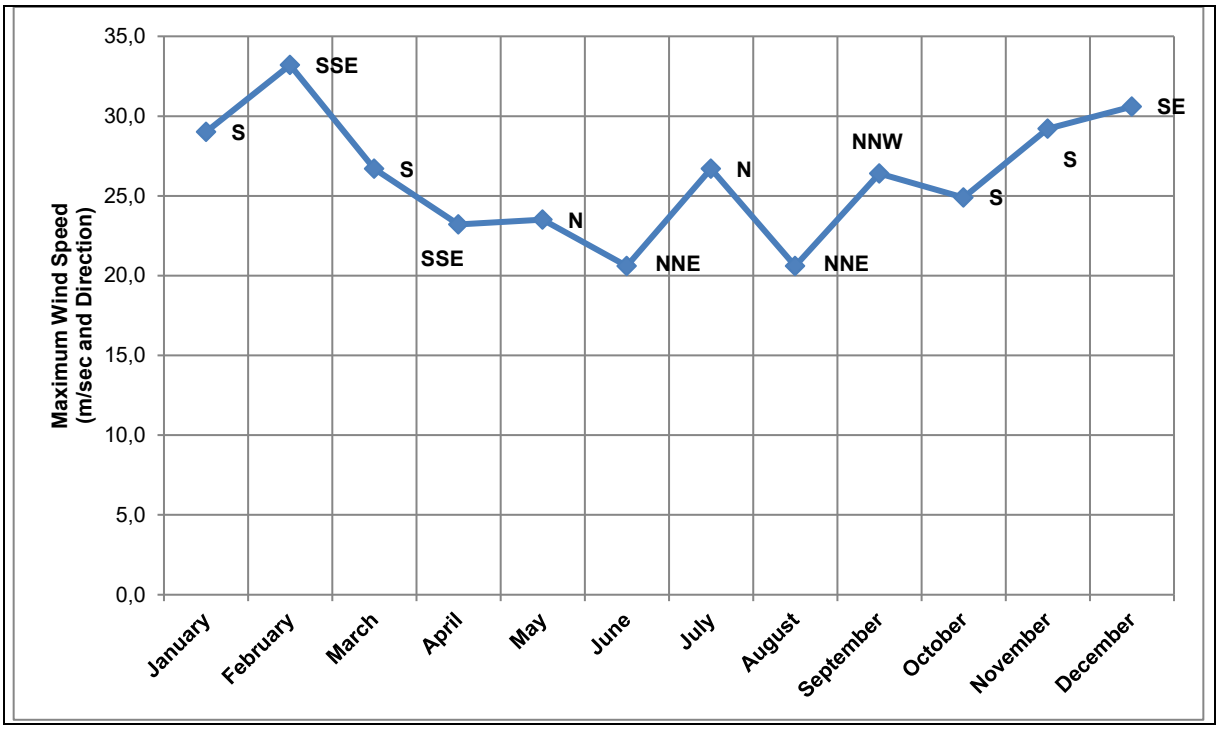


Figure X.49 Manavgat Meteorology Station Maximum Wind Direction and Speed

X.2.2.2. Physical Risks of Hazards

The Project faces physical risks from natural and human-induced hazards due to the region's unique geography and bustling activity. Antalya is prone to earthquakes, flash floods, and occasional wildfires and it impacts directly the Project, which could damage infrastructure, disrupt construction, or endanger workers and future users. Identifying and addressing these hazards is crucial for ensuring the motorway's safety, durability, and minimal environmental impact, guiding effective mitigation and preparedness strategies.

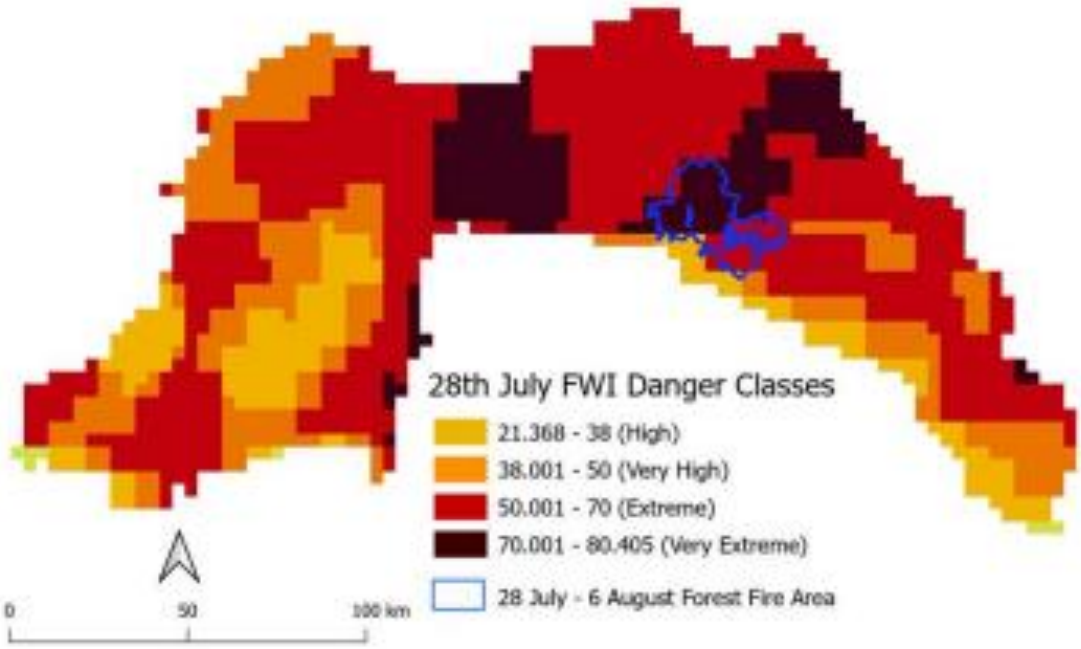
Wildfire Risk

According to the European Forest Fire Information System (EFFIS), fire danger is classified into six categories based on the Fire Weather Index (FWI), which reflects weather conditions that influence wildfire likelihood and severity. Higher FWI values indicate drier, hotter, and windier conditions, all of which increase the likelihood and intensity of wildfires. In 2021, a new category; "Very Extreme" for FWI values above 70 was introduced to better capture the severity of fire conditions observed in Mediterranean countries such as Türkiye, Greece, and Italy during intense summer wildfire events. The Fire Danger Classes and their FWI values are listed on the Table X.53.

Table X.53 FWI Value Index

Fire Danger Classes	FWI
Low	5.2 – 11.2
Moderate	11.2 - 21.3
High	21.3 - 38
Very High	38 - 50
Extreme	50 - 70
Very Extreme	>= 70

Based on the research by H. Atalay (2024)[9], Antalya is identified as a high-risk area for wildfires based on the wildfire that happened on the 28th of July 2021, with certain locations experiencing more frequent fire events. The study's findings, presented under the Creative Commons Attribution 4.0 License, were found using the EFFIS FWI map (Figure X.50) and compared with the data form 16 Meteorological stations (Figure X.51).



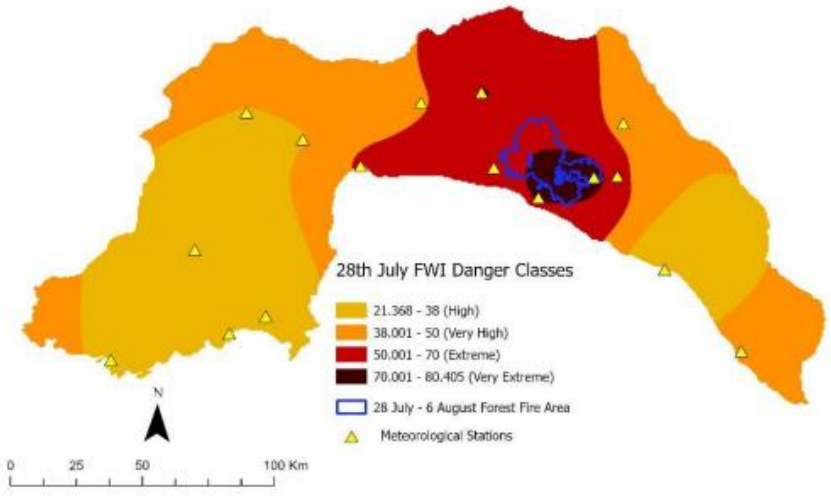
Reproduced from Atalay, H., Dervisoglu, A., & Sunar, F. (2024). **Fire Weather Index and Forest Fire Danger Mapping: Insights from a Case Study in Antalya - Manavgat Forest, Türkiye**. ISPRS Archives, XLVIII-4/W9, 53–60. https://doi.org/10.5194/isprs-archives-XLVIII-4-W9-2024-53-2024 Licensed under Creative Commons Attribution 4.0 International

Figure X.50 EFFIS FWI map (for 28 July 2021)[9]

As seen from the Figure below (Figure X.51), Antalya is a city with a high fire risk due to its climatic conditions, vegetation types, and topography. The combination of hot, dry summers and dense

[9] https://isprs-archives.copernicus.org/articles/XLVIII-M-1-2023/573/2023/isprs-archives-XLVIII-M-1-2023-573-2023.pdf

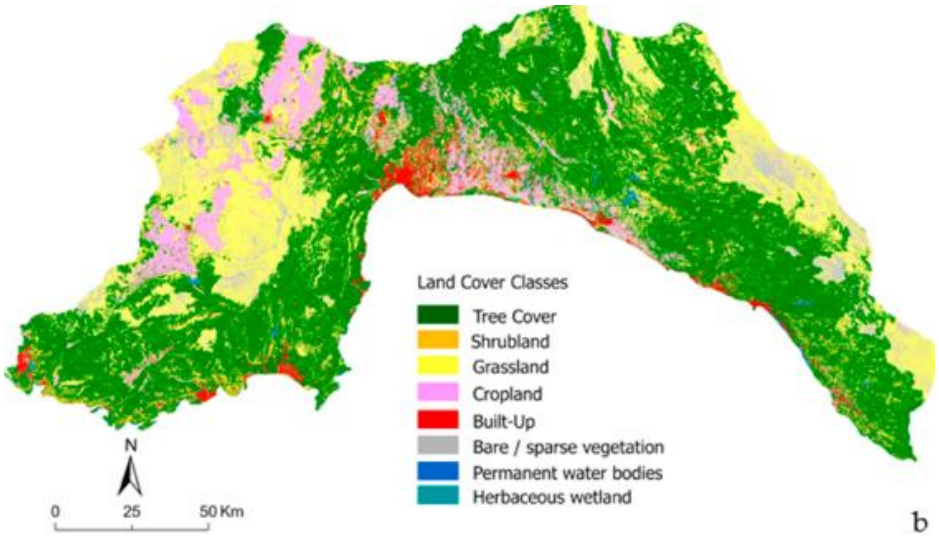
forested areas creates an environment highly susceptible to wildfires. This elevated risk underscores the importance of effective fire monitoring and prevention strategies to protect the region's natural resources and communities.



Reproduced from Atalay, H., Dervisoglu, A., & Sunar, F. (2024). **Fire Weather Index and Forest Fire Danger Mapping: Insights from a Case Study in Antalya - Manavgat Forest, Türkiye**. ISPRS Archives, XLVIII-4/W9, 53–60. https://doi.org/10.5194/isprs-archives-XLVIII-4-W9-2024-53-2024 Licensed under Creative Commons Attribution 4.0 International

Figure X.51 FWI Fire Danger Map (28 July 2021)

Additionally, Antalya is an area characterized by extensive tree cover, which significantly increases the potential for wildfires to spread rapidly. Given the region's high temperatures and dry conditions, the dense forests create a perfect environment for fires to propagate quickly, exacerbating the risks to both natural ecosystems and nearby communities.

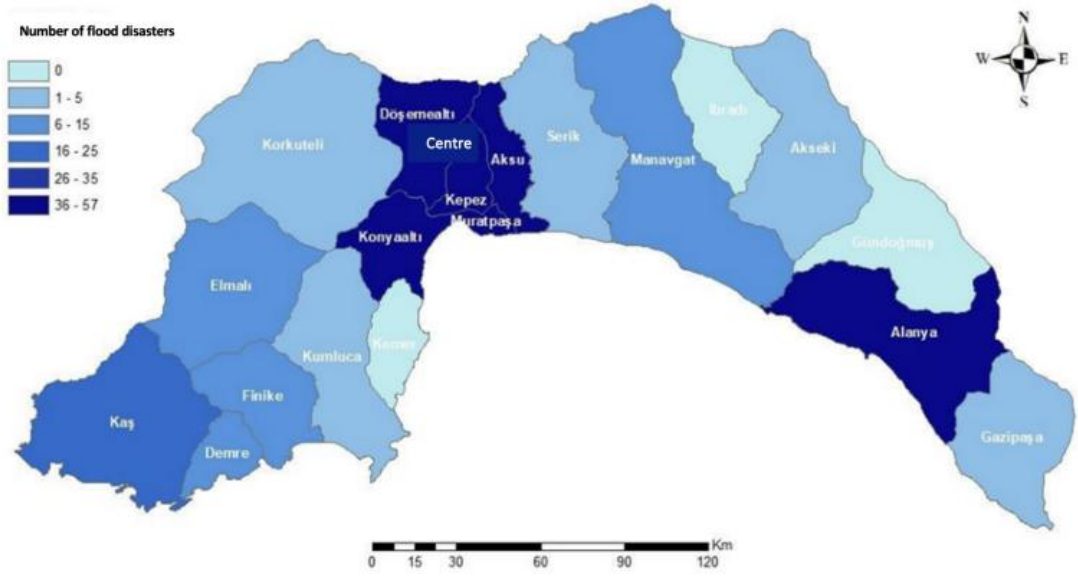


Reproduced from Hatice Atalay,Adalet Dervisoglu and Filiz Sunar (2024). *Exploring Forest Fire Dynamics: Fire Danger Mapping in Antalya Region, Türkiye*. *ISPRS International Journal of Geo-Information*, 13(3), 74. https://doi.org/10.3390/ijgi13030074 Licensed under Creative Commons Attribution 4.0 International

Figure X.52 ESA WorldCover LULC map of Antalya

Extreme Rainfall, Overflow and Floods Risks

According to the Municipality of Antalya, Antalya faces significant flood risks due to its Mediterranean climate, geographical structure, and urbanization, worsened by climate change. Increased sea and ocean temperatures drive higher evaporation, leading to moisture-laden air masses that cause sudden, heavy rainfall. This results in flooding and inundation, particularly in urban areas with inadequate infrastructure and impermeable surfaces that prevent water infiltration, causing rapid runoff to low-lying areas (Figure X.53).



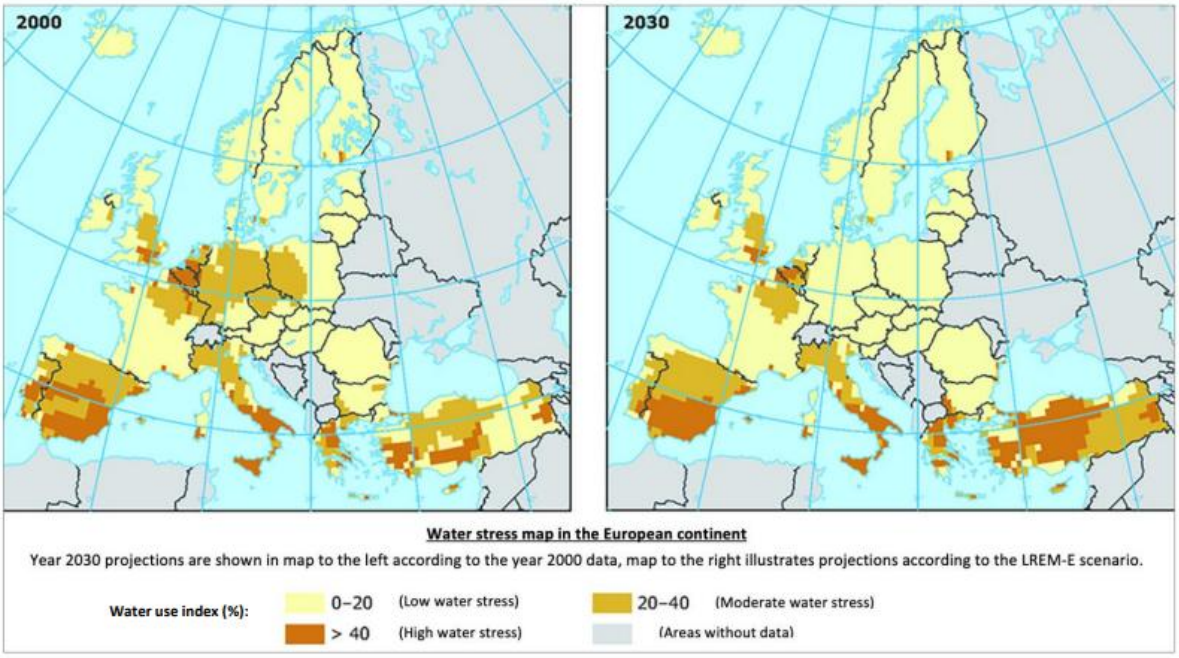
Source: AFAD, İRAP, 2021 (MGM data).

Figure X.53 Distribution of flood disasters in Antalya between 1975 and 2020

In the years 1993, 1995, 1999, 2001, 2002, 2003, 2009, 2010, and 2013 in Antalya major floods happened, with a notable flood in Elmalı (2018) causing loss of life and property damages. The 2021 AFAD IRAP report notes that between 1975 and 2020, central districts like Döşemealtı, Kepez, Muratpaşa, Aksu, and Konyaaltı, followed by Kumluca, Finike, Manavgat, Kemer, Demre, and Alanya, recorded the highest number of flood disasters. With 80% of Antalya's 1085 mm annual rainfall (1100 mm in Manavgat and Alanya) occurring in winter meaning that the flash flood risks are high. Vulnerable sectors include agriculture, tourism, infrastructure, and health, with at-risk groups such as women, children, seniors, low-income communities, and those in substandard housing risks.

Water Scarcity and Drought Risk

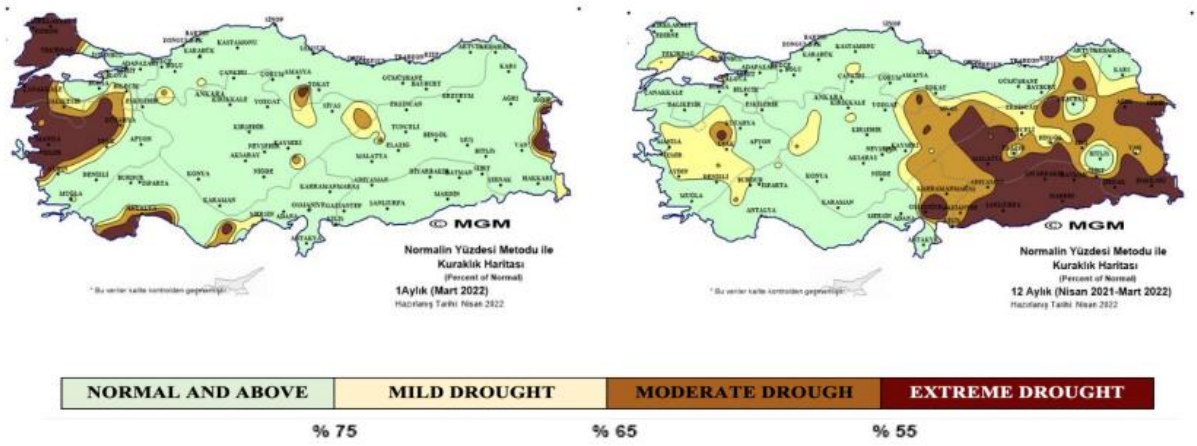
According to the European Environment Agency (EEA) and related scientific sources, water scarcity is assessed using the Water Exploitation Index (WEI), which measures the ratio of average long-term freshwater demand to available water resources. Higher WEI values indicate greater pressure on water resources, highlighting regions with high water demand or limited supply (Figure X.54).



Source: SECAP (Sustainable Energy and Climate Action Plan) 2022 – Antalya Metropolitan Municipality

Figure X.54 European river basins in 2000 and a forecast scenario for 2030

In Antalya, long-term declines in precipitation (notably from 1960 to 2015) and rising demand from population growth and agriculture have increased the risk of water scarcity. Droughts in 1973–1974 and 1989–1991 were particularly severe. Although long-term studies, as shown in the Figure X.55, suggest no consistent drought trend, they do indicate variability over time, while short-term analyses reveal moderate drought conditions that fluctuate from year to year.



Source: SECAP (Sustainable Energy and Climate Action Plan) 2022 – Antalya Metropolitan Municipality[10]

Figure X.55 Türkiye drought map for March 2022 on left and April 2021-March 2022 on the right

Despite forested areas and river systems, Antalya is highly vulnerable due to intensive greenhouse agriculture, groundwater overuse, and climate-driven rainfall decline. Drought management plans were introduced in 2018, but ongoing high water use and insufficient recharge continue to threaten ecosystems and water security.

Heatwaves Risks

According to data and studies[11], heatwaves are periods of unusually high surface temperatures lasting days or week. In Antalya, average temperatures have been rising since the 1980s, particularly in summer when they often exceed 40°C. Heat stress occurs when the body is unable to regulate its temperature effectively due to high ambient heat (Table X.54). It can lead to symptoms such as fatigue, dizziness, muscle cramps, and in severe cases, heat stroke. Prevention includes adequate hydration, rest, and appropriate clothing.

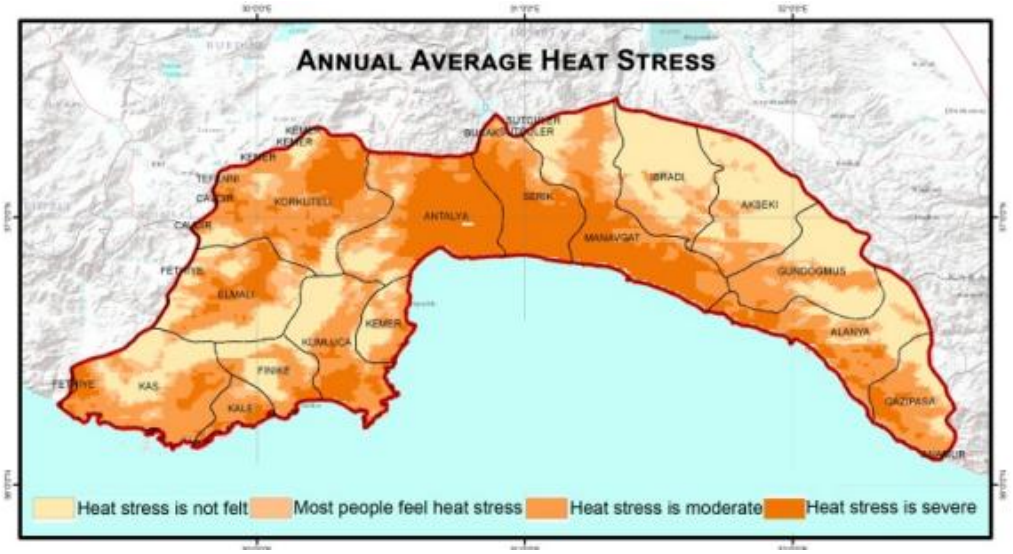
Table X.54 Heat Stress Index

Discomfort Index (DI)	Heat Stress	Description
<22	Heat stress is not felt	A mild heat can be sensed by most people
22 - 24	Most people feel heat stress	Heat stress is moderate
24 - 28	Heat stress is moderate	People feel very hot within this range and difficulties may be found when physical work is performed
>28	Heat stress is severe	People who perform physical work are at high risk of heat-associated illness, such as heat exhaustion and heat stroke

[10] https://www.antalya.bel.tr/Content/UserFiles/Files/YarinlardaBizVariz/Dokumanlar/2022/2022-Y%C4%B1l%C4%B1-SECAP.pdf

[11] https://isprs-archives.copernicus.org/articles/XLVIII-M-1-2023/573/2023/isprs-archives-XLVIII-M-1-2023-573-2023.pdf

Antalya experiences hot summers with temperatures often exceeding 35°C. These conditions increase the risk of heat stress, especially for outdoor workers and vulnerable populations. High humidity levels can worsen the body's ability to cool itself, leading to symptoms such as fatigue, dizziness, and heat-related illnesses. Effective measures such as hydration, shade, and work-rest cycles are essential to mitigate heat stress in this region (Figure X.56).

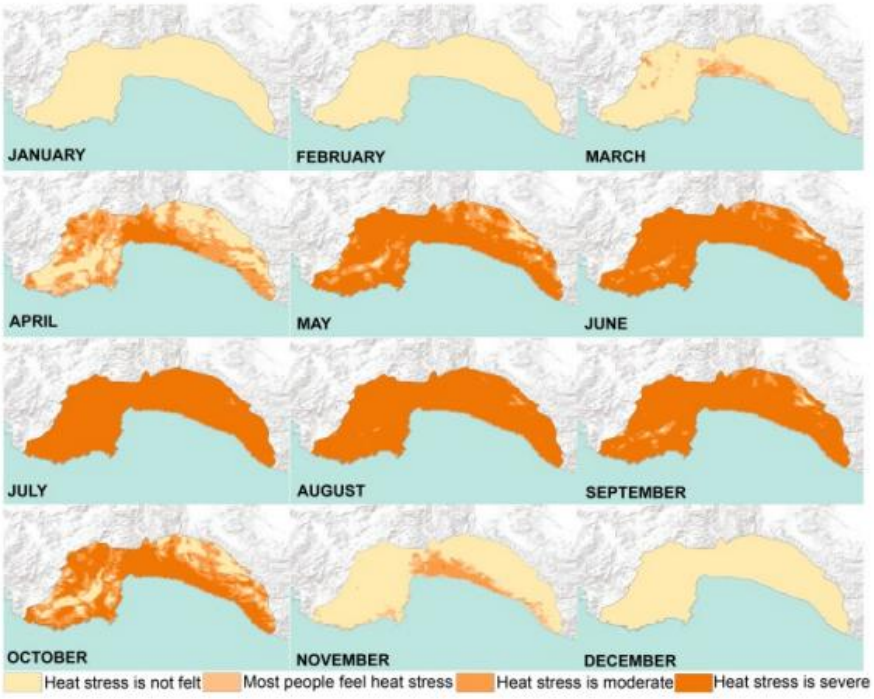


Adapted from Şahingöz, M. and Berberoğlu, S.: DETECTION OF DISCOMFORT INDEX WITH REMOTE SENSING TECHNOLOGY: THE CASE OF ANTALYA PROVINCE, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLVIII-M-1-2023, 573–578, https://doi.org/10.5194/isprs-archives-XLVIII-M-1-2023-573-2023 , 2023.

Figure X.56 Annual average heat stress in Antalya

Heat waves also disrupt agriculture in the region. Higher temperatures and more frequent hot days damage crops, increase pests, and reduce yields. While warmer weather extends growing seasons in inland areas like Elmalı and Korkuteli, allowing for more crops or variety, it also intensifies evaporation and drought, straining water resources. Heavy irrigation further threatens lakes in the region with depletion.

Antalya's tourism sector, which is vital to the coastal economy, faces challenges from rising summer temperatures, which increase energy demands, cause water shortages, and raise risks of infectious diseases and poor air quality. As shown on the Figure X.57, the Heat Stress is severe for 7 months straight which can be attractive to tourists because of the warmer weather.



Adapted from Şahingöz, M. and Berberoğlu, S.: DETECTION OF DISCOMFORT INDEX WITH REMOTE SENSING TECHNOLOGY: THE CASE OF ANTALYA PROVINCE, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLVIII-M-1-2023, 573–578, https://doi.org/10.5194/isprs-archives-XLVIII-M-1-2023-573-2023 , 2023.

Figure X.57 Monthly distribution of discomfort index

The urban heat island effect worsens these issues in Antalya. Rapid urbanization has reduced green spaces and agricultural areas, replacing them with heat-trapping concrete, making the city feel hotter. Temperature data from 1980 to 2019 shows a clear warming trend, with most months in the last decade being warmer than earlier periods. Projections indicate Antalya will face even higher temperatures and drought in the future, amplifying these challenges.

Storms, Strong Winds and Tornados Risks

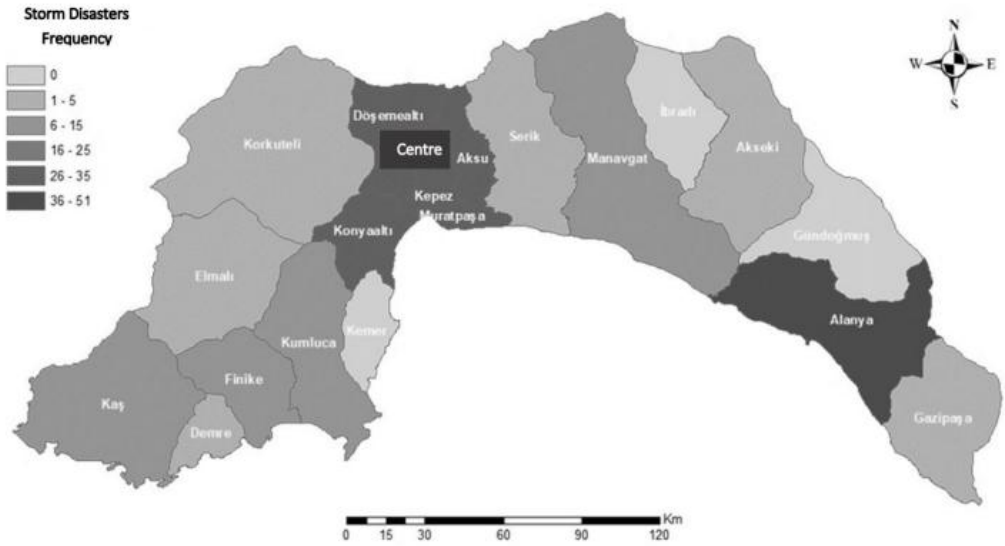
Storms, characterized by severe atmospheric phenomena such as cloud cover, precipitation, strong winds, lightning, or thunder, are expected to increase in frequency and intensity due to climate change.Antalya, due to its geographical structure, topography, land-sea interaction, and climatic characteristics, experiences frequent tornado and storm events. The 2021 IRAP report by AFAD notes that these events are difficult to predict precisely, as they occur rapidly under specific atmospheric conditions and can only be detected through remote sensing and short-term forecasts. This unpredictability underscores the need for adaptive infrastructure in the city

Acording to the Antalya Municipality[10], Greenhouse and agricultural activities, which are common in Antalya, are highly vulnerable to tornadoes and storms, resulting in significant damage to crops, equipment, and sometimes the loss of life. Between 2000 and 2020, AFAD data indicates that Alanya, central districts, Finike, and Kaş experienced the highest number of tornado events (Table X.55) with a recorded wind speed of 155 km/h in Antalya's city center during that period, far exceeding the 60 km/h threshold for a meteorological storm.

Table X.55 Number of Tornado Disasters in Antalya between 1975 and 2020

District	Number of Tornado Disasters
Alanya	51
Merkez	36
Finike	27
Kumluca	27
Kaş	17
Demre	6
Manavgat	6
Gazipaşa	3
Korkuteli	1
Akseki	0
Elmalı	0
Gündoğmuş	0
İbradı	0
Kemer	0
Serik	0

In March 2022, severe tornadoes, storms, and downpours struck Aksu, Serik, Gazipaşa, and Alanya districts at night, causing extensive damage to greenhouses and crops. In Serik, 256 decares of greenhouse area belonging to 65 farmers suffered 80% damage. In Alanya, 230 decares of agricultural land owned by 55 farmers were affected. Gazipaşa saw 10 decares of greenhouses damaged for 3 farmers, while in Aksu, 134 decares of greenhouse area and 18 decares of olive orchards were impacted. Overall, 630 decares of greenhouse areas were damaged, affecting hundreds of farmers.



Source: SECAP (Sustainable Energy and Climate Action Plan) 2022 – Antalya Metropolitan Municaplity

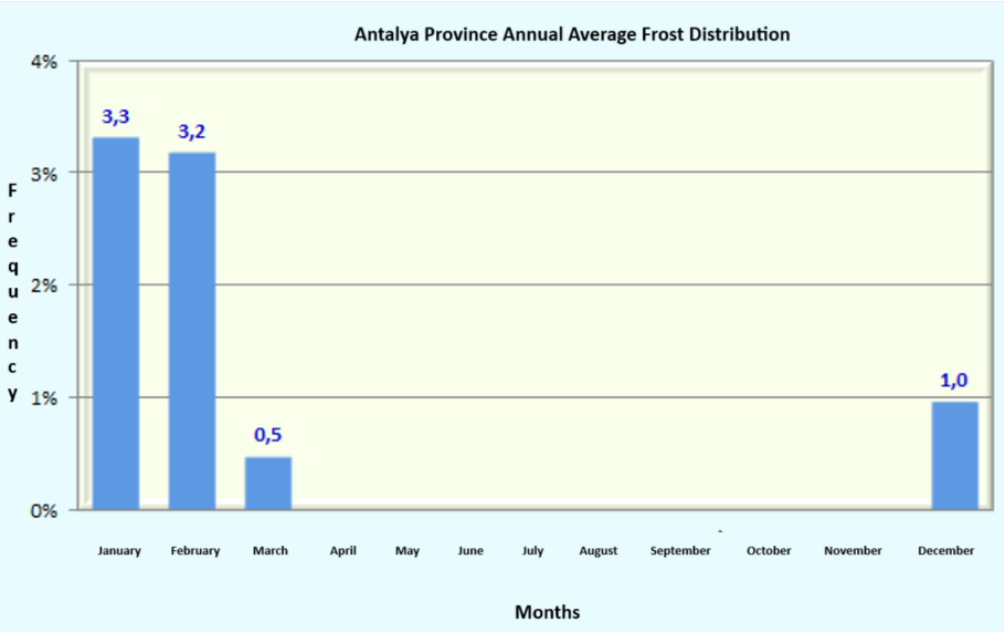
Figure X.58 Distribution of storm disasters in Antalya between 1975 and 2020

The high prevalence of greenhouse and agricultural activities in Antalya amplifies the damage from these weather events. With climate change driving more frequent and severe atmospheric changes, the risk of tornadoes and storms in Antalya is high in the present and also in the future. Research findings confirm this elevated risk, particularly noting frequent tornadoes in Finike, Demre, and Kemer districts.

Cold Waves and Snowfall

A cold wave, also known as a cold snap or deep freeze, is a weather event marked by a sharp and rapid temperature drop across a large area, resulting in temperatures significantly below the region's seasonal norms. Cold waves can cause widespread issues, including risks to human health, damage to crops and property, and disruptions to essential services. Often linked with severe winter weather like blizzards or ice storms, these events may bring snowfall, creating hazardous travel conditions, accumulating on infrastructure, and straining public services. Strong winds can worsen the impact by increasing wind chill, making temperatures feel even colder.

According to the General Directorate of Meteorology, frost hazards in Antalya occur predominantly during the winter months, typically between December and February (Figure X.59).



[12]Source: General Directorate of Meteorology of Türkiye

Figure X.59 Antalya Province Annual Avarage Frost Distribution

According to the Municipality of Antalya, cold waves have negatively affected greenhouse activities, with frost risks being notably higher in Aksu and Serik. Additionally, in Elmalı, Korkuteli, Akseki, and İbradı, frost events that previously occurred in late April have shifted to May since 2022.

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X.2.3. Potential Impacts

X.2.3.1. Land Preparation and Construction Phase

Potential impacts of the project on climate change would occur through greenhouse gas emissions generated during the construction phase. Greenhouse gas emissions from the project are estimated in terms of CO_2 equivalent (CO_2 e), representing all greenhouse gas emissions in CO_2 form.

During the construction phase of the Antalya- Alanya Motorway Project, from Serik to Alanya, GHGs will be generated due to consumption associated with operation of construction machinery, equipment, and vehicles, operations in quarries and material transportation, personal shuttles, heating and energy needs of the personnel for the creation of the motorway (84 km of the main Route) and access roads (33.8 km of the Route). The major greenhouse gas emission will be CO_2 emissions resulting from the combustion of petroleum-based products such as diesel engines of construction vehicles and electric generators. Relatively small amounts of methane and nitrous oxide will also be emitted during fuel combustion.

Scope 1 Greenhouse Gas Emissions from Direct Fuel Combustion for the construction phase

The number of equipment to be used during the construction phase of the Project, which is expected to last approximately 36 months (3 years), is provided in Chapter III.6. These equipment are estimated to consume approximately 83,295,537 liters of diesel-based fuel and 13,176.34 tons of LNG. The

[12]https://mgm.gov.tr/FILES/ziraat/TrDonHaritasi/antalya.png

estimated GHG emissions in total and per year (in tCO_2 e and tCO_2 e/year) which will be determined by the expected fuel usage during this stage are presented on Table X.56.

Table X.56 GHG Emission from Fuels for Construction Phase (Scope 1)

Fuel (Unit)	Consumption (Total) [liter]	Consumption (Total) [ton]	Conversion Factor [kg CO_2e]*	Emissions (Total) [tCO_2 e]	Emissions (Annual Average) [tCO_2 e/year]
Diesel	83,295,537	-	2.66	221,566.13	73,855.38
LNG	-	13,176.34	2,590.46	34,132.84	11,377.59

*https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024

The total GHG emission of fuel sources during the construction will be 255,697 tCO_2 e. The estimated greenhouse gas emissions is 85,232.91. tCO_2 e per year

Scope 2 Greenhouse Gas Emissions from Electricity Consumption for the construction phase

During the 36-month construction period, electricity will be sourced from the public grid to support both infrastructure operations and workforce accommodations. Infrastructure use including site offices, lighting, and equipment is estimated to consume 49,622,017 kWh. In parallel, electricity use by approximately 3,300 workers across three labor camps, for daily living such as lighting, air conditioning, and appliances, is projected at 35,175,535 kWh. In the calculation of greenhouse gas emissions resulting from electricity generation and consumption, conversion factor published in Türkiye Electricity Production And Electricity Consumption Point Emission Factors Information Form data from the year 2022 were used as the basis. The electricity generation emission factor for Türkiye in 2022 was determined to be 0.438 $kgCO_2e/kWh$. (see Table X.57).

Table X.57 Emissions from Electricity Use During Construction Phase (Scope 2)

Energy (Unit)	Consumption (Total) [kWh]	Consumption [kWh/year]	Emission Factor [kg CO_2 e/kWh]*	Emissions (Annual Average) [tCO_2 e/year]
Electricity (Infrastructure)	49,622,017	16,540,672.33	0.438	7,244.81
Electricity (People)	35,175,535	11,725,178.44	0.438	5,135.63

*https://enerji.gov.tr/evced-cevre-ve-iklim-elektrik-uretim-tuketim-emisyon-faktorleri

The total GHG emission from electricity sources during the 3 years of the construction phase will be 37,141.32 tCO_2 e. The estimated greenhouse gas emissions is 12,380.44 tCO_2 e per year

Equator Principle IV (2020) requires clients to publicly disclose annual greenhouse gas emissions if the combined Scope 1 and Scope 2 emissions during the construction phase exceed 100,000 tons of CO_2 equivalent. The Project is estimated to generate a total of 97,613.35 tons of CO_2 equivalent per year from Scope 1 and Scope 2 emissions, which is below the Equator Principles' threshold of 100,000 tCO_2 e per year, which would otherwise trigger a detailed climate change risk assessment and mitigation plan. This indicates the Project's compliance with relevant Equator Principles requirements.

To continue, the Project has identified and committed to implementing feasible emission reduction measures, in alignment with IFC Performance Standard 3 (PS3) and the Equator Principles.

Overall, the Project adheres to both regulatory and voluntary standards for greenhouse gas management for the construction phase, demonstrating a strong commitment to responsible environmental stewardship in accordance with national and international climate frameworks.

X.2.3.2. Operation Phase

During the operation phase of the Antalya-Alanya Project (Serik to Alanya motorway), greenhouse gas (GHG) emissions will primarily result from the ongoing activities associated with the, maintenance of the motorway, and its access roads and the electricity to use for the motorways infrastructure. Below is an overview of the potential GHG emissions during this phase, focusing on carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which are generated due to vehicle traffic, maintenance activities, and related infrastructure operations.

Scope 1 Greenhouse Gas Emissions from Direct Fuel Combustion for the operation phase

During the 12-year operation phase, GHG emissions will arise from the combustion of LNG for cooking and heating systems, daily travel by 50 company vehicles (25 electric and 25 petrol, each covering 100 km/day) shown on Table X.58, and operation of 3 heavy-duty diesel based vehicles daily, running 10 hours for maintenance activities shown on Table X.59.

Table X.58 GHG Emission from Maintenance vehicles Fuels for the Operation Phase (Scope 1)

Vehicle Type	Number of vehicles	Working hours per day	Days	Liters consumed per hour (l / h)	Conversion Factor [kg CO2e]	Total CO_2 Emissions (t CO_2eq/year)*
Heavy Maintenance Vehicle	3	10	365	30	2.66	873.81

Table X.59 GHG Emission from Car Fuels for the Operation Phase (Scope 1)

Car Type	Number of vehicles	Distance travelled per day (km)	Days	Conversion Factor [kg CO2e]	Total CO_2 Emissions (t CO_2eq/year)*
EV	25	100	365	0.07015	64.01
Petrol	25	100	365	0.1645	150.11

For the LNG usage:

- Energy demand to Cook for 250 employees:
    - For 250 employees, The usage of 5 GJ/day for cooking appliances such as stoves and ovens.

- LNG equivalent will be 5 / 50 GJ/ton = 0,1 tons/day (lower heating value (LHV) of methane is 50 GJ/ton).
- 365*0,1 =36.5 tons/year of LNG
- With the conversion rate of 2,590.46 kg CO_2e, we find 94.55 t CO2 e/ year of LNG use for cooking

- Heating
  - 1000m^2 of areas that needs to be heated, As Antalya has generally a warmer climate we will take 0.2GJ/m2 a year to heat
  - 0.2*1000=200 GJ/ year
  - And the LNG equivqalent is 50 GJ/t so 200/50 = 4 tons/year
  - With the conversion rate of 2,590.46 kg CO_2e, we find 10.36 tCO2 e/year

The total GHG emission of fuel sources during the operation phase will be 14,314.08 tCO_2 e during a period of 12 years. The estimated greenhouse gas emissions is 1,192.84 tCO_2 e per year, which is below the Equator Principles' threshold of 100,000 tCO_2 e per year and 25,000 tCO_2 e per year.

Scope 2 Greenhouse Gas Emissions from Electricity Consumption for the operation phase

During the operation phase, the primary power source for the motorway infrastructure will be the public electricity grid. Electricity consumption will be limited to essential operational systems such as roadway lighting, traffic management systems, electric signage, and EV charging stations. As the total value of the consumption of electricity is not known, the worst-case scenario approach has been applied to estimate annual electricity consumption. The electricity consumption values for the operation phase were obtained from the Project Sponsor and were based on the annual total electricity consumption data from 2024 for a completed motorway project of similar nature. This estimate also incorporates the power consumption of electric vehicle charging units and other project-specific technical details. In the calculation of greenhouse gas emissions resulting from electricity generation and consumption, conversion factor published in Türkiye Electricity Production And Electricity Consumption Point Emission Factors Information Form data from the year 2022 were used as the basis. The electricity generation emission factor for Türkiye in 2022 was determined to be 0.438 kg CO_2 e/kWh. (Table X.60).

Table X.60 Emissions from Electricity Use During the Operation Phase (Scope 2)

Energy (Unit)	Consumption [kWh/year]	Emission Factor [kg CO_2 e/kWh]	Emissions (Annual Average) [tCO_2 e/year]
Electricity (Infrastructure)	21,267,933	0.438	9,315.35

The total GHG emission from electricity sources during the 12 years of the operation phase will be 111,784.2 tCO_2 e. The estimated greenhouse gas emissions is 9,315.35 tCO_2 e per year

Equator Principle IV (2020) also requires clients to publicly disclose annual greenhouse gas emissions if the combined Scope 1 and Scope 2 emissions during the construction phase exceed 100,000 tons of CO_2 equivalent and encourages the public disclosure if it exceeds 25,000 tons of CO_2 equivalent. The Project is estimated to generate a total of 10,508.19 tons of CO_2 equivalent per year from Scope

1 and Scope 2 emissions, which is below the Equator Principles' threshold of 100,000 tCO_2 e per year, which would otherwise trigger a detailed climate change risk assessment and mitigation plan or the threshold of 25,000 which encourages the public disclosure. This indicates the Project's compliance with relevant Equator Principles requirements.

Overall, the Project adheres to both regulatory and voluntary standards for greenhouse gas management for the operation phase, demonstrating a strong commitment to responsible environmental stewardship in accordance with national and international climate frameworks.

Carbon Capture Capacity

Carbon is retained in biomass, decomposing organic matter and soil in terrestrial ecological systems. Carbon stock in terrestrial ecological systems plays an important role in the global carbon cycle. Carbon is exchlanged between ecological systems and the atmosphere through natural processes such as photosynthesis, respiration, decomposition and combustion. Human activities change the carbon stocks in ecological systems and alter the exchanges between the carbon pools and the atmosphere through land use and land use change (*IPCC, 2000)*.

Antalya-Alanya Motorway Project is considered to have a potential impact on regional carbon stocks through removal of forests for motorway construction. In this section, the losses in carbon capture and oxygen generation capacities due to deforestation activities are estimated. Loss of carbon capture capacity is based on a comparative analysis of this capacity with regard to the official data held by the District and Sub-District Directorates of Forestry regarding the capacity that has been calculated to exist in the region of responsibility of each directorate. The region of responsibility is the geographical area/region where the directorate is responsible for managing all the forest areas and assets in this region (including provision of permits in the forest areas, reforestation/afforestation activities, tree planting and removing). As a result of this evaluation, the significance assessment has been made based on the calculated availability of carbon capture capacity and the forest area to be lost.

Number of trees to be removed and the area they occupy are determined and calculated from forestry inventory data in forest management plans of the relevant directorates (Serik Forestry Management Directorate, Taşağıl Forestry Management Directorate, Manavgat Forestry Management Directorate, and Alanya Forestry Management Directorate) under Antalya Regional Directorate of Forestry and summarized in Table X.61.There are a total of 10 forestry sub-districts namely; Akbaş, Alara, Kargı, Çardak, Taşağıl, Manavgat, Naras, Selale, Yalçıdibi, and Murtiçi.

Table X.61 Number of Trees to be Removed, Area Occupied and Total Forest Area

Number of Trees Removed	Area Occupied by Trees Removed (ha)	Total Forest Area Under Responsibility of the Directorates (ha)
278,915	1,030.69	166,817.30

Loss in the amount of carbon capture capacity and oxygen generation capacity is estimated from the data provided in the forest management plans and the amount of forest area to be lost in scope of the project and presented in Table X.62.

Table X.62 Loss of Carbon Capture Capacity and Oxygen Generation Capacity

Carbon Capture Capacity		
Total Carbon Capture Capacity of the Forest Area	tons	1.056.769
Loss of Carbon Capture Capacity	tons	3.542
Loss of Carbon Capture Capacity	%	0.34
Oxygen Generation Capacity		
Total Oxygen Generation Capacity of the Forest Area	tons	45.807
Loss of Oxygen Generation Capacity	tons	154
Loss of Oxygen Generation Capacity	%	0.34

Carbon Capture Capacity		
Total Carbon Capture Capacity of the Forest Area	Tons	8,478,683
Loss of Carbon Capture Capacity	tons	52,386
Loss of Carbon Capture Capacity	%	0.62
Oxygen Generation Capacity		
Total Oxygen Generation Capacity of the Forest Area	tons	147,096
Loss of Oxygen Generation Capacity	tons	909
Loss of Oxygen Generation Capacity	%	0.62

As it can be seen in Table X.62, the removal of forests corresponds in a 0.62% reduction in the total carbon capture and oxygen generation capacity within the area of authorization of 10 sub-districts managements of Antalya Forestry. This loss reflects the impact of deforestation activities carried out within the project area and is quantified based on the estimated biomass and carbon storage of the affected forestland.

Infrastructure Effects on Climate Change

Throughout the project lifecycle, the motorway will contribute to climate change through both direct and indirect pathways. As shown previously, multiple phases of the project, including deforestation, construction, operation, and traffic, plays a role in greenhouse gas (GHG) emissions and impacting the climate. The direct and indirect effects of the Project infrastructure will be shown below:

- Deforestation: Removal of trees that will absorb CO_2 and will reduce the land's ability to capture greenhouse gases.
- Construction phase of the project:
  - Constructions emissions: Concrete and asphalt will add significant CO_2 to the atmosphere due to their energy-intensive production.
  - Fuel use: Generates direct GHG emissions
  - Material transportation: Emissions though to fuel and energy use.
- Operation phase of the project:

- Electricity use: EV charging docks, and traffic and lighting controls will contribute to emissions.
- Traffic: While the motorway is expected to serve millions of users annually, a substantial portion of this traffic will be diverted from the existing D400 highway. Therefore, the project primarily reallocates existing traffic rather than generating entirely new vehicle flows. Although some induced traffic may occur over time due to improved connectivity, its overall contribution to emissions is expected to be incremental relative to the diverted baseline.
- Urban sprawl: The motorway may contribute to increased regional accessibility, which could in turn support population growth and land development. However, such trends are influenced by multiple external factors, and the emissions impact attributable specifically to the motorway is expected to be limited compared to broader socioeconomic drivers.

The motorway is expected to contribute to greenhouse gas emissions through deforestation, construction, and long-term operation. With thoughtful planning and mitigation, these impacts will be managed to support more sustainable outcomes.

Transition Risks

For the Project, the transition risks will be associated with changes in regulatory frameworks, market dynamics, and stakeholder expectations. These risks may impact project timelines, cost structures, and compliance obligations, requiring proactive management and flexible adaptation strategies.

Table X.63 Transition Risks, their Impacts and Mitigations

Transition Risk	Description	Potential Impact	Mitigation Measures	Responsible Party	Monitoring KPIs
Policy and Legal Risks	New carbon pricing or emissions regulations in Türkiye	Increased operational costs or compliance fines.	Integrate low-carbon design (e.g., energy-efficient lighting); monitor policy changes.	SPV	Annual policy review; compliance audit results.
Technology Risks	Shift to EV or smart transport technologies.	Reduced demand if infrastructure is outdated.	Install EV charging stations; design for future smart traffic systems.	SPV and EPC	Number of EV stations installed; technology upgrade plan.
Market Risks	Declining private vehicle use due to low-carbon transport preferences.	Lower toll revenues.	Promote multi-modal transport links (e.g., smart lanes); and market to eco-conscious users.	SPV	Traffic volume trends; revenue forecasts.
Reputational Risks	Community or NGO opposition to environmental impact.	Project delays or loss of stakeholder support.	Engage communities early; implement transparent emissions reporting.	SPV	Number of consultations; public sentiment analysis.

Transition risks must be taken into consideration during the whole Project. By adopting low-carbon technologies, the project can remain resilient and aligned with evolving market, policy trends, and regulations for a greener Türkiye.

Impact of Climate Change on the Project

Changes in the air temperature and precipitation regimes in the future years are expected due to the impacts of the climate change. In order to analyze mentioned and other impacts of the climate change, modeling studies are carried out by generating various scenarios. These scenarios are defined as a specific pathway or storyline within the Shared Socioeconomic Pathways (SSPs) framework. The SSPs are developed by the Intergovernmental Panel on Climate Change (IPCC) to explore different possible futures based on varying combinations of socioeconomic development and climate policies. Based on the evaluations on these scenarios, two of these scenarios were chosen to assess the climate change vulnerability of the Project. Two extreme SSP5-8.5 (Fossil Fuel Development Pathway) and SSP1-2.6 (Sustainability Pathway) scenarios were selected for the modeling study.

SSP1-2.6 (Sustainability Pathway):

The SSP1-2.6 scenario, often referred to as the "Sustainability Pathway," envisions a future where strong efforts are made to achieve sustainable development goals and mitigate climate change. This scenario assumes a high level of international cooperation, rapid technological advancement, and ambitious climate policies aimed at limiting global warming to well below 2 degrees Celsius above pre-industrial levels by the end of the century.

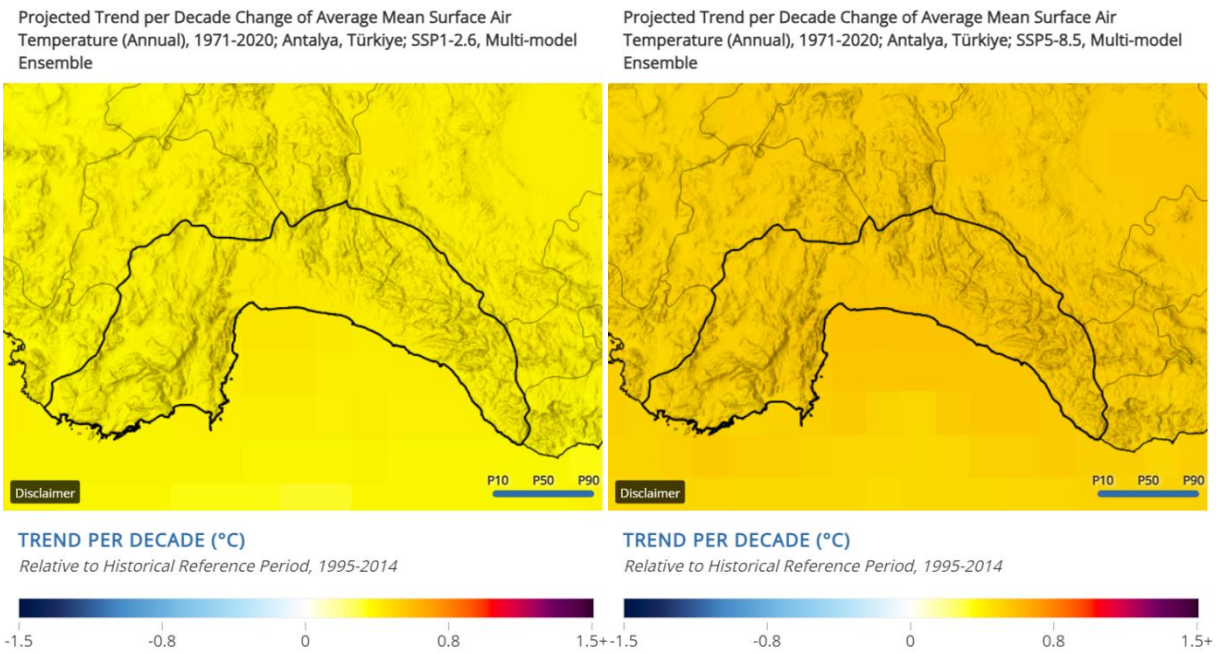
The SSP1-2.6 Scenario features robust economic growth coupled with equitable distribution of resources and wealth. Investments in education, healthcare, and infrastructure contribute to improved human well-being and social equality. Technological innovation plays a crucial role in SSP1-2.6, with widespread adoption of clean and renewable energy sources, energy-efficient technologies, and sustainable agricultural practices. Carbon capture and storage (CCS) technologies are deployed to reduce emissions from industries and power generation.

Stringent environmental regulations are implemented globally to limit greenhouse gas emissions and protect natural ecosystems. International cooperation is strong, with countries collaborating on climate mitigation efforts through mechanisms such as carbon pricing and technology transfer. As a result of these efforts, greenhouse gas emissions are significantly reduced, leading to a trajectory consistent with limiting global warming to 2.6°C or lower by the end of the century.

SSP5-8.5 (Fossil-Fueled Development Pathway):

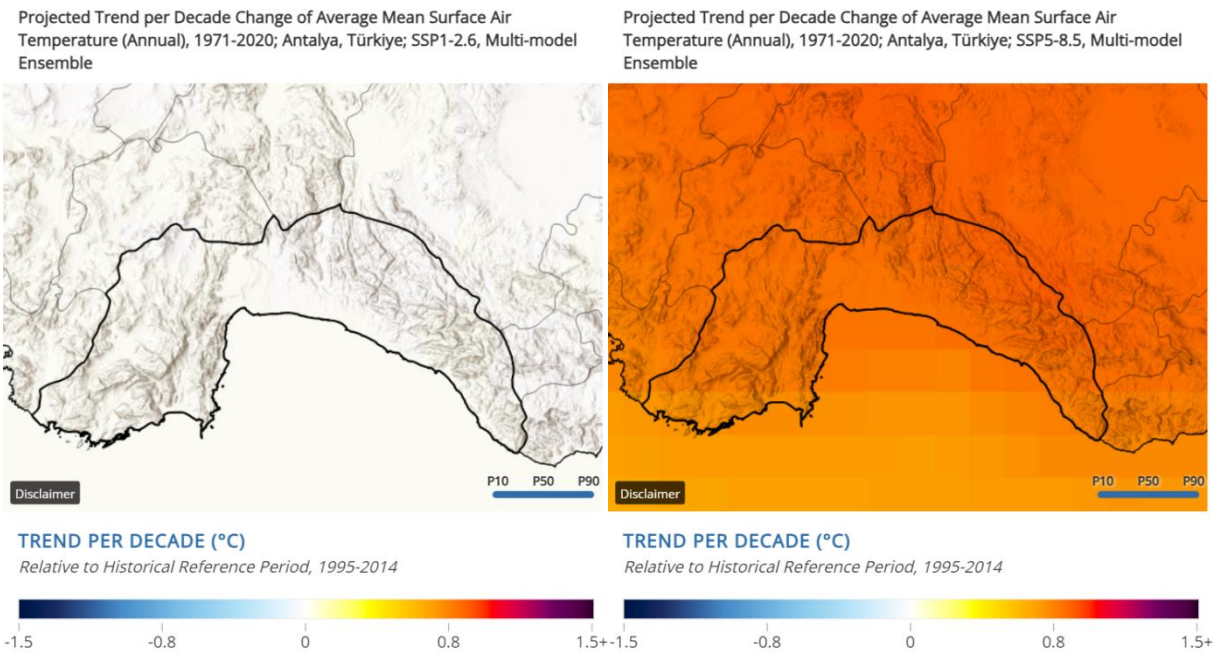
SSP5-8.5 represents a future where socioeconomic development is characterized by high population growth, rapid urbanization, and reliance on fossil fuels. In this scenario, there is limited international cooperation, and efforts to address climate change are insufficient to curb greenhouse gas emissions effectively. The SSP5-8.5 Scenario features uneven economic growth, with disparities in wealth and access to resources. Urbanization is rapid, leading to increased energy demand and environmental degradation in some regions. Technological progress in SSP5-8.5 is driven by market forces and economic considerations rather than sustainability goals. There is continued reliance on fossil fuels for energy production, transportation, and industrial processes, leading to high greenhouse gas emissions. Environmental regulations in SSP5-8.5 are relatively weak, and there is limited international cooperation on climate mitigation efforts. Policies prioritize economic growth and energy security over environmental protection. Greenhouse gas emissions continue to rise unchecked in SSP5-8.5, leading to significant global warming and associated climate impacts such as sea-level rise, extreme weather events, and ecosystem disruption. The trajectory of warming under this scenario exceeds 8.5°C above pre-industrial levels by the end of the century.

These scenarios represent two contrasting futures based on different socioeconomic pathways and climate policies, highlighting the importance of global action to address climate change and transition towards sustainable development. Future projections of precipitation and mean temperature changes for each scenario are given for Antalya province in the figures below.



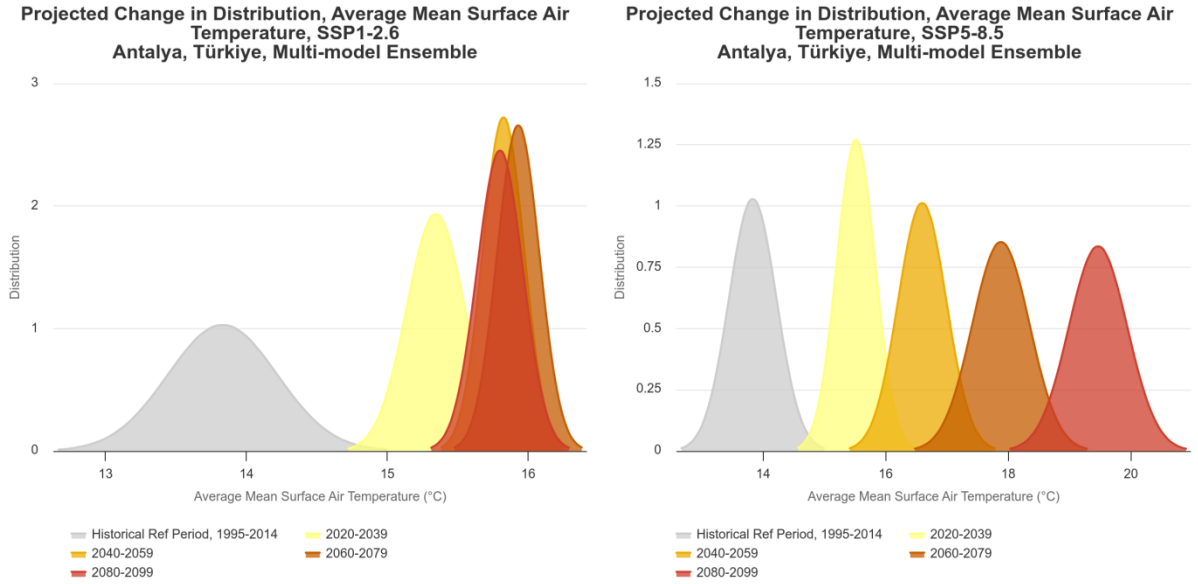
Source: World Bank, Climate Change Portal, 2024 (https://climateknowledgeportal.worldbank.org/country/turkiye/trends-variability-projections).

Figure X.60 Projected Average Mean Surface Air Temperature Changes of Antalya per Decade until 2050 according to SSP1-2.6 and SSP5-8.5



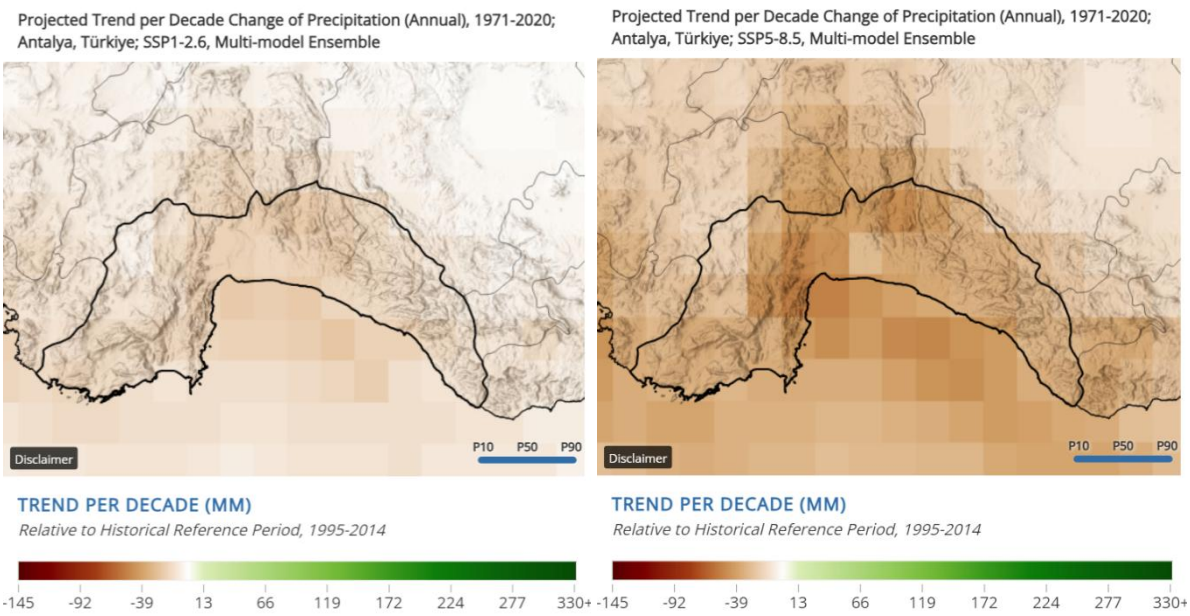
Source: World Bank, Climate Change Portal, 2024 (https://climateknowledgeportal.worldbank.org/country/turkiye/trends-variability-projections).

Figure X.61 Projected Average Mean Surface Air Temperature Changes of Antalya per Decade until 2100 according to SSP1-2.6 and SSP5-8.5



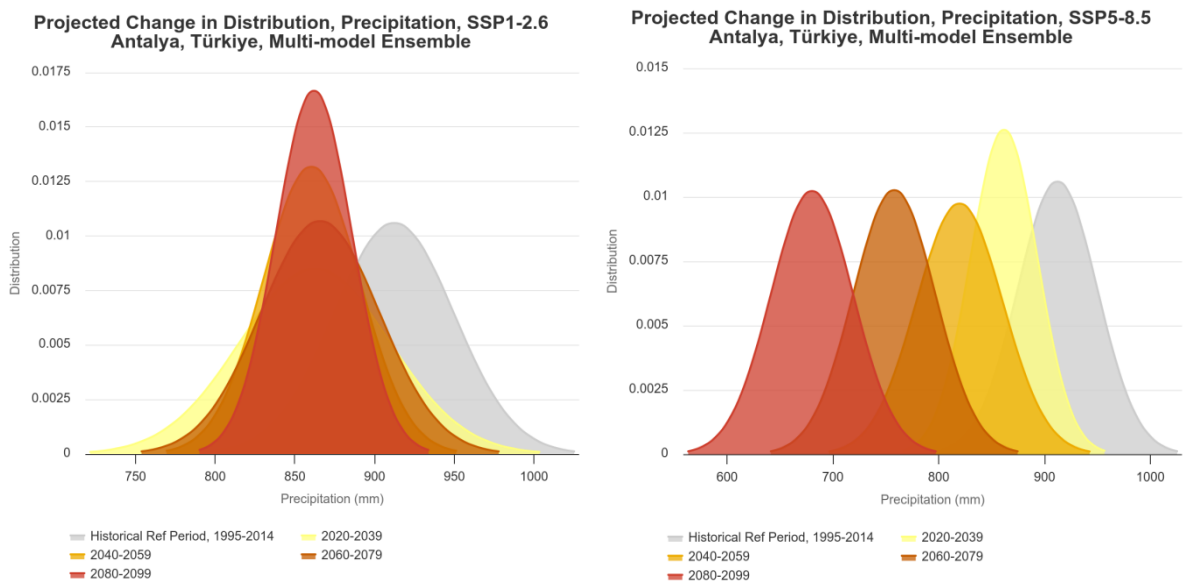
Source: World Bank, Climate Change Portal, 2024 (https://climateknowledgeportal.worldbank.org/country/turkiye/trends-variability-projections).

Figure X.62 Projected Average Mean Surface Air Temperature Change Distributions of Antalya according to SSP1-2.6 and SSP5-8.5



Source: World Bank, Climate Change Portal, 2024 (https://climateknowledgeportal.worldbank.org/country/turkiye/trends-variability-projections).

Figure X.63 Projected Precipitation Changes of Antalya per Decade until 2050 according to SSP1-2.6 and SSP5-8.5



Source: World Bank, Climate Change Portal, 2024 (https://climateknowledgeportal.worldbank.org/country/turkiye/trends-variability-projections).

Figure X.64 Projected Precipitation Change Distributions of Antalya according to SSP1-2.6 and SSP5-8.5

The summary of the evaluations of the given images above are comprised below:

- According to the SSP1-2.6 scenario, the average air temperature in Antalya is expected to increase by approximately 1.5 degrees by 2039, approximately 2 degrees by 2059, approximately 2.1 degrees by 2079, and approximately 2 degrees by 2099.
- According to the SSP1-2.6 scenario, the average precipitation in Antalya is expected to decrease by approximately 49.8 mm to 862.5 mm by 2039, by approximately 51.9 mm to 860.4 mm by 2059, by approximately 46.5 mm to 865.8 mm by 2079, and by approximately 50.3 mm to 861.9 mm by 2099.
- According to the SSP5-8.5 scenario, the average air temperature in Antalya is expected to increase by approximately 1.7 degrees by 2039, approximately 2.8 degrees by 2059, approximately 4.1 degrees by 2079, and approximately 5.6 degrees by 2099.
- According to the SSP5-8.5 scenario, the average precipitation in Antalya is expected to decrease by approximately 50.6 mm to 861.7 mm by 2039, by approximately 92.6 mm to 819.7 mm by 2059, by approximately 154.32 mm to 757.9 mm by 2079, and by approximately 232 mm to 680.2 mm by 2099.

The projections for the SSP1-2.6 and the SSP5-8.5 scenario regarding average air temperature and average precipitation in Antalya are provided in the Table X.64 and Table X.65.

Table X.64 Changes in Average Precipitation in Antalya According to SSP1-2.6 and SSP5-8.5 Scenarios

Scenario	Historical Ref Period 1995-2014	2020-2039	2040-2059	2060-2079	2080-2099
SSP1-2.6 (mm)	912.3	862.5	860.4	865.8	861.9
SSP5-8.5 (mm)	912.3	861.7	819.7	757.9	680.2

Table X.65 Changes in Average Air Temperature in Antalya According to SSP1-2.6 and SSP5-8.5 Scenarios

Scenario	Historical Ref Period 1995-2014	2020-2039	2040-2059	2060-2079	2080-2099
SSP1-2.6 (^{O}C)	13.8	15.3	15.8	15.9	15.8
SSP5-8.5 (^{O}C)	13.8	15.5	16.6	17.9	19.5

The meteorological conditions of the Project area are evaluated in terms of meteorological and climatic characteristics according to the observations of Manavgat Meteorological Stations. According to Manavgat Meteorology Station records, the number of annual average snowy days is 0.1 and annual average number of days with snow covered is 0.02. The average annual total number of stormy days is 2.49 with the highest average in September (see Table X.45). According to these data;

In the SSP1-2.6 scenario, characterized by low carbon emissions and sustainable development policies, a reduction in the number of snowy days and snow-covered days can be expected due to an overall warmer climate. The total frosty days might not show a significant change as frost events are primarily related to cold weather conditions, which may not change noticeably in this scenario. The total stormy days are not expected to change significantly in the SSP1-2.6 scenario due to the relatively lower impact of climate change.

In contrast, the SSP5-8.5 scenario, characterized by high carbon emissions and low environmental policies, might lead to either a decrease or increase in snowy days and days covered with snow, but generally, a decrease is expected in a warmer climate. The total frosty days would likely decrease in the SSP5-8.5 scenario due to overall warmer temperatures and reduced frost occurrences. There might be an increase in total stormy days in the SSP5-8.5 scenario due to higher temperatures and more pronounced climate change effects.

Meteorological and Climate Characteristics, as seen in Table X.40, the highest temperatures of the year (above 40 degrees Celsius) were recorded in May, June, July, August and September. The lowest temperature was observed in February with an average temperature of -2.8 degrees. According to these data;

In the SSP1-2.6 scenario, there might be an increase in the highest temperatures recorded during the seasonal months, but this increase is not likely to be significant. Given that the lowest temperature is recorded at -2.8 degrees Celsius in January, no significant change in average lowest temperatures is expected under the SSP1 scenario.

In the SSP5-8.5 scenario, there could be an increase in the highest temperatures recorded during the seasonal months. Higher carbon emissions and increased greenhouse gases could elevate temperatures. Under the SSP5-SSP8.5 scenario, with the lowest temperature recorded at -2.8 degrees Celsius in January, there might be an increase in average lowest temperatures.

Assessment of Possible Exposures Caused by Climate Change

As can be seen from the results of the scenario used to determine the impacts that may occur due to climate change, it has been revealed that extreme temperature changes and decrease precipitation may occur. The Project infrastructure is likely to be affected by these extreme weather conditions. Potential impacts and adaptation measures to be taken are summarized in this section.

Water Drainage Infrastructures: It may cause deformations, cracking and corrosion in the materials and structure of water discharge substructures. Especially concrete structures can be sensitive to extreme temperatures and cold temperatures. While cracking may occur in materials that expand under extreme heat, brittleness and cracking of materials may occur under extreme cold.

As a result of changes in the amount, intensity and distribution of precipitation, water drainage infrastructures will be under more stress during excessive precipitation and the risk of floods may increase. In addition, impacts such as sea level rise may affect the design and resilience of drainage infrastructure. Extreme weather events can make it difficult to access infrastructure. Especially during heavy rainfall, problems such as clogging and cleaning of drainage systems may occur.

Working Days: Working in extreme heat can lead to heat-related health problems/illnesses such as heat exhaustion, heatstroke, and dehydration, impacting workers' health and productivity. High temperatures can decrease employees' concentration, physical endurance, and overall performance, leading to lower productivity levels. Extreme heat can create hazardous working conditions, increasing the risk of accidents and injuries among workers. High temperatures can also affect the functioning of machinery, electronics, and other equipment, causing delays and disruptions in work processes.

Working in extreme cold can result in health issues like frostbite, hypothermia, and respiratory problems, compromising workers' well-being and ability to work effectively. Cold temperatures can cause equipment malfunctions, frozen pipes, frost on the motorway, and other technical issues, impacting productivity and workflow.

Precipitation can lead to road closures, traffic congestion, and public transportation delays, affecting employees' ability to reach the workplace. Flooding and severe storms can damage buildings, roads, and utilities, causing disruptions in business operations and potentially leading to temporary closures.

In summary, extreme high and low temperatures, as well as extreme precipitation, can pose health risks, reduce efficiency, create safety hazards, disrupt transportation, and damage infrastructure, all of which can impact working days and business continuity.

Machinery and Equipment: Extreme hot weather conditions can adversely affect the performance of some machinery equipment. Electronic equipment can overheat and lose functionality when exposed to high temperatures. This is particularly crucial for computers, traffic control systems, and other sensitive electronic devices. Additionally, effects such as expansion of metal parts and changes in the viscosity of oils can also impact the mechanical components of machinery equipment.

Extreme cold weather conditions can also have adverse effects on machinery equipment. Materials such as lubrication systems, hydraulic systems, and plastic components may be less effective in extreme cold. Issues like freezing and becoming brittle can occur with metal parts. Additionally, extreme cold weather conditions can negatively impact the performance of chemical components such as batteries and accumulators.

Slope and Stability: Slope and pile stability depends on the type of soil, capillary structures, water permeability and water holding capacity. Water-absorbent soils such as clay may be more affected by precipitation, while sandy soils may allow water to pass through faster. The slope and height of the pile have a significant influence on stability. Steep slopes or high piles can be more susceptible to the impact of precipitation and therefore cause greater changes in stability. Both heavy precipitation and continuous moderate Precipitation can increase the saturation of the ground and the risk of erosion. Especially severe and prolonged precipitation can lead to soil erosion and the risk of landslides.

Landslides: Landslides are the downslope movement of soil, rock, or debris under the influence of gravity, often triggered by factors such as heavy precipitation, seismic activity, or human-induced changes to the landscape. The occurrence and severity of landslides depend on soil composition, slope angle, and moisture content. Saturated soils, particularly those with high clay content, are more prone to sliding due to reduced shear strength, while rocky or sandy terrains may resist movement unless destabilized by external forces. Steep slopes or areas with significant elevation changes are especially vulnerable, as they amplify gravitational pull. Prolonged or intense precipitation can exacerbate landslide risk by increasing pore water pressure and eroding stabilizing soil structures, leading to rapid and destructive mass wasting events.

Wildfires: The risk and spread of wildfires depend on vegetation type, moisture levels, weather conditions, and topography. Dry and resin-rich vegetation, such as coniferous forests or shrubs, can ignite more easily and burn rapidly. Low humidity, high temperatures, and strong winds significantly increase fire risk and intensity. The slope of the terrain also plays a crucial role; fires move more quickly uphill due to preheating of vegetation. Prolonged droughts or consecutive hot days can dry out fuel sources, creating highly flammable conditions. Wildfires can be sparked by sudden ignition sources such as lightning strikes or human actions, but they are also greatly fueled by ongoing dry conditions. And in areas where forest maintenance is lacking or where dead plant material has accumulated, fires can escalate rapidly and spread without control, endangering both natural environments and nearby communities.

Snowfall:

Snowfall impacts terrain stability, infrastructure, and safety, depending on snow volume, temperature, slope angle, and soil properties. Heavy snow accumulation adds weight to slopes, increasing the risk of avalanches, especially on steep terrains or areas with loose snow. Rapid snowmelt, triggered by warm temperatures or rain, can oversaturate soils, reducing cohesion and promoting landslides, particularly in fine-grained or clay-heavy soils. Prolonged snowfall or intense snowstorms can increase the risk of slope failure by overloading the terrain. Freeze-thaw cycles weaken the soil structure and further destabilize the slopes.

Adaptation Measures for Climate Change Impacts

Water Drainage Infrastructures:

- General hydrological considerations/design of the Project will be in accordance with KGM design standards and AASHTO Highway Drainage Principles. In this regard, generally, 100-year flood flow will be taken into account on stream passage designs (Ref. State Highways Technical Requirements, Item 9.3). Minimum dimensions of all culverts will be 2m x 2m except discharge culverts.
- Culverts will be designed with one outlet whenever possible. In order to minimize changes in the hydrology and flow of water courses, design of structures will be done accordingly. The design will also ensure an appropriate capacity for culverts through embankments when flood plains are cut off.
- The design will be done in a way to minimize the risks of flooding. During the operation phase, reviewed Emergency Preparedness and Response Plan will be used to mitigate flood events.
- Storm water management practices that slow peak runoff flow, reduce sediment load, and increase infiltration, including vegetated swales (planted with salt-resistant vegetation), filter strips, terracing, detention ponds or basins, and infiltration trenches, will be planned.

Working Days:

- Adjustments will be made to working hours based on weather forecasts to avoid working during periods of extreme heat, heavy rainfall or high winds.
- Predicted changes in weather conditions will be monitored using meteorological stations and work schedule will be planned according to this information.
- Shaded rest areas will be provided for workers during hot weather periods, adequate water supply will be ensured and heat-related illnesses and injuries will be prevented by taking frequent breaks.
- During periods of cold weather, workers will be provided with appropriate protective equipment such as insulated clothing, gloves and shoes.
- Storm preparedness plans will be developed for workers that include procedures for evacuating work areas during storms or lightning storms.
- Workers will be trained on emergency response procedures specific to climate-related events.

Machinery and Equipment:

- Materials resistant to climate change will be selected. Regular maintenance/repair and monitoring of machinery equipment will be provided.
- Protection of machinery and equipment will be ensured through appropriate drainage system designs.
- Energy efficient machinery and equipment will be preferred to minimize the contribution to climate change.
- Emergency response plans will be developed for climate-related events that may have an impact on machinery and equipment. This will include equipment shutdown protocols, evacuation procedures, and emergency plans for rapid repairs and recovery.

Slope and Stability:

- Retaining walls will be constructed in certain sections to ensure ground and slope stability.
- Areas prone to slope instability resulting from climate change factors, such as increased precipitation, soil erosion or temperature fluctuations, will be identified and these areas will be constantly monitored.
- Water will be removed from the slopes using structures such as waterways, culverts and erosion control structures.
- Vegetation management measures will be implemented to stabilize slopes and reduce soil erosion.
- Comprehensive risk assessments will be conducted to identify potential hazards associated with slope instability in changing climate conditions.
- Provide training to employees on slope stability principles, climate change impacts and adaptation strategies.

Landslides:

- Early warning systems will detect landslide triggers like heavy rain or ground shifts in high-risk areas.
- Zones prone to landslides due to increased precipitation or soil saturation will be mapped and monitored.
- Drainage systems, such as channels and barriers, will divert water to reduce slope saturation.
- Vegetation and bioengineering will stabilize slopes and curb erosion via root systems.
- Geotechnical assessments will evaluate landslide risks under changing climate conditions.
- Staff training will cover landslide prevention and climate impact response strategies.

Wildfires:

- Firebreaks and buffer zones will be established in strategic areas to slow the spread of potential wildfires.
- Regions with high wildfire risk due to climate change factors—such as prolonged drought, rising temperatures, and reduced humidity—will be identified and regularly monitored.

- Dry vegetation, dead wood, and other combustible materials will be removed through regular clearing and controlled burns to reduce available fuel.
- Native, fire-resistant plant species will be used in vegetation management to help limit the spread and intensity of fires.
- Detailed wildfire risk assessments will be conducted, taking into account climate projections, local vegetation, and topography to guide mitigation strategies.
- Employees will receive training on wildfire prevention, emergency response procedures, and the effects of climate change on fire behavior.

Snowfall:

- Early warning systems will use meteorological data to detect heavy snowfall or blizzard conditions.
- Areas prone to heavy snowfall due to climate-driven changes will be mapped and monitored.
- Cold-resistant vegetation and slope stabilization measures will be applied to reduce snow-induced erosion.
- Geotechnical and environmental assessments will evaluate snowfall-related risks along the motorway.
  Employee training will cover snow hazard awareness, safe removal practices, and climate adaptation strategies.

Physical Climate Impacts of Hazards

The physical risk impacts will have a negative effect on both phases of the project, as they are likely to cause delays in the overall timeline. These disruptions can hinder progress during the starting stages and continue to affect subsequent phases, ultimately compromising the efficiency and timely completion of the project.

The project route traverses multiple high-risk areas that are susceptible to a range of different types of hazards. These include environmental, geotechnical, and climate-related risks such as wildfire-prone zones, areas vulnerable to flooding and landslides, regions with unstable soil conditions, and locations exposed to extreme temperatures and weather events

The hazard levels were calculated using data from the Antalya Metropolitan Municipality's SECAP (Sustainable Energy and Climate Action Plan) document by analyzing the likelihood and possible impact of each climate-related hazard. The hazard level for each hazard was determined using the standard formula: Hazard Level = Likelihood × Impact. The Table X.66 summarizes the assessment results and provides explanations based on local climatic conditions and their potential effects on construction activities in the region.

Table X.66 Physical Climate Risk Hazard Level Matrix

Hazard	Likelihood	Possible Impact	Hazard Level	Explanation
Wildfires	High	High	**High**	Antalya's hot, dry summers spark wildfires, threatening construction sites, equipment, and closing operational motorways.
Extreme Rainfall, Floods	High	High	**High**	Extreme rainfall events erode construction sites, damage road surfaces, and disrupt traffic flow..
Water Scarcity and Drought	High	High	**High**	Droughts limit water for construction (e.g., concrete mixing) and road maintenance (e.g., cleaning).
Heatwaves	High	High	**High**	Heatwaves risk worker health during construction, degrade asphalt, and affect driver safety in operation
Storms, Strong Winds, and Tornados	High	High	**High**	Storms damage temporary construction structures and disrupt operations with debris and signage damage.
Cold Waves	Medium	Medium	**Medium**	Rare cold waves delay construction, affect material curing, and create icy patches during operation.
Snowfall	Low	Medium	**Medium**	Rare snowfall halts construction and requires snow removal to maintain operational motorway safety.

The risk levels were calculated using data from the Antalya Metropolitan Municipality's SECAP (Sustainable Energy and Climate Action Plan) document by analyzing the likelihood and possible impact of each climate-related hazard. The updated risk analysis incorporates a more detailed approach by evaluating the hazard level, the exposure, sensibility/vulnerability, and overall risk level for each hazard for the project cycle based on the construction schedule, material integrity, worker safety, and operational efficiency. The table below (Table X.72) categorizes the identified risks according to these factors.

Table X.67 Physical Climate Risk Analysis Matrix

Hazard	Hazard Level	Exposure	Sensibility/ Vulnerability	Risk Level
Wildfires	High	High	High	**High**
Extreme Rainfall, Floods	High	High	High	**High**
Water Scarcity and Drought	High	High	Medium	**High**
Heatwaves	High	High	High	**High**
Storms, Strong Winds, and Tornados	High	High	Medium	**High**
Cold Waves	Medium	Medium	Medium	**Medium**
Snowfall	Medium	Medium	Low	**Medium**

Table X.68 presents the physical climate risks identified for the project, their possible impacts, corresponding risk levels, and recommended risk management and mitigation measures. And also, outlines each risk, its potential impact on the project, and the associated risk level, along with suggested strategies to mitigate or manage these risks.

Table X.68 Possible Impacts of Physical Risks

Physical Climate Risks	Possible Impacts on the Project	Risks Levels	Risk Management and Mitigation Ideas
Wildfires	• Traffic disruptions: Road closures or detours due to nearby fires or poor visibility from smoke. • Infrastructure damage: Melting of signs, lighting systems, and deformation of asphalt surfaces. • Safety hazards: Increased accident risk from reduced visibility and sudden evacuations. • Maintenance interruptions: Delays or hazards in routine road operations and repairs. • Post-fire hazards: Soil instability, erosion, and potential landslides affecting road safety and function.	High	• Heat-resistant concrete additives and asphalt binders designed for high temperatures to ensure proper curing and durability. • Detection systems and visibility sensors along roads to provide early warnings. • Maintenance during low-fire-risk seasons. • Slope stabilization techniques for post fire to prevent landslides.
Extreme Rainfall, Overflow and Floods	• Climate-induced disruptions such as floods, flooding in transportation networks can delay the delivery of critical materials, impacting project schedules and budgets. • Climate-induced disruptions such as droughts, heavy rainfall, or flooding can cause variability in soil moisture that undermines ground stability, requiring additional site service before construction can proceed.	High	• Weather forecasting tools to anticipate delays and adjust schedules. • Implement drainage systems.
Water Scarcity and Drought	• Disruptions as water becomes scarce and the availability of water for construction activities such as dust suppression or concrete mixing becomes low. • Delayed maintenance due to water restrictions. • Degradation of roadside ecosystems • Potential conflict with local communities over shared water resources.	High	• Adopt water-efficient technologies If possible, on-site water should be recycled. • Use of drought-resistant vegetation alongside of the motorway. • Engagement with local communities to agree on shared water resource plans.
Heatwaves	• High temperatures and humidity can adversely affect the curing of concrete and laying of asphalt, potentially compromising material quality and construction timelines. • Exposure to extreme heat or severe weather conditions increases health risks for construction workers, often necessitating reduced work hours or changing safety protocols.	High	• Heat-resistant concrete additives and asphalt binders designed for high temperatures to ensure proper curing and durability. • Asphalt laying and concrete pouring during cooler parts of the day • Heat stress management plans, including mandatory breaks in shaded or cooled areas, hydration stations. • Flexible scheduling to account for reduced work hours during extreme heat. • Real-time heat index monitoring to adjust work.
Storms, Strong Winds and Tornados	• Disruption of motorway infrastructure due to damage to signage, lighting, and barriers. • Disruption of traffic flow from fallen debris and road closures. • Disruption of vehicle safety from strong crosswinds. • Disruption of operations from construction delays and power outages.	High	• Wind-resistant signage, lighting, and barriers • High-strength steel or composites to withstand storm • Real-time debris detection systems • Response teams to manage road closures and rerouting during storm events • Wind speed sensors along the motorway to warn drivers with electronic message signs
Cold Waves and Snowfall	• Delays in construction activities due to frozen ground, limited visibility, and reduced worker efficiency in cold conditions. • Increased risk of accidents on-site and on access roads due to icy or snow-covered surfaces. • Damage to materials and machinery not suited for low temperatures or inadequate winter storage. • Disruption of transportation and logistics, including delayed deliveries and restricted access to the project site. • Additional maintenance burdens from snow removal, de-icing, and ensuring operational safety during prolonged cold events.	Medium	• Provide insulated storage or heated shelters for temperature-sensitive materials and equipment. • Implement de-icing and snow removal protocols for construction and operation areas and the Project roads. • In winter, equip the motorway with snowplows and salt spreaders to maintain accessibility and safety. • Monitoring of snowfall and temperature conditions to trigger response measures.

X.2.4. Mitigation Measures

The following subsection describes the actions and strategies designed to avoid, minimize or offset the potential adverse impacts of the Project on climate change, or to enhance potential Project benefits.

X.2.4.1. Land Preparation and Construction Phase

Türkiye's NDC commits to a 41% reduction in GHG emissions by 2030 relative to the Business-As-Usual (BAU) scenario, with a peak in emissions by 2038. GHG emissions generated during land preparation and construction phase of the Project can be considered as relatively short term emissions when compared to the emissions of operation of the Motorway. The Project adopts several mitigation measures to minimize its carbon footprint and support the country's climate commitments under both the NDC and National Climate Change Strategy (NCC).

Construction activities will be carried out in accordance with good industrial practices, with a focus on energy efficiency and emission reduction:

- High-efficiency and low-emission construction machinery will be prioritized at construction sites to minimize fuel consumption.
- Regular maintenance of equipment will be conducted to improve engine efficiency and reduce the idling time of stop-and-go heavy vehicles.
- Electricity demand during construction activities will be met as much as possible through renewable energy sources.
- The use of recycled and locally sourced materials will be encouraged to reduce indirect emissions from material transportation.
- An effective waste management plan will be implemented to control organic waste that may cause methane emissions
- These measures aim to reduce the carbon footprint during the construction phase and enhance environmental sustainability.

Through these measures, the Project contributes to national climate targets by reducing GHG emissions during the construction phase and promoting long-term environmental sustainability.

X.2.4.2. Operation Phase

Various strategies have been adopted to reduce greenhouse gas emissions during the operation phase of the motorway. The new motorway route aims to reduce fuel consumption of vehicles by improving traffic flow and minimizing stop-and-go traffic on the existing road network. And ensuring that the motorway access connects to low-carbon public transports, such as buses, or other public transport, this will result in shorter travel times and a reduction in direct CO_2 emissions from vehicles. In addition, charging stations are planned to be installed in each of the four service areas planned along the route to encourage the use of electric vehicles (EVs), in alignment with Türkiye's Nationally Determined Contributions (NDC) transport decarbonization goals.

Energy-efficient LED technologies will be used in tunnels, intersections, and lighting systems, and there will be a shift towards low-carbon energy sources for electricity consumption. Environmentally friendly materials and practices will be preferred in road maintenance and operation activities to reduce indirect emissions. And in the future, the project envisages using electric or hybrid vehicles for maintenance and renewable energy for operations to contribute to the net-zero goals by 2053, as outlined in the National Climate Change Strategy (NCC) and NDC.

To compensate for the environmental impact caused by tree cutting, five times the number of trees to be cut will be planted. The Project also plans to protect remaining vegetation, stabilize soil through erosion control, establish green buffer zones along the motorway, regularly monitor forest recovery and carbon storage, and engage local communities in sustainable forest management.

All these measures demonstrate the Project's alignment with Türkiye's climate commitments under the NDC and NCC and will be monitored and reported to align with the 41% reduction target in 2030 ensure that the Antalya–Alanya Motorway serves as a low-carbon transport infrastructure in the long term from existing road network.

X.2.5. Summary of Assessment and Residual Impact

This section provides a summary of the various calculations in the above subsections. The results for annual Scope 1 and Scope 2 are presented bellow in Table X.69.

Table X.69 Summary of Annual Emissions for Scope 1 and Scope 2

Construction Phase	**Emissions per year ($t CO_2 e$)**
Scope 1	85,232.91
Scope 2	12,380.44
Total	**97,613.35**
Operation Phase	**Emissions per year ($t CO_2 e$)**
Scope 1	1,192.84
Scope 2	9,315.35
Total (Scope 1 and Scope 2)	**10,508.19**

During the construction and operation phases of the Antalya-Alanya Motorway Project, the total annual Scope 1 and Scope 2 greenhouse gas emissions resulting from diesel, LNG, and electricity consumption were estimated at approximately 97,613.35 tons and 10,508.19 tons of CO_2 equivalent, respectively, both remaining below the limits set by the Equator Principles. Additionally, due to tree clearing in forested areas throughout the project duration, a 0.62% reduction in regional carbon sequestration and oxygen production capacity is expected, reflecting the impact on the forest resources within the project area. The Project has demonstrated compliance with national and international standards for greenhouse gas management.

The summary of the assessment made in the general framework is provided in Table X.70. Assessment based on sensitive locations/receptors, project stages, air quality measurement results and air quality modeling studies were made in this ESIA Report.

Table X.70 Summary of Air Quality and GHG Assessments

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phase												
Increase in PM_{10}, $PM_{2.5}$ concentrations, Settled Dust	Local Communities: Akdam, Avsallar, Bademliyar, Bucakşeyhler, Çakallar, Deniz Tepesi, Emişbeleni, Hacıali, Hacıobası, Kalemler, Karakaya, Konaklı, Köprüçay, Sağırin, Sarılar, Sarıabalı, Serik, Sülek, Taşağıl, Ulukapı, Uzunlar	Adverse	Local	Medium	Low (0-25 % exceedance of air quality standard)	Short term reversible	Intermittent	Medium (B)	Moderate (2)	Medium (B2)	• Dust should be minimized from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house filters or cyclones). • Dust should be minimized from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content. • Speed limitations will be defined and obeyed for construction vehicles. • Well and adequate maintained vehicles shall be used. Regular maintenance of machinery and equipment will be ensured. • The drop height of potentially dust generating materials will be kept as low as possible. • Construction vehicles will not be permitted to keep engines running while waiting to enter the site or waiting on-site. • Dust suppression methods (i.e. watering with water trucks, applying non-toxic chemicals, speed limits for mobile vehicles, use of well-maintained vehicles/machinery) will be applied at road construction sites, service roads and quarry/material borrow/storage sites to mitigate Project-related dust emissions. Watering will be applied at any time necessary including night time, weekends or off-days by using pressurized distribution or spraying systems that would ensure even distribution of water. • If there is traffic flow on the existing roads near the work sites, dust suppression measures will be continuously applied to ensure traffic safety. If there is no traffic existing in the local roads, dust suppression measures will be applied only at local residential and business areas. • All the dust-emitting components of the crushing-screening plants will be put in closed spaces and equipped with dust suppression systems. • Loading and unloading operations will be performed without throwing/scattering. • During the transportation of the excavated materials outside the construction site, the material will be covered with nylon tarpualin. • In the supply of construction materials, local licensed quarries (existing or new) will be preferred to reduce transportation distance to minimize associated impacts and costs. • Wind shields/barriers will be placed at work sites such as material storage areas to prevent dust dispersion where necessary. • Relevant provisions of the Regulation on Air Pollution Control Sourced from Industry and Regulation on the Assessment and Management of Air Quality will be complied with to minimize air emissions sourced from construction machinery and trucks. • Blasting operations will be conducted in line with the legislation in force and good industry practices/modern techniques. • Roads to be used for access to quarry sites will be upgraded by the Project Sponsor to minimize dust emissions during transport. These roads will have sufficient width. • Exhaust emission measurements of the vehicles will be conducted periodically every three months. • Driving through settlements will be avoided wherever alternative roads are present. • Any damage caused by insufficient or lack of dust suppression measures will be compensated. • High-dust construction activities near Hacıali neighborhood shall be avoided during stagnant meteorological conditions or temperature inversion events. • To control fugitive dust emissions in the vicinity of Hacıali neighborhood, water spraying, application of soil stabilizers, and road paving will be implemented. • All material-transporting trucks operating along routes near Hacıali neighborhood	Low
	Ecologically Sensitive Areas Taşağıl, Sarıabalı	Adverse	Local	Medium	Low (0-25 % exceedance of air quality standard)	Short term reversible	Intermittent	Medium (B)	Moderate (2)	Medium (B2)		Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											shall be covered as part of dust control measures. • Wind fences or vegetative barriers will be installed between emission sources and the Hacıali neighborhood. Additionally, air quality monitoring stations will be established at appropriate location around these neighborhood, and regular measurements will be conducted.	
GHG (Greenhouse Gas)	Settlement areas along the Project route	Adverse	Wide	Medium	Medium (25,000-100,000 t CO_2 e)	Short term reversible	Intermittent	Wide (A)	Moderate (2)	High (A2)	• High-efficiency and low-emission construction machinery will be prioritized at construction sites to minimize fuel consumption. • Regular maintenance of equipment will be conducted to improve engine efficiency and reduce the idling time of stop-and-go heavy vehicles. • Electricity demand during construction activities will be met as much as possible through renewable energy sources. • The use of recycled and locally sourced materials will be encouraged to reduce indirect emissions from material transportation. • An effective waste management plan will be implemented to control organic waste that may cause methane emissions. • These measures aim to reduce the carbon footprint during the construction phase and enhance environmental sustainability. • To compensate for the environmental impact caused by tree cutting, five times the number of trees to be cut will be planted.Preserving existing trees and plants to prevent further loss. • Creating vegetated areas along the motorway to reduce the impacts. • Involving locals in sustainable forest management and restoration.	Medium
Operation Phase												
Increase in concentrations of gasous pollutants	Local Communities Akdam, Avsallar, Bademliyar, Bucakşeyhler, Çakallar, Deniz Tepesi, Emişbeleni, Hacıali, Hacıobası, Kalemler, Karakaya, Konaklı, Köprüçay, Sağırin, Sarılar, Sarıabalı, Serik, Sülek, Taşağıl, Ulukapı, Uzunlar	Adverse	Local	Long	Low (0-25 % exceedance of air quality standard)	Irreversible	Continuous	Wide (A)	Low (1)	Low (A1)	• At the service areas, a green buffer strip will be formed between the outer lane of the Motorway and the facilities. This strip will be properly planted (e.g. with shrubs that start growing from the base and are resistant to dust and gaseous emissions) to form a barrier against dust to be sourced from the Motorway's vehicle traffic. • The application of automatic toll systems along the Motorway will contribute to an optimization of traffic flows and thus lower emissions.	Low
	Ecologically Sensitive Areas Taşağıl, Sarıabalı	Adverse	Local	Long	Low (0-25 % exceedance of air quality standard)	Irreversible	Continuous	Medium (B)	Moderate (2)	Medium (B2)		Low
GHG (Greenhouse Gas)	Settlement areas along the Project route	Adverse	Wide	Long	Medium (25,000-100,000 t CO_2 e)	Irreversible	Continuous	Wide (A)	Moderate (2)	High (A2)	• Various strategies have been adopted to reduce greenhouse gas emissions during the operation phase of the motorway. • The new motorway route is designed to improve traffic flow and reduce stop-and-go traffic, thereby lowering fuel consumption. • These improvements will result in shorter travel times and reduced direct CO_2 emissions from vehicles. • To encourage the use of electric vehicles (EVs), charging stations will be installed in each of the 4 service areas planned along the route. Energy-efficient LED technologies will be used in tunnels, intersections and lighting systems.	Medium

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											• There will be a shift toward low-carbon energy sources for electricity consumption. • Environmentally friendly materials and practices will be preferred in road maintenance and operation activities to reduce indirect emissions. • Collectively, these measures will ensure that the Antalya–Alanya Motorway serves as a low-carbon transport infrastructure in the long term.	
Pysical Risks	Infrastructure and Natural Enviornement	Adverse	Wide	Short	Major	Reversible	Recurrent	Wide (A)	High (3)	High (A3)	• Heat-resistant concrete additives and asphalt binders designed for high temperatures to ensure proper curing and durability. • Detection systems and visibility sensors along roads to provide early warnings. • Maintenance during low-fire-risk seasons. • Slope stabilization techniques for post fire to prevent landslides. • Weather forecasting tools to anticipate delays and adjust schedules. • Implement drainage systems. • Adopt water-efficient technologies • If possible, on-site water should be recycled. • Use of drought-resistant vegetation alongside of the motorway. • Engagement with local communities to agree on shared water resource plans. • Heat-resistant concrete additives and asphalt binders designed for high temperatures to ensure proper curing and durability. • Asphalt laying and concrete pouring during cooler parts of the day • Heat stress management plans, including mandatory breaks in shaded or cooled areas, hydration stations. • Flexible scheduling to account for reduced work hours during extreme heat. • Real-time heat index monitoring to adjust work. • Wind-resistant signage, lighting, and barriers • High-strength steel or composites to withstand storm • Real-time debris detection systems • Response teams to manage road closures and rerouting during storm events Wind speed sensors along the motorway to warn drivers with electronic message signs	Medium
		Adverse	Wide	Short	Medium	Reversible	Recurrent	Medium (B)	Moderate (2)	Medium (B2)	• Provide insulated storage or heated shelters for temperature-sensitive materials and equipment. • Implement de-icing and snow removal protocols for construction and operation areas and the Project roads. • In winter, equip the motorway with snowplows and salt spreaders to maintain accessibility and safety. • Monitoring of snowfall and temperature conditions to trigger response measures.	Low

* *The impacts mentioned above have been assessed based on the worst-case scenario, and it is expected that the actual impacts will occur at lower levels with the implementation of the proposed air quality and climate change mitigation measures.*

XI. NOISE AND VIBRATION

This chapter assesses the anticipated noise and vibration impacts of the Project. In this context, the land preparation and construction, and operation phases of the Project are considered, and the associated impacts are evaluated accordingly. In the final ESIA, this chapter will cover the following aspects:

- Legislative framework for environmental noise, and vibration assessment,
- Baseline environmental noise measurements,
- Assessment and quantification of potential Project emissions,
- Noise modeling with SoundPLAN V 9.1 software for land preparation and construction, and operation phases of the Project,
- Assessment of potential noise and vibration impacts,
- Mitigation measures regarding assessed impacts, and
- Residual impacts regarding noise impacts.

XI.1. Noise

Noise is defined as an undesired sound that is loud or unpleasant or that causes disturbance. Sound consists of vibrations transmitted to the ear as rapid variations in air pressure. In other words, sound is a disturbance propagated through the air as a pressure wave. The fluctuations in atmospheric pressure are sensed by the ear. Frequency is the number of pressure fluctuations per second and is expressed in Hertz (Hz). In other words, the frequency of sound is the rate at which a sound wave oscillates, measured in a number of cycles per second. The human ear is more sensitive to frequencies important for voice communication and hearing sensitivity decreases markedly at frequencies below about 250 Hz. The upper-frequency limit of audibility is around 20 kHz. The frequency of the pressure wave is converted to pitch and its amplitude is converted to loudness. The human ear can respond to a wide range of amplitudes and frequencies of sound.

The response of the hearing system to the amplitude of sound pressure is non-linear and can be characterized by a logarithmic relationship. The relationship is also frequency dependent and an adjustment or weighting is applied to the response of a microphone to different frequency components of a sound in order to produce a scale that better reflects the hearing system. In addition, in order to characterize sounds that fluctuate in intensity, it is necessary to derive a statistic that applies over a period of time.

Sound pressures are measured in units of Pascal (Pa). In order to cope with such a range of sound pressure values it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as sound pressure levels in decibels (dB).

Several different weightings have been proposed to convert measured sound pressure to a measure that correlates with perceived loudness in different circumstances. The ‘A’ weighting can be accepted as the most commonly used and correlates well with the perceived noisiness of road vehicles.

Traffic noise is a general term used to define the noise from traffic using the road network. A broad indication of typical traffic noise levels likely to be encountered at various distances from the road for two different traffic conditions is presented in Figure XI.1. The first is representative of a heavily trafficked road (about 150,000 vehicles per day) and the second is a lighter trafficked road (about 50,000 vehicles per day).

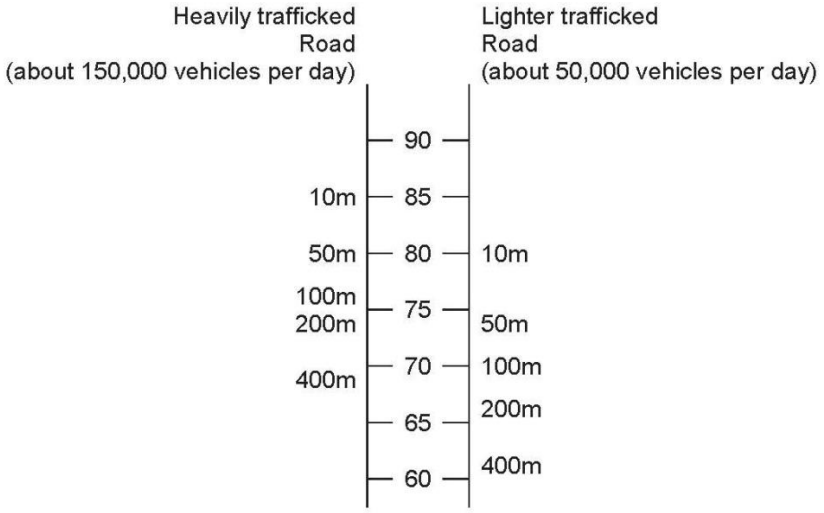


Figure XI.1 Example of Typical Traffic Noise Levels *(UK Highways Agency, 2011)*

XI.1.1. Assessment Methodology and Data Sources

XI.1.1.1. Legal Framework

Turkish Legal Requirements

Regulation on Environmental Noise Control (RENC)

Environmental noise in Türkiye is regulated by the Regulation on Environmental Noise Control (RENC) published on 30.11.2022 in Official Gazette No 32029. This regulation is intended to ensure that precautions are taken to prevent disturbance to peace and tranquility and to ensure the physical and mental health of persons potentially exposed to environmental noise. For this purpose, the regulation sets out requirements regarding noise mapping, acoustic reporting, environmental noise assessment to determine noise exposure levels, and preparation and application of action plans to prevent or mitigate the negative impacts of noise exposure on human beings and the environment.

According to the Regulation on Environmental Noise Control, noise limit values defined to prevent noise from road projects are defined in Annex II, Table 1. Environmental noise limits values defined in the RENC are presented in Table XI.1.

Table XI.1. Environmental Noise Limits Values

Noise Source	Measured Parameter	Environmental Noise Level		
		Day (07:00 – 19:00)	Evening (19:00 – 23:00)	Night (23:00 – 07:00)
Industrial plants, transportation resources	$LA_{eq,5min}$	65 dB(A)	60 dB(A)	55 dB(A)
Music broadcasting workplaces (1)	$LA_{eq\ 63\text{-}250\ Hz}$	60 dB(A)	55 dB(A)	50 dB(A)
Workplaces (2)	$LA_{eq,5min}$	Background + 5 dB(A)		Background +3 dB(A)
In case of multiple workplaces (3)	$LA_{eq,5min}$	Background + 7 dB(A)		Background +5 dB(A)
All resources	LC_{max}	100 dB(C)		

(1): These limit values are valid as of 31.12.2023. These limit values are provided in each 1/3 octave band of the specified frequency range. In the acoustic reports prepared until this date; environmental noise measurement results and measures determined as a result of the measurement results taken are included.
(2): Workplaces broadcasting music and sea vessels are included.
(3): Each workplace that contributes to the background noise level is equally responsible for ensuring this limit value. Each workplace takes the necessary measures according to their contribution to noise.

The Annex-2 Article 10 of RENC states that "The working hours of the construction activities of projects such as dams, bridges, tunnels, motorways, urban highways, mass housing which require public benefit and construction activities that will prevent daytime traffic in the city are determined by the decision of the Provincial Local Environmental Board." In this context, the permitted time zones for outdoor activities in residential areas that cause environmental noise are given in Table XI.2.

Table XI.2. Permitted Time Frame for Outdoor Activities in Residential Areas

Activity Name	Activity Time
Construction site activities	10.00-22.00
Outdoor activities that cause environmental noise	10.00-01.00
Use of fireworks	20.00-22.00
Blasting activities in mines, quarries, and other areas	10.00-20.00

As an exception to these time frames, according to Annex-2, Article 10 of the RENC, working hours for construction projects such as dams, bridges, tunnels, motorways, main urban roads, and mass housing developments that serve public interest and construction activities that are likely to disrupt daytime city traffic are set by the Provincial Local Environmental Board's decision.

International Finance Corporation (IFC) Standards

Noise limit levels are described under Environmental, Health and Safety (EHS) Guidelines, General EHS Guidelines: Environmental, Noise. The noise limit values are based on World Health Organization Guidelines for Community Noise. Noise levels defined by IFC are presented in Table XI.3.

Table XI.3. IFC Noise Limit Values

Receiving Environment	Hourly LAeq (dBA)	
	Day 07:00 - 22:00	Night 22:00 - 07:00
Residential, institutional and educational areas	55	45
Industrial, and commercial areas	70	70

IFC requires that noise impacts should not exceed the levels presented in Table XI.3. . If the background noise levels are above the standard levels, noise should not result in an increase in background noise levels more than 3 dB at the nearest receptor location off-site.

The IFC EHS Guideline also presents examples of noise reduction options that should be considered where noise levels exceed these guideline values, along with recommendations for noise monitoring to be carried out either to establish existing ambient noise levels or to verify operational noise levels.

In addition to the IFC General EHS Guidelines, the IFC EHS Guideline for Toll Roads offers guidance on noise management for road/motorway projects. While this guideline provides management practices to prevent, minimize, and control noise, it does not specify noise limit values. As a result, the guidance on noise management in this document is limited and was determined to have limited applicability to this Project.

When European Directives are reviewed, Directive 2002/49/EC namely, the Environmental Noise Directive states that “Member States shall designate at the appropriate levels the competent authorities and bodies responsible for implementing this directive: (a) making and, where relevant, approving noise maps and action plans for agglomerations, major roads, major railways and major airports; (b) collecting noise maps and action plans. Although the EU Environmental Noise Directive does not prescribe noise limits for new roads, such standards are expected to be established at the national level for member states. This directive requires that the member states apply the noise indicators L_{den} and L_{night} for noise assessment.

In summary, Turkish noise limits and IFC guidelines were utilized to assess the impacts of the Project on environmental noise levels.

Noise Assessment Criteria

Within the scope of the Project, noise assessments were carried out based on both the national regulation (RENC limit values) and the IFC limit values. Since IFC thresholds define more stringent criteria compared to RENC, the assessments were conducted in accordance with the stricter IFC standards.

Significance Criteria

The significance criteria for the impacts regarding noise will be determined, as high, medium or low, based on the evaluation of magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter IV (“ESIA Methodology”) will be used for the determination of the magnitude of impacts, while sensitivity/value criteria to be used in the scope of impact assessment is summarized in Table XI.4.

Table XI.4. Criteria for Sensitivity/Value of Resource/Receptor

Receptor/Resource	Sensitivity/Value Level		
	High (3)	Medium (2)	Low (1)
Human Receptors	Educational, cultural, health facilities, places densely populated with summer houses and camping areas and/or areas densely populated with residences	Areas with dense work places/ industrial areas and areas not densely populated with residences	Industrial / Rural areas

The magnitude of impacts was evaluated based on increase in baseline noise levels measured in settlements close to the Motorway route. The magnitude of impact is defined as low, medium and high when the result of modeling study increases baseline noise levels of a specified location 3-6 dBA, 6-9 dBA and more than 9 dBA, respectively (see Table XI.5). Furthermore, regardless of the increase in baseline noise level, the magnitude of impact is classified as high when results of noise modeling study indicate exceedance in noise limit values. Therefore, increases in noise levels up to 3 dB at a specified location are considered acceptable, with the impact magnitude defined as negligible.

Table XI.5. Impact Magnitude Criteria

Magnitude of Impact	Increase in Baseline Noise Level (L_{den} dBA)
Low	3-6 dBA
Medium	6-9 dBA
High	>9 dBA or noise modeling study indicates exceedance of noise limit values

XI.1.2. Baseline Conditions

As part of the ESIA studies, baseline noise measurements were conducted along and around the Antalya–Alanya Motorway route in September 2024 to determine the existing noise levels during both weekdays and weekends. Background noise measurements were conducted at 21 locations along and around the Antalya–Alanya Motorway route, with a focus on residential areas and sensitive receptors most likely to experience elevated noise levels. The selected measurement sites included locations near quarries, state highways, and other roads with heavy traffic to capture a representative range of existing noise conditions. These locations were chosen to ensure that the nearest sensitive receptors to the Project area were included in the baseline noise assessment. Therefore, background noise measurements were indeed conducted at the closest sensitive receptors to the Project area to accurately reflect existing noise levels.

Detailed information on the distances of residential buildings and sensitive receptors located near the Project alignment, as well as field conditions, is provided in Table XI.6. To visually support the noise monitoring campaign, representative weekday and weekend photographs were included from two selected locations: Emişbeleni Neighborhood, representing a rural residential setting, and Serik District, representing an urban environment. These photos were selected to illustrate the environmental context of the noise measurement points. Field photographs are provided in Figure XI.2 and Figure XI.3.

As shown in Figure XI.4, 24-hour continuous noise measurements were conducted at the 21 selected locations along the motorway alignment. The noise measurements were commissioned by ENCON Laboratuvarı A.Ş. and carried out in accordance with TS ISO 1996–2 standards by ANKALAB Çevre Analiz Laboratuvarı SAN. TİC. LTD. ŞTİ., an accredited laboratory authorized by the Ministry of Environment, Urbanization and Climate Change. The brand and model information of the equipment used, along with calibration and accreditation certificates, are provided in Annex-2. A summary of the measurement results is presented in Table XI.6.



Emişbeleni Neighbourhood



Serik Neighbourhood

Figure XI.2 Weekday Noise Measurement – Emişbeleni and Serik Neighbourhood



Emişbeleni Neighbourhood



Serik Neighbourhood

Figure XI.3 Weekend Noise Measurement – Emişbeleni and Serik Neighbourhood

Table XI.6 Geographical and Environmental Information of Noise Measurement Points

Neighborhood	Coordinates	Corresponding Motorway (KM)	Environmental Activities	Distance to Project Alignment (m)
Akdam	393414/4055623	127+000	Greenhouses, residential areas, a school, and a mosque near a road with vehicle traffic	380
Avsallar	389720/4055765	123+400	Greenhouses, residential areas, and hotels near a road with vehicle traffic.	640
Bademliyar	389655/4072729	115+000	The Bademliyar quarry is located near the receptor along the Konya-Manavgat D695 highway	11,980
Bucakşeyhler	363395/4078780	86+500	Residential areas, tourism facilities, and greenhouses near a road with vehicle traffic.	190
Çakallar	386572/4060940	117+100	Residential areas and roads	230
Deniz Tepesi	334640/4094389	52+000	Greenhouses and residential areas near a road with vehicle traffic.	350
Emişbeleni	399364/4055198	133+000	Greenhouses and residential areas near a road with vehicle traffic.	75
Hacıali	370544/4070725	97+750	Greenhouses, residential areas, and a school near a road with vehicle traffic.	560
Hacıobası	373104/4065985	Manavgat East Access Road 1+000	Greenhouses and residential areas near a road with vehicle traffic.	100
Kalemler	353691/4080989	76+300	Greenhouses and residential areas near a road with vehicle traffic.	490
Karakaya	385356/4061872	115+500	Greenhouses and residential areas near a road with vehicle traffic.	410
Konaklı	401287/4049717	140+600	Greenhouses and residential areas near a road with vehicle traffic.	550
Köprüçay	339819/4095932	56+700	Greenhouses, Köprüçay stream, and residential areas near a road with vehicle traffic.	2,860
Sağırin	341974/4097230	57+250	Residential areas, tourism facilities, a school, and a river near a road with vehicle traffic.	4,890
Sarılar	360448/4076493	83+500	Greenhouses, Borrow Pit, and residential areas near a road with vehicle traffic.	2,335
Sarıabalı	337884/4093014	55+400	Greenhouses, Köprüçay stream, and residential areas near a road with vehicle traffic.	0
Serik	330608/4089427	Serik Access Road 7+000	Greenhouses and residential areas near a road with vehicle traffic.	690
Sülek	371900/4068786	100+000	Residential areas near a road with vehicle traffic.	620
Taşağıl	343326/4087476	Taşağıl Access Road 2+500	Antalya-Konya D687 highway and residential areas	310
Ulukapı	365551/4075913	90+300	Greenhouses and residential areas near a road with vehicle traffic.	425
Uzunlar	376876/4066570	105+400	Greenhouses, Çenger stream, and residential areas near a road with vehicle traffic.	1,330

Table XI.7. Noise Measurement Results

Districts	Measurement Date	Environmental Conditions During Sampling	Coordinates (UTM WGS84-Zone 35)		RENC Noise Levels			IFC EHS Guidelines Noise Levels	
			X (North)	Y (East)	L_{eq} Day (7:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)
Sarıabalı	16-17.09.2024	Sunny	337884	4093014	62.4	56.2	53.6	61.5	53.2
	21-22.09.2024	Sunny			61.9	55.7	55.6	61.2	55.5
Sarılar	16-17.09.2024	Sunny	360448	4076493	65.5	63.7	62.0	65.1	62.5
	21-22.09.2024	Sunny			63.1	63.0	59.0	63.2	59.3
Bucakşeyhler	16-17.09.2024	Sunny	363395	4078780	70.3	56.3	55.0	69.3	55.6
	21-22.09.2024	Sunny			65.7	64.3	58.7	65.5	59.3
Kalemler	16-17.09.2024	Sunny	353691	4080989	57.6	52.7	45.7	57.1	45.6
	21-22.09.2024	Sunny			66.0	61.7	60.8	65.5	60.6
Köprüçay	16-17.09.2024	Sunny	339819	409532	63.9	58.6	58.5	63.2	58.8
	21-22.09.2024	Sunny			64.0	62.9	62.8	64.0	62.4
Bademliyar	16-17.09.2024	Sunny	389655	4072729	71.8	56.9	55.5	70.9	55.3
	21-22.09.2024	Sunny			63.3	61.7	61.6	63.2	61.2
Ulukapı	16-17.09.2024	Sunny	365551	4075913	60.2	59.8	59.4	60.4	59.0
	21-22.09.2024	Sunny			62.7	57.9	54.9	62.1	55.0
Taşağıl	16-17.09.2024	Sunny	343526	4087476	79.1	68.5	56.4	78.3	56.5
	21-22.09.2024	Sunny			68.8	65.5	65.3	68.4	65.1
Hacıali	16-17.09.2024	Sunny	370544	4070725	73.1	45.6	43.9	72.2	43.5
	21-22.09.2024	Sunny			68.5	67.2	66.0	68.4	65.9
Deniz Tepesi	16-17.09.2024	Sunny	334640	4094389	63.9	55.2	54.8	63.1	54.8

Districts	Measurement Date	Environmental Conditions During Sampling	Coordinates (UTM WGS84-Zone 35)		RENC Noise Levels			IFC EHS Guidelines Noise Levels	
			X (North)	Y (East)	L_{eq} Day (7:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)
	21-22.09.2024	Sunny			67.0	61.1	57.8	66.3	57.4
Serik	16-17.09.2024	Sunny	330608	4089427	64.4	63.0	60.4	64.3	60.2
	21-22.09.2024	Sunny			66.6	62.2	60.3	66.1	59.9
Konaklı	17-18.09.2024	Sunny	401287	4049717	56.3	52.4	51.6	55.6	51.4
	21-22.09.2024	Sunny			64.4	63.0	60.4	64.3	60.2
Çakallar	17-18.09.2024	Sunny	386572	4060940	58.3	56.5	41.9	57.9	48.7
	21-22.09.2024	Sunny			62.2	62.7	60.7	61.9	61.7
Avsallar	17-18.09.2024	Sunny	389720	4055765	57.2	54.2	53.9	56.8	53.6
	21-22.09.2024	Sunny			61.6	61.5	55.4	61.9	54.9
Akdam	17-18.09.2024	Sunny	393414	4055623	64.4	62.3	61.5	63.8	62.1
	21-22.09.2024	Sunny			62.1	60.2	57.4	62.0	56.9
Emişbeleni	17-18.09.2024	Sunny	399364	4055198	59.8	59.0	52.2	59.8	52.2
	21-22.09.2024	Sunny			71.6	69.5	66.7	71.3	66.6
Karakaya	17-18.09.2024	Sunny	385356	4061872	68.7	66.2	62.7	68.5	62.4
	21-22.09.2024	Sunny			73	72.8	63.8	73.2	63.6
Hacıobası	17-18.09.2024	Sunny	373104	4065985	55.9	50.3	50.2	55.3	50.2
	21-22.09.2024	Sunny			61.2	60.2	43.9	61.2	47.6
Uzunlar	17-18.09.2024	Sunny	376876	4066570	62.9	60.6	60.1	62.6	59.8
	21-22.09.2024	Sunny			74.5	62.3	53.5	73.6	54.3
Sülek	17-18.09.2024	Sunny	371900	4068786	57.9	50.5	50.0	57.2	49.8
	21-22.09.2024	Sunny			68.6	66.8	62.4	68.2	63.5

Districts	Measurement Date	Environmental Conditions During Sampling	Coordinates (UTM WGS84-Zone 35)		RENC Noise Levels			IFC EHS Guidelines Noise Levels	
			X (North)	Y (East)	L_{eq} Day (7:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)
Sağırin	17-18.09.2024	Sunny	341974	4097230	70.7	64.6	64.3	70.1	64.0
	21-22.09.2024	Sunny			67.6	67.0	66.0	67.3	66.5

The conducted noise measurements were compared against the equivalent continuous sound level (Leq) values specified for industrial plants and transportation resources in Table XI.1 of the Regulation on Environmental Noise Control, as well as the limit values for residential, institutional, and educational areas outlined in Table XI.3 of the IFC EHS Guidelines. The assessment results indicate that Leq levels measured during daytime, evening, and nighttime frequently exceed these thresholds at multiple locations. Notably, in settlements such as Bucakşeyhler, Bademliyar, Taşağıl, Hacıali, Karakaya, and Sağırin, noise levels during both day and night were observed to be significantly above the IFC limits. This is primarily attributed to the presence of various noise sources and sensitive receptors in close proximity. Measurement points were carefully selected to accurately represent the existing acoustic environment within the project area, covering a mix of 21 major road and state roads, 20 residential areas, 15 agricultural enterprises, 3 tourism sites, 3 schools, 1 mosque, and 4 rivers. This combination ensures representation of diverse conditions found in rural, semi-urban, and more developed areas, thereby capturing typical noise levels in locations where people live, work, and gather.Conditions that may result in high noise levels for each measurement point are given in Table XI.6.

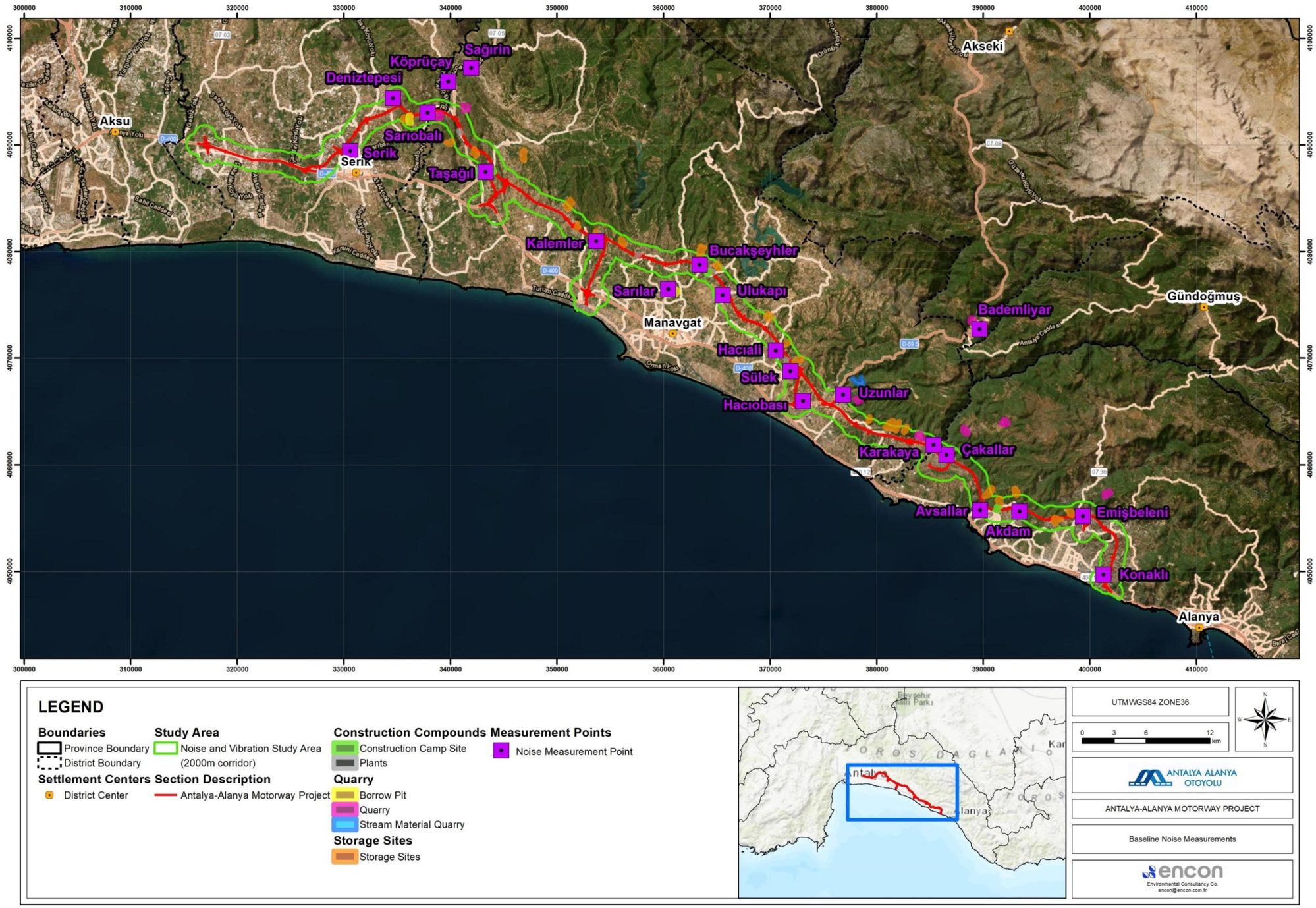


Figure XI.4 Baseline Noise Measurements

XI.1.3. Potential Impacts

Both land preparation and construction, and operation phase activities of the Project are expected to result in increases in noise levels, particularly in the vicinity of the Motorway route.

In order to evaluate the increase in noise levels in neighborhoods along the route, noise modeling was conducted using SoundPLAN V 9.1 (64-bit) software. The objectives of the modeling study are as follows:

- Estimate noise levels caused by construction activities related to the Project and prepare corresponding noise maps.
- Estimate noise levels during the operation of the Motorway and prepare corresponding noise maps.
- Determine whether noise levels at a specified location exceed limit values defined in relevant regulations and guidelines.
- Define mitigation measures to reduce noise levels to acceptable levels at specified limit exceeding locations.

The noise emissions for the motorway were calculated using data from the “Guide du bruit des transports terrestres, fascicule: prévision des niveaux sonores – CETUR 1980”, which is referenced in the French standard NMPB-Routes-96 (XPS 31-133). This methodology is recognized in the Réseau National des Experts en bruit des infrastructures de transport (RNEC) and is also compatible with the principles outlined in the EU Environmental Noise Directive (END).

The selection of the NMPB-Routes-96 method, rather than the CNOSSOS-EU: Road (2015/2021) model, was based on its continued acceptance in various national frameworks and its applicability to the project’s specific parameters. The RNEC guideline provides flexibility in allowing either NMPB-Routes-96 or CNOSSOS-EU methods, and in this case, the former was selected due to availability of input parameters and compatibility with existing datasets.

For motorway calculations:

- NMPB-Routes-96 / CETUR 1980 (as per French standard and endorsed by RNEC) or CNOSSOS-EU: Road (2015 or 2021) (as per EU END)

For industrial facilities:

- TS ISO 9613-2:2024-01, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation or CNOSSOS-EU: Industry (2015 or 2021)

Furthermore, the calculation height was taken as 4 meters, in accordance with the standard practice defined in both NMPB and CNOSSOS-EU frameworks. This height corresponds to the most exposed point on the building façade, which should be located at 4 ± 0.2 m above ground level, ensuring consistency with both directive requirements and modeling accuracy.

For the construction site and construction phase, TS ISO 9613 - 2: 2024-01 Acoustics - Attenuation of Sound as it Propagates Outside - Part 2: General Calculation Method was used.

Noise map calculations were performed according to the Noise Map Preparation Guide published by the Ministry of Environment, Urbanization and Climate Change. The modeling results will be evaluated according to the noise limit values for “industrial facilities, transportation resources” defined in the RENC (see Table XI.1), and the IFC noise limit value of 45 dB (A) at night (see Table XI.3).

XI.1.3.1. Land Preparation and Construction Phase

Noise modeling for the land preparation and construction phases was conducted by simulating the noise levels generated by construction machinery and equipment used during these activities. To represent the worst-case scenario, the maximum number of machinery and equipment was considered in the modeling studies. Noise intensity levels for each type of equipment were sourced from the SoundPlan software database. It is unrealistic to assume that all construction machinery and equipment planned to operate at the project site will run at full capacity. The primary reasons are the insufficient number of personnel and the physical impracticality of operating two different types of machinery in the same place at the same time due to workflow constraints. For this reason, a 50% operating percentage was used in the modeling. Additionally, the machinery and equipment to be utilized for road construction activities are planned to operate for 20 hours per day in two shifts. In contrast, the machinery and equipment to be used within the construction sites are expected to operate for 10 hours per day, also in two shifts.

Blasting Noise (Air Overpressure) Assessment

The noise impact from blasting activities has been evaluated in terms of air overpressure, which is a key parameter for blasting-induced noise. According to the Antalya–Alanya Motorway Project Blasting Excavation Pre-Design Report, Project Director Prof. Dr. Ali Kahriman (Mining Engineer), Graduate School, Explosives Engineering Master's Program Coordinator, Istanbul Okan University, Faculty of Engineering and Natural Sciences, a threshold of 140 dB is considered as the limit for air overpressure. Depending on the explosive charge, the distances at which this threshold value can be reached have been calculated. As shown in Table XI.8, the distance at which 140 dB air pressure can be reached varies between 18 m and 72 m, depending on the amount of explosive used. These results ensure that blasting operations are managed in a way that minimizes the potential noise and safety impacts on the environment and sensitive receivers (evaluated according to the 15 mm/s vibration limit). The blasting noise values represent the scenario calculated for 15 mm/s. At lower vibration velocities (for example, 5 mm/s or 2 mm/s), the explosive charge would be reduced or the distance to the receiver would increase, resulting in a lower amplitude of blasting noise.

The Peak Particle Velocity (PPV) is calculated using the following formula:

$$PPV = K \times SD^{-\beta} = K \times (R/W^{0.5})^{-\beta}$$

- PPV: Peak Particle Velocity (15 mm/s used for calculations)
- K: Ground constant
- β: Ground attenuation coefficient
- R: Distance from blast to receiver (m)

To calculate the allowable amount of explosives per delay (W), the equation is rearranged as follows:

$$W = \left(\frac{R}{\sqrt[\beta]{\frac{K}{PPV}}} \right)^2$$

The sound pressure level at a given distance is calculated as:

$$L(d) = L(d_0) - 20.\log 10\ (d/d_0)$$

- L(d) = sound pressure level (dB(A)) at distance d
- L(d0) = reference sound pressure level (dB(A)) at distance d0
- d0 = reference distance (m)
- d = target distance (m)

Table XI.8 Calculations based on the distance to the risk point for a vibration of 15 mm/s

Distance to Risk Point (m)	Max. Explosive Charge (kg/delay) [15 mm/s limit]	140 dB Air Overpressure Distance (m)
50	6.06	18
100	24.22	29
150	54.50	37
200	96.88	45
250	151.38	53
300	217.98	59
350	296.70	66
400	387.52	72

Calculations were carried out based on the worst-case scenario, with a maximum explosive charge of 387.52 kg per delay. The maximum charge weight per delay is expressed in TNT equivalent, and approximately 70% of the explosives consist of ammonium nitrate, which is common practice in the mining industry. The result of the maximum charge per delay (kg) is illustrated in Figure XI.5, while the detailed Blasting Noise Levels are provided in Table XI.9.

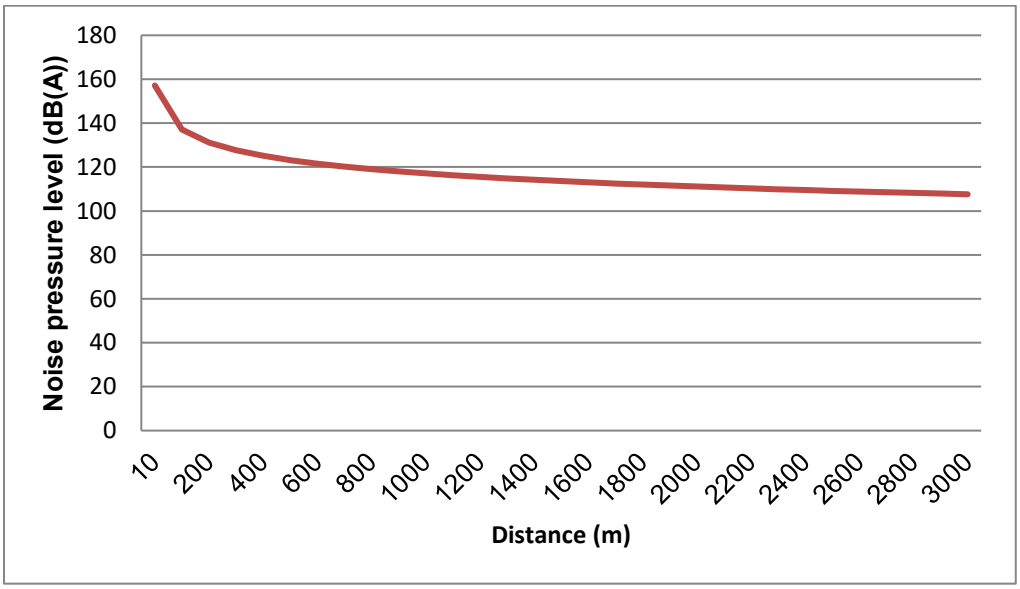


Figure XI.5 Noise Pressure Level Attenuation with Distance from Blasting Source

Table XI.9 Predicted Blasting Noise Levels

Charge Per Delay	30 m	100 m	500 m	600 m	1,000 m	1,500 m	2,000 m	3,000 m
387.52 kg	147.6	137.1	123.2	121.6	117.1	113.6	111.1	107.6
296.7 kg	146.8	136.4	122.4	120.8	116.4	112.9	110.4	106.8
217.98 kg	145.9	135.4	121.4	119.9	115.4	111.9	109.4	105.9
151.38 kg	144.9	134.5	120.5	118.9	114.5	111.0	108.5	104.9
96.88 kg	143.5	133.1	119.1	117.5	113.1	109.5	107.0	103.5
54.5 kg	141.8	131.4	117.4	115.8	111.4	107.8	105.3	101.8
24.22 kg	139.7	129.2	115.3	113.7	109.2	105.7	103.2	99.7
6.06 kg	135.6	125.1	111.1	109.5	105.1	101.6	99.1	95.6

Prior to blasting operations, the sensitivity of nearby settlements and structures to noise and vibration will be assessed. All blasting operations will be conducted in accordance with the project's Blasting Management Plan. The noise from a blast can be quite high if the listener is within a few hundred meters of the blast. Airborne pressure waves, particularly the low-frequency component, can cause annoyance through both hearing and feeling at levels above peak values of around 140 dBA. However, at greater distances, it is generally perceived as a low rumble or "popping" sound lasting one or two seconds. If the wind is blowing away from the listener, the sound may not be heard. Certain atmospheric conditions, such as low cloud cover, can allow the sound waves to propagate over longer distances, resulting in a more noticeable "air blast" effect. The development and implementation of the Blasting Management Plan, combined with conducting blasts within pits and well below ground level, will minimize the impact of air blast noise. Aboveground blasting operations will not be conducted within a 100-meter radius of residential areas or neighborhoods if alternative construction methods are feasible.

Noise Modelling for Land Preparation and Construction Phase

During the noise impact assessment, virtual receiver points were defined within a calculation area covering approximately 3 kilometers along the construction zones of the project route, and extending up to 1 kilometer on both sides of the motorway corridor. These virtual receivers were positioned to both represent the baseline noise measurement locations and to ensure accurate modeling of noise propagation.

While developing the terrain model for the region, it was observed that building heights within the study area vary due to the project route passing through different zones. Although most buildings in the project area are one to two stories high, in residential complexes located within the project corridor, building heights can reach up to five stories.

List of maximum number machinery to be used in different sections of motorway are presented in Table XI.10.

Noise modeling for the construction phase was conducted using SoundPLAN software, with simulations performed at a height of 4 meters and using 10 x 10 meter grid structure. Noise levels observed in nearest receptors which are all classified with high sensitivities are presented in **Error! Reference source not found.** Table XI.6.

Table XI.10. Maximum Number of Construction Machinery

Type of Machinery	Number of Machinery	Sound Power Level dB(A)*
Excavator	51	105
Grader	5	100

Type of Machinery	Number of Machinery	Sound Power Level dB(A)*
Bulldozer	14	120
Jumbo	12	120
Telehandler	12	104
Mobile Crane	20	104
Trans mixer	50	115
Shotcrete Machine	12	99
Loader	20	105
Mobile Concrete Pump	7	99
Fixed Concrete Pump	16	99
Water Truck	7	104
Drum Compactor	10	115
Asphalt Paver	12	100
Asphalt Distributor	2	104
Soil Compactor	14	115
Roller	10	90
Dump Truck	140	104
Rock Driller	12	120
Injection Machine	12	105
Concrete Batching Plant	7	100
Benninnghoven Asphalt Plant	3	100
Flygt Pump	21	75
Mechanical Plant	3	110
Total	**472**	**126.47****

* Sound power levels are taken from the SoundPLAN library. Source :Bearbeitung: RWTÜV Anlagentechnik GmbH, Essen im Auftrag des Landesumweltamtes NRW, Essen 2000
** Total sound power level

The sound power levels of the machinery to be used at construction sites and for road construction activities have been calculated using the formula provided below.

$$Leq = \sum_{İ=1}^{n} 10*\log[1/n*(10^{Li/10}+.....+10^{Li/10})$$

n: Total Quantity
Li: Sound Power Level
Leq: Total Sound Power Level

Due to the fact that the project route traverses different regions, building heights within the project area exhibit variation. While the majority of structures are low-rise buildings ranging from 1 to 2 storeys,

certain public housing developments within the project corridor include buildings with heights of up to 5 storeys. The terrain model of the project area is illustrated in Figure XI.6 and Figure XI.7.

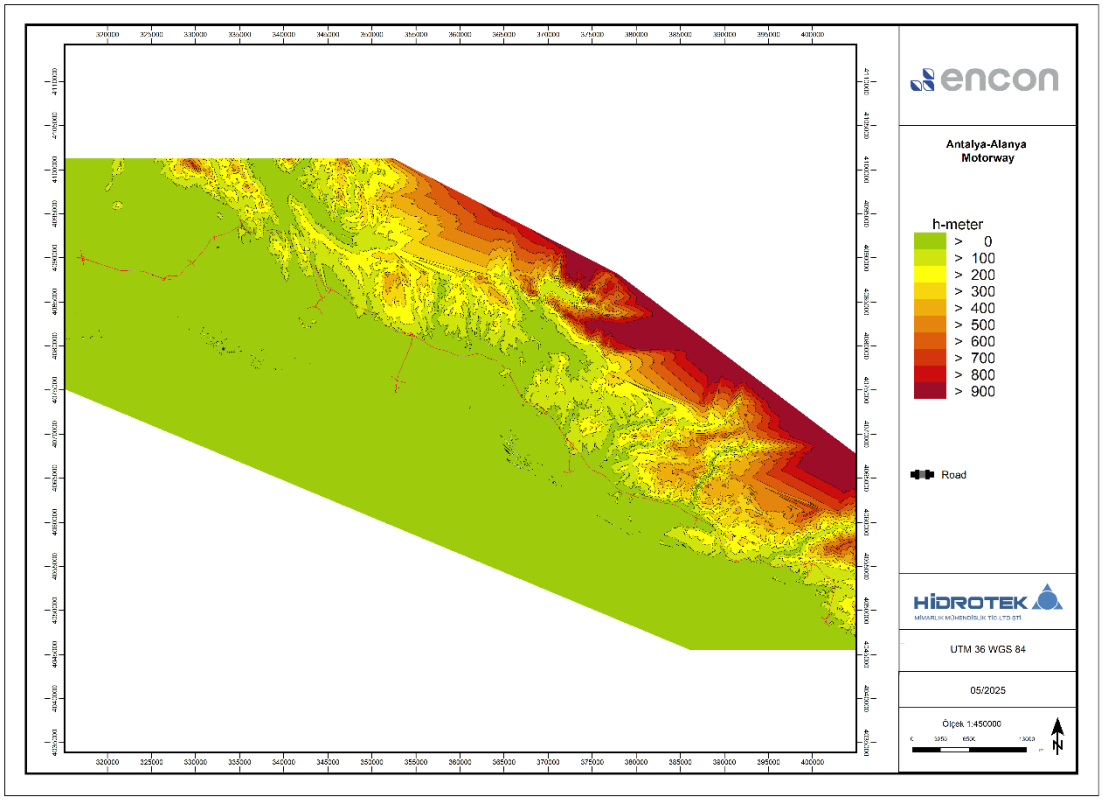


Figure XI.6 AAMP land model

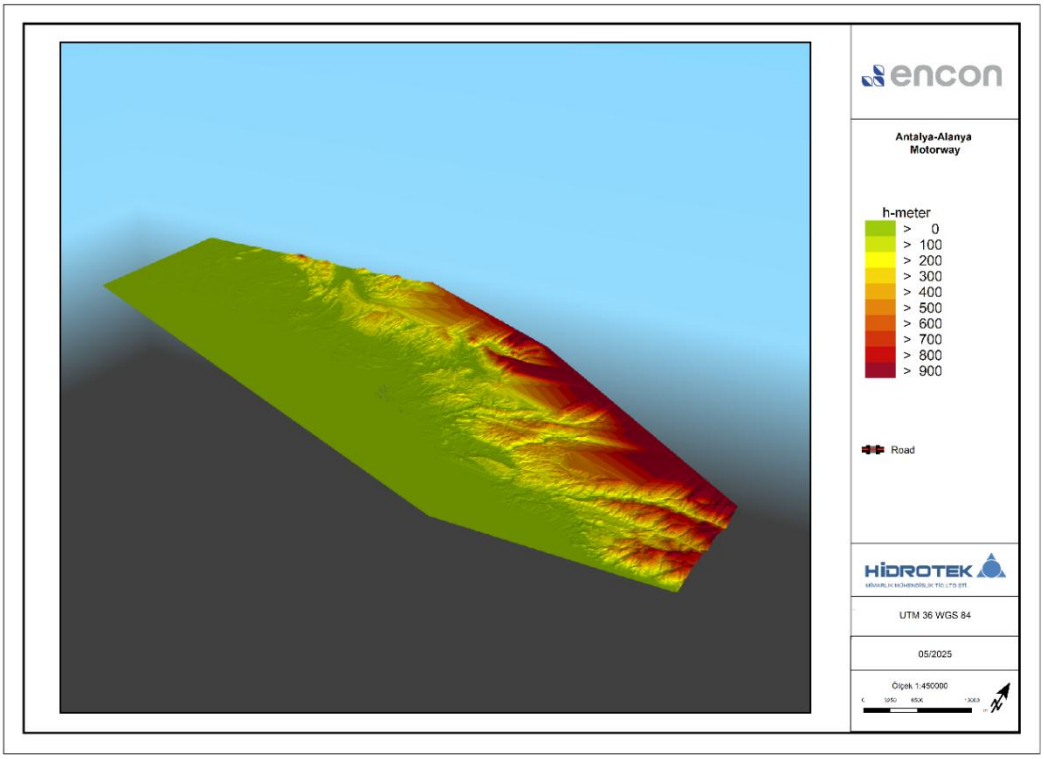


Figure XI.7 AAMP Land model 3D

Situation Assessment for Construction Sites and Motorway Construction Route

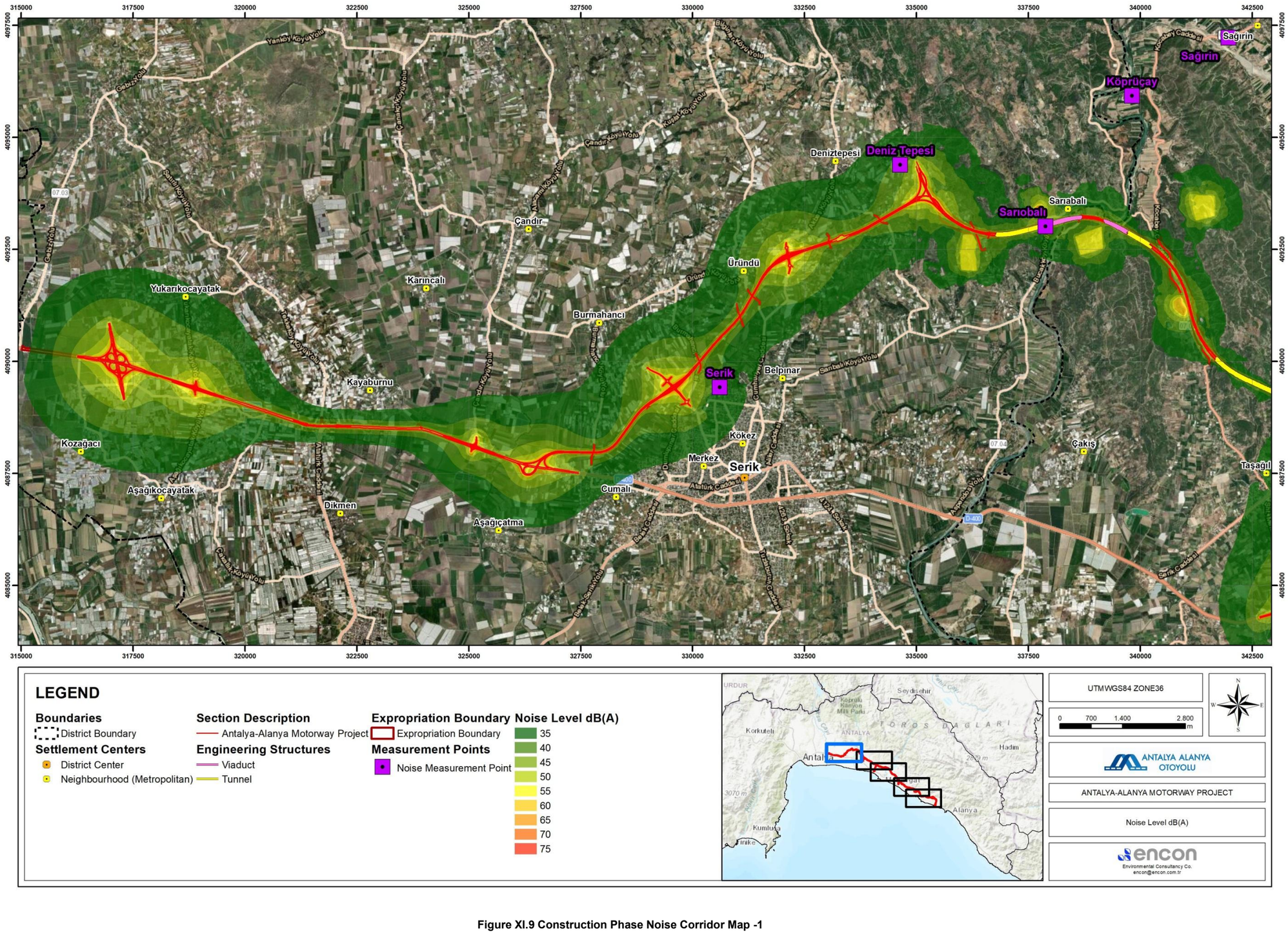
In the noise modelling study, land use classifications were taken into account, and it was specified that construction site activities would be carried out during daytime hours (07:00–19:00). Accordingly, all calculations were conducted based on this time frame. The impact assessment was performed by comparing the modelling results with the threshold values specified in the RENC.

The spatial distribution of construction site and motorway construction activities is presented in Figure XI.8, using Google Earth imagery. Noise distribution maps corresponding to Lgag (24-hour exposure) and Lday (07:00–19:00) are provided in Figure XI.14 through Figure XI.18. An example section based on these modelling results is presented herein, while detailed outputs and full modelling documentation are provided in Annex 7 Noise Modelling Report**.**



Figure XI.8 Construction Sites, Quarries and Motorway Route Map Sheets

During the construction phase, noise levels and affected areas along the motorway are illustrated in Figure XI.9 to Figure XI.13 as noise corridors in decibels. These maps depict the spatial distribution and intensity of noise generated by excavation, embankment, quarry operations, and transportation activities. The noise corridors help identify the maximum decibel levels that nearby settlements may be exposed to and support the planning of necessary mitigation measures.



LEGEND

Boundaries
- District Boundary

Settlement Centers
- District Center
- Neighbourhood (Metropolitan)

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Expropriation Boundary
- Expropriation Boundary

Measurement Points
- Noise Measurement Point

Noise Level dB(A)
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

UTMWGS84 ZONE36

0 700 1.400 2.800 m

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Noise Level dB(A)

encon
Environmental Consultancy Co.
encon@encon.com.tr

Figure XI.9 Construction Phase Noise Corridor Map -1

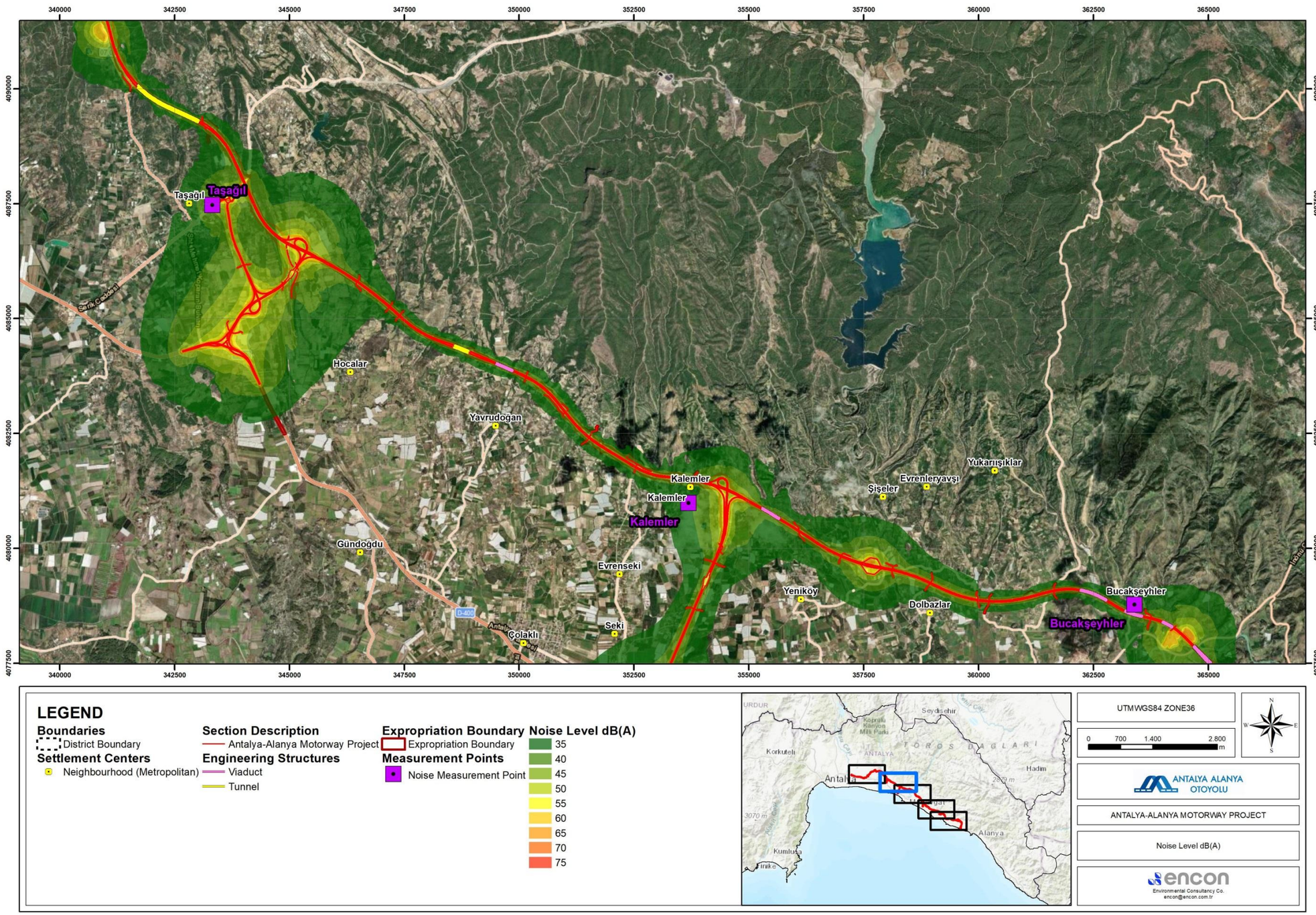


Figure XI.10 Construction Phase Noise Corridor Map -2

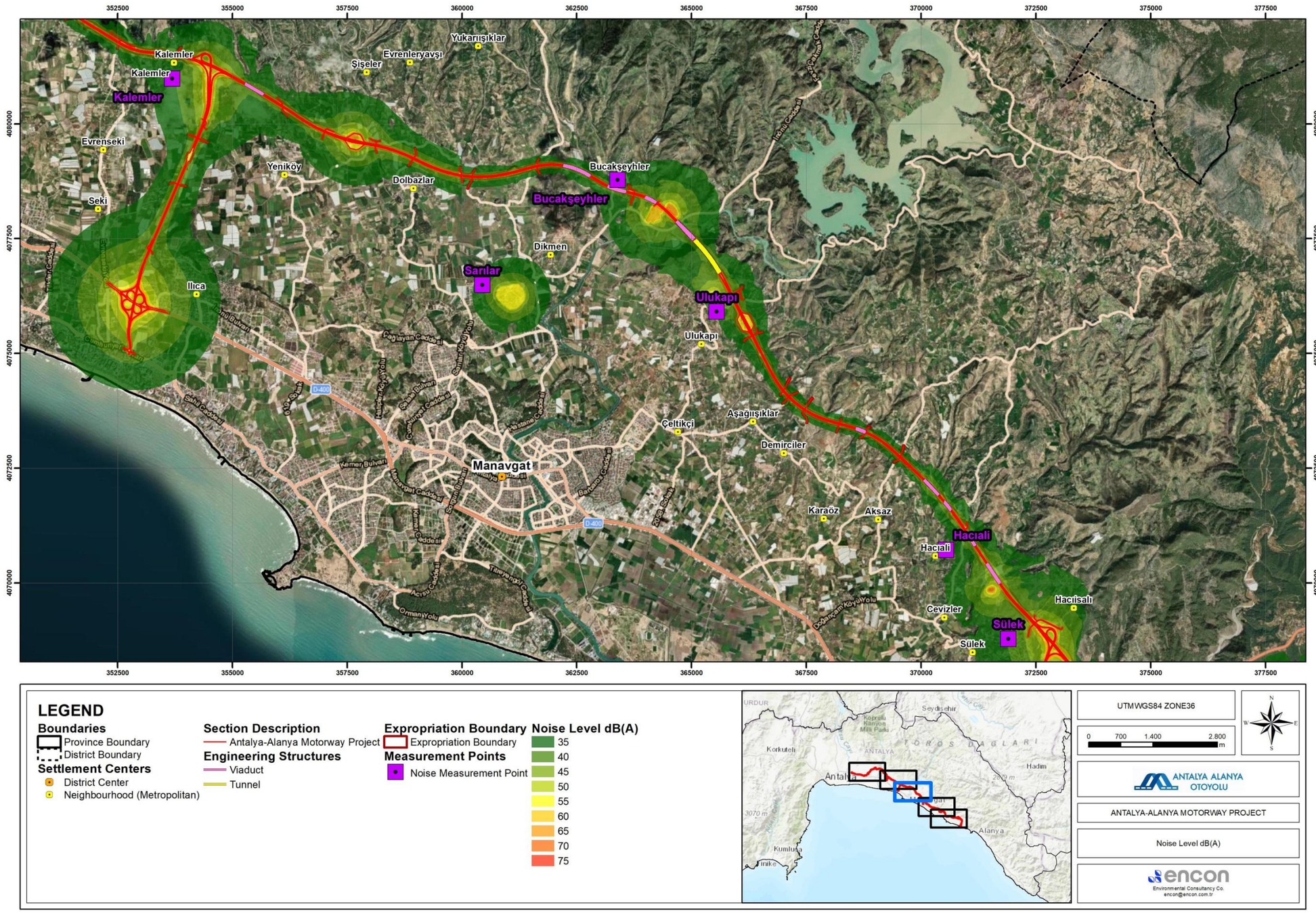


Figure XI.11 Construction Phase Noise Corridor Map -3

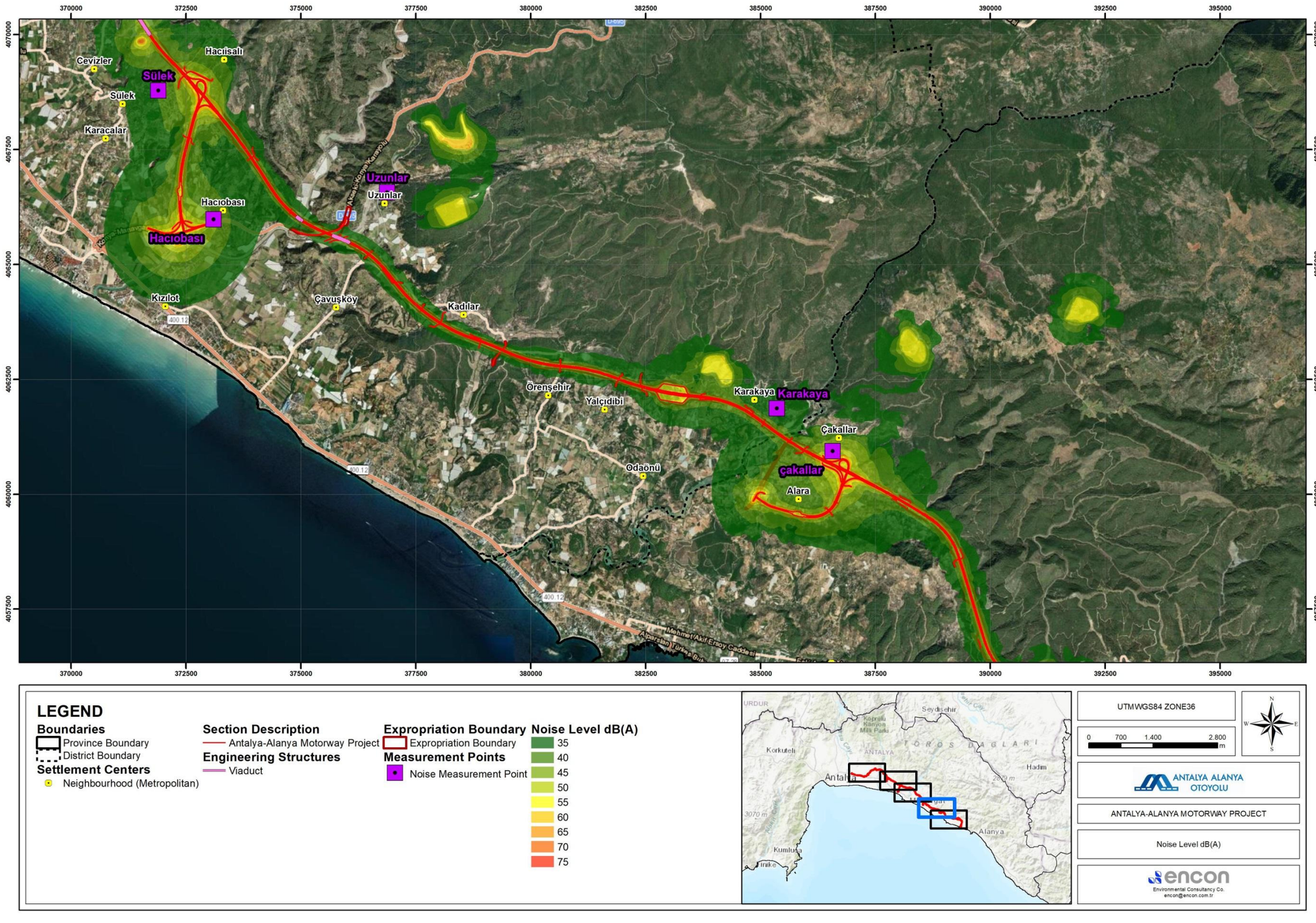


Figure XI.12 Construction Phase Noise Corridor Map -4

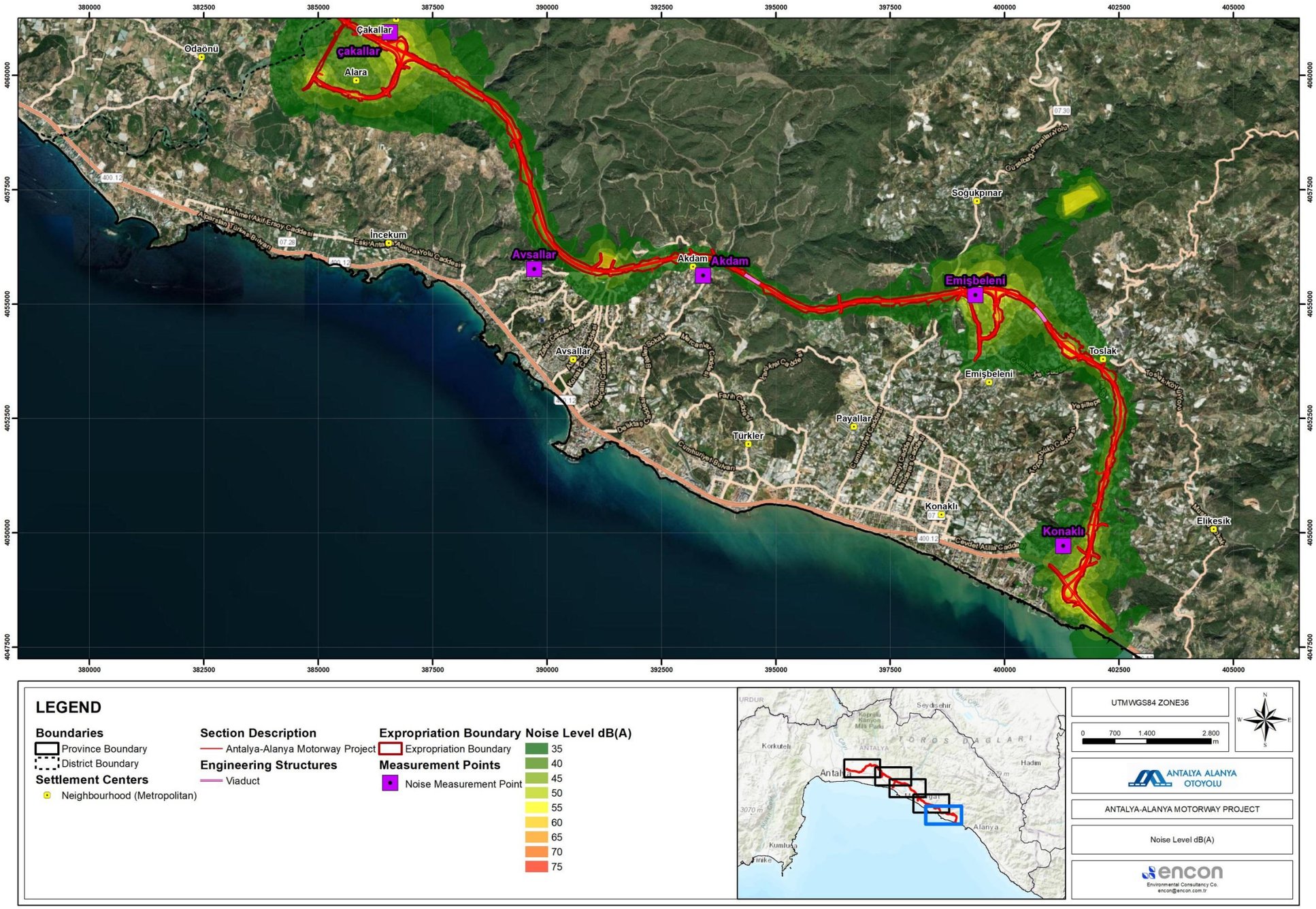


Figure XI.13 Construction Phase Noise Corridor Map -5

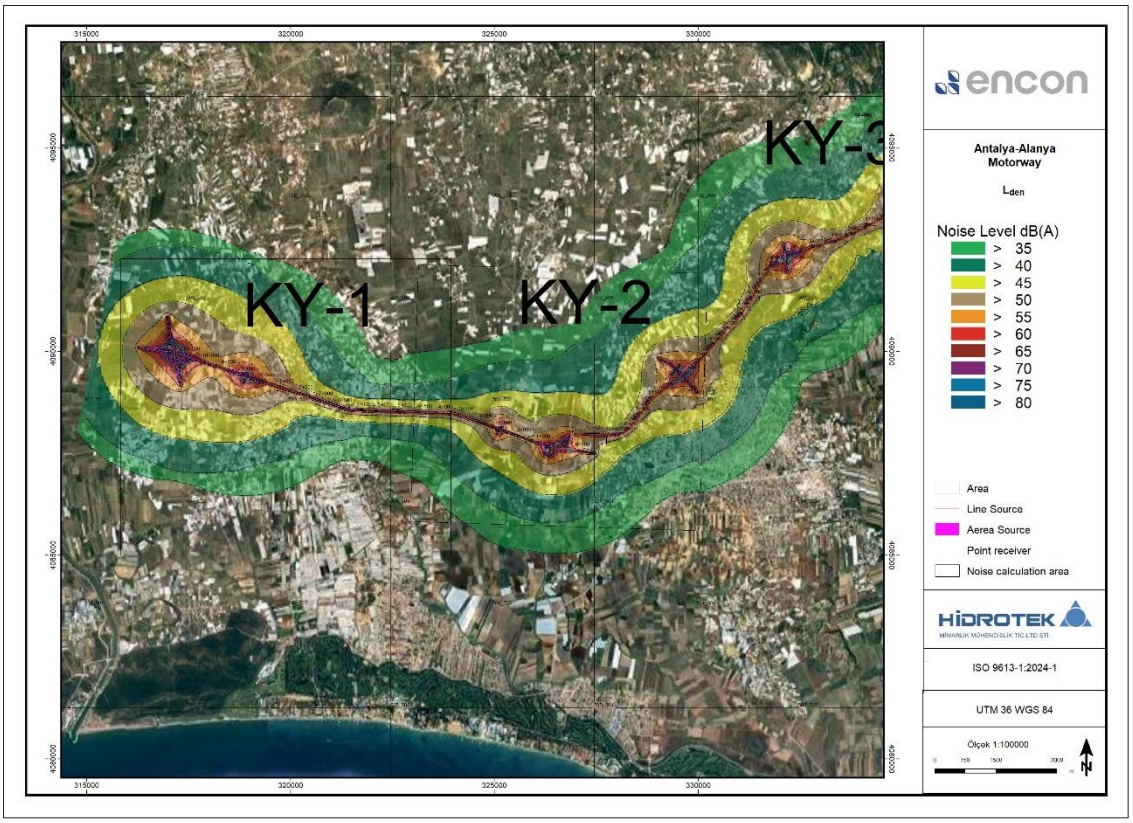


Figure XI.14 S-1 (11+000/1+500) L_{den} Noise Map for Construction Sites, Quarries and Motorway Route

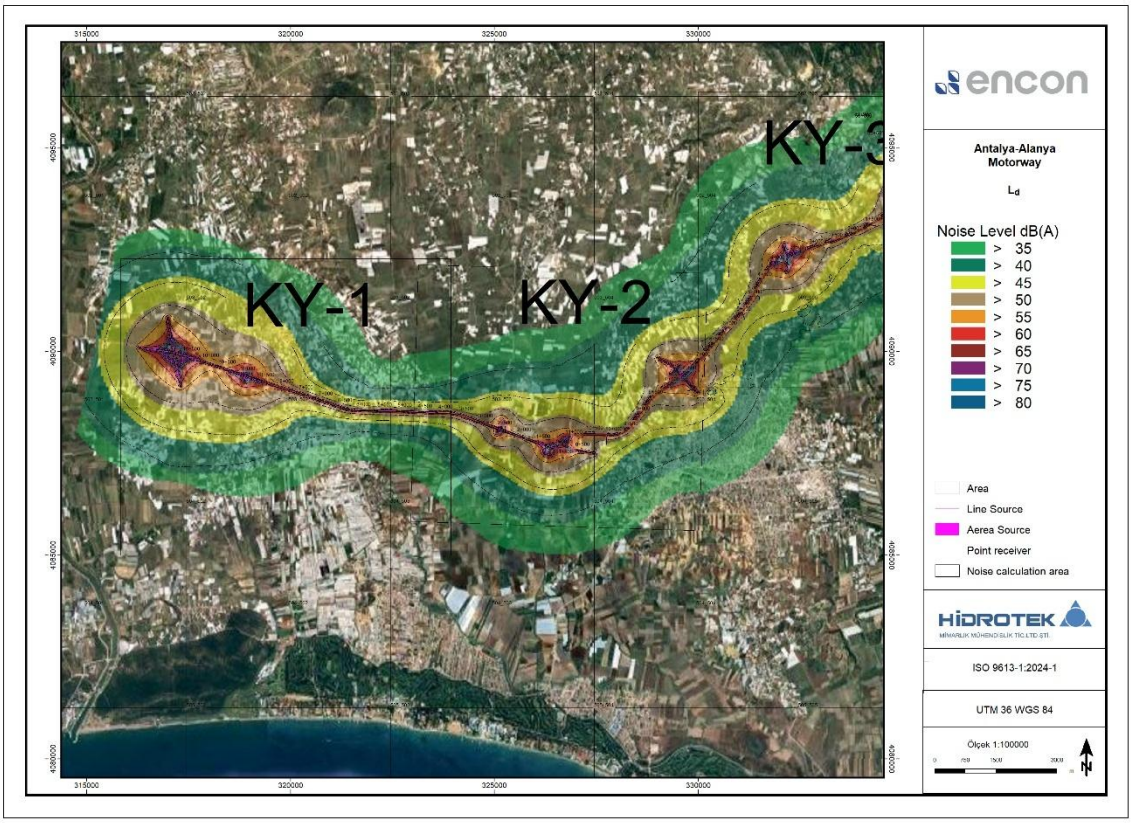


Figure XI.15 S-1 (11+000/1+500) L_d Noise Map for Construction Sites, Quarries and Motorway Route

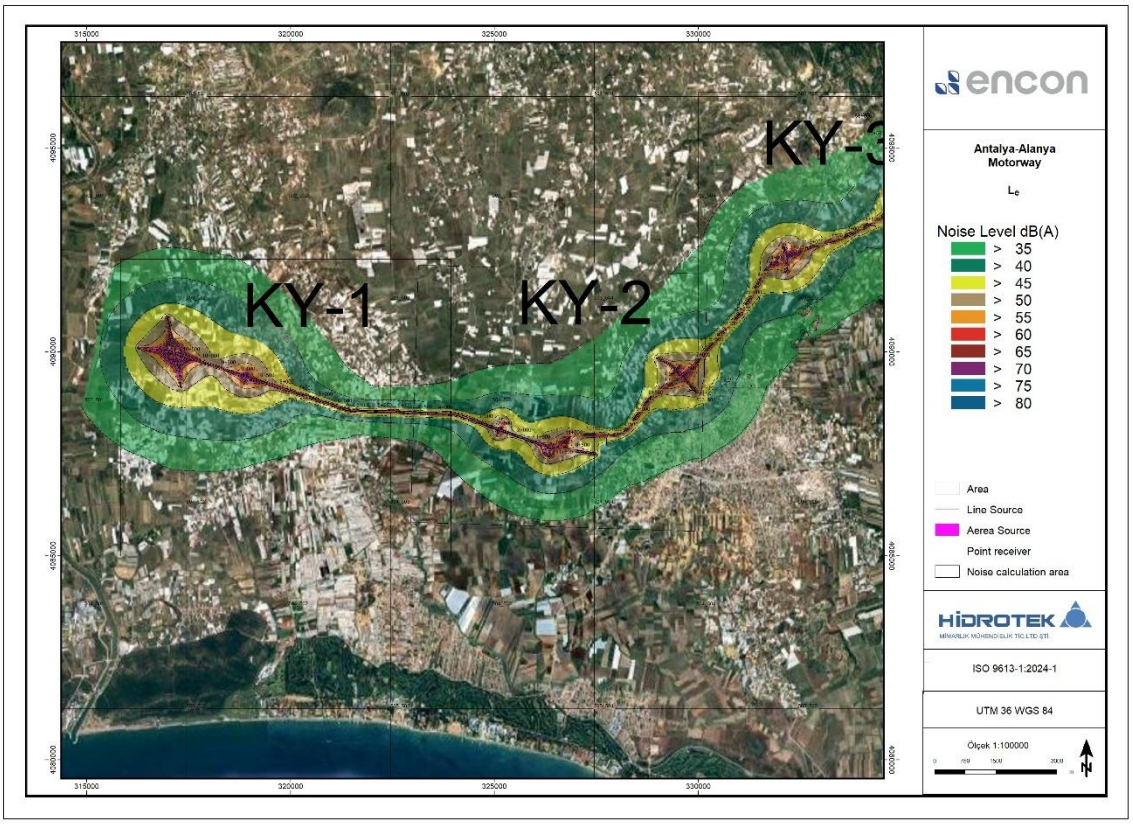


Figure XI.16 S-1 (11+000/1+500) L_e Noise Map for Construction Sites, Quarries and Motorway Route

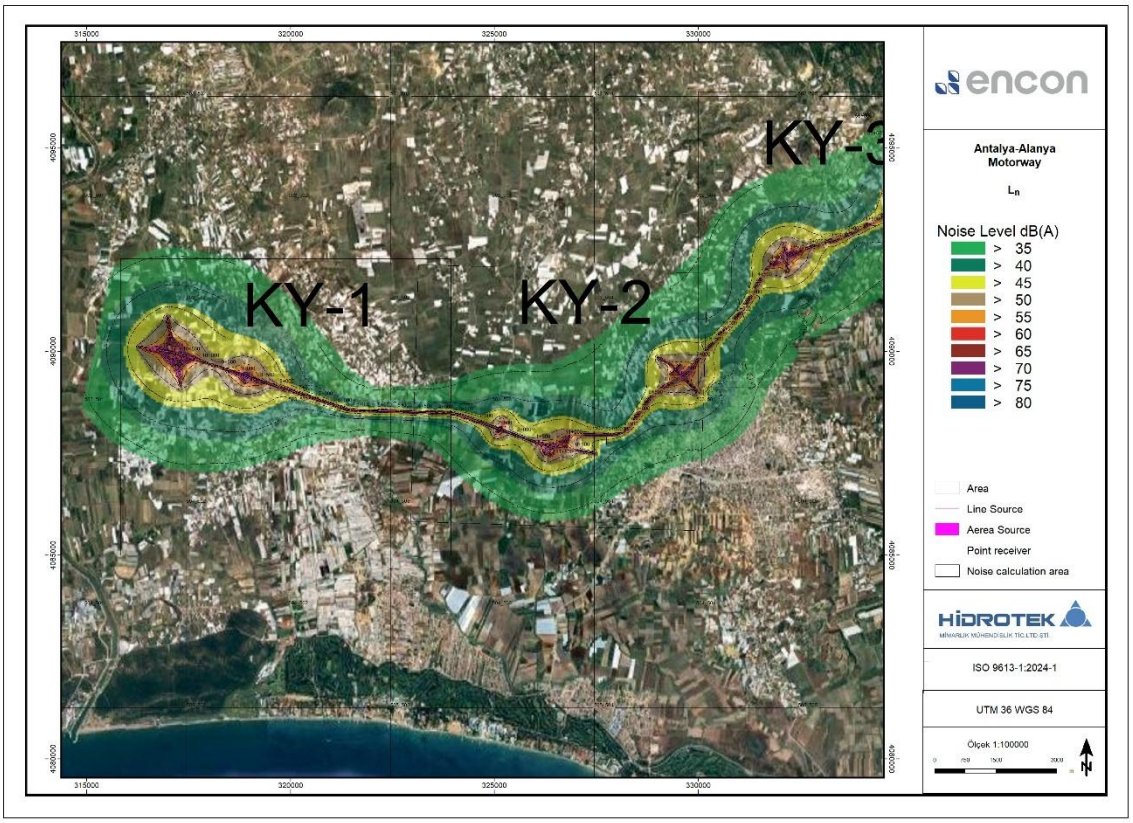


Figure XI.17 S-1 (11+000/1+500) L_n Noise Map for Construction Sites, Quarries and Motorway Route

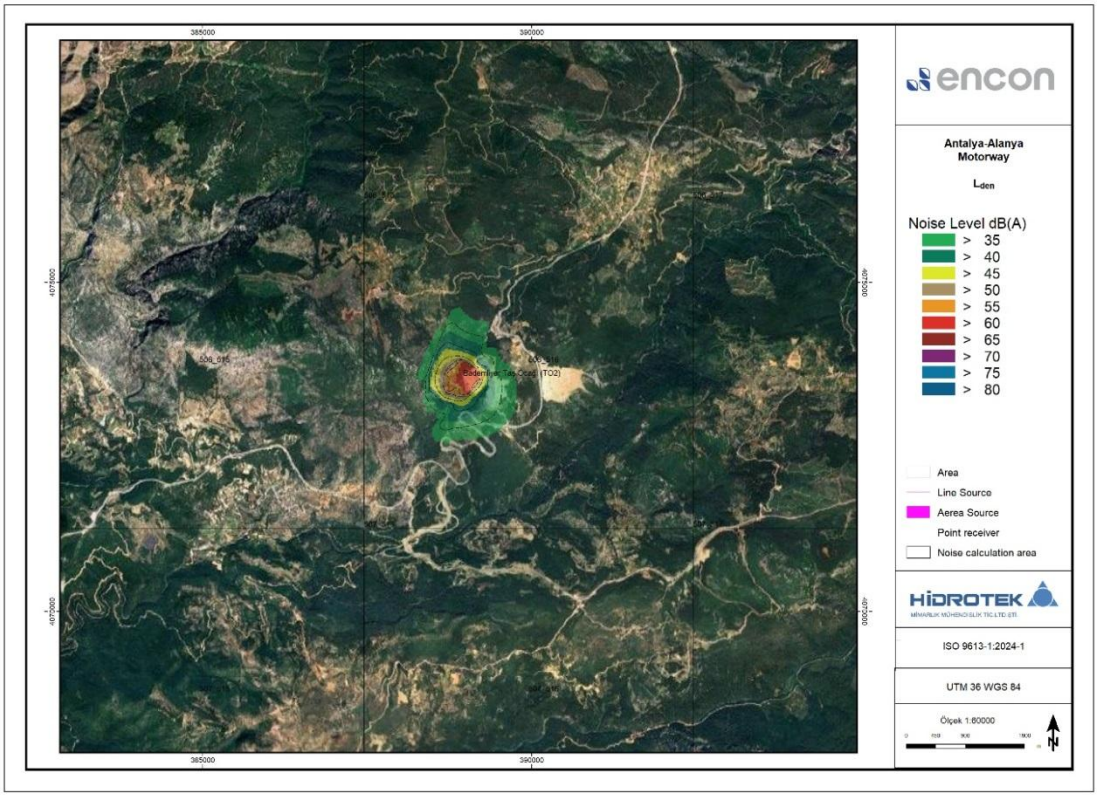


Figure XI.18 S-7 (Bademliyar) L_{den} Noise Map for Construction Sites, Quarries and Motorway Route

Table XI.11 AAMP noise modeling results and comparison table in construction phase

Districts	Measurement Date	RENC						IFC				Cumulative (Baseline + Model Result)					Difference (Cumulative - Baseline)				
		Baseline	Baseline	Baseline	Model Result	Model Result	Model Result	Baseline	Baseline	Model Result	Model Result	RENC L_{eq} Day	RENC L_{eq} Evening	RENC L_{eq} Night	IFC L_{eq} Day	IFC L_{eq} Night	RENC Calculated	RENC Calculated	RENC Calculated	IFC Calculated	IFC Calculated
		L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Night	L_{eq} Day	L_{eq} Night						L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Night
		(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Konaklı	17-18.09.2024	56.3	52.4	51.6	43.7	44.5	43.3	55.6	51.4	43.6	43.9	56.5	53.1	52.2	55.9	52.1	0.2	0.7	0.6	0.3	0.7
	21-22.09.2024	64.4	63.0	60.4	43.7	44.5	43.3	64.3	60.2	43.6	43.9	64.4	63.1	60.5	64.3	60.3	0.0	0.1	0.1	0.0	0.1
Çakallar	17-18.09.2024	58.3	56.5	41.9	52.1	52.9	51.6	57.9	48.7	52.0	52.3	59.2	58.1	52.0	58.9	53.9	0.9	1.6	10.1	1.0	5.2
	21-22.09.2024	62.2	62.7	60.7	52.1	52.9	51.6	61.9	61.7	52.0	52.3	62.6	63.1	61.2	62.3	62.2	0.4	0.4	0.5	0.4	0.5
Avsallar	17-18.09.2024	57.2	54.2	53.9	30.7	28.8	27.5	56.8	53.6	30.1	28.2	57.2	54.2	53.9	56.8	53.6	0.0	0.0	0.0	0.0	0.0
	21-22.09.2024	61.6	61.5	55.4	30.7	28.8	27.5	61.9	54.9	30.1	28.2	61.6	61.5	55.4	61.9	54.9	0.0	0.0	0.0	0.0	0.0
Akdam	17-18.09.2024	64.4	62.3	61.5	33.0	32.7	31.5	63.8	62.1	32.7	32.2	64.4	62.3	61.5	63.8	62.1	0.0	0.0	0.0	0.0	0.0
	21-22.09.2024	62.1	60.2	57.4	33.0	32.7	31.5	62.0	56.9	32.7	32.2	62.1	60.2	57.4	62.0	56.9	0.0	0.0	0.0	0.0	0.0
Emişbeleni	17-18.09.2024	59.8	59	52.2	56.2	57.0	55.8	59.8	52.2	56.1	56.5	61.4	61.1	57.4	61.3	57.9	1.6	2.1	5.2	1.5	5.7
	21-22.09.2024	71.6	69.5	66.7	56.2	57.0	55.8	71.3	66.6	56.1	56.5	71.7	69.7	67.0	71.4	67.0	0.1	0.2	0.3	0.1	0.4
Karakaya	17-18.09.2024	68.7	66.2	62.7	37.4	37.2	36.0	68.5	62.4	37.0	36.6	68.7	66.2	62.7	68.5	62.4	0.0	0.0	0.0	0.0	0.0
	21-22.09.2024	73.0	72.8	63.8	37.4	37.2	36.0	73.2	63.6	37.0	36.6	73.0	72.8	63.8	73.2	63.6	0.0	0.0	0.0	0.0	0.0
Hacıobası	17-18.09.2024	55.9	50.3	50.2	49.0	49.8	48.5	55.3	50.2	48.9	49.2	56.7	53.1	52.4	56.2	52.7	0.8	2.8	2.2	0.9	2.5
	21-22.09.2024	61.2	60.2	43.9	49.0	49.8	48.5	61.2	47.6	48.9	49.2	61.5	60.6	49.8	61.4	51.5	0.3	0.4	5.9	0.2	3.9
Uzunlar	17-18.09.2024	62.9	60.6	60.1	31.1	20.9	19.7	62.6	59.8	29.9	20.3	62.9	60.6	60.1	62.6	59.8	0.0	0.0	0.0	0.0	0.0
	21-22.09.2024	74.5	62.3	53.5	31.1	20.9	19.7	73.6	54.3	29.9	20.3	74.5	62.3	53.5	73.6	54.3	0.0	0.0	0.0	0.0	0.0
Sülek	17-18.09.2024	57.9	50.5	50	42.4	42.6	41.3	57.2	49.8	42.1	42.0	58.0	51.2	50.5	57.3	50.5	0.1	0.7	0.5	0.1	0.7
	21-22.09.2024	68.6	66.8	62.4	42.4	42.6	41.3	68.2	63.5	42.1	42.0	68.6	66.8	62.4	68.2	63.5	0.0	0.0	0.0	0.0	0.0
Sağırin	17-18.09.2024	70.7	64.6	64.3	-	-	-	70.1	64	-	-	-	-	-	-	-	-	-	-	-	-
	21-22.09.2024	67.6	67.0	66.0	-	-	-	67.3	66.5	-	-	-	-	-	-	-	-	-	-	-	-
Sarıabalı	16-17.09.2024	62.4	56.2	53.6	71.8	72.6	71.3	61.5	53.2	71.7	72.0	72.3	72.7	71.4	72.1	72.1	9.9	16.5	17.8	10.6	18.9
	21-22.09.2024	61.9	55.7	55.6	71.8	72.6	71.3	61.2	55.5	71.7	72.0	72.2	72.7	71.4	72.1	72.1	10.3	17.0	15.8	10.9	16.6
Sarılar	16-17.09.2024	65.5	63.7	62	39.8	14.9	13.6	65.1	62.5	38.6	14.3	65.5	63.7	62.0	65.1	62.5	0.0	0.0	0.0	0.0	0.0
	21-22.09.2024	63.1	63.0	59.0	39.8	14.9	13.6	63.2	59.3	38.6	14.3	63.1	63.0	59.0	63.2	59.3	0.0	0.0	0.0	0.0	0.0
Bucakşeyhler	16-17.09.2024	70.3	56.3	55	38.0	34.0	32.7	69.3	55.6	37.1	33.4	70.3	56.3	55.0	69.3	55.6	0.0	0.0	0.0	0.0	0.0
	21-22.09.2024	65.7	64.3	58.7	38.0	34.0	32.7	65.5	59.3	37.1	33.4	65.7	64.3	58.7	65.5	59.3	0.0	0.0	0.0	0.0	0.0
Kalemler	16-17.09.2024	57.6	52.7	45.7	40.7	41.5	40.3	57.1	45.6	40.6	40.9	57.7	53.0	46.8	57.2	46.9	0.1	0.3	1.1	0.1	1.3
	21-22.09.2024	66.0	61.7	60.8	40.7	41.5	40.3	65.5	60.6	40.6	40.9	66.0	61.7	60.8	65.5	60.6	0.0	0.0	0.0	0.0	0.0
Köprüçay	16-17.09.2024	63.9	58.6	58.5	22.3	9.8	8.5	63.2	58.8	21.1	9.2	63.9	58.6	58.5	63.2	58.8	0.0	0.0	0.0	0.0	0.0
	21-22.09.2024	64.0	62.9	62.8	22.3	9.8	8.5	64.0	62.4	21.1	9.2	64.0	62.9	62.8	64.0	62.4	0.0	0.0	0.0	0.0	0.0
Bademliyar	16-17.09.2024	71.8	56.9	55.5	33.4	-	-	70.9	55.3	32.1	-	71.8	-	-	70.9	55.3	0.0	-	-	0.0	0.0
	21-22.09.2024	63.3	61.7	61.6	33.4	-	-	63.2	61.2	32.1	-	63.3	-	-	63.2	61.2	0.0	-	-	0.0	0.0
Ulukapı	16-17.09.2024	60.2	59.8	59.4	44.3	32.2	31.0	60.4	59	43.2	31.6	60.3	59.8	59.4	60.5	59.0	0.1	0.0	0.0	0.1	0.0
	21-22.09.2024	62.7	57.9	54.9	44.3	32.2	31.0	62.1	55.0	43.2	31.6	62.8	57.9	54.9	62.2	55.0	0.1	0.0	0.0	0.1	0.0
Taşağıl	16-17.09.2024	79.1	68.5	56.4	49.4	49.8	48.5	78.3	56.5	49.2	49.2	79.1	68.6	57.1	78.3	57.2	0.0	0.1	0.7	0.0	0.7
	21-22.09.2024	68.8	65.5	65.3	49.4	49.8	48.5	68.4	65.1	49.2	49.2	68.8	65.6	65.4	68.5	65.2	0.0	0.1	0.1	0.1	0.1
Hacıali	16-17.09.2024	73.1	45.6	43.9	33.6	28.7	27.5	72.2	43.5	32.7	28.1	73.1	45.7	44.0	72.2	43.6	0.0	0.1	0.1	0.0	0.1
	21-22.09.2024	68.5	67.2	66.0	33.6	28.7	27.5	68.4	65.9	32.7	28.1	68.5	67.2	66.0	68.4	65.9	0.0	0.0	0.0	0.0	0.0
Deniztepesi	16-17.09.2024	63.9	55.2	54.8	44.7	45.4	44.2	63.1	54.8	44.6	44.9	64.0	55.6	55.2	63.2	55.2	0.1	0.4	0.4	0.1	0.4
	21-22.09.2024	67.0	61.1	57.8	44.7	45.4	44.2	66.3	57.4	44.6	44.9	67.0	61.2	58.0	66.3	57.6	0.0	0.1	0.2	0.0	0.2
Serik	16-17.09.2024	64.4	63	60.4	42.5	43.3	42.1	64.3	60.2	42.4	42.7	64.4	63.0	60.5	64.3	60.3	0.0	0.0	0.1	0.0	0.1
	21-22.09.2024	66.6	62.2	60.3	42.5	43.3	42.1	66.1	59.9	42.4	42.7	66.6	62.3	60.4	66.1	60.0	0.0	0.1	0.1	0.0	0.1

*No additional contribution is considered for the areas marked with a dash (-).

According to the construction phase modelling results presented in Table XI.11, exceedances of the IFC standards (Background + 3 dBA) were observed only in Sarıabalı neighbourhood during both weekday and weekend assessments. Noise monitoring in Sarıabalı is recommended.

The modelling results also indicate that exceedances of the IFC standard occurred during nighttime on weekdays in Emişbeleni and Çakallar neighbourhoods, and during nighttime on weekends in Hacıobası neighbourhood. Based on these findings, it is recommended that construction activities, particularly during night hours, be limited; noise-generating operations be scheduled predominantly during daytime; and additional noise mitigation measures (e.g., barriers, equipment maintenance, use of quieter methods) be implemented where necessary. Other locations remained within IFC limits.

Several measures are recommended to reduce this increase in noise levels (see Section XI.1.4.1). These figures provide a spatial representation of predicted noise levels based on topography, building structures, source characteristics, and operational scenarios. The noise modelling methodology, input parameters (such as traffic volume, vehicle types, construction activities, etc.), and detailed information on the noise maps are provided in the Noise Modelling Report included in Annex 7.

The assessment of noise-related impacts has been carried out by evaluating the magnitude of impact and the sensitivity/value of the receptors/resources. The significance of impacts has been classified as high, medium, or low based on this evaluation. The criteria presented in Chapter IV (“ESIA Methodology”) have been used to determine the magnitude of impact, while the sensitivity/value levels of the receptors/resources have been assessed in accordance with the criteria summarized in Table XI.4. Based on the results of the noise modeling study, increases in baseline noise levels measured in settlements located near the motorway route were used to determine the impact magnitude. The outcome of this assessment is presented in Table XI.12.

Table XI.12. Sensitivity of Settlements to Noise along the Motorway Route

Receptor / Location	Sensitivity of the Receptor
Konaklı	High (3)
Çakallar	High (3)
Avsallar	High (3)
Akdam	High (3)
Emişbeleni	Medium (2)
Karakaya	High (3)
Hacıobası	High (3)
Uzunlar	High (3)
Sülek	Medium (2)
Sağırin	Medium (2)
Sarıabalı	High (3)
Sarılar	High (3)
Bucakşeyhler	High (3)
Kalemler	High (3)
Köprüçay	Medium (2)
Bademliyar	Medium (2)
Ulukapı	High (3)

Receptor / Location	Sensitivity of the Receptor
Taşağıl	High (3)
Hacıali	Medium (2)
Deniztepesi	High (3)
Serik	Medium (2)

In the absence of mitigation measures, noise may occur, particularly in buildings located very close to construction areas based on worst-case estimates. However, it should be noted that all impacts related to the land preparation and construction phase will be intermittent and temporary (short-term and reversible) impacts for at most 3 years.

XI.1.3.2. Operation Phase

Similar to the land preparation and construction phases, noise impacts during the operation phase were assessed through a modelling study conducted using the SoundPLAN software. This assessment considered nearby settlements and sensitive receptors located along the motorway route. The predicted noise levels for daytime, evening, and nighttime periods were compared with the limit values defined in both the national Regulation on the Evaluation and Management of Environmental Noise (RENC) and the IFC Environmental, Health and Safety (EHS) Guidelines. The modelling results, together with existing baseline noise measurements, were evaluated against these standards, and appropriate mitigation measures were proposed where exceedances were identified.

The spatial distribution of motorway operation activities is presented in Figure XI.24, using Google Earth imagery. Noise distribution maps corresponding to Lgag (24-hour exposure) and Lday (07:00–19:00) are provided in Figure XI.25 through Figure XI.28. An example section based on these modelling results is presented herein, while detailed outputs and full modelling documentation are provided in Annex 7 Noise Modelling Report**.**

During the operation phase, noise levels caused by traffic are shown in Figure XI.19 to Figure XI.23 as noise corridors in decibels. The maps illustrate how noise varies with different traffic volumes and vehicle types, indicating the maximum decibel levels that nearby residential areas may experience. These figures provide a basis for implementing traffic management and noise reduction measures.

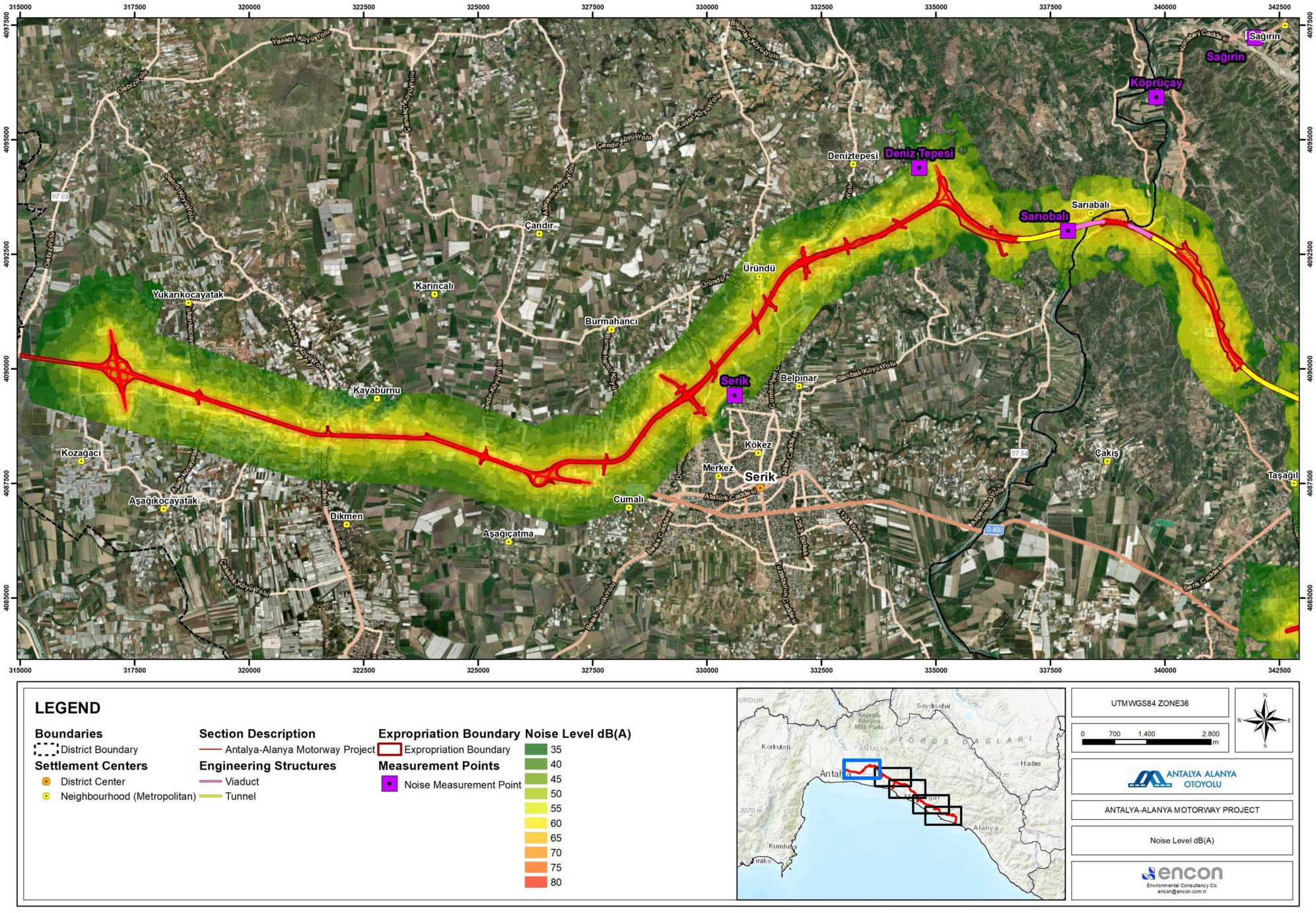


Figure XI.19 Operation Phase Noise Corridor Map - 1

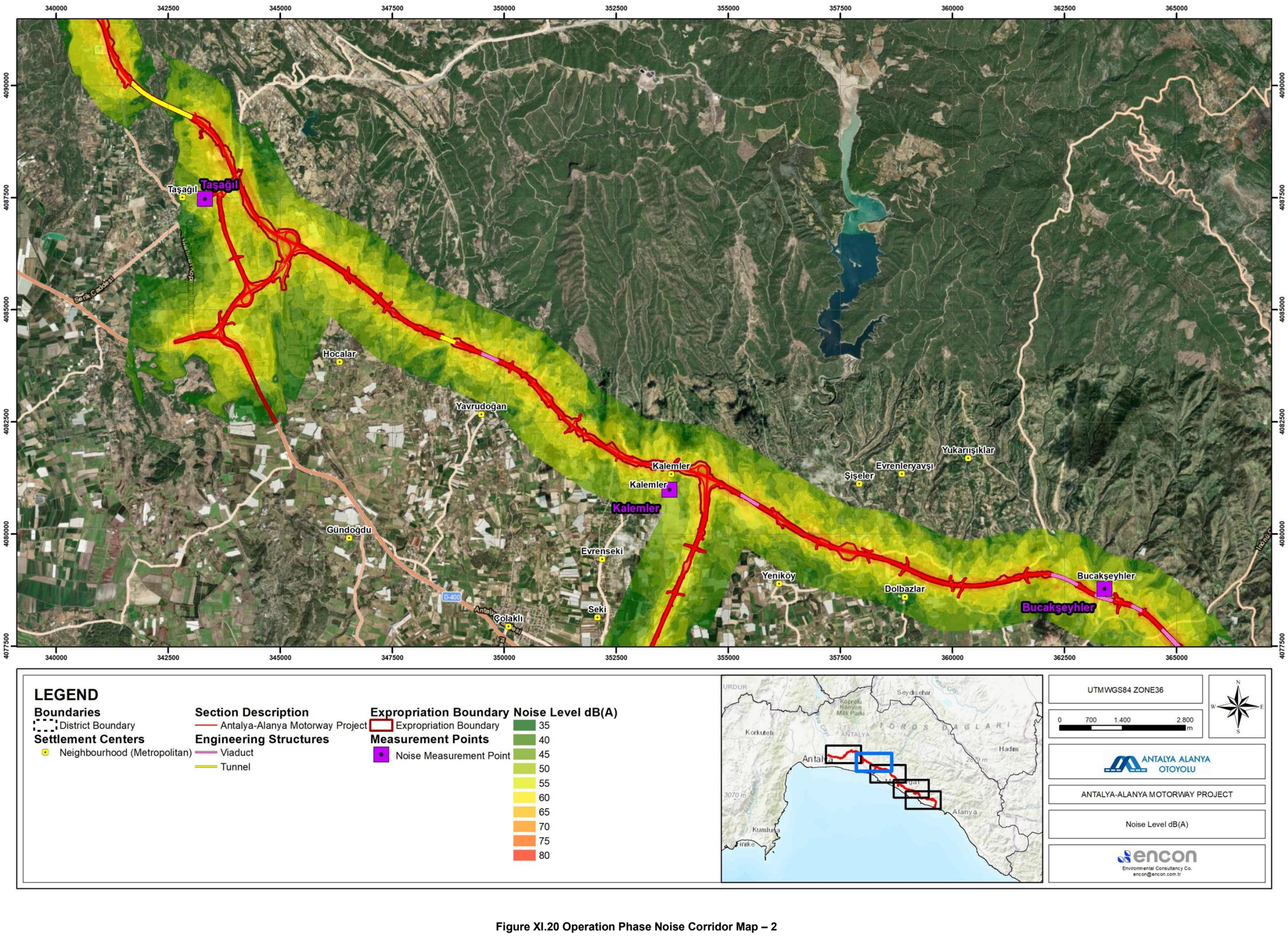


Figure XI.20 Operation Phase Noise Corridor Map – 2

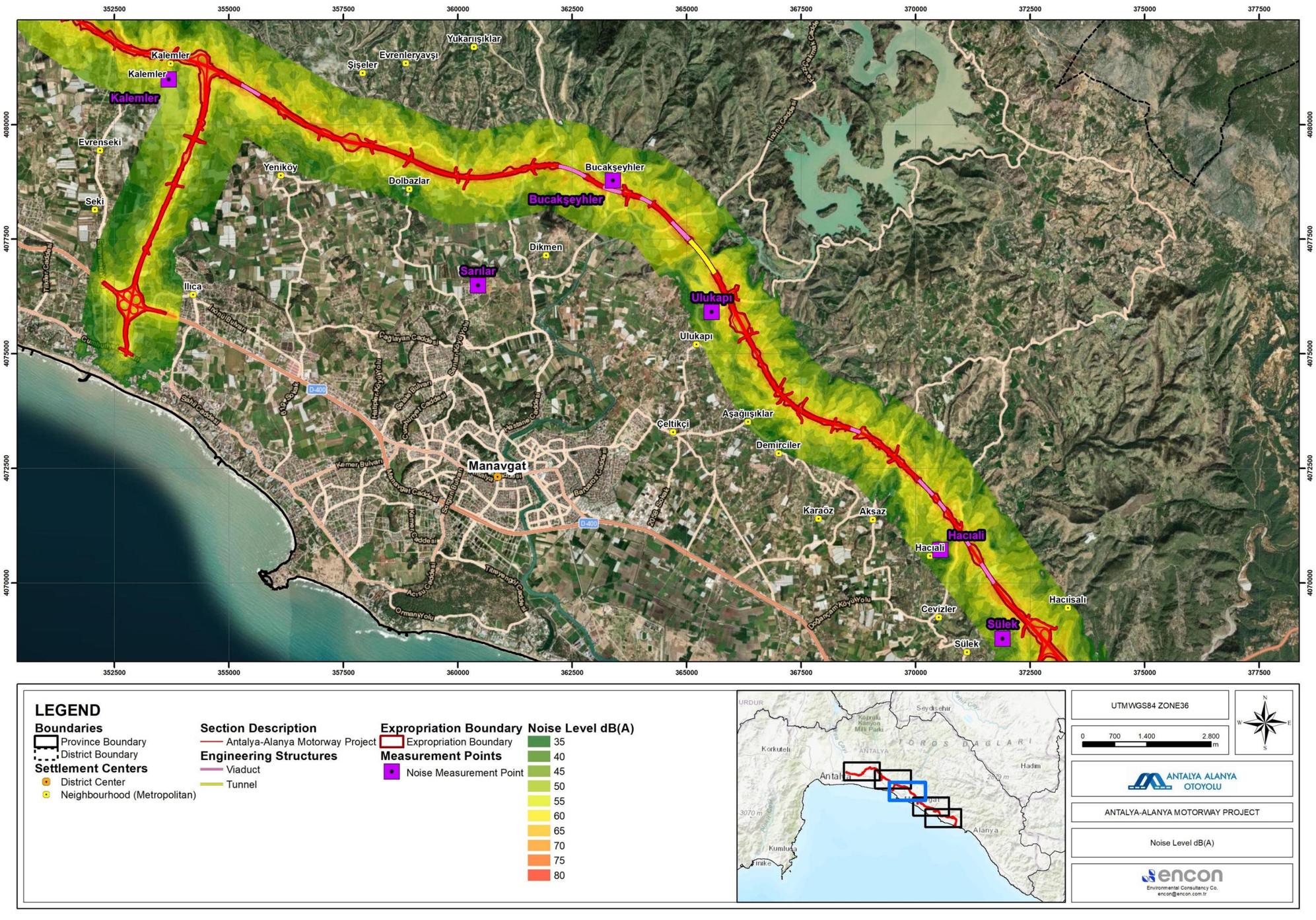


Figure XI.21 Operation Phase Noise Corridor Map – 3

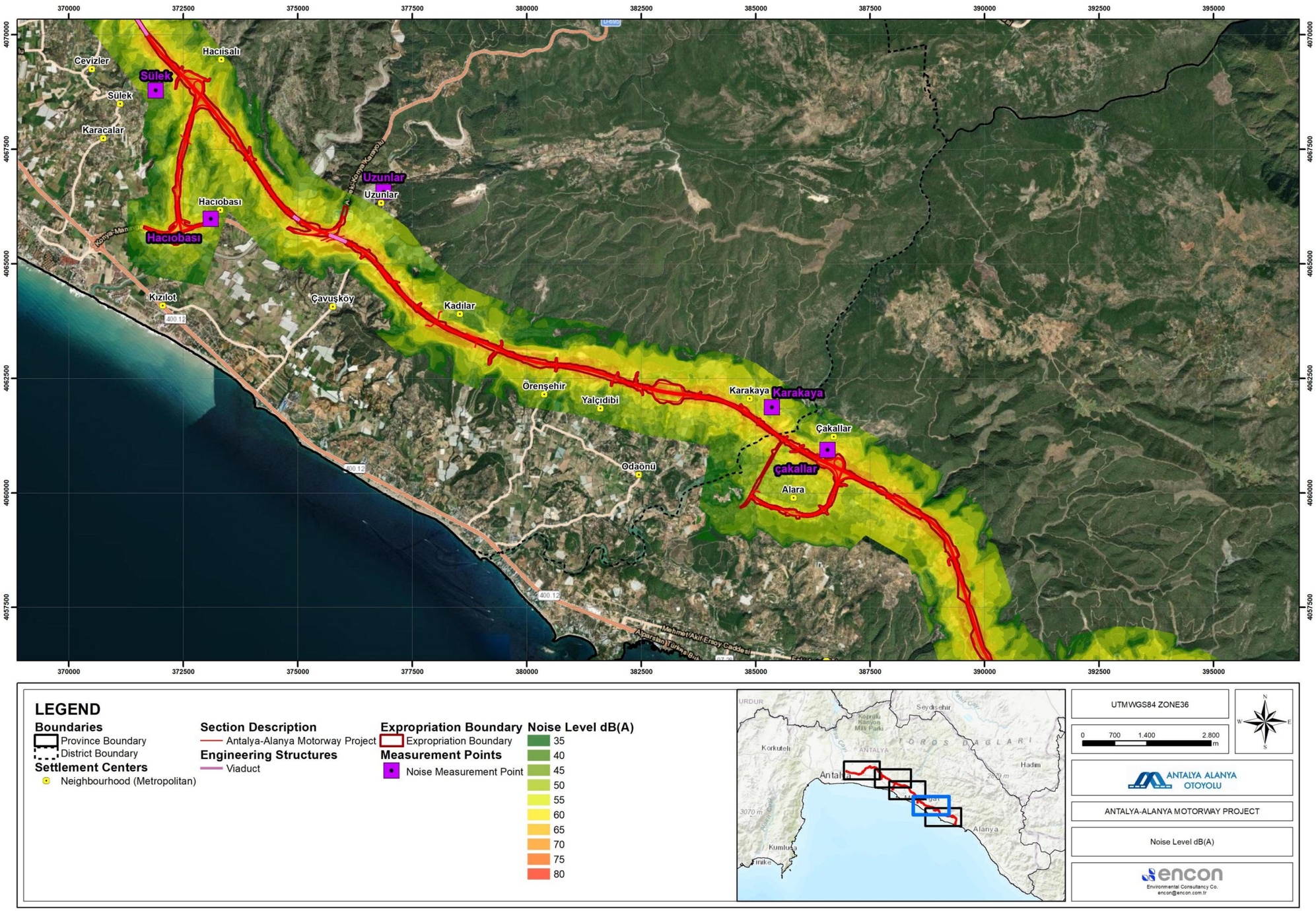


Figure XI.22 Operation Phase Noise Corridor Map – 4

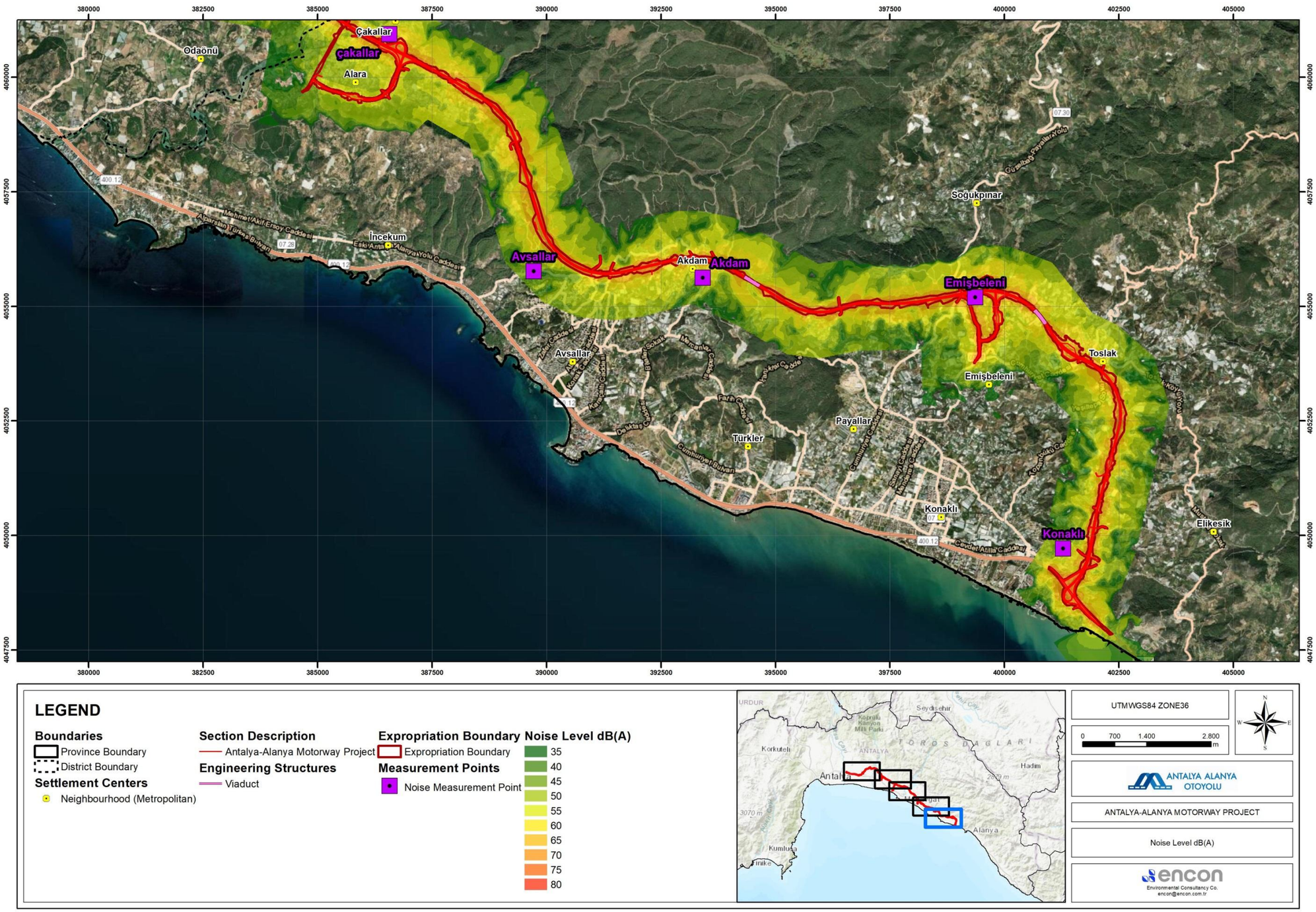


Figure XI.23 Operation Phase Noise Corridor Map – 5



Figure XI.24 AAMP Noise Map Plot Distribution

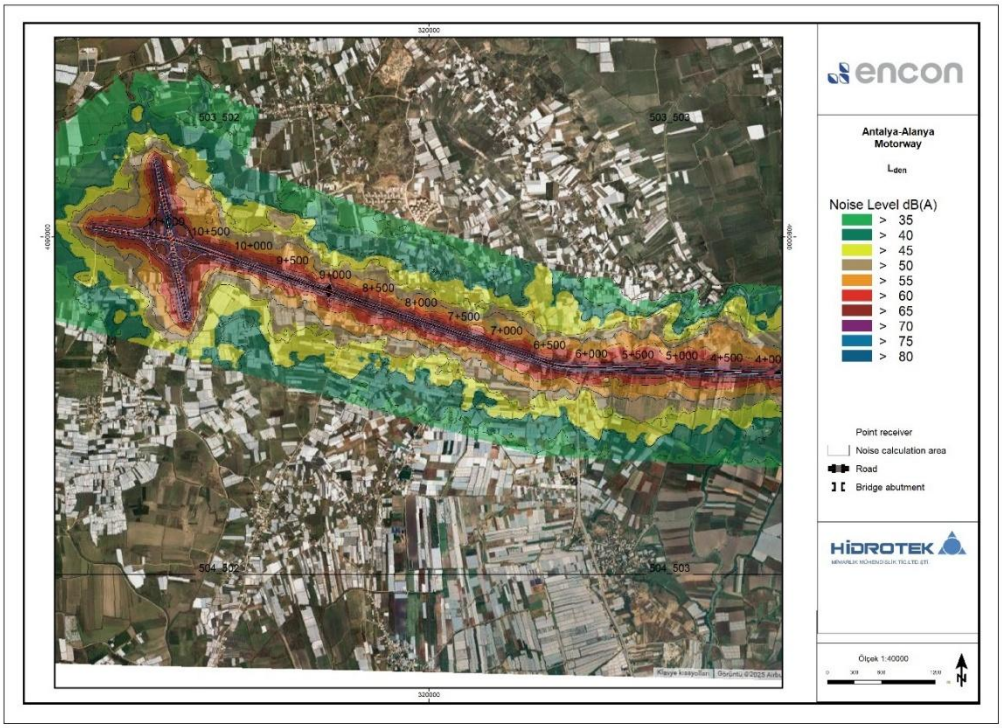


Figure XI.25 KY-1 (1+000/4+000) AAMP Lden

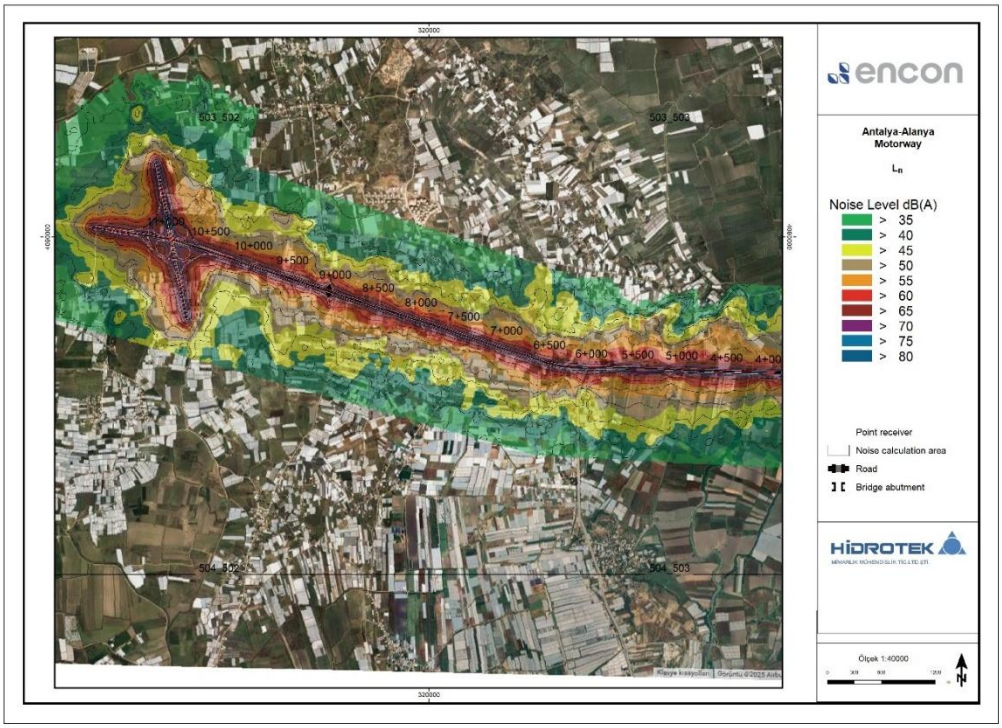


Figure XI.26 KY-1 (1+000/4+000) Ln

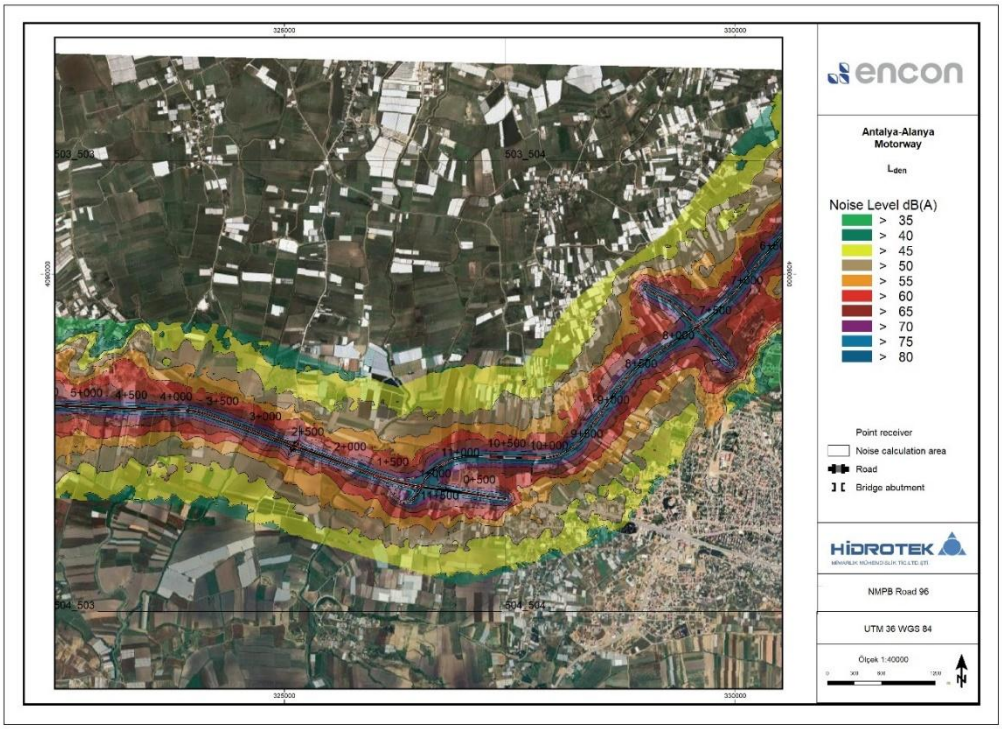


Figure XI.27 KY-2 (4+500/7+400) AAMP Noise Map Lden

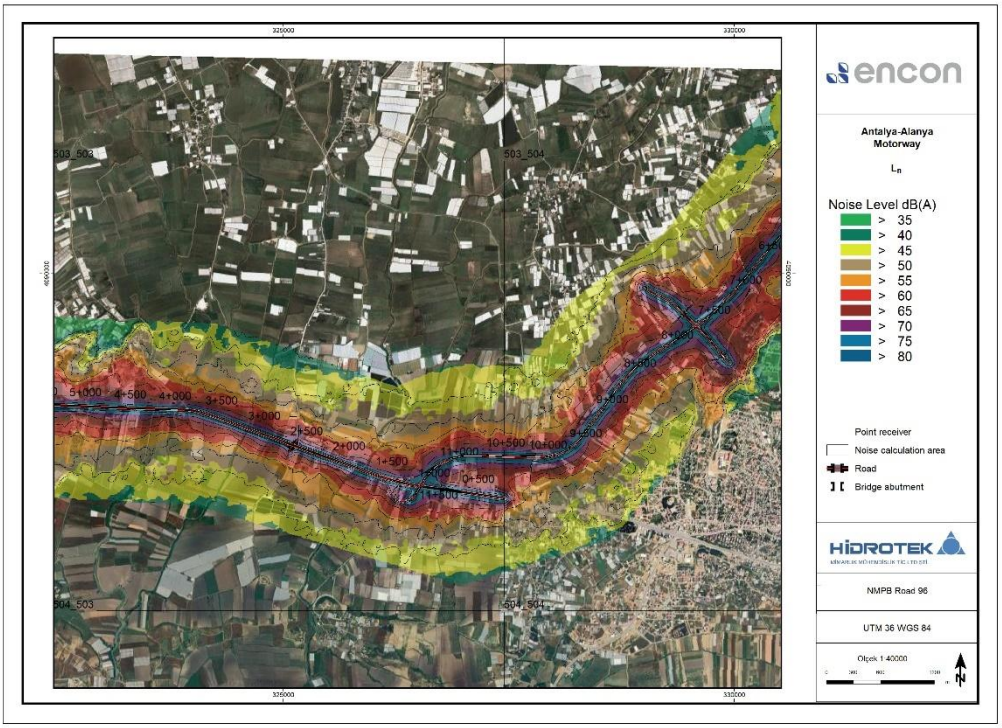


Figure XI.28 KY-2 (4+500/7+400) AAMP Noise Map Ln

Table XI.13 AAMP noise modeling results and comparison table in operation phase

Districts	Measurement Date	RENC						IFC				Cumulative (Baseline + Model Result)					Difference (Cumulative - Baseline)				
		Baseline	Baseline	Baseline	Model Result	Model Result	Model Result	Baseline	Baseline	Model Result	Model Result	RENC	RENC	RENC	IFC	IFC	RENC Calculated	RENC Calculated	RENC Calculated	IFC Calculated	IFC Calculated
		L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Night	L_{eq} Day	L_{eq} Night	L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Night	L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Night
		(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Konaklı	17-18.09.2024	56.3	52.4	51.6	57.9	52.8	50.2	55.6	51.4	57	50.7	60.2	55.6	54.0	59.4	54.1	3.9	3.2	2.4	3.8	2.7
	21-22.09.2024	64.4	63	60.4	57.9	52.8	50.2	64.3	60.2	57	50.7	65.3	63.4	60.8	65.0	60.7	0.9	0.4	0.4	0.7	0.5
Çakallar	17-18.09.2024	58.3	56.5	41.9	60.4	55.5	53	57.9	48.7	59.5	53.4	62.5	59.0	53.3	61.8	54.7	4.2	2.5	11.4	3.9	6.0
	21-22.09.2024	62.2	62.7	60.7	60.4	55.5	53	61.9	61.7	59.5	53.4	64.4	63.5	61.4	63.9	62.3	2.2	0.8	0.7	2.0	0.6
Avsallar	17-18.09.2024	57.2	54.2	53.9	53.1	48.4	46	56.8	53.6	52.3	46.4	58.6	55.2	54.6	58.1	54.4	1.4	1.0	0.7	1.3	0.8
	21-22.09.2024	61.6	61.5	55.4	53.1	48.4	46	61.9	54.9	52.3	46.4	62.2	61.7	55.9	62.4	55.5	0.6	0.2	0.5	0.5	0.6
Akdam	17-18.09.2024	64.4	62.3	61.5	58.8	54.1	51.7	63.8	62.1	58	52.1	65.5	62.9	61.9	64.8	62.5	1.1	0.6	0.4	1.0	0.4
	21-22.09.2024	62.1	60.2	57.4	58.8	54.1	51.7	62	56.9	58	52.1	63.8	61.2	58.4	63.5	58.1	1.7	1.0	1.0	1.5	1.2
Emişbeleni	17-18.09.2024	59.8	59	52.2	65.9	60.4	57.4	59.8	52.2	65	57.9	66.9	62.8	58.5	66.1	58.9	7.1	3.8	6.3	6.3	6.7
	21-22.09.2024	71.6	69.5	66.7	65.9	60.4	57.4	71.3	66.6	65	57.9	72.6	70.0	67.2	72.2	67.1	1.0	0.5	0.5	0.9	0.5
Karakaya	17-18.09.2024	68.7	66.2	62.7	60.3	55.5	53.2	68.5	62.4	59.4	53.5	69.3	66.6	63.2	69.0	62.9	0.6	0.4	0.5	0.5	0.5
	21-22.09.2024	73	72.8	63.8	60.3	55.5	53.2	73.2	63.6	59.4	53.5	73.2	72.9	64.2	73.4	64.0	0.2	0.1	0.4	0.2	0.4
Hacıobası	17-18.09.2024	55.9	50.3	50.2	58.4	52.4	48.8	55.3	50.2	57.5	49.5	60.3	54.5	52.6	59.5	52.9	4.4	4.2	2.4	4.2	2.7
	21-22.09.2024	61.2	60.2	43.9	58.4	52.4	48.8	61.2	47.6	57.5	49.5	63.0	60.9	50.0	62.7	51.7	1.8	0.7	6.1	1.5	4.1
Uzunlar	17-18.09.2024	62.9	60.6	60.1	-	-	-	62.6	59.8	-	-	-	-	-	-	-	-	-	-	-	-
	21-22.09.2024	74.5	62.3	53.5	-	-	-	73.6	54.3	-	-	-	-	-	-	-	-	-	-	-	-
Sülek	17-18.09.2024	57.9	50.5	50	51.7	46.9	44.5	57.2	49.8	50.9	44.9	58.8	52.1	51.1	58.1	51.0	0.9	1.6	1.1	0.9	1.2
	21-22.09.2024	68.6	66.8	62.4	51.7	46.9	44.5	68.2	63.5	50.9	44.9	68.7	66.8	62.5	68.3	63.6	0.1	0.0	0.1	0.1	0.1
Sağırin	17-18.09.2024	70.7	64.6	64.3	-	-	-	70.1	64	-	-	-	-	-	-	-	-	-	-	-	-
	21-22.09.2024	67.6	67	66	-	-	-	67.3	66.5	-	-	-	-	-	-	-	-	-	-	-	-
Sarıabalı	16-17.09.2024	62.4	56.2	53.6	59.3	54.5	52.2	61.5	53.2	58.4	52.5	64.1	58.4	56.0	63.2	55.9	1.7	2.2	2.4	1.7	2.7
	21-22.09.2024	61.9	55.7	55.6	-	-	-	61.2	55.5	58.4	52.5	-	-	-	63.0	57.3	-	-	-	1.8	1.8
Sarılar	16-17.09.2024	65.5	63.7	62	-	-	-	65.1	62.5	-	-	-	-	-	-	-	-	-	-	-	-
	21-22.09.2024	63.1	63	59	59.3	54.5	52.2	63.2	59.3	-	-	64.6	63.6	59.8	-	-	1.5	0.6	0.8	-	-
Bucakşeyhler	16-17.09.2024	70.3	56.3	55	65.9	61.2	58.8	69.3	55.6	65.1	59.2	71.6	62.4	60.3	70.7	60.8	1.3	6.1	5.3	1.4	5.2
	21-22.09.2024	65.7	64.3	58.7	65.9	61.2	58.8	65.5	59.3	65.1	59.2	68.8	66.0	61.8	68.3	62.3	3.1	1.7	3.1	2.8	3.0
Kalemler	16-17.09.2024	57.6	52.7	45.7	56.9	52	48.8	57.1	45.6	56.1	49.9	60.3	55.4	50.5	59.6	51.3	2.7	2.7	4.8	2.5	5.7
	21-22.09.2024	66	61.7	60.8	56.9	52	48.8	65.5	60.6	56.1	49.9	66.5	62.1	61.1	66.0	61.0	0.5	0.4	0.3	0.5	0.4
Köprüçay	16-17.09.2024	63.9	58.6	58.5	-	-	-	63.2	58.8	-	-	-	-	-	-	-	-	-	-	-	-
	21-22.09.2024	64	62.9	62.8	-	-	-	64	62.4	-	-	-	-	-	-	-	-	-	-	-	-
Bademliyar	16-17.09.2024	71.8	56.9	55.5	-	-	-	70.9	55.3	-	-	-	-	-	-	-	-	-	-	-	-
	21-22.09.2024	63.3	61.7	61.6	-	-	-	63.2	61.2	-	-	-	-	-	-	-	-	-	-	-	-
Ulukapı	16-17.09.2024	60.2	59.8	59.4	55.4	50.7	48.3	60.4	59	54.5	48.6	61.4	60.3	59.7	61.4	59.4	1.2	0.5	0.3	1.0	0.4
	21-22.09.2024	62.7	57.9	54.9	55.4	50.7	48.3	62.1	55	54.5	48.6	63.4	58.7	55.8	62.8	55.9	0.7	0.8	0.9	0.7	0.9
Taşağıl	16-17.09.2024	79.1	68.5	56.4	55.2	49.8	46.8	78.3	56.5	54.3	47.3	79.1	68.6	56.9	78.3	57.0	0.0	0.1	0.5	0.0	0.5
	21-22.09.2024	68.8	65.5	65.3	55.2	49.8	46.8	68.4	65.1	54.3	47.3	69.0	65.6	65.4	68.6	65.2	0.2	0.1	0.1	0.2	0.1
Hacıali	16-17.09.2024	73.1	45.6	43.9	43.5	38.8	36.4	72.2	43.5	42.7	36.8	73.1	46.4	44.6	72.2	44.3	0.0	0.8	0.7	0.0	0.8
	21-22.09.2024	68.5	67.2	66	43.5	38.8	36.4	68.4	65.9	42.7	36.8	68.5	67.2	66.0	68.4	65.9	0.0	0.0	0.0	0.0	0.0
Deniztepesi	16-17.09.2024	63.9	55.2	54.8	49.7	44.1	41	63.1	54.8	48.8	41.5	64.1	55.5	55.0	63.3	55.0	0.2	0.3	0.2	0.2	0.2
	21-22.09.2024	67	61.1	57.8	49.7	44.1	41	66.3	57.4	48.8	41.5	67.1	61.2	57.9	66.4	57.5	0.1	0.1	0.1	0.1	0.1
Serik	16-17.09.2024	64.4	63	60.4	42.7	38	35.6	64.3	60.2	41.9	36	64.4	63.0	60.4	64.3	60.2	0.0	0.0	0.0	0.0	0.0
	21-22.09.2024	66.6	62.2	60.3	42.7	38	35.6	66.1	59.9	41.9	36	66.6	62.2	60.3	66.1	59.9	0.0	0.0	0.0	0.0	0.0

*No additional contribution is considered for the areas marked with a dash (-).

According to the operation phase modelling results presented in Table XI.13, the IFC standard (Background + 3 dBA) was exceeded during both daytime and nighttime on weekdays in Çakallar and Emişbeleni neighbourhoods. In Konaklı, Hacıobası, Bucakşeyhler, and Kalemler neighbourhoods, exceedances were observed during daytime on weekdays, with nighttime exceedances on weekends in Hacıobası neighbourhood.

In the Emişbeleni and Bucakşeyhler neighborhoods, the installation of noise barriers is recommended due to the exceedance of the IFC standard. In other neighborhoods where IFC limits are only slightly exceeded or limited to specific time periods, operational measures such as restricting construction activities during nighttime hours, regular maintenance of noise-generating equipment, using quieter methods, and shifting noise sources to daytime hours are recommended. (see Section XI.1.4.2).

Result

The noise emission impacts of the Project were evaluated using SoundPLAN V 9.1 (64-bit) software in accordance with RENC and IFC regulations, utilizing projected traffic data for 2040 to predict noise levels. Existing noise levels were measured at 21 locations along the motorway route and construction sites, with virtual receivers assigned to these points for noise calculations. During the motorway's construction phase, noise limit values were exceeded at the quarries and construction site in accordance with legislation. Furthermore, it is projected that noise limits are predicted to be exceeded in two regions after the motorway becomes operational. To mitigate these impacts, noise barriers have been proposed for the Bucakşeyhler and Emişbeleni sections, and ongoing monitoring is recommended in both areas moving forward.

Action Plan Recommendations

Based on the modeling results, afforestation is recommended as a primary measure to maintain noise levels within permissible limits. For effective noise mitigation, afforestation areas should extend at least 30 meters wide from the motorway, with the planting of dense, evergreen trees suitable for both winter and summer seasons. Tree species should be selected for their leaf properties to maximize noise absorption. Additionally, earthen embankments are proposed to provide elevation and act as noise barriers; these structures consist of raised earthworks reinforced with materials such as wood, concrete, steel nets, or woven grasses, which also allow for the planting of tree saplings and contribute aesthetically to the motorway environment. In locations where space is limited, conventional noise barriers may be installed. It is essential that background noise measurements be conducted in sensitive receptor areas during both construction and operation phases, with noise mitigation measures implemented only when noise levels exceed environmental limits. Continuous monitoring, evaluation, and timely implementation of corrective actions are therefore strongly advised.

An action plan has been developed for the Bucakşeyhler and Emişbeleni neighborhoods. Representative noise maps illustrating the conditions prior to the implementation of the action plan are presented in Figure XI.29 and Figure XI.30, in accordance with the Environmental Noise Directive and IFC guidelines. Detailed information on the noise modeling is provided in Annex 7.

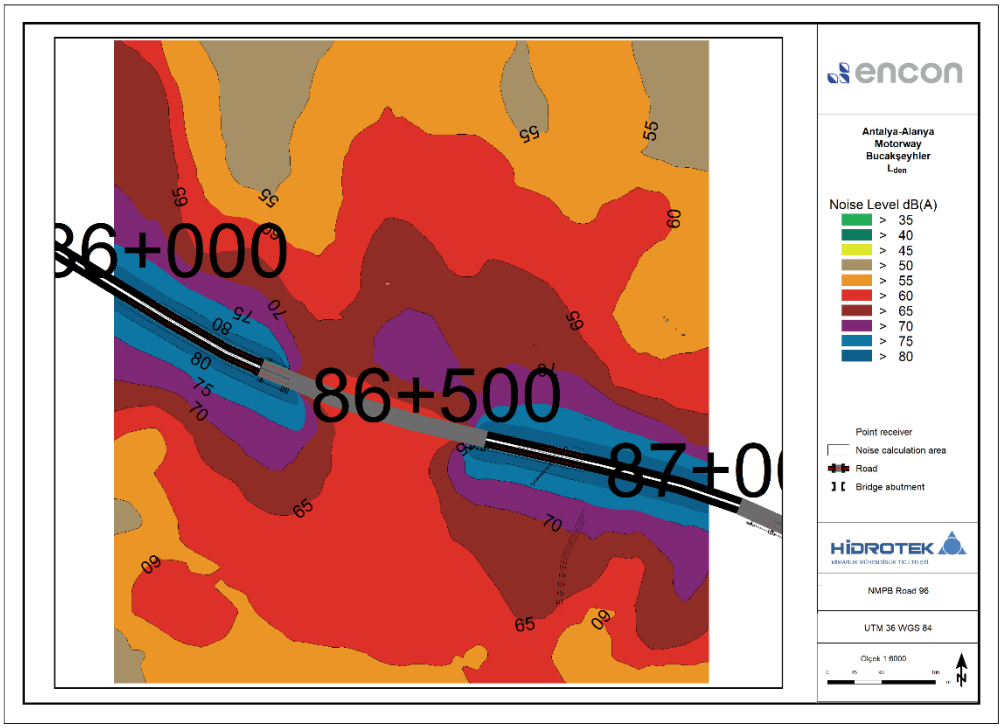


Figure XI.29 Bucakşeyhler noise map Lden

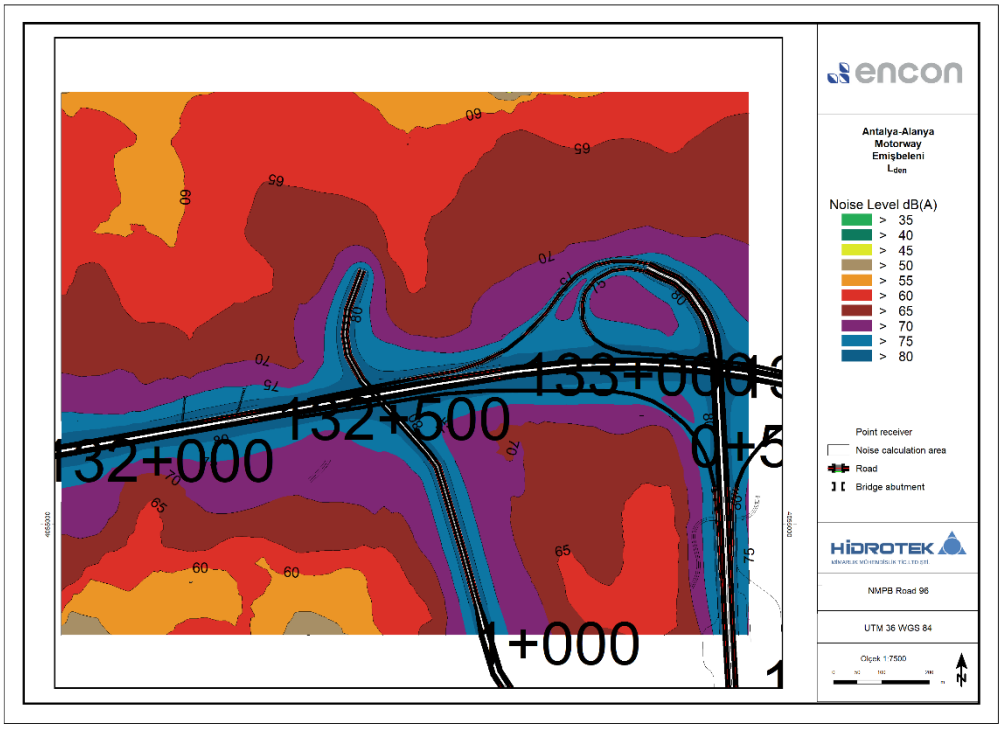


Figure XI.30 Emişbelen noise map Lden

The noise barrier layouts for both areas, where action plans have been developed, are presented in Figure XI.31 and Figure XI.32.

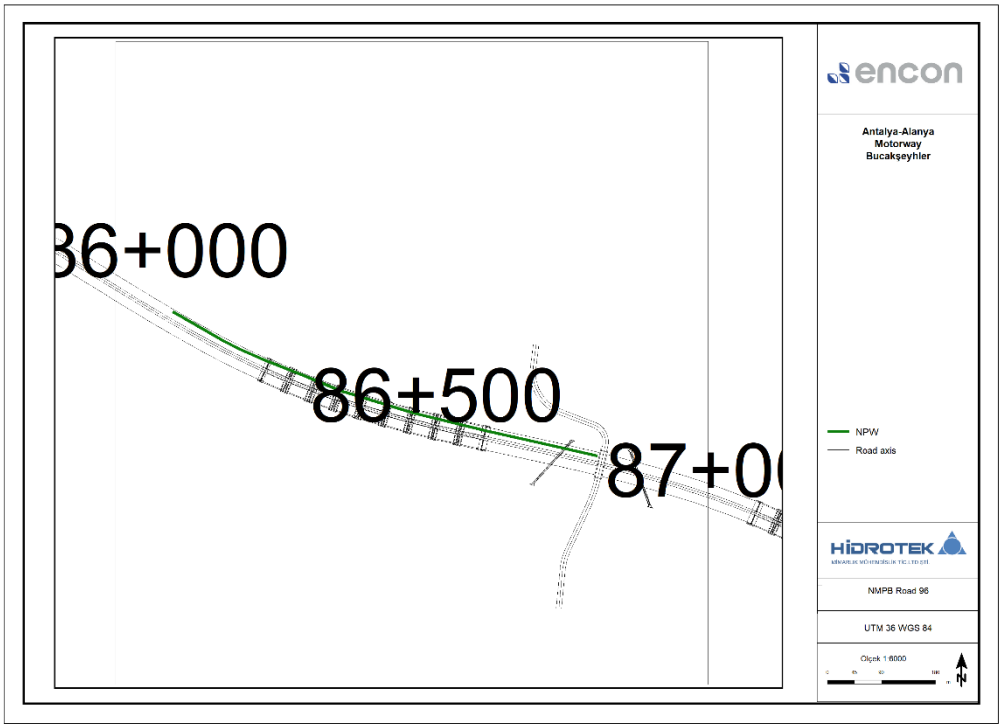


Figure XI.31 Noise barrier locations for Bucakşeyhler

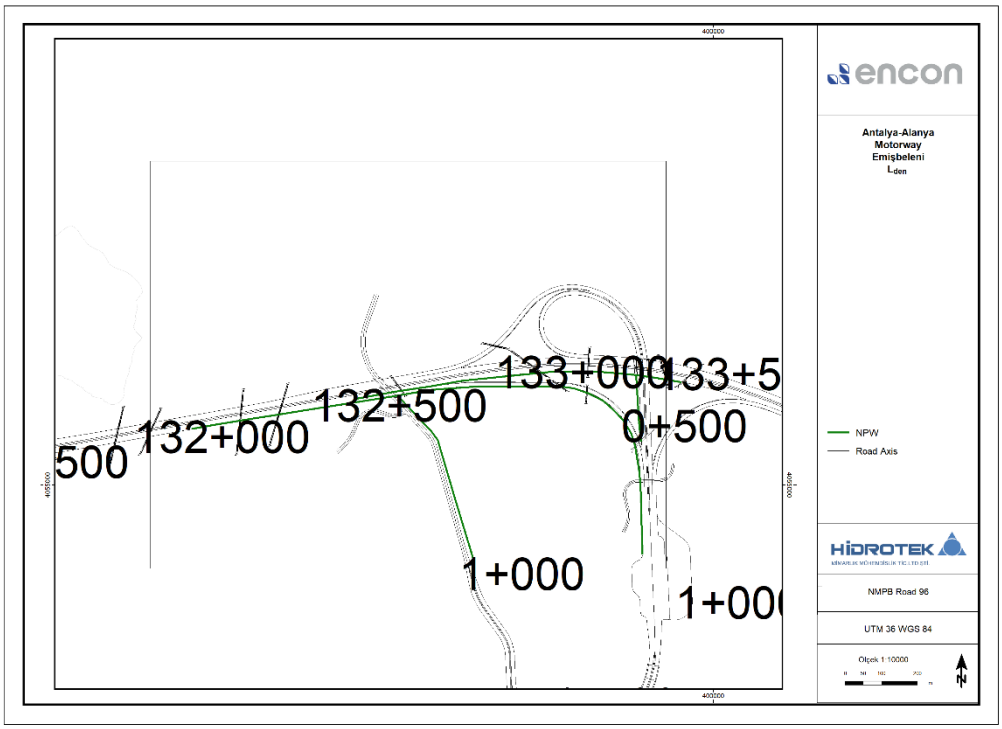


Figure XI.32 Noise barrier locations for Emişbelen

An action plan has been developed for the Bucakşeyhler and Emişbeleni neighborhoods. Representative noise maps illustrating the conditions after the implementation of the action plan are presented in Figure XI.33 and Figure XI.34, in accordance with the Environmental Noise Directive and IFC guidelines. Detailed information regarding the noise modeling is provided in Annex 7.

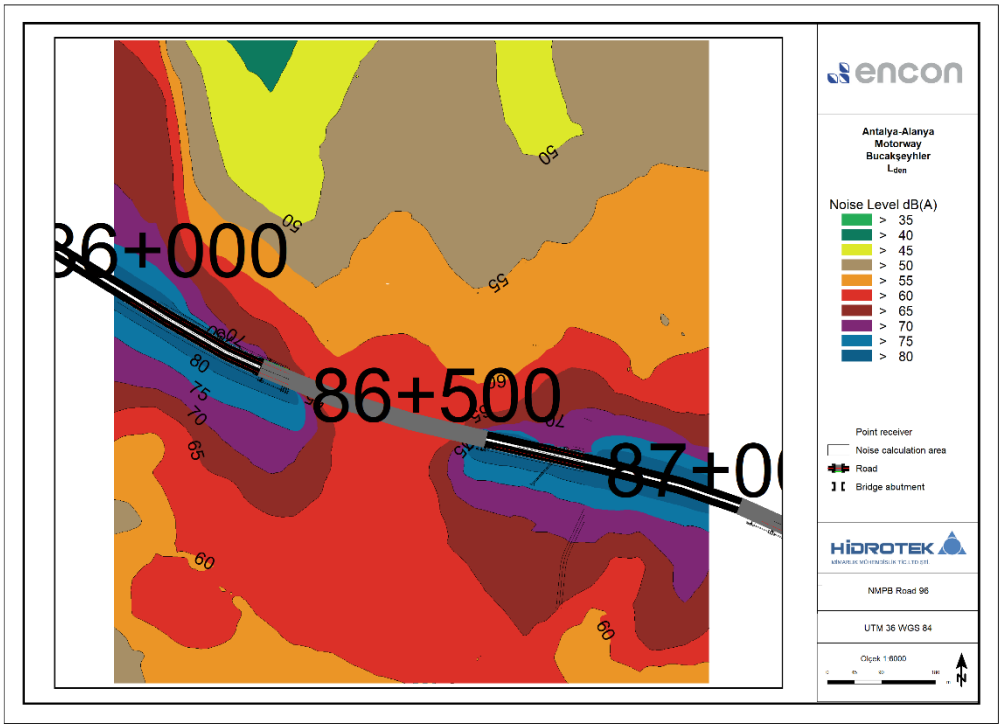


Figure XI.33 Bucakşeyhler noise map Lden

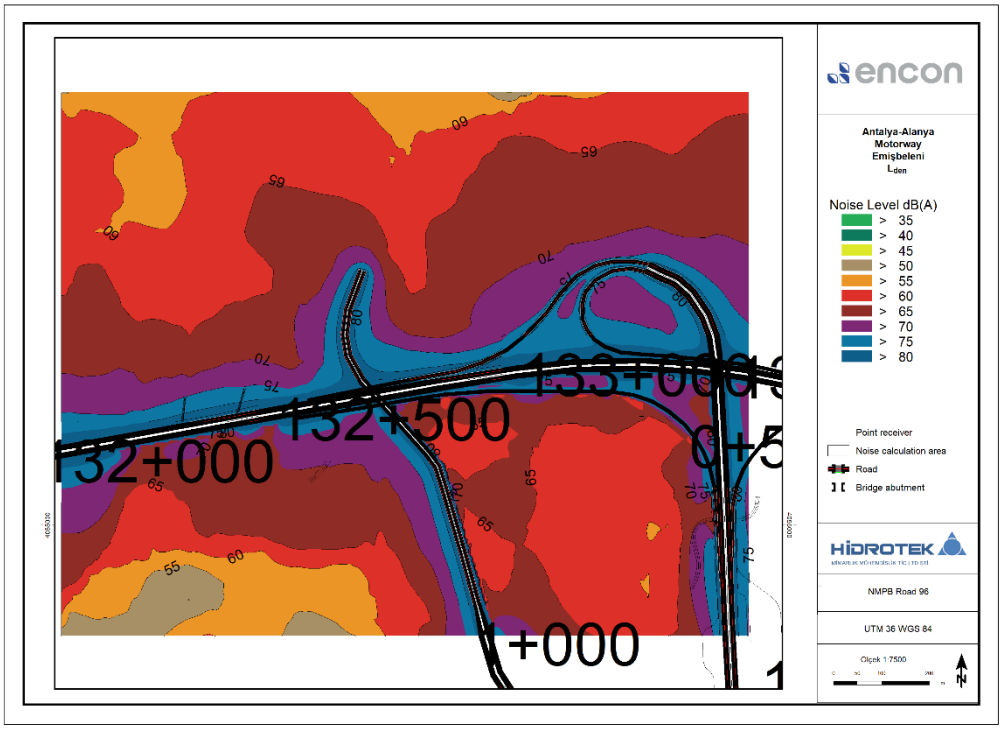


Figure XI.34 Emişbelen noise map Lden

Following the implementation of the action plan, noise level improvements were evaluated in accordance with the Environmental Noise Directive and IFC guidelines. The results of these evaluations are presented in comparison tables provided in Table XI.14.

Table XI.14 AAMP noise modeling results and comparison table (for1st measurement values)(After the action plan)

Districts	Measurement Date	RENC						IFC				Cumulative (Baseline + Model Result)					Difference (Cumulative - Baseline)				
		Baseline	Baseline	Baseline	Model Result	Model Result	Model Result	Baseline	Baseline	Model Result	Model Result	RENC L_{eq} Day	RENC L_{eq} Evening	RENC L_{eq} Night	IFC L_{eq} Day	IFC L_{eq} Night	RENC Calculated	RENC Calculated	RENC Calculated	IFC Calculated	IFC Calculated
		L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Night	L_{eq} Day	L_{eq} Night						L_{eq} Day	L_{eq} Evening	L_{eq} Night	L_{eq} Day	L_{eq} Night
		(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	(07:00-22:00)	(22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Emişbeleni	17-18.09.2024	59.8	59	52.2	62	56.4	53.4	59.8	52.2	61.1	53.9	64.0	60.9	55.9	63.5	56.1	4.2	1.9	3.7	3.7	3.9
	21-22.09.2024	71.6	69.5	66.7	62	56.4	53.4	71.3	66.6	61.1	53.9	72.1	69.7	66.9	71.7	66.8	0.5	0.2	0.2	0.4	0.2
Bucakşeyhler	16-17.09.2024	70.3	56.3	55	56	51.2	48.8	69.3	55.6	55.1	49.2	70.5	57.5	55.9	69.5	56.5	0.2	1.2	0.9	0.2	0.9
	21-22.09.2024	65.7	64.3	58.7	56	51.2	48.8	65.5	59.3	55.1	49.2	66.1	64.5	59.1	65.9	59.7	0.4	0.2	0.4	0.4	0.4

Following the implementation of the action plan, changes in noise levels were evaluated in accordance with the Environmental Noise Directive and IFC guidelines; Bucakşeyhler neighbourhood was found to comply with IFC standards, while in Emişbeleni neighbourhood, noise barriers reduced levels but weekday exceedances of the IFC standards (Background + 3 dBA) were still observed. As the modelling was based on a worst-case scenario, noise levels are expected to decrease in the future as vehicles transition to electric.

XI.1.4. Mitigation Measures

The following subsection describes the actions and strategies designed to avoid, minimize or offset the potential adverse noise impacts of the Project.

XI.1.4.1. Land Preparation and Construction Phase

To ensure that the noise levels remain below national and international standards at the closest sensitive receptors to noise source, the following mitigation measures will be implemented:

- Equipment and machinery with lower sound power levels and noise-reduced models will be prioritized when possible and feasible.
- Newer and/or well-maintained vehicles, machinery and equipment will be preferred for procurement.
- Maintenance of construction machinery and equipment will be carried out regularly.
- Silencers will be installed on appropriate machinery and equipment, including mechanical plants machinery and construction vehicle exhausts.
- Portable barriers and acoustic enclosures will be installed around noise-generating stationary machinery, such as power generators, if necessary.
- Speed limits for construction vehicles will be enforced, particularly near sensitive areas.
- Traffic through residential areas will be minimized wherever possible. Dedicated site access roads will be constructed to reach Project components (campsites, the Motorway, quarries etc.) to avoid disturbances in residential areas when necessary.
- Noise monitoring will be conducted during the construction phase according to the Environmental Monitoring Plan (see Chapter XX “Environmental and Social Management System”). Noise levels in nearby settlements will be regularly monitored, and corrective measures will be taken immediately if any exceedance of national regulation and/or international standard limits is detected.
- Potentially affected buildings sensitive to nighttime disturbances will be identified prior to construction, and nighttime construction works will be limited accordingly.
- A community consultation program will be initiated to inform the nearby residents, businesses and the local community when noise impacts are anticipated according to construction schedule.
- Any noise related complaints received through the Project’s Grievance Mechanism will be assessed, and corrective actions will be implemented as necessary.
- Construction vehicles will not be permitted to keep engines running while waiting to enter the site or waiting on-site.
- Ancillary components in campsites, such as power generators, will be placed with consideration of potential noise disturbances.
- The Motorway alignment will be used for transportation whenever feasible.
- Roads used during the construction of the Motorway will be well maintained.
- Site personnel will be trained to carry out construction activities using noise-reduction methods.
- During the construction phase of the motorway in the Sarıabalı region, it was determined that the background noise levels increased by more than 3 dB(A) during daytime hours. It is therefore recommended that machinery and equipment to be used in this area be selected

based on low noise emission criteria, and that regular noise monitoring be conducted to ensure compliance with applicable noise limits.

XI.1.4.2. Operation Phase

- A green buffer strip will be formed at the service areas between the outer lane of the Motorway and the facilities. This strip will be properly planted (e.g. with shrubs that start growing from the base and are resistant to dust and gaseous emissions as well as noise) to act as a barrier against noise from the Motorway traffic.
- During the design phase of the Project, natural topography will be utilized as a noise buffer where possible.
- The Motorway route through residential areas will be minimized to the greatest extend feasible.
- Implementation of the action plans near the locations identified by the noise modeling study will be assessed in the later stages of project development. In addition, the installation of the noise barrier will be carried out after the approval of KGM, as detailed in the Environmental and Social Monitoring Plan (see Section XX), with the results of noise monitoring at the specified locations.
- Action plans will be developed and implemented in accordance with Technical Specifications of KGM where applicable.
- Any noise-related complaints received through the Project's Grievance Mechanism will be evaluated and corrective actions will be implemented as necessary.
- Semiannual noise measurements will be conducted at critical receptors determined by noise modelling throughout operation phase. If measurements approach the thresholds specified in RENC, noise barriers will be installed upon KGM approval. If noise barriers prove insufficient, additional measures such as landscaping will be implemented. Noise modelling and critical receptor assessments will be revised based on design changes or other mitigation measures applicable at critical locations.
- Based on the results of the Noise Modeling conducted as part of the Project scope, Noise barriers and earth embankment systems are considered as technically feasible mitigation options for Bucakşeyhler and Emişbeleni area. Aluminum noise barriers with high sound absorption capacity are recommended. An example of a sound-absorbing aluminum noise barrier is shown in Figure XI.35.

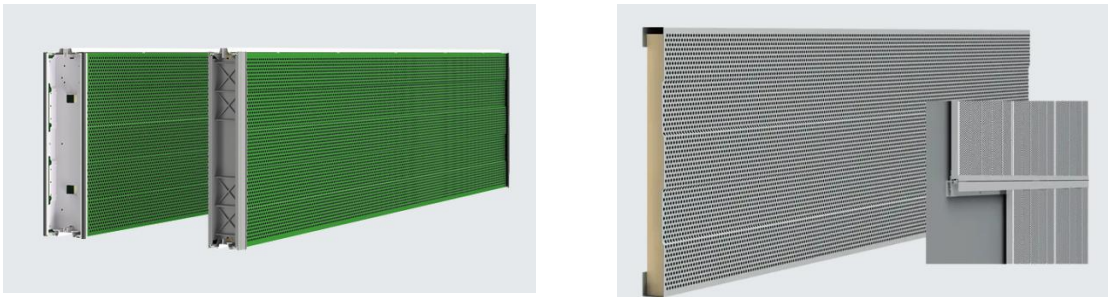


Figure XI.35 Sound-absorbing type aluminum noise barrier

XI.1.5. Summary of Assessment and Residual Impacts

The noise impact of the project was assessed using SoundPLAN V9.1 (64-bit) software, in line with the Environmental Noise Control Regulation and IFC guidelines. Noise predictions were based on traffic data projected for the year 2040. Existing noise levels were measured at 21 locations along the motorway and construction areas. Virtual receivers were assigned to these locations to estimate potential noise levels.

During the construction phase, measurements in the Sarıabalı area showed that noise levels exceeded the national daytime background limits by 3 dB(A), going beyond the allowed thresholds. The IFC's 55 dB(A) construction noise limit was also taken into account and compared with the measured values. Once the motorway is operation, noise levels are expected to exceed limits in two areas Bucakşeyhler and Emişbeleni due to traffic. Noise barriers are recommended for these locations, and ongoing noise monitoring will be necessary in the future.

In the Sarıabalı region, noise levels exceeding the permitted limits were recorded during the daytime, evening, and nighttime periods. Similarly, according to IFC guidelines, construction and motorway-related noise levels exceed the threshold values in Sarıabalı area.

In specific, two noise barriers are proposed at the sections of the settlements; namely Bucakşeyhler and Emişbeleni. The proposed artificial barriers would be 4.5 meters high and their length is proposed to be 3,750 meters in total (3,000 meters for Emişbeleni section and 750 meters for Bucakşeyhler section)

Details of the noise assessment and the significance of residual impacts are provided in Table XI.39. The Noise Level Report is included in Annex-7.

XI.2. Vibration

Vibration is a low-frequency disturbance producing physical movement in buildings and residents. Vibration can be measured in terms of Peak Particle Velocity, or PPV (i.e. the maximum speed of movement of a point in the ground during the passage of a source of vibration).

Construction activities can result in varying degrees of vibration depending on the equipment and methods used. Vibration from construction spreads through the ground and diminishes in strength with distance. Vibration can result in a disturbance in settlements close to the point of operation and may result in a risk of damage to structures in close vicinity. However, ground vibrations from construction activities rarely reach the levels that can damage structures but can achieve audible ranges in buildings close to the site. Construction activities which typically generate the most severe vibrations are blasting and piling operations.

Construction of the Motorway has the potential to cause vibration impacts as a result of activities such as piling, operation of vibratory equipment and blasting.

Operation of the Motorway has the potential to cause nuisance through vibration. Vibration arising from Motorway operation can be transmitted through the air or through the ground. Air vibration is generated by engines or exhaust of vehicles with frequencies of 50-100 Hz, while ground vibration is produced by interaction between vehicle wheels and road surface, observed in the 8-20 Hz frequency range (UK Highways Agency, 2011).

XI.2.1. Assessment Methodology and Data Sources

XI.2.1.1. Legal Framework

Turkish Legal Requirements

Regulation on Environmental Noise Control

According to RENC Annex-2 Article 12, vibration standards defined in Table 3 for the limit values of ground vibrations caused by blasting in mines, quarries and similar areas cannot be exceeded. Table 4 of RENC Annex-2 presents the maximum permissible values of ground vibrations generated by railway and road transport vehicles, workplaces, and industrial facilities in the nearest structure and ground vibrations generated by machinery and equipment inside the building. According to Article 14 of RENC Annex-2, the limit values of ground vibrations caused by pile driving and similar vibration-generating operations in construction and construction machinery outside the nearest structure should meet the limit values in Table 5.

Maximum permissible vibration for sensitive and highly sensitive areas due to blasting in mines, quarries, etc. is presented in Table XI.15. The maximum permissible values of ground vibrations caused by railway and road transport vehicles, workplaces and industrial facilities in the nearest building and ground vibrations caused by machinery and equipment inside the building are presented in Table XI.16. The maximum permissible vibration for sensitive and highly sensitive areas caused by pile driving and other vibration-inducing activities and heavy construction vehicles during construction is presented in Table XI.17.

Table XI.15. Vibration Limits for Quarries

	Structure Type	Maximum Vibration Velocity at the Foundation of Buildings, (mm/s) (according to frequency, f=Hz)			On the top floor[2] slab for all frequencies
		f= 1-10	f=10-50	f=50-100[1]	
1	Industrial buildings	20	40	50	40
2	Durable structures such as houses, bricks, and concrete	5	15	20	15
3	Buildings, historical and natural structures that are sensitive to vibration and are not included in items 1 and 2 [3]	2	8	10	8

(1): For frequencies greater than 100 cycles/sec, a large vibration level is permissible.
(2): For buildings with more than one floor, measurements should be taken both at the foundation of the building and at the slab of the top floor.
(3): These limit values determined for historical and natural structures may be restricted by precise, comprehensive vibration measurements and scientific studies to be carried out on-site.

Table XI.16. Vibration Limits for Ground Vibrations Caused by Road Transport Vehicles, Workplaces and Industrial Facilities in the Nearest Structure

	Frequency of Vibration (Hz)	Maximum Allowed Vibration Speed (rms value (mm/s))
Residential buildings	1[1]	1.5
	8-100	0.3
In the offices	1[2]	3.5
	8-100	0.6
Historical and natural structures[4]	1[3]	0.8
	8-100	0.1

(1): The maximum permissible vibration speed is determined according to the vibration frequency in the graph drawn logarithmically with the specified values. For example, between 1 Hz-8 Hz, it decreases linearly from 1.5 mm/sec to 0.3 mm/sec in the logarithmic graph.
(2): The highest permissible vibration speed is determined according to the vibration frequency in the graph drawn logarithmically with the specified values. For example, between 1 Hz-8 Hz, it decreases linearly from 3.5 mm/sec to 0.6 mm/sec in the logarithmic graph.
(3): The highest permissible vibration speed is determined according to the vibration frequency in the graph drawn logarithmically with the specified values. For example, between 1 Hz-8 Hz, it decreases linearly from 0.8 mm/sec to 0.1 mm/sec in the logarithmic graph.
(4): These limit values determined for historical and natural structures can be limited by precise, comprehensive vibration measurements and related scientific studies to be carried out on site.

Table XI.17. Vibration Limits for Construction

Area/Receptor	Maximum Allowed Vibration (Peak Particle Velocity in-mm/s)[1]	
	Continuous Vibration	Discontinuous Vibration
Residential Areas	5	10
Commercial Areas	15	30
Historical and Natural Structures[2]	2	5

(1): Frequency: 1-80 Hz.
(2): These limit values determined for historical and natural structures may be limited by precise, comprehensive vibration measurements and scientific studies to be carried out on-site.

Damage Classification

Blast-induced damage criteria developed by various researchers have been implemented to varying degrees. These studies generally fall into two main categories:

i. Identification, measurement, and analysis of ground vibrations and air overpressure resulting from blasting;
ii. Definition of structural damage thresholds and correlation of these thresholds with post-blast parameters to enable appropriate blast design.

Among the commonly referenced and widely accepted standards—due to their use of similar parameters—the three most prominent are:

- The Regulation on the Control of Environmental Noise by the Republic of Türkiye Ministry of Environment, Urbanization and Climate Change,
- The U.S. Bureau of Mines (USBM) Damage Criteria, and
- The German Standard DIN 4150.

The damage classification proposed by the USBM (see Table XI.18) divides damage into three categories: Threshold Damage, Minor Damage, and Major Damage. Threshold Damage is considered non-structural and cosmetic in nature.

Table XI.18 Damage Classification[1]

Damage Category	Damage Description
Threshold Damage (Initial Damage)	Cracking and blistering of paint; small plaster cracks at the joints of structural elements; extension of pre-existing cracks.
Minor Damage	Blistering and detachment of plaster; hairline to 3 mm wide cracks in partition walls and around window frames in stone masonry; mortar loss due to loosened joints.
Major Damage	Wide cracks in walls; cracks in arches; weakening of load-bearing structural elements; falling of stones or bricks in masonry structures (e.g., chimneys); reduction in load-bearing capacity.

Although Minor Damage is relatively more visually disturbing, it does not affect the structural strength or the load-bearing capacity of building elements. The only type of damage that causes permanent deformation and compromises the structural integrity of a building is classified as Major Damage. In the analyses and evaluations to be carried out in the later sections of this report, the term “damage” will be used in the sense of “Threshold Damage”.

On the other hand, Table XI.19 presents safe vibration levels that are not expected to cause damage in residential-type structures, categorized by building types. The values provided correspond to vibration levels that are not expected to induce cracks in the load-bearing elements of buildings. These thresholds are based on the assumptions that the buildings are constructed on properly engineered foundations, are no more than two stories high, and that the ground vibrations are short-term (lasting only a few seconds) and induced by blasting.

The limit values in Table XI.19 have been set lower than the threshold levels observed to cause damage in on-site measurements and observations conducted in the United States.

[1] According to the Antalya–Alanya Motorway Project Blasting Excavation Pre-Design Report, Project Director Prof. Dr. Ali Kahriman (Mining Engineer), Graduate School, Explosives Engineering Master’s Program Coordinator, Istanbul Okan University, Faculty of Engineering and Natural Sciences

Table XI.19 Maximum Safe Peak Particle Velocity (PPV) Levels for Different Building Types[2]

Building Type	Low Frequency (< 40 Hz)	High Frequency (> 40 Hz)
Modern Houses	19.0	50.8
Older Structures (with Timber Elements)	12.7	50.8

The values presented in Table XI.19 are based on the assumption that the probability of superficial cracking does not exceed 5%, meaning they provide a 95% confidence level that such cracks will not occur. Nevertheless, an alternative evaluation criterion that accounts more precisely for frequency variations is presented in Figure XI.36.

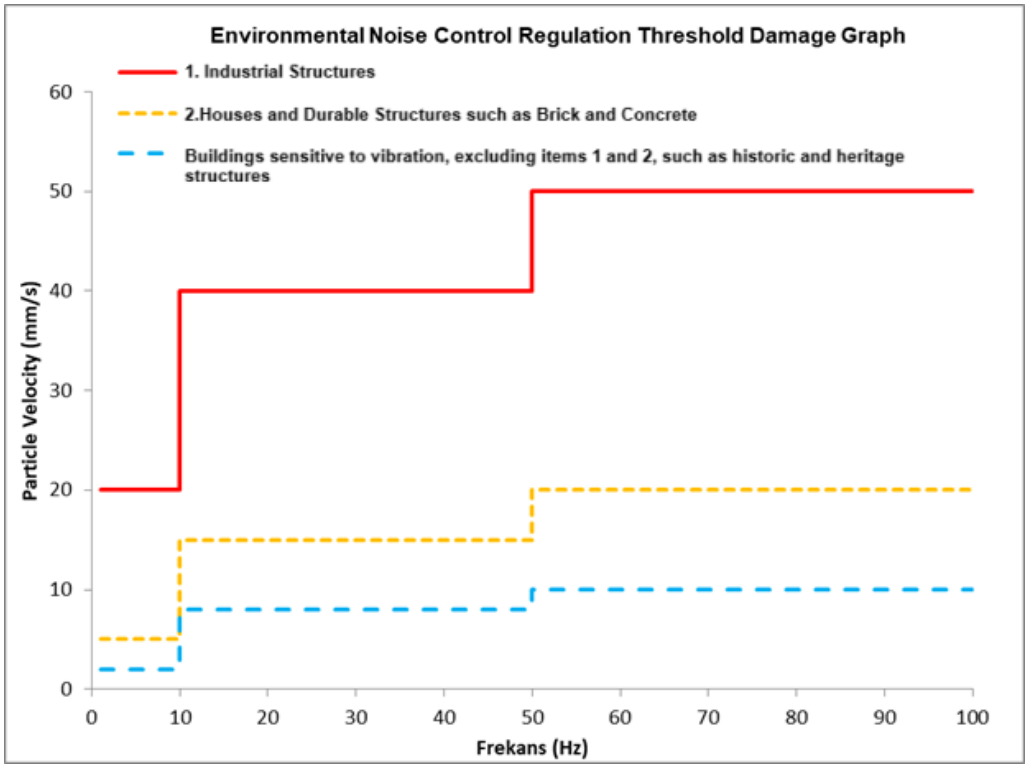


Figure XI.36 Threshold Damage Limit Values According to the Regulation of the Republic of Türkiye Ministry of Environment, Urbanization and Climate Change

IFC Standards

IFC Environmental, Health and Safety Guideline for Construction Materials Extraction state that the most significant vibration emissions are usually associated with blasting during material extraction and suggest techniques to minimize and control vibration impacts. IFC guidelines do not define any standards for vibration.

Significance Criteria

The significance criteria for the impacts regarding vibration will be determined, as high, medium or low, based on the evaluation of the magnitude of impact and sensitivity/value of the receptors/resources.

[2] According to the Antalya–Alanya Motorway Project Blasting Excavation Pre-Design Report, Project Director Prof. Dr. Ali Kahriman (Mining Engineer), Graduate School, Explosives Engineering Master's Program Coordinator, Istanbul Okan University, Faculty of Engineering and Natural Sciences

The criteria previously presented in Chapter IV ("ESIA Methodology") will be used for the determination of the magnitude of impacts, while sensitivity/value criteria to be used in the scope of impact assessment is summarized in Table XI.20.

Table XI.20. Criteria for Sensitivity/Value of Resource/Receptor

Ecosystem Component	Sensitivity/Value Level		
	High (3)	Medium (2)	Low (1)
Residential Areas*	Neighborhood/village part of it (>20)	More than few number (10-20) of residential buildings	Few (1-10) residential buildings

** The level of sensitivity in public places such as health institutions, places of worship, hotels, etc. will increase by one degree for each existing institution/business.*

XI.2.2. Baseline Conditions

Baseline conditions regarding vibration indicate that, currently, no significant source was identified to cause vibration for the Project. Based on the assessments and measurements conducted, no significant sources of vibration have been identified within the Project area or its surroundings. This indicates that, under current baseline conditions, there are no environmental or structural concerns related to vibration. In other words, the existing vibration levels remain within natural background levels, and no notable human-made or mechanical sources contributing to elevated vibration levels have been observed.

XI.2.3. Potential Impacts

XI.2.3.1. Land Preparation and Construction Phase

Land preparation and construction phase of the Project has the potential to cause vibration impacts as a result of activities such as heavy vehicle movement, piling, excavation, heavy earthworks, operation of vibratory equipment, demolition, and blasting.

The operation of heavy vehicles during construction works is expected to impact specific locations for relatively short periods. The major concern regarding construction-related vibration is the potential for structural damage to nearby buildings. In addition to this, disturbances to residents in the immediate vicinity are also another primary concern.

The Construction Noise and Vibration Guideline (NSW Government, Transport, Roads and Maritime Services, 2016) recommends minimum working distances for vibratory construction equipment from sensitive receptors (see Table XI.21). The minimum working distances vary according to particular equipment types and also local geotechnical conditions.

Based on the Transportation and Construction Vibration Guidance Manual by Caltrans[3], Table XI.22 outlines the recommended "n" values for different soil types when assessing the vibrations produced by construction equipment such as pile drivers, bulldozers, and cranes. These values help to determine the potential impact of vibration levels on nearby structures and the surrounding environment during construction activities.

[3] https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf

Table XI.21. Recommended Minimum Working Distances for Vibratory Equipment from Sensitive Receptor

Equipment	Description	Minimum Working Distance	
		Cosmetic Damage	Human Response
Vibratory Roller	<50 kN (typically 1-2 tons)	5 m	15 m to 20 m
	<100 kN (typically 2-4 tons)	6 m	20 m
	<200 kN (typically 4-6 tons)	12 m	40 m
	<300 kN (typically 7-13 tons)	15 m	100 m
	<300 kN (typically 13-18 tons)	20 m	100 m
	<300 kN (>18 tons)	25 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m	4 m
Jackhammer	Hand held	1 m	2 m

Table XI.22 Measured and Suggested "n" Values Based on Soil Class for drilling

Class	Soil Description	Characteristics	Measured "n" *(Woods & Jedele)*	Suggested "n"
I	Weak or Soft Soils	Loose soils, dry or partially saturated peat, muck, mud, loose beach or dune sand, recently plowed ground, soft spongy forest/jungle floor, organic soils, topsoil, *(Easily penetrated by shovel)*	Data not available	**1,4**
II	Competent Soils	Most sands, sandy clays, silty clays, gravel, silts, weathered rock, *(Can be dug with shovel)*	**1,5**	**1,3**
III	Hard Soils	Dense compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock, *(Cannot be dug with shovel; requires pick to break up)*	**1,1**	**1,1**
IV	Hard, Competent Rock	Bedrock, freshly exposed hard rock, *(Difficult to break with hammer)*	Data not available	**1**

Vibration caused by Drilling Rigs

Drilling rigs will be used at various locations along the project route, generating vibrations that may affect nearby structures, infrastructure, and sensitive receptors. The intensity of these vibrations depends on the type of equipment, operational methods, local soil conditions, and the distance from the vibration source to receptors.

$$PPVEquipment = PPVRef * (25/D)^n \quad (1)$$

- PPV Equipment: the predicted peak particle velocity at the receiver (in in/sec)

- PPV Ref PPV Ref: is the reference PPV value for the drilling rig measured at 25 ft (in in/sec),
- D: the distance from the vibration source to the receptor (in ft),
- n: Attenuation rate exponent based on soil class (based on Table XI.22)

Vibration levels will be estimated using recognized methods that consider equipment vibration characteristics and site-specific attenuation factors derived from geotechnical data and receptor proximity. Reference vibration values for the equipment will be sourced from manufacturer data or prior measurements, and where necessary, field monitoring will be conducted to validate predicted levels.

Vibration Due to Drilling and Excavating Operations

Drilling operations, particularly those involving the use of high-capacity mechanical rigs, can generate low-level ground vibrations. While these vibrations are significantly lower than those produced by blasting, they are still subject to evaluation especially when activities are carried out near sensitive structures or environments.

The PPVRef has been established based on the performance data of the drilling rigs and bulldozers/excavators intended for use during the works. Considering the geological context, where the material being drilled is classified as hard, competent rock, a vibration attenuation constant of n = 1 has been applied. Based on these parameters, the reference Peak Particle Velocity is determined as 0.089 inch/s at 25 feet.

Using standard propagation models and using Equation 1, after coverting PPV for drilling rigs from in/sec to mm/s, the predicted vibration level at a distance of 10 meters is calculated to be approximately 1.72 mm/s.This value falls below the threshold of 2 mm/s according to Table XI.17, which is commonly recognized as the continuous vibrations limit for potential structural or environmental impact (Table XI.24). Therefore, the vibrations generated by the drilling operations are expected to remain within acceptable limits and are not anticipated to cause any adverse effects on surrounding assets or infrastructure shown on Figure XI.37.

Table XI.23 Calculations based on the distance to the risk point for of Drilling-Induced Vibration.

Distance (m)	PPV (mm/s)
5	3.45
8.65	1.99
10	1.72
20	0.86
30	0.57
50	0.34
60	0.29
80	0.22
100	0.17
150	0.11
300	0.06

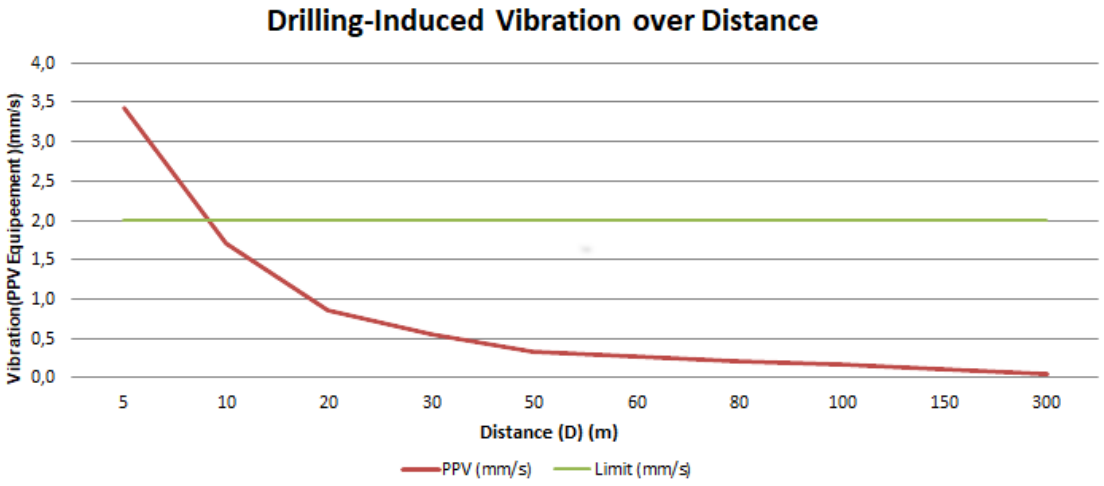


Figure XI.37 Area of effect of Drilling-Induced Vibration over Distance

Blasting preliminary design models to be applied in all types of excavations

According to the Regulation on Environmental Noise Control, the allowable particle velocity thresholds for potential damage on residential receptors and cultural heritage areas are set at 15 mm/s and 8 mm/s respectively for blasting activities in quarries and for potential damage on residential receptors and cultural heritage areas are set at 10 mm/s and 5 mm/s respectively for blasting activities in tunnels and cut-and-foundation. The maximum amount of explosives per delay that can be used without exceeding this threshold has been calculated using the equation PPV = K × SD^(-β), and the results are presented in Table XI.32**Error! Reference source not found.**. An example of the calculation steps used to create the table is provided below:

$$PPV = K \times SD^{-\beta} = K \times (R/W^{0.5})^{-\beta} \qquad (2)$$

To calculate the allowable amount of explosives per delay (W), the Peak Particle Velocity equation is rearranged as follows:

$$PPV = K * \left(\frac{R}{\sqrt{W}}\right)^{-\beta} <=> W = \left(\frac{R}{\sqrt[\beta]{\frac{K}{PPV}}}\right)^{2} <=> D = \sqrt{W} * \left(\frac{K}{PPV}\right)^{1/\beta} \qquad (3)$$

- PPV: Peak Particle Velocity (mm/s)
- K: Ground constant
- β: Ground attenuation coefficient
- R: Distance (m)

For the Antalya – Alanya Motorway Project, bench blasting using the mini-bench method will be implemented for cut and foundation excavations, considering site-specific conditions. The maximum charge per delay for different distances is presented in Table XI.32**Error! Reference source not found.**. Blasting geometry will be designed with variable bench heights depending on the distance to sensitive receptors.

According to the Antalya–Alanya Motorway Project Blasting Excavation Pre-Design Report, Project Director Prof. Dr. Ali Kahriman (Mining Engineer), Graduate School, Explosives Engineering Master's Program Coordinator, Istanbul Okan University, Faculty of Engineering and Natural Sciences, the main explosive will be ANFO or its equivalents, initiated preferably with non-electric delay systems. In general, 89 mm diameter boreholes with ANFO are planned; for benches shorter than 5 m, 76 mm diameter boreholes are recommended. Design parameters for both diameters are provided in Table XI.24, and two of the proposed bench blasting preliminary design models are shown on the sample plan and section in Figure XI.38, Figure XI.39, and Figure XI.40.

For the maximum allowable explosive amounts per delay, the most conservative values (K: 1884.9 and β: 1.605) are those from the vibration prediction equation developed by Kahriman et al. (2019) for the limestone rock units in Kepez District, Antalya. For safety reasons, these values have been adopted within the risk analysis framework.

Within this study, blasting operations must comply with the allowable explosive amounts per delay based on the appropriate vibration propagation equation and the distance to risk structures.

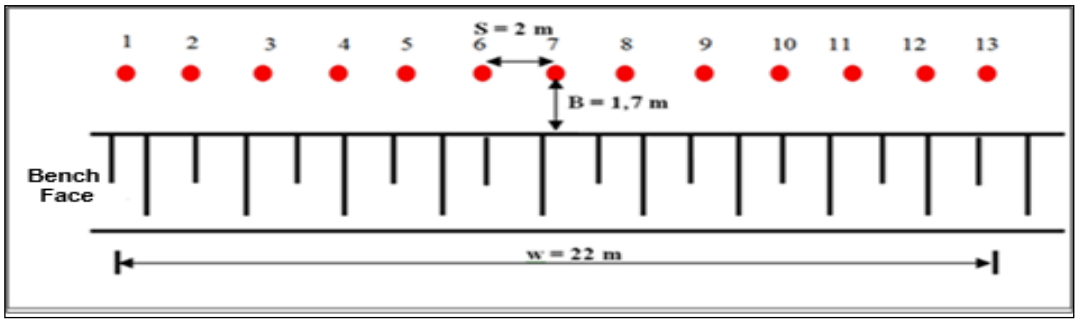


Figure XI.38 Proposed mini-step blasting preliminary design model (on Plan)

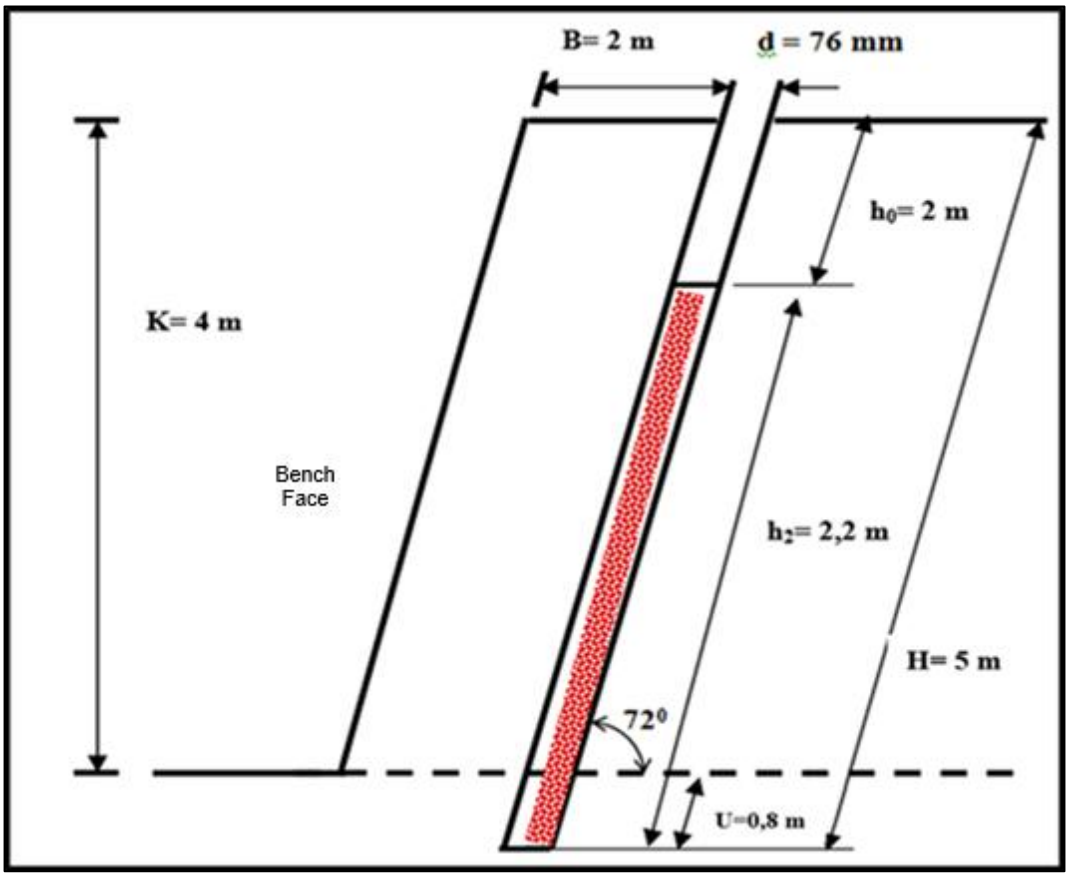


Figure XI.39 Proposed mini-step blasting preliminary design model (on Section)

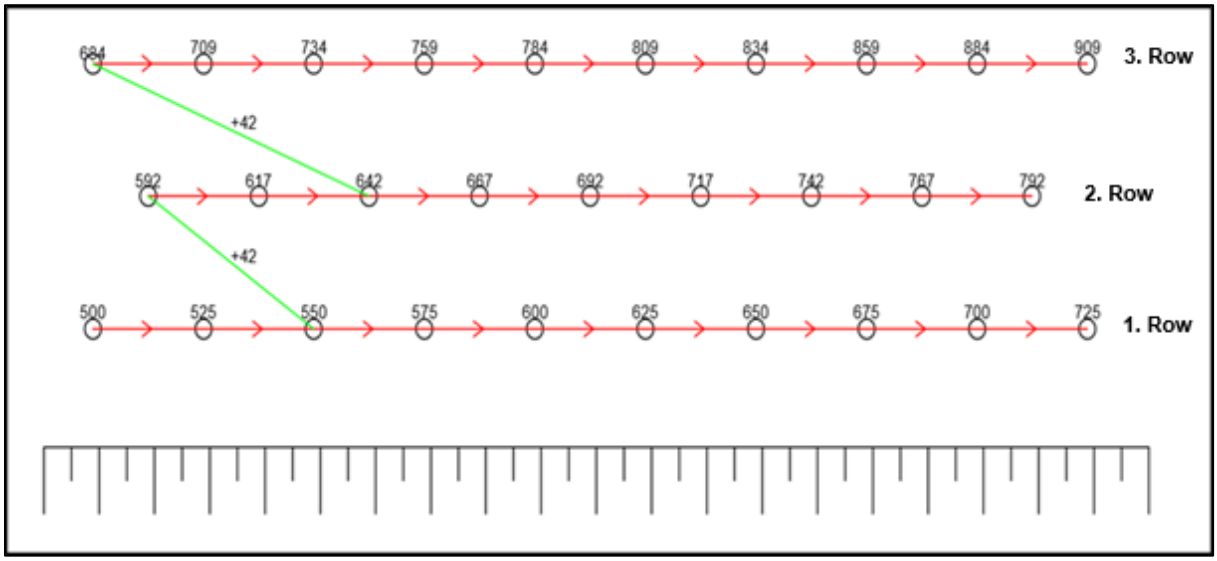


Figure XI.40 Example of a 3-row sample connection pattern with a delay of 500 ms within hole, 25 ms between holes in the same row, 42 ms between rows

In shots with two or more rows, connections shall be made between the rows using a delay element. In the inter-row transition, the delay will be planned in such a way that the holes in the back

row will not be blown before the holes in the front row are blown. A sample connection model is shown in Figure XI.40.

Table XI.24 Proposed Mini-Step Blasting Pre-Design Models

Bench Height K (m)	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Hole Diameter d (mm)	76	89	76	89	76	89	76	89
Hole Length H (m)	3.8	4.2	5.0	5.2	6.2	6.2	7.1	7.1
Burden Thickness B (m)	1.7	2.4	2.0	2.5	2.25	2.7	2.2	2.7
Spacing Between Holes S (m)	2	2.6	2.5	2.75	2.6	3.0	2.7	3.3
Stemming h_0 (m)	1.7	2.4	2.0	2.5	2.25	2.7	2.2	2.7
Charge Density lb (kg/m)	3.6	5.0	3.6	5.0	3.6	5.0	3.6	5.0
Charge Quantity Q (kg)	7.56	9.0	10.8	13.5	14.22	17.5	17.64	22
Specific Drilling b (m/m^3)	0.37	0.22	0.25	0.19	0.21	0.15	0.2	0.13
Specific Charge q (kg/m^3)	0.74	0.48	0.54	0.5	0.49	0.43	0.49	0.41

For blasts near sensitive structures with bench heights over 5 meters, the staged charging method is recommended to reduce the charge per delay. This involves in-hole stemming and detonating different segments of the hole with separate delays, requiring an electronic initiation system. Parameters for the 10-meter bench are provided in Table XI.25, with a sample borehole section in Figure XI.41 and the delay layout shown in Figure XI.42.

Table XI.25 Parameters of the 2-stage blasting model to be applied when the step length is 10 meters

Bench Height K (m)	**10**
Hole Diameter d (mm)	76
Hole Length H (m)	11
Burden Thickness B (m)	2.3
Spacing Between Holes S (m)	2.7
Charge Density lb (kg/m)	4.0
Stemming (1) h_{01} (m)	2.5
Stemming (2) h_{02} (m)	1.0
Priming Charge (1) Q_b1 (kg)	0.5
Priming Charge (2) Q_b2 (kg)	0.5
Charge Quantity (1) Q_1 (kg)	15
Charge Quantity (2) Q_2 (kg)	15
Total Charge in Stage 1 Q_tot1 (kg)	15.5
Total Charge in Stage 2 Q_tot2 (kg)	15.5

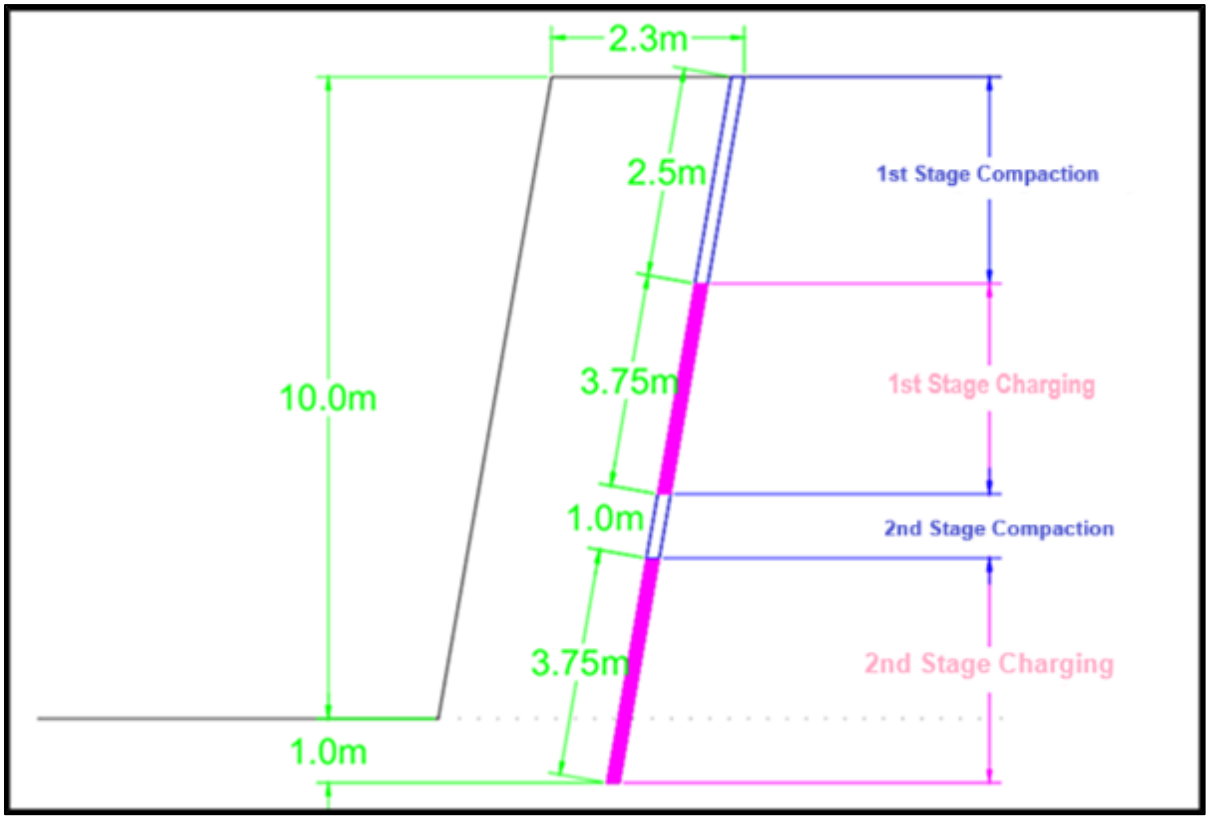


Figure XI.41 Hole section of the 2-stage blasting model to be applied when the step length is 10 meters

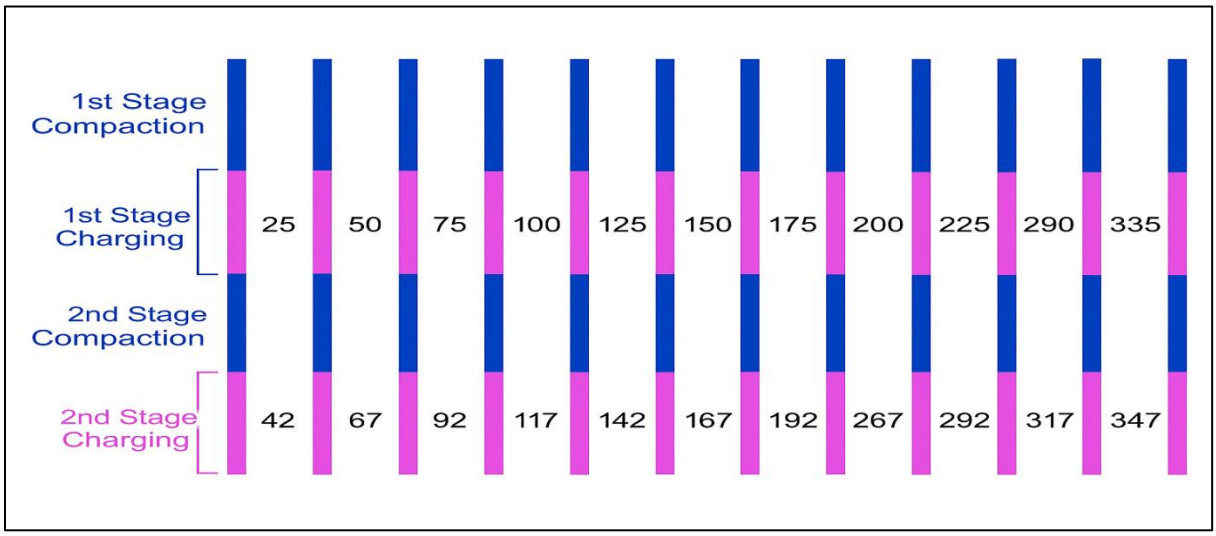


Figure XI.42 2-stage blasting model delay scheme to be applied when the step length is 10 meters

Blasting Preliminary Design Models for Tunnel Excavations

Within the scope of the "Antalya – Alanya Motorway Project," tunnel excavations are planned at five different locations. The start and end kilometer points, along with the lengths of these tunnels, are provided in Table XI.26.

Table XI.26Tunnels planned to be constructed under the Project

Tunnel Name		Start Km	End Km	Tunnel Lenght (m)
T1 Tüneli	Left Tube	54+327	55+376	1,049
	Right Tube	54+311	55+378	1,065
T2 Tüneli	Left Tube	57+366	57+898	532
	Right Tube	57+386	57+985	597
T3 Tüneli	Left Tube	60+935	62+477	1,542
	Right Tube	60+958	62+477	1,519
T4 Tüneli	Left Tube	70+131	70+475	344
	Right Tube	70+131	70+475	344
T5 Tüneli	Left Tube	88+679	89+544	865
	Right Tube	88+671	89+544	873

The Project plans to construct excavations based on two different tunnel cross-section types: arched invert and flat invert. Visuals of these cross-sections are shown in Figure XI.43 and Figure XI.44, respectively.

Upon examining Figure XI.43 and Figure XI.44, the upper half geometries of both cross-sections are similar, while the lower halves vary. Therefore, a blasting design has been developed for the arched invert type cross-section shown in Figure XI.43, covering the upper half, lower half, and invert excavations. The upper half blasting design can be commonly applied to both cross-section types.

Excavation stages for the arched invert tunnel, with a total cross-sectional area of approximately 156 m², are illustrated in Figure XI.45. According to this plan, the upper half is excavated first, followed by the lower half, and finally the invert section.

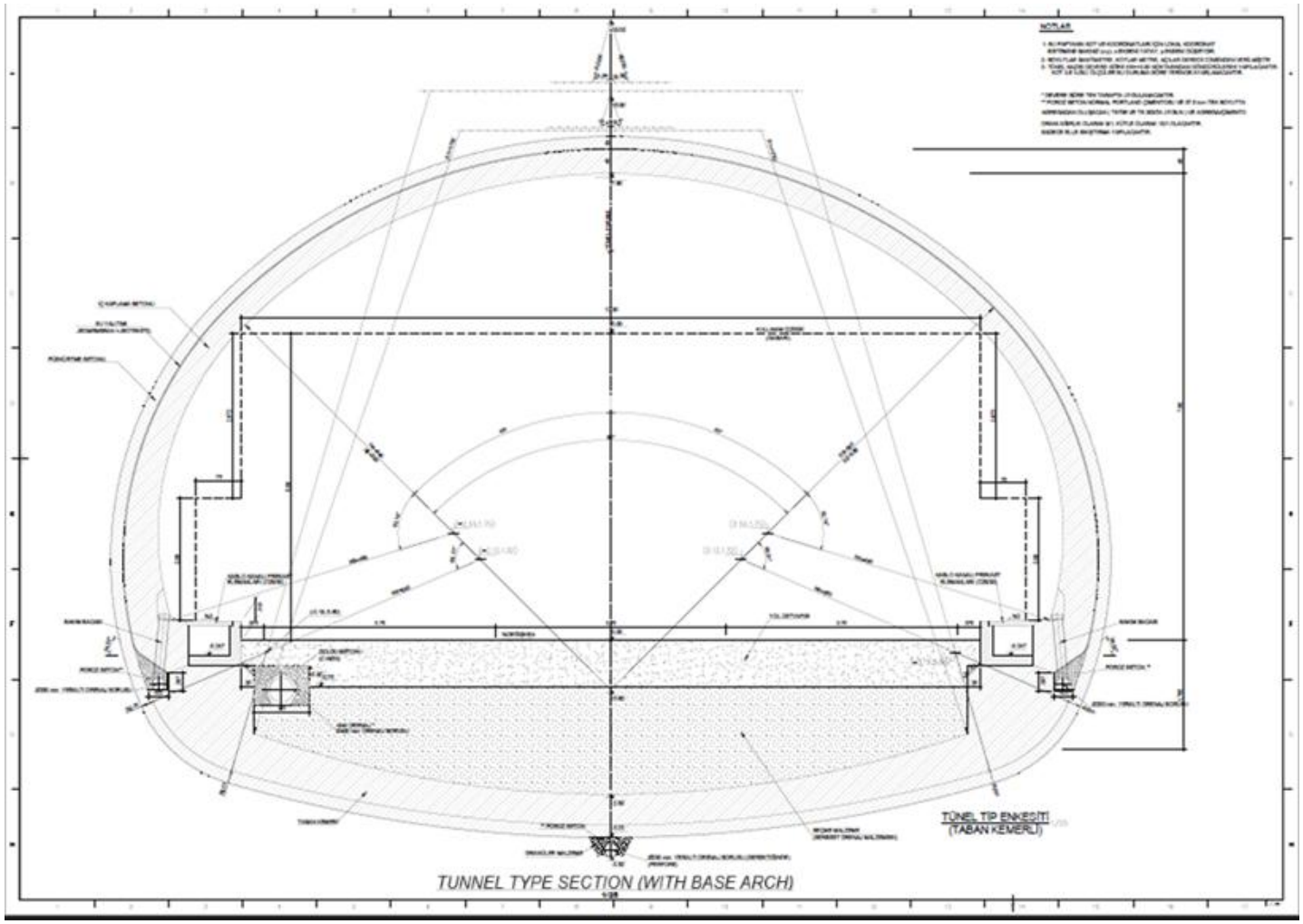


Figure XI.43 base-arched tunnel type cross-section

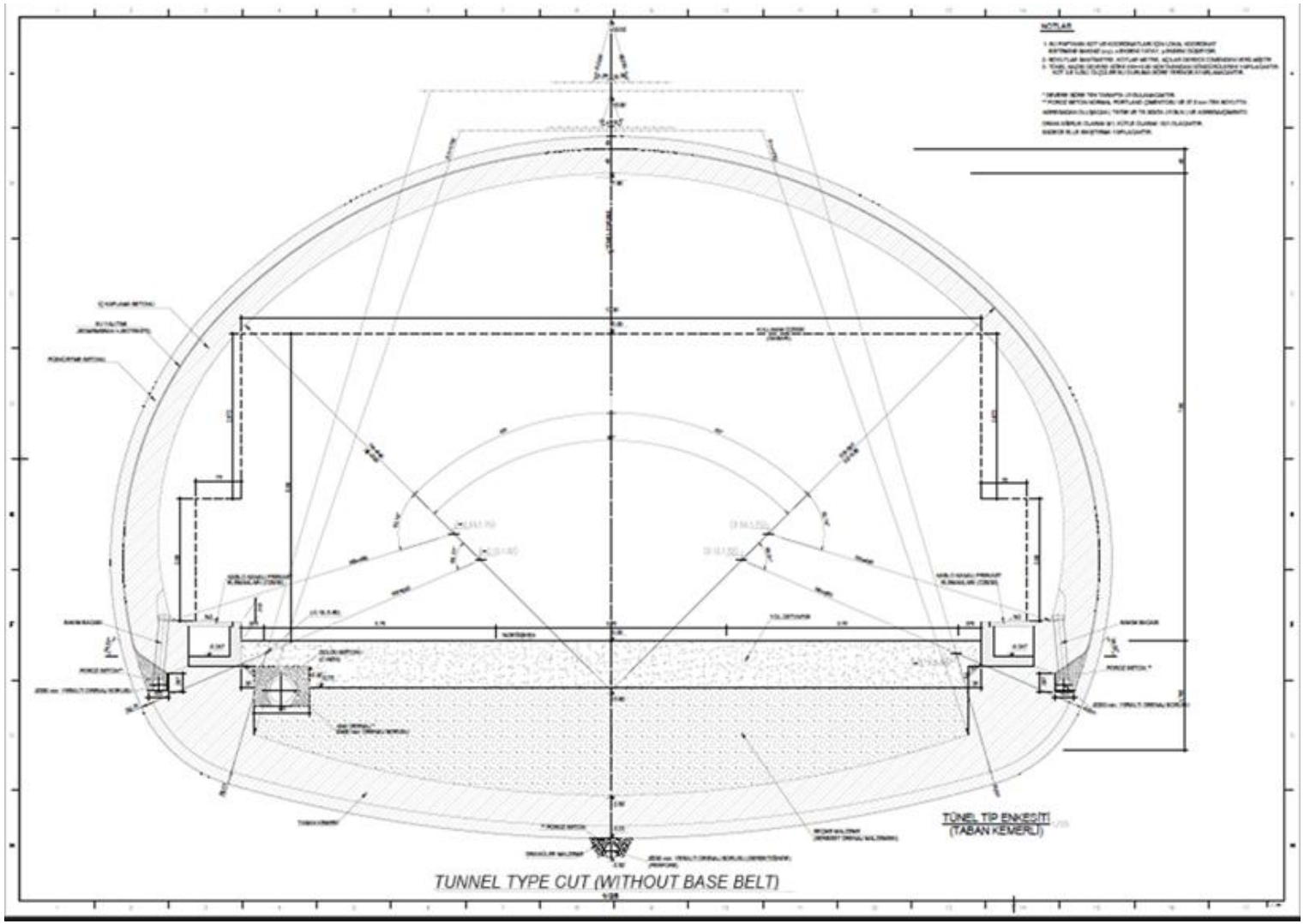


Figure XI.44 Flat-bottom tunnel cross-section

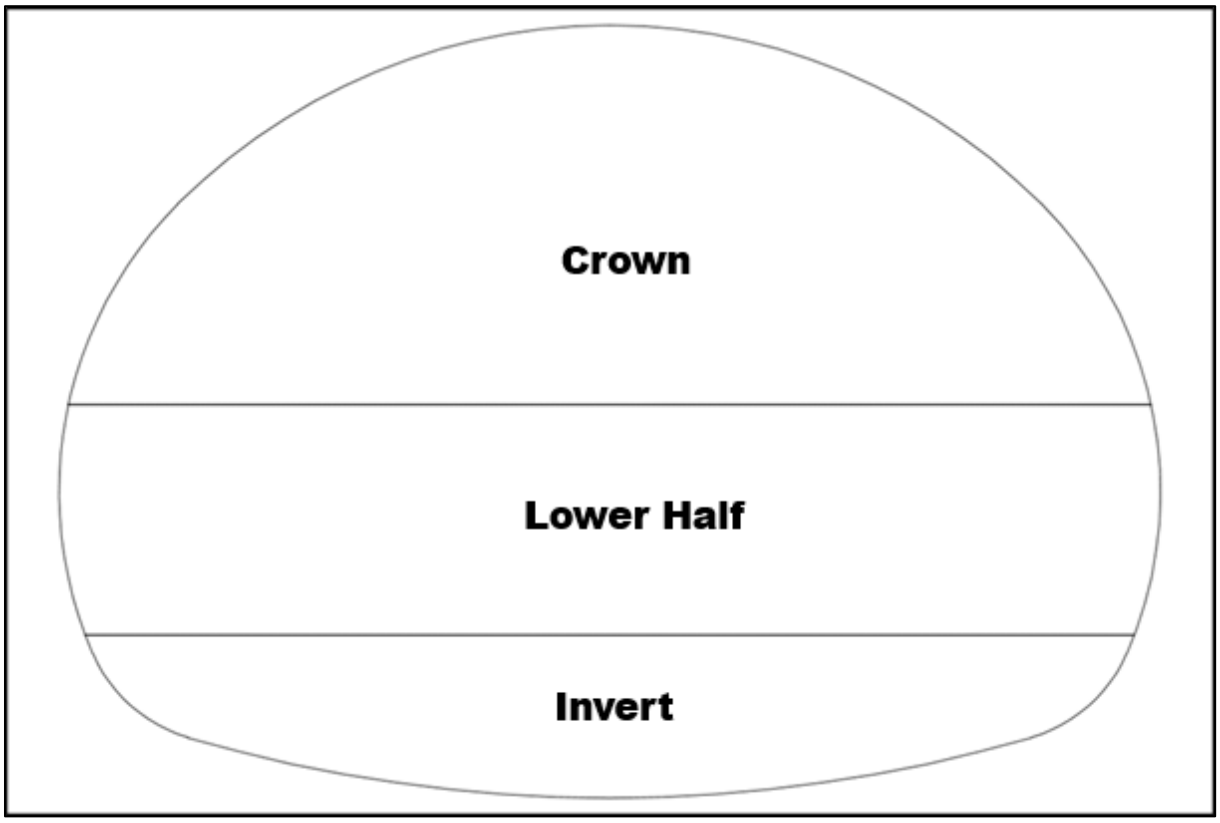


Figure XI.45 Base-arched tunnel excavation zones

The parameters and techniques used in the design of the blasting models are outlined below:

- A drill-hole diameter of 42 mm (within the range of 42–45 mm) is assumed.
- Emulsion explosive cartridges measuring 38 x 500 mm and weighing 0.5 kg are considered as the explosive material.
- All distances used in the designs are given in meters.

Quantities of Explosive Materials that may be needed during the Works

The quantities of explosives and accessories potentially required during the blasting excavation works for the Antalya – Alanya Motorway Project have been estimated.

The excavation phase is planned to last approximately 3 years, involving blasting for cuttings, foundations, and tunnels. The estimated excavation volume for cuttings and foundations is 17,500 m³, while the total excavation volume for tunnels is expected to be 14,000 m³. It is assumed that blasting will occur 26 days per month, 312 days per year, totaling 936 blasting days throughout the Project duration.

Based on the proposed blasting designs, the estimated quantities of explosives and accessories needed for cuttings and foundation excavations are provided in Table XI.27, while those for tunnel excavations are given in Table XI.28.

Table XI.27 Estimated quantities of explosive materials and accessories to be required for cutting and foundation excavations

Explosives and Accessories	Daily Requirement	Monthly Requirement	Annual Requirement	Total Requirement (Project Duration)
ANFO / Booster-sensitive emulsion explosive	100,000 kg	2,600,000 kg	31,200,000 kg	93,600,000 kg
Cap-sensitive emulsion explosive (dynamite)	9,500 kg	247,000 kg	2,964,000 kg	8,892,000 kg
Electronic detonator	5,000 units	130,000 units	1,560,000 units	4,680,000 units
Electric detonator	200 units	5,200 units	62,400 units	187,200 units
Non-electric detonator	19,000 units	494,000 units	5,928,000 units	17,784,000 units
Detonating cord	70,000 meters	1,820,000 meters	21,840,000 meters	65,520,000 meters

Table XI.28 Estimated quantities of explosive materials and accessories required for tunnel excavations

Explosives and Accessories	Daily Requirement	Monthly Requirement	Annual Requirement	Total Requirement (Project Duration)
Cap-sensitive emulsion explosive (dynamite)	4,500 kg	117,000 kg	1,404,000 kg	4,212,000 kg
Electronic detonator	1,500 units	39,000 units	468,000 units	1,404,000 units
Electric detonator	500 units	13,000 units	156,000 units	468,000 units
Non-electric detonator	3,000 units	78,000 units	936,000 units	2,808,000 units
Detonating cord	1,000 meters	26,000 meters	312,000 meters	936,000 meters

Evaluation of Air Shock Stone Skidding Distances That May Occur During Blast Excavations

The distances at which a 140 dB airblast effect would occur and the areas affected by flyrock have been calculated based on the amount of explosive material used per delay. General information about the site is provided in Table XI.29. The minimum distance that can be maintained from the nearest risk point based on the amount of explosive used per delay has been calculated and is presented in Table XI.30.

Table XI.29 General information about the site

General Information		Land Constants		Air Shock Constants	
Threshold Damage Limit PPV (mm/s)	Air Shock Effect Limit (db)	K	β	K	β
15	140	1,884.9	1.605	24.8	1.1

Table XI.30 Calculation according to the amount of explosive material to be used per delay for 15 mm/s using Equation 3

Calculation according to the amount of explosives to be used per delay			
Blast Details		**Results**	
Maximum Explosive Charge per Delay (kg)	Allowable Distance to the Nearest Structure from the Risk Point (m)	Distance that can be achieved to avoid exceeding 140 dB air shock	Flyrock Risk Distance (m)
10.82[4]	66.8	21.8	65.3

Based on the calculations provided in Table XI.31, the maximum flyrock distance and the air shock distance corresponding to a sound pressure level of 140 dB have been determined for a charge weight of 10.82 kg per delay, with a threshold of 15 mm/s for durable structures located near settlements. These distances are illustrated on a representative model shown in Figure XI.46.

Table XI.31 Calculations based on the distance to the risk point for a vibration of 15 mm/s using Equation 3

Distance to Risk Point (m)	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 15 mm/s Threshold Damage Limit	Distance (m) Subject to 140 dB Air Overpressure Based on the Explosive Charge Used	Flyrock Impact Zone Based on the Explosive Charge Used (m)
50	6.06	18	45.00
100	24.22	29	55.00
150	54.50	37	125.00
200	96.88	45	3,339.00
250	151.38	53	3,339.00
300	217.98	59	3,339.00
350	296.70	66	3,339.00
400	387.52	72	3,339.00

[4] According to the Antalya–Alanya Motorway Project Blasting Excavation Pre-Design Report, Project Director Prof. Dr. Ali Kahriman (Mining Engineer), Graduate School, Explosives Engineering Master's Program Coordinator, Istanbul Okan University, Faculty of Engineering and Natural Sciences

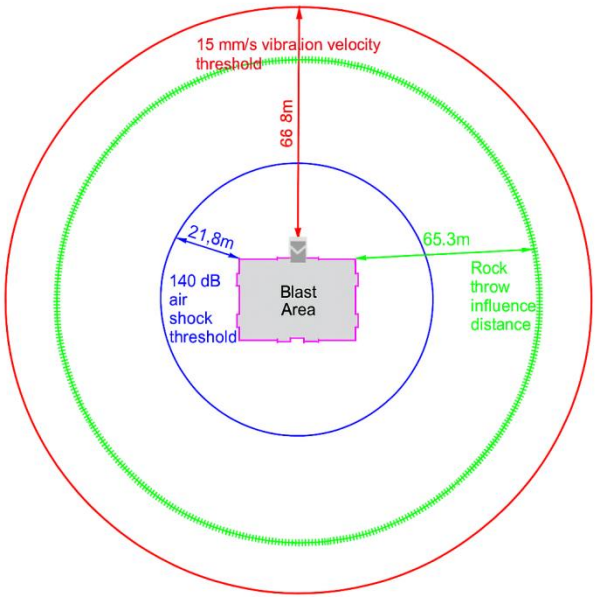


Figure XI.46 Area of effect when using 10.82 kg of explosives per delay

Blasting Design Considerations for Vibration during Construction

For all operations, the blasting design specifies a charge weight of 10.82 kg per delay. For quarry operations, this charge is intended to control vibrations at 15 mm/s for durable structures and 8 mm/s for vibration-sensitive structures, with safe distances of 66.8 meters and 98.8 meters, respectively. For tunnels, cuts, and foundation excavations, the same explosive charge is used to limit vibrations to 10 mm/s for durable structures and 5 mm/s for vibration-sensitive structures, with corresponding safe distances of 86 meters and 132.5 meters.

Table XI.32 illustrates how the maximum allowable explosive charge per delay varies with distance to ensure vibration limits are not exceeded. For a charge of 10.82 kg, safe distances range from about 66.8 meters for the 15 mm/s vibration limit typical of durable structures, up to 132.5 meters for the strict 5 mm/s limit used for highly sensitive structures. At closer distances, the allowable charge decreases sharply. For example, at 5 meters, only 0.06 kg is permitted under the 15 mm/s limit, and as little as 0.02 kg for the 5 mm/s threshold.

Table XI.32 Calculations based on the distance to the risk point for different vibrations using Equation 3

Distance to Risk Point (m)	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 15 mm/s Threshold Damage Limit	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 10 mm/s Threshold Damage Limit	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 8 mm/s Threshold Damage Limit	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 5 mm/s Threshold Damage Limit
5	0.06	0.04	0.03	0.02
10	0.24	0.15	0.11	0.06
15	0.54	0.33	0.25	0.14
20	0.97	0.58	0.44	0.25
30	2.18	1.32	1.00	0.55
40	3.88	2.34	1.77	0.99
50	6.06	3.65	2.77	1.54

Distance to Risk Point (m)	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 15 mm/s Threshold Damage Limit	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 10 mm/s Threshold Damage Limit	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 8 mm/s Threshold Damage Limit	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 5 mm/s Threshold Damage Limit
60	8.72	5.26	3.98	2.22
66.8	10.81	6.52	4.94	2.75
70	11.87	7.16	5.42	3.02
80	15.50	9.35	7.08	3.94
86	17.91	10.81	8.18	4.56
90	19.62	11.84	8.96	4.99
98.9	23.69	14.29	10.82	6.03
100	24.22	14.61	11.07	6.16
110	29.31	17.68	13.39	7.45
120	34.88	21.04	15.94	8.87
130	40.93	24.70	18.70	10.41
132.5	42.52	25.66	19.43	10.82

Based on a charge weight of 10.82 kg per delay, the safe distances and vibration limits for quarry blasting are illustrated in Figure XI.47, while those for tunnel, cut, and foundation blasting are shown in Figure XI.48.

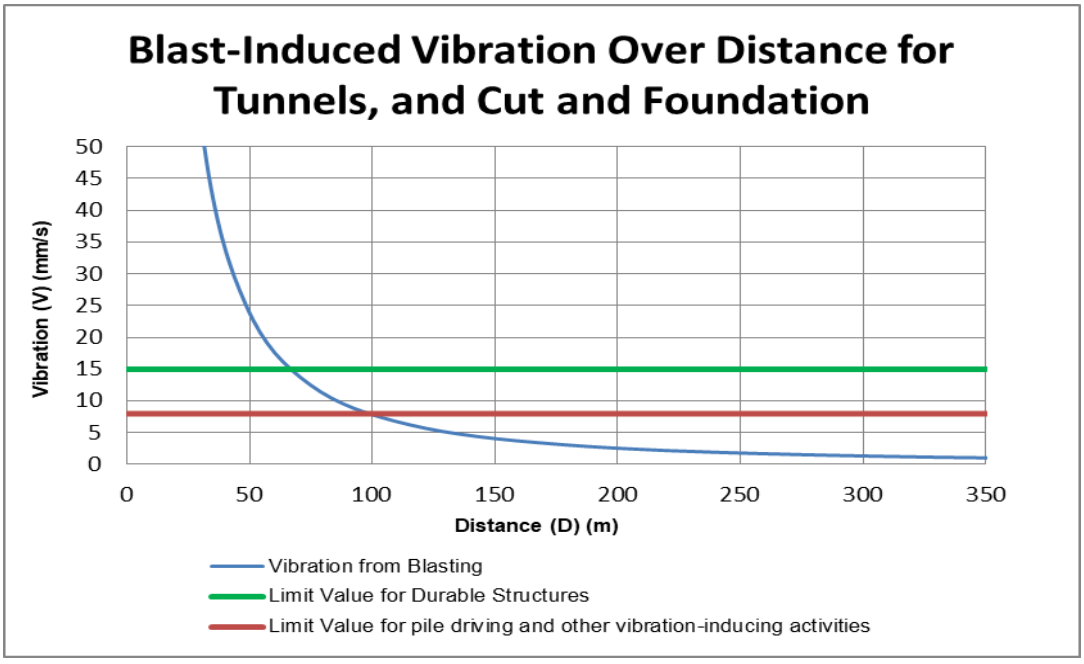


Figure XI.47 Blast-Induced Vibration of 15 mm/s and 8 mm/s over Distance

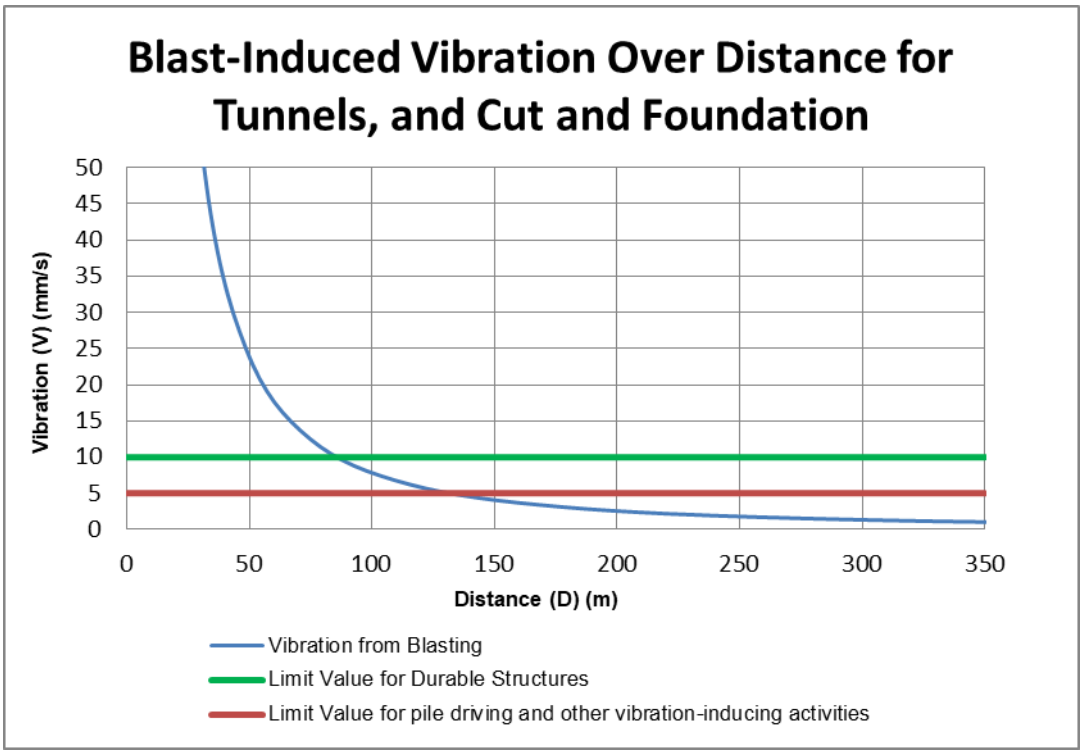


Figure XI.48 Area of effect of Blast-Induced Vibration over Distance for Tunnels, and Cut and Foundation

To assess the potential vibration impacts caused by blasting activities, sensitivity analyses were conducted individually for the settlements that may be affected by the planned tunnel and cut blasting operations. The results of these analyses are presented in Table XI.33 and the geographical distribution of the sensitivity analyses for the settlements that may be affected by the planned tunnel and cut blasting operations is presented in Figure XI.49 through Figure XI.53.

To support these findings, blast vibration assessments were carried out (using the equation 3 and the values of Kahriman et al. (2019) with the constants K= 1884.9 and β =1.605) to identify areas that may be subject to potential impacts based on their proximity to vibration-sensitive structures. For tunnels (Table XI.33), and cuts and foundations (Table XI.35), the vibration limits are set at 10 mm/s for durable structures and 5 mm/s for vibration-sensitive structures such as mosques, cultural heritage sites, and schools. In contrast, for quarries and borrow pits (Table XI.34), the allowable limits increase to 15 mm/s for durable structures and 8 mm/s for vibration-sensitive structures. These assessments help determine which environments could pose risks to sensitive sites and guide the implementation of appropriate safety standards.

Table XI.33. Blast Vibration assessment for tunnels with vibration of 10mm/s for durable structures and 5 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact	Fly Rock Impact	Air Shock impact
Tunnel 1	Start Km: 54+311	Sarıabalı	158	10.82	3.77	**-6.23**		**No Impact**	**No Impact**	**No Impact**
	End Km: 55+378		40	10.82	34.19	**24.19**		**Potential Impact**	**Potential Impact**	**No Impact**
	End Km: 55+378	HRM 8*	177	10.82	3.14		**-1.86**	**No Impact**	**No Impact**	**No Impact**
	Start Km: 54+311	Student Hostel	700	10.82	0.35		**-4.65**	**No Impact**	**No Impact**	**No Impact**
Tunnel 2	Start Km: 57+366	Çakış	215	10.82	2.30	**-7.70**		**No Impact**	**No Impact**	**No Impact**
	End Km: 57+985		750	10.82	0.31	**-9.69**		**No Impact**	**No Impact**	**No Impact**
	Start Km: 57+366	HRM 8*	53	10.82	21.77		**16.77**	**Potential Impact****	**Potential Impact**	**No Impact**
Tunnel 3	Start Km: 60+935	Taşağıl	195	10.82	2.69	**-7.31**		**No Impact**	**No Impact**	**No Impact**
	End Km: 62+477		80	10.82	11.24	**1.24**		**Potential Impact**	**No Impact**	**No Impact**
	End Km: 62+477	HRM 11*	196	10.82	2.67		**-2.33**	**No Impact**	**No Impact**	**No Impact**
	End Km: 62+477	Mosque	845	10.82	0.26		**-4.74**	**No Impact**	**No Impact**	**No Impact**
Tunnel 4	Start Km: 70+131	HRM 16*	163	10.82	3.59		**-1.41**	**No Impact**	**No Impact**	**No Impact**
	End Km: 70+475		60	10.82	17.84		**12.84**	**Potential Impact****	**Potential Impact**	**No Impact**
	End Km: 70+475		60	10.82	17.84		**12.84**	**Potential Impact****	**Potential Impact**	**No Impact**
Tunnel 5	Start Km: 88+671	Ulukapı	150	10.82	4.10	**-5.90**		**No Impact**	**No Impact**	**No Impact**
	End Km: 89+544		110	10.82	6.74	**-3.26**		**No Impact**	**No Impact**	**No Impact**
	End Km: 89+544	HRM 36*	248	10.82	1.83		**-3.17**	**No Impact**	**No Impact**	**No Impact**
	End Km: 89+544	Mosque	854	10.82	0.25		**-4.75**	**No Impact**	**No Impact**	**No Impact**

**See Chapter 13 for the details of the locations of Cultural Heritage sites*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table XI.36 to address these potential impacts.*

Table XI.34 Blast vibration assessment for Quarries and Borrow Pits with vibration of 15mm/s for durable structures and 8 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 15 mm/s for Durable Structures	Exceedence of the limit of 8 mm/s for Vibration Sensitive Structures	Vibration Impact	Fly Rock Impact	Air Shock Impact
Sarıabalı (AO-1) Borrow Pit	Km 53+800	Sarıabalı	63	10.82	16.49	**1.49**		Potential Impact	Potential Impact	No Impact
		Student Hostel	720	10.82	0.33		**-7.67**	No Impact	No Impact	No Impact
Çakış (TOY4a) Quarry	Km 56+500	Çakış	180	10.82	3.06	**-11.94**		No Impact	No Impact	No Impact
		Mosque	570	10.82	0.48		**-7.52**	No Impact	No Impact	No Impact
Kuruçay (TOY4b) Quarry	Km 58+500	Sağırin	800	10.82	0.28	**-14.72**		No Impact	No Impact	No Impact
		HRM 8*	720	10.82	0.33		**-7.67**	No Impact	No Impact	No Impact
Dikmen Borrow Pit	Km 83+000	Sarılar	100	10.82	7.86	**-7.14**		No Impact	No Impact	No Impact
		HRM 20*	100**	10.82	7.82	**-**	**-0.18**	No Impact	No Impact	No Impact
		Mosque	770	10.82	0.30		**-7.70**	No Impact	No Impact	No Impact
Bademliyar (TO2) Quarry	Km 104+750	Güçlüköy	1060	10.82	0.18	**-14.82**		No Impact	No Impact	No Impact
		School	1060	10.82	0.18		**-7.82**	No Impact	No Impact	No Impact
Uzunlar (TOY5) Quarry	Km 106+000	Uzunlar	910	10.82	0.23	**-14.77**		No Impact	No Impact	No Impact
Karakaya Quarry	Km 114+200	Karakaya	460	10.82	0.68	**-14.32**		No Impact	No Impact	No Impact
		School	620	10.82	0.42		**-7.58**	No Impact	No Impact	No Impact
Saburlar Quarry	Km 117+000	Saburlar	71	10.82	13.61	**-1.39**		No Impact	No Impact	No Impact
		Mosque	400	10.82	0.85		**-7.15**	No Impact	No Impact	No Impact
Karamanlar Quarry	Km 119+500	Karamanlar	366	10.82	0.98	**-14.02**		No Impact	No Impact	No Impact
Soğukpınar Quarry	Km 134+000	Toslak	326	10.82	1.18	**-13.82**		No Impact	No Impact	No Impact

**See Chapter 13 for the details of the locations of Cultural Heritage sites*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table XI.36 to address these potential impacts and the distance changes.*

Table XI.35 Blast Vibration Assessment for Cut, and Foundation with vibration of 10mm/s for durable structures and 5 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact	Fly Rock Impact	Air Shock Impact
Cut and Foundation	Serik Access Road Km 2+000	Sarıabalı	30	10.82	54.26	**44.26**		**Potential Impact**	**Potential Impact**	**No Impact**
		Mosque	820	10.82	0.27		**-4.73**	**No Impact**	**No Impact**	**No Impact**
	Serik Access Road Km 1+700	HRM 58	10**	10.82	316.41	**-**	**311.41**	**Potential Impact**	**Potential Impact**	**Potential Impact**
	Km 52+500	Deniztepesi	125	10.82	5.49	**-4.51**		**No Impact**	**No Impact**	**No Impact**
		HRM 5*	5**	10.82	962.52	**-**	**957.52**	**Potential Impact**	**Potential Impact**	**Potential Impact**
		HRM 6*	5**	10.82	962.52	**-**	**957.52**	**Potential Impact**	**Potential Impact**	**Potential Impact**
	Km 53+500	Sarıabalı	60	10.82	17.84	**7.84**		**Potential Impact**	**Potential Impact**	**No Impact**
		Student Hostel	990	10.82	0.20		**-4.80**	**No Impact**	**No Impact**	**No Impact**
	Km 58+800	HRM 9*	-**	10.82	-	**-**	**-**	**No Impact**	**No Impact**	**No Impact**
	Km 66+200	Hocalar	91	10.82	9.14	**-0.86**		**No Impact**	**No Impact**	**No Impact**
	Km 66+500	HRM 12*	332	10.82	1.15		**-3.85**	**No Impact**	**No Impact**	**No Impact**
	Km 73+500	Yavrudoğan	32	10.82	48.92	**38.92**		**Potential Impact**	**Potential Impact**	**No Impact**
	Km 76+500	Kalemler	26	10.82	68.27	**58.27**		**Potential Impact**	**Potential Impact**	**No Impact**
		Mosque	235	10.82	1.99		**-3.01**	**No Impact**	**No Impact**	**No Impact**
	Km 79+000	Yeniköy	110	10.82	6.74	**-3.26**		**No Impact**	**No Impact**	**No Impact**
	Km 84+000	Yukarıışıklar	62	10.82	16.92	**6.92**		**Potential Impact**	**Potential Impact**	**No Impact**
		Mosque	640	10.82	0.40		**-4.60**	**No Impact**	**No Impact**	**No Impact**
	Km 85+000	Dikmen	65	10.82	15.69	**5.69**		**Potential Impact**	**Potential Impact**	**No Impact**
		HRM 27*	166	10.82	3.48		**-1.52**	**No Impact**	**No Impact**	**No Impact**
		Mosque	290	10.82	1.42		**-3.58**	**No Impact**	**No Impact**	**No Impact**
	Km 94+500	Karaöz	57	10.82	19.37	**9.37**		**Potential Impact**	**Potential Impact**	**No Impact**
	Km 95+500	Aksaz	44	10.82	29.34	**19.34**		**Potential Impact**	**Potential Impact**	**No Impact**
		HRM 38*	15**	10.82	165.06	**-**	**160.06**	**Potential Impact**	**Potential Impact**	**Potential Impact**
	Km 97+500	Hacıali	51	10.82	23.15	**13.15**		**Potential Impact**	**Potential Impact**	**No Impact**
		School	510	10.82	0.57		**-4.43**	**No Impact**	**No Impact**	**No Impact**
	Km 100+500	Hacıaisalı	56	10.82	19.93	**9.93**		**Potential Impact**	**Potential Impact**	**No Impact**
	Km 104+500	Uzunlar	121	10.82	5.79	**-4.21**		**No Impact**	**No Impact**	**No Impact**
		HRM 41*	20	10.82	104.02		**99.02**	**Potential Impact**	**Potential Impact**	**Potential Impact**
		Mosque	260	10.82	1.70		**-3.30**	**No Impact**	**No Impact**	**No Impact**
	Km 105+500	Uzunlar	144	10.82	4.38	**-5.62**		**No Impact**	**No Impact**	**No Impact**
		School	800	10.82	0.28		**-4.72**	**No Impact**	**No Impact**	**No Impact**
	Km 112+000	Yalçıdibi	35	10.82	42.37	**32.37**		**Potential Impact**	**Potential Impact**	**No Impact**
		HRM 45*	30	10.82	54.26		**49.26**	**Potential Impact**	**Potential Impact**	**No Impact**
		Mosque	660	10.82	0.38		**-4.62**	**No Impact**	**No Impact**	**No Impact**
	Km 116+000	HRM 47*	258	10.82	1.72		**-3.28**	**No Impact**	**No Impact**	**No Impact**
	Km 116+500	Çakallar	53	10.82	21.77	**11.77**		**Potential Impact**	**Potential Impact**	**No Impact**
		School	330	10.82	1.16		**-3.84**	**No Impact**	**No Impact**	**No Impact**
	Km 118+500	Çakallar	55	10.82	20.51	**10.51**		**Potential Impact**	**Potential Impact**	**No Impact**
	Km 120+800	HRM 57*	10**	10.82	316.41	**-**	**311.41**	**Potential Impact**	**Potential Impact**	**Potential Impact**
	Km 121+500	Hacılar	587	10.82	0.46	**-9.54**		**No Impact**	**No Impact**	**No Impact**
		Mosque	876	10.82	0.24		**-4.76**	**No Impact**	**No Impact**	**No Impact**
	Km 124+000	Avsallar	211	10.82	2.37	**-7.63**		**No Impact**	**No Impact**	**No Impact**

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact	Fly Rock Impact	Air Shock Impact
	Km 126+500	Akdam	30	10.82	54.26	**44.26**		**Potential Impact**	**Potential Impact**	**No Impact**
		Mosque	250	10.82	1.81		**-3.19**	**No Impact**	**No Impact**	**No Impact**
	Km 130+000	Türkler	130	10.82	5.16	**-4.84**		**No Impact**	**No Impact**	**No Impact**
		Mosque	350	10.82	1.05		**-3.95**	**No Impact**	**No Impact**	**No Impact**
	Km 133+000	Soğukpınar	39	10.82	35.61	**25.61**		**Potential Impact**	**Potential Impact**	**No Impact**
	Km 133+800	HRM 50*	74	10.82	12.74		**7.74**	**Potential Impact****	**No Impact**	**No Impact**
	Km 136+000	Toslak	65	10.82	15.69	**5.69**		**Potential Impact**	**Potential Impact**	**No Impact**
		HRM 51*	100	10.82	7.86		**2.86**	**Potential Impact****	**No Impact**	**No Impact**
		HRM 52*	106	10.82	7.16		**2.16**	**Potential Impact****	**No Impact**	**No Impact**
	Km 140+000	Konaklı	27	10.82	64.26	**54.26**		**Potential Impact**	**Potential Impact**	**No Impact**
		HRM 53*	26	10.82	68.27		**63.27**	**Potential Impact****	**Potential Impact**	**No Impact**
		Mosque	630	10.82	0.41	**-9.59**		**No Impact**	**No Impact**	**No Impact**
	Km 141+500	Mosque	250	10.82	1.81	**-8.19**		**No Impact**	**No Impact**	**No Impact**

**See Chapter 13 for the details of the locations of Cultural Heritage sites*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table XI.36 to address these potential impacts.*

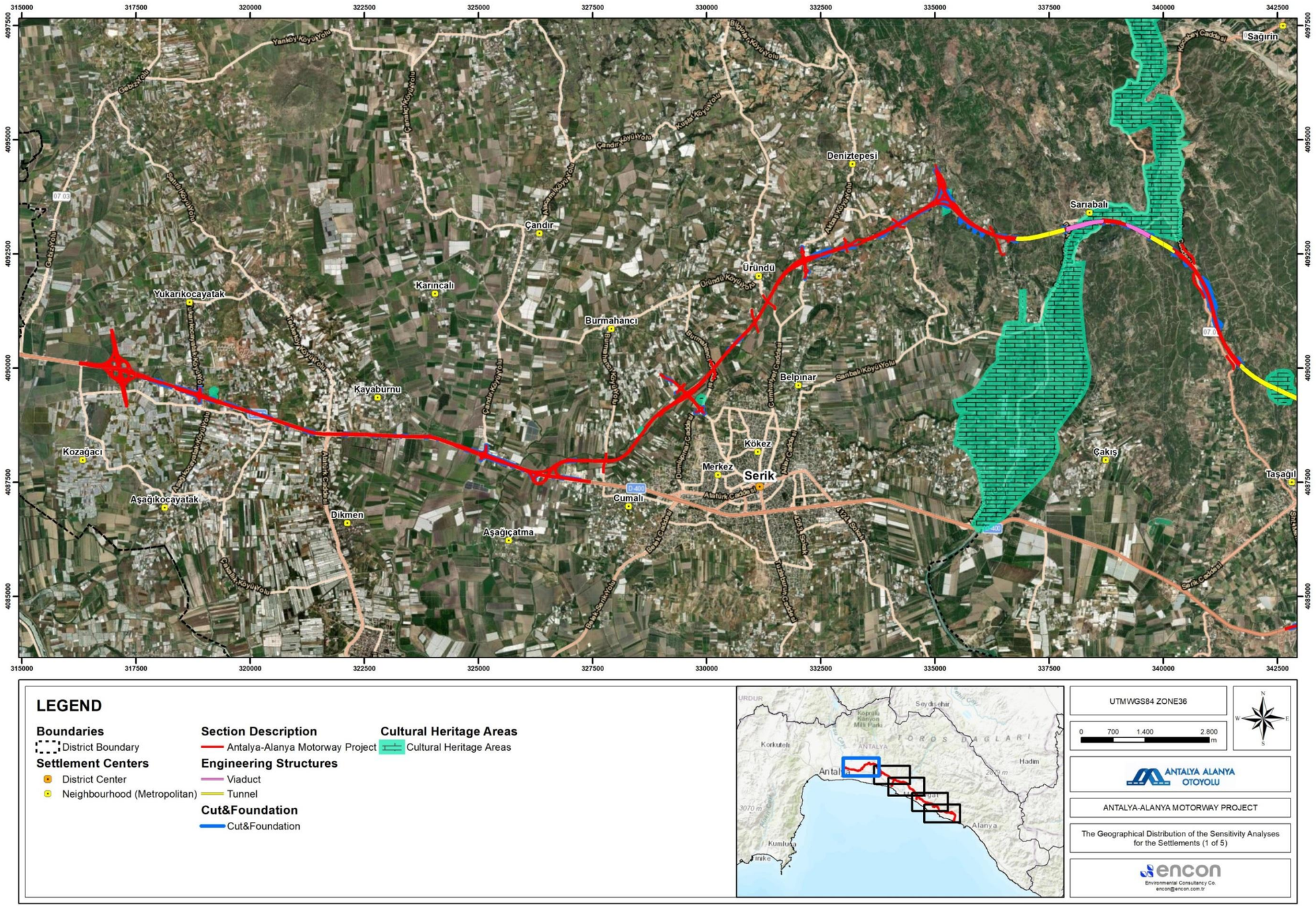


Figure XI.49 The geographical distribution of the sensitivity analyses for the settlements-1

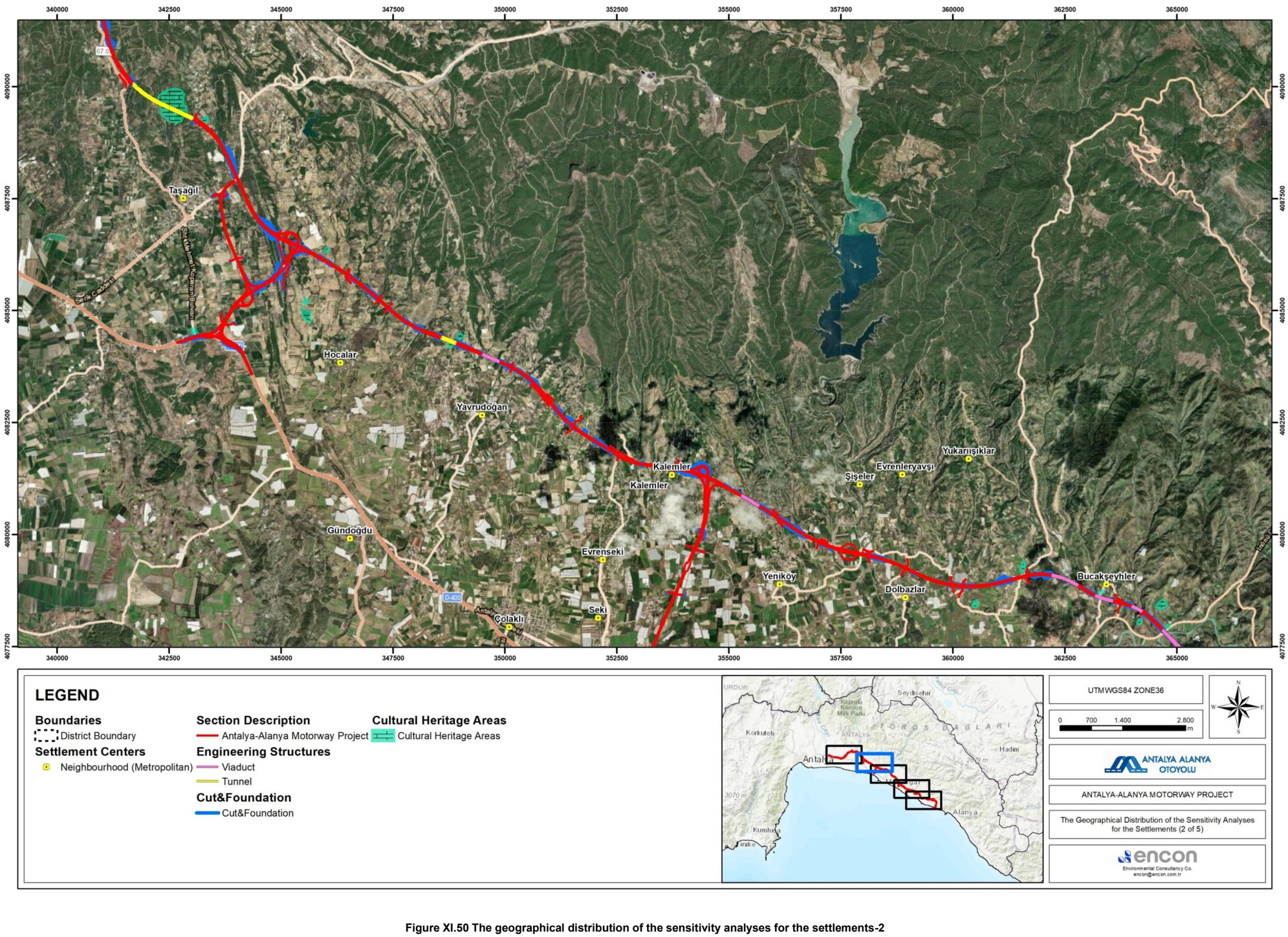


Figure XI.50 The geographical distribution of the sensitivity analyses for the settlements-2

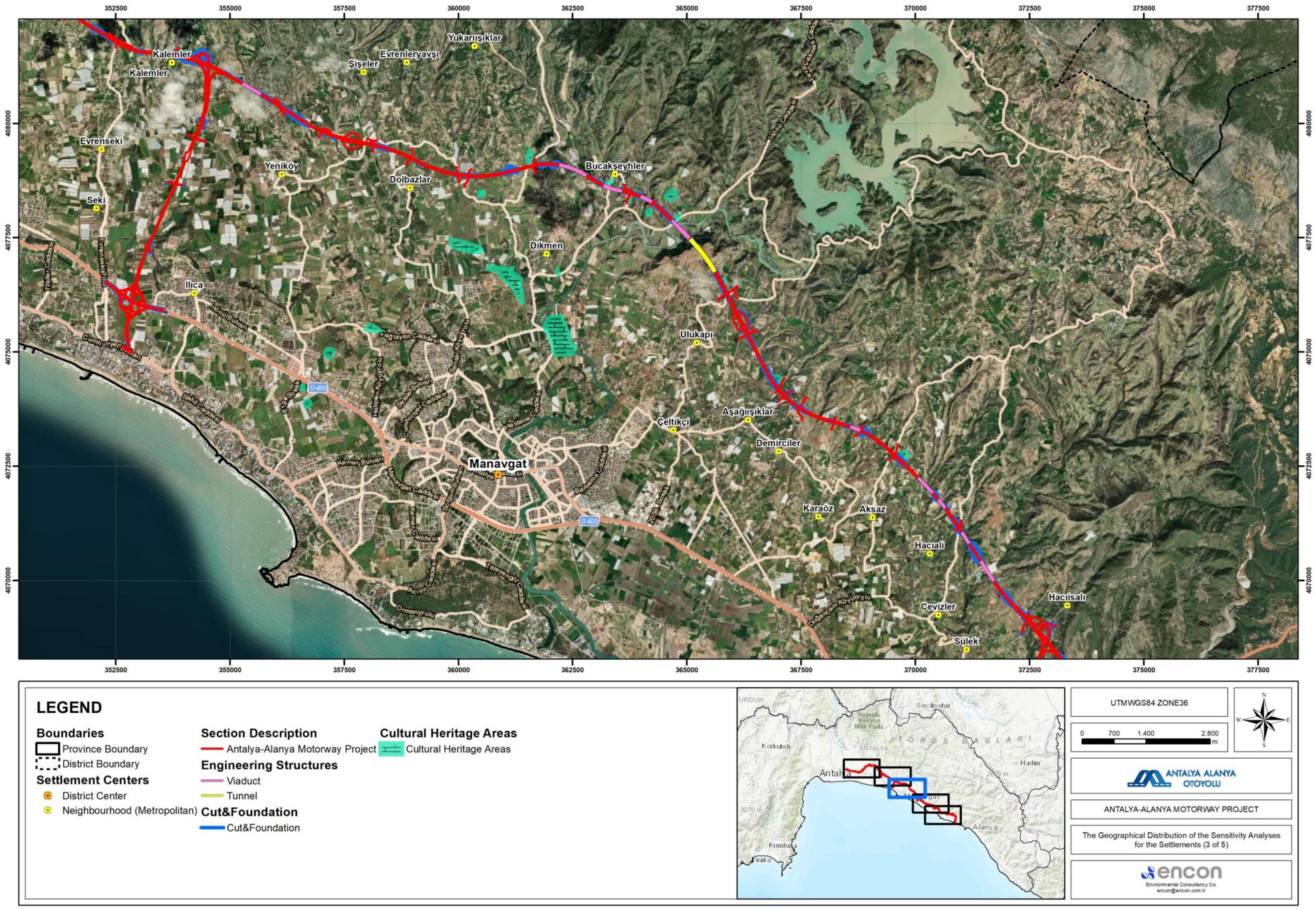


Figure XI.51 The geographical distribution of the sensitivity analyses for the settlements-3

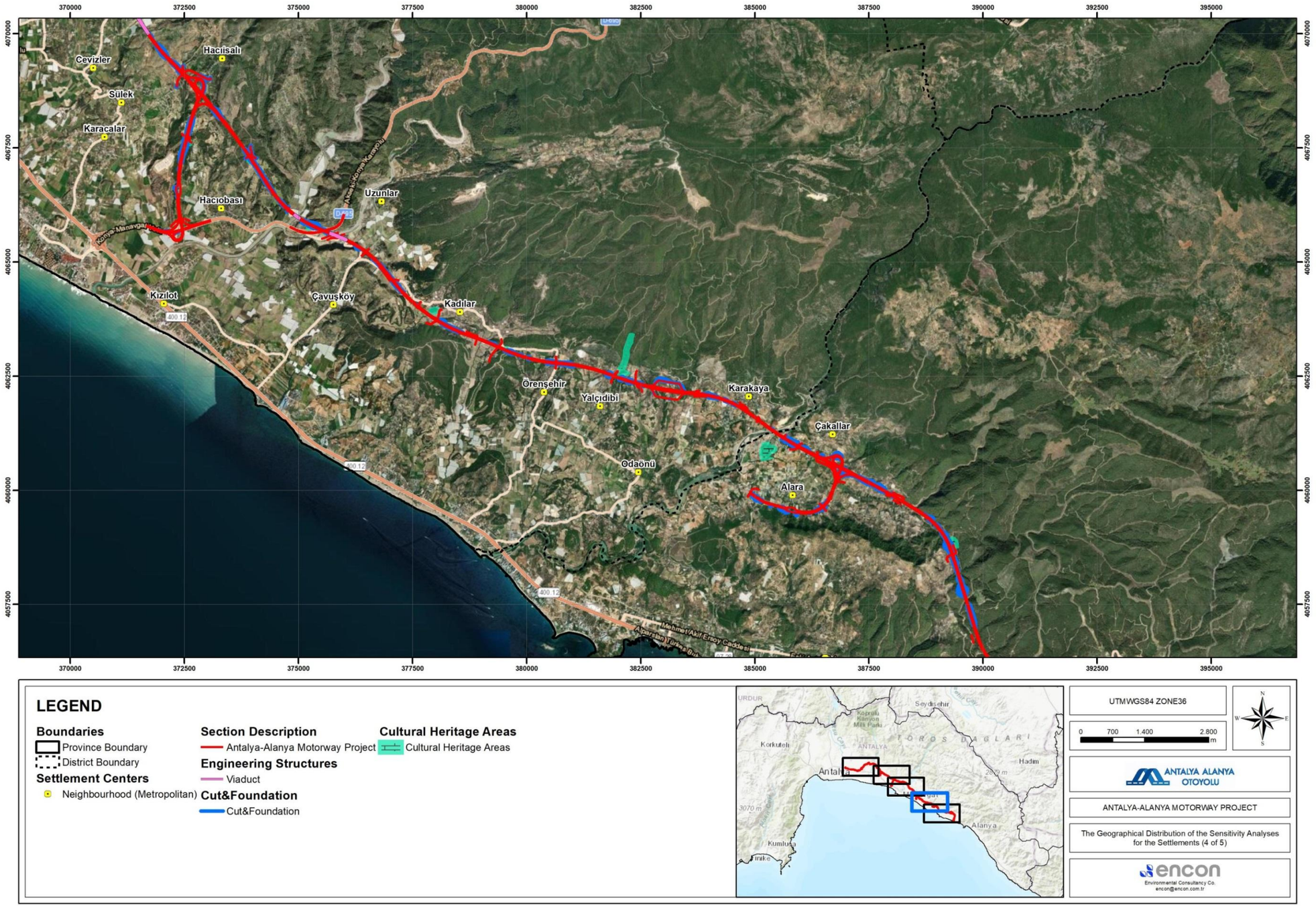


Figure XI.52 The geographical distribution of the sensitivity analyses for the settlements-4

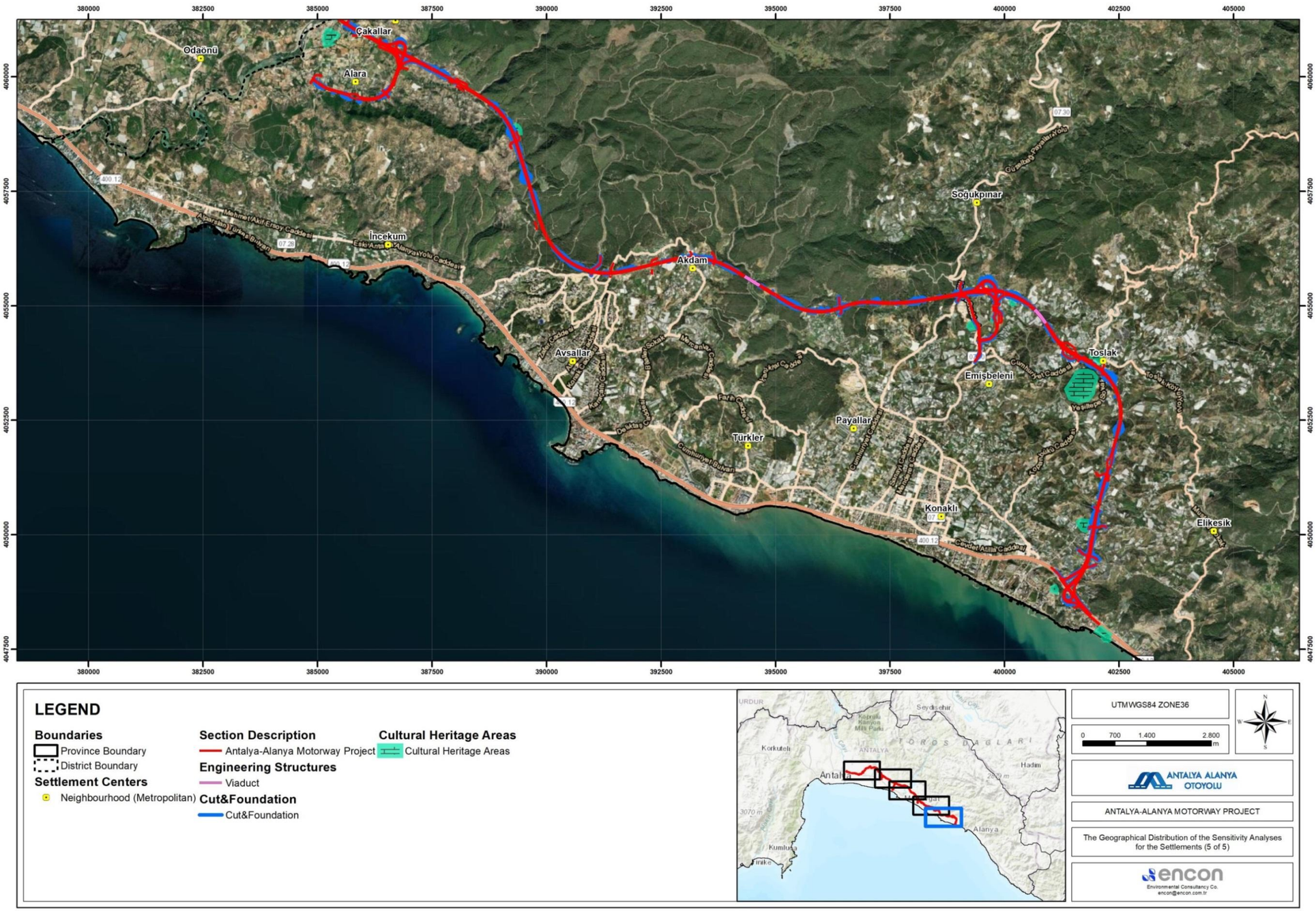


Figure XI.53 The geographical distribution of the sensitivity analyses for the settlements-5

To address the environmental impacts of blasting at the specified locations concerning ground vibration, site-specific actions detailed in have been implemented or are planned for the identified cultural heritage sites (HRM 5, HRM 8, HRM 9, HRM 16, HRM 20, HRM 38, HRM 41, HRM 45, HRM 50, HRM 51, HRM 52, HRM 53, HRM 57, and HRM 58), particularly where vibration-sensitive structures are located within 132.5 meters and the potential for threshold exceedance is elevated (Table XI.36).

For HRM 5, salvage excavation is underway, with construction paused until the salvage excavation is finished.

For HRM 6, no blasting will be carried out before the decision of the conservation board; discussions with the institution are ongoing. After the decision a control survey will be done on the area. The measures determined by the institution will be implemented based on the results of the survey.

HRM 9 has not been registered by the Board (Permitting date and No.: 26.12.24/18914) and a construction permit has been granted for working on this area. In accordance with Article 4 of Law No. 2863, if any archaeological remains are encountered during construction, all activities must be halted immediately and the Museum Directorate must be notified.

For HRM 16, at 60 meters, the maximum charge per delay (kg) will be reduced as shown in Table XI.36.

For HRM 20 is a 1st degree archaeological site (Aqueduct that supplied water to the ancient city of Side), and to protect it, a 100-meter buffer zone will be established between the blasting location and the archaeological site to provide protection, and no activity will be carried out within this zone. The opinion of the Antalya Board will be sought before any activity begins.

For HRM 38, which is already located on a hilltop, the blasting activities are confined to the lower slopes below, and a recent design revision incorporating a shoring wall has clearly defined the work zone. Within this boundary, the use of minimal explosives or mechanical breaking methods will help reduce potential vibration impacts on the site above. Based on the calculations presented in Table XI.23, the maximum distance at which the PPV reaches 2 mm/s is 8.6 meters. Therefore, the mechanical breaker's vibrations are not expected to affect the cultural heritage sites except for HRM 6 which is still being processed by the board.

For HRM 50, HRM 51, and HRM 52, at distances of 70, 100, and 106 meters respectively, will implement tailored reductions in maximum charge per delay based on proximity and sensitivity.

For HRM 8, HRM 41, HRM 45, HRM 53, HRM 57 and HRM 58, a minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed. Based on the calculations presented in Table XI.23, the maximum distance at which the PPV reaches 2 mm/s is 8.6 meters. Therefore, the mechanical breaker's vibrations are not expected to affect these cultural heritage sites except for HRM 6 which is still being processed by the board. Preliminary assessments indicate that all six sites will require controlled blasting, but only where distances exceed the 56.96-meter threshold. Excavation activities conducted beneath this threshold will be carefully managed to mitigate residual risks in close proximity to archaeological features.

These measures ensure compliance with established ground vibration thresholds, 15 mm/s at 66.8 m and 8 mm/s at 98.4 m for quarries, and 10 mm/s at 86 m and 5 mm/s at 132.5 m for tunnels and cut-and-formation works, while protecting cultural heritage and nearby settlements. A minimum charge of 2 kg for 3 m hole (as common practice) (ANFO powder + dynamite) produces a peak particle velocity of 5 mm/s at a distance of 56.96 meters, establishing a conservative baseline for safe blasting near sensitive archaeological features. No blasting will be conducted within 56.96 meters; mechanical breaker's vibrations are not expected to affect the cultural heritage sites except for HRM 6 which is still being processed by the board.

Table XI.36 Site-Specific Vibration Measures for Cultural Heritage

Site	Explanation	Distance (m)	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 5 mm/s Threshold Damage Limit	Mitigations	Residual Impact	Assurance Measures
HRM 5	This area is currently undergoing salvage excavation. Construction activities will only proceed once the archaeological excavation has been fully completed and the necessary approvals have been obtained from the Board, the Municipality, and the Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. Upon permit approval, minimal explosive charges will be used to prevent damage to the site.	5	0.0154	Wait until the excavation is finished	Change of location of the site	Archaeological surveys coordinated with the Museum Directorate.
HRM 6	Remains of an architectural structure, possibly from the Roman Period, likely representing a frontier garrison settlement. A dense accumulation of rubble stone and visible wall rows, which may belong to the structure, are present on the surface. Additionally, numerous roof tile fragments and a small number of sherds from daily use vessels have been observed.	5	0.0154	No blasting will be carried out before the decision of the conservation board. After the decision a drilling operation will be done on the area. The measures determined by the Board will be implemented based on the results.	-	-
HRM 8	This area is a natural protected zone. Therefore, throughout the entire process, we will reduce the maximum charge per delay (kg) and conduct survey and monitoring activities through an external contractor.	53	1.7306	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be placed at 53 m, with weekly ecological surveys and compliance reporting to the Ministry of Environment.
HRM 9	This area was not Registered by the Board and construction permit has been obtained. But in case of Chance Find during the construction, Article 4 of Law No. 2863, the work is to be halted, and the Museum Directorate must be notified.	-	-	Visual inspections for chance find.	Negligible risk unless chance finds occur.	An on-site archaeological observer will monitor works, with immediate halting and notification to the Museum Directorate in case of chance finds (Law No. 2863).
HRM 16	Lowering the maximum Charge per Delay (kg).	60	2.2179	Use a charge of 2.2 kg with electronic detonators.	PPV: 4.968 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting.	Seismographs will be positioned at 60 m, and a pre-blast structural stability survey will be conducted.
HRM 20	This area is not located on the project route, but is located within the Dikmen Quarry. The HRM-20 registered archaeological site is an aqueduct that supplied water to the ancient city of Side. Because the area has been designated a first-degree archaeological site, the opinion of the Antalya Board will be sought before any activity begins. Additionally, a 100-meter buffer zone will be established between the blasting area and the archaeological site to provide protection, and no activity will be carried out within this zone.	100	6.1608	A charge of 6.15 kg using electronic detonators will be employed. A 100 m buffer zone from the ancient waterway must be maintained. The site is currently on standby. If the appointed specialist contractor determines that blasting is not a viable option, mechanical breaking may be used as an alternative.	PPV: 4.968 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting.	Seismographs will be positioned at 100 m, and a pre-blast structural stability survey will be conducted.
HRM 38	The archaeological site lies at the summit of the hill, whereas the designated blasting area is located along the foothill. Given the topographical separation and distance, vibrations are expected to be attenuated. Furthermore, the recent design change led to the determination of the work area by the shoring (IKSA) wall, which established a clear boundary. Within this defined area, preventive measures can be implemented using a small amount of explosives or through mechanical breaking methods to minimize any potential impact as explained in the above paragraphs.	15	0.1386	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs. A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. Based on the external contractor the charge can be modified based on the attenuation.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be placed at 15 m and behind the IKSA wall, with structural surveys of the hill summit before and after blasting.
HRM 41	Lowering the maximum Charge per Delay (kg).	20	0.2464	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be installed at 20 m to monitor vibration attenuation over distance.
HRM 45	Lowering the maximum Charge per Delay (kg.	30	0.5545	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be installed at 30 m to verify compliance with PPV limits.
HRM 50	Lowering the maximum Charge per Delay (kg).	70	3.0188	Use a charge of 3 kg with electronic detonators.	PPV: 4.975 mm/s. Low or negligible risk, but nearing threshold. Monitoring recommended during blasting.	Seismographs at 70 m to monitor vibration attenuation over distance. Pre-blast survey.

Site	Explanation	Distance (m)	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 5 mm/s Threshold Damage Limit	Mitigations	Residual Impact	Assurance Measures
HRM 51	Lowering the maximum Charge per Delay (kg).	100	6.1608	Use a charge of 6.15 kg with electronic detonators.	PPV: 4.993 mm/s. Low or negligible risk, but nearing threshold. Monitoring recommended during blasting.	Seismographs at 100 m to monitor vibration attenuation over distance.
HRM 52	Lowering the maximum Charge per Delay (kg).	106	6.9222	Use a charge of 6.92 kg with electronic detonators.	PPV: 4.999 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting.	Seismographs will be installed at 106 m to monitor vibration attenuation over distance.
HRM 53	Lowering the maximum Charge per Delay (kg).	29	0.5181	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs .	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs at 29 m to monitor vibration attenuation over distance.
HRM 57	With the design change, the route was moved outside the archaeological site, reducing potential impacts. A preliminary survey will be done to assess the situation, and measures like reducing explosives use will be applied.	10	0.0616	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible..	Seismographs will be placed at 10 m, with archaeological monitoring to ensure protection of heritage assets.
HRM 58	With the design change, the route was moved outside the archaeological site, reducing potential impacts. A preliminary survey will be done to assess the situation, and measures like reducing explosives use will be applied.	10	0.0616	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be placed at 10 m, with archaeological monitoring to ensure protection of heritage assets.

At the Kuruçay (TOY4b) Quarry and at Km 52+500, Km 85+000, Km 95+500, Km 112+000, Km 136+000, and Km 140+000, the blasting pattern will be selected based on the presence of vulnerable sensitive.

In addition to vulnerable structures, some durable structures located nearby may also experience potential impacts due to flyrock and ground vibrations. The areas potentially affected include the neigborhoods of Sarıabalı, Taşağıl, Yavrudoğan, Kalemler, Yukarıışıklar, Dikmen, Karaöz, Aksaz, Hacıali, Hacıaisalı, Yalçıdibi, Çakallar, Akdam, Soğukpınar, Toslak, and Konaklı.

To reduce potential environmental impacts, it is recommended to use low-charge and delayed blasting techniques in areas close to setllements. Protective nets or coverings should be used to secure blasting zones and minimize the risk of rock throw. In additionmonitoring systems for vibration should be installed in high-risk areas, and local communities should be informed prior to blasting activities with appropriate safety measures in place. Detailed information is given in Table XI.39.

Due to the highly variable and often unpredictable geological conditions found within a tunnel the start and end points only have been defined in the blasting plan. The specific details regarding the blasting approach, including the charge per delay and blast pattern, will be determined by a consultant as the work progresses. This tailored risk mitigation strategy is necessary because the content and composition of the rock cannot be fully known in advance. Also, the consultant will conduct a blast attenuation survey to precisely determine how vibrations decrease with distance and the attenuation, ensuring that the impact on nearby receptors is accurately measured and kept within safe limits.

In addition, to enhance the efficiency and safety of blasting and drilling operations, the Project engaged a specialized contractor. In cases where Potential Impact Zones are identified and cannot be mitigated through design modifications or excavation adjustments, the contractor will implement a tailored risk mitigation strategy. This includes modifying the blast pattern and adopting a specialized low-risk blasting approach, such as reducing the charge per delay, to minimize potential hazards while maintaining operational effectiveness. Additionally, the a specialized consultant will be responsible for conducting a blast attenuation survey to determine the distance at which vibration levels decrease to lower magnitudes.

XI.2.3.2. Operation Phase

Vibration perceived in a building structure close to a road with heavy traffic load is generally below 1 mm/s and found to rarely exceed 2 mm/s. This corresponds to normal levels of vibration generated during normal use of a building (for example, walking and closing doors). It is known that structural damage caused by vibration to buildings can occur above 10 mm/s levels which correspond to 10 times higher vibration levels expected from roads. (UK Highways Agency, 2011) So, the operation of a motorway is unlikely to cause significant vibration impacts on properties located in the vicinity.

Table XI.37 shows human response levels to continuous vibration from traffic. With vibration levels of 1-2 mm/s observed in heavy traffic roads, human response to vibration will remain at perceptible levels but will not reach level of annoying.

Table XI.37. Human Response to Continuous Vibration from Traffic

Vibration (PPV – mm/sec)	Human Response
10.16-15.24	Unpleasant
5.08	Annoying
2.54	Begins to annoy
2.03	Readily perceptible
0.15-0.48	Threshold of perception

Source: (Jones & Stokes, 2004)

XI.2.4. Mitigation Measures

XI.2.4.1. Land Preparation and Construction Phase

Blasting operations conducted as part of the Project will result in intermittent vibration impacts. The following measures will be taken to avoid and/or minimize relevant impacts on the local communities:

- Prior to the blasting operations, the sensitivity of nearby settlements/buildings against noise and vibration will be assessed. Buildings located within 100 meters of major vibration sources will be identified and assessed for vibration sensitivity prior to construction. Structural conditions of buildings located within 100 meters of the motorway alignment will be recorded before and after construction works to assess any possible vibration-induced damage.
- One day before the blasting activities, the Turkish gendarmerie should be notified, announcements from the mosque should be done and protective barriers should be implamanted.
- During the entire construction phase, regular surveys will be carried out throughout blasting and drilling activities by the contractor, capturing photographic records of all structures adjacent to blasting areas to detect and evaluate any damage that may arise post-blasting. Explosive charges will be optimized accordingly.
- Detailed records of blasting operations will be kept and blasting related impacts will be closely monitored.
- Modern blasting techniques will be employed to minimize vibration, including the use of millisecond delays with low charge weights, which will be determined based on geological formation and rock density.
- Blasthole counts and total charge per shot will be carefully optimized to comply with regulatory limits and minimize the risk of flyrock. To further protect potentially affected areas, both rubber and metallic blasting mats will be strategically deployed. During blasting activities will be kept on charge amounts, delays, and distance to blast sites, and resulting vibration levels. During blasting activities, compliance with the limit will be monitored in potential sensitive receptors.
- Blasting activities will adhere to the limit values specified in the Regulation on Environmental Noise Control for ground vibrations. Records of air shock and vibration measurements will be maintained, and compliance with regulatory limit values will be monitored to minimize impacts on local residents.
- The Project's grievance mechanism will be active for any complaints related to vibration impacts. Complaints will be thoroughly evaluated, and corrective actions will be implemented as necessary.
- Construction works will be designed and scheduled to minimize vibration and its adverse effects.
- Blasting will be carried out at designated times in order to prevent disturbance.
- Construction machinery and equipment will be operated by taking into account the recommended minimum working distances presented in Table XI.21.
- A specialized blasting team will be engaged to ensure safe and efficient operations.
- In locations where Potential Impact Zones are identified and cannot be mitigated through design or excavation changes, the contractor will implement tailored risk mitigation strategies.
- Modifying blast patterns and using low-risk techniques, such as reducing charge per delay, to minimize hazards.
- Damping ditches will be used to further reduce and attenuate vibrations for improved performance and stability.
- A blast attenuation survey will be carried out by the consultant to determine the distance at which vibration levels decrease to acceptable thresholds. If there is a Vibration Sensitive Structure located near or above the tunnels, all relevant factors will be carefully considered.
- The minimum charge per delay is set at 2 kg for 3 m hole (as common practice), which produces an effective impact radius of 56.96 meters from the blast site. If the distance between the blasting area and any cultural heritage site is less than 56.96 meters, all blasting activities must be suspended. In such cases, excavation and related operations must be carried out using mechanical equipment, such as excavators, instead of explosives.
- Seismographs will be installed to monitor ground vibrations and ensure that any blasting activity conducted at safe distances remains within acceptable vibration limits for every cultural heritage site less than 132.5 m of the nearest blasting location.

To safeguard cultural heritage sites that may be affected by vibration from blasting activities, a comprehensive set of mitigation measures has been developed (Table XI.36). These measures aim to preserve both the structural integrity and cultural significance of the sites, based on a thorough assessment of their sensitivity to vibration impacts. Key strategies include restricting the intensity of vibrations in proximity to heritage structures, conducting detailed inspections before and after blasting events, and employing advanced vibration-reducing technologies.

Customized risk mitigation approaches, such as modifying blast patterns and reducing charge sizes, will also be implemented to minimize potential damage to these sensitive locations. To establish a safe blasting distance near cultural heritage sites, the Peak Particle Velocity (PPV) equation (**3**) was utilized with specific parameters: a minimum charge per delay of 2 kg for 3 m hole (as common practice) and a PPV threshold of 5 mm/s, which is the limit considered safe for sensitive areas and substituting the constants by β= 1.605, K= 1884.9. The calculation is as follows:

$$D = \sqrt{W} * \left(\frac{K}{PPV}\right)^{\frac{1}{\beta}}$$

$$D = \sqrt{2} * \left(\frac{1884}{5}\right)^{\frac{1}{1.605}}$$

$$D = 56.96\ meters$$

The minimum safe blasting distance has been determined to be approximately 56.96 meters with a charge of 2 kg for 3 m hole (as common practice). Blasting will be strictly avoided within this range to prevent any potential damage to nearby heritage sites. Instead, material removal in this area will be carried out using excavators. Additionally, pilot blasting will be conducted at safe distances to validate vibration predictions and confirm the effectiveness of protective measures in place.

For blasting activities carried out at distances between 56.96 meters and 132.8 meters from the heritage sites, the maximum allowable explosive charge per delay for the post-mitigation will be calculated using the Peak Particle Velocity (PPV) equation (**3**), which has been rearranged to solve for charge weight (W):

$$W = \left(\frac{R}{\sqrt[\beta]{\frac{K}{PPV}}}\right)^2$$

Substituting the values β= 1.605, K= 1884.9 and PPV= 5 mm/s, the equation becomes:

$$W = \left(\frac{R}{\sqrt[1.605]{\frac{1884.9}{5}}}\right)^2$$

Table XI.38 presents post-mitigation calculations showing how the maximum allowable explosive charge per delay varies with distance to ensure that the 5 mm/s vibration threshold is not exceeded. After mitigation measures are applied, significantly larger charges can be used at safe distances. For example, at 132.5 meters from a sensitive area, up to 10.82 kg of explosives per delay can be safely detonated. However, the allowable charge still decreases sharply with reduced distance. At 56.96 meters, even post-mitigation, the charge must be limited to just 2 kg for 3 m hole (as common practice) to remain within the threshold.

Table XI.38 Post-mitigation calculations based on the distance to the risk point for a vibration of 5 mm/s

Distance to Risk Point (m)	Maximum Allowable Explosive Charge per Delay (kg) Without Exceeding the 5 mm/s Threshold Damage Limit
56.96	2.00
60.00	2.22
65.00	2.60
70.00	3.02
75.00	3.47
80.00	3.94
85.00	4.45
90.00	4.99
95.00	5.56
100.00	6.16
105.00	6.79
106.00	6.92
110.00	7.45
115.00	8.15
120.00	8.87
125.00	9.63
130.00	10.41
132.50	10.82

Based on the vibration threshold of 5 mm/s, the safe distances and corresponding maximum charge weights for sensitive areas are illustrated in Figure XI.54. According to the consultant's study, higher charges may be permitted where specialized mitigation measures, such as attenuation techniques and other vibration-reducing methods, are implemented.

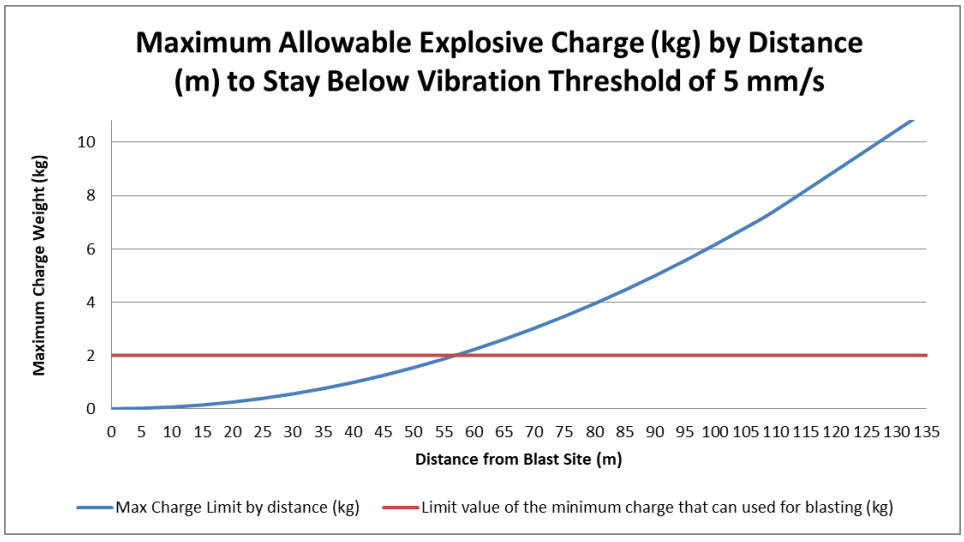


Figure XI.54 Maximum allowable explosive charge (kg) by distance (m) to stay below vibration treshold of 5 mm/s

However, if the distance between the blasting area and any cultural heritage site is less than 56,96 meters, all blasting activities must be suspended. In such cases, the site operations proceed using mechanical equipment such as excavators, rather than explosives.

Measurements of peak particle velocity (PPV) generated by drilling rigs and excavators indicate that all sites remain within acceptable vibration limits, with the exception of HRM 6. This site is currently pending a decision by the board, and therefore, no construction activity should take place.

XI.2.4.2. Operation Phase

If any complaint related to vibration is received through the Project's Grievance Mechanism, the complaint will be evaluated and corrective actions will be devised and implemented as necessary.

XI.2.5. Summary of Assessment and Residual Impacts

Land preparation and construction phase of the Project has the potential to cause vibration impacts as a result of activities such as heavy vehicle movement, piling, excavation, heavy earthworks, operation of vibratory equipment, demolition, and blasting. The assessment indicates that vibration from construction activities is likely to result in short term disturbance at nearby settlements with varying sensitivities. The residual impacts and assurance measures of cultural heritage sites that can be potentially impacted by the recommended charge per delay of 10.82 kg have been assessed in Table XI.36. However, these disturbances can be avoided and/or reduced by mitigation measures suggested above. Table XI.39 provides a summary of the vibration assessments. Residual impacts from construction-related vibration are expected to range from medium to low, depending on the sensitivity of the receptor and type of activity.

Table XI.39. Summary of Noise and Vibration

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phase												
Increase in noise levels due to Project activities	Local Communities: Deniztepesi, Konaklı, Çakallar, Avsallar, Akdam, Karakaya, Hacıobası, Uzunlar, Sarıabalı, Sarılar, Bucakşeyhler, Kalemler, Ulukapı, Taşağıl,	Adverse	Local	Medium	Low	Short term reversible	Intermittent	Medium (B)	High (3)	High (B3)	• Equipment and machinery with lower sound power levels and noise-reduced models will be prioritized when possible and feasible. • Newer and/or well-maintained vehicles, machinery and equipment will be preferred for procurement. • Maintenance of construction machinery and equipment will be carried out regularly. • Silencers will be installed on appropriate machinery and equipment, including mechanical plants machinery and construction vehicle exhausts. • Portable barriers and acoustic enclosures will be installed around noise-generating stationary machinery, such as power generators, if necessary. • Speed limits for construction vehicles will be enforced, particularly near sensitive areas. • Traffic through residential areas will be minimized wherever possible. Dedicated site access roads will be constructed to reach Project components (campsites, the Motorway, quarries etc.) to avoid disturbances in residential areas when necessary.	Medium
	Local Communities: Serik, Emişbeleni, Sülek, Sağırin, Köprüçay, Bademliyar, Hacıali	Adverse	Local	Medium	Low	Short term reversible	Intermittent	Medium (B)	Moderate (2)	Medium (B2)	• According to the environmental monitoring plan under Project ESMS, noise monitoring will be conducted during the construction phase and the effect of noise in near neighborhoods will be controlled regularly. In case of any inconsistencies with regulation limits, measures will be immediately taken to diminish the noise levels and to satisfy the standards. • Potentially affected buildings sensitive to nighttime disturbances will be identified prior to construction, and nighttime construction works will be limited accordingly. • Any noise related complaints received through the Project's Grievance Mechanism will be assessed, and corrective actions will be implemented as necessary. • Construction vehicles will not be permitted to keep engines running while waiting to enter the site or waiting on-site. • Ancillary components in campsites, such as power generators, will be placed with consideration of potential noise disturbances. • The Motorway alignment will be used for transportation whenever feasible. • Roads used during the construction of the Motorway will be well maintained. • Site personnel will be trained to carry out construction activities using noise-reduction methods. • During the construction phase of the motorway in the Sarıabalı region, it was determined that the background noise levels increased by more than 3 dB(A) during daytime hours. It is therefore recommended that machinery and equipment to be used in this area be selected based on low noise emission criteria, and that regular noise monitoring be conducted to ensure compliance with applicable noise limits. • Noise monitoringis recommended for the Sarıabalı area. • A community consultation program will be initiated to inform the nearby residents, businesses and the local community when noise impacts are anticipated according to construction schedule.	Low
Increase in vibration emissions due to Project activities Blasting operations in quarries.	Local Communities Sarıabalı (AO-1) Borrow Pit (Sarıabalı) Dikmen Borrow Pit (HRM 20)	Adverse	Restricted	Medium	High	Short term irreversible	Intermittent	Wide (A)	High (3)	High (A3)	• Prior to the blasting operations, the sensitivity of nearby settlements/buildings against noise and vibration will be assessed. Buildings located within 100 meters of major vibration sources will be identified and assessed for vibration sensitivity prior to construction. Structural conditions of buildings located within 100 meters of the motorway alignment will be recorded before and after construction works to assess any possible vibration-induced damage. • One day before the blasting activities, the Turkish gendarmerie should be notified, announcements from the mosque should be done and protective barriers should be implamanted.	Medium

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Increase in vibration emissions due to Project activities Blasting operations in Tunnels	Local Communities Tunnel 1 (Sarıabalı), Tunnel 2 (HRM 8), Tunnel 3 (Taşağıl), Tunnel 4 (HRM 16)	Adverse	Restricted	Medium	High	Short term irreversible	Intermittent	Wide (A)	High (3)	High (A3)	During the entire construction phase, regular surveys will be carried out throughout blasting and drilling activities, capturing photographic records of all structures adjacent to blasting areas to detect and evaluate any damage that may occur post-blasting.Explosive charges will be optimized accordingly. Detailed records of blasting operations will be kept and blasting related impacts will be closely monitored • Explosive charges will be optimized accordingly. Detailed records of blasting operations will be kept and blasting related impacts will be closely monitored. • Modern blasting techniques will be employed to minimize vibration, including the use of millisecond delays with low charge weights, which will be determined based on geological formation and rock density. • Blasthole counts and total charge per shot will be carefully optimized to comply with regulatory limits and minimize the risk of flyrock. To further protect potentially affected areas, both rubber and metallic blasting mats will be strategically deployed. During blasting activities will be kept on charge amounts, delays, and distance to blast sites, and resulting vibration levels. During blasting activities, compliance with the limit will be monitored in potential sensitive receptors. • Blasting activities will adhere to the limit values specified in the Regulation on Environmental Noise Control for ground vibrations. Records of air shock and vibration measurements will be maintained, and compliance with regulatory limit values will be monitored to minimize impacts on local residents. • The Project's grievance mechanism will be active for any complaints related to vibration impacts. Complaints will be thoroughly evaluated, and corrective actions will be implemented as necessary. • Construction works will be designed and scheduled to minimize vibration and its adverse effects. • During the entire construction phase, regular surveys will be carried out throughout blasting and drilling activities by the contractor, capturing photographic records of all structures adjacent to blasting areas to detect and evaluate any damage that may arise post-blasting. Explosive charges will be optimized accordingly. • Blasting will be carried out at designated times in order to prevent disturbance. • In areas with identified or potential archaeological risk, archaeological excavations must be conducted and completed before the start of construction activities. Furthermore, all necessary documentation must be thoroughly prepared and submitted to the relevant authorities as part of the permitting process prior to initiating any excavation work.	Medium
Increase in vibration emissions due to Project activities Blasting operations in Cut and Foundation	Local Communities Sarıabalı, HRM 58, HRM 5, HRM 6, HRM 9,Yavrudoğan, Kalemler, Yukarıışıklar, Dikmen, Karaöz, Aksaz, HRM 38, Hacıali, Hacıaisalı, HRM 41, Yalçıdibi, HRM 45, Çakallar, HRM 57, Akdam, Soğukpınar, HRM 50, Toslak, HRM 51, HRM 52, Konaklı, HRM 53	Adverse	Restricted	Medium	High	Short term irreversible	Intermittent	Wide (A)	High (3)	High (A3)		Medium
Increase in vibration emissions due to Project activities : Blasting operations for motorway excavation.	Local Communities Konaklı, HRM 53	Adverse	Restricted	Medium	Medium	Short term irreversible	Intermittent	Medium (B)	Low (1)	Low (B1)		Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Increase in vibration emissions due to Project activities : Operation of heavy construction vehicles.	Local Communities	Adverse	Restricted	Medium	Low	Short term irreversible	Intermittent	Restricted (C)	High (3)	Medium (C3)	• Construction machinery and equipment will be operated by taking into account the recommended minimum working distances presented in Table XI.21. • If blasting in close proximity to a settlement or sensitive site is deemed unavoidable, the blasting pattern shall be appropriately modified. This will include a reduction in the maximum charge per delay (kg), with the specific charge tailored to suit the distance and sensitivity of the surrounding area (Table XI.34 and Table XI.35). • A specialized external contractor will be engaged to ensure safe and efficient operations. • In locations where Potential Impact Zones are identified and cannot be mitigated through design or excavation changes, the contractor will implement tailored risk mitigation strategies. • Modifying blast patterns and using low-risk techniques, such as reducing charge per delay, to minimize hazards. • Damping ditches will be used to further reduce and attenuate vibrations for improved performance and stability. • A blast attenuation survey will be carried out by the consultant to determine the distance at which vibration levels decrease to acceptable thresholds. If there is a Vibration Sensitive Structure located near or above the tunnels, all relevant factors will be carefully considered. • A blast attenuation survey will be carried out by the consultant to determine the distance at which vibration levels decrease to acceptable thresholds. If there is a Vibration Sensitive Structure located near or above the tunnels, all relevant factors will be carefully considered. • The minimum charge per delay is set at 2 kg for 3 m hole (as common practice) , which produces an effective impact radius of 56.96 meters from the blast site. If the distance between the blasting area and any cultural heritage site is less than 56.96 meters, all blasting activities must be suspended. In such cases, excavation and related operations must be carried out using mechanical equipment, such as excavators, instead of explosives. • Seismographs will be installed to monitor ground vibrations and ensure that any blasting activity conducted at safe distances remains within acceptable vibration limits for every cultural heritage site less than 132.5 m of the nearest blasting location.	Low
Operation Phase												
Increase in noise levels due to vehicle traffic	Local Communities Bucakşeyhler, Sarıabalı, Çakallar, Emişbeleni	Adverse	Local	Long	High	Irreversible	Continuous	Wide (A)	Low (1)	Medium (A1)	• A green buffer strip will be formed at the service areas between the outer lane of the Motorway and the facilities. This strip will be properly planted (e.g. with shrubs that start growing from the base and are resistant to dust and gaseous emissions as well as noise) to act as a barrier against noise from the Motorway traffic. • During the design phase of the Project, natural topography will be utilized as a noise buffer where possible. • The Motorway route through residential areas will be minimized to the greatest extend feasible. • The implementation of action plans near locations identified by the noise modeling study will be evaluated during later stages of project development. In addition, establishment of noise barrier will be considered based on noise monitoring results at specified locations, after	Low
	Local Communities	Adverse	Local	Long	Low	Irreversible	Continuous	Wide (A)	Low (1)	Medium (A1)		Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
	Akdam, Avsallar, Bademliyar, Hacıali, Deniztepesi, Hacıobası, Kalemler, Karakaya, Konaklı, Sarılar, Taşağıl, Ulukapı, Uzunlar, Köprüçay, Sağırin, Serik, Sülek										the approval of KGM, as detailed in the Environmental and Social Monitoring Plan (see Chapter XX). • Action plans will be developed and implemented in accordance with Technical Specifications of KGM where applicable. • Any noise-related complaints received through the Project's Grievance Mechanism will be evaluated and corrective actions will be implemented as necessary. • Annual noise measurements will be conducted at critical receptors determined by noise modeling throughout operation phase. If measurements approach the thresholds specified in RENC, noise barriers will be installed upon KGM approval. If noise barriers prove insufficient, additional measures such as landscaping will be implemented. Noise modeling and critical receptor assessments will be revised based on design changes or other mitigation measures applicable at critical locations • For the Bucakşeyhler and Emişbeleni regions, a total of 3,750 meters of noise barriers, each 4.5 meters high, are proposed 750 meters at Bucakşeyhler and 30 meters at Emişbeleni. • Monitoring points will be established in the neighborhoods of Bucakşeyhler and Emişbeleni.	Low
Increase in vibration emissions due to vehicle traffic	Local Communities	Adverse	Restricted	Long	Low	Irreversible	Continuous	Medium (B)	Low (1)	Low (B1)	• If any complaint related with vibration is received through Project's Grievance Mechanism, the complaint will be evaluated and where necessary, corrective actions will be planned and implemented.	Low

* *The impacts mentioned above have been assessed based on the worst-case scenario, and it is expected that the actual impacts will occur at lower levels with the implementation of the proposed noise and vibration mitigation measures.*

XII. CHAPTER – PROTECTED AREAS, LANDSCAPE AND VISUAL ENVIRONMENT

XII.1. Protected Areas

In order to identify and evaluate the protected areas within the Project area and its immediate vicinity, desktop studies and literature researches are carried out within the scope of the Project. For the works carried out, the sensitive area list available in Annex-5 of EIA Regulation (issued in Official Gazette No: 31907 dated July 29, 2022) is used as reference. This list covers areas that need to be protected in accordance with international conventions that Türkiye is contracting party and nationally declared protected areas.

Utilized data sources within the scope of the desktop studies are listed below:

- Database of Ministry of Agriculture and Forestry General Directorate of Nature Conservation and National Parks [1]
- Map of Prohibited and Open Hunting Areas in Antalya for years 2024-2025[2]
- Database of Ministry of Culture and Tourism[3]
- Database of General Directorate of Cultural Heritage and Museums
- Official letters and files that were obtained from relevant authorities
- kml / kmz files of the Project area and Google Earth Software

Protected areas around the Project are determined from above mentioned sources. The land use characteristics of the section were identified in the study area/corridor (having a total width of 400 meters being 200 meters on each side of the motorway axis) and there are no protected areas observed within the Project area. Other protected areas in Antalya Province, along with their locations and distances from the project area, are shown in

The Protected Areas Map of the Project Area is presented in **Error! Not a valid bookmark self-reference.**.

[1] https://www.tarimorman.gov.tr/DKMP/Sayfalar/EN/AnaSayfa.aspx
https://saybis.tarimorman.gov.tr/
2 https://avbis.tarimorman.gov.tr/AvlakHaritalari.aspx
3 https://www.ktb.gov.tr/?_Dil=2

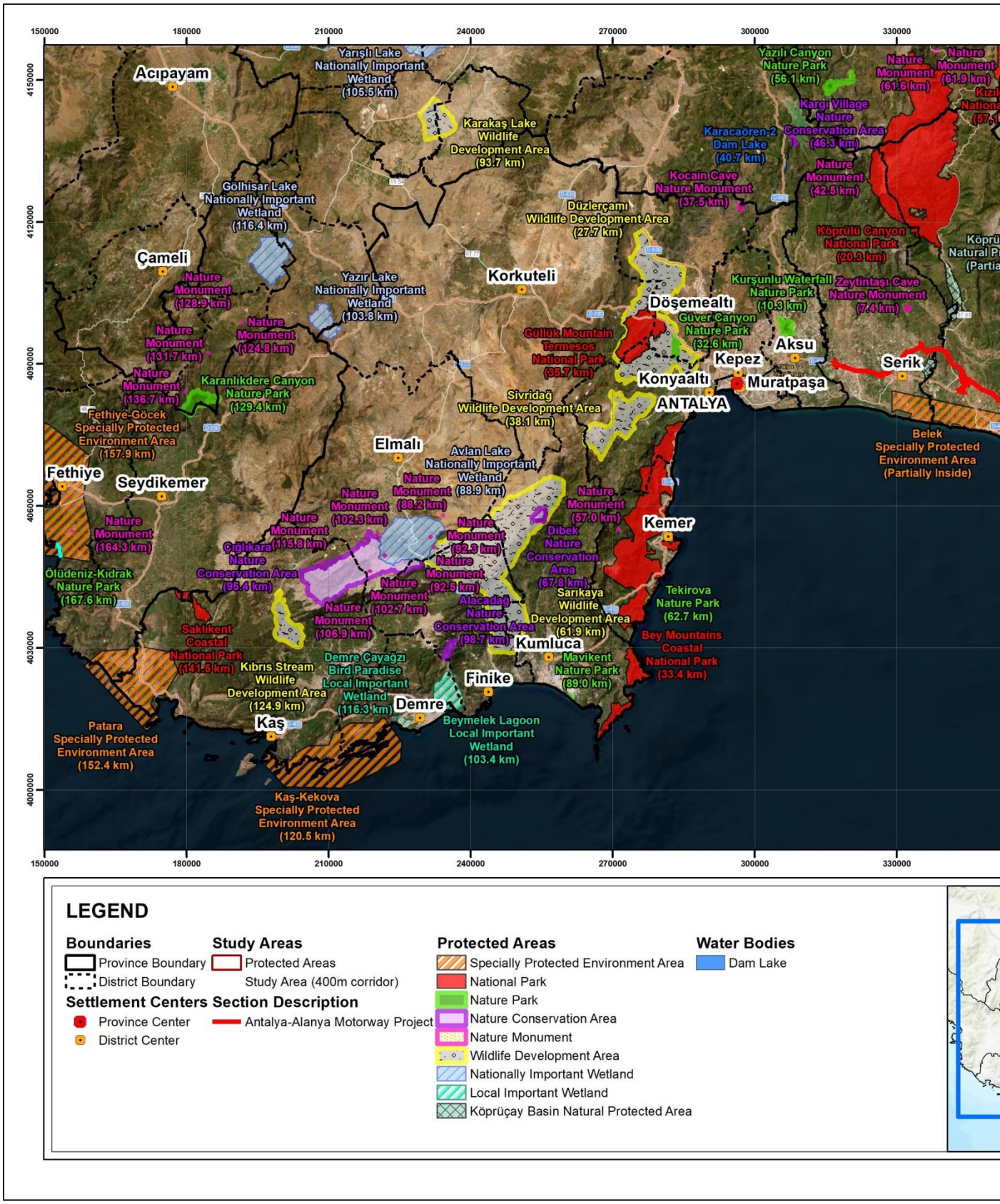

150000
180000
210000
240000
270000
300000
330000
4150000
4120000
4090000
4060000
4030000
4000000
Acıpayam
Yarışlı Lake Nationally Important Wetland (105.5 km)
Karakaş Lake Wildlife Development Area (93.7 km)
Gölhisar Lake Nationally Important Wetland (116.4 km)
Çameli
Nature Monument (128.9 km)
Nature Monument (131.7 km)
Nature Monument (136.7 km)
Karanlıkdere Canyon Nature Park (129.4 km)
Nature Monument (124.8 km)
Yazır Lake Nationally Important Wetland (103.8 km)
Fethiye-Göcek Specially Protected Environment Area (157.9 km)
Fethiye
Seydikemer
Nature Monument (164.3 km)
Ölüdeniz-Kıdrak Nature Park (167.6 km)
Saklıkent Coastal National Park (141.5 km)
Patara Specially Protected Environment Area (152.4 km)
Kaş
Kaş-Kekova Specially Protected Environment Area (120.5 km)
Kıbrıs Stream Wildlife Development Area (124.9 km)
Demre Çayağzı Bird Paradise Local Important Wetland (116.3 km)
Demre
Finike
Beymelek Lagoon Local Important Wetland (103.4 km)
Elmalı
Avlan Lake Nationally Important Wetland (88.9 km)
Nature Monument (88.2 km)
Nature Monument (102.3 km)
Nature Monument (115.8 km)
Çığlıkara Nature Conservation Area (95.4 km)
Nature Monument (106.9 km)
Nature Monument (102.7 km)
Nature Monument (92.5 km)
Nature Monument (92.3 km)
Alacadağ Nature Conservation Area (98.7 km)
Kumluca
Sarıkaya Wildlife Development Area (61.9 km)
Dibek Nature Conservation Area (67.8 km)
Nature Monument (57.0 km)
Kemer
Mavikent Nature Park (89.0 km)
Tekirova Nature Park (62.7 km)
Bey Mountains Coastal National Park (33.4 km)
Belek Specially Protected Environment Area (Partially Inside)
Sivridağ Wildlife Development Area (38.1 km)
Konyaaltı
ANTALYA
Muratpaşa
Kepez
Aksu
Serik
Güllük Mountain Termesos National Park (35.7 km)
Döşemealtı
Güver Canyon Nature Park (32.6 km)
Kurşunlu Waterfall Nature Park (10.3 km)
Zeytintaşı Cave Nature Monument (7.4 km)
Köprülü Canyon National Park (20.3 km)
Düzlerçamı Wildlife Development Area (27.7 km)
Kocain Cave Nature Monument (37.5 km)
Karacaören-2 Dam Lake (40.7 km)
Kargı Village Nature Conservation Area (46.3 km)
Yazılı Canyon Nature Park (56.1 km)
Nature Monument (61.6 km)
Nature Monument (61.9 km)
Nature Monument (42.5 km)
Korkuteli
LEGEND
Boundaries
Province Boundary
District Boundary
Settlement Centers
Province Center
District Center
Study Areas
Protected Areas
Study Area (400m corridor)
Section Description
Antalya-Alanya Motorway Project
Protected Areas
Specially Protected Environment Area
National Park
Nature Park
Nature Conservation Area
Nature Monument
Wildlife Development Area
Nationally Important Wetland
Local Important Wetland
Köprüçay Basin Natural Protected Area
Water Bodies
Dam Lake

Figure XII.2 Protected Areas Map of the Antalya Province .

XII.1.1. Baseline Conditions

As mentioned above, sensitive area list available in Annex-5 of the EIA Regulation was used as reference to identify the protected areas around the Project area. Identified protected areas in accordance with sensitive area list are described below.

Areas Under Protection in Accordance with International Conventions that Türkiye is a Contracting Party

Some relevant conventions in this context can be listed as follows:

- Convention on the Conservation of European Wildlife and Natural Habitats" (Bern Convention)
- The Convention for the Protection of the Mediterranean Sea Against Pollution" (Barcelona Convention)
- Protocol Concerning Specially Protected Areas in the Mediterranean
- 100 Historic Sites of Common Mediterranean Interest announced by United Nation Environment Programme and selected in accordance with the Geneva Declaration
- World Cultural and Natural Heritage Convention
- The Convention on the Protection of Wetlands of International Importance as Waterfowl Habitat (RAMSAR Convention)
- European Landscape Convention

There are no protection areas in the Project area identified by any international convention/agreement, including the ones listed above, that Türkiye is signatory.

Protected Areas in accordance with National Legislation

a) "National Parks", "Nature Parks", "Nature Monuments" and "Nature Conservation Areas" identified in accordance with the second and third articles of National Parks Law

Antalya has eight parks in total, including four national parks and seven nature parks. The list of these parks is given in Table XII.1 below. İncekum Nature Park is the closest one among all others to the Project area and it is located 2 km south of corridor. Distances of the parks to the relevant sections of the route are also given in Table XII.1.

Table XII.1 List of National and Nature Parks in the Antalya Province

Name of National/Nature Park	Distance to the Closest Project Unit (km)	Direction with respect to the Closest Project Unit
İncekum Nature Park	2.0	South
Kurşunlu Waterfall Nature Park	10.3	West
Köprülü Canyon National Park	20.3	North
Altınbeşik Cave National Park	24.6	North
Güver Canyon Nature Park	32.6	West

Bey Mountains Coastal National Park	33.4	Southwest
Güllük Mountain Termesos National Park	35.7	West
Mavikent Nature Park	89.0	Southwest

There are twenty-one nature monuments near the project area. The list of these monuments is given in Table XII.2. Zeytintaşı Cave Nature Monument is the closest monument and it is located 7.4 km to the north of the corridor.

Table XII.2 List of Nature Monuments Near the Project Area

Name of Nature Monument	Distance to the Closest Project Unit (km)	Direct with respect to the Closest Project Unit
Zeytintaşı Cave	7.4	North
Kocain Cave	37.5	Northwest
Unnamed Nature Monument-1	42.5	North
Derebucak-Çamlık	53.3	North
Unnamed Nature Monument-2	57.0	Southwest
Unnamed Nature Monument-3	62.2	East
Altıkardeşler	78.1	East
Unnamed Nature Monument-4	78.6	Northeast
Unnamed Nature Monument-5	88.2	Southwest
Unnamed Nature Monument-6	92.3	Southwest
Unnamed Nature Monument-7	92.5	Southwest
Unnamed Nature Monument-8	101.1	Northeast
Unnamed Nature Monument-9	102.3	Southwest
Unnamed Nature Monument-10	102.7	Southwest
Unnamed Nature Monument-11	106.9	West
Unnamed Nature Monument-12	115.8	West
Unnamed Nature Monument-13	124.8	West
Unnamed Nature Monument-14	128.9	West
Unnamed Nature Monument-15	131.7	West
Unnamed Nature Monument-16	136.7	West
Unnamed Nature Monument-17	164.3	Southwest

There are three nature conservation areas in Antalya. The list of these conservation areas is given in Table XII.3. Kargı Village is the closest area and it is located 68.3 km to the northwest of the corridor.

Table XII.3. List of Nature Conservation Areas in the Antalya Province

Name of Nature Conservation Area	Distance to the Closest Project Unit (km)	Direction with respect to the Closest Project Unit
Dibek	67.8	Southwest
Çığlıkara	95.4	Southwest
Alacadağ	98.7	Southwest

b) “Wildlife Protection Areas, Wildlife Development Areas and Wild Animal Settlement Areas” identified in accordance with the Land Hunting Law.

There are eight wildlife development areas in Antalya province. There are also five wild animal settlement areas in Antalya province. Details on these areas are presented in Table XII.4 and Table XII.5, respectively.

Table XII.4 List of Wildlife Development Areas in the Antalya Province

Wildlife Development Area	Distance to the Closest Project Unit (km)	Direction with respect to the Closest Project Unit
Dimçayı	15.3	East
Üzümdere	19.6	North
Gündoğmuş	19.9	Northeast
Düzlerçamı	27.7	West
Sivridağ	38.1	West
Gidengelmez Mountain	49.2	North
Sarıkaya	61.9	Southwest
Kıbrıs Stream	124.9	Southwest

Table XII.5 List of Wild Animal Settlement Areas in the Antalya Province

Wild Animal Settlement Area	Direction with respect to the Closest Project Unit
Kaş Dristrict	Southwest
Kumluca District	Southwest
Serik District	North
Manavgat District	North
Gündoğmuş District	North

Prohibited and Open Hunting Areas in Antalya Province are presented in Figure XII.1.

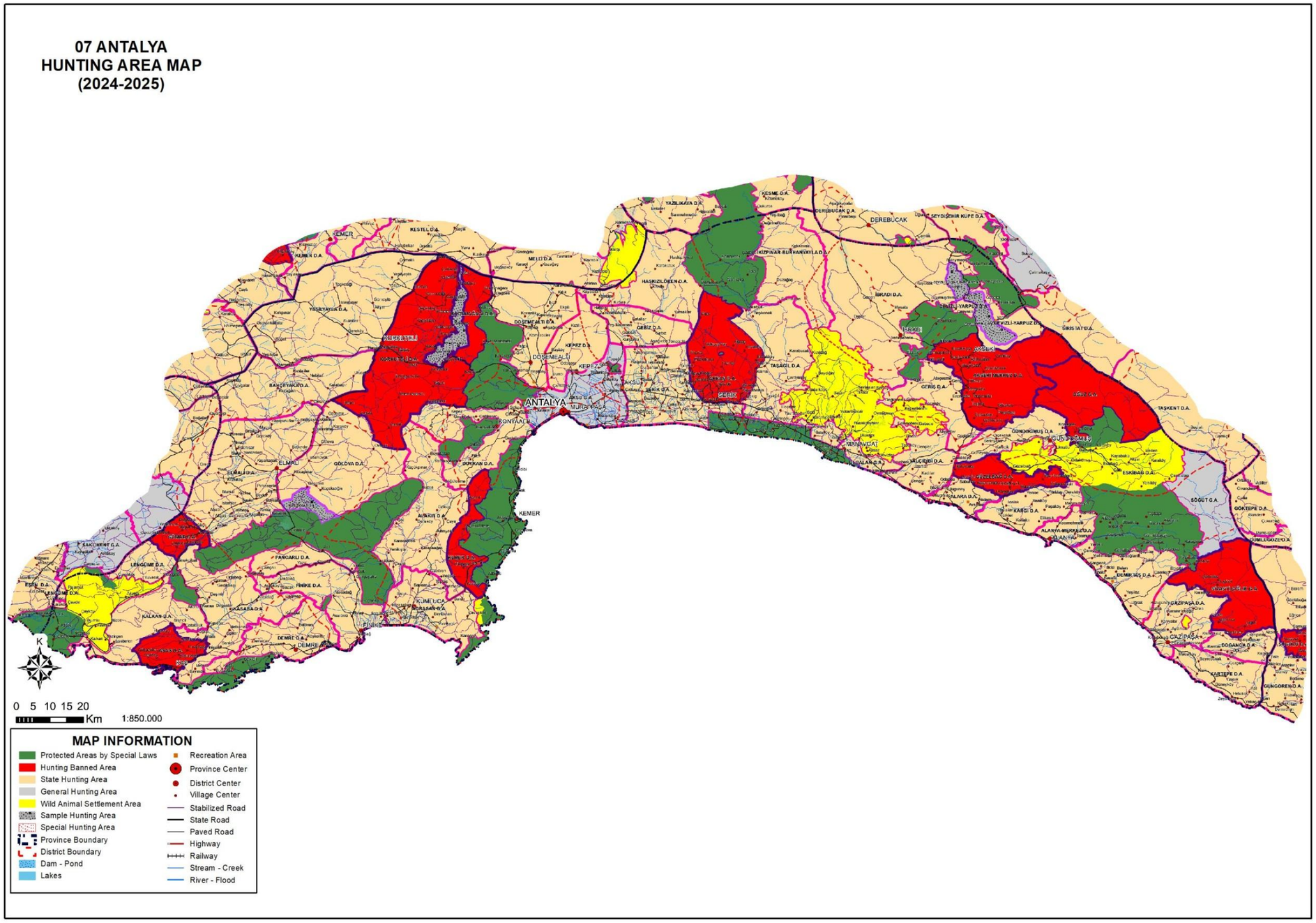


Figure XII.1 Prohibited and Open Hunting Areas in Antalya

c) Areas defined as “Cultural Property”, “Natural Property”, “Protected Site” and “Protected Area” according to 2863 numbered Law on Protection of Cultural and Natural Properties dated 23 July 1983, Article 3, Paragraph 1, Clause (a) (Definitions); Sub-clauses 1, 2, 3 and 5; and areas identified and registered in the same Law and amendments

A route survey was organized by the Project Sponsor together with the ENCON in order to understand the Project route. As a result of this field visit, cultural assets were seen within the Project Area.

Archaeological and immovable cultural heritage within the scope of the ESIA process are being conducted by the expert group of HERMES Archeology & Environmental and Social Consultancy Company between 26th of August and 8th of September in 2024 and 14th and 17th of March 2025.

Further detailed information about Cultural Heritage regarding the Project and potential impact area will be given in Chapter XIII (“Archaeological and Immovable Cultural Heritage”) after the relevant assessments are made.

Köprüçay Basin Natural Protected Area is partially inside of the Project area.

Further detailed information about biodiversity regarding the Project and potential impact area will be given in Chapter IX (“Ecology and Biodiversity”) after the relevant assessments are made.

d) Aquaculture Production and Breeding Sites within the scope of Fisheries Laws and Regulations.

Article 34 of the Communiqué No. 5/1 on the Regulation of Fishing for Commercial Purposes (Communique No: 2020/20) lists the inland water bodies where hunting is completely forbidden. Inland waters where hunting is completely prohibited for Antalya province are listed below.

- Dim Dam Lake
- Gökçeler Dam Lake
- Manavgat Dam Lake
- Naras Dam Lake
- Oymapınar Dam Lake

Annex-7 of the same communique lists streams within a distance of 500 meters from the sea in the stream directions where aquaculture is prohibited. These waterbodies for Antalya Province are also listed below with their respected districts.

- Acısu (Karaçay), Akçay streams - Finike District
- Aksu Stream - Aksu District
- Alakır Stream - Finike and Kumluca Districts Border
- Alara Stream - Alanya and Manavgat Districts Border
- Boğaçayı – Konyaltı District
- Dimçayı - Alanya District
- Duden Stream – Muratpaşa District
- Eşen Stream - Fethiye and Kaş Districts Border
- Kaledıran Stream - Anamur and Gazipasa Districts Border
- Kargı Stream - Alanya District
- Köprü Stream - Serik and Manavgat Districts Border
- Manavgat River - Manavgat District

According to this communique, in places identified as sea turtle breeding areas (for Antalya Province; Patara, Demre, Kumluca, Tekirova, Belek, Kızılot, Gazipaşa, Demirtaş, Olympos-Çıralı) I (a) group mining is prohibited. These mining activities are involved in the Project since they cover the mining of the sand and gravel used in construction and road construction and found naturally in nature. Annex-4 of the Communiqué No. 5/2 on the Regulation of Fishing for Amateur Purposes (Communique No: 2020/21) lists the inland water bodies where hunting is completely prohibited. Inland waters where hunting is completely prohibited for Antalya province are listed below.

Bıçkıcı Stream – Gazipaşa District
Çığlık Stream - Gazipaşa District
Delice Stream - Gazipaşa District
Avlan Lake – Elmalı District
Üzümdere – Alanya District

Annex-5 of the same communiqué lists the inland water bodies where hunting is partially prohibited. Inland waters where hunting is partially prohibited for Antalya province are given in the Table XII.6.

Table XII.6 Inland Waters where Hunting is Partially Prohibited in Antalya Province

Prohibition Boundaries	Stream Name	District
Köprülü Canyon National Park Düzyer location in the southwest of Çaltepe Village, the section from the borders of the National Park to Olukköprü	-	Manavgat District
The region starting from Akbiladan Stream in the south of Kalecik Village to Ali Bridge in the direction of water flow	Alara Stream	Alanya District
The section starting from Sıçanlı Plateau Yavuşan Stream, which is the origin point of the stream, to the junction of Taşatan Stream with Derince Stream in the direction of water flow	Kargı Stream	
1st Branch Stream origin point, following Gavurdaşı Stream, 2nd Branch origin point, following Kuru Stream and Derinkoyak Stream, following Dim stream flow direction until Bucakköy Neighborhood bridge	Dim Stream	
The section starting from the origin point of the stream, Erenler içi, following the canyon in the direction of flow until the intersection of the stream coming from Cinali Neighborhood	Sapadere Stream	
From the point where the İkizpınarı Stream in Değirmenözü Village Boğazkavak Neighborhood of Köprülü Canyon National Park joins the Köprüçay, Boyalıçay, Kırgeçit Stream, Kocadere, Akçay Stream, including Gökçesu spring, up to Karabük Village Bridge	Boyalıçay, Kırgeçit Stream, Kocadere, Akçay Stream, Gökçesu	
Starting from the place where the stream is originated, the section up to Kabakbükü in the direction of the flow of the stream	Direnli Stream	Gazipaşa District
The part from Aşağı Karaman Neighborhood to the junction with Doyran Stream	Karaman Stream	

None of the abovementioned areas are within the Project area and therefore the Project is not expected to have any impacts on them within the national legislation.

e) Areas defined in the relevant articles of the Water Pollution Control Regulation

Since the 17th, 18th, 19th and 20th Articles in Water Pollution Control Regulation were repealed; the Regulation on the Protection of Drinking-Potable Water Basins was taken as a reference in order to determine the basin protection limits for drinking water reservoirs. According to the Antalya Province Environmental Status Report for 2023, water dams used for drinking purposes within Antalya province are listed in Table XII.7.

Table XII.7 List of Water Dams used for Drinking Purposes in the Antalya Province

Name of Dam	Distance to the Closest Project Unit (km)	Direction with respect to the Closest Project Unit
Manavgat Dam	2.0	Northeast
Oymapınar Dam	8.8	North
Alanya Dim Dam	21.0	East
Karacaören II Dam*	40.7	Northwest

**Karacaören-II Dam is located outside the borders yet it is used for drinking purposes in the Antalya Province.*

f) Areas in accordance with the scope of Air Quality Assessment and Management Regulation

According to the 7th Article of Air Quality Assessment and Management Regulation, zones and sub-zones for air quality identification are listed in Annex-I of Memorandum 2013/37. This memorandum divides Türkiye into various zones and sub-zones to identify pollution profiles of provinces by the MoEUCC. According to the evaluations made by the Ministry in this extent in Annex-III, Antalya is included in the “high pollution potential provinces” list.

g) Areas determined and declared as "Specially Protected Environment Area" by the President of the Republic pursuant to Article 9 of the Environment Law

Belek Specially Protected Environment Area is partially inside of the Project area and it is to the south. There is also Kaş-Kekova Specially Protected Environment Area, Patara Specially Protected Area and Fethiye-Göçek Specially Protected Environment Area to the southwest, with a distance of 120.5 km, 152.4 km and 157.9 km from the Project area, repectively.

h) Areas under protection according to the Bosphorus Law,

There are no protected areas within the scope of Bosporus Law in the Project area.

i) Areas considered as forest areas in accordance with the Forest Law,

The Project falls within the jurisdiction of four (4) different Forestry Management Directorates (Serik, Taşağıl, Manavgat and Alanya) under Antalya Regional Directorate of Forestry as summarized in Table XII.8.

Table XII.8 Relevant Forestry Directorates for the Project

Regional Directorate	Forestry Management Directorate	Management Sub-directorate
Antalya Regional Directorate of Forestry	Serik Forestry Management Directorate	Serik Forestry Management Sub-directorate
		Akbaş Forestry Management Sub-directorate
	Taşağıl Forestry Management Directorate	Taşağıl Forestry Management Sub-directorate
		Çardak Forestry Management Sub-directorate
	Manavgat Forestry Management Directorate	Şelale Forestry Management Sub-directorate
		Naras Forestry Management Sub-directorate
		Manavgat Forestry Management Sub-directorate
		Yalçıdibi Forestry Management Sub-directorate
	Alanya Forestry Management Directorate	Alara Forestry Management Sub-directorate
		Avsallar Forestry Management Sub-directorate
		Kargı Forestry Management Sub-directorate

According to CORINE (2018) database, forestlands (including the broad-leaved forests, coniferous forest and mixed forest) cover 10.5% (722.65 ha) of the entire study corridor (6,856.13 ha).

According to STATIP (2015) database, forestlands (including the broad-leaved forests, coniferous forest, mixed forest and shrublands) cover 29.1% (1,991.45 ha) of the entire study corridor (6,856.13 ha).

According to GDRS (1993) database, forestlands cover 14.4% (988.19 ha) of the entire study corridor (6,856.13 ha).

Analyses such as canopy cover classifications and forest stand types of the forests in the project area using Forest Management Plans will be carried out by determining the expropriation corridor and will be given in Chapter V.

j) Areas where construction is prohibited in accordance with the Coastal Law,

There are no areas subject to construction ban in accordance with the Coastal Law.

k) Areas specified in the Law on the Breeding of Olive Groves and Grafting of Wild Olives,

There are no areas designated in accordance with Law on Improvement of Olive Cultivation and Grafting of Wild Species.

l) Areas specified in the Pasture Law,

According to CORINE (2018) database, pasturelands are not present within the study corridor. According to STATİP (2015) database, pasturelands are 3.31% for the Project and total area of pastureland is 227.04ha. According to GDRS (1993) database, pasturelands are 0.31% for the Project and total area of pastureland is 21.09 ha. The pasture areas included in the STATİP 2015 data are within the scope of the Pasture Law No. 4342. It should be noted that; in this study, regardless of whether it is within the scope of the Law or not, the land is determined based on its current use according to its natural structure. Detailed assessment will be given in Chapter V.

m) Areas specified in the Regulation on the Protection of Wetlands.

There are one nationally important and three locally important wetlands in Antalya province according to the List of Wetlands of International Importance of Türkiye. These wetlands and their distances to the Project route are also given in Table XII.9 and Table XII.10, respectively below.

Table XII.9 List of Nationally Important Wetland Areas in the Antalya Province

Nationally Important Wetland Area	Distance to the Closest Project Unit (km)	Direction with respect to the Closest Project Unit
Avlan Lake	88.9	Southwest

Table XII.10 List of Locally Important Wetland Areas in the Antalya Province

Locally Important Wetland Area	Distance to the Closest Project Unit (km)	Direction with respect to the Closest Project Unit
Eğri Lake	41.3	Northeast
Baymelek Lagoon	103.4	Southwest
Demre Çayağzı Bird Paradise	116.3	Southwest

The Protected Areas Map of the Project Area is presented in **Error! Not a valid bookmark self-reference.**.

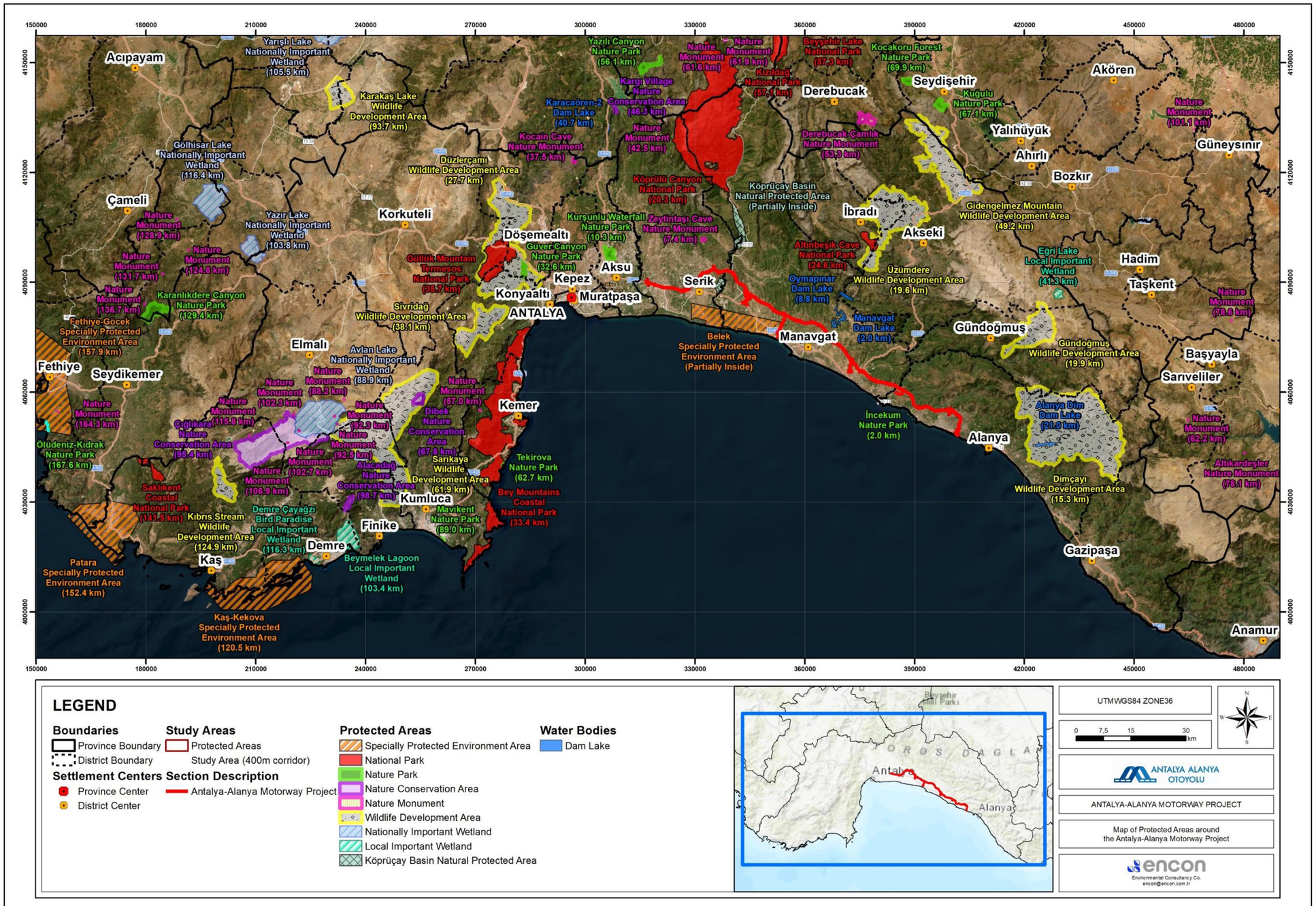


Figure XII.2 Protected Areas Map of the Antalya Province

n) Areas identified in the approved Environmental Plans as areas whose existing characteristics are to be preserved and where construction is prohibited (natural character to be preserved, biogenetic reserve areas, geothermal areas and similar).

According to Antalya-Burdur-Isparta Region Environmental Plan there are no construction prohibited areas in the region.

o) Agricultural Areas: Agricultural development areas; irrigated, irrigable and land use capability classes I, II, III and IV areas; all of the class I and II and special crop plantation areas used in rainfall-dependent agriculture.

Table XII.11 provides an overview of the land use capabilities of the agricultural areas within the study corridor. As can be seen, in the Table XII.11, a major part (36.3%) of the agricultural lands consists of soils having Class II land use capability. Class II lands are decent lands that can only be processed after taking some special precautions. Their difference from Class I lands is one or more of the limiting factors such as slight slope, moderate exposure to erosion, moderately thick soil, exposure to occasional moderate floods and a moderate level of moisture that can easily be isolated.

Table XII.11 Land Use Capabilities of the Agricultural Areas within the Study Corridor (according to Turkish General Directorate for Rural Services, 1993)

Land Use Capability Class	Area (m^2)	Area (ha)	Percent (%)
Class I	4,599,930.62	459.99	12.27
Class II	13,599,393.62	1,359.94	36.28
Class III	8,095,488.95	809.55	21.60
Class IV	5,346,802.43	534.68	14.27
Class VI	5,838,424.14	583.84	15.58
Total:	**37,480,039.76**	**3,748.00**	**100.00**

Wetlands: Natural or artificial, permanent or temporary, stagnant or flowing, fresh, brackish or salty, covering depths not exceeding 6 meters during the ebb and flow of the tidal movement of the seas, all waters, marshes, reeds and peatlands that are important as a habitat for living things, especially water birds, and places that are ecologically wetlands from the coastal edge line of these areas towards the land side.

The wetlands in the Antalya Province are given in Table XII.9 and Table XII.10, and also shown in

The Protected Areas Map of the Project Area is presented in **Error! Not a valid bookmark self-reference.**.

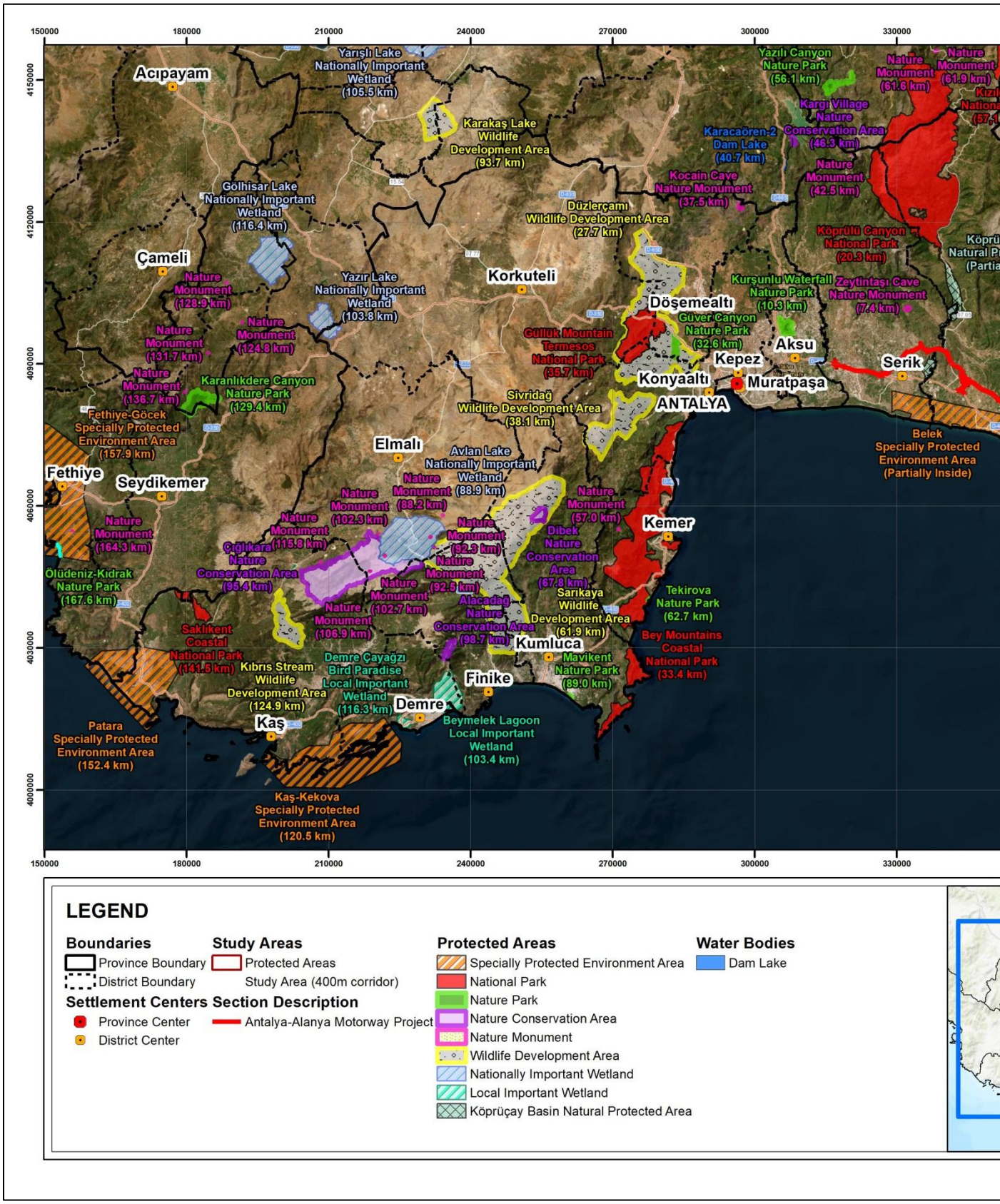

150000
180000
210000
240000
270000
300000
330000
4150000
4120000
4090000
4060000
4030000
4000000
Acıpayam
Yarışlı Lake Nationally Important Wetland (105.5 km)
Karakaş Lake Wildlife Development Area (93.7 km)
Gölhisar Lake Nationally Important Wetland (116.4 km)
Çameli
Nature Monument (128.9 km)
Nature Monument (131.7 km)
Nature Monument (124.8 km)
Yazır Lake Nationally Important Wetland (103.8 km)
Korkuteli
Düzlerçamı Wildlife Development Area (27.7 km)
Kocain Cave Nature Monument (37.5 km)
Karacaören-2 Dam Lake (40.7 km)
Yazılı Canyon Nature Park (56.1 km)
Kargı Village Nature Conservation Area (46.3 km)
Nature Monument (61.6 km)
Nature Monument (61.9 km)
Nature Monument (42.5 km)
Köprülü Canyon National Park (20.3 km)
Kurşunlu Waterfall Nature Park (10.3 km)
Zeytintaşı Cave Nature Monument (7.4 km)
Döşemealtı
Güver Canyon Nature Park (32.6 km)
Güllük Mountain Termesos National Park (36.7 km)
Aksu
Kepez
Serik
Konyaaltı
Muratpaşa
ANTALYA
Sivridağ Wildlife Development Area (38.1 km)
Nature Monument (136.7 km)
Karanlıkdere Canyon Nature Park (129.4 km)
Fethiye-Göcek Specially Protected Environment Area (157.9 km)
Belek Specially Protected Environment Area (Partially Inside)
Elmalı
Avlan Lake Nationally Important Wetland (88.9 km)
Fethiye
Seydikemer
Nature Monument (164.3 km)
Nature Monument (102.3 km)
Nature Monument (88.2 km)
Nature Monument (115.8 km)
Nature Monument (92.9 km)
Nature Monument (57.0 km)
Kemer
Dibek Nature Conservation Area (67.8 km)
Çığlıkara Nature Conservation Area (95.4 km)
Nature Monument (92.5 km)
Ölüdeniz-Kıdrak Nature Park (167.6 km)
Nature Monument (102.7 km)
Alacadağ Nature Conservation Area (98.7 km)
Sarıkaya Wildlife Development Area (61.9 km)
Tekirova Nature Park (62.7 km)
Nature Monument (106.9 km)
Saklıkent Coastal National Park (141.5 km)
Kumluca
Bey Mountains Coastal National Park (33.4 km)
Demre Çayağzı Bird Paradise Local Important Wetland (116.3 km)
Kıbrıs Stream Wildlife Development Area (124.9 km)
Mavikent Nature Park (89.0 km)
Finike
Demre
Kaş
Beymelek Lagoon Local Important Wetland (103.4 km)
Patara Specially Protected Environment Area (152.4 km)
Kaş-Kekova Specially Protected Environment Area (120.5 km)
LEGEND
Boundaries
Province Boundary
District Boundary
Settlement Centers
Province Center
District Center
Study Areas
Protected Areas
Study Area (400m corridor)
Section Description
Antalya-Alanya Motorway Project
Protected Areas
Specially Protected Environment Area
National Park
Nature Park
Nature Conservation Area
Nature Monument
Wildlife Development Area
Nationally Important Wetland
Local Important Wetland
Köprüçay Basin Natural Protected Area
Water Bodies
Dam Lake

Figure XII.2 Protected Areas Map of the Antalya Province .

None of the wetlands area intersects with the Project route.

q) Lakes, rivers, groundwater management areas.

Baranda Lake is the only natural lake mentioned in Environmental Status Report for 2023 of Antalya Province.

The rivers of the Antalya province are given in Table XII.12 below.

Table XII.12 List of Rivers in the Antalya Province

Name of the Rivers	
Aksu Stream	Kargı Stream
Alakır Stream	Karpuz Stream
Alara Stream	Köprü Stream
Başgöz Stream	Korkuteli Stream
Bıçkıcı Stream	Manavgat Stream
Dim Stream	Obaçay
Düden Stream	Salamur Stream
Eşen Stream	Sedre Stream

r) Areas which are important for scientific research and/or habitats of threatened or endangered species and species endemic to our country, biosphere reserves, biotopes, biogenetic reserve areas, areas with unique geological and geomorphological formations.

According to Antalya-Burdur-Isparta Region Environmental Plan there is no such area in the region.

XII.1.2. Potential Impacts and Mitigation Measures

Project development aims to avoid any significant impact on any protection area or area of environmental, social and cultural importance. In this regard, direct potential impacts on protected areas are assessed by field survey and GIS techniques. The potential impacts of the Project on any protection areas will be mitigated through either changing the route of the Motorway or other design changes. Potential impacts on the protected areas, and protection of these areas is one of the main criteria being considered in the route selection process.

Based on the findings of the ongoing studies, changes may be made in the route of the Project as a mitigation measure. Detailed information about further optimization studies in this area are provided in Chapter **Error! Reference source not found.** (“Analysis of Alternatives”) after relevant assessments are made based on the field survey.

By the above mentioned revisions and adjustments, the potential significant impacts on the protected areas will be avoided or mitigated to acceptable levels.

XII.2. Landscape and Visual Environment

The Motorway itself and its large components such as viaducts, toll plazas, and service areas will be a source of change in the existing visual environment. Because of the experiential nature of visual resources, the human response to visual changes in the landscape cannot be quantified, even though the visual changes associated with a development can be described (Hankinson 1999). The areas having unique or high landscape value, such as national parks, nature parks or natural forests, recreational areas, etc., are generally the ones that are most important with regard to potential visual effects of the Motorway and its components. The Project route selection has been done in due consideration of the protected areas, where a significant distance has been maintained with the Motorway components and the protected areas.

XII.2.1. Assessment Methodology and Data Sources

The Project information including route maps, locations of structures were reviewed together with the available literature regarding the conditions in the area.

The assessment addresses the whole Project components including the Motorway route and related facilities. In this context, in addition to the route, the assessment will consider the following elements:

- Toll Plazas
- Interchanges and access roads
- Viaducts and bridges
- Quarries and Campsites

Based on the assessment, mitigation measures are recommended for the purpose of integrating the Motorway into the wider landscape. The mitigation measures will be in the form of proposed Motorway planting and will also serve to visually screen the Motorway from nearby viewers, mainly residents of nearby neighborhoods.

Significance Criteria

The significance criteria for the impacts on landscape and visual environment is determined, as high, medium or low, based on the evaluation of magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter 4 (“ESIA Methodology”) is used for the determination of the magnitude of impact on landscape and visual environment. Sensitivity/value criteria used in the scope of impact assessment are summarized in Table XII.13.

Table XII.13 Criteria for Sensitivity/Value of Resource/Receptor

Ecosystem Component	Sensitivity/Value Level		
	High (3)	Medium (2)	Low (1)
Landscape	Natural landscape character areas	Semi-natural landscape character areas (e.g. undeveloped rural settlement areas)	Unnatural and/or semi-natural landscape character areas (e.g. developed rural settlement areas, urban areas)
Visual Environment (Residents of Settlements)	Settlements located at a distance between 0-400 meters from Motorway Axis and visual impact occurance according to topography, artificial and natural barriers	Settlements located at a distance between 400-700 meters from Motorway Axis and visual impact occurance according to topography, artificial and natural barriers	Settlements located at a distance between 700-1000 meters from Motorway Axis and visual impact occurance according to topography, artificial and natural barriers

XII.2.2. Baseline Conditions

The landscape of the study area has been analyzed and described in terms of the key features and overall character via Google Earth. The landscape characteristics around the Project Route are identified with reference to the Motorway KMs in Table XII.14 below.

Table XII.14 Landscape Characteristics around the Motorway Route

Km Chainage	Description
52+000 / 56+000	**Flat Agricultural Lands in Deniztepesi and Sarıabalı Neighborhoods** This section is located at the beginning of the Motorway route. The area consists mostly of flat agricultural lands, greenhouse areas, rural settlements and some residences of Deniztepesi Neighborhood. The southwest of this section is urbanized starting from a distance of approximately 6 km. Serik Junction near Deniztepesi and Sarıabalı neighborhoods are located in this section. Köprüçay also passes through the region. There are agricultural areas, greenhouse areas and some residences on the banks of Köprüçay in Sarıabalı Neighborhood.
56+000 / 66+000	**Sloping Forest Lands in Çakış, Sağırin and Taşağıl Neighborhoods** In this section of the Motorway route, there are sloping forest lands and agricultural lands on the slopes of the hills, as well as agricultural lands on the plains in Taşağıl Neighborhood.
66+000 / 70+500	**Flat Agricultural Lands in Hocalar and Gündoğdu Neighborhoods** In this section of the Motorway route, the entire area consists of flat agricultural lands. In Yavrudoğan Neighborhood, sloping forest lands on the slopes of the hills are noteworthy. Taşağıl Junction near Hocalar Neighborhood is located in this section.
70+500 / 88+000	**Flat Agricultural Lands in Çolaklı, Ilıca and Manavgat Neighborhoods** In this section of the Motorway route, the whole area consists of flat agricultural land, wooded areas on the slopes of hills and some houses belonging to neighborhoods. Manavgat Junction near Yukarıışıklar Neighborhood is located in this section. Along the connection road to Manavgat Junction, urban settlements are dense and there are also agricultural areas and greenhouse areas. Manavgat Stream also passes through the area.
88+000 / 90+500	**Flat Agricultural Lands in Doğançam, Karacalar and Kızılağaç Neighborhood** In this section of the Motorway route, there are sloping forest lands on the slopes of the hills and agricultural lands on the plains, as well as a few residential areas belonging to the Doğançam Neighborhood.
90+500 / 100+000	**Flat Agricultural Lands in Kızılot and Çenger** In this section of the Motorway route, the entire area consists of flat agricultural land and forest areas on the slopes of hills. The Manavgat Interchange near Yukarıışıklar neighborhood is located in this section. There are a few greenhouses with larger areas in this section of the route.
100+000 / 104+000	**Sloping Forest Lands in Hacıisalı and Hacıobası Neighborhoods** In this section of the Motorway route, there are sloping forest lands on the slopes of the hills and agricultural lands on the plains. Manavgat East Junction near Hacıisalı Neighborhood is located in this section.
104+000 / 120+000	**Flat Agricultural Lands in Çavuşköy, Kadılar, Örenşehir, Yalçıdibi, Odaönü, Karakaya and Çakallar, Karamanlar Neighborhoods** In this section of the Motorway route, the entire area consists of flat agricultural lands, greenhouse areas, wooded areas on the slopes of hills and residential areas belonging to neighborhoods. Alarahan Junction near Çakallar Neighborhood is located in this section.
120+000 / 125+500	**Sloping Forest Lands in İncekum and Avsallar Neighborhoods** In this part of the Motorway route, sloping forest lands are predominant on the slopes of the hills. There are also greenhouse areas on the plains of Avsallar Neighborhood.
125+500 / 136+000	**Sloping Forest Lands in Akdam, Türkler, Soğukpınar and Toslak Neighborhoods** In this section of the Motorway route, there are sloping forest lands on the slopes of the hills, as well as greenhouse areas on the plains of Akdam, Türkler, Soğukpınar and Toslak Neighborhoods, and scattered houses within these areas. The Konaklı Junction near the Soğukpınar Neighborhood is located in this section. Along the Konaklı Junction connection road, greenhouse areas are dense and residential areas are also located on the route.

XII.2.3. Visibility Analysis

In the visibility studies, 62 settlements within the socio-economic area of impact were taken into account, and the visible and nonvisible regions from these settlements were mapped via ArcGIS. These settlements are classified in Table XII.15 according to their visibility levels of the Motorway in three categories as fully visible, partially visible and nonvisible.

Table XII.15 Visibility of the Project from each Settlement

Visibility Degree of the Project from the Settlements	Settlements
Fully Visible	Aşağıçatma, Çakallar, Kayaburnu, Kızılot, Kökez, Merkez (Serik), Sarılar, Soğukpınar, Sülek, Üründü, Uzunlar,
Partially Visible	Akdam, Alara, Aşağıışıklar, Avsallar, Bucakşeyhler, Deniztepesi, Dikmen (Manavgat), Dolbazlar, Emişbeleni, Evrenleryavşı, Gültepe, Gündoğdu, Hacıali, Hacıisali, Hacıobası, Hatipler, Hocalar, Ilıca, Kalemler, Karakaya, Karaöz, Konaklı, Örenşehir, Sağırin, Side, Şişeler, Taşağıl, Toslak, Türkler, Ulukapı, Yavrudoğan, Yeniköy, Yukarıışıklar,
Nonvisible	Aksaz, Aşağıkocayatak, Burmahancı, Çakış, Çandır, Çavuşköy, Cevizler, Cumalı, Demirciler, Dikmen (Serik), Elikesik, İncekum, Kadılar, Karacalar, Odaönü, Sarıabalı, Yalçıdibi, Yukarıkocayatak,

Example visibility maps for residential areas where the Project is fully visible, partially visible and nonvisible are presented in
Figure XII.3,
Figure XII.4 and
Figure XII.5, respectively. Visibility maps prepared for the remaining settlements are presented in Annex-4.

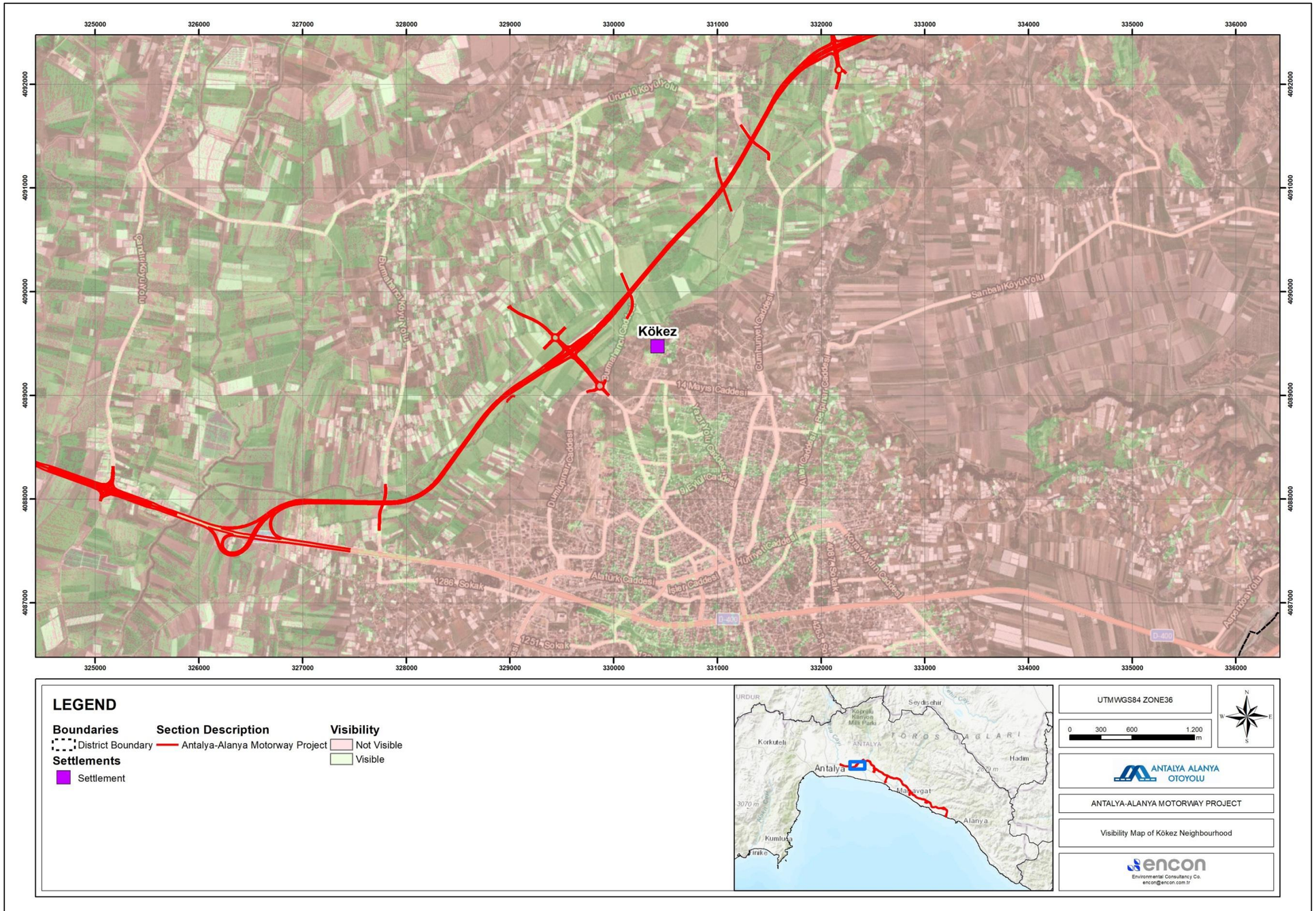


Figure XII.3 Visibility Map of Kökez Neighbourhood for the Project Route (Fully Visible)

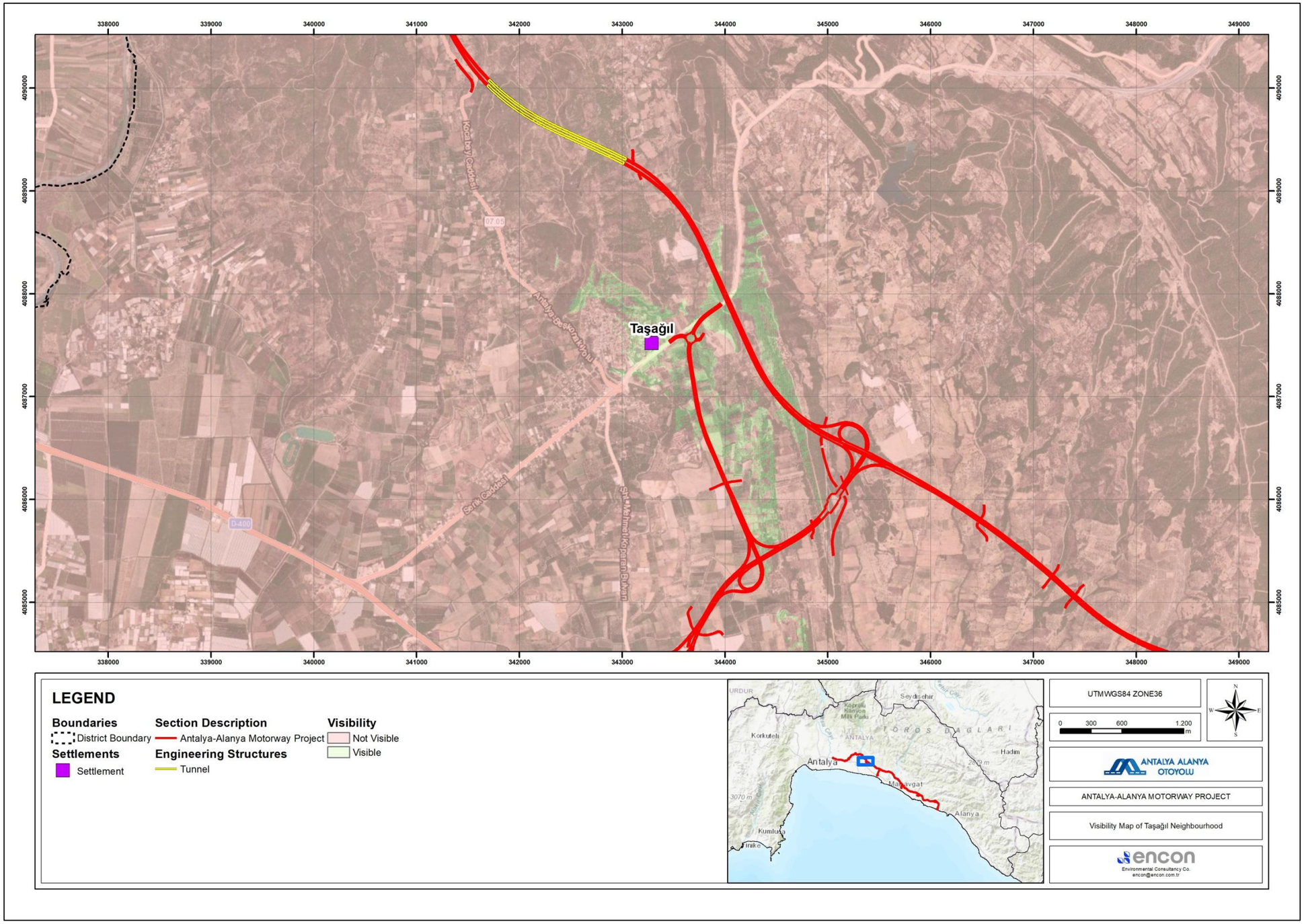


Figure XII.4 Visibility Map of Taşağıl Neighbourhood for the Project Route (Partially Visible)

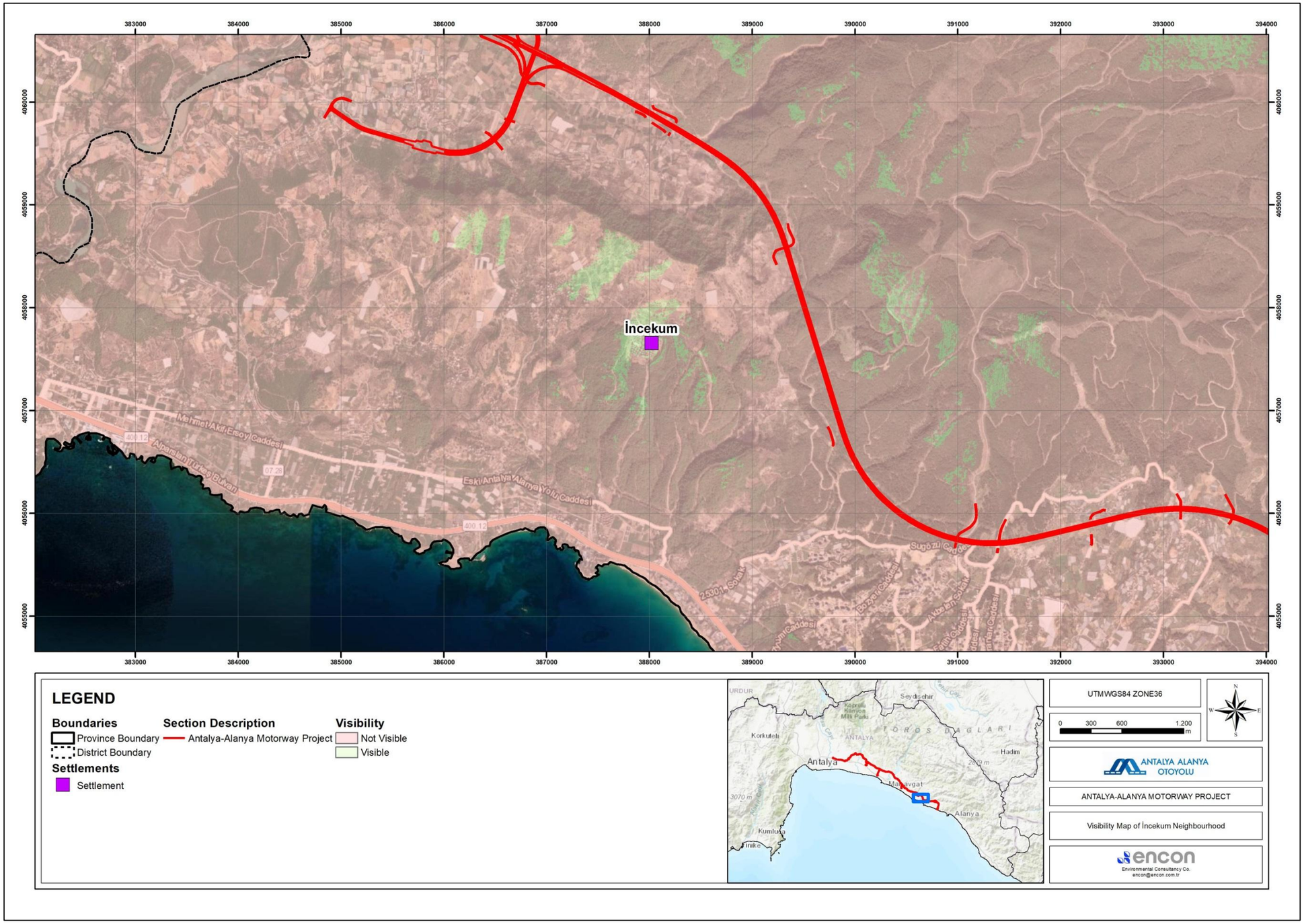


Figure XII.5 Visibility Map of İncekum Neighbourhood for the Project Route (Nonvisible)

XII.2.4. Potential Impacts and Mitigation Measures

Construction of the Motorway and its components will result in the changes in the existing land use. Accordingly, landscape character of these areas will change permanently. Project will have a length of 117.8 km, including the main carriageway and the access roads. The width of the expropriation corridor changes between 100 meters to 450 meters depending on the scale of excavation and fill requirements and footprints of the road structures such as interchanges, service areas, etc. Therefore, landscape in the mentioned area will be affected. In addition, quarries and campsites will have potential impacts on landscape.

Land Preparation and Construction Phases

Potential Impacts

Construction activities of the Project will be completed in 3 years thus the changes in the landscape and visual impacts due to construction components such as campsites, large earthmoving activities, construction machinery, etc. will be relatively temporary in nature. However, there will be disruption to the local landscapes in the immediate vicinity of the Motorway route. These will mainly result from:

- Campsites
- Large earthmoving activities
- Construction machinery
- Quarry sites
- Construction works of bridge and viaduct
- Temporary fences around construction areas
- High visibility cones or concrete blocks
- Construction of toll plazas and associated buildings
- Construction of parking areas and the service areas

Mitigation Measures to be taken

Main aims of the mitigation measures regarding landscape and visual impacts are keeping the changes as small as possible and limiting the visibility of the adverse changes while ensuring the design and construction of the project in a manner that the project melts into the landscape. In this regard, protecting existing landscape features such as shrubs, trees, and natural topography and avoiding unnecessary earthmoving activities are the main components of mitigation strategy. During the period of construction, following measures will be taken to reduce impacts of the works on the landscape and on viewers:

- To protect the existing vegetation and maintain the landscape's integrity, temporary protective fencing will be installed before any work begins on site. This will help preserve as much of the vegetation as possible and retain the natural visual screening.
- Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts.
- The construction sites will be kept tidy and workers will have necessary knowledge/training about the issue.
- Temporary fencing will be implemented to obstruct visibility from the outside to the intense construction activity areas.
- Planting will be implemented to restore or compensate for lost habitats.

- Planting mixes will be selected using native species and planting will be set out to establish new and enhance existing native habitats. The use of native species throughout the area is important in order that the Motorway planting will, over time, become almost indistinguishable from the vegetation naturally occurring in the surrounding area.

Operation Phase

Potential Impacts

Operational phase impact sources will be the Motorway itself and the associated structures for operation of the Motorway. The impacts during the early operation phase of the Project will be the highest in terms of visual impacts since implementation of the mitigation measures, such as planting of trees, will be in the early stages. In the continuing years of operation the visual impacts would be further decreased. The components of the Project that would cause impacts can be summarized as follows:

- Motorway alignment
- Interchanges
- Bridges
- Viaducts, culverts
- Service areas and parking areas
- Toll plazas
- Lighting structures around interchanges, service areas and toll plazas

Mitigation Measures to be taken

General Directorate of Highways (KGM) has technical specifications for landscaping works and a motorway maintenance handbook. These specifications cover project design, implementation and operation/maintenance phases. Therefore, all mitigation measures about landscaping have been provided in the technical attachments of the contract, and Project Sponsor is responsible to implement and keep these measures. According to KGM handbook, side slopes that are wider than three meters should be afforested. In case side slope is narrower than three meters, side slope should be planted with groundcover species, shrub and tree clubmoss. Similarly, central reserves that are wider than three meters should be planted with shrub and tree species.

In this regard, landscaping activities will be conducted along the Project Route in order to minimize the potential impacts of the Project on the natural environment, ensure slope stability, form a barrier against noise and gaseous emissions, avoid monotonous driving conditions and develop aesthetic appearance. In the scope of the activities, existing local soil conditions, natural vegetative structure, existing plant species on the cultivation areas and irrigation/watering requirements of the potential species to be planted are going to be considered. The following can be outlined as the major mitigation measures for the Project:

- Planting will be implemented to reconnect hedgerows or areas of planting formerly severed as a result of the maintenance works in order to maintain wildlife corridors.
- Landscape design will be coherent with regional landscape identity to the extent possible.
- Planting treatments will be designed to visually screen road structures and earthworks from nearby housing and settlements.

- Planting treatments will be planned according to key views and vistas which will reinforce local identity and minimize driver monotony.

Summary of Assessments and Residual Impacts

Temporary impacts of the construction phase can be mitigated to acceptable levels by means of proper rehabilitation of the construction sites. Therefore, residual landscape and visual impacts would be mostly low. Visual changes due to the Motorway and permanent structures will cause a long-term impact on the landscape. However, since the motorway projects are linear projects, visual impacts will occur in a narrow but long corridor (200 meters of each side of the Motorway Axis). Thus, residual impact for the operation is evaluated as medium.

Especially at the areas where rural landscape character is observed, the landscape character will change considerably at certain sections. Therefore, residual impact at these sections is considered as medium for construction phase. However, once landscape works are completed in operation phase (in 5-15 years), residual impact at these areas is expected to be low.

Summary of the landscape, visual environment and protected areas assessments is presented in Table XII.16.

Table XII.16 Summary of the Landscape, Visual Environment and Protected Areas Assessment

Affected Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phases													
Landscape*		Change of existing landscape	Adverse	Local	Medium	Medium	Irreversible	Continuous	Major (A)	Medium (2) to Low (1)	High (A2) to Medium (A1)	To protect the existing vegetation and maintain the landscape's integrity, temporary protective fencing will be installed before any work begins on site. This will help preserve as much of the vegetation as possible and retain the natural visual screening. Temporary fencing will be implemented to obstruct visibility from the outside to the intense construction activity areas.	Medium
Visual Environment	Fully Visible Settlements	Change of visual environment	Adverse	Local	Medium	High	Long term irreversible	Intermittent	Moderate (B)	High (3)	High (B3)	The construction sites will be kept tidy and workers will have necessary knowledge/training about the issue. Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts	Medium
	Partially Visible Settlements		Adverse	Local	Medium	Medium	Long term irreversible	Intermittent	Minor (C)	High (3)	Medium (C3)		Low
	Nonvisible Settlements		Adverse	Local	Medium	Low	Long term irreversible	Intermittent	Minor (C)	High (3)	Medium (C3)		Low
Protected Areas**		Impacts (e.g. dust / noise emission) on flora and fauna elements in the protected area	Adverse	Wide	Medium	Medium	Short term reversible	Intermittent	Moderate (B)	Low (1)	Low (B1)	Required permits and licenses will be obtained. Route will be planned according to registered/newly found protected areas. Fencing around the worksite will be established to minimize dust/noise emissions where feasible.	Low
Operation Phase													
Landscape*		Change of existing landscape	Adverse	Local	Long	High	Irreversible	Continuous	Major (A)	Medium (2) to Low (1)	High (A2) to Medium (A1)	Planting will be implemented to reconnect hedgerows or areas of planting severed as a result of the maintenance works in order to maintain wildlife corridors. Planting treatments will be planned according to key views and vistas which will reinforce local identity and minimize driver monotony.	Medium
Visual Environment	Fully Visible Settlements	Change of visual environment	Adverse	Local	Long	High	Long term irreversible	Continuous	Moderate (B)	High (3)	High (B3)	Planting will be implemented to restore or compensate for lost habitats. Native species will be used and planting will, over time, become almost indistinguishable from the vegetation naturally occurring in the surrounding area. Non native species will be used in locations where their presence is of local relevance. For example, in an urban area, non native or ornamental species will be used to match non native or ornamental planting in that urban area. Planting treatments will be designed to visually screen road structures and earthworks from nearby housings and settlements.	Medium
	Partially Visible Settlements		Adverse	Local	Long	Medium	Long term irreversible	Continuous	Minor (C)	High (3)	Medium (C3)		Low
	Nonvisible Settlements		Adverse	Local	Long	Low	Long term irreversible	Continuous	Minor (C)	High (3)	Medium (C3)		Low
Protected Areas**	Belek Specially Protected Environment Area	Intersection with Protected Areas	Adverse	Restricted	Long	Medium	Long term irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	Required permits and licenses will be obtained. Fencing around the worksite will be established to minimize dust/noise emissions where feasible. Maintaining buffer zones where feasible	Low

Affected Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
	Köprüçay Basin Natural Protected Area		Adverse	Restricted	Long	Medium	Long term irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	Required permits and licenses will be obtained. Fencing around the worksite will be established to minimize dust/noise emissions where feasible. Maintaining buffer zones where feasible Conducting ongoing biodiversity monitoring to confirm that no permanent impacts occur during project implementation.	Low
	HRM-1, HRM-5, HRM-15, HRM 32, HRM-40, HRM-42		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	High (3)	High (B3)	First of all, the route change will be evaluated. If changes cannot be made, the notifications of the museum directorate will be followed.	Medium
	HRM-1		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	In the section where a route change could not be implemented, trial excavations will be initiated under the instructions of the Antalya Regional Board for the Protection of Cultural Heritage. Subsequently, salvage excavations will be carried out, and the unearthed graves will be reinterred within the same parcel, in a location that is not impacted by the Project. These activities will be conducted under the supervision of the local imam and the village head (muhtar). In addition, for known graves, waivers of consent will be obtained from the family members.	Low
	HRM-5		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	In the section where a route change could not be implemented, trial excavations will be initiated under the instructions of the Antalya Regional Board for the Protection of Cultural Heritage. Subsequently, salvage excavations will be carried out, and the unearthed graves will be reinterred within the same parcel, in a location that is not impacted by the Project. These activities will be conducted under the supervision of the local imam and the village head (muhtar). In addition, for known graves, waivers of consent will be obtained from the family members.	Low
	HRM-15		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	In the section where a route change could not be implemented, trial excavations will be initiated under the instructions of the Antalya Regional Board for the Protection of Cultural Heritage. Subsequently, salvage excavations will be carried out, and the unearthed graves will be reinterred within the same parcel, in a location that is not impacted by the Project. These activities will be conducted under the supervision of the local imam and the village head (muhtar). In addition, for known graves, waivers of consent will be obtained from the family members.	Low
	HRM-32		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	Excavation works and permitting processes are ongoing.	Low
	HRM-40		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	Design Processes are ongoing	Low

Affected Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
	HRM-42		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	Excavation works and permitting processes are ongoing.	Low
	HRM 31		Adverse	Restricted	Long	Low	Reversible	Intermittent	Moderate (B)	Medium (2)	Medium (B2)	A route change has been completed to avoid potential impacts on cultural heritage sites.	Low
	HRM 3, HRM 6, HRM 9, HRM-11, HRM-16		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	High (3)	High (B3)	During the construction activities, this area needs to be marked and should be prevented from being damaged. It is recommended that the Directorate of the relevant Archaeological Museum should be informed of its existence to carry out on-site field inspections and if needed for registration to ensure its protection. If an on-site inspection will be done the archaeological area in mention could be proposed for being declared either as a 1st or 3rd Degree Archaeological Site by the Museum. The construction works around the area require archaeological on-site monitoring. The notifications of the museum directorate will be followed.	Medium
	HRM-3		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	All necessary permits have been obtained from the Regional Conservation Board, and there are no constraints for proceeding with the construction works.	Low
	HRM-6		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	In the section where a route change could not be implemented, a deliberate narrowing of the project footprint was carried out to prevent damage to the identified wall alignments. This measure was taken specifically to ensure that these features are not impacted by construction activities. Trial pits will be start.	Low
	HRM-9		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	It was evaluated by the Board and was not registered. Board permit has been obtained.	Low
	HRM-11		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	It was evaluated by the Board and was not registered.	Low
	HRM-16		Adverse	Restricted	Long	Medium	Irreversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	All necessary permits have been obtained from the Regional Conservation Board, and there are no constraints for proceeding with the construction works.	Low

**Sensitivities of these ecosystem components are designated with considering their existence in overall Motorway Route*

XIII. CULTURAL HERITAGE

This chapter identifies the current status of archaeological and immovable cultural heritage that may be relevant to Antalya-Alanya Motorway Project and defines potential impacts of the Project activities on the cultural heritage located within the Project's area of influence, including tangible forms of cultural heritage, unique natural features or tangible objects that embody cultural values, and intangible forms of culture.

To supplement the cultural heritage assessments presented in this Chapter, a Cultural Heritage Management Plan (CHMP) – including a Chance Finds Procedure and a Grave Relocation Procedure – has been prepared as an appendix to this ESIA Report and should be read in conjunction with this Chapter.

The cultural heritage study aims to identify and assess the tangible and intangible cultural heritage on the planned route for the Project and its impact area, describe their expansion limits, assess the potential impact of the construction and operation activities on cultural heritage assets, and offer suggestions for mitigation measures. The cultural heritage baseline and assessment studies were conducted in accordance with the relevant requirements of the national legislation (laws and regulations) and international standards, as outlined in Section XIII.1

The main objectives of the cultural heritage studies conducted as part of the ESIA are as follows:

- To assess the potential for cultural entities and their characteristics in specific locations before construction starts and to develop plans and design strategies for the prevention of construction damage in those areas located on the Project Site,
- To provide data on the identified potential areas to be included in reports for the purposes of proper planning of the construction of the Project (including the Project calendar) to avoid delays in the Project construction activities,
- To develop strategies following the legal procedures, and to propose changes (if needed) in routing/transposition of associated facilities in areas of high archaeological value. To propose further actions to be taken where re-routing/transposition of associated facilities is not possible,
- To collect and record archaeological data scattered over the construction area through the use of scientific methods described below, and to facilitate the transportation of movable cultural heritage items to the relevant museums,
- To archive, all data gathered on archaeological sites and to prepare identification and registration tags of archaeological assets for being reported to the Ministry of Culture and Tourism of the Republic of Türkiye, and
- To enrich the cultural and archaeological inventory of Türkiye with the attested new archaeological finds and features

The studies on the cultural heritage within the scope of the ESIA process were conducted by the expert group of HERMES Archeology & Environmental and Social Consultancy Company (from now on called Hermes), with field surveys undertaken between 26th of August and 8th of September in 2024 and 14th and 17th of March 2025.

The names of the archaeologists who conducted the study and contributed to the report are presented in below table (see Table XIII-1):

Table XIII-1 Expert Team Table Performing the Study

Name	Title	Duty
Engin ÇOŞAR	Senior Archaeologist	Field Coordinator, Field Studies, Reporting
Ahmet Levent KESKİN	Archaeologist	Field Studies, Reporting
Gözde ERGÜL	Archaeologist	Reporting, Support

As part of the studies, the Antalya Regional Board for the Protection of Cultural Heritage (ARHB) was consulted by the Project, through KGM. Cultural heritage findings were reported by KGM to the Board, site visits were conducted by the ARHB officials as required, and official ARHB decisions were obtained for each site accordingly. **Table XIII-7** presented in **Section XIII.3** of this Chapter *"Cultural Heritage Baseline"*, also summarizes the permitting status of each site based on the decisions of the ARHB. This table will serve as a permitting tracker throughout the Project implementation phase.

The ARHB decisions – including a tracker indicating the permitting status of each site – are also presented in Appendix 3 of the Cultural Heritage Management Plan (CHMP).

XIII.1. Regulatory Requirements and Applicable International Standards

XIII.1.1. National Legislation

XIII.1.1.1. Tangible Cultural Heritage

In Türkiye, the movable and immovable cultural and natural assets are under protection and conservation with the "Law on Preservation of Cultural and Natural Assets", 2863 that was amended by law numbered 3386 (Date of Acceptance: 21.07.1983, published in the Official Newspaper issue 18113 with date 23.07.1983). According to the Law, essential assets which are identified as cultural and natural heritage under legal protection are identified as follows:

- Natural and immovable cultural assets belonging to the 19th century and before,
- Any immovable cultural asset constructed after the end of the 19th century but categorized as "a significant asset which requires preservation" by the Ministry of Culture and Tourism,
- Immovable cultural assets located within the Protection Sites (in the Law, Protection Sites are defined as ancient sites and city ruins that reflect the main social, economic or architectural characteristics of their era. Protection Sites may also be locations where fundamental historical events took place or areas containing considerable natural or cultural assets with natural or cultural features requiring preservation),
- Structures, buildings or places that have witnessed significant historical events during the Turkish Independence War or the foundation of the Turkish Republic, regardless of time and registration; and
- All dwellings and buildings used by Mustafa Kemal ATATÜRK without considering their time of construction or registration.

Within the scope of this Law, the Ministry of Culture and Tourism and its local branches (Boards for Preservation of Cultural and Natural Assets, Museums) are responsible for taking decisions at a national level and providing necessary legal actions to protect cultural and natural assets listed above. At the local level, Regional Boards for Preservation of Cultural and Natural Assets are responsible for registering and classifying the cultural and natural heritage, inspecting and making decisions regarding

land use and construction works related to motorway projects which can affect these assets. Declaration of site protection, covering discovered cultural heritage located in their area of authorization, is also under the responsibility of the Regional Boards, whose decisions can directly affect the Project, too.

According to the Law on Preservation of Cultural and Natural Assets numbered 2863, all-natural and cultural assets meeting conditions for legal preservation are the property of the State. Therefore, regional boards have the power and the authority to ensure the legal protection and conservation of relevant sites and to approve or reject all activities that have the potential for negative impacts on these sites, such as construction, destruction, road cuts, and excavation. Currently, the Antalya Regional Board for Preservation of Cultural and Natural Assets is the board responsible for the Project Area.

Apart from the Law on Preservation of Cultural and Natural Assets numbered 2863, some additional regulations do exist governing the procedures for the protection and preservation of cultural and natural assets. First is the Principal Decision of the Ministry of Culture and Tourism of Türkiye named "Protection and Use Conditions of Archaeological Sites" (No. 658, issued 5 November 1999). This decision states that all archaeological sites need to be classified and protected according to their significant features. Three main categories are determined as relevant to archaeological sites:

- 1st Degree Archaeological Sites
- 2nd Degree Archaeological Sites
- 3rd Degree Archaeological Sites.

1st Degree Archaeological Sites: Areas requiring the highest level of protection. They should be preserved except for scientific excavations. The area should be free of any type of building and construction. All kinds of construction, excavation, and modification activities are prohibited. However, for exceptional cases such as the necessity for infrastructure construction, Regional Preservation Boards may permit such activities based on the approval of the relevant museum and the head of the scientific excavation team.

2nd Degree Archaeological Sites: Areas requiring a medium level of protection. They should be preserved based on the conditions of protection and utilization set by the Regional Preservation Boards. Additional construction is prohibited. As for the 1st-degree archaeological sites, for exceptional cases such as the necessity for infrastructure construction, Regional Preservation Boards may permit such activities based on the approval of the relevant museum and the head of the scientific excavation team.

3rd Degree Archaeological Sites: Lowest level protection area. New arrangements can be permitted in these archaeological areas in light of the protection and making use decisions. Construction is permitted based on the decisions of Regional Preservation Boards. Before applying for a construction permit, test pit excavations should be conducted, and the relevant museum should review the outcomes of these excavations and, if present, the head of the scientific excavation team. Reviews should be submitted to Regional Preservation Boards. The Boards may ask for an extension of the areal test pit coverage before taking any decision.

Furthermore, "Implementation Guidelines for Field Surveys, Test Pits and Excavation Works on Cultural and Natural Assets" of the Ministry of Culture and Tourism of Türkiye, with the approval number 94949537-160.99-51264, dated 13/03/2013, defines the procedures for salvage excavations, archaeological test pits, and other studies that might be required.

XIII.1.1.2. Intangible Cultural Heritage

The United Nations Educational, Scientific and Cultural Organization (UNESCO) accepted the "Convention for the Safeguarding of the Intangible Cultural Heritage" in 2003. Türkiye became a party to the UNESCO Convention on Intangible Cultural Heritage in 2006.

According to the Article 2 of the Convention:

The "intangible cultural heritage" means the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity.

For the purposes of this Convention, consideration will be given solely to such intangible cultural heritage as is compatible with existing international human rights instruments, as well as with the requirements of mutual respect among communities, groups and individuals, and of sustainable development.

Buildings, historic places, monuments, and artefacts are cultural property. Intangible heritage consists of nonphysical intellectual wealth, such as folklore, customs, beliefs, traditions, knowledge, and language. In 2001, UNESCO surveyed States and NGOs to try to agree on a definition, and the Convention for the Safeguarding of the Intangible Cultural Heritage was drafted in 2003 for its protection and promotion. Türkiye became a party to the Convention in 2006.

Within the Convention, the "intangible cultural heritage" is manifested inter alia in the following domains:

- oral traditions and expressions, including language as a vehicle of the intangible cultural heritage (myths, epics, legends, folk tales, riddles, poems, lullabies, etc.),
- performing arts (traditional theatre, puppets, folk dance, folk music etc.),
- social practices, rituals and festive events (birth, circumcision, farewells to military, weddings, anniversaries, Hıdrellez, The Navruz, Sema, Semah etc.),
- knowledge and practices concerning nature and the universe (folk meteorology, traditional cuisines, etc.),
- traditional craftsmanship (pottery, wood carving, telkari, paper marbling etc),

XIII.1.2. Applicable International Standards

The international standards applicable to the Project's cultural heritage assessment and management processes include the following:

- International Finance Corporation (IFC) Performance Standard 8 (PS 8) (2012)
- Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework (Approved February 2016 (Amended February 2019, May 2021, November 2022, and June 26, 2024), Environmental and Social Standard 1 on Environmental and Social Assessment and Management – Requirements on Cultural Resources
- Equator Principles (EP) 4 (2020)

The following international guidelines have also been taken into consideration as part of the study:

- International Finance Corporation - IFC, Performance Standard 8.
- European Bank for Reconstruction and Development - EBRD, Environmental and Social Policy, PR8, Cultural Heritage.
- UK Department for Transport, Design Manual for Roads and Bridges Part 2 HA 208/07 Cultural Heritage.
- Guidance on Heritage Impact Assessments for Cultural World Heritage Properties, International Council on Monuments and Sites (ICOMOS) January 2011.

- Asian Infrastructure Investment Bank (AIIB), Environmental and Social Framework (June 2024).

According to IFC PS 8, requirements related to replicable and non-replicable cultural heritage are as follows:

*Removal of **Replicable** Cultural Heritage:*

11. Where the client has encountered tangible cultural heritage that is replicable and not critical, the client will apply mitigation measures that favor avoidance. Where avoidance is not feasible, the client will apply a mitigation hierarchy as follows:

- Minimize adverse impacts and implement restoration measures, in situ, that ensure maintenance of the value and functionality of the cultural heritage, including maintaining or restoring any ecosystem processes4 needed to support it;
- Where restoration in situ is not possible, restore the functionality of the cultural heritage, in a different location, including the ecosystem processes needed to support it;
- The permanent removal of historical and archeological artifacts and structures is carried out according to the principles of paragraphs 6 and 7 above; and
- Only where minimization of adverse impacts and restoration to ensure maintenance of the value and functionality of the cultural heritage are demonstrably not feasible, and where the Affected Communities are using the tangible cultural heritage for long-standing cultural purposes, compensate for loss of that tangible cultural heritage.

*Removal of **Non-Replicable** Cultural Heritage:*

12. Most cultural heritage is best protected by preservation in its place, since removal is likely to result in irreparable damage or destruction of the cultural heritage. The client will not remove any nonreplicable cultural heritage,5 unless all of the following conditions are met:

- There are no technically or financially feasible alternatives to removal;
- The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and
- Any removal of cultural heritage is conducted using the best available technique.

XIII.2. Assessment Methodology and Data Sources

This section outlines the methodology and key data sources used for the identification, evaluation, and protection/management of both tangible and intangible cultural heritage within the Project Area, in line with national legislation and relevant international standards.

The study area for the archaeological and immovable cultural heritage assessments has been identified as the 400 m corridor (200 m from each side of the Motorway axis). The methodology followed in the scope of the studies has consisted of the following four phases.

- Pre-Field Work and Desktop Studies including consultations and official correspondence with the ARHB
- Field Surveys
- Impact Assesment
- Reporting

The archaeological findings that are highly likely to be encountered during a field survey could be listed below[1]:

- Plain settlements,
- Flat ground settlements,
- Hilltop settlements,
- Mounds,
- Chapel,
- Cemeteries (Late Ottoman, Early Republican),
- Monumental Tombs,
- Necropoleis,
- Sanctuaries,
- Modern Cemeteries,
- Lookout Towers,
- Forts,
- Aqueducts,
- Ancient Bridges,
- Ancient roads and culverts,
- Areas of Archaeological Potential, etc.

[1] https://www.oxfordreference.com/display/10.1093/acref/9780199534043.001.0001/acref-9780199534043?btog=chap&hide=true&pageSize=20&skipEditions=true&sort=titlesort&source=%2F10.1093%2Facref%2F9780199534043.001.0001%2Facref-9780199534043
https://dictionary.cambridge.org/dictionary/

The archaeological evaluation method of a determined area is made according to the table below (see Table XIII-2).

Table XIII-2 Pre- Field Work and Desktop Studies

Site	Type of the Surface Material	Intensity Rate of the Surface Material
Registered Sites	Sites that are registered and protected by Law No. 2863.	
Sites in the Process of Registration **(Registration work continues in these areas).**	Sites that are in the process of registration as per Law No. 2863.	
Non-registered Sites **(According to the relevant law, these areas must be reported to the Museum Directorate within 72 hours of their identification).**	Sites that are cultural assets but non-registered	
Non-registered Potential Archaeological Site **(According to the relevant law, these areas must be reported to the Museum Directorate within 72 hours of their identification).**	Ceramic, roof tile, architectural stone block, glass object shards, stone object shards, metal object shards, bone, etc.	Between 1-10 pieces (Low Intensity), Inside of approximately 100 m^2 area
Non-registered Archaeological Site **(According to the relevant law, these areas must be reported to the Museum Directorate within 72 hours of their identification).**	Ceramic, roof tile, architectural stone block, glass object shards, stone object shards, metal object shards, bone, etc.	Between 10-100 pieces (High Intensity) Inside of approximately 100 m^2 area
	Architectural remains, etc.	1 tumulus, 1 wall, 1 cistern etc.
Non-registered Other Sites **(According to the relevant law, these areas must be reported to the Museum Directorate within 72 hours of their identification).**	Sites include the remains of the bridge, bastion, blockhouse, fountain, entrenchment, grave/cemetery, etc.	

XIII.2.1. Pre-Field Work and Desktop Studies

Prior to field work planned as part of the study, scientific publications, documents, archives of Regional Preservation Boards, Museums, and the Ministry of Culture and Tourism were reviewed through desktop studies.

Firstly, data on provinces, districts, and cities/villages within the scope of the Project Site was thoroughly collected. All publications on previous archaeological works conducted in the relevant geographical regions and data on archaeological sites located in the vicinity of the Project Site and impact area were studied.

Resources that were used during the desktop study:

- Academic publications about archaeological sites around the Project Site and its surroundings,
- Historical maps,
- Reports on previous Cultural Heritage Works and Field Survey Results,
- Inventory Archives of the Ministry of Culture and Tourism.

Additionally, all archaeological sites have been defined during this desktop study phase with the help of topographical maps and satellite imagery.

During the desktop studies, the document formats for collecting data were designed as "Impact Assessment Form" and "Archaeological Status Table", for use in future field works. Impact Assessment Forms include all needed data for the GIS database.

As a result of the research conducted on the Ministry of Culture and Tourism website, numbers related to immovable cultural assets in Antalya province were found and listed below (see Table XIII-3).

Table XIII-3 Statistics of Immovable Cultural Assets in Need of Protection in Antalya, End of 2023

IMMOVABLE CULTURAL ASSETS	Amount
	Antalya
Protected Street	4
Monuments	22
Governmental Buildings	62
Cultural Buildings	675
Military Buildings	130
Industrial or Trading Buildings	170
Religious Buildings	201
Cemeteries	263
Examples of Civil Architecture	2130
Remains	368
TOTAL	4025

Source: https://kvmgm.ktb.gov.tr/TR-44799/illere-gore-korunmasi-gerekli-tasinmaz-kultur-varligi-istatistigi.html

Intangible Cultural Heritage

Within the scope of the **intangible cultural heritage** desktop studies, the work initially focused on desk-based research, reviewing academic publications and regional studies. In addition, research was carried out using the inventory system of the Ministry of Culture and Tourism.

Palaeoanthropological and Paleontological Values

The desktop studies also included a review of the **palaeoanthropological and paleontological** potential of the study area based on specialist literature review, using the following data sources:

- Desk-based review: Scientific articles, reports, museum archives, TAY database and GIS-based inventories; regional geology and geomorphology data.
- Remote sensing and GIS: Satellite imagery, DEM/slope analysis; morphometric indicators of karstic voids and cave networks.
- Fieldwork: Ground-truthing walks and micro-collection; archive and literature research.
- Conservation and permitting: Coordination with museums and the Regional Conservation Board.

XIII.2.2. Field Surveys

The main objective of the field activities was the on-site investigation of all archaeological areas and intangible cultural heritage, including the previously identified ones.

In the detailed surface surveys, the route and the areas with associated facilities, such as quarries and camp (accommodation) sites (which constitutes the cultural heritage study area), were inspected in August and September 2024. A 200-meter buffer on both sides of the motorway (resulting in a total

buffer width of 400 meters) has been established for the study. Dates with favourable weather conditions were specifically selected for this fieldwork.

In the sections where the route was revised, on-site investigations were conducted.

During the surveys, extensive field walking was used to identify movable and immovable archaeological and cultural assets along the Project Site. Areas with low or impossible chances of access (rice fields, dense vegetation, high altitude over 2500 m) were surveyed through satellite imagery and 1/25,000 scaled maps. Due to the stormy season, extensive fieldwork and physical examination could not be carried out in some areas. Additionally, those areas were studied using ancient sources and field surveys/excavations previously conducted.

The following activities were carried out within the scope of intensive surveys:

- determination of the ties of the Project Site with the archaeological areas,
- identification of the spatial extension of the archaeological features by observing the surface findings,
- observing the locations where surface findings were concentrated, and
- identification of sections where the Project Site intercepts the concentration areas.

Only archaeological objects visible on the surface were investigated during the field works.

During the site walking, all findings (architectural remains or traces, graves or traces of graves, mounds, tumuli, castle, etc.) were recorded on Field Survey Forms and included in the daily fieldwork reports. The Project Site, including its immediate surroundings, was taken as the center of the field research.

All computational data on the forms were prepared through the preference of one of the UTM ED50 and WGS systems. Furthermore, all computational data (such as kmz/kml) related to discovered areas were also prepared following the field surveys, for further incorporation into impact assessment and reporting.

Intangible Cultural Heritage

For the fieldwork phase, baseline **intangible cultural heritage** elements were also identified in the settlemented located along the project corridor, through one-to-one interviews with local residents — primarily landowners— who are mostly those affected by the Project. The findings of these interviews are presented in Section XIII.3.3.

Palaeoanthropological and Paleontological Values

The determination of palaeoanthropological and paleontological potential was carried out through a combination of desk-based analysis, specialist literature review, and field verification integrated into the overall cultural heritage survey. The methodology followed the principles of IFC PS 8, ICOMOS Guidance on Heritage Impact Assessment, and Turkish Law No. 2863 on the Protection of Cultural and Natural Assets.

XIII.2.3. Impact Assesment Methodology

The Project activities may have potential impacts on the sites, which have been identified to be located within the Project construction area or study corridor. The impact of the construction activities on the cultural heritage elements (tangible and intangible) and the degree of importance of these elements were assessed in accordance with the criteria proposed in the “Guidance on Heritage Impact Assessments for Cultural World Heritage Properties,” which is also recommended by the Ministry of Culture and Tourism for cultural heritage impact assessment.

In addition, the relevant requirements of the IFC PS 8 have been taken into consideration. The results of the assessments are summarized in Section XIII.3.

Significance of the impacts on the identified cultural heritages within the Project Route were evaluated according to the "Guidance on Heritage Impact Assessments for Cultural World Heritage ("WH") Properties" published by the International Council on Monuments and Sites (ICOMOS), a unit related to UNESCO.

Accordingly, in determining the significance of cultural heritage impacts, both the value of heritage asset and the scale and severity of change/impact were taken into consideration, by using the impact assessment matrix published by ICOMOS, as presented in **Error! Reference source not found.**. The i mpact matrix was taken from the Cultural Heritage Impact Assessment (CHIA) Guidance published by ICOMOS.

VALUE OF HERITAGE ASSET	SCALE & SEVERITY OF CHANGE/IMPACT				
	No Change	Negligible change	Minor change	Moderate change	Major change
For WH properties Very High – attributes which convey OUV	SIGNIFICANCE OF EFFECT OR OVERALL IMPACT (EITHER ADVERSE OR BENEFICIAL)				
	Neutral	Slight	Moderate/ Large	Large/very Large	Very Large
For other heritage assets or attributes	SIGNIFICANCE OF IMPACT (EITHER ADVERSE OR BENEFICIAL)				
Very High	Neutral	Slight	Moderate/ Large	Large/very Large	Very Large
High	Neutral	Slight	Moderate/ Slight	Moderate/ Large	Large/Very Large
Medium	Neutral	Neutral/Slight	Slight	Moderate	Moderate/ Large
Low	Neutral	Neutral/Slight	Neutral/Slight	Slight	Slight / Moderate
Negligible	Neutral	Neutral	Neutral/Slight	Neutral/Slight	Slight

Figure XIII-1 Impact Matrix defined by ICOMOS Guideline, 2011

Determination of the value of the heritage asset

For the determination of the value of the heritage asset in accordance with ICOMOS guidance, the criteria outlined in **Error! Reference source not found.** was used. This approach incorporates the legal r egistration status of the sites (based on ARHB decisions), replicability characteristics (according to IFC PS8 and based on professional evaluations of the experts), and visibility status (based on experts' site observations).

Table XIII-4 Criteria for Value of the Heritage Assets

Description of the Criteria	[2]Value of Heritage Asset according to ICOMOS Impact Matrix	Law No. 2863 (Protection of Cultural and Natural Assets)	Replicability/ Non-replicability according to IFC PS 8 definitions	Visibility according to the Experts' Site Observations
-Assets with little or no surviving archaeological interest.	Negligible	Non-registered	Replicable	Invisible
-Designated or undesignated assets of local importance. -Assets compromised by poor preservation and/or poor survival of contextual associations -Assets of limited value, but with potential to contribute to local research objectives.	Low	Non-registered	Replicable	Partially Visible
-Designated or undesignated assets that can contribute significantly to regional research objectives.	Medium	3rd Degree Archaeological Area	Replicable / Non-replicable*	Partially Visible
-Nationally-designated Archaeological Monuments protected by the State Party's laws -Undesignated sites of the quality and importance to be designated. -Assets that can contribute significantly to acknowledged national research objectives.	High	1st and 2nd Degree Archaeological Areas	Replicable / Non-replicable*	Fully Visible
-Sites of acknowledged international importance inscribed as WH property. -Individual attributes that convey OUV of the WH property. -Assets that can contribute significantly to acknowledged international research objectives.	Very High	UNESCO	Critical Cultural Heritage / Non-replicable	-

Source: ICOMOS Guidance, 2011.

** Sites with national designation (1st and 2nd Degree) may also meet the IFC Performance Standard 8 'non-replicable' criteria. This classification informs the determination of impact significance in subsequent assessments (see Table XIII-8).*

Regarding the classification of each cultural heritage assets as "replicable" or "non-replicable / critical cultural heritage" according to IFC PS8 and the IFC–EBRD Good Practice Handbook: Cultural Heritage (2018), as well as guidance provided by ICOMOS, three key evaluation axes were taken into consideration, as outlined below.

1. Uniqueness and Irreplaceability

- Evaluate whether the cultural heritage is unique in the period or culture it represents and whether comparable examples exist elsewhere.
- Assets with this characteristic are typically classified as non-replicable / critical cultural heritage.

2. Replicability / Portability

- Determine whether, after comprehensive documentation, the cultural heritage can be relocated or reconstructed elsewhere while maintaining its heritage value.
- Assets that are technically portable or can be reconstructed, and that are not unique, are generally considered replicable.

3. Legal Protection and Community Significance

[2] As discussed in Section XIII.3, none of the cultural heritage assets identified within the cultural heritage study area, are in the status of "world heritage". Therefore, for the determination of the value of heritage asset according to the impact matrix of ICOMOS, the categories given for "other heritage assets or attributes" was used.

- Assess whether the asset is formally registered under national legislation and/or carries long-standing spiritual or ritual importance for local communities.
- The presence of this criterion may result in the asset being treated as critical cultural heritage or, at a minimum, requiring stronger protection as “other heritage.”

These three evaluation criteria were applied collectively to determine the replicability status of each cultural heritage asset within the Project area, as summarized below:

- Uniqueness combined with non-portability → Non-replicable (Critical Cultural Heritage)
- Portability combined with lack of uniqueness → Replicable
- Presence of legal protection or strong community value → Triggers PS8 requirements for critical or at least stronger protection measures.

Based on this methodology, the **value of each heritage asset** identified by the expert team within the cultural heritage study area has been determined by taking into account its legal registration status and replicability characteristics, and is presented in Section XIII.3 “*Baseline Cultural Heritage*”.

Determination of the Scale and Severity of Change/Impact

The scale and severity of impacts (direct or indirect) or changes are assessed based on impact magnitude based mainly on the distance of the assets to the impact source (e.g. construction corridor), which also incorporates whether impacts are temporary or permanent, reversible or irreversible.
The criteria used for the determination of the magnitude of impacts are outlined in **Error! Reference s ource not found.**. Cumulative effect of separate impacts was also taken into consideration, as relevant

Table XIII-5 Magnitude Criteria Used in the Determination of the Scale and Severity of Impacts

Magnitude	Scale and Severity of Change/Impact
%0-%20	No Change
%20-%40	Negligible Change
%40-%60	Minor Change
%60-%80	Moderate Change
%80-%100	Major Change

Based on this methodology, the **scale and severity of change/impact for each heritage asset** identified by the expert team within the cultural heritage study area has been determined by taking into account their location with respect to the construction corridor and activity sites, as well as temporary or permanent, reversible or irreversible nature of impacts, and is presented in Section XIII.4 “*Potential Impacts*”.

For the assessment of **palaeoanthropological and paleontological impacts**, relevant data collected through desk-based analyses and field surveys were synthesised to produce a risk–sensitivity mapping of the corridor, guiding future field investigations, conservation, and monitoring requirements.

XIII.3. Cultural Heritage Baseline

Baseline conditions along the Motorway route and its vicinity have been characterized based on literature data and the findings of the field surveys conducted by the experts of a third party cultural heritage consultancy company commissioned by the Project.

The Province of Antalya, where the Project Site is located and field surveys were made, is among the regions with high archaeological risk zones in Türkiye. Antalya has been continuously inhabited and favored as a settlement from ancient times to the present due to several factors: its strategic location at the starting point of routes leading into the interior of Anatolia, its coastal position along key trade routes, its favorable climate, and the availability of agricultural products grown year-round, which can be transported to numerous destinations. Various cultures have dominated the region from ancient times to the present day, and life in the region has persisted for generations. All these had triggered continuous habituation within the region since antiquity. Nowadays, field inspections and registration works are ongoing in the region under the authority of the Ministry of Culture and Tourism staff.

Considering the cultural heritage potential of the area, the cultural heritage baseline was prepared in accordance with the results obtained from the literature review and fieldwork during which many new and previously unknown archaeological areas were discovered. Some archaeological areas from the Project Route whose knowledge of being already registered by the Ministry of Culture and Tourism was shared by the official letter were situated in the regions of Antalya Province.

During the field surveys (covering the Project Route and facilities areas), a total of 60 registered and non-registered archaeological and cultural heritage sites were identified. Among them, archaeological areas that were previously registered, such as the area called "1st-degree archaeological sites", which are within the borders of the Antalya Provinces, were assessed.

Statistics of archaeological findings according to their periods and types are presented in the figures below (see Figure XIII.2 and Figure XIII.3).

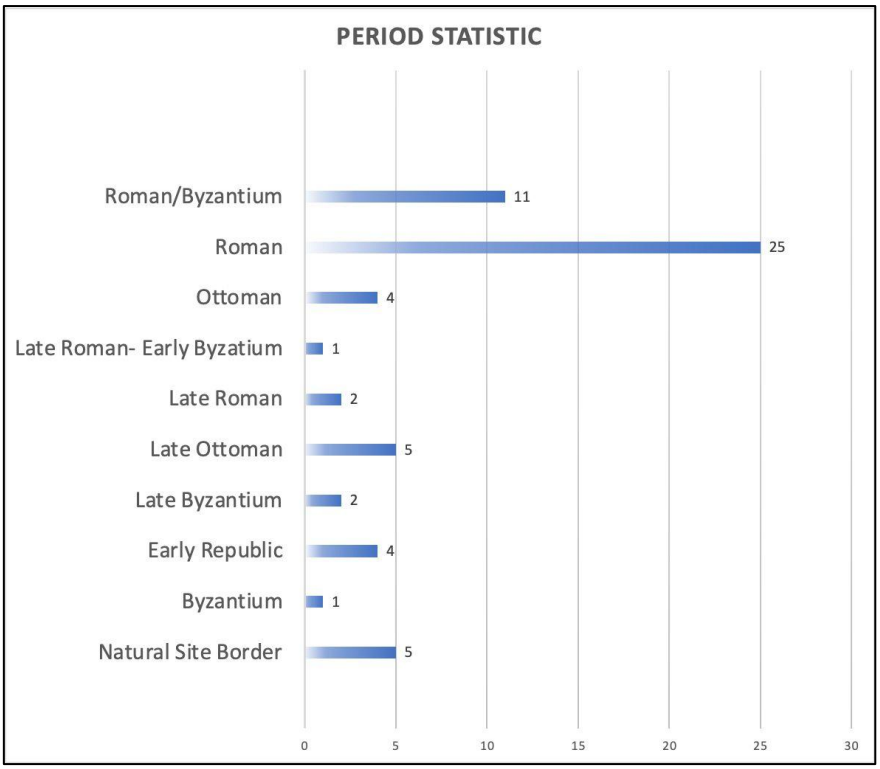


Figure XIII.2 Statistic of Historical Findings

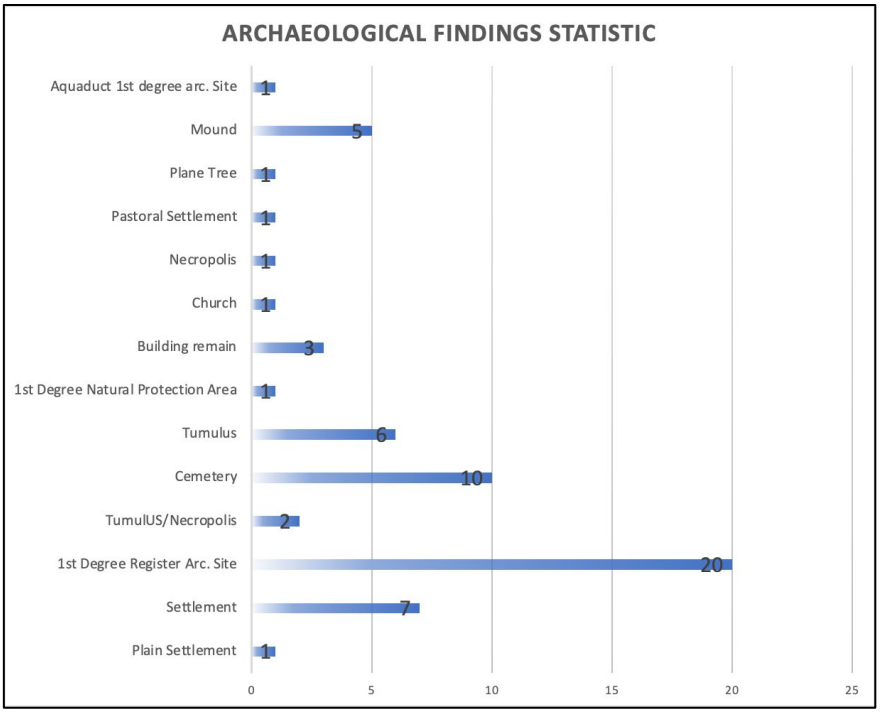


Figure XIII.3 Statistic of Archaeological Findings[3]

[3] The information related to the aquaduct can be accessed from the official website of the Ministry of Culture and Tourism.

XIII.3.1. Historical Geography of the Region

Antalya, known in antiquity as Attaleia, meaning "Land of Attalos", was founded by Attalos II. In antiquity, the surrounding region of the city was referred to as Pamphylia, meaning "very fertile", while the western part of the area was known as Lycia. Beginning in the 8th century BC, migrants from the western shores of the Aegean Sea established cities such as Aspendos and Side in this region. In the mid-2nd century BC, King Attalos II of Pergamon attempted to besiege Side, located approximately 75 km east of modern-day Antalya. Failing to capture the city, he proceeded to the area where the present city of Antalya stands and founded a new settlement. After the Kingdom of Pergamon fell in 133 BC, the city remained independent for a period before being taken over by pirates. By 67 BC, Attaleia had become a naval base for Pompeius in his campaigns against piracy. Emperor Hadrian's visit notably influenced the city's development in 130 AD, during which significant investments were made. Under Byzantine rule, Attaleia became a bishopric centre and experienced further growth following its conquest by the Turks. Due to the modern city being built atop the ancient settlement, few remnants from antiquity are visible today. Among the surviving ruins is part of the harbour breakwater, believed to be from the old harbour, along with the surrounding walls. One of the most well-preserved and prominent ancient structures is Hadrian's Gate, which has been restored and remains an important historical monument in Antalya. Over time, some people called the city Atalia, then Adalya. Antalya comes from this name.

Archaeological excavations indicate that human habitation in Antalya and its surrounding areas dates back approximately 40,000 years. Since 2000 BC, the region has been governed by various city-states and empires, including the Hittites, Pamphylia, Lycia, Cilicia, and Persia. It later came under the control of Alexander the Great and his successors, such as Antigonus, the Ptolemies, the Seleucids, and the Kingdom of Pergamon. Subsequently, the Roman Republic and later the Roman Empire ruled both the city of Antalya and the wider region.

While the Eastern Roman Empire controlled the region, also known as the Byzantine Empire, it was annexed to Turkish territory by the Seljuks in 1207. During the period of the Anatolian Principalities, it fell under the rule of the Hamitoğulları, a branch of the Teke Tribe. The Teke Turkmens, one of the largest tribes in terms of population in modern Turkmenistan, began migrating to this area in the 11th century. The region, known as the Lakes Region, today—encompassing parts of northern Antalya, Isparta, and Burdur—is also referred to as the Teke region. During the Ottoman period, the center of the Teke Sanjak, affiliated with the Anatolian province, was located in what is now the provincial center of Antalya. At that time, it was referred to as the Teke Sanjak. The current name of the province is a slightly altered form of its ancient name, which was adopted during the Republican period.

The famous Ottoman traveler Evliya Çelebi visited Antalya in the second half of the 17th century and provided detailed observations of the city. He noted that there were four neighborhoods and around three thousand houses within the castle, while twenty-four neighborhoods existed outside its walls. According to Çelebi, the city's bazaar was also located outside the castle, highlighting the vibrancy of trade in the area. He remarked on the harbor, stating it was large enough to accommodate 200 ships, indicating the city's significance as a maritime hub. Antalya was the center of the Teke Sanjak during his time, which was administratively connected to Konya. In the final years of the Ottoman Empire, Antalya was elevated to the status of an independent Sanjak, reflecting its growing importance within the region.

XIII.3.2. Tangible Cultural Heritage Baseline

Archaeological sites within the cultural heritage study area were identified as a result of the desktop studies and field walkover surveys, conducted by HERMES with the help of the Project site senior archaeologist.

Table XIII-6 lists the archaeological and cultural heritage sites identified within the cultural heritage study area, including information on the type, period, location, distance, description, registration status, current status, replicability (replicable / non-replicable), and the sensitivity level of each resource. Each site has been designated with a unique heritage resource (HRM) code. The summary provided within the table constitutes a clear reference for the subsequent impact assessment and mitigation planning.

It is important to note that **none** of the cultural heritage sites identified within the cultural heritage study area is in the status of "world heritage".

Detailed description of each site and photographic documentation is further provided below.

A satellite image showing the Project Site and the sites identified within the cultural heritage study area is presented in **Error! Reference source not found.**.

The findings relevant to these sites identified as part of Project's cultural heritage studies have been reported to the Antalya Regional Board for the Protection of Cultural Heritage. The ARHB are presented in Appendix 3 of the CHMP.

Table XIII-6 Archaeological and Cultural Heritage Findings within the Project Area

HRM Number	Name of the site	Province	Registration Status			District/Neighborhood	KM Chainage / Location
			Registered	Under Registration	Unregistered		
HRM 1	Cemetery	Antalya	x			Serik/Yukarıkocayatak	South of Kocayatak Village
HRM 2	Rural Settlement	Antalya			x	Serik/Yukarıkocayatak	South of Kocayatak Village
HRM 3	Rural Settlement	Antalya	x			Serik/Merkez	Serik interchange access road
HRM 4	Settlement	Antalya			x	Serik/Merkez	Serik interchange access road
HRM 5	Cemetery	Antalya			x	Serik/Deniztepesi	Km 52+500
HRM 6	Building Remains	Antalya	x			Serik/Deniztepesi	Km 52+500
HRM 7	Tumulus	Antalya	x			Serik/Deniztepesi	Km 52+500
HRM 8	Manavgat Natural Site Border	Antalya	x			Manavgat	Km 56+000
HRM 9	Late Roman Settlement	Antalya			x	Manavgat/Taşağıl	Km 59+000
HRM 10	Settlement	Antalya	x			Manavgat/Taşağıl	Km 62+000
HRM 11	Archaeological Settlement	Antalya			x	Manavgat/Taşağıl	Km 62+750
HRM 12	Necropolis	Antalya	x			Manavgat/Hocalar	Km 67+000
HRM 13	Settlement	Antalya			x	Manavgat/Hocalar	KM 67+000
HRM 14	Cemetery	Antalya	x			Manavgat/Hocalar	Km 67+000
HRM 15	Cemetery	Antalya	x			Manavgat/Taşağıl	Taşağıl interchange access road
HRM 16	Tumulus and Necropolis	Antalya	x			Manavgat/Gündoğdu	Km 70+400
HRM 17	Settlement	Antalya			x	Manavgat/Gündoğdu	Km 70+500
HRM 18	Mound	Antalya	x			Manavgat/Yukarıışıklar	Km 83+500
HRM 19	Manavgat Waterfall Protected Area	Antalya	x			Manavgat/Ulukapı	Km 88+000
HRM 20	Aqueduct	Antalya	x			Manavgat/Sarılar	Km84+000
HRM 21	Settlement	Antalya	x			Manavgat/Yukarıışıklar	Km 83+000
HRM 22	Aqueduct	Antalya			x	Manavgat/Dikmen	Km 86+000
HRM 23	Cemetery	Antalya	x			Manavgat/Hatipler	Km 82+000
HRM 24	Mound	Antalya	x			Manavgat/Hatipler	Km 81+000
HRM 25	Tumulus	Antalya			x	Manavgat/Side	Km 81+000
HRM 26	Hilltop Settlement	Antalya	x			Manavgat/Hatipler	Km 81+000
HRM 27	Settlement	Antalya	x			Manavgat/Yukarıışıklar	Km 84+400
HRM 28	Tumulus	Antalya			x	Manavgat/Bucakşeyhler	Km 85+900
HRM 29	Aqueduct	Antalya	x			Manavgat/Bucakşeyhler	Km 86+500
HRM 30	Fountain	Antalya	x			Manavgat/Bucakşeyhler	Km 86+500
HRM 31	Necropolis	Antalya			x	Manavgat/Bucakşeyhler	Km 87+000
HRM 32	Church Remains	Antalya	x			Manavgat/Bucakşeyhler	Km 87+100

HRM Number	Name of the site	Province	Registration Status			District/Neighborhood	KM Chainage / Location
			Registered	Under Registration	Unregistered		
HRM 33	Settlement	Antalya	x			Manavgat/Bucakşeyhler	Km 87+700
HRM 34	Cemetery	Antalya			x	Manavgat/Bucakşeyhler	Km 87+500
HRM 35	Building Remains	Antalya	x			Manavgat/Bucakşeyhler	Km 88+200
HRM 36	Rural Settlement	Antalya			x	Manavgat/Ulukapı	Km 89+800
HRM 37	Settlement	Antalya	x			Manavgat/Aşağıışıklar	Km 92+200
HRM 38	Settlement	Antalya	x			Manavgat/Aksaz	Km 95+600
HRM 39	Tumulus	Antalya			x	Manavgat/Hacıobası	Km 102+500
HRM 40	Cemetery	Antalya	x			Manavgat/Hacıobası	Manavgat interchange east access road
HRM 41	Church or Build Remains	Antalya	x			Manavgat/Uzunlar	Km 104+500
HRM 42	Settlement	Antalya	x			Manavgat/Uzunlar	Km 105+000
HRM 43	Cemetery	Antalya		x		Manavgat/Kadılar	Km 108+750
HRM 44	Historical Plane Tree	Antalya			x	Manavgat/Kadılar	Km 109+600
HRM 45	Cemetery	Antalya		x		Manavgat/Yalçıdibi	Km 112+250
HRM 46	Yalçıdibi Waterfall	Antalya	x			Manavgat/Yalçıdibi	Km 112+250
HRM 47	Çardaktepe	Antalya	x			Alanya/Alara	Km 116+000
HRM 48	Building Remains	Antalya	x			Alanya/Emişbeleni	Konaklı interchange access road
HRM 49	Building Remains	Antalya	x			Alanya/Emişbeleni	Konaklı interchange access road
HRM 50	Building Remains	Antalya	x			Alanya/Emişbeleni	Km 134+00
HRM 51	Cemetery	Antalya		x		Anlanya/Toslak	Km 136+200
HRM 52	Settlement	Antalya	x			Anlanya/Toslak	Km 136+000
HRM 53	Building Remains	Antalya	x			Alanya/Konaklı	Km 140+000
HRM 54	Building Remains	Antalya	x			Alanya/Telatiye	Alanya west interchange access road end
HRM 55	Building Remains	Antalya	x			Alanya/Telatiye	Alanya west interchange access road
HRM 56	Building Remains	Antalya	x			Manavgat/ Çakış	Km 56+750
HRM 57	Settlement	Antalya	x			Alanya/İncekum	Km 120+800
HRM 58	Settlement	Antalya	x			Manavgat/Taşağıl	Taşağıl Junction
HRM 59	Settlement	Antalya	x			Manavgat/Taşağıl	Near the Taşağıl connection point on D400
HRM 60	Settlement or Necropolis	Antalya	x			Manavgat/Taşağıl	Near the Taşağıl connection point on D400

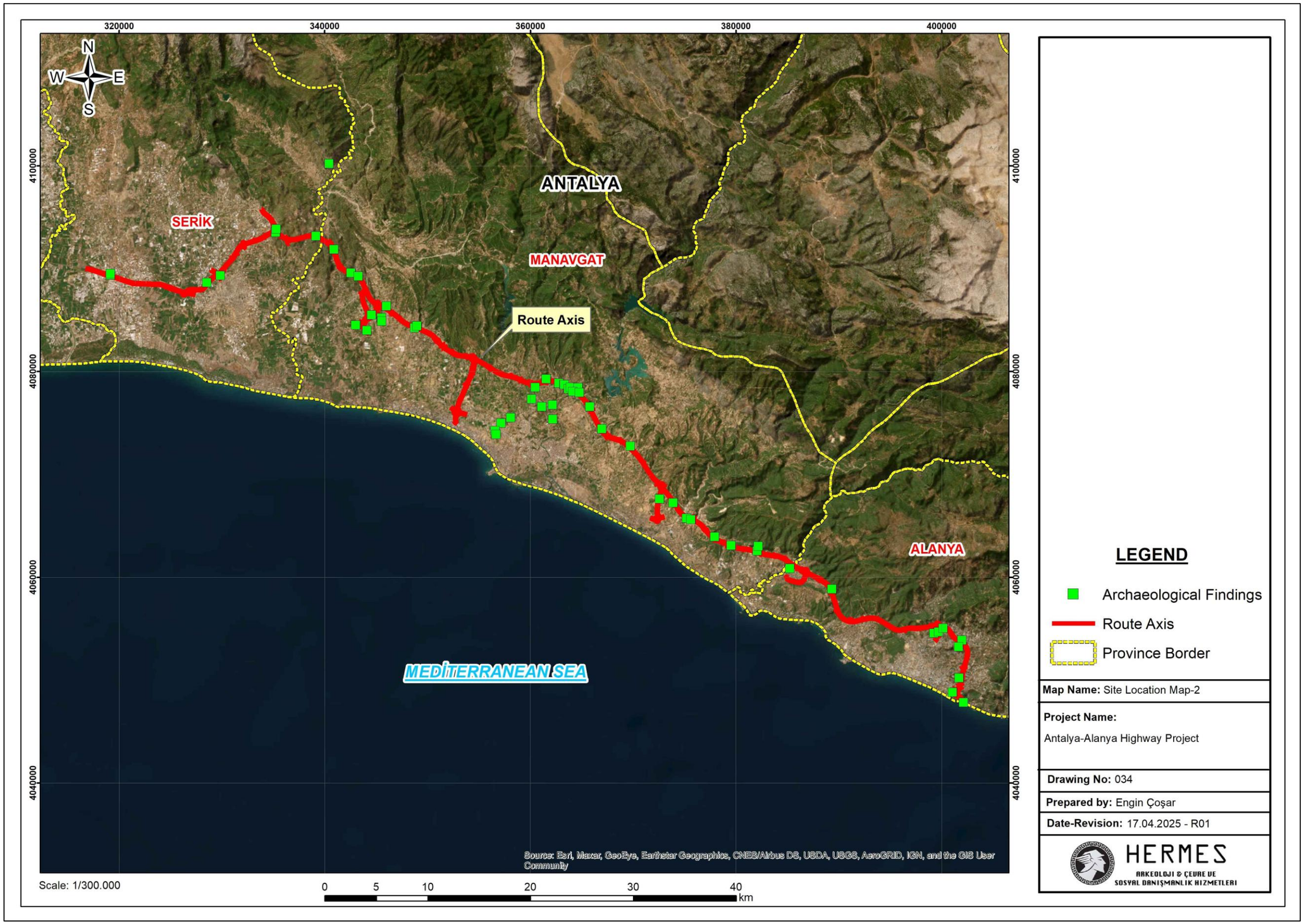


Figure XIII-4 Satellite Image Showing Project Route and Identified Archaeological Assets

Detailed information on each site is provided below.

HRM 1 Cemetery

The cemetery is located at the Yukarıkocayatak junction between Antalya province and Serik district. Upon examining the graves, numerous turban and cap-shaped gravestones were observed. These gravestones, which are similar to those commonly found in the "Beylik" period cemeteries but more frequently in Ottoman period cemeteries, bear Ottoman inscriptions.



Figure XIII.5. General View of the Project Site and Archaeological Findings-1 (HRM 1)

The cemetery is located on the northern side of the Project route and belongs to Kocayatak Village, where it is still actively used. It contains both old and relatively new graves.



Figure XIII.6. General View of the Project Site and Archaeological Findings-2 (HRM 1)

HRM 2 Rural Settlement

It is situated at the Kocayatak junction between Antalya Province and Serik District, north of the HRM 1 cemetery.

The archaeological site is located on a hillside and features a single-phase context. Fragments of daily-use containers were observed at the foot of the hillside.



Figure XIII.7. General View of the Project Site and Archaeological Findings (HRM 2)

Upon examining the pottery, it appears that they can be dated to the later stages of the Byzantine period or the Ottoman period.

HRM 3 Rural Settlement

It is a settlement area situated within the irrigation channels with a partially preserved elevation. The identified ceramics can be dated to the Late Roman and Early Byzantine periods.



Figure XIII.8. General View of the Project Site and Archaeological Findings (HRM 3)

HRM 4 Settlement

During the examinations, tile fragments and pieces of daily use vessels dating back to the 14th-15th centuries were observed on the surface. The area where these findings were made is situated along the edge of a stream, with an elevation rising to the east. It is possible that the ceramics may have been carried down from this elevation to the area near the stream. However, the section where the artifacts were found also presents suitable elevations that could indicate a settlement in this location.



Figure XIII.9. General View of the Project Site and Archaeological Findings (HRM 4)

HRM 5 Cemetery

The site is located within the boundaries of Antalya Province, Serik District, Deniztepesi Neighborhood. Based on information obtained from the query system of the General Directorate of Land Registry and Cadastre, the site is registered as a cemetery (located in block 139, parcel no. 5). Upon investigation, it has been determined that this cemetery dates back to the Early Republican period and is still in use as a modern cemetery.



Figure XIII.10. General View of the Project Site and Archaeological Findings (HRM 5)

Local interviews have confirmed that the cemetery has been in use until recent times, with many of the graves being owned by families of individuals.

HRM 6 Building Remains

There is an archaeological site covered with bushes at a dominant point on the hill, towards the south of the HRM 5 cemetery parcel. Upon examination, it is understood that the site contains wall rows belonging to a square-plan structure, measuring approximately 40 m by 40 m.

Rubble stones, likely belonging to architectural structures, are quite dense on the surface, and wall rows are visible. The walls of the building are 1-2 meters wide and notably thick, suggesting that the structure could have been a terminal garrison settlement. In addition, dense roof tile fragments and a small number of ceramic pieces from daily use containers were detected.



Figure XIII.11. General View of the Project Site and Archaeological Findings (HRM 6)

HRM 7 Tumulus

The site is located on a prominent hill within the Project route corridor, where traces of illegal excavations were detected. Upon examination, rows of walls were observed on the surface. Based on the shape of the archaeological site and the findings, the site is believed to be a tumulus.

Additionally, dense roof tile fragments and scattered ceramic pieces from daily use containers were found around the elevated area.



Figure XIII.12. General View of the Project Site and Archaeological Findings (HRM 7)

HRM 8 Manavgat Natural Site Border

The project plans to cross the Köprü Stream via a viaduct. However, information from the ARHB indicates that there is a protected area along the valley of the Köprü Stream, extending southward and including the ancient city of Aspendos. The Project route intersects with the protected area in several sections, and it is anticipated that intensive construction activities will occur in certain areas related to the Project.

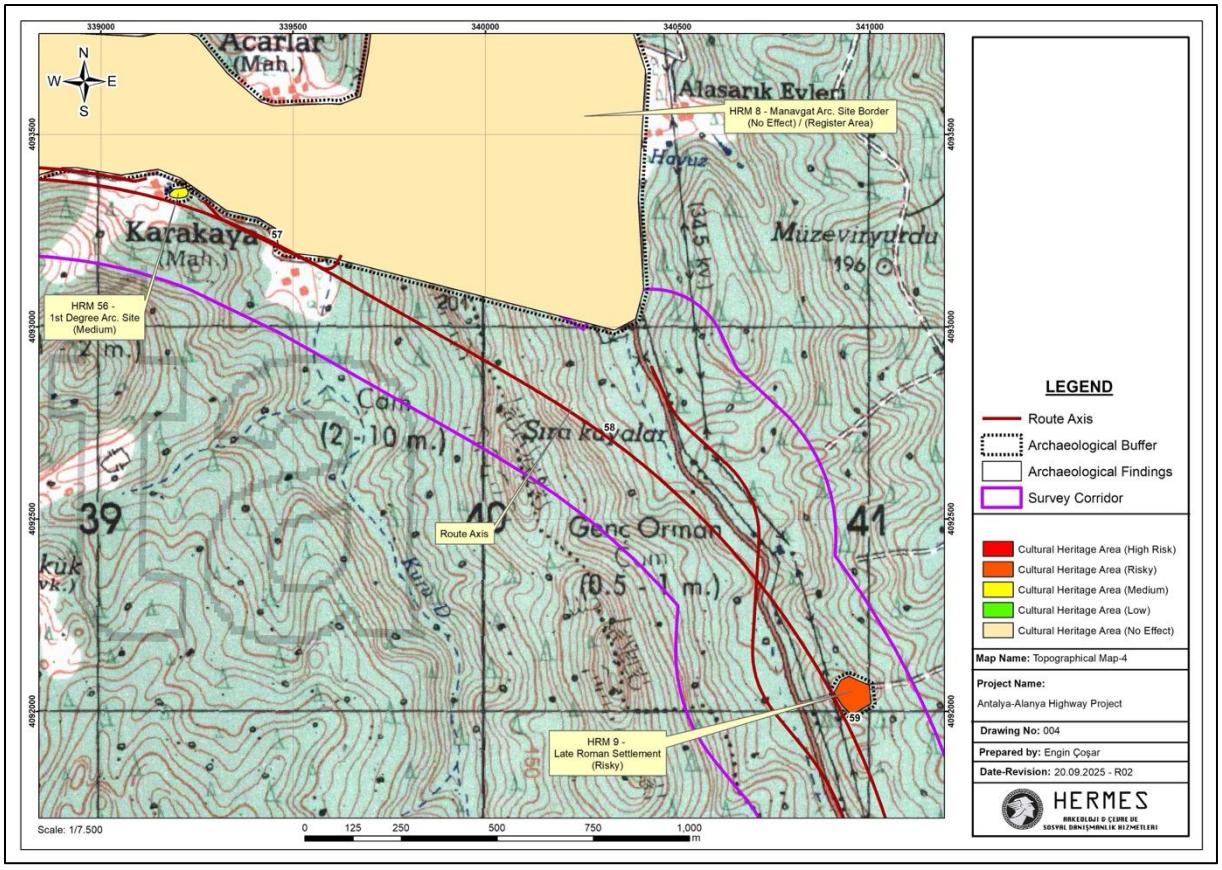


Figure XIII.13. General View of the Project Site and Archaeological Findings (HRM 8)

HRM 9 Late Roman Settlement

The identified structure is believed to be a military and surveillance facility due to its strategic location overlooking a valley and its position on a prominent hill in the area. A dense layer of rubble stone, potentially belonging to architectural remains, is scattered across the surface. Additionally, fragments of roof tiles and ceramics from daily use containers are visible on the surface.



Figure XIII.14. General View of the Project Site and Archaeological Findings (HRM 9)

HRM 10 Settlement

According to the info received from the AHRB, the hill through which the T4 tunnel of the project passes..

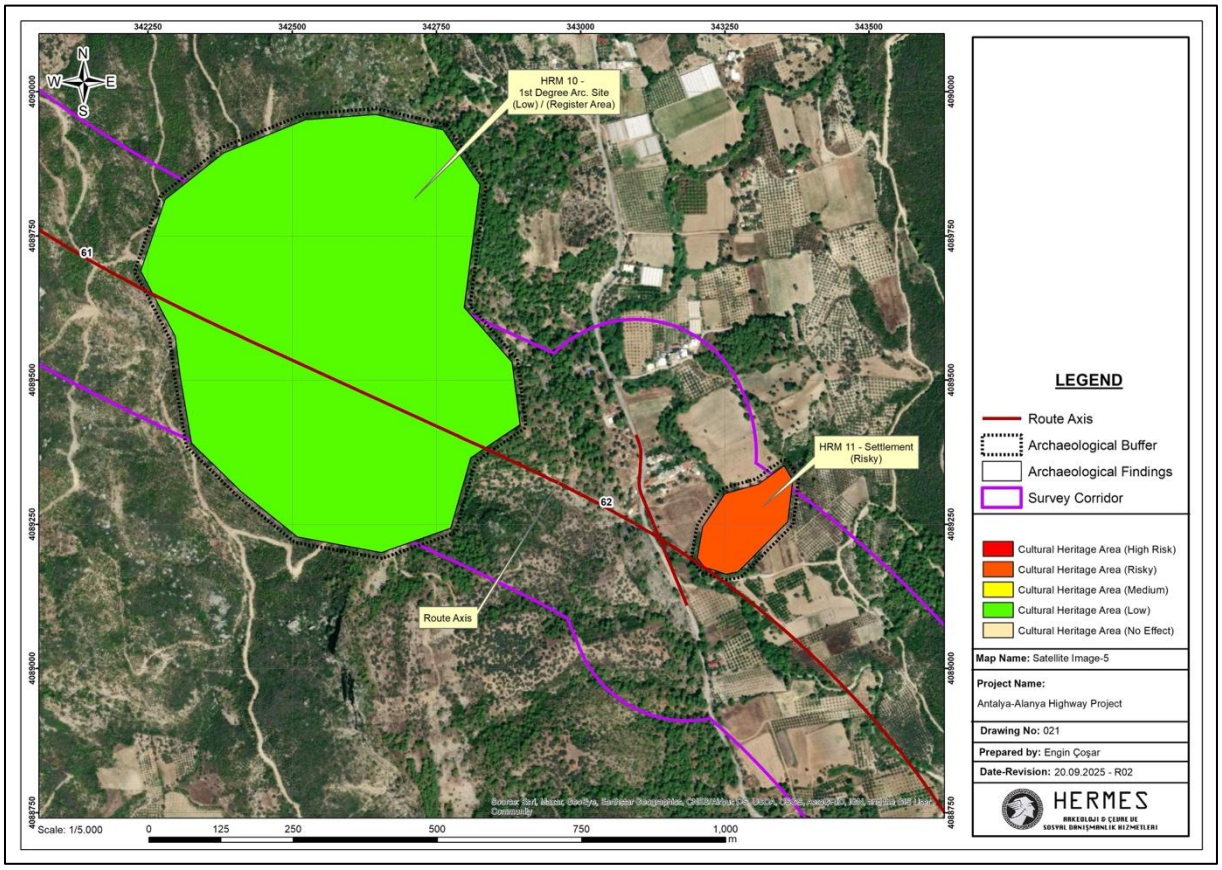


Figure XIII.15. General View of the Project Site and Archaeological Findings (HRM 10)

HRM 11 Archaeological Settlement

The archaeological site is located north of Taşağıl and within the valley extending along a slope by the stream. A significant amount of rubble that may belong to architectural structures is visible on the surface. Additionally, fragments of tiles, fragments from daily use vessels, and terra sigillata sherds have also been observed.



Figure XIII.16. General View of the Project Site and Archaeological Findings (HRM 11)

HRM 12 Necropolis

The necropolis is located within the Project corridor and is situated in a wooded area. High-quality ceramic fragments dating from the 4th to 6th centuries AD are visible on the surface and along the slope sections. Additionally, numerous tile pieces, likely used for covering graves, are present. A significant number of slabs and covering stones that may belong to the graves are also observed in the area.



Figure XIII.17. General View of the Project Site and Archaeological Findings (HRM 12)

HRM 13 Settlement

The settlement is located on a hillside that provides a sheltered view of the surrounding area.

As a result of the route change, the area has been excluded from the project's impact corridor.

Although no architectural traces were observed on the surface, a dense layer of pottery was identified. Additionally, thin-walled, high-quality ceramic fragments dating from the 4th to 6th centuries AD were visible on the surface.



Figure XIII.18. General View of the Project Site and Archaeological Findings (HRM 13)

HRM 14 Cemetery

The site is the Hocalar Village cemetery and covers a substantial area.

As a result of the route change, the area has been excluded from the project's impact corridor.

An examination of the graves indicates that they date from the early Republican period to modern times.



Figure XIII.19. General View of the Project Site and Archaeological Findings (HRM 14)

HRM 15 Cemetery

The cemetery is situated along the Antalya-Mersin road and contains graves from early periods. Some of the graves are constructed with well-cut stone blocks, which are believed to have been sourced from another location and reused in this cemetery.



Figure XIII.20. General View of the Project Site and Archaeological Findings (HRM 15)

HRM 16 Tumulus and Necropolis

In the area designated for the construction of the T5 tunnel, a significant presence of dense and high-quality ceramics was observed on the surface of a hill. Based on the ceramic and glass findings, the archaeological site can be dated to the 4th-5th centuries AD. Additionally, a substantial amount of tile fragments was also noted in the area.

Based on the findings, the identified archaeological site is believed to be either a tumulus or a necropolis.



Figure XIII.21. General View of the Project Site and Archaeological Findings (HRM 16)

HRM 17 Settlement

A diverse range of ceramic pieces is visible on the surface, including amphora fragments and toes, handle pieces from very large amphorae, and fragments from various daily use vessels. Based on these findings, the archaeological site can be dated to the Late Roman period.



Figure XIII.22. General View of the Project Site and Archaeological Findings (HRM 17)

HRM 18 Mound

The archaeological site is within the borders of Çukurören neighbourhood.

As a result of the route change, the area has been excluded from the project's impact corridor.

During the examination, intense concentrations of ceramic and tile fragments dating back to the Roman period were observed on the surface. Additionally, numerous rubble stones and illegal excavation pits were identified.

While the registration boundaries only encompass the top of the mound, artifacts have been noted scattered along the slopes too.



Figure XIII.23. General View of the Project Site and Archaeological Findings (HRM 18)

HRM 19 Manavgat Waterfall Protected Area

Manavgat Waterfall is designated as a protectes sensitive area.

As a result of the route change, the area has been excluded from the project's impact corridor.

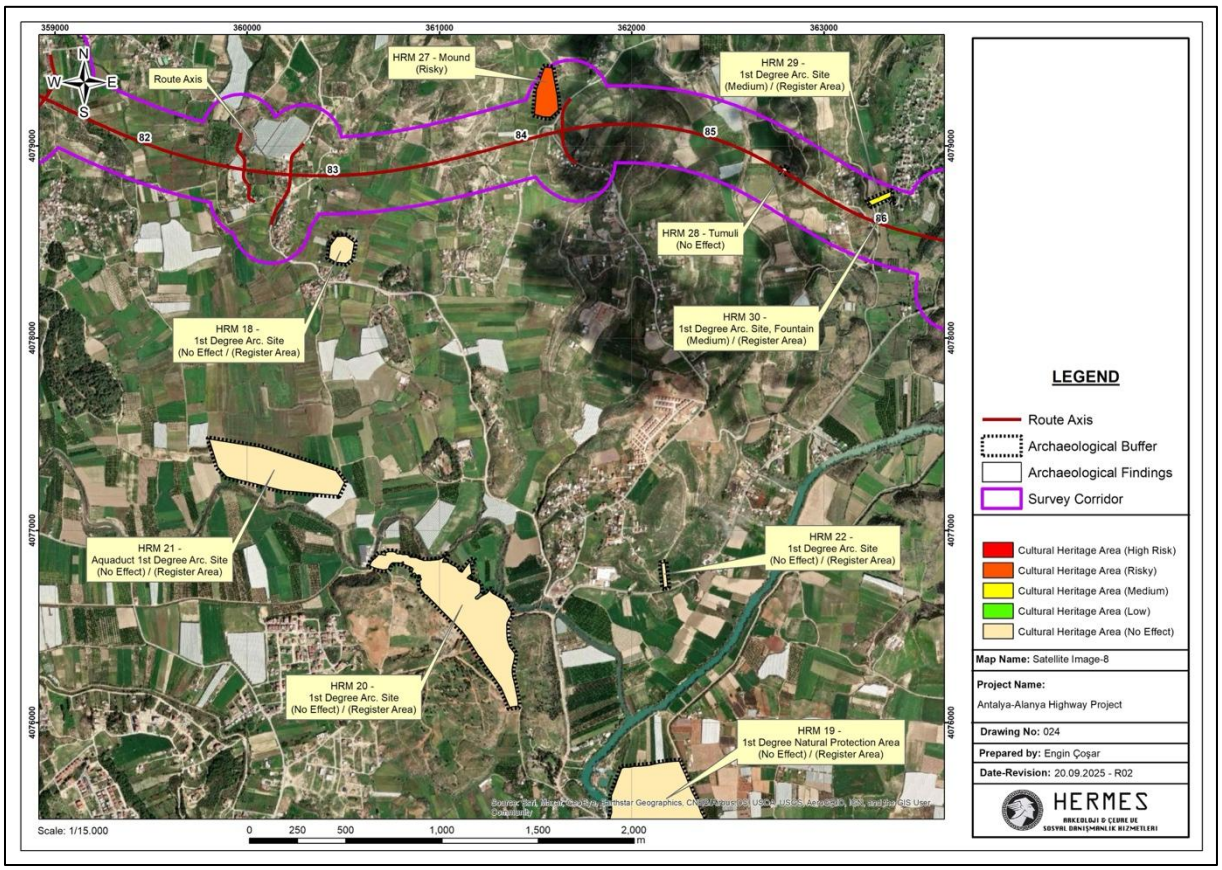


Figure XIII.24. General View of the Project Site and Archaeological Findings (HRM 19)

HRM 20 Aqueduct

Aqueducts were built to transport water to the ancient city of Side. The buttresses of the aqueduct, which still stand today, are constructed from local stones.

As a result of the route change, the area has been excluded from the project's impact corridor.



Figure XIII.25. General View of the Project Site and Archaeological Findings (HRM 20)

HRM 21 Settlement

As a result of the route change, the area has been excluded from the project's impact corridor.

During the survey, a dense ceramic layer was observed on the surface across the entire area. Based on the general appearance of the site, it is believed to be a settlement.



Figure XIII.26. General View of the Project Site and Archaeological Findings (HRM 21)

HRM 22 Aqueduct

When the inventory registration system of the Ministry of Culture and Tourism was checked, it was seen that there is indeed an aqueduct in this area that was registered.

As a result of the route change, the area has been excluded from the project's impact corridor.



Figure XIII.27. General View of the Project Site and Archaeological Findings (HRM 22)

HRM 23 Cemetery

This area is the cemetery of Hatipler Village. Examination of the cemetery reveals that the gravestones were crafted from ancient columns. These stones were repurposed from other locations and brought here for secondary use.

As a result of the route change, the area has been excluded from the project's impact corridor.



Figure XIII.28. General View of the Project Site and Archaeological Findings (HRM 23)

HRM 24 Mound

The mound, situated near Hatipler neighborhood.

As a result of the route change, the area has been excluded from the project's impact corridor.

It exhibits a single-phase settlement character. This archaeological site, positioned at a high elevation compared to its surroundings, contains dense ceramic pieces dating to the Late Roman-Early Byzantine Period. However, due to the area being a cultivated field, a comprehensive examination to ascertain the actual extent of the site could not be conducted.



Figure XIII.29. General View of the Project Site and Archaeological Findings (HRM 24)

HRM 25 Tumulus

In the examinations conducted at the archaeological site, which resembles a tumulus due to its artificial elevation, ceramics dating to the Late Roman-Early Byzantine period were encountered.

As a result of the route change, the area has been excluded from the project's impact corridor.



Figure XIII.30. General View of the Project Site and Archaeological Findings (HRM 25)

HRM 26 Hilltop Settlement

A large number of Late Roman ceramic fragments were identified on the surface of the archaeological site, which appears as a mound due to its elevated form.

As a result of the route change, the area has been excluded from the project's impact corridor.



Figure XIII.31. General View of the Project Site and Archaeological Findings (HRM 26)

HRM 27 Settlement

A significant concentration of Roman pottery and tile fragments was observed on the surface and in the cross-sections of the identified archaeological site. Based on the variety of pottery, the site is believed to be a settlement. Fragments of daily use containers and tiles were also identified.



Figure XIII.32. General View of the Project Site and Archaeological Findings (HRM 27)

HRM 28 Tumulus

During the surveys, a hill with scattered amorphous stones was detected on an elevation overlooking the valley. A small number of ceramic remains were also found in the area, suggesting the possibility of a tumulus.



Figure XIII.33. General View of the Project Site and Archaeological Findings (HRM 28)

HRM 29 Aqueduct

The structure is an aqueduct that transported water to the ancient city of Side, reflecting the architectural style of the Roman period. These aqueducts channeled water from distant sources to the city center to supply the city's water needs. The aqueduct is well-preserved.



Figure XIII.34. General View of the Project Site and Archaeological Findings (HRM 29)

HRM 30 Fountain

The structure is a fountain located near the HRM 29.

It is situated within the Project impact corridor and has an active water flow today. The fountain is regularly used by local residents.



Figure XIII.35. General View of the Project Site and Archaeological Findings (HRM 30)

HRM 31 Necropolis

A necropolis area was detected along the side of the Bucakşeyhler Village road. Bone fragments and covering tile fragments were found in the sections examined.

Since the hill is designated as a necropolis, there is a possibility of encountering graves during the construction works.



Figure XIII.36. General View of the Project Site and Archaeological Findings (HRM 31)

HRM 32 Church Remains

The ruins of a building with walls approximately 4 meters high were identified along the Project route. Based on its architecture, constructed from regionally common stones like sandstone and limestone, and the ceramics found in its vicinity, the structure has been dated to the Roman period. No additional architectural elements were observed around the structure, leading to the assumption that it may have been a singular structure. A large number of ceramic and tile fragments were identified surrounding the site.

It has been reported that the structure was registered within a smaller area, but the ceramics were distributed in a wider area.



Figure XIII.37. General View of the Project Site and Archaeological Findings (HRM 32)

HRM 33 Settlement

The identified archaeological site is located outside the Project impact corridor. However, in case of potential route changes or additional studies, the site has been documented for reference, and caution should be exercised in future site selection.

A significant amount of high-quality ceramic fragments, dating back to the Roman period, were observed on the surface. No signs of architectural elements were identified.

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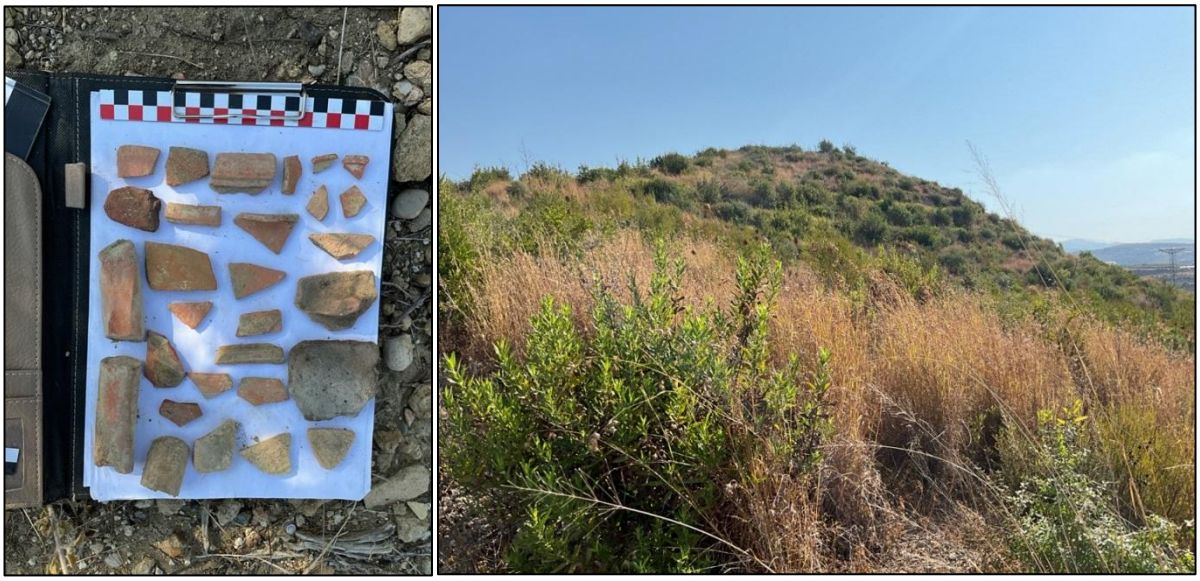

Figure XIII.38. General View of the Project Site and Archaeological Findings (HRM 33)

HRM 34 Cemetery

The cemetery is located on a hill within the Project impact corridor and is believed to contain graves from the Early Republican period. This cemetery, which is used in conjunction with more recent graves, is not expected to be affected by the Project route.



Figure XIII.39. General View of the Project Site and Archaeological Findings (HRM 34)

HRM 35 Building Remains

The site consists of structural walls situated on a slope surrounded by bushes that overlooks the Manavgat River.



Figure XIII.40. General View of the Project Site and Archaeological Findings (HRM 35)

HRM 36 Rural Settlement

Surveys revealed the presence of several ceramic fragments, albeit in limited quantities. The coarse nature of the pottery suggests a date to the Late Ottoman period.



Figure XIII.41. General View of the Project Site and Archaeological Findings (HRM 36)

HRM 37 Settlement

The archaeological site is situated on a hilltop near a stream and falls within the Project impact corridor. The surface is covered with dense rubble stones believed to be remnants of architectural features. Additionally, numerous roof tile fragments and ceramic pieces, including those dating back to the 4th-5th centuries AD and fragments of daily use containers, were identified in the area.



Figure XIII.42. General View of the Project Site and Archaeological Findings (HRM 37)

HRM 38 Settlement

The archaeological site is situated on a hill north of Aksaz Village and contains a significant quantity of ceramics. Based on the findings, the area can be dated between the 3rd and 6th centuries AD.

Alongside high-quality ceramics, glass fragments, handles, pieces of daily use containers, and decorated ceramic rims were discovered. Additionally, rubble stones that may belong to architectural structures were also identified in the vicinity.



Figure XIII.43. General View of the Project Site and Archaeological Findings (HRM 38)

HRM 39 Tumulus

It is an archaeological site situated in a forested area. A significant quantity of ceramic and tile pieces dating back to the Roman Period were discovered. Additionally, a modern water tank is present in the vicinity where the ceramics were found, leading to the belief that a tumulus may have been damaged during the tank's construction.



Figure XIII.44. General View of the Project Site and Archaeological Findings (HRM 39)

HRM 40 Cemetery

The cemetery area is partially intersected by the Project route and is believed to date back to the early Republican period, with gravestones visible on the surface.



Figure XIII.45. General View of the Project Site and Archaeological Findings (HRM 40)

HRM 41 Church or Build Remains

Architectural remains were identified on a hillside alongside the motorway between Seydişehir and Manavgat. Upon examination, it is believed that the remains may indicate the presence of a church-like structure.

During the research, some ceramics were observed on the surface, including roof tiles and pieces from daily use containers. Based on these finds, the site has been dated to the Late Roman to Early Byzantine period.



Figure XIII.46. General View of the Project Site and Archaeological Findings (HRM 41)

HRM 42 Settlement

The settlement is situated on the banks of Çenger Stream within a sheltered location. A significant quantity of pottery and glass dating back to the Late Roman period has been identified on the surface, together with roof tiles and other ceramic fragments from daily use containers. Based on these ceramics, the area has been dated to the Late Roman-Early Byzantine period.



Figure XIII.47. General View of the Project Site and Archaeological Findings (HRM 42)

HRM 43 Cemetery

The cemetery is situated near the village of Kadılar, within a forested area. Both Early Republican period and modern graves have been observed in the vicinity.



Figure XIII.48. General View of the Project Site and Archaeological Findings (HRM 43)

HRM 44 Historical Plane Tree

The plane tree located within the Project impact corridor.



Figure XIII.49. General View of the Project Site and Archaeological Findings (HRM 44)

HRM 45 Cemetery

The site is the Yalçıdibi village cemetery, where a diverse range of graves from the late Ottoman, early Republican, and modern periods has been observed.

Notable features of the cemetery include numerous graves adorned with turbans and those bearing Ottoman inscriptions and various motifs, which highlight the cultural and historical significance of the site.



Figure XIII.50. General View of the Project Site and Archaeological Findings (HRM 45)

HRM 46 Yalçıdibi Waterfall

Literature research indicates that the waterfall in question is likely recognized as a natural preservation area due to its seasonal fluidity.



Figure XIII.51. General View of the Project Site and Archaeological Findings (HRM 46)

HRM 47 Çardaktepe

The Çardaktepe, is situated in the northwest of the Alara District.

In this section, the connection road has been cancelled due to its intersection with an archaeological site.

Drone footage reveals the presence of several structures on the hill, suggesting that these structures extend down to the skirts of the site.



Figure XIII.52. General View of the Project Site and Archaeological Findings (HRM 47)

HRM 48 Building Remains

The architectural remains located on a hillside are believed to belong to a castle or a church-like structure. The walls of the structure are still intact, standing at a height of 3-4 meters.



Figure XIII.53. General View of the Project Site and Archaeological Findings (HRM 48)

HRM 49 Building Remains

The architectural remains located on a hillside are believed to belong to a castle or a church-like structure. The walls of the structure are still intact, standing at a height of 2-3 meters.



Figure XIII.54. General View of the Project Site and Archaeological Findings (HRM 49)

HRM 50 Building Remains

The remains of the building are situated within several gardens and along the boundaries of private property. The walls of the structure are still intact, standing at a height of 5-6 meters.



Figure XIII.55. General View of the Project Site and Archaeological Findings (HRM 50)

HRM 51 Cemetery

The area serves as the Toslak village cemetery, which is still in use today and features graves from the early Republican period.



Figure XIII.56. General View of the Project Site and Archaeological Findings (HRM 51)

HRM 52 Settlement

The archaeological site, located on a hill, is highly a hilltop settlement.



Figure XIII.57. General View of the Project Site and Archaeological Findings (HRM 52)

HRM 53 Build Remains

The archaeological site, located on a hill, is highly a hilltop settlement.

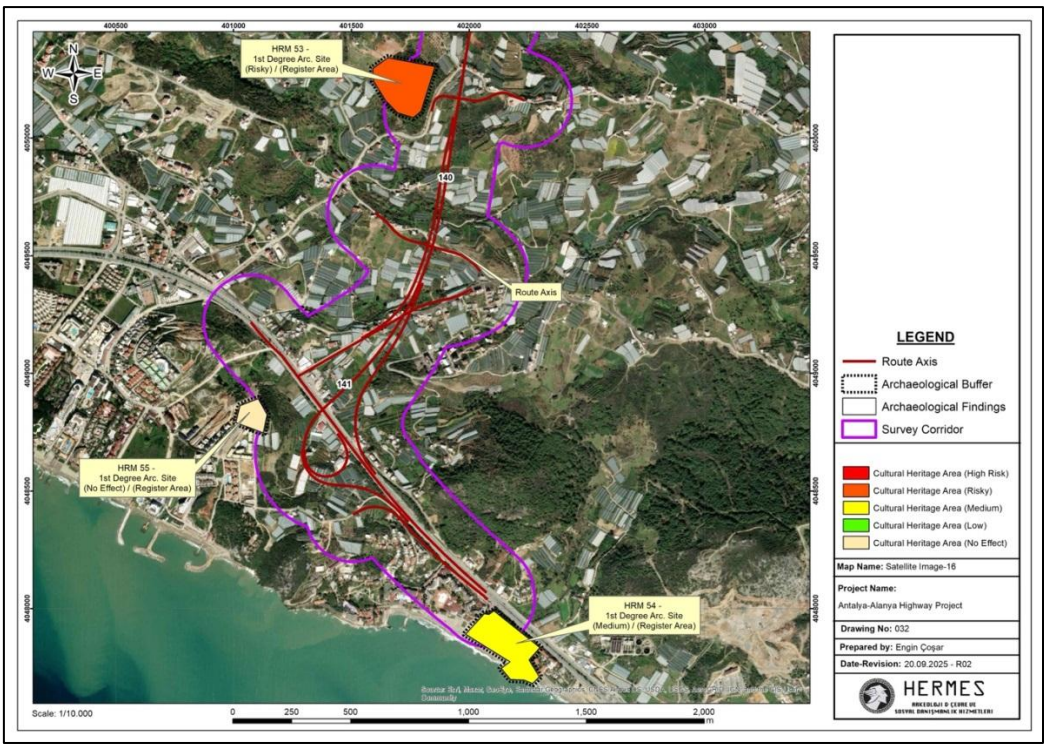

Figure XIII.58. General View of the Project Site and Archaeological Findings (HRM 53)

HRM 54 Build Remains

The site, characterized by the remains of a building along the shore and a green area behind it, is believed to be an ancient port bath or a port-related structure.



Figure XIII.59. General View of the Project Site and Archaeological Findings (HRM 54)

HRM 55 Build Remains

The archaeological remains, located on a slope, highly belong to a castle or a church like structure.



Figure XIII.60. General View of the Project Site and Archaeological Findings (HRM 55)

HRM 56 Building Remains

The project route crosses the Manavgat Stream, this section—where the structure is situated—coincides with an existing asphalt road alignment.



Figure XIII.61. General View of the Project Site and Archaeological Findings (HRM 56)

HRM 57 Settlement

According to the registered site data obtained from the ARHB, it has been determined that the route corridor partially intersects with a designated archaeological site.

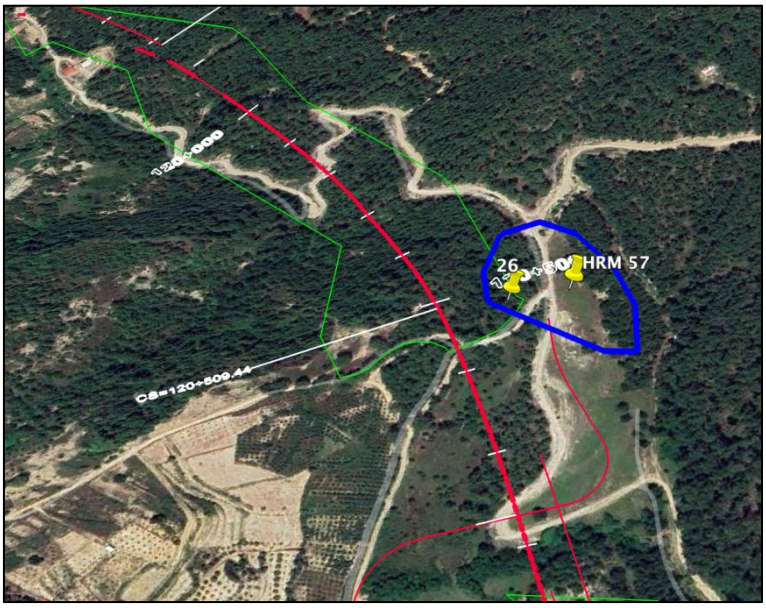

Figure XIII.62. General View of the Project Site and Archaeological Findings (HRM 57)

HRM 58 Settlement

According to the registered site data obtained from the ARHB, it has been determined that the route corridor partially intersects with a designated archaeological site.



Figure XIII.63. General View of the Project Site and Archaeological Findings (HRM 58)

HRM 59 Settlement

According to the registered site data obtained from the ARHB, it has been determined that the project expropriation corridor partially overlaps with an archaeological conservation site. It has also been observed that residential buildings are located within the section where the site lies.

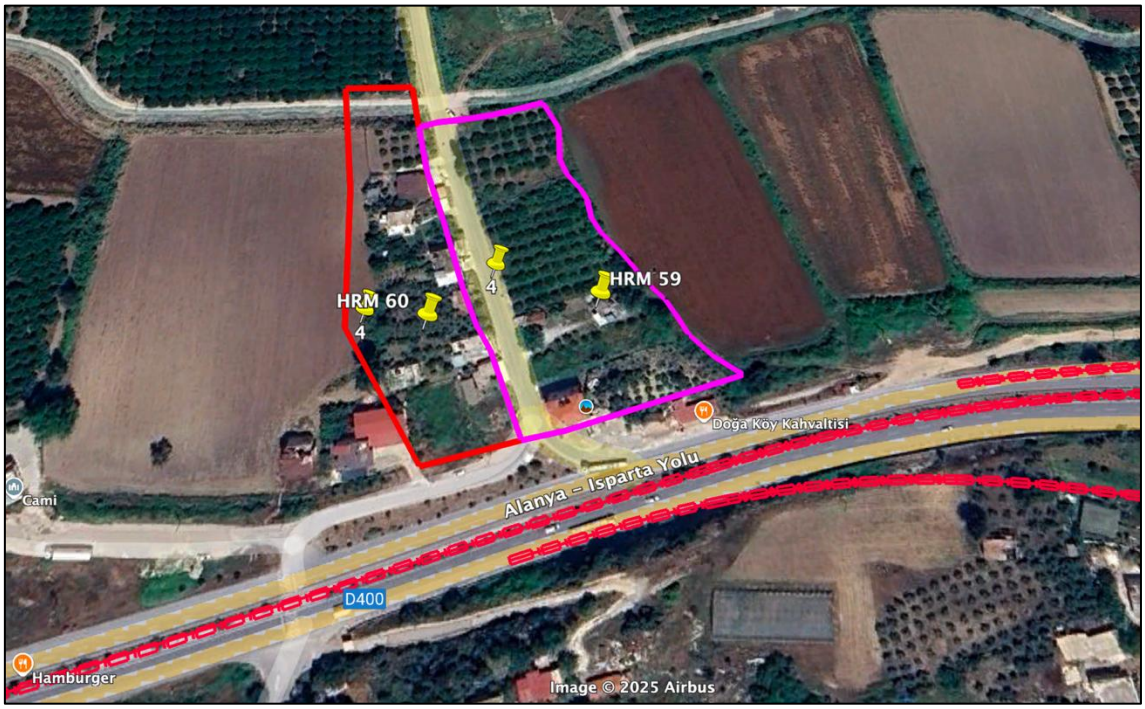

Figure XIII.64. General View of the Project Site and Archaeological Findings (HRM 59)

HRM 60 Settlement or Necropolis

According to the registered site data obtained from the ARHB, it has been determined that the project expropriation corridor partially overlaps with an archaeological conservation site. It has also been observed that residential buildings are located within the section where the site lies.

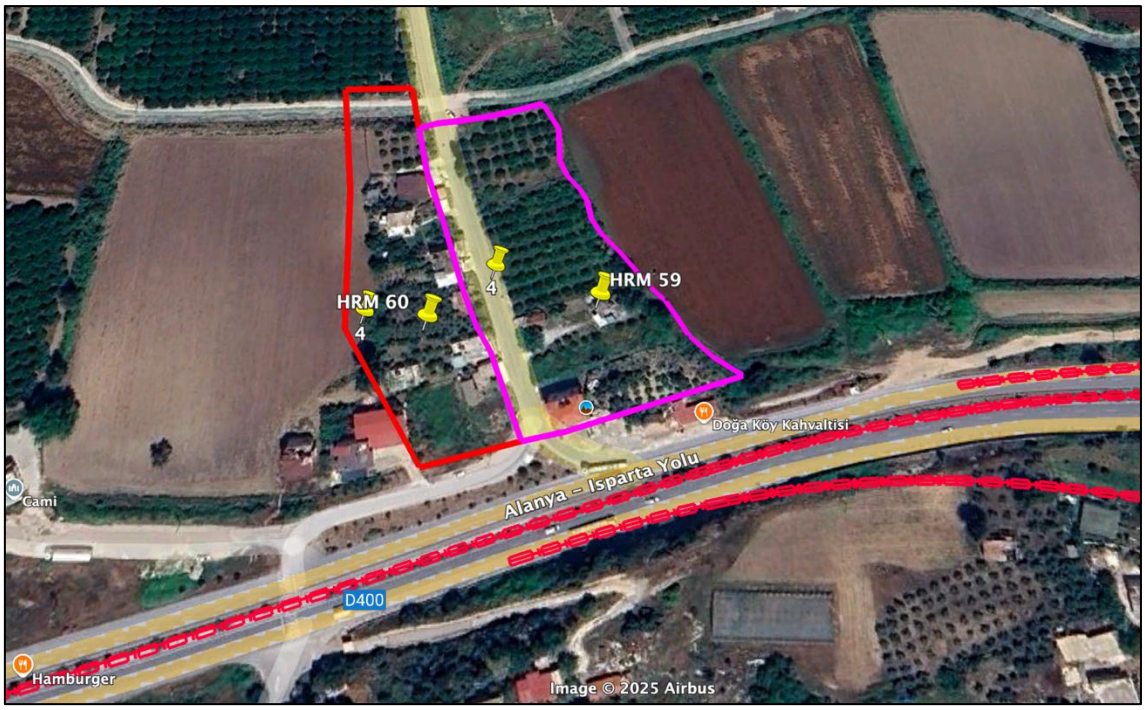

Figure XIII.65. General View of the Project Site and Archaeological Findings (HRM 60)

Table XIII-7 Summary of Identified Tangible Cultural Heritage Assets within the Project Corridor including Permitting Status (presented under Current Status Column)

HRM ID	Type	Period	Location	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Description	Registration Status	Current Status	PS 8 Heritage Value	Value of the Heritage Asset
HRM 1	Cemetery	Late Ottoman	South of Kocayatak Antalya/Serik/Yukarıkocayatak	Within	Yes-partially	Late Ottoman-Modern Cemetery Area: The site contains hundreds of graves dating back to the Late Ottoman (18th-19th century) and modern periods Some of the graves have suffered damage due to illegal excavations.	**1st Degree**	**ARHB permitting process is <u>ongoing</u>.** A partial corridor narrowing has been implemented; however, due to the condition of the existing highway and settlement activities in the area, it was decided to carry out a salvage excavation and relocate the graves within the same cemetery. In order to carry out works in these areas, a Technical Justification Report has been submitted to the ARHB. The consultant academics within the ARHB, in line with the relevant legislation and taking into account the opinion of the Museum Directorate, have completed their evaluation and the permits for excavation have been obtained. The finalization of the design is awaited.	Replicable	High
HRM 2	Rural Settlement	Late Byzantium	South of Kocayatak Antalya/Serik/Yukarıkocayatak	138 m	No - does not overlap	Single Phase Rural Settlement: Surface findings include sherds from late-period daily-use vessels. This settlement falls within the project corridor.	**Non-registered**	**ARHB permitting process is <u>complete</u>.** The identified area has been reported to the Museum Directorate, and the procedures at the ARHB have been completed. It was evaluated by the Board and was not registered.	Replicable	Low
HRM 3	Rural Settlement	Late Roman - Early Byzantium	Serik K3 Interchange Access Road Km 8+800 Antalya/Serik/Burmahancı	26 m	Yes-partially	Single-Phase Settlement: Sherds of daily-use vessels from the Late Roman-Early Byzantine period have been identified on the surface. No architectural remains are visible. The site is situated between fields and the canal.	**1st Degree**	**ARHB permitting process is <u>complete</u>.** The identified area has been reported to the Museum Directorate, and the procedures at the ARHB have been completed. **There are no constraints for proceeding with the construction works.** There is a high probability of chance finds in these areas.	Replicable	High
HRM 4	Settlement	Late Byzantium	Serik K3 Interchange Access Road Km 8+800 Antalya/Serik/Belpınar	177 m	No - does not overlap	Late Period Settlement: Likely dating back to the 14th-15th centuries, this settlement is characterized by a distinct elevation. The site is situated between a stream bed and a road. The surface is scattered with dense tile fragments and sherds of daily-use vessels.	**Non-registered**	**ARHB permitting process is <u>complete</u>.** The identified area has been reported to the Museum Directorate, and the procedures at the ARHB have been completed. It was evaluated by the Board and was not registered. **All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works**.	Replicable	Low
HRM 5	Cemetery	Late Ottoman	Serik K1 Interchange Km 52+500 Antalya/Serik/Deniztepesi	Within	Yes-partially	It is a cemetery spread over a vast area, located within the borders of Antalya, Serik, Deniztepesi neighborhood, on parcel 139-5/135-9. The land registry record, when queried from the system, identifies the area as a cemetery. It is likely an Early Republic to modern-era cemetery.	**Non-reigstered**	**ARHB permitting process is <u>ongoing</u>.** In order to carry out works in these areas, a Technical Justification Report has been submitted to the ARHB. The consultant academics within the ARHB, in line with the relevant legislation and taking into account the opinion of the Museum Directorate, have completed their evaluation and the permits for excavation have been obtained. The necessary permits have been obtained from the ARHB, and the **salvage excavations will commence.**	Replicable	Low
HRM 6	Building Remains	Roman	Serik K1 Interchange Km 52+500 Antalya/Serik/Deniztepesi	Within	Yes-partially	Remains of an architectural structure, possibly from the Roman Period, likely representing a frontier garrison settlement. A dense accumulation of rubble stone and visible wall rows, which may belong to the structure, are present on the surface. Additionally, numerous roof tile fragments and a small number of sherds from daily use vessels have been observed.	**1st Degree**	**ARHB permitting process is <u>ongoing</u>.** Design change was completed before the trial pits study.In order to carry out works in these areas, a Technical Justification Report has been submitted to the ARHB. Trial pits will start.	Replicable	High
HRM 7	Tumulus	Roman	Serik K1 Interchange Km 52+500 Antalya/Serik/Sarıabalı	70 m	Yes-partially	Tumulus: A row of stones, possibly belonging to the wall of the tomb, is visible on the surface. In the vicinity of the artificial hill, there are densely packed roof tile fragments and a sparse number of ceramic pieces from daily use vessels.	**1st Degree**	**ARHB permitting process is <u>complete</u>.** **All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works.**	Replicable	High

HRM ID	Type	Period	Location	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Description	Registration Status	Current Status	PS 8 Heritage Value	Value of the Heritage Asset
HRM 8	Manavgat Natural Site Border	Archeological or Natural Site Border	Viaduct-4 Km 56+000	Within	Yes - fully	Manavgat Natural Preservation Area	Natural Preservation Area	**Permitting process is complete.** All necessary permits have been obtained and there are no constraints for proceeding with the construction works.	Non-replicable	Medium
HRM 9	Late Roman Settlement	Late Roman	Km 59+000 Antalya / Manavgat/ Taşağıl	Within	Yes - fully	Late Roman Settlement: Due to its location, the settlement is believed to have been constructed for surveillance purposes. It is situated on a hill overlooking the valley and features a dense layer of rubble stone that may belong to architectural structures. Additionally, roof tile fragments and ceramic fragments from daily use vessels are visible on the surface.	**Non-registered**	**ARHB permitting process is complete.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works It was evaluated by the Board and was not registered. Board permit has been obtained.	Replicable	Low
HRM 10	Settlement	-	Km 62+000 Antalya / Manavgat Taşağıl	Within (Tunnel)	Yes - fully	1st Degree Registered Archaeological Site	**1st Degree**	**ARHB permitting process is complete.** **All necessary permits have been obtained from the Regional Conservation Board, and there are no constraints for proceeding with the construction works**	Non-replicable	High
HRM 11	Archaeological Settlement	Roman	Km 62+750 Antalya / Manavgat Taşağıl	Within	Yes-partially	Late Roman Settlement: Features a dense layer of rubble stone that may belong to architectural structures. Additionally, roof tile fragments and ceramic fragments from daily use vessels and terra sigilatta are visible on the surface.	**Non-registered**	**ARHB permitting process is complete.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works It was evaluated by the Board and was not registered.	Replicable	Low
HRM 12	Necropolis	Roman	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	174 m	No - does not overlap	Roman Period Necropolis: In addition to high-quality ceramic and tile fragments dating back to the 4th-6th centuries AD, many slabs and covering stones that may belong to graves are present on the surface and in the section. It is anticipated that there is a nearby settlement area associated with this necropolis.	**1st Degree**	**ARHB permitting process is complete.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works	Replicable	High
HRM 13	Settlement	Roman	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	800 m	No - does not overlap	Roman Period Settlement: No traces of architecture are visible on the surface. Thin-walled, high-quality ceramic fragments dating back to the 4th-6th centuries AD have been found. The site is situated on a hillside in a sheltered location overlooking the surrounding area.	**Non-registered**	**ARHB permitting process is complete.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works It was evaluated by the Board and was not registered. Route change was completed before the permit process	Replicable	Low
HRM 14	Cemetery	Early Republic	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	916 m	No - does not overlap	Hocalar Köyü Cemetery: Early Republican and modern cemetery.	**1st Degree**	**ARHB permitting process is complete.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works Route change was completed before the permit process.	Replicable	High
HRM 15	Cemetery	Early Republic	Taşağıl Interchange Access Road Antalya /Manavgat Taşağıl	Within	Yes-partially	Cemetery: Early Republican and modern cemetery. Use of spolia in some graves.	**1st Degree**	**ARHB permitting process is ongoing.** The necessary permits have been obtained from the ARHB), and the **salvage excavations will commence.**	Replicable	High
HRM 16	Tumulus and Necropolis	Roman	Km 70+400 Antalya /Manavgat Gündoğdu	Within (Tunnel)	Yes-partially	Tumulus-Necropolis: In addition to high-quality ceramic and glass fragments from the 4th-5th centuries AD, a large number of tile fragments are also visible on the surface.	**1st Degree**	**ARHB permitting process is complete.** All necessary permits have been obtained from the Regional Conservation Board, and there are no constraints for proceeding with the construction works	Non-Replicable	High
HRM 17	Settlement	Roman	Km 70+500 Antalya /Manavgat Yavrudoğan	125 m	No - does not overlap	Tumulus-Necropolis Area: Various ceramic fragments from different shapes are visible on the surface, including bases of amphorae, handle pieces from	**Non-registered**	**ARHB permitting process is complete.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works It was evaluated by the Board and was not registered.	Replicable	Low

HRM ID	Type	Period	Location	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Description	Registration Status	Current Status	PS 8 Heritage Value	Value of the Heritage Asset
						very large amphorae, and fragments of daily use vessels.				
HRM 18	Mound	Roman	Manavgat K1 İnterchange Km 83+500 Antalya /Manavgat Yukarıışıklar	313 m	No - does not overlap	Registered Archaeological Site: Dense ceramic and tile fragments from the Roman Period are visible on the surface. Illegal excavation pits containing numerous rubble stones have been identified in the area.	**1st Degree**	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Non-Replicable	High
HRM 19	Manavgat Waterfall Protected Area	-	Manavgat K3 İnterchange Km 88+000	2900 m	No - does not overlap	Registered Natural Site: Manavgat Waterfall Preservation Area. Although it is not in direct contact with the Project area, it falls within the 400 m corridor. Due to its status as a natural asset, the Antalya Environment and Urbanization Provincial Directorate and the Antalya Board of Preservation must be informed before any work is conducted.	Natural Preservation Area	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Non-Replicable	Medium
HRM 20	Aqueduct	Roman	Manavgat K2 Interchange Km 84+000 Antalya /Manavgat Sarılar	1780 m	No - does not overlap	Registered Archaeological Site: This is the aqueduct supplying water to the ancient city of Side. Since the Project involves a first-degree archaeological site, the opinion of the Antalya Board of Preservation must be obtained before proceeding with any work.	**1st Degree**	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Non-Replicable	High
HRM 21	Settlement	Roman	Manavgat Interchange Access Road Km 83+000 Antalya /Manavgat Yukarıışıklar	1433 m	No - does not overlap	Registered Archaeological Site: This is the aqueduct supplying water to the ancient city of Side. Since the Project involves a first-degree archaeological site, the opinion of the Antalya Board of Preservation must be obtained before proceeding with any work.	**1st Degree**	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Non-Replicable	High
HRM 22	Aqueduct	Roman	Manavgat K3 Interchange Km 86+000	2200 m	No - does not overlap	Aqueduc Feet: For reference see kültürvarlıkları.gov.tr. However, no archaeological evidence was encountered during the examination.	**Non-registered**	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Replicable	Low
HRM 23	Cemetery	Late Ottoman	Manavgat K4 Interchange Km 82+000 Antalya /Manavgat Hatipler	3900 m	No - does not overlap	Hatipler Village Cemetery Area: This site encompasses a cemetery from the Late Ottoman to the Early Republican period, as well as modern graves. Reused columns and column capitals are incorporated into the graves, and spiralled, monolithic columns are also present. Additionally, there are quilted gravestones dating from the Late Ottoman period.	**1st Degree**	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Replicable	High
HRM 24	Mound	Roman	Manavgat K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	4500 m	No - does not overlap	Mound: The site is situated at a high elevation relative to the surrounding settlement. Ceramic fragments from the Late Roman to Early Byzantine period have been observed in great numbers. However, due to the area being a cultivated field, a detailed examination could not be conducted.	**3rd Degree**	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Non-Replicable	Medium
HRM 25	Tumulus	Roman	Manavgat K4-K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	3100 m	No - does not overlap	Tumulus: A small number of ceramic fragments dating back to the Late Roman to Early Byzantine period are visible on the surface.	**Non-registered**	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Replicable	Low
HRM 26	Hilltop Settlement	Roman	Manavgat K4-K5 Interchange Km 81+000	3300 m	No - does not overlap	Mound: A large number of ceramic fragments dating to the Late Roman period are visible on	**1st Degree**	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Non-Replicable	High

HRM ID	Type	Period	Location	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Description	Registration Status	Current Status	PS 8 Heritage Value	Value of the Heritage Asset
			Antalya /Manavgat Hatipler			the surface. No traces of architecture have been observed.				
HRM 27	Settlement	Roman	Km 84+400 Antalya /Manavgat Yukarıışıklar	84 m	No - does not overlap	Mound: A large number of ceramic and tile fragments dating back to the Roman period are visible on the surface and in the section. No traces of architecture have been observed.	**3rd Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Non-Replicable	Medium
HRM 28	Tumulus	Roman	Km 85+900 Antalya/Manavgat Bucakşeyhler	Within	Yes - fully	Tumulus: The surface contains a small number of ceramic pieces dating back to the Roman period. The dense presence of stream stones at the top of the hill suggests that the hill was intentionally created.	**Non-registered**	**ARHB permitting process is complete.** It was evaluated by the Board and was not registered. And trial pits was completed and no archaeological material. Construction activities can be implemented	Replicable	Low
HRM 29	Aqueduct	Roman	Km 86+500 Antalya/Manavgat Bucakşeyhler	74 m	No - does not overlap	Registered Archaeological Site: This is the aqueduct supplying water to the ancient city of Side. Although it is not in direct contact with the Project area, it falls within the 400 m corridor.	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Non-Replicable	High
HRM 30	Fountain	Ottoman	Km 86+500 Antalya/Manavgat Bucakşeyhler	128 m	No - does not overlap	Fountain: An Ottoman-period fountain structure. The stones used in the construction were sourced from the nearby aqueduct.	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Replicable	Hig
HRM 31	Necropolis	Roman	Km 87+00 Antalya/Manavgat Bucakşeyhler	7 m	Yes-partially	Necropolis: A necropolis area. Skeletal remains and numerous covering tile fragments were found in the sections.	**Non-registered**	**ARHB permitting process is ongoing.** Design change was completed The area is outside of the project's expropration corridor.	Replicable	Low
HRM 32	Church Remains	Roman	Km 87+100 Antalya /Manavgat/Bucakşeyhler	Within	Yes-partially	Registered Archaeological Site: The architectural walls from the Roman period are still standing, and a large number of ceramics and tile fragments from the same period can be observed in the surrounding area.	**1st Degree**	**ARHB permitting process is ongoing.** The necessary permits process is ongoing, according to the opinion of Antalya Regional Board for the Protection of Cultural Heritage (RHB), and the salvage excavation is ongoing.	Replicable	High
HRM 33	Settlement	Roman	Km 87+700 Antalya/Manavgat Bucakşeyhler	260 m	No - does not overlap	Mound: The surface features a dense concentration of high-quality ceramic pieces dating back to the Roman period. However, no architectural remains have been observed.	**1st Degree**	**Pocess is complete.** The area is outside of the project's expropration corridor.	Non-Replicable	High
HRM 34	Cemetery	Ottoman	Km 87+500 Antalya/Manavgat Bucakşeyhler	160 m	No - does not overlap	Cemetery Area: Despite the intensive use of the cemetery, no uniform orientation of the graves was observed. It is believed that the cemetery was in use during both the Byzantine and Ottoman periods.	**Non-registered**	**Process is complete.** It was evaluated by the Board and was not registered. The area is outside of the project's expropration corridor.	Replicable	Low
HRM 35	Building Remains	Ottoman	Km 88+200 Antalya/Manavgat Bucakşeyhler	1 m	Yes-partially	Building: The main walls are visible on the surface. However, due to the location, the area surrounding the structure could not be thoroughly examined. It is located along the camp road alignment.	**1st Degree**	**ARHB permitting process is complete.** All necessary permits have been obtained from the Regional Conservation Board, and there are no constraints for proceeding with the construction works	Replicable	High
HRM 36	Rural Settlement	Ottoman	Km 89+800 Antalya /Manavgat Ulukapı	65 m	No - does not overlap	Area with Pottery: Sparse pottery and tile fragments are visible on the surface. However, no architectural remains have been identified.	**Non-registered**	**Process is complete.** It was evaluated by the Board and was not registered. The area is outside of the project's expropration corridor.	Replicable	Low
HRM 37	Settlement	Roman	Km 92+200 Antalya /Manavgat Aşağıışıklar	Within	Yes-partially	Roman Period Settlement: A dense accumulation of rubble stones, likely belonging to architectural structures, is visible on the surface. Additionally, a large number of tiles and fragments of daily use vessels	**1st and 3rd Degree**	**ARHB permitting process is ongoing.** An application has been submitted to the Antalya Regional Board for the Protection of Cultural Heritage (ARHB) regarding this area, consisting of 1st Degree and 3rd Degree sites. The ARHB required	Non-Replicable	High

HRM ID	Type	Period	Location	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Description	Registration Status	Current Status	PS 8 Heritage Value	Value of the Heritage Asset
						from the 4th-5th centuries AD are present throughout the area.		that archaeological trial (sondaj) excavations be carried out and the results submitted to the Board. For the 1st degree site, following the route revision (design change), the alignment has been shifted outside the boundaries of the 1st-degree archaeological site and impact on this site has been avoided However, for the 3rd degree site, since no route revision (design change) could be implemented within the 3rd-degree registered area, archaeological trial (sondaj) excavations, including vegetation clearance, will be undertaken at this site in accordance with the applicable legislation. Following the completion archaeological trial excavation and vegetation clearance, a final decision will be obtained from ARHB.		
HRM 38	Settlement	Roman	Km 95+600 Antalya /Manavgat Aksaz	65 m	Yes-partially	Roman Period Settlement: The settlement, which dominates the valley, features a wide range of material dating from the Early Roman Period to the 4th-5th centuries AD. Numerous high-quality ceramic fragments, in various forms, are found on the surface, along with tile and glass pieces.	**1st Degree**	**Process is complete.** Design change was completed	Non-replicable	High
HRM 39	Tumulus	Roman	Km 102+500 Antalya /Manavgat Hacıobası	35 m	Yes-partially	Tumulus: Tile fragments dating back to the Roman Period are visible on the surface. The site is situated on the edge of a slope filling area.	**Non-registered**	**Process is complete** It was evaluated by the Board and was not registered	Replicable	Low
HRM 40	Cemetery	Late Ottoman	Manavgat Interchange East Access Road Antalya /Manavgat Hacıobası	32 m	Yes-partially	Cemetery: This is a Late Ottoman period cemetery area with a dense number of burials observed throughout the site.	**1st Degree**	**ARHB permitting process is ongoing.** Design Processes are ongoing Salvage excavation and relocation will be carried out for certain graves after the necessary permits have been obtained. The expropriation corridor remains within the cemetery limits; however, no graves are affected according to the latest measurements. This has been ensured through a design change implemented along both the main route and the access road, effectively avoiding any physical interaction with the burial area.	Replicable	High
HRM 41	Church or Build Remains	Byzantium	Km 104+500 Antalya /Manavgat Uzunlar	61 m	No - does not overlap	Byzantine Period Church-Administrative Building: The structure, with its main walls standing approximately 2 meters high, features an apsidal section on its eastern facade. Numerous roof tile fragments are visible on the surface.	**1st Degree**	**Process is complete.** Design change was completed The area is outside of the project's expropriation corridor.	Replicable	High
HRM 42	Settlement	Roman	Km 105+000 Antalya /Manavgat Uzunlar	Within	Yes-partially	Mound: The surface of the settlement, located in a sheltered area by the river, contains a very dense concentration of ceramic and glass fragments dating back to the Late Roman period. The slope facing the river consists of natural rock, while the rear section is a landfill area suitable for settlement.	**1st Degree**	**ARHB permitting process is ongoing** Vegetation clearance has been completed, the excavation contractor has been appointed, and excavation works was completed. A report which is inclueded resul of excavation was submitted Museum Directorate. Final decision is awaited.	Replicable	High
HRM 43	Cemetery	Early Republic	Km 108+750 Antalya /Manavgat Kadılar	60 m	No - does not overlap	Cemetery Area: Early Republican Period and modern cemetery. As the reference point is located adjacent to the cemetery, it is believed that the route passes through the cemetery. In this case, it must be remembered that Cemetery Laws will apply on anything related to the area.	**Non-registered**	**Process is complete.** It was evaluated by the Board and was not registered. The area is outside of the project's expropriation corridor.	Replicable	Low
HRM 44	Historical Plane Tree	-	Km 109+600	24 m	Yes-partially	Historical Plane TreeAs a natural asset, notification should be made to the Antalya Provincial	**Non-registered**	**Process is complete.**	Replicable	Low

HRM ID	Type	Period	Location	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Description	Registration Status	Current Status	PS 8 Heritage Value	Value of the Heritage Asset
			Antalya /Manavgat Kadılar			Directorate of Environment and Urbanization. Since the plane tree meets the criteria for a natural asset, with a diameter of 2 m and a height of 15-17 m, it must be protected in situ.				
HRM 45	Cemetery	Late Ottoman	Km 112+250 Antalya /Manavgat Yalçıdibi	42 m	Yes-partially	Cemetery: The area is a late Ottoman, early Republican, and modern cemetery. Numerous skullcap tombstones are also notable within the cemetery.	**Non-registered**	**Process is complete.** Design change was completed	Replicable	Low
HRM 46	Yalçıdibi Waterfall	-	Km 112+250 Antalya /Manavgat Yalçıdibi	168 m	No - does not overlap	Registered 1st Degree Site: Yalçıdibi Waterfall is a registered natural asset.	Natural Preservation Area	**Process is complete.** The area is outside of the project's expropration corridor.	Non-replicable	Medium
HRM 47	Çardaktepe	Roman / Byzantium	Alarahan K2 Interchange Access Road Km 116+000 Antalya/Alanya Alara	266 m	No - does not overlap	Registered 1st Degree Archaeological Site: This site is registered by the Antalya Preservation Board. The main walls of the structure are visible on the surface. The opinion of the Board must be obtained before construction.	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Non-replicable	High
HRM 48	Building Remains	Roman	Konaklı K1 Interchange Access Road Antalya/Alanya Payallar	9 m	No - does not overlap	Registered 1st Degree Archaeological Site: Building remains are visible on the surface.	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Replicable	High
HRM 49	Building Remains	Roman / Byzantium	Konaklı K1 Interchange Access Road Antalya/Alanya Emişbeleni	Within	Yes-partially	Registered 1st Degree Archaeological Site: There is no indication of the function of the structure, whose main walls are preserved up to 3 meters. The structure is located within a 400-meter corridor.	**1st Degree**	**ARHB permitting process is ongoing.** The route has minimal contact with the building remain's conservation area. Design changes are ongoing there.	Replicable	High
HRM 50	Building Remains	Roman / Byzantium	Km 134+000 Antalya/Alanya Emişbeleni	113 m	No - does not overlap	Building: There is no indication of the function of the structure, with only 3 meters of the main walls preserved.	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Replicable	High
HRM 51	Cemetery	Early Republic	Km 136+200 Antalya/Alanya Toslak	17 m	Yes-partially	Cemetery: Early Republican and modern cemetery. There may also be late Ottoman period graves in the area, which should be verified through further examination.	**Non-registered**	**Process is completed.** It was evaluated by the Board and was not registered.	Replicable	Low
HRM 52	Settlement	-	Km 136+000 Antalya/Alanya Toslak	122 m	No - does not overlap	Registered 1st Degree Site	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Non-Replicable	High
HRM 53	Building Remains	Roman / Byzantium	Km 140+000	39 m	No - does not overlap	Registered 1st Degree Archaeological Site: The presence of an apse on the eastern facade of the building, with main walls preserved up to 3-4 meters, indicates that the structure may have been a church.	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Non-Replicable	High
HRM 54	Building Remains	Roman / Byzantium	Alanya West Interchange Access Road End Antalya/Alanya Telatiye	55 m	No - does not overlap	Registered 1st Degree Archaeological Site: Numerous well-preserved structures are observed in the area near the coast.	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Non-Replicable	High
HRM 55	Building Remains	Roman / Byzantium	Alanya West Interchange Access Road End Antalya/Alanya Telatiye	178 m	No - does not overlap	Registered 1st Degree Archaeological Site: The structure is situated in an elevated location with a commanding view of the surrounding area. Its main walls are preserved up to a height of 4 meters.	**1st Degree**	**Process is complete.** The area is outside of the project's expropration corridor.	Non-Replicable	High

HRM ID	Type	Period	Location	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Description	Registration Status	Current Status	PS 8 Heritage Value	Value of the Heritage Asset
HRM 56	Building Remains	Roman / Byzantium	Km 56+750 Antalya / Manavgat Çakış	Within	Yes - fully	Registered 1st Degree Archaeological Site : The relevant matter was evaluated by the Regional Conservation Council on 26.12.2024. With Council Decision No. 6162842 dated 31.12.2024, the issue was approved by the Council, and the project design for this section was endorsed.	**1st Degree**	**Process is <u>complete</u>.** Design change was completed	Replicable	High
HRM 57	Settlement	Roman / Byzantium	Km 120+800 Antalya/Alanya İncekum	Within	Yes-partially	Registered 1st Degree Archaeological Site: The updated registration list was obtained from the Conservation Council. It has been observed that, in this section of the route, there is partial overlap with an archaeological conservation site. The project design team must revise the alignment to avoid encroachment on the registered site boundaries. If such an adjustment is not feasible, an application should be submitted to the Conservation Council accompanied by a technical justification report.	**1st Degree**	**Process is <u>complete</u>.** Design change was completed Although the expropriation boundary remained within the existing boundaries, the design change moved the building boundary outside the protected area.	Replicable	High
HRM 58	Settlement	Roman / Byzantium	Taşağıl Interchange Access Road Antalya / Manavgat Taşağıl	Within	Yes-partially	Registered 1st Degree Archaeological Site: The updated registration list was obtained from the Conservation Council. It has been observed that, in this section of the route, there is partial overlap with an archaeological conservation site. The project design team must revise the alignment to avoid encroachment on the registered site boundaries. If such an adjustment is not feasible, an application should be submitted to the Conservation Council accompanied by a technical justification report.	**1st Degree**	**ARHB permitting process is <u>ongoing</u>** Design change completed The necessary permits are awaited from the Antalya Cultural Heritage Preservation Regional Board (ARHB).	Replicable	High
HRM 59	Settlement	Roman / Byzantium	Located along the D-400 Highway and near the Taşağıl Access Road Antalya / Manavgat Taşağıl	27 m	Yes-partially	Registered 3rd Degree Archaeological Site: The updated registration list was obtained from the Conservation Council. It has been observed that, in this section of the route, there is partial overlap with an archaeological conservation site. The project design team must revise the alignment to avoid encroachment on the registered site boundaries. If such an adjustment is not feasible, an application should be submitted to the Conservation Council accompanied by a technical justification report.	**3rd Degree**	**ARHB permitting process is <u>ongoing</u>** Design change completed The necessary permits are awaited from the Antalya Cultural Heritage Preservation Regional Board (ARHB).	Non-Replicable	Medium
HRM 60	Settlement or Necropolis	Roman / Byzantium	Located along the D-400 Highway and near the Taşağıl Access Road Antalya / Manavgat Taşağıl	31 m	Yes-partially	Registered 1st Degree Archaeological Site: The updated registration list was obtained from the Conservation Council. It has been observed that, in this section of the route, there is partial overlap with an archaeological conservation site. The project design team must revise the alignment to avoid	**1st Degree**	**ARHB permitting process is <u>ongoing</u>** Design change completed The necessary permits are awaited from the Antalya Cultural Heritage Preservation Regional Board (ARHB).	Replicable	High

HRM ID	Type	Period	Location	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Description	Registration Status	Current Status	PS 8 Heritage Value	Value of the Heritage Asset
						encroachment on the registered site boundaries. If such an adjustment is not feasible, an application should be submitted to the Conservation Council accompanied by a technical justification report.				

*All distances have been calculated based on the centerline of the road to ensure consistency and accuracy in spatial assessment.

XIII.3.3. Intangible Cultural Heritage Baseline

Türkiye is a multicultural country. The people of Türkiye consisted of local people and immigrants from the Balkans, Caucasus, Crimea and Central Asia who had settled in the country since the 19th century. The people who came to Türkiye in the late Ottoman period and early Republic period included Muslim immigrants, Turkish-speaking Crimean Tatars and Nogais from the Balkans previously ruled by the Ottomans; Azeris, Uzbeks, Turkmen, Kazakhs, Kyrgyz and other Inner Asian Turkic peoples expelled by the Russian Empire and the USSR, and later the war-torn Turkic Afghans as well as peoples of the North and South Caucasus, such as Circassians, Abkhazians, Dagestanis, Karachay-Balkarla, Chechens and Muslim Georgians. Besides Turkish-speaking immigrants, Bosnians, Pomaks, Albanians, Macedonians, and Greek Muslims, people who do not speak Turkish, are also among the immigrants from the Balkans.

Among the locals, Turks are the majority, including rural and urban Turks, former nomadic Turkmen and semi-nomadic Yoruks. The second main indigenous groups are the Kurds and Zazas, who speak Western Iranian languages. There are also Laz people who speak a South Caucasian language. Sunni and Nusayri Arabs follow next. There are also minorities in Türkiye, such as some non-Muslim Orthodox Greeks, Gregorian and Catholic Armenians, Jews, Assyrians and Chaldeans, and a small number of Molokans (Russian peasants who refuse to obey the Russian Orthodox Patriarchate).

The majority of the population in Türkiye is Muslim (98.8%). There are two main Muslim sects: Sunnis and Alawites. Sunni Turks and Kurds predominate in Türkiye, but Turkish, Kurdish, and Arab Alevis have a significant population (approximately 20% of the total population). Alevi ceremonies are performed in Turkish, whether they are Turkish or not. Although Alawite worship is related to Imam Shia, it differs from regular Shiite doctrine in belief and creed.

In addition to respecting the formal adaptation of the faith, such as a regular mosque or church attendance, the people in Türkiye have also developed beliefs and ceremonial practices based on their local environment, which can be considered the beginning of folk faith. At the centre of such practices is the creation of saints in Christianity, saints (Evliya) in Sunni Islam, or cultural personalities such as "dede" or "ocak" in Alevism. The believers accept them as intermediaries between the folk and the divine power. The tombs or shrines (türbe) of these persons are somehow attributed to specific locations where those people lived for some part of their lives or their whole lives. In addition, the tombs or shrines of others, called Sayyids, who are believed to be descendants of the Prophet Muhammed, are accepted as sacred. Such people, who are believed to be holy, are buried where they died or had shed blood. Places where those sacred personalities were buried are visited by people following their death. People visiting those places generally practice certain forms of worship or prayers in the hope that their wishes will come true. People also visit these places during faith fasts, and prayers are made to these holy people for good deeds to gain merit in the eyes of God. People additionally visit these places for other reasons: e.g., a woman who cannot give birth prays to have children, to heal a person who is sick, another in distress to overcome difficulties, etc. The tombs of these people are then converted into dome-shaped buildings surrounded by rocks to protect them and provide people with a more comfortable environment for prayers/worship.

Sometimes, the names or stories of those who lie in those localities are forgotten or unknown, but people continue to visit these places, pray, and offer offerings. In some places, graves belonging to forgotten Christian saints or monks were also known to be converted to Muslim saints over time, or people who converted to Islam continued their beliefs under the cover of traditional Islam. It is sufficient for the person performing these ceremonial practices to know that a holy or saintly person is lying there no matter to which religion they belong.

In some temples and shrines, a vow is made to fulfil a wish. If the wish comes true, the place is visited once again, and an animal is sacrificed to the spirit of the intermediary. Sacrifice meat and other prepared meals are distributed to neighbours, especially those in need. In some places in Türkiye, tree

worship or tree cult practices are also practised. Among them, the most popular practice is to tie a piece of cloth to the tree with the wish.

In addition, religious or non-religious periodic and ceremonial practices do exist, such as village festivals, pro bono village entertainments, sacrifice, ceremonies (such as circumcision and baptism), mawlids, Eid (Ramadan and Kurban) and Friday prayers, holy nights (kandil), martyr days and rain prayers. These traditions were created as an exception from religious celebrations and ceremonies such as festivities, Hıdrellez, Bayram and Friday prayers, and harvest festivals.

Nowruz is celebrated every year on March 21 in the centrums of the settlements or on the fairgrounds. The common practice in Nowruz is jumping over a fire, painting eggs, and competing in egg-tossing games.

The 32nd General Conference of the United Nations Educational, Scientific and Cultural Organization, whose short name is UNESCO, held in Paris between 29 September and 17 October 2003, adopted the "Convention for the Safeguarding of the Intangible Cultural Heritage" on 17 October 2003. The Convention was accepted unanimously at the session of the Grand National Assembly of Türkiye dated 19.01.2006, under the name "Law on Approval of the Convention for the Protection of Intangible Cultural Heritage" (No: 5448) that was published in the Official Gazette dated 21 January 2006 and numbered 26056 and entered into force in Türkiye. The procedure of becoming a party was completed on 27 March 2006.

There are Intangible Cultural Heritage Lists that were established in accordance with Articles 16, 17 and 18 of the Convention, whose names are as follows:

- Representative List of the Intangible Cultural Heritage of Humanity
- List of Intangible Cultural Heritage Requiring Urgent Protection
- A Record of Good Practices in Conservation

The first writings of Türkiye took place with the inclusion of previously announced Masterpieces on the Representative List of Intangible Cultural Heritage within the scope of Article 16 at the Third Ordinary Meeting of the Intergovernmental Committee held in Istanbul in 2008.

As of December 2022, Türkiye has a total of 30 items registered in the Intangible Cultural Heritage List, which can be listed as follows (see **Error! Reference source not found.**):

Table XIII-8 UNESCO Intangible Cultural Heritage List

Representative List of the Intangible Cultural Heritage of Humanity	
1	Meddah (Public Storyteller) Tradition (2008)
2	Mevlevi Whirling (Sema) Ceremonies (2008)
3	Âşıklık (Minstrel) Tradition (2009)
4	Karagöz (2009)
5	Nowruz (Joint file with Azerbaijan, India, Iran, Kyrgyzstan, Uzbekistan and Pakistan (2009) (in 2016, the file was expanded with the participation of Afghanistan, Azerbaijan, India, Iraq, Iran, Kazakhstan, Kyrgyzstan, Uzbekistan, Pakistan, Tajikistan and Turkmenistan)
6	Traditional Conversation Meetings (Yaren, Barana, Sıra Nights and others, 2010)
7	Alevi-Bektashi Whirling Ritual (Semah) (2010)
8	Kırkpınar Oil Wrestling Festival (2010)
9	Traditional Ceremonial Keşkek (2011)
10	Mesir Paste Festival (2012)

Representative List of the Intangible Cultural Heritage of Humanity	
11	Turkish Coffee and Tradition (2013)
12	Ebru: Turkish Decoration Art of Paper (2014)
13	The tradition of baking "Thin Bread" and Sharing: referred to as Lavaş, Katrıma, Jupka or Yufka (joint file with Azerbaijan, Iran, Kazakhstan, Kyrgyzstan and Türkiye) (2016)
14	Traditional Art of Decorated Tile (2016)
15	Spring Festival Hıdırellez (joint file with Macedonia) (2017)
16	Dede Korkut-Korkut "The Ancestor" Heritage: Culture, Legends and Music (joint file with Azerbaijan and Kazakhstan, 2018)
17	Traditional Turkish Archery (2019)
18	Miniature Art (joint file with Azerbaijan, Iran and Uzbekistan) (2020)
19	A traditional game of wit and strategy: Togyzqumalaq, Toguz Korgool, Mangala / Gocme (joint file with Kazakhstan and Kyrgyzstan) (2020)
20	Hüsn-i Hat, Traditional Calligraphy in Islamic Art in Türkiye (2021)
21	Tea Culture: Symbol of Identity, Hospitality and Social Interaction (joint file with Azerbaijan, 2022)
22	Traditional Production of Silk for Sericulture and Weaving (joint file with Afghanistan, Azerbaijan, Iran, Tajikistan, Turkmenistan and Uzbekistan, 2022)
23	Nasreddin Hodja/Molla Nesreddin/Molla Ependi/Apendi/Afendi Kozhanasyr Joke Telling Tradition (joint file with Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, 2022)
24	Tezhip/Tazhib/Zarhalkori/Tezhip/Naqqoshlik (joint file with Azerbaijan, Islamic Republic of Iran, Tajikistan and Uzbekistan, 2023)
25	Iftar/Eftari/Iftar/Iftor and Sociocultural Traditions (joint file with Azerbaijan, Islamic Republic of Iran and Uzbekistan, 2023)
26	Balaban/Mey Craftsmanship and Performing Art (joint file with Azerbaijan, 2023)
27	Mother of Pearl Inlay Workmanship (joint file with Azerbaijan, 2023)
UNESCO List of Intangible Cultural Heritage Requiring Urgent Protection	
28	Whistled Language (2017)
29	Traditional Ahlat Stone Workmanship (2022)
30	Traditional Knowledge, Methods and Practices on Olive Cultivation (2023)

Yörük Culture (Karakeçeliler)

The Karakeçilis, members of the tribe that played a pioneering role in establishing Anatolia as a Turkish homeland and later founding a global empire (Ottomans), first entered Anatolia under the leadership of Ertuğrul Gazi in the 6th century of the Hijra. There are various interpretations regarding the origin of the name "Karakeçili". The most widely accepted explanation is that the tribe took its name during the conquest of Karacahisar when Ertuğrul Gazi reportedly called out, "Come on, Karakeçili Yörüks, come on, Alps (my warriors)", during their military manoeuvres where they tied lights to the horns of their black sheep (Kara keçi in Turkish) and covered their tents (alayçık) with black felt. The Karakeçilis themselves believe that their name originated from this event. The Karakeçili tribe is a branch of the Kayı tribe, which is considered the foremost of the four branches of Günhan (the eldest son of Oğuz Han) from the Bozoklar, the senior line among the 24 Oğuz tribes. The Mongol invasion was the key factor driving the migration of the Karakeçili tribe to Anatolia. As a large and influential tribe, they migrated under the leadership of Ertuğrul Bey, along with other tribes from the Kayı lineage. This migration laid the foundation for a long-lasting and powerful empire, which would dominate three continents, with its centre in Anatolia. The Ottoman sultans highly regarded the Karakeçili tribe. Yavuz Sultan Selim, in particular, honoured them by naming the Karakeçili tribe the 'Harameyni Şerifeyn Tribe' during his reign.

Sultan Abdulhamid II referred to the Karakeçilis as his compatriots and once introduced them to the German Emperor Wilhelm as his relatives. Today, the Karakeçilis are dispersed across various regions

and districts throughout Anatolia. Historian Yusuf Halaçoğlu notes that "There are exactly 260 Karakeçili communities within the borders of Türkiye, not as settlements, but as distinct tribal groups."Highlighting the significant presence of the Karakeçilis in terms of population. Presently, Karakeçili communities can be found in almost every region of Türkiye, including areas such as Kırıkkale-Karakeçili, Ankara-Beypazarı, Eskişehir, Eskişehir-Sivrihisar, Sultanözü, Sivas, Kırşehir, Muğla, Antalya, Bilecik, Balıkesir, Kütahya, Bursa, Urfa, Urfa-Siverek, Urfa-Suruç, Gaziantep, Bingöl-Simsor, Denizli, Çorum, Uşak, and Samsun.

The Yörüks have played a significant role in preserving the richness of the Turkish language. They have transmitted what is often referred to as 'pure Turkish' in its unaltered form, maintaining the language's authenticity across generations. Furthermore, they have succeeded in preserving and passing down the oral traditions of Turkish culture, including stories, tales, and legends, through a vibrant oral literature tradition.

Traditional "Düğmeli" Construction System

This traditional construction system, commonly known today as "düğmeli' (buttoned)", is also referred to as "pişduvanlı", "pişduvanlı", "pişduvan duvar", "pişduvanlı duvar", or "hatıllı duvar (beam wall)". While it is the characteristic and most widely used construction technique in the Akseki and İbradı regions, it also represents one of the most original, creative, and distinctive systems in Turkish vernacular architecture. This method involves the reinforcement of dry-stone walls, built without mortar or binding materials, using wooden beams known as "hatıl" or "pişduvan" to form the main body of the building. Although it may appear simple, it is a highly functional construction technique that requires significant skill and results in incredibly durable structures. In addition to traditional houses, this technique has been widely employed in the construction of various other structures, including mosques, tombs, village rooms, vineyard houses, madrasahs, schools, and pekmez roofs.

Sarıhacılar Village, located in the Akseki region and boasting a 700-year history, was declared a protected site by UNESCO in 1994. The village is known as a settlement of greater historical importance in the past than the current centre of Akseki. Situated along the Silk Road, it was positioned on the main trade route connecting the Mediterranean, particularly via Manavgat and Alanya, with the interior of Anatolia. As a result, Sarıhacılar was highly developed in trade during this period. The architecture of the buildings reflects this commercial significance, with the ground floors of many structures historically housing shops, such as jewellers and drapers, where trade activities were once conducted.

Elmalı Yeşilyayla Oil Wrestling

Elmalı Yeşilyayla Oil Wrestling holds the distinction of being the oldest oil wrestling event in Türkiye, although it ranks second after Kırkpınar in terms of organisational history. The event's foundation dates back to 1419 when the land known as Musalla Çevrik (the present-day site of Yeşil Mosque) was designated as the wrestling field. This land was integrated into the "Toramanlar Vakfı (Foundation)" real estate holdings, established by Nuh Çelebi.

It is believed that the tradition of wrestling among the Turks dates back to ancient times. Even today, wrestling remains a prominent feature in certain regions, where it is performed during weddings and Hıdrellez celebrations, with widespread participation from the younger generation. In modern culture, the wrestling tradition continues to uphold the principles of fostering healthy, athletic, and morally upright individuals within Turkish society.

Elmalı is one of the regions that has best preserved the wrestling tradition. Historically, until the mid-1970s, it was common for residents and villagers to gather in Cumhuriyet Square to watch performances by the 'Mehter Takımı' (Ottoman Army Band) and the theatrical play 'Hart Hart Deve' (Camel). The Elmalı Oil Wrestling event, nowadays, has evolved into a cultural and artistic festival, typically taking place in the evening in a lively and festive atmosphere. Today, symposiums and exhibitions are held a week

before the wrestling competitions begins. Additionally, artists are invited, and public concerts are organised in the evenings, a few days prior to the wrestling events. The historic Elmalı Yeşil Yayla Oil Wrestling occurs annually during the first week of September.

Döşemealtı Carpeting

Carpets woven on looms known as "ıstar" in the Döşemealtı district of Antalya are referred to as "Döşemealtı carpets" in the literature. These carpets, which have been awarded a geographical indication and whose oldest examples are displayed in the Antalya Museum, hold a distinctive place within the Turkish carpet-weaving tradition. Döşemealtı carpets are notable for their dark colours, kilim-patterned motifs, short piles, and dimensions that make them easily transportable.

Contrasting colours are a hallmark of Döşemealtı carpets. Traditionally, frequently used colours include navy blue, burgundy, red, dark green, pistachio green, camel, light and dark blue, orange, melon, dusty rose, white, and black. The most common background colours are red, navy blue, burgundy, and green.

The edge borders of traditional Döşemealtı carpets are named based on the patterns and motifs used in the central field. The border is commonly called "su (water)" in the local region.

Iftar Invitation Tradition in Ceceler Neighborhood

Ceceler Neighborhood is a rural settlement located in the Akseki District to the east of Antalya. The tradition of offering an iftar (the meal to break the fast during Ramadan) in this community dates back to old times and has continued to the present, though it has evolved with various changes over time.

Iftars are organised collectively and systematically in the Village Hall. A team of cooks prepares the meals in the kitchen of the historic Village Hall. These individuals also serve the food, clean, and wash the dishes, with support from the villagers at every stage of the process. The person hosting the iftar provides the cooks with a menu and covers all the expenses for the day. Meals are delivered to the homes of those who are too ill or elderly to attend the gathering. Additionally, many people from the district and nearby settlements are invited to participate in the iftar.

Canbazhane / Körmük Tradition

Canbazlık (acrobatics) refers to the profession or skill of individuals known as "canbaz (acrobat)" who perform dangerous stunts on ropes, horses, cars, and other apparatus. This art, which is one of the traditional performing arts of Anatolia and has roots tracing back to ancient times, is preserved in its own cultural context and space. In places such as Antalya, where this tradition remains vibrant, the practice itself is realised with spaces called "canbazhane".

The Canbazhanes in question, where traditional circus arts are performed, have gained their cultural significance by being established during holidays, festivals, and fairs. These events meet the entertainment and aesthetic preferences of the people, bringing them together in a shared sense of excitement and unity. Through these practices, a distinct "Canbazhane Culture" has emerged within society, contributing to the preservation of this traditional art form.

Elmalı Abdal Musa Commemoration Events

Abdal Musa, also known as "Abdal Musa Sultan" in the region, was a Turkish saint of the 14th century whose tomb is located in the Tekke Neighborhood of Elmalı district. He was a prominent figure of the Hacı Bektaş-ı Veli Lodge and played a significant role in developing, institutionalising, and spreading the Alevi-Bektashi tradition. For this reason, he is regarded as the second pir (Piri Sani) of the Alevi-Bektashi tradition, following Hacı Bektaş Veli.

The Abdal Musa Tomb is a significant pilgrimage site in the Alevi-Bektashi tradition, and it is also visited and respected by individuals from the Sunni Islamic tradition. The "Abdal Musa Commemoration Ceremonies", held annually in the Tekke Neighborhood since 1983, have become a well-established tradition, fostering a spiritual atmosphere in the region. Organised under the leadership of the "Association for Research and Sustaining the Abdal Musa Culture", these events attract visitors from various countries and across the nation. Pilgrims visit the tomb to offer sacrifices, pray, and seek blessings.

Charity Pişi (fried dumpling) Tradition

Pişi, also known as "bişi", is a type of pastry made from yeast dough, typically fried in oil, with a characteristic hole in the middle, famous in the Antalya region. It is widely consumed in daily life and holds cultural significance as a ritual and special occasion food. Pişi is often prepared and served collectively during social gatherings and group meals, including military farewells, funerals, weddings, and circumcisions, particularly in the rural settlements of the province.

Pişi is an indispensable part of iftar and sahur meals during Ramadan. It is also prepared on special occasions such as Kandil, Kadir Night, Fridays, and Arafa and distributed to neighbours as charity. Offering pişi for charity is a common food ritual following a death, with the belief that the act's spiritual reward will benefit the deceased's soul.

Hıdırellez

Hıdırellez is a seasonal religious festival celebrated in recognition of the day when the Prophets Hızır and İlyas are believed to have met on earth. In Antalya, as in much of Türkiye, Hıdırellez is marked with various events and rituals associated with the awakening of nature. These practices are rooted in hopes for the coming year to bring abundance, prosperity, health, peace, and happiness. In preparation for Hıdırellez, homes are thoroughly cleaned. It is widely believed that Hızır will bring blessings and prosperity to the places he visits and the things he touches during the night of Hıdırellez.

Gılamık Weaving in Ormana District

Gılamık weaving is a traditional shuttle weaving technique still practised in the Ormana Neighborhood of İbradı. This type of weaving is also known by various names, including "Kılamuk", "gılamuk", "gılamıklı", "kılamuklu", and "gılamuklu", and is now commonly referred to as "Ormana Cloth" after the district it is most known. Gılamık weaving employs the bedding technique and was originally a form of silk weaving. However, due to the decline in silk production and challenges in marketing, cotton and linen threads are now also used. The weaving is done on wooden looms, locally called "düzen" or foot-operated looms. Historically, Gılamık products were primarily used as women's headscarves, a function that continues today. Additionally, the fabric is now utilised as decorative coverings for furniture, such as table and coffee table sets and bed sets.

Pıngıdık Game

The entire population of Gökbük Village is composed of Tahtacı Turkmens, with the village's settlement dating back to 1850. Oral accounts from the elderly suggest that the villagers initially coexisted with local Christians (referred to as Rum in Turkish) before becoming the sole inhabitants following the population exchange. The origins of the Tahtacı community in Gökbük can be traced to the Kumluca District of Antalya, though information regarding their earlier migration history is lacking. However, their history aligns with other Tahtacı communities in the mountainous coastal regions from Adana to Çanakkale.

One notable cultural element, the 'Pıngıdık Game,' has an uncertain origin. It is unclear whether it was brought by the Tahtacıs from their previous settlements or learned from the former Christian residents of the village. Oral traditions support the first possibility passed down through generations. Historically, Pıngıdık was played on March 21, marking Nevruz, which is also associated with the time of the highland migration. In recent years, the game has been played on a weekend in mid-February due to the emigration of the village's primary population and their return during the mid-term holiday. Nevertheless, it is important to note that the traditional timing of the game aligns with the celebration of Nevruz.

Project-specific Evaluation

The Yoruk culture is dominant in the Deniztepesi Neighborhood, where the Avşar Turks still reside. This community was formed by Yoruks who migrated from Central Asia and whose sanjak was Bozok Karahacılı. Aşure Day continues to be celebrated in the region, and there is also a rich wedding culture. Weddings typically begin with the arrival of the "aptal (fools)" on Fridays and continue throughout the weekend. Photographs of tangible and intangible cultural heritage interviews in different villages are shown in Figure XIII.66, Figure XIII.67, Figure XIII.68 and Figure XIII.69.

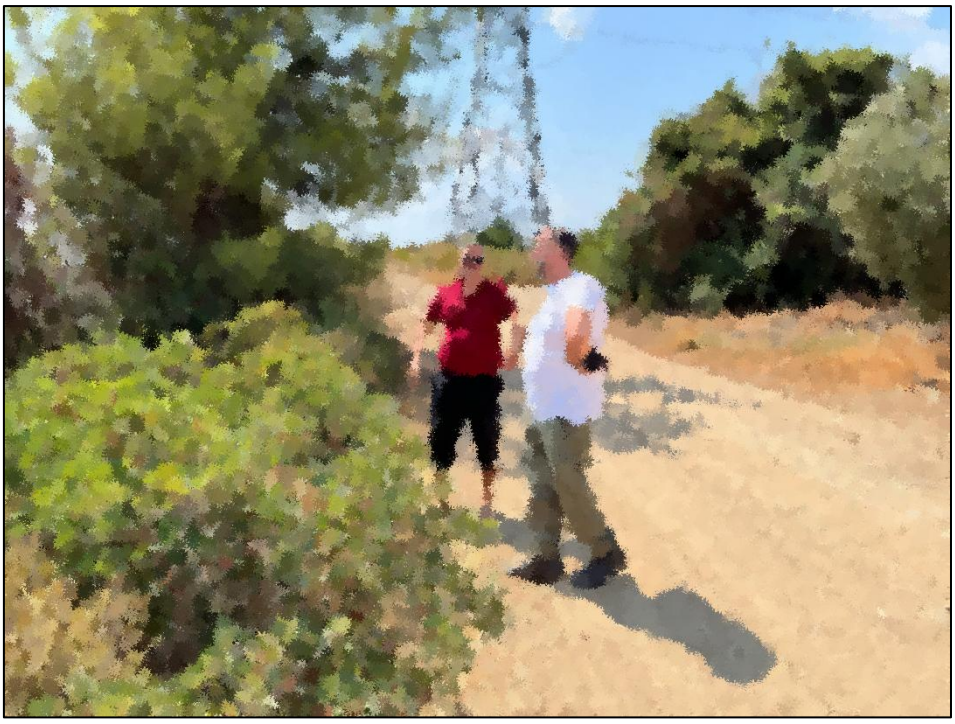

Figure XIII.66 Tangible and Intangible Cultural Heritage Interviews, Yavrudoğan Village



Figure XIII.67 Tangible and Intangible Cultural Heritage Interviews, Aksaz Village

In the interviews held in the Deniztepesi and Aksaz village, it was mentioned that Hıdırellez celebrations are still held in the village. Additionally, it was noted that during marriage ceremonies, the tradition of taking the bride from her house on a horse, as was customary in the past, is still practiced.



Figure XIII.68 Tangible and Intangible Cultural Heritage Interviews, Üründü Village


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Figure XIII.69 Tangible and Intangible Cultural Heritage Interviews, Deniztepesi Village

According to the observations and research, the following inferences can be drawn:

- Local people depend on their traditions.
- Various festivals are held during the harvest season, depending on agricultural production.
- These festivals serve not only to promote the products obtained but also as opportunities for people to come together, socialize, and spend time with one another.
- Communities maintain their ethnic identities and continue to practice their traditions.
- No intangible cultural heritage elements have been identified in the immediate vicinity of the project site that will be negatively affected by the Project.

XIII.3.4. Palaeoanthropological and Paleontological Conditions

This section has been prepared to highlight the palaeoanthropological potential of caves and rock shelters in the province of Antalya and its surroundings dated to the Pleistocene–Early Holocene. It aims to summarise the evidence of human presence and behaviour—lithic technology, faunal remains, taphonomy and palaeoclimate—and, in the context of the project corridor, to produce a risk–sensitivity mapping to guide field investigations and conservation/monitoring measures.

Regional Framework

The coastal zone of Antalya and the foothills of the Taurus Mountains contain an extensive karstic cave system that offered favourable conditions for long-term human occupation. Key sites such as Karain, Öküzini, Beldibi and Belbaşı preserve rich cultural sequences spanning from the Middle–Upper Palaeolithic through the Epipalaeolithic and into the Neolithic transition.

Key Sites and Selected Findings

Karain Cave

One of Turkey's most comprehensive Pleistocene sequences, Karain Cave records a long history of occupation covering the Middle–Upper Palaeolithic. Small-mammal taphonomy and faunal assemblages have been used to reconstruct palaeoenvironmental conditions and predator activity. A 2024 study highlights the potential of speleothem (stalagmite) records from Karain for detailed palaeoclimatic reconstruction. In addition, the presence of Procaviidae (Hyracoidea) remains within Middle Pleistocene deposits provides significant evidence for biogeographical and palaeoclimatic interpretations.

Öküzini Cave

There is strong evidence of intermittent human occupation during the Late Pleistocene–Early Holocene. Systematic radiocarbon dating of its Epipalaeolithic sequence indicates a chronology from ca. 18,200 BC to ca. 6,600 BC. The lithic industries are characterised by backed microliths, lunates and triangles, alongside a diverse bone-tool repertoire. Faunal assemblages document changes in human–animal interactions and suggest a possible increase in plant exploitation.

Beldibi Rock Shelter

Upper Palaeolithic–Mesolithic lithic industries occur together with stylised rock paintings depicting motifs such as wild goats, deer and human figures. A multi-layered cultural sequence, up to six layers, has been reported.

Belbaşı Rock Shelter

Located approximately 5 km from Beldibi, Belbaşı preserves Late Palaeolithic/Mesolithic occupation; its location and stratigraphy have been described in detail in the classical literature[4].

Palaeontological Investigations along the Project Corridor

During the surface surveys, palaeontological findings were also included within the scope of the investigation. No fossilised marine remains or any stone tools were encountered during the investigations.

[4] **References Used**
Based on the literature review, the information has been generally compiled from the articles and research notes of ***Işın Yalçınkaya, Mary C. Stiner, Steven L. Kuhn, F. Ocakoğlu, R. Lee Lyman, Şevket (Sevket) Sen, Gizem Kartal, Metin Kartal, Harun Taşkıran, İsmail Kılıç Kökten, Enver Yaşar Bostancı, and Dorothy A. E. Garrod****, accessible on the internet.*

XIII.4. Potential Impacts

This section identifies the potential impacts of the Project on cultural heritage during the land preparation, construction, and operation phases. The most significant impacts are expected to occur during the construction phase, due to extensive ground disturbance and vibration-generating activities.

The potential impacts on cultural heritage resources may be direct or indirect:

- Direct impacts are those resulting from physical disturbance within or immediately adjacent to a heritage site due to construction or land modification activities.

- Indirect impacts are secondary effects, including vibration, dust dispersion, restricted access, or changes to the visual and environmental context surrounding heritage sites.

During the construction phase phase, vibration arising from blasting and excavation activities may pose a risk to nearby cultural heritage assets, particularly to registered archaeological sites and vibration-sensitive structures. These aspects have been assessed in detail in accordance with the Project Standards for vibration-sensitive receptors.

There are no Indigenous Peoples recognized under national or international frameworks within Türkiye; therefore, no impacts related to spiritual or ceremonial heritage of indigenous peoples are anticipated.

On the other hand, the Project may also bring benefits if there are cultural heritage sites that were previously located in remote areas and could gain increased access through the operation of the Motorway. Also, through the baseline surveys and documentation of the previously unknown cultural heritage sites, the Project helps shed light on the still less known past of the region within the framework of interdisciplinary archaeological studies by implementing appropriate techniques and methods so that the Project, and contributes to the cultural and archaeological inventory of the country.

XIII.4.1. Land Preparation and Construction Phase

Impacts on Tangible Cultural Heritage

Impacts on cultural heritage may occur during the construction of the Project components, during which themaximum impacts are expected.

During the land preparation and construction phases, various project activities may generate direct and indirect impacts on tangible cultural heritage. These potential effects are summarized below .

Direct Impacts on Tangible Cultural Heritage

The potential direct impacts of the Project on cultural heritage assets may include the following:

- Physical disturbance or destruction of subsurface archaeological remains due to land clearing, excavation, or cut-and-fill operations.
- Loss or displacement of surface artifacts and cultural layers during topsoil stripping.
- Structural damage or destabilization of nearby archaeological features resulting from blasting and mechanical breaking.
- Partial removal or alteration of landscape features contributing to the integrity or visibility of heritage sites.
- Damage to architectural elements, walls, or burial features located within or adjacent to the working corridor.
- Accidental impacts from construction machinery, vehicle movement, or material stockpiling within or near sensitive areas.

- Ground compaction or surface abrasion leading to permanent modification of archaeological contexts.
- Disturbance or relocation of artifacts during the installation of temporary construction facilities, camps, or access routes.

As a result of the baseline surveys and subsequent assessments, the following **seven** archaeological sites located within the Project's cultural heritage impact area were identified as high-risk sites that will be subject to direct impacts of the Project:

- HRM 1- Cemeteries
- HRM 5- Cemeteries
- HRM 15- Cemeteries
- HRM 32- Church Remains
- HRM 37- Settlement
- HRM 42- Settlement

Among these sites, **cemetery areas and individual graves** are considered particularly sensitive cultural heritage features.

The measures to be taken to mitigate impacts on these sites (e.g. salvage excavation, documentation) are described in Section XIII.5, including a Grave Relocation Procedure for the management of impacts on cemeteries/graves.

Indirect Impacts on Tangible Cultural Heritage

The following **indirect impacts** may affect the cultural heritage resources during this phase of the Project:

- Vibration and ground movement from heavy machinery affecting the stability of nearby structures or ruins.
- Dust deposition and flyrock reducing the integrity or visibility of surface features.
- Visual intrusion and landscape alteration diminishing the historical setting or sense of place of heritage sites.
- Changes in natural drainage and micro-topography leading to erosion or sedimentation around archaeological areas.
- Restricted access to heritage sites used by local communities for traditional or religious purposes.
- Increased human activity and accessibility promoting unauthorized artifact collection or looting.
- Secondary degradation due to uncontrolled waste disposal, runoff, or poor housekeeping near heritage locations.

a) Blasting-Induced Indirect Impacts

During land preparation and construction, blasting activities are expected to generate ground vibration, air shock, and flyrock, as one of the main indirect Project impacts. These effects may pose direct risks to cultural heritage assets, such as structural stress, displacement of masonry, or dislodgement of fragile materials. In addition, indirect effects may occur through temporary air pressure waves (air shock) or the projection of rock fragments (flyrock), which could affect the physical integrity and setting of nearby archaeological sites within approximately 132.5 meters of the blasting locations.

The assessment of these potential impacts has been based on the vibration thresholds and modelling results presented in Chapter XI.2.3 (Noise and Vibration). Sensitive heritage receptors identified within the potential impact zone include HRM 5, HRM 6, HRM 8, HRM 9, HRM 16, HRM 20, HRM 38, HRM 41, HRM 45, HRM 50, HRM 51, HRM 52, HRM 53, HRM 57, and HRM 58. At these locations, the

proximity of heritage features to blasting operations increases the likelihood of cumulative vibration and air pressure effects.

Without mitigation, such effects could result in short-term, irreversible physical damage or partial loss of contextual integrity. The overall significance of these unmitigated impacts is assessed as moderate to high, depending on the receptor sensitivity and proximity.Relevant mitigation measures are presented in Section XIII.5.

b) Indirect Visual Impacts

Construction activities will be completed in 3 years thus the changes in the Project route due to construction activities will be relatively temporary in nature.

Impacts on Intangible Cultural Heritage

Assessment of the impact of the project on intangible cultural heritage has been conducted in the Project route and its vicinity in compliance with international standards and local legislation. No intangible cultural heritage elements have been identified in the immediate vicinity of the project site that will be negatively affected by the Project.

On the other hand, as discussed above, the Project activities are expected to physically affect the cemeteries. This may result in certain indirect impacts on intangible cultural heritage. The potential impacts are summarized below:

- Physical disturbance or damage to graves or associated structures from earthworks, heavy machinery, vibration, or accidental encroachment.
- Restricted or unsafe access for families and community members who visit graves for ceremonies or regular remembrance.
- Dust, noise and vibration creating nuisance or disrespect during ongoing burials or visits.
- Chance finds of previously unrecorded burials or archaeological remains requiring immediate protection and formal reporting.
- Social tension and reputational risk if communities perceive disrespect to burial grounds or if consultations are inadequate.

XIII.4.2. Operation Phase

During the operation phase, impacts may occur as a result of the presence and functioning of the permanent road infrastructure. These potential direct and indirect impacts on tangible and intangible cultural heritage are outlined below.

Impacts on Tangible Cultural Heritage

Direct Impacts

- Permanent modification of the landscape affecting the original topographic and contextual integrity of heritage sites.
- Structural stress or vibration from long-term traffic loads near sensitive archaeological remains.
- Limited risk of accidental damage during maintenance or utility works if conducted within heritage buffer zones.

Indirect Impacts

- Visual contrast between modern infrastructure and heritage landscapes, potentially reducing the aesthetic or symbolic value of sites.

- Increased accessibility leading to risks of vandalism, looting, or artifact collection by visitors or local communities.
- Indirect changes in surface water drainage or micro-climatic conditions affecting the conservation state of nearby remains.
- Potential reduction in the perception of heritage value due to the introduction of noise, lighting, and vehicle movement.
- Decreased community access to heritage locations if traffic or safety restrictions are imposed without alternative pathways.

Indirect Visual Impacts

In terms of visual impact, the changes along the Project alignment following the completion of construction activities will be of a permanent nature. The highway, viaducts, bridges, tunnel entrances, and lighting elements will become permanent components of the landscape, thereby affecting the visual integrity of the natural and cultural environment.

Accordingly, motorway itself and its large components such as viaducts, toll plazas, and service areas will be a source of change in the existing visual environment. Because of the experiential nature of visual resources, the human response to visual changes cannot be quantified, even though the visual changes associated with a development can be described.

These indirect impacts of the project occur in areas where structural remains are visible on the surface, relatively intact wall structures are preserved, and the project route remains within the visual impact zone.

These cultural heritage sites have been identified as HRM 6, HRM 29, HRM 41, HRM 48, HRM 49, HRM 50, HRM 53, HRM 54, HRM 55, and HRM 56. At these locations, there is no direct physical intervention on the cultural heritage assets; however, the visual alteration and perceptual integrity loss caused by the project corridor are considered indirect impacts.

In the visual impact studies, the designated cultural heritage sites were taken into account, and the visible and invisible areas of the road were mapped using ArcGIS. Cultural heritage sites were categorized into three categories based on their visibility from the road: fully visible, partially visible, and invisible. All visibility maps identified the category as partially visible.

Maps of the Project route, where cultural heritage sites are partially visible are presented between Figure XIII.70 and Figure XIII.79.

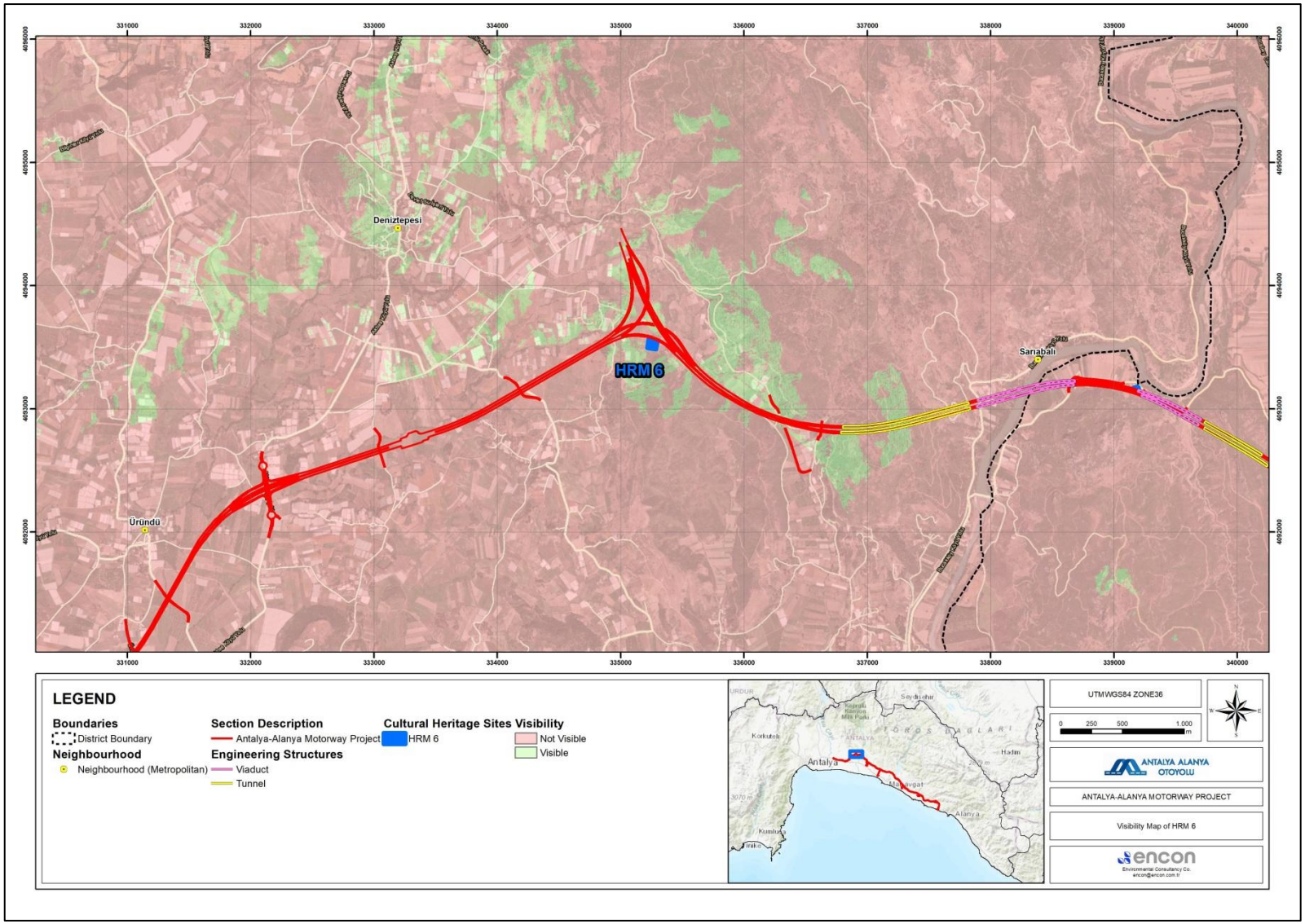


Figure XIII.70. Visibility Map of HRM 6

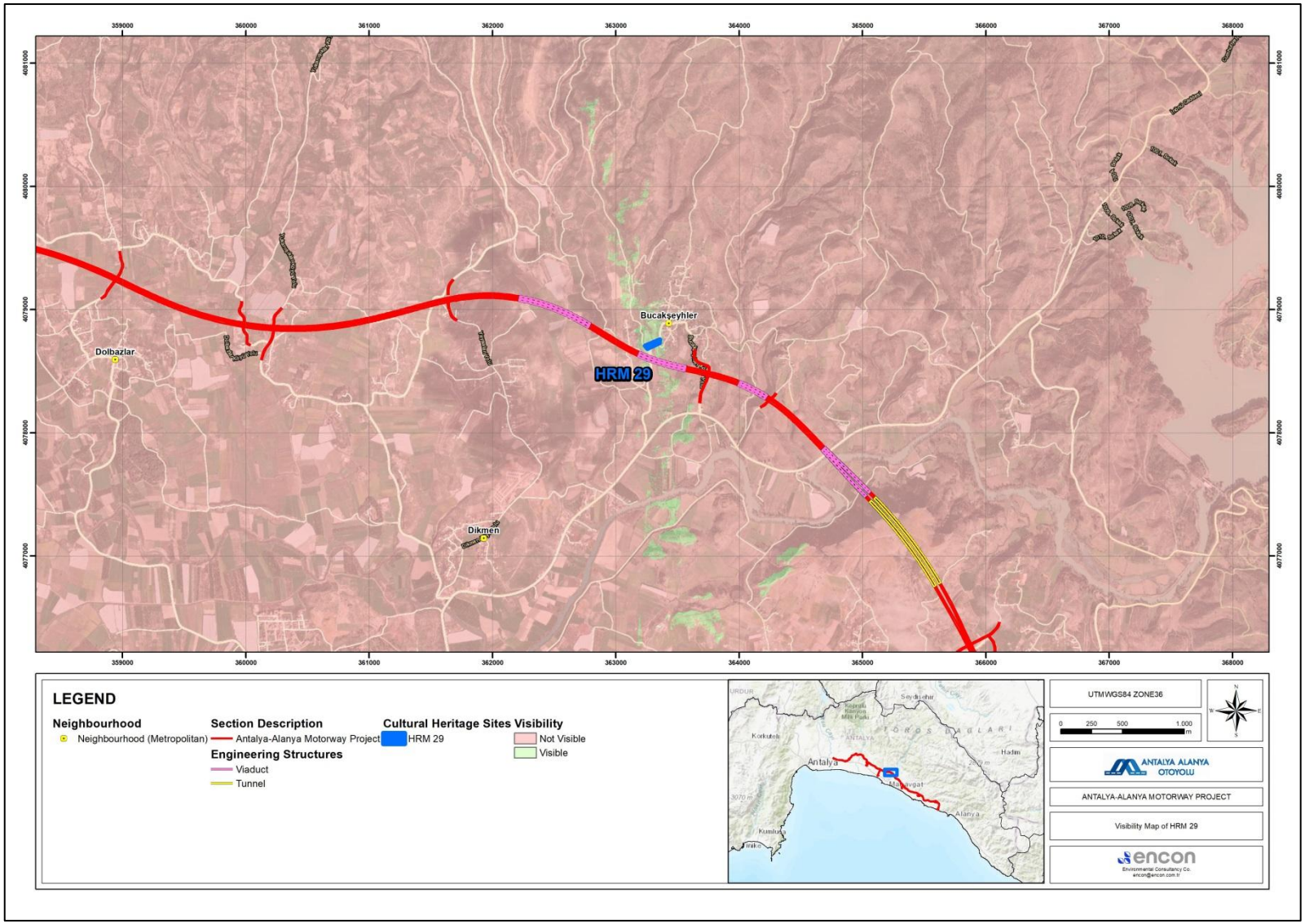


Figure XIII.71. Visibility Map of HRM 29

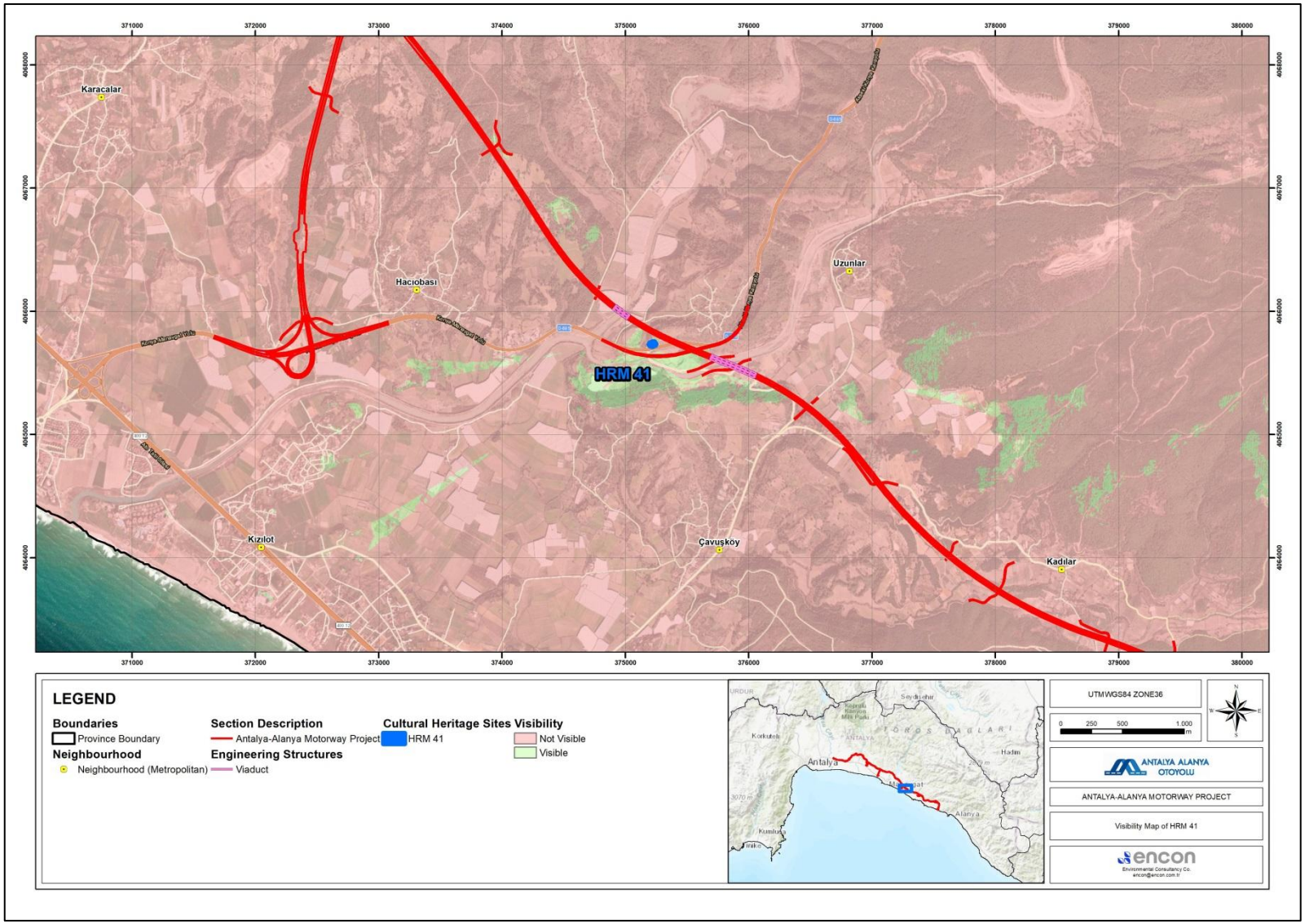


Figure XIII.72. Visibility Map of HRM 41

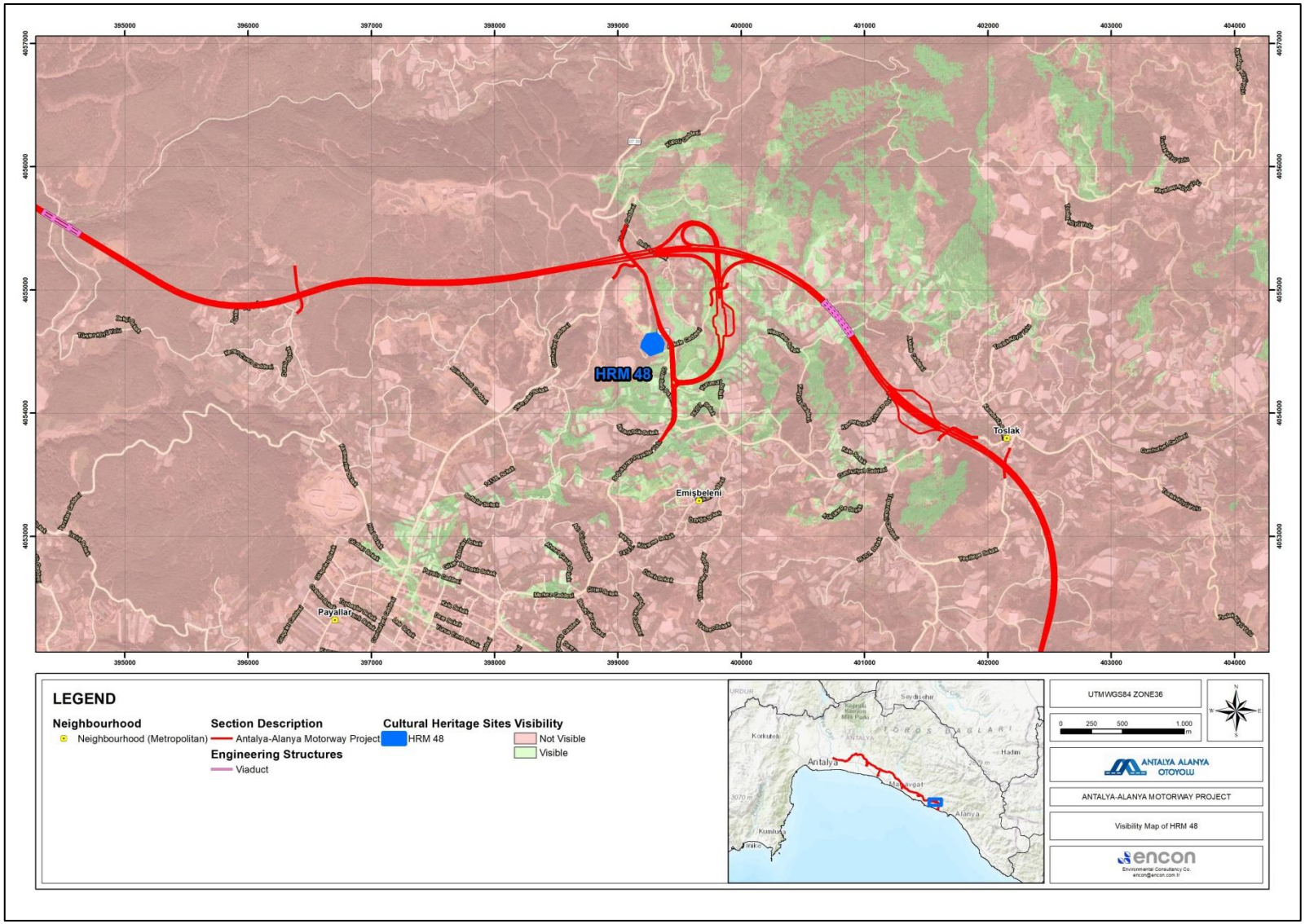


Figure XIII.73. Visibility Map of HRM 48

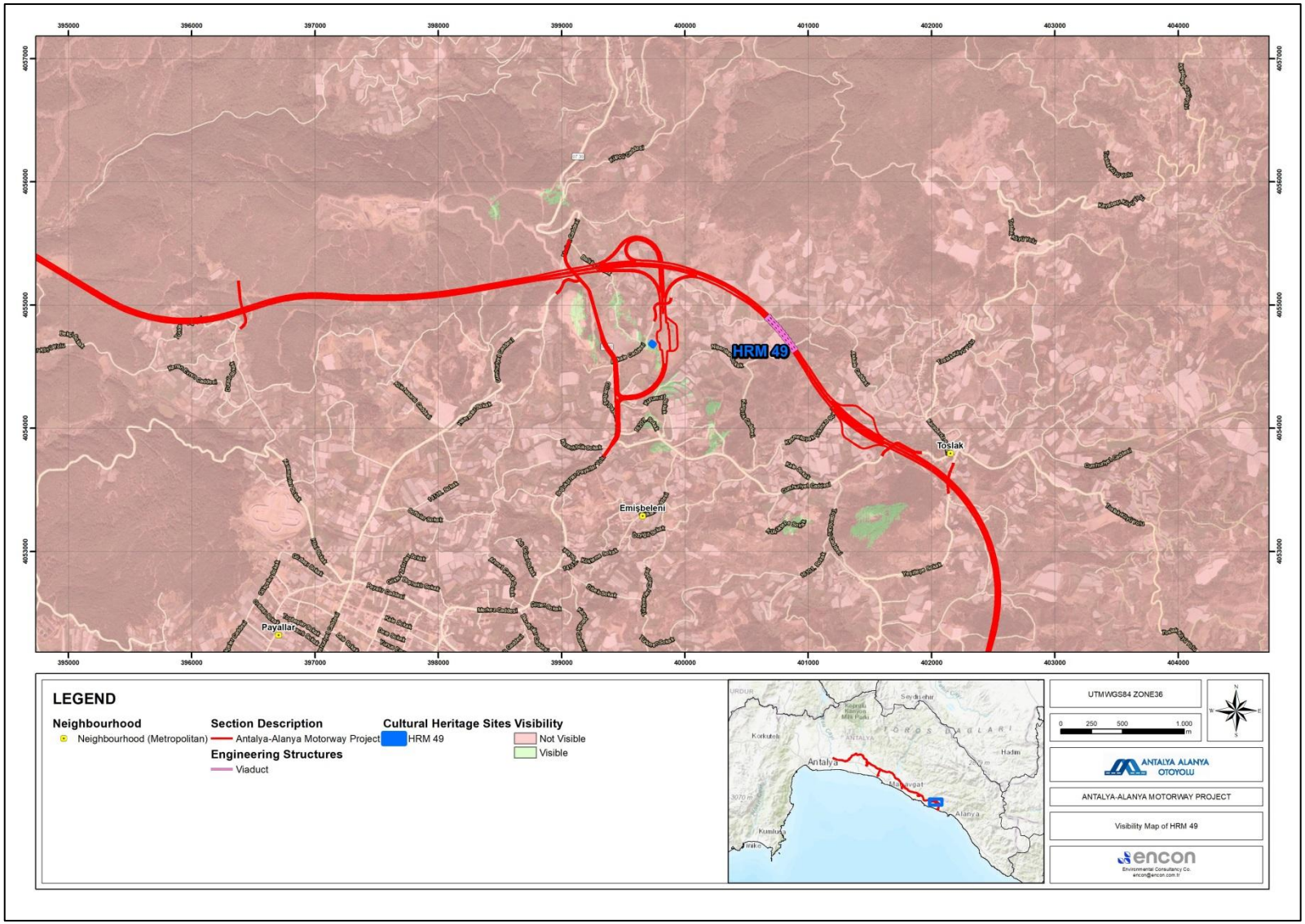


Figure XIII.74. Visibility Map of HRM 49

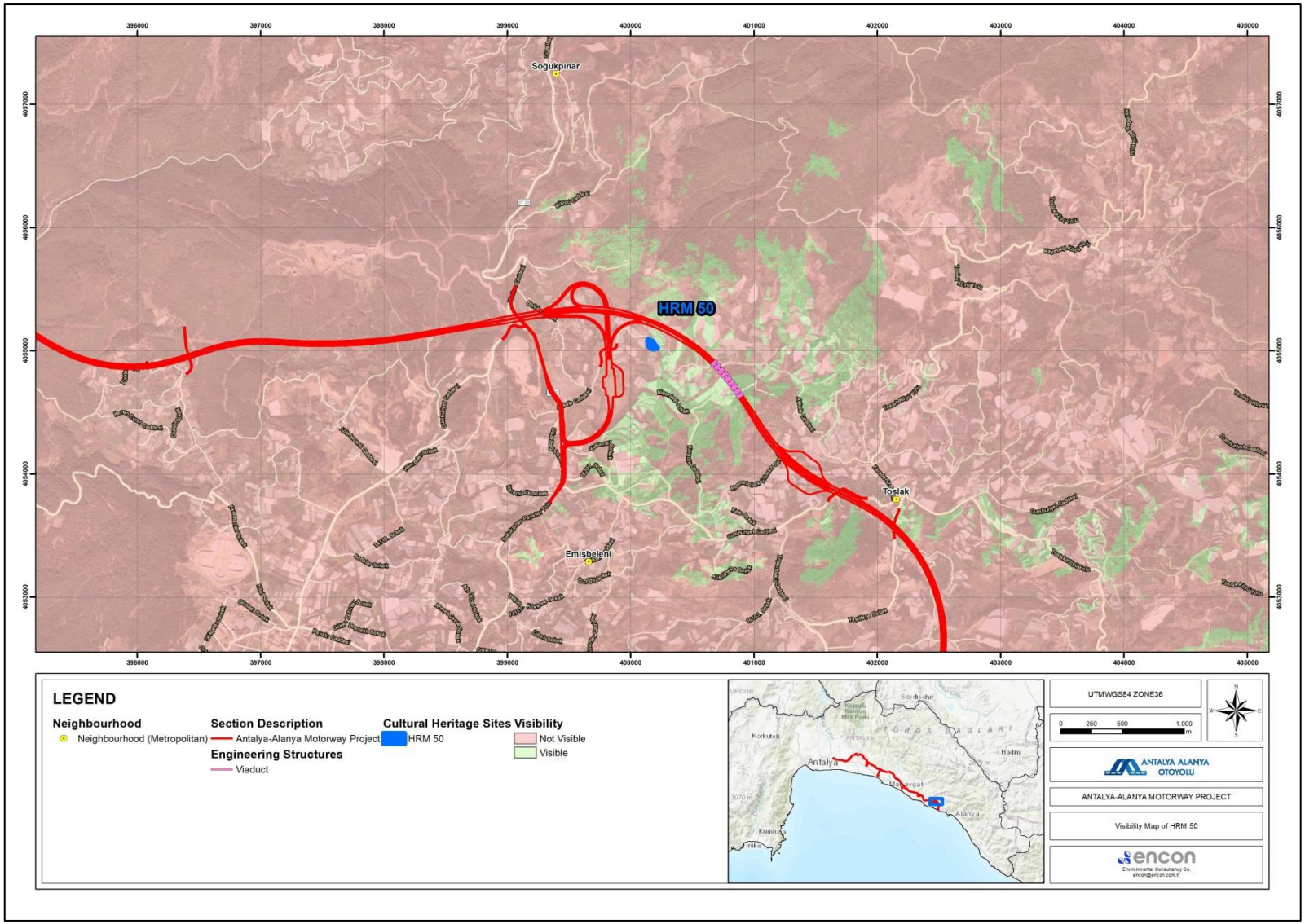


Figure XIII.75. Visibility Map of HRM 50

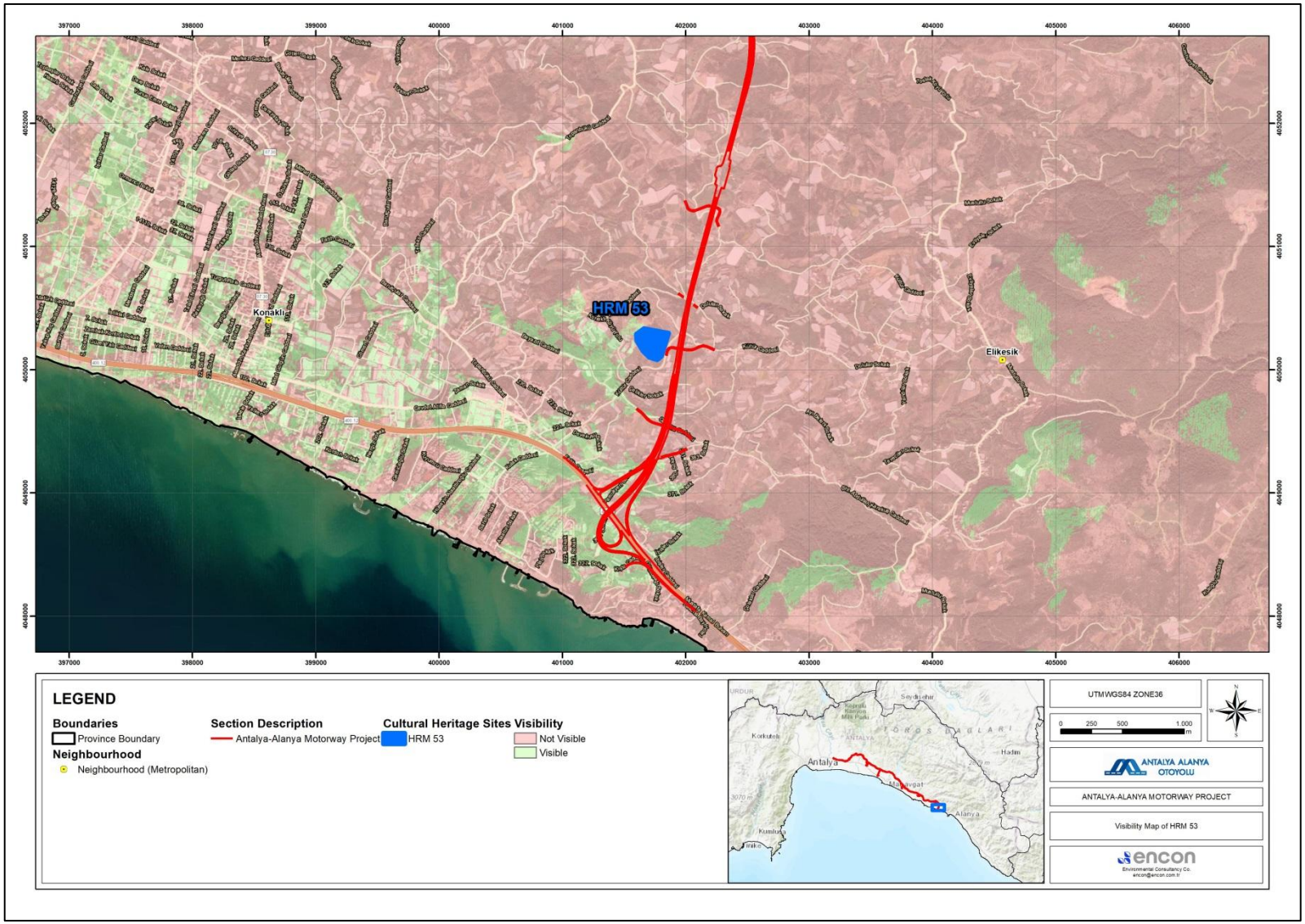


Figure XIII.76. Visibility Map of HRM 53



Figure XIII.77. Visibility Map of HRM 54



Figure XIII.78. Visibility Map of HRM 55

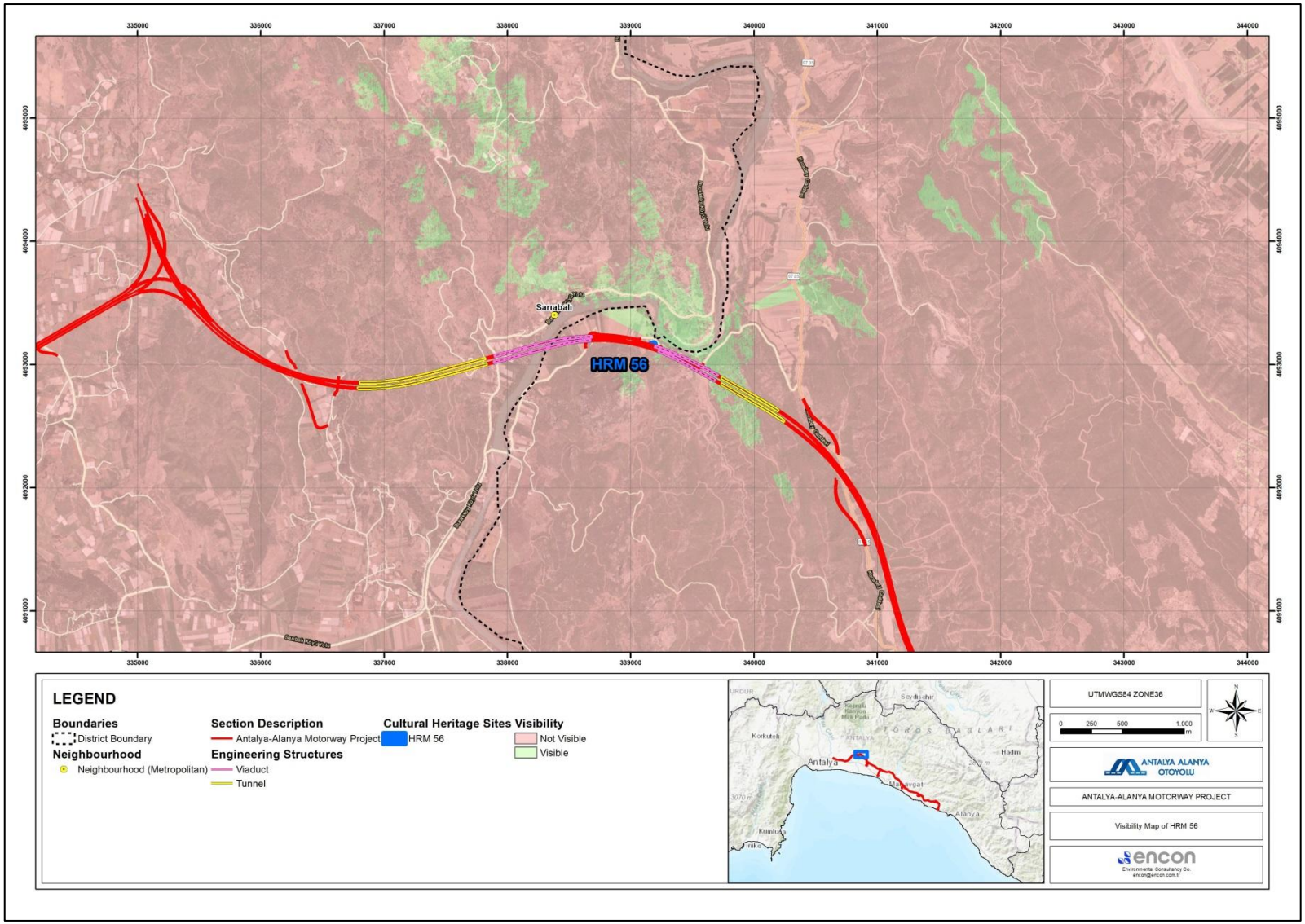


Figure XIII.79. Visibility Map of HRM 56

Impacts on Intangible Cultural Heritage

During the Project operation phase, impacts on cemeteries may lead to indirect impacts on intangible cultural heritage. While direct physical impacts associated with construction are no longer relevant, some impacts are important to consider. These impacts are listed below:

- Ongoing community access conflicts if operational security or fencing restricts traditional visits and ceremonies.
- Long-term noise, traffic or pollution affecting the sanctity of the cemetery or creating a sense of disrespect.
- Erosion or indirect impacts (e.g., water runoff, vibration from ongoing operations) that could damage grave structures.
- Loss of intangible cultural heritage if traditional rituals or periodic festivals linked to the cemetery are disrupted.

XIII.4.3. Decommissioning and Closure Phase

The impacts during the decommissioning phase are likely to be similar to those of the construction phase; hence, the activities will be identical to those of the construction phase. The route is expected to be restored to its previous use.

XIII.4.4. Assesment of Impact Significance

The significance of potential impacts on cultural heritage assets has been assessed in accordance with the methodology described in Section XIII.1.2.3, which follows both the ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2011) and IFC PS8.

The evaluation combines the heritage value (sensitivity) of each asset and the scale and severity of change/impact (magnitude) predicted to result from Project activities. This approach ensures consistency with both national procedures recommended by the Ministry of Culture and Tourism and international best practice.

The results of this assessment are summarized in Table XIII-14 – Impact Register Table, which presents for each HRM the significance of impact based on the baseline value of the heritage assets and predicted magnitude of impact, as well as the proposed mitigation, and residual significance after mitigation.

XIII.5. Mitigation and Management Measures

Mitigation measures will be taken for the sites identified during the ESIA studies in order to avoid and/or minimize the adverse impacts of the Project on those sites. All site-specific mitigation and management measures have been developed and implemented in close consultation with the Antalya Regional Directorate for the Protection of Cultural Heritage (ARHB) to ensure full compliance with Law No. 2863 on the Protection of Cultural and Natural Assets (1983) and other applicable Turkish legislation.

In addition, the mitigation framework has been structured in alignment with the IFC PS 8 (Cultural Heritage) and the IFC mitigation hierarchy, which together provide internationally recognized best practices for cultural heritage protection. This dual compliance ensures that both national legislative requirements and international standards are met, while safeguarding tangible and intangible cultural heritage values.

Mitigation follows the principles of the IFC Mitigation Hierarchy:

- ***Avoidance:*** In all instances, avoidance must be the preferred measure. During the Project design and planning process, several archaeological areas identified through baseline surveys were excluded from the Project footprint. Realignment and design modifications were applied to ensure that critical or non-replicable sites were not affected.

- ***Minimisation:*** Where complete avoidance was not feasible, impacts were reduced through protective buffer zones, restricted access, and adapted construction methods. For example, minor design changes were implemented in areas close to archaeological sites to reduce potential impacts.

- ***Restoration / Conservation:*** Where impacts occurred or risks were identified, restoration and conservation works were carried out under the authority of the Museum Directorate and in accordance with ARHB decisions.

- ***Offset / Compensation:*** No offset measures have been required to date, as avoidance and minimisation strategies have effectively addressed the identified risks. However, if needed, offset measures (e.g., enhanced conservation, awareness activities, or public access to alternative heritage resources) may be considered.

In this respect, the mitigation strategy of the Project has been established according to IFC Heritage Value Categories, as summarized in Table XIII-9.

Table XIII-9 Mitigation Strategy according to IFC Heritage Value Categories

Category	Brief Description	Relevance for the Mitigation Hierarchy
Non-replicable	Cultural heritage assets that cannot be replaced or reproduced; their loss cannot be recovered (e.g., archaeological sites, unique ritual areas).	Priority: full avoidance. Relocation or offsetting is not acceptable.
Replicable	Heritage that can be reconstructed elsewhere or relocated after thorough documentation while preserving its essence (e.g., movable architectural elements).	Priority: avoid where possible; if unavoidable, controlled relocation/reconstruction.
Critical Cultural Heritage	Heritage of outstanding significance, nationally or internationally recognised; typically also falls under “non-replicable”.	Avoidance plus international best practice and continuous stakeholder engagement.

Sites or formations identified as potentially significant in terms of **palaeoanthropology and paleontology** will be managed under the Chance Find Procedure and the Cultural Heritage Management Plan (CHMP) to ensure appropriate protection and reporting.

XIII.5.1. Management of Impacts on Tangible Cultural Heritage

In accordance with the IFC PS 8 and the general principles of mitigation hierarchy, , multiple sections of the route have been revised due to the presence of archaeological assets identified in the field. Accordingly, the Project design team has implemented changes and partial revisions in 15 archaeological locations, thereby avoiding potential adverse impacts on the identified heritage assets. These sites that have been avoided through design changes are listed in Table XIII 10.

Table XIII-10 Cultural Heritage Avoided by Route Change or Design Change

HRM ID	Type	Period	Location	Registration Status
HRM-13	Settlement	Roman	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	Non-Registered
HRM-14	Cemetery	Early Republic	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	1st Degree
HRM-18	Mound	Roman	Manavgat K1 İnterchange Km 83+500 Antalya /Manavgat Yukarıışıklar	1st Degree
HRM-19	Manavgat Waterfall Protected Area	-	Manavgat K3 İnterchange Km 88+000	1st Degree Natural Area
HRM-20	Aqueduct	Roman	Manavgat K2 Interchange Km 84+000 Antalya /Manavgat Sarılar	1st Degree
HRM-21	Settlement	Roman	Manavgat Interchange Access Road Km 83+000 Antalya /Manavgat Yukarıışıklar	1st Degree
HRM-22	Aqueduct	Roman	Manavgat K3 Interchange Km 86+000	Non-Registered
HRM-23	Cemetery	Late Ottoman	Manavgat K4 Interchange Km 82+000 Antalya /Manavgat Hatipler	1st Degree
HRM-24	Mound	Roman	Manavgat K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	3rd Degree
HRM-25	Tumulus	Roman	Manavgat K4-K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	Non-Registered
HRM-26	Hilltop Settlement	Roman	Manavgat K4-K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	1st Degree
HRM 31	Necropolis	Roman	Km 87+00 Antalya/Manavgat Bucakşeyhler	Non-registered

HRM ID	Type	Period	Location	Registration Status
HRM-38	Settlement	Roman	Km 95+600 Antalya /Manavgat Aksaz	1st Degree
HRM 41	Church or Build Remains	Byzantium	Km 104+500 Antalya /Manavgat Uzunlar	1st Degree
HRM 45	Cemetery	Late Ottoman	Km 112+250 Antalya /Manavgat Yalçıdibi	Non-registered
HRM-56	Building Remains	Roman / Byzantium	Km 56+750 Antalya / Manavgat Çakış	1st Degree
HRM-57	Settlement	Roman / Byzantium	Km 120+800 Antalya/Alanya İncekum	1st Degree
HRM-58	Settlement	Roman / Byzantium	Taşağıl Interchange Access Road Antalya / Manavgat Taşağıl	1st Degree
HRM 59	Settlement	Roman / Byzantium	Located along the D-400 Highway and near the Taşağıl Access Road Antalya / Manavgat Taşağıl	3rd Degree
HRM 60	Settlement or Necropolis	Roman / Byzantium	Located along the D-400 Highway and near the Taşağıl Access Road Antalya / Manavgat Taşağıl	1st Degree

Mitigation measures and recommended actions have been developed for each identified **tangible** cultural heritage asset to prevent, minimize, or manage potential adverse impacts. These measures will be implemented in parallel with the general mitigation principles outlined below, which apply to all Project activities that may affect cultural heritage during the land preparation, construction, and operation phases.

- Archaeological immovable assets that are located on the Project Route and its area of influence may be buried or covered entirely with vegetation. For this reason, during the deforestation activities on the Project Site, the Client will conduct a visual inspection. The construction activities are carried out under the supervision of an archaeologist. Additionally, all archaeological findings will be recorded on the Project's constraint maps, and protective measures will be implemented by placing "Critical Area" warning signs in the vicinity of the archaeological site.In compliance with laws no: 5226 and 3386 and the 4th article of the revised law no: 2863, in case any movable-immovable cultural asset is encountered as a result of the activities conducted during the field preparation and construction stages, the activities should be stopped, and Directorate of the Antalya Archaeology Museum should be notified immediately.
- The Cultural Heritage Management Plan and Chance Find Procedure required for the management of "chance finds" have been prepared and submitted as an annex to the Cultural Heritage Management Plan. All operators who are to be engaged in the soil works and Project employees will receive training regarding "project requirements, protection of cultural and archaeological heritage, laws and legislations related with the archaeological and cultural heritage and cultural heritage management plan and chance find procedures".
- Chance Finds Procedure will be implemented by trained construction workforce to avoid or minimize significant impacts. Accordingly, in cases when a chance find is encountered

during the construction activities, further steps will be taken in accordance with the plans and procedures and the relevant bodies, and the Directorate of the Museum should be notified immediately. If any archaeologically potential asset is discovered, relevant instructions about the site's sensitivity will be shared with all construction teams a few days before the construction activities. The construction activities will be conducted using appropriate equipment and methods. The proper equipment will be identified together with the directorate of the museum and the construction teams.

- In areas where there is an identified or potential archaeological risk, archaeological excavations will be carried out and completed prior to the commencement of construction. In addition, all required documentation must be fully prepared and submitted to the relevant authorities as part of the permitting process before any excavation activities begin.
- Archaeological areas will be notified to the relevant museum directorates immediately.
- Considering the assessments provided in Chapter XI.2.3 (see Table XI.36), which covers vibration impact assessment, the quantities of explosives will be optimized in areas near archaeological sites. During pre-construction surveys, the impact of construction activities on cultural heritage aspects will be considered, and vibration measurements will be repeated in areas deemed necessary. Vibration calculations will be updated to ensure that no damage will be caused to the archaeological heritage before construction begins. Additionally, If the specialized contractor determines that the required charge quantity is too low to be effective, mechanical breaking methods may be employed as a precautionary measure to safeguard these areas.

For the **seven** high-risk archaeological sites identified in Section XIII.4.1 (HRM 1- Cemeteries; HRM 5- Cemeteries; HRM 15- Cemeteries; HRM 32- Church Remains; HRM 37- Settlement; HRM 42- Settlement), project works will not commence until all permits are obtained from the relevant authorities (i.e. ARHB) and required archaeological works, including surveys, archaeological trial excavation, salvage excavations, documentation, etc., have been completed.

The current status of work to be carried out in high-risk archaeological sites is presented in **Error! R eference source not found.**. These measures constitute pre-construction mitigation commitments to ensure cultural heritage protection.

Table XIII-11 Table of High-Risk Archaeological Areas

Type	Status – Contractor Procurement	Planned / Ongoing Activities
HRM 1- Cemeteries	ARHB permitting process is ongoing. The finalization of the design is awaited. Excavation of approximately 10 modern and historic graves is planned under the supervision of the Museum Directorate. The graves are planned to be relocated within the boundaries of the same cemetery. The specific relocation site will be determined by the Metropolitan Municipality Cemeteries Directorate.	Excavations are scheduled to commence as of Q4, 2025.
HRM 5- Cemeteries	ARHB permitting process is ongoing. The design has been finalized. The presence of the Museum Directorate specialist is awaited, and under the supervision of the specialist, the excavation of approximately 40 graves is planned. Since the area is not registered at this stage, it cannot be confirmed whether the graves are of historical character; the outcome of the excavation is awaited. However, the Board has indicated that in either case, the graves may be relocated. The graves are planned to be relocated within the boundaries of the same cemetery. The specific relocation site will be determined by the Metropolitan Municipality Cemeteries Directorate.	Excavations are scheduled to commence as of Q4, 2025.
HRM 15- Cemeteries	ARHB permitting process is ongoing. The design has been finalized. Under the supervision of a Museum specialist, the excavation of approximately 25 graves is planned. Modern graves are also present within	Excavations are scheduled to commence as of Q4, 2025.

Type	Status – Contractor Procurement	Planned / Ongoing Activities
	the cemetery. The Board has indicated that in either case, the graves may be relocated. The graves are planned to be relocated within the boundaries of the same cemetery. The specific relocation site will be determined by the Metropolitan Municipality Cemeteries Directorate	
HRM 32- Church Remains	ARHB permitting process is ongoing. Archaeological excavation works are ongoing. The site, located within the expropriation corridor but outside the active construction footprint, will be relocated and exhibited in a designated safe area to ensure its protection and continued visibility. The official coordination process between the Antalya Regional Board for the Protection of Cultural Heritage (ARHB), the General Directorate of Highways (KGM), and the Project Sponsor is ongoing to determine the final relocation site.	The completion of the excavations and the relocation and reconstruction of the structure are scheduled for Q2/Q3 2026.
HRM 37- Settlement	ARHB permitting process is ongoing. An application has been submitted to the Antalya Regional Board for the Protection of Cultural Heritage (ARHB) regarding this area. Following the route revision, the alignment has been shifted outside the boundaries of the 1st-degree archaeological site. However, since no design revision could be implemented within the 3rd-degree registered area, a test trench excavation was requested in accordance with the applicable legislation and will be carried out under the supervision of the Antalya Museum Directorate.	Excavations are scheduled to commence as of Q4, 2025.
HRM 42- Settlement	ARHB permitting process is ongoing. Vegetation clearance has been completed, the excavation contractor has been appointed, and trial trenches will be opened under the supervision of the Museum Directorate.	Excavations are scheduled to commence as of Q4, 2025.

Main aims of the mitigation measures regarding visual impacts are

Management of Blasting Impacts

To address blasting-induced risks and impacts, site-specific mitigation and monitoring measures have been developed in coordination with the Noise and Vibration assessment and are detailed in Table XIII.12 (Blasting-Induced Impact Mitigation and Monitoring Measures). These measures ensure that all potential effects—including ground vibration, air shock, and flyrock—are managed within acceptable thresholds and in compliance with the requirements of the ARHB and the Museum Directorate.

To manage and minimize potential impacts from blasting—including vibration, air shock, and flyrock—site-specific mitigation measures have been developed for each identified HRM location (see Table XIII.11). These include:

- Optimization of the charge per delay and use of delayed blasting;
- Application of protective blasting mats or coverings to prevent flyrock and reduce air shock;
- Real-time vibration monitoring near sensitive receptors;
- Coordination with the Antalya Regional Conservation Council (RCHB) and Museum Directorate prior to each blast;
- Suspension of blasting when exceedance risk is identified;
- Implementation of archaeological supervision and buffer zones at active work fronts.

The implementation of these measures will ensure that ground vibration, air shock, and flyrock remain within the safe threshold limits defined in Chapter XI.2.3, and no adverse effects are expected on cultural heritage receptors. Therefore, when properly applied, these mitigation actions are expected to prevent the occurrence of significant vibration-, air shock-, or flyrock-related impacts.

Table XIII-12 Site-Specific Vibration Measures for Cultural Heritage

Site	Explanation	Mitigations	Residual Impact	Monitoring
HRM 5	For HRM 5, salvage excavation is underway, with construction paused until the salvage excavation is finished. Construction activities will only proceed once the archaeological excavation has been fully completed and the necessary approvals have been obtained from the Board, the Municipality, and the Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. Upon permit approval, minimal explosive charges will be used to prevent damage to the site.	Wait until the excavation is finished	Change of location of the site; minumum impact on archaeological site	Archaeological surveys coordinated with the Museum Directorate.
HRM 6	Remains of an architectural structure, possibly from the Roman Period, likely representing a frontier garrison settlement. A dense accumulation of rubble stone and visible wall rows, which may belong to the structure, are present on the surface. Additionally, numerous roof tile fragments and a small number of sherds from daily use vessels have been observed.	No blasting will be carried out before the decision of the conservation board. After the decision, a control survey/drilling operation will be done on the area. The measures determined by the Board will be implemented based on the results of the survey.	-No impact on archaeological site	-
HRM 8	This area is a natural protected zone. Therefore, throughout the entire process, we will reduce the maximum charge per delay (kg) and conduct survey and monitoring activities through an external contractor.	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be placed at 53 m, with weekly ecological surveys and compliance reporting to the Ministry of Environment.
HRM 9	HRM 9 has not been registered by the Board (Permitting date and No.: 26.12.24/18914) and a construction permit has been granted for working on this area. But in case of Chance Find during the construction, Article 4 of Law No. 2863, the work is to be halted, and the Museum Directorate must be notified.	Visual inspections for chance find will be implemented. In accordance with Article 4 of Law No. 2863, if any archaeological remains are encountered during construction, all activities must be halted immediately and the Museum Directorate must be notified.	Negligible risk unless chance finds occur.	An on-site archaeological observer will monitor works, with immediate halting and notification to the Museum Directorate in case of chance finds (Law No. 2863).
HRM 16	Lowering the maximum Charge per Delay (kg).	For HRM 16, at 60 meters, the maximum charge per delay (kg) will be reduced. Use a charge of 2.2 kg with electronic detonators will be applied.	PPV: 4.968 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting.	Seismographs will be positioned at 60 m, and a pre-blast structural stability survey will be conducted.

Site	Explanation	Mitigations	Residual Impact	Monitoring
HRM 20	HRM 20 is a 1st degree archaeological site. This area is not located on the project route, but is located within the Dikmen Quarry. The HRM-20 registered archaeological site is an aqueduct that supplied water to the ancient city of Side. Because the area has been designated a first-degree archaeological site, the opinion of the Antalya Board will be sought before any activity begins. Additionally, a 100-meter buffer zone will be established between the blasting area and the archaeological site to provide protection, and no activity will be carried out within this zone.	a 100-meter buffer zone will be established between the blasting location and the archaeological site to provide protection, and no activity will be carried out within this zone. The opinion of the Antalya Board will be sought before any activity begins. A charge of 6.15 kg using electronic detonators will be employed. A 100 m buffer zone from the ancient waterway must be maintained. The site is currently on standby. If the appointed specialist contractor determines that blasting is not a viable option, mechanical breaking may be used as an alternative.	PPV: 4.968 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting.	Seismographs will be positioned at 100 m, and a pre-blast structural stability survey will be conducted.
HRM 38	The archaeological site lies at the summit of the hill, whereas the designated blasting area is located along the foothill. Given the topographical separation and distance, vibrations are expected to be attenuated. Furthermore, the recent design change led to the determination of the work area by the shoring (IKSA) wall, which established a clear boundary. Within this defined area, preventive measures can be implemented using a small amount of explosives or through mechanical breaking methods to minimize any potential impact as explained in the above paragraphs.	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs. A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. Based on the external contractor the charge can be modified based on the attenuation.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be placed at 15 m and behind the IKSA wall, with structural surveys of the hill summit before and after blasting.
HRM 41	Lowering the maximum Charge per Delay (kg).	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be installed at 20 m to monitor vibration attenuation over distance.

Site	Explanation	Mitigations	Residual Impact	Monitoring
HRM 45	Lowering the maximum Charge per Delay (kg.	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be installed at 30 m to verify compliance with PPV limits.
HRM 50	Lowering the maximum Charge per Delay (kg).	Use a charge of 3 kg with electronic detonators.	PPV: 4.975 mm/s. Low or negligible risk, but nearing threshold. Monitoring recommended during blasting.	Seismographs at 70 m to monitor vibration attenuation over distance. Pre-blast survey.
HRM 51	Lowering the maximum Charge per Delay (kg).	Use a charge of 6.15 kg with electronic detonators.	PPV: 4.993 mm/s. Low or negligible risk, but nearing threshold. Monitoring recommended during blasting.	Seismographs at 100 m to monitor vibration attenuation over distance.
HRM 52	Lowering the maximum Charge per Delay (kg).	Use a charge of 6.92 kg with electronic detonators.	PPV: 4.999 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting.	Seismographs will be installed at 106 m to monitor vibration attenuation over distance.
HRM 53	Lowering the maximum Charge per Delay (kg).	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs .	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs at 29 m to monitor vibration attenuation over distance.
HRM 57	With the design change, the route was moved outside the archaeological site, reducing potential impacts. A preliminary survey will be done to assess the situation, and measures like reducing explosives use will be applied.	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible..	Seismographs will be placed at 10 m, with archaeological monitoring to ensure protection of heritage assets.

Site	Explanation	Mitigations	Residual Impact	Monitoring
HRM 58	With the design change, the route was moved outside the archaeological site, reducing potential impacts. A preliminary survey will be done to assess the situation, and measures like reducing explosives use will be applied.	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be placed at 10 m, with archaeological monitoring to ensure protection of heritage assets.

In the Table XIII-11, these measures ensure compliance with established ground vibration thresholds, 15 mm/s at 66.8 m and 8 mm/s at 98.4 m for quarries, and 10 mm/s at 86 m and 5 mm/s at 132.5 m for tunnels and cut-and-formation works, while protecting cultural heritage and nearby settlements. A minimum charge of 2 kg for 3 m hole (as common practice) (ANFO powder + dynamite) produces a peak particle velocity of 5 mm/s at a distance of 56.96 meters, establishing a conservative baseline for safe blasting near sensitive archaeological features. No blasting will be conducted within 56.96 meters; mechanical breaker's vibrations are not expected to affect the cultural heritage sites except for HRM 6 which is still being processed by the board.

Management of Visual Impacts

During the period of construction, following measures will be taken to migitage the indirect **visual impacts** with an objective of keeping the changes as small as possible and limiting the visibility of the adverse changes while ensuring the design and construction of the project in a manner that the project melts into the landscape:

- Existing vegetation to be protected will be fenced with temporary protective fencing before work commences on site, so that as much vegetation as possible could be protected to maintain the integrity of the landscape and the existing visual screening.
- Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts.
- The construction sites will be kept tidy and workers will have necessary knowledge/training about the issue.
- Temporary fencing will be implemented to obstruct intense construction activity areas.
- Implementation of landscape design along the road using vegetation compatible with the natural environment.
- Planting of appropriate tree and shrub species to create visual barriers.
- Establishment of green strips to reduce visual interaction between the project corridor and cultural heritage sites.

XIII.5.2. Management of Impacts on Intangible Cultural Heritage

Baseline information on **intangible** cultural heritage is provided in Section XIII.3.3.

During the **construction phase**, the following measures will be implemented along with the general mitigation measures given below:

- • Clearly demarcated buffer zones will be established and maintained around all designated cemeteries, prohibiting the entry of equipment except under approved procedures. vibration, dust and noise control measures will be implemented (e.g., low-vibration equipment, water spraying, acoustic barriers).
- Safe and uninterrupted access routes for relatives and community members will be provided, with signage and alternative pathways arranged where necessary.A formal Chance Find Procedure (CFP) will be applied in accordance with IFC PS8 and national law, ensuring immediate work stoppage, notification of the Museum/Heritage Authority, and written clearance prior to resuming work..
- In the pre-construction period, meetings will be held with the mukhtars. Dates of the activities, rituals, etc., for local days or more extended activity periods planned to be held in the region will be learned through meetings with the mukhtars and local people. The community will be prevented from being affected by the construction in possible customary practices that can be experienced locally.
- Mobility of the people and vehicles during the activities planned to be held in the region will not be prevented,
- Contractors and subcontractors will be trained on the code of conduct, including their approach to relations with local communities, during the employment phase and at regular intervals throughout the Project.
- Information regarding intangible cultural heritage will be provided to contractors and subcontractors on any site-specific sensitivity/issue (e.g., festival locations, dates, events, etc.).

Although no specific ICH elements within the immediate Project footprint are expected to be adversely affected, the SPV will continue engagement with the households in affected settlements to document potential ICH aspects that may not have been captured during the baseline assessments, ensuring

continued sensitivity to community traditions. Engagement and site observations will be conducted particularly in districts, villages, and neighbourhoods where cemetery areas are located. This work will proceed under the oversight and coordination of the Project Archaeologist and the Project CLOs. A review of Chapter XIII indicates that the ICH-related locations primarily comprise areas where the public congregates or performs religious rites—such as cemeteries—and that several such locations are affected by the Project, with some graves requiring relocation. Measures to be takend during grave relocation are separately addressed under Section XIII.5.3.

Mitigation measures and recommended actions identified during the **operational phase** for intangible cultural assets are given below:

- Permanent, sign-posted access routes will be maintained, and visiting hours or access arrangements agreed with the community shall be clearly communicated.Long-term environmental controls, such as dust suppression, traffic management, and drainage and erosion control, will be implemented to prevent gradual physical damage.
- Periodic community consultations will continue to identify evolving cultural needs and assess the effectiveness of mitigation measures.Cemetery-related cultural events and visiting patterns will be integrated into the site's operational management plan to ensure that ceremonies and rituals are not disrupted..

XIII.5.3. Grave Relocation Procedure

Baseline archaeological surveys also identified a number of cemetery areas, some of which have been formally registered and legally protected, while others continue to be used for modern burials. These sites therefore embody both historic graves and contemporary burial practices, attracting regular visits from families and community members. This dual character means that, alongside tangible heritage protection, the Project will also address the intangible heritage dimension associated with ongoing rituals and commemorative practices.

The relocation of graves is a highly sensitive process and will be implemented in line with national legal requirements and local practices. In all cemetery areas, where the alignment cannot be modified or where cemeteries are encountered incidentally, and in cases where modern-era cemeteries are affected by construction, Whenever work is required in any such area, the identified graves will be first reported by the SPV to KGM, and KGM will them **notify** the relevant public authorities, as detailed below. If graves identified during the archaeological baseline study are determined to be of **historical significance**, first the Regional Conservation Board will be notified. Through the Board's process, if the graves are confirmed to have **historical value**, the registration procedure will first be completed before relocation.

Grave relocation activities will be undertaken under the supervision of the Antalya Museum Directorate and ARHB, in accordance with relevant national legislation and IFC PS 8 requirements. This will include consultations with the relevant local authorities (the Municipality; the Ministry of Environment, Urbanization and Climate Change / Directorate of Local Administrations; the Directorate of Cemeteries). Official letters will be submitted to these entities; notices regarding the planned works in villages will be

posted; the public posting period will be monitored; and one-to-one meetings will be held with grave owners to obtain signed consent forms.

To manage these combined responsibilities, the Project will:

- Engage with stakeholders and communities through regular, documented consultations with families and local religious/community leaders, provide advance notice of planned works and agree on temporary access routes for visitors.
- Maintain access and demonstrate respect, ensuring uninterrupted and dignified access for relatives and visitors, establishing clearly marked buffer zones and, where necessary, applying quiet hours during ceremonies.
- Protect archaeological and heritage values by demarcating and fencing historic and modern graves separately, and implementing vibration, dust and noise controls during construction works near cemeteries.
- Implement Chance Find and monitoring procedures, including a formal Chance Find Procedure for any unexpected discoveries and continuous archaeological monitoring in high-risk areas.

Prior to construction, meetings will be held with village/neighbourhood headmen (muhtars) and the outcomes will be recorded. During the construction phase, potential construction-related issues will be identified through these meetings and the corresponding needs will be listed. As an initial action, during the muhtar meetings, communities will be informed to ensure that no difficulties are encountered regarding access to cemeteries; in addition to other potential complaints, it will be reiterated that complaints related to ICH can also be submitted through the established Grievance Redress Mechanism (GRM).

Through these measures, the Project will safeguard both tangible and intangible cultural heritage, protect legally registered cemeteries, respect ongoing burial traditions, and maintain full compliance with Turkish legal requirements and international standards such as IFC PS5 & PS8, World Bank ESS8, EBRD PR8 and ICCROM guidelines.

This matter will be monitored by the Project Archaeologist and the CLO team and will be reported regularly in the monthly reports.

This issue, detailed in the Stakeholder Engagement Plan, will be monitored by the Project Archaeologist and the CLO team and will be reported regularly in monthly reports (see ESIA Annex-9 SEP).

A Grave Relocation Procedure is presented in the appendices of the CHMP. The procedure to be followed is summarized below:

1- Identification of Need – Determining that a grave must be relocated due to project alignment or other compelling reasons.
2- Submission of Application – Submission of a formal request by the responsible parties (e.g., SPV, General Directorate of Highways, Municipality) to the relevant Metropolitan Municipality Cemetery Directorate.
3- Stakeholder Coordination – Engagement with relevant authorities including health institutions, religious representatives (e.g., imam), and families of the deceased.
4- Notification Stage – Written notifications will be delivered to the families of the deceased whose graves will be relocated.
5- Public Announcement (Mukhtars) – Public notices will be posted for 15 days in the offices of relevant mukhtars, ensuring coverage for all affected communities.

6- Local Newspaper Announcement – A notice will also be published in a local newspaper to ensure wider public awareness.
7- Selection of New Grave Site – The Metropolitan Municipality Cemeteries Directorate, in consultation with relevant authorities and affected families, will identify and approve a suitable new grave location within an officially designated cemetery area.
8- Start of Relocation – Within one week after the posting period, relocation works will commence under municipal supervision, with participation of a medical doctor, imam, and administrative staff.
9- Completion of Relocation – Due to the sensitive nature of the matter, all relocations will be completed as quickly as possible. The Metropolitan Municipality will coordinate the process and provide the necessary resources.
10- Support Services – If required, heavy machinery or other technical support may be requested from the Project Owner, and such requests will be met promptly.
11- Documentation and Reporting – All steps will be officially documented, including photographic evidence, grave identification, and new burial location, and reported to the competent authorities.

All necessary requirements are fulfilled within the competent authority, and the SPV and EPC will provide support if required.

Community engagement and respect for local sensitivities will be ensured throughout the process. By integrating both tangible and intangible cultural heritage considerations, the Project will ensure compliance with national legislation and international lender requirements.

XIII.5.4. Implementation of Commitments

The Project is committed to complying with both Turkish legislation and international standards on cultural heritage.

Ongoing engagement includes site investigations, training, and continuous consultation with the Antalya Regional Directorate for the Protection of Cultural Heritage, as well as coordination with the Antalya and Side Museum Directorates for excavation permits and monitoring. Commitments are summarized in Table XIII.13.

Table XIII.13 Cultural Heritage Commitments

No	Commitment	Project Phase	Responsible Party	Implementation Method	Monitoring / Reporting
1	Conducting archaeological baseline field surveys and notifying the Regional Conservation Board and Museum Directorate of the findings	Pre-Construction	Project Owner	Preparation of relevant documents	Follow-up by consultant and/or Project archaeologist, permit register tracking
2	Preparation of CHMP and Chance Find Procedure before construction begins	Pre-Construction	Project Owner	Preparation of relevant documents	Submission to contractors, implementation monitoring
3	Training of construction units and teams on actions to be taken in case of chance finds	Pre-Construction	Project Owner	Preparation of training materials and delivery of programme	Training records
4	In case of archaeological finds during construction, all works to be stopped and the Museum archaeologist informed	Construction	Contractor & Project Archaeologist	Staff training, site demarcation and marking	Incident reports, photographic and coordinate records

5	Establishment of protection buffer zones around designated archaeological sites	Construction	Contractor	Restriction of machinery access, installation of signage	Pre-construction survey reports or Site Monitoring Reports
6	Annual repetition of cultural heritage awareness trainings for new and ongoing staff	Construction & Operation	Project Owner & Project Archaeologist	Implementation of training programme	Training attendance lists, periodic reporting

XIII.5.5. Ongoing Statutory Engagement with the Regional Conseration Board (ARHB)

The Project Owner will maintain continuous statutory engagement with the Regional Conservation Board (ARHB) throughout the lifecycle of the Project. This engagement will be aligned with the Project schedule and will ensure that all cultural heritage management activities are conducted in compliance with national legislation and regulatory requirements.

The engagement programme includes:

- ***Pre-Construction Phase:*** Submission of baseline archaeological survey results to the ARHB for review and approval. Formal request for guidance and decisions on identified archaeological sites within the Project footprint (completed during ESIA process).

- ***Construction Phase:*** Regular updates to the ARHB on ongoing monitoring activities and chance find reports. Immediate notification of the ARHB in case of significant discoveries, followed by official correspondence and site inspections as required.

- ***Operation Phase:*** It is not expected that any cultural heritage assets will be affected during the operation phase, and no additional coordination with the Ministry of Culture and Tourism regarding cultural heritage areas will be necessary

The Project Owner will ensure that minutes of meetings, official correspondence, and ARHB decisions are systematically recorded and integrated into the Project's Environmental and Social Management System (ESMS). This structured engagement programme will guarantee timely regulatory approvals and ensure that cultural heritage management is fully aligned with the overall Project schedule.

XIII.6. Summary of Assessment and Residual Impacts

The impact assessment was conducted in accordance with the ICOMOS Guidelines for Heritage Impact Assessments, particularly those relevant to UNESCO World Heritage contexts. In alignment with IFC PS8, the assessment prioritized the preservation of cultural heritage in situ, especially in cases where sites are non-replicable or of significant value. As recommended in the archaeological baseline studies, the preferred mitigation strategy has been to avoid impacts by modifying the project alignment where archaeological sites were identified. Accordingly, the project design was revised in 15 locations to preserve cultural heritage resources in place, effectively minimizing potential residual impacts. This approach is consistent with the mitigation hierarchy outlined in PS8, which emphasizes avoidance, minimization, and in-situ restoration before considering relocation or compensation.

The studies being conducted by cultural heritage experts aim to identify unregistered sites in addition to the known registered sites. With effective implementation of the mitigation measures for conservation of these sites in accordance with this ESIA Report, it would be possible to reduce the significance of impacts to generally low levels. Cooperation with the regional conservation boards, implementation of Chance Finds Procedure and archaeological monitoring to be done by experts to be hired by the Project during the land preparation and construction phase is crucial for management of cultural heritage

corresponding to the Motorway route. The Project has already identified important sites. Therefore the Project is likely to contribute to the cultural and archaeological inventory of Türkiye and the still less known past of the region with these and possible new archaeological findings and the process to be conducted with the authorities within the framework of interdisciplinary archaeological studies.

Overall, the Project will be a benefit that contributes to the country's cultural and archaeological inventory through the implementation of appropriate techniques, methods and ESIA measures.

Assessments of archaeological and immovable cultural heritage will be conducted in accordance with the Impact Severity Classification Matrix in Chapter IV ("ESIA Methodology") (see **Error! Reference s ource not found.**).

XIII.6.1. Residual Impacts

Error! Reference source not found. summarizes the impacts caused by Project activities on the i dentified archaeological assets and residual impacts after mitigation measures are applied.

Land preparation and construction phase of the Project has the potential to cause vibration impacts as a result of activities such as blasting.

The assessment indicates that vibration from construction activities is likely to result in short term disturbance at nearby cultural heritage sites with varying sensitivities.

The residual impacts and assurance meaure of cultural heritage sites that can be potentially impacted by the recommended charge per delay of 10.82 kg have been assessed in Chapter XI.2.3 Table XI.36. However, these disturbances can be avoided and/or reduced by mitigation measures suggested above.

XIII.6.2. Monitoring

During the construction phase of the Project and road rehabilitation works, on-site archaeological monitoring should be conducted in order not to damage the listed identified cultural heritages.

During pre-construction surveys, the impact of construction activities on cultural heritage aspects will be considered, and vibration measurements will be repeated in areas deemed necessary. Vibration calculations will be updated to ensure that no damage will be caused to the archaeological heritage before construction begins.

Site- Specific Monitoring Commitments

Site-specific monitoring will be undertaken to assess and manage potential impacts on cultural heritage sites, particularly in relation to vibration effects from construction activities (e.g., blasting, piling, heavy vehicle movement). The following commitments apply:

- ***Baseline Monitoring:*** Prior to construction, baseline measurements of vibration levels must be conducted in the vicinity of known archaeological sites to establish reference conditions.
- ***During Construction:*** Continuous or periodic monitoring of vibration levels shall be carried out when works are undertaken near sensitive archaeological areas.
- ***Threshold Values:*** Monitoring must be based on national regulations and international best practice thresholds for vibration impact on built heritage.

- ***Blasting Activities:*** Where blasting near archaeological sites is unavoidable, it is recommended that the charge size be reduced. By conducting blasts with lower explosive quantities, the transmission of vibration impacts to archaeological sites shall be minimised. Details regarding the assessment of blasting and vibration impacts are provided in ESIA Chapter XI.2.3.

- ***Reporting:*** Monitoring results must be recorded, evaluated, and included in periodic cultural heritage monitoring reports submitted to the Project Owner and relevant authorities.

- ***Corrective Actions:*** If thresholds are exceeded, construction methods must be adapted (e.g., further reduction of blast charge, increased distance, or use of alternative equipment) to prevent damage to archaeological assets.

These monitoring commitments will be developed in consultation with the Antalya Regional Directorate for the Protection of Cultural Heritage and the Museum Directorate, to ensure full compliance with Turkish law and lender requirements.

Monitoring Methodology of Archaeological Sites and Cemeteries

In line with the requirements of the Cultural Heritage Management Plan (CHMP), regular monitoring provisions have been defined for archaeological sites, cemeteries and structural remains. In particular, cemeteries hold both tangible and intangible cultural heritage value, and therefore require monitoring during both the construction and operation phases.

Cemetery Areas

Because cemeteries represent both tangible and intangible cultural heritage, monitoring during the construction period is required in the sections where cemeteries are located. This requirement does not apply to every cemetery: for those listed sites where the route has been realigned, monitoring is not considered necessary and no specific commitments have been defined. For cemeteries located close to the final alignment, in order to ensure that community visits and commemorative practices are not adversely affected, regular post-construction monitoring is recommended at three- to six-month intervals.

Archaeological Sites

For areas identified in the CHMP as being adjacent to registered or potential archaeological sites, it is recommended that, where land acquisition has been completed, pre-construction investigations be undertaken. Prior to construction, machine-assisted trial trenching under the direct supervision of the Project Archaeologist may be carried out. In addition, within these sensitive areas, it is recommended that archaeological monitoring (watching brief) be implemented by the Project Archaeologist throughout the construction phase.

Relocated Structures (HRM-32)

Following the relocation of the structure known as HRM-32 to a secure location outside the Project impact area, monitoring at the new site is required. After the completion and restoration works, monthly surface inspections and reporting by the Project Archaeologist will be undertaken to track and record any potential construction-related damage.

Table XIII-14 Summary of the Assessments on Archaeological and Immovable Cultural Heritage

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction																			
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 1**	South of Kocayatak Antalya/Serik/Yukarıkocayatak	Cemetery	**1st Degree**	**Replicable**	**High**	Direct: * Physical disturbance of graves and burial context during excavation. * Restricted access and disruption of ceremonies and rituals Indirect Tangible: * Impact on social sensitivity and reputational perception * Vibration and dust impacts from construction Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	**Non-replicable**	Local	Long	**High**	Irreversible	One-off	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. * Document all graves prior to relocation, including photography, GPS mapping, and headstone inventory. • Heritage awareness training to all construction personnel will be provided before works commence. • Safe and uninterrupted access routes for relatives and community members will be provided. • Monitoring will be carried out by the Project Archaeologist continuously. • No activities will be carried out until the salvage excavation has been completed.	.	**Medium**
Archaeological and Immovable Cultural Heritage	**HRM 2**	South of Kocayatak Antalya/Serik/Yukarıkocayatak	Rural Settlement	**Not Registered**	**Replicable**	**Low**	Direct: • Possible physical disturbance of surface finds during construction activities. Indirect: * Potential vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist.		
Archaeological and Immovable Cultural Heritage	**HRM 3**	Serik K3 Interchange Access Road Km 8+800 Antalya/Serik Burmahancı	Rural Settlement	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: • Vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • If necessary, it is recommended to carry out a preliminary investigation along the project alignment, including survey and trial trenching. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Monitoring will be carried out by the Project Archaeologist continuously. • Quarterly monitoring (four times per year) is recommended.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 4**	Serik K3 Interchange Access Road Km 8+800 Antalya/Serik Belpınar	Settlement	**Not Registered**	**Replicable**	**Low**	Direct: • Possible physical disturbance of surface finds during construction activities. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 5**	Serik K1 Interchange Km 52+500 Antalya/Serik Deniztepesi	Cemetery	**Non Registered**	**Replicable**	**Low**	Direct: * Physical disturbance of graves and burial context during excavation. * Restricted access and disruption of ceremonies and rituals Indirect Tangible: * Potential vibration, air shock, fly rock and dust impacts from blasting and construction. * Impact on social sensitivity and reputational perception Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	Replicable	Local	Long	**High**	Irreversible	Occasional	**Major**	**Medium (A1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No activities will be carried out until the salvage excavation has been completed. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Provide safe and uninterrupted access routes for relatives and community members.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 6**	Serik K1 Interchange Km 52+500 Antalya/Serik Deniztepesi	Building Remains	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration, air shock, fly rock and dust impacts from construction • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	Occasional	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No blasting will be carried out before the decision of the conservation board. After the decision a drilling operation will be done on the area. The measures determined by the Board will be implemented based on the results. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts.		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	• Conduct continuous monitoring during and after blasting by the Project Archaeologist.		

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 7**	Serik K1 Interchange Km 52+500 Antalya/Serik Sarıabalı	Tumulus	**1st and 3rd Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: * Vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Monitoring will be carried out by the Project Archaeologist continuously.		**Low**
Archaeological and Immovable Cultural Heritage	**HRM 8**	Viaduct-4 Km 56+000	Manavgat Archeological or Natural Site Border	Natural Preservation Area	**Non-replicable**	**Medium**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration, fly rock and dust impacts from construction • Visual and contextual alteration from nearby construction works. * Impact on the ecologic structure in natural areas	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	Occasional	**Major**	**High (A2)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before,		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist. • Apply vibration and dust-control measures. • Weekly ecological surveys and compliance reporting to the Ministry of Environment will be maintained throughout construction.		

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 9**	Km 59+000 Antalya / Manavgat/ Taşağıl	Late Roman Settlement	**No Registered**	**Replicable**	**Low**	Direct: • Physical disturbance of surface remains and rubble stone layers from blasting. Indirect: * Potential vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	Occasional	**Major**	**Medium (A1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • Conduct continuous monitoring during and after blasting by the Project Archaeologist. • Weekly ecological surveys and compliance reporting to the Ministry of Environment.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 10**	Km 62+000 Antalya / Manavgat Taşağıl	Settlement	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: * Potential vibration and dust impacts from construction	**Adverse**	Non-replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Monitoring will be carried out by the Project Archaeologist continuously. • Quarterly monitoring (four times per year) by the Project Archaeologist is recommended		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 11**	Km 62+750 Antalya / Manavgat Taşağıl	Archaeological Settlement	**Non Registered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: * Potential vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Moderate**	**Low (B1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Document all visible features and artifacts through GPS mapping and photography before construction. • Establish a fenced buffer zone where feasible around visible remains. • Implement vibration and dust control measures (e.g., wetting surfaces, limiting heavy machinery use). • Provide heritage awareness training to all construction personnel.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 12**	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	Necropolis	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to land preparation and construction activities. Indirect: * Impact on social sensitivity and reputational perception	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Avoid any ground disturbance within the 1st Degree boundary; clearly demarcate and fenced buffer zone. • Conduct vibration baseline measurements and continuous monitoring during construction to ensure thresholds are not exceeded. • Apply dust-control measures (watering, surface cover) and limit heavy-equipment operation near the buffer. • Provide heritage-awareness training to construction personnel. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Monitoring will be carried out by the Project Archaeologist continuously.		**Low**
Archaeological and Immovable Cultural Heritage	**HRM 13**	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	Settlement	**Non Registered**	**Replicable**	**Low**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	• Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.		
Archaeological and Immovable Cultural Heritage	**HRM 14**	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	Cemetery	**1st Degree**	**Replicable**	**High**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Local	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist. • Provide safe and uninterrupted access routes	.	**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	for relatives and community members.		

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 15**	Taşağıl Interchange Access Road Antalya /Manavgat Taşağıl	Cemetery	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	Replicable	Local	Short	**High**	Irreversible	One-off	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No activities will be carried out until the salvage excavation has been completed. • Provide safe and uninterrupted access routes for relatives and community members.		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 16**	Km 70+400 Antalya /Manavgat Gündoğdu	Tumulus and Necropolis	**1st Degree**	**Non-Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration, fly rock and dust impacts from construction	**Adverse**	Non-Replicable	Restricted	Short	**Medium**	Irreversible	Occasional	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Document all visible surface materials (GPS, photographs) before construction. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.		**Low**
Archaeological and Immovable Cultural Heritage	**HRM 17**	Km 70+500 Antalya /Manavgat Yavrudoğan	Settlement	**Non Registered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: * Potential vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	• Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Confirm the precise location and ensure the 125 m distance is maintained throughout construction. • Apply dust suppression (water spraying, speed control) during excavation and haulage. • Conduct periodic inspections by the Project Archaeologist during nearby excavation works.		
Archaeological and Immovable Cultural Heritage	**HRM 18**	Manavgat K1 İnterchange Km 83+500 Antalya /Manavgat Yukarıışıklar	Mound	**1st Degree**	**Non-replicable**	**High**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 19**	Manavgat K3 İnterchange Km 88+000	Manavgat Waterfall Protected Area	Natural Preservation Area	**Non-Replicable**	**Medium**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Non-Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C2)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 20**	Manavgat K2 Interchange Km 84+000 Antalya /Manavgat Sarılar	Aqueduct	**1st Degree**	**Non-replicable**	**High**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	Occasional	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 21**	Manavgat Interchange Access Road Km 83+000 Antalya /Manavgat Yukarıışıklar	Settlement	**1st Degree**	**Non-replicable**	**High**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	.	**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 22**	Manavgat K3 Interchange Km 86+000	Aqueduct	**Non Registered**	**Replicable**	**Low**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 23**	Manavgat K4 Interchange Km 82+000 Antalya /Manavgat Hatipler	Cemetery	**1st Degree**	**Replicable**	**High**	Direct: • No direct impact expected following route change. Indirect Tangible: • No indirect impact expected following route change. Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	Replicable	Local	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Provide safe and uninterrupted access routes for relatives and community members. • No excavation, stockpiling, or machinery movement permitted within the confirmed cemetery boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**
Archaeological and Immovable Cultural Heritage	**HRM 24**	Manavgat K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	Mound	**3rd Degree**	**Non-replicable**	**Medium**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	Minor	**Low (C2)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure	.	**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.		
Archaeological and Immovable Cultural Heritage	**HRM 25**	Manavgat K4-K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	Tumulus	**NonRegistered**	**Replicable**	**Low**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	Minor	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 26**	Manavgat K4-K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	Hilltop Settlement	**1 st Degree**	**Non-replicable**	**High**	Direct: • No direct impact expected following route change. Indirect: • No indirect impact expected following route change.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	Minor	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 27**	Km 84+400 Antalya /Manavgat Yukarıışıklar	Settlement	**3rd Degree**	**Non-replicable**	**Medium**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: * Potential vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Moderate**	**Medium (B2)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	.	**Low**
Archaeological and Immovable Cultural Heritage	**HRM 28**	Km 85+900 Antalya/Manavgat Bucakşeyhler	Tumulus	**NoNRegistered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: * Potential vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	One-off	**Major**	**Medium (A1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	• Conduct continuous monitoring during and after blasting by the Project Archaeologist		
Archaeological and Immovable Cultural Heritage	**HRM 29**	Km 86+500 Antalya/Manavgat Bucakşeyhler	Aqueduct	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: * Vibration and dust impacts from construction • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 30**	Km 86+500 Antalya/Manavgat Bucakşeyhler	Fountain	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage due to land preparation and construction activities Indirect: • No indirect impact expected.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 31**	Km 87+00 Antalya/Manavgat Bucakşeyhler	Necropolis	**Non Registered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: • Vibration and dust from construction activities	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Moderate**	**Low (B1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 32**	Km 87+100 Antalya /Manavgat/Bucakşeyhler	Church Remains	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: * Vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	One-off	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No activities will be carried out until the salvage excavation has been completed. • Once all archaeological works have been finalized and construction permits have been granted, all construction activities must be carried out under the supervision of both the Museum archaeologist and the Project archaeologist. • The structure and other remains uncovered during the excavation will be relocated to a site close to their current location and in an area that will not be affected by the Project. At the new relocation site, monitoring of the structure is recommended. The structure will be completed and restored; however, to guard against any potential damage caused by construction activities, monthly monitoring is recommended, to be carried out by the Project Archaeologist through surface inspections and reporting.		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 33**	Km 87+700 Antalya/Manavgat Bucakşeyhler	Settlement	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage due to land preparation and construction activities Indirect: • No indirect impact expected.	**Adverse**	Replicable	Local	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultral Heritage **Intangible Cultural Heritage**	**HRM 34**	Km 87+500 Antalya/Manavgat Bucakşeyhler	Cemetery	**Non-Registered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to land preparation and construction activities * Restricted access and disruption of ceremonies and rituals Indirect Tangible: * Impact on social sensitivity and reputational perception Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	Replicable	Local	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document all graves prior to relocation, including photography, GPS mapping, and headstone inventory. • Provide safe and uninterrupted access routes for relatives and community members. • No excavation, stockpiling, or machinery movement permitted within the confirmed cemetery boundary.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 35**	Km 88+200 Antalya/Manavgat Bucakşeyhler	Building Remains	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: • Vibration and dust from construction activities	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 36**	Km 89+800 Antalya /Manavgat Ulukapı	Rural Settlement	**NonRegistered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to land preparation and construction activities Indirect: • Vibration and dust from construction activities	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 37**	Km 92+200 Antalya /Manavgat Aşağıışıklar	Settlement	**1st and 3rd Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage due to land preparation and construction activities Indirect: • Vibration and dust from construction activities	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	One-off	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 38**	Km 95+600 Antalya /Manavgat Aksaz	Settlement	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: • Vibration, fly rock, air shock and dust from construction activities	**Adverse**	Non-replicable	Restricted	Short	**Low**	Irreversible	Occasional	**Minor**	**Medium (C3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Cover sensitive areas with protective geotextile or sandbag barriers during blasting. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	overpressure near the site. • Based on the external contractor the charge can be modified based on the attenuation. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary.		

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 39**	Km 102+500 Antalya /Manavgat Hacıobası	Tumulus	**NonRegistered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: • Vibration and dust from construction activities	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Moderate**	**Low (B1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 40**	Manavgat Interchange East Access Road Antalya /Manavgat Hacıobası	Cemetery	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities * Restricted access and disruption of ceremonies and rituals Indirect Tangible: • Vibration and dust from construction activities * Impact on social sensitivity and reputational perception Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	Replicable	Local	Short	**High**	Irreversible	One-off	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No activities will be carried out until the salvage excavation has been completed. • Provide safe and uninterrupted access routes for relatives and community members.	.	**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 41**	Km 104+500 Antalya /Manavgat Uzunlar	Church or Build Remains	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration, air shock, fly rock and dust impacts from construction • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	Occasional	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Apply vibration and dust-control measures. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Quarterly monitoring (four times per year) is recommended.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 42**	Km 105+000 Antalya /Manavgat Uzunlar	Settlement	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	One-off	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Quarterly monitoring (four times per year) is recommended by the Project Archaeologist.		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 43**	Km 108+750 Antalya /Manavgat Kadılar	Cemetery	**Non-registered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to land preparation and construction activities * Restricted access and disruption of ceremonies and rituals Indirect Tangible: * Impact on social sensitivity and reputational perception Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	Replicable	Local	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document all graves prior to relocation, including photography, GPS mapping, and headstone inventory. • Provide safe and uninterrupted access routes for relatives and community members. • No excavation, stockpiling, or machinery movement permitted within the confirmed cemetery boundary.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 44**	Km 109+600 Antalya /Manavgat Kadılar	Potential Historical Plane Tree	**Non Registered**	**Replicable**	**Low**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: • Vibration and dust from construction activities • Visual and contextual alteration from nearby construction works. * Impact on the ecologic structure in natural areas	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C1)**	Since there is not any registered asset in that area; • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 45**	Km 112+250 Antalya /Manavgat Yalçıdibi	Cemetery	**Non-Registered**	**Replicable**	**Low**	Direct: * Physical disturbance of graves and burial context during excavation. * Restricted access and disruption of ceremonies and rituals Indirect Tangible: * Potential vibration,fly rock and dust impacts from construction * Impact on social sensitivity and reputational perception Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	Replicable	Local	Short	**Medium**	Irreversible	Occasional	**Moderate**	**Low (B1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • Provide safe and uninterrupted access routes for relatives and community members. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.	.	**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 46**	Km 112+250 Antalya /Manavgat Yalçıdibi	Yalçıdibi Waterfall	(Natural Preservation Area	**Non-replicable**	**Medium**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: • Visual and contextual alteration from nearby construction works. * Impact on the ecologic structure in natural areas	**Adverse**	Non-replicable	Restricted	Short	**Low**	Irreversible	One-off	**Minor**	**Low (C2)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**
Archaeological and Immovable Cultural Heritage	**HRM 47**	Alarahan K2 Interchange Access Road Km 116+000 Antalya/Alanya Alara	Çardaktepe 1st Degree Archaeological Site	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: • No indirect impact expected.	**Adverse**	Non-replicable	Restricted	Short	**Low**	Irreversible	One-off	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact.	.	**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	• Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		
Archaeological and Immovable Cultural Heritage	**HRM 48**	Konaklı K1 Interchange Access Road Antalya/Alanya Payallar	Building Remains	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: • Vibration and dust from construction activities • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Moderate**	**High(B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 49**	Konaklı K1 Interchange Access Road Antalya/Alanya Emişbeleni	Building Remains	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: • Vibration and dust from construction activities • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	One-off	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 50**	Km 134+000 Antalya/Alanya Emişbeleni	Building Remains	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration and dust impacts from construction • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	Occasional	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 51**	Km 136+200 Antalya/Alanya Toslak	Cemetery	**Non-registered**	**Replicable**	**Low**	Direct: * Physical disturbance of graves and burial context during excavation. * Restricted access and disruption of ceremonies and rituals Indirect Tangible: * Vibration and dust impacts from construction * Impact on social sensitivity and reputational perception Indirect ICH: Visual, Dust, Loss of Access, Noise	**Adverse**	Replicable	Local	Short	**Medium**	Irreversible	Occasional	**Moderate**	**Low (B1)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • Provide safe and uninterrupted access routes for relatives and community members. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 52**	Km 136+000 Antalya/Alanya Toslak	Settlement	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	Occasional	**Modarater**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 53**	Km 140+000	Building Remains	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration, fly rock and dust impacts from construction • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	Occasional	**Modarate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 54**	Alanya West Interchange Access Road End Antalya/Alanya Telatiye	Building Remains	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration and dust impacts from construction • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**
Archaeological and Immovable Cultural Heritage	**HRM 55**	Alanya West Interchange Access Road End Antalya/Alanya Telatiye	Building Remains	**1st Degree**	**Non-replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**Low**	Irreversible	One-off	**Moderate**	**High(B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	• Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		
Archaeological and Immovable Cultural Heritage	**HRM 56**	Km 56+750 Antalya / Manavgat Çakış	Building Remains	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration and dust impacts from construction • Visual and contextual alteration from nearby construction works.	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	One-off	**Major**	**High (A2)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts.		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
																	• Conduct continuous monitoring during and after blasting by the Project Archaeologist		

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 57**	Km 120+800 Antalya/Alanya İncekum	Settlement	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration, air shock, fly rock and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	Occasional	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • A design change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Quarterly monitoring is recommended.		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 58**	Taşağıl Interchange Access Road Antalya / Manavgat Taşağıl	Settlement	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration, fly rock and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**High**	Irreversible	Occasional	**Major**	**High (A3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • A design change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Apply vibration and dust-control measures. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Quarterly monitoring is recommended.		**Medium**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 59**	Located along the D-400 Highway and near the Taşağıl Access Road Antalya / Manavgat Taşağıl	Settlement	**3rd Degree**	**Non-replicable**	**Medium**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Moderate**	**Medium (B2)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Confirm permit validity with the Antalya Regional Conservation Board (RCHB) and maintain updated correspondence at site level. • All construction within or near the registered boundary must be archaeologically monitored. • Define and fence the approved work corridor using visible markers to prevent unauthorized entry into adjacent sensitive zones. • Mechanical stripping and excavation to be conducted under archaeologist supervision to identify and record any remaining finds. • In-situ documentation and sampling of any materials uncovered during construction, following the RCHB-approved salvage protocol. • Limit vibration and compaction by avoiding heavy machinery operation within 25 m of any structural remnants. • Implement dust suppression, sediment control, and controlled drainage to prevent erosion or runoff over sensitive areas. • Provide toolbox training for workers on archaeological awareness and reporting procedures.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Archaeological and Immovable Cultural Heritage	**HRM 60**	Located along the D-400 Highway and near the Taşağıl Access Road Antalya / Manavgat Taşağıl	Settlement or Necropolis	**1st Degree**	**Replicable**	**High**	Direct: • Potential physical damage to due to blasting, land preparation and construction activities Indirect: * Vibration and dust impacts from construction	**Adverse**	Replicable	Restricted	Short	**Medium**	Irreversible	One-off	**Moderate**	**High (B3)**	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. •No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist		**Low**
Operation Phase																			
Intangible Cultural Heritage	**HRM 1**	South of Kocayatak Antalya/Serik/ Yukarıkocayatak	Cemetery	**1st Degree**	**Replicable**	**High**	**Direct:** * Restricted access and disruption of ceremonies and rituals .	**Adverse**	**Non-replicable**	Local	Long	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• Maintain fencing and signage to prevent unauthorized access. • Conduct periodic monitoring in coordination with ARHB and the Museum Directorate. * Continue vibration monitoring if traffic load is high. • Prohibit maintenance activities or expansion within the buffer zone. • Implement community engagement to raise awareness and respect for the site. • Provide safe and uninterrupted access routes for relatives and community members.		**Low**

Affected Ecosystem Component	Historical Site Name	Location	Type	Registration Status	IFC PS 8 Heritage Value	Sensitivity / Value of the Resource / Receptor	Definition of Potential Impact (pre-mitigation)	Type of Impact	PS 8 Heritage Value	Impact Magnitude						Impact Significance (pre-mitigation)	Mitigation Measures		Significance of Residual Impacts
										Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Intangible Cultural Heritage	**HRM 15**	Taşağıl Interchange Access Road Antalya /Manavgat Taşağıl	Cemetery	**1st Degree**	**Replicable**	**High**	**Direct:** * Restricted access and disruption of ceremonies and rituals	**Adverse**	Replicable	Local	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• Maintain fencing and signage to prevent unauthorized access. • Conduct periodic monitoring in coordination with ARHB and the Museum Directorate. * Continue vibration monitoring if traffic load is high. • Prohibit maintenance activities or expansion within the buffer zone. • Implement community engagement to raise awareness and respect for the site. • Provide safe and uninterrupted access routes for relatives and community members.	.	**Low**
Archaeological and Immovable Cultural Heritage **Intangible Cultural Heritage**	**HRM 40**	Manavgat Interchange East Access Road Antalya /Manavgat Hacıobası	Cemetery	**1st Degree**	**Replicable**	**High**	**Direct:** * Restricted access and disruption of ceremonies and rituals	**Adverse**	Replicable	Local	Short	**Low**	Irreversible	One-off	**Minor**	**Medium (C3)**	• Maintain fencing and signage to prevent unauthorized access. • Conduct periodic monitoring in coordination with ARHB and the Museum Directorate. * Continue vibration monitoring if traffic load is high. • Prohibit maintenance activities or expansion within the buffer zone. • Implement community engagement to raise awareness and respect for the site. • Provide safe and uninterrupted access routes for relatives and community members.		**Low**

XIV. SOCIO-ECONOMIC ENVIRONMENT

This section examines how the Antalya-Alanya Motorway Project could affect the socio-economic environment of the region. It evaluates the impact of both the construction and operation phases of the Motorway separately. Desktop and field studies have been conducted to assess these impacts. This chapter covers the following:

- Assessment methodology and data sources,
- Baseline conditions of the socio-economic environment,
- Potential social impacts of the proposed project,
- Mitigation measures,
- Summary of assessment and residual impacts.

XIV.1. Assessment Methodology and Data Sources

XIV.1.1. Significance Criteria

The significance criteria for the impacts on socio-economic environment will be determined, as high, medium or low, based on the evaluation of magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter 4 (“ESIA Methodology”) will be used for the determination of the magnitude of impact on the socio-economic environment, while sensitivity/value criteria to be used in the scope of impact assessment is summarized in Table XIV.2

Detailed explanation of the sensitivity components for each resource/receptor is provided in the following “Baseline Conditions” section.

Evaluation of magnitude of impacts was based on the baseline conditions of the affected area and expert judgment (see Table XIV.1).

Table XIV.1 Impact Magnitude Criteria

Affected Resource/Receptor	Definition of Impact	Magnitude of Impact
Physical Displacement	Loss of residential structures requiring relocation of individuals or households due to land acquisition	High
	Effects on livelihood from livestock activities	Low
Restriction of Access to the Agricultural Lands and Greenhouses	Effects on livelihood from to the Agricultural Lands and Greenhouses	High
Infrastructures and Distribution of Utility Services	Effects on traffic and mobility	Medium
	Effects on infrastructures and utility services	Medium
Local Business	Physical displacement and loss of economic activities	High
Vulnerable Groups	Noise and Dust Emissions Generated by Construction Activities	High
Demographic Structure	Influence on local communities	Medium
Employment Opportunities	Opportunities for the local economy	Medium
Increase of Tension in Local Community	Increase of Tensions and Conflicts	Low

Table XIV.2 Criteria for Sensitivity/Value of Resource/Receptor

Affected Ecosystem Component	Definition of Impact	Sensitivity Criteria	Sensitivity/Value Level		
			High (3)	Medium (2)	Low (1)
Livelihood and Economic and Physical Displacement	Effects on livelihood from agricultural activities	• Settlements where agriculture is one of the main source of income • Settlements where access to agricultural areas will be restricted due to the Project • 10% of the total agricultural lands of the settlements • will be affected by the Project	3 Item	2 Item	0-1 Item
	Effects on Local Business	• Presence of businesses along or near the route • Businesses run by tenants or vulnerable groups • Disruption due to construction or reduced access	3 Item	2 Item	0-1 Item
	Effects on livelihood from livestock activities	• Settlements where livestock is one of the source of income • Settlements where access to pasture lands will be restricted due to the Project • Settlements where livestock activities are affected by the project	3 Item	2 Item	0-1 Item
Infrastructures and Distribution of Utility Services	Effects on traffic and mobility	• Settlement with a population ≥ 500 inhabitant • Settlements with single road access • Settlements benefiting from mobile schooling • Settlements with difficulties in access in winter	4 Item	2-3 Item	0-1 Item
	Effects on infrastructures and utility services	• Settlements with no municipal water supply • Settlements with electric cuts • Settlement with no sewage system	3 Item	2 Item	0-1 Item
Demographic Structure of Settlements	Influence on local communities	• Settlements experiencing out-migration or in-migration • Women ratio is above 52% • Presence of tensions and conflicts in the settlement	3 Item	2 Item	0-1 Item
Employment Opportunities	Opportunities for local economy	• Settlements with a population ≥ 500 inhabitant • Presence of industrial facilities within the 5 km buffer • Presence of organized industrial zones within the 5 km buffer • Settlements where unemployment is a major problem	4 Item	2-3 Item	0-1 Item
Increase of Tensions in the	Increase of Tensions and Conflicts	• Presence of tensions and conflicts in the	3 Item	2 Item	0-1 Item

Affected Ecosystem Component	Definition of Impact	Sensitivity Criteria	Sensitivity/Value Level		
			High (3)	Medium (2)	Low (1)
Local Community		settlement ● Presence of minorities ● Women ratio is above 52%			

**Sensitivity of this parameter will be taken as low, if none of the items on the left is applicable.*

XIV.1.2. Data Sources

Socio-economic investigations have two main components: desktop studies and field studies. Initially, information about the impact area and the settlements (such as land use and population data, etc.) was collected from various sources, including TurkStat. The sources used in the desktop studies are TURKSTAT 2023-2024, Antalya Provincial Directorate, Antalya Governorship. The field studies sources are ENCON Social Field Studies and GEM Resettlement Field Studies. The data obtained from site visits, and desk studies was used to plan and analyze social field interviews to be conducted along the planned Motorway route between June 3rd and June 6th, 2024.

In June 2024, Encon conducted a comprehensive four-day social field study as part of this process. The activities included:

Day 1: Interviews with professors from the Faculty of Agriculture and the Faculty of Tourism at Akdeniz University to gather academic and sectoral insights relevant to the project area.

Day 2: Headman interviews were conducted in Serik Central and Karataş neighborhoods. A focus group meeting was held in Serik Central, while another focus group took place in Taşağıl (Manavgat) with participants from diverse professions and age groups. Additionally, a separate focus group was conducted with elderly individuals representing vulnerable populations in Taşağıl.

Day 3: Multiple stakeholder focus group discussions occurred, including sessions with the muhktar of Ulukapı (Manavgat), road construction and site chiefs from the Manavgat Directorate of Public Works in Sanayi neighborhood, women from Ulukapı and Kalemler villages, and mixed groups of 9–14 participants from various professions and age ranges in Kalemler, Ulukapı, and Hacısali villages. Vulnerable elderly groups in Hacısali village were interviewed separately, and an individual interview was held with the president of the Manavgat Chamber of Agriculture.

Day 4: Interviews were conducted with the mukhtars of Karakaya (Manavgat) and Toslak (Alanya). Additional focus group discussions were held in the villages of Alara, Akdam, and Toslak (Alanya).

In addition, data used in this section is also based on the field report conducted with WSP on February, 2025, and the Resettlement Action Plan (RAP) Scoping Report prepared by GEM Sustainability Services and Consultancy Inc. for the Antalya–Alanya Motorway Project, dated May, 2025. This additional input helped to expand and cross-verify key data points gathered during earlier stages of fieldwork.

Three main tools used for quantitative and qualitative data collection during the social field study are described in questionnaires in Table XIV.3.

Table XIV.3Data Collection Tools

Tools	Description
Key Informant Interview	The key informant questionnaires were used as supporting tools for gathering information to make the research study more comprehensive. These questionnaires provided a way to verify information obtained from other data collection methods, ensuring the reliability of the data. Additionally, they helped gather preliminary information to support the use of other data collection methods. Within the scope of the project in total, the key informant questionnaires were applied in four (4) neighborhoods that are likely to be affected by the project: Serik/Merkez, Manavgat/Ulukapı, Manavgat/Karakaya, and Alanya/Toslak.. The main topics covered in the key informant questionnaires are given below: ● Population and Demographic Profile ● Socioeconomic Conditions ● Agriculture and Livestock ● Infrastructure Services ● Health/Education

Tools	Description
	• Facilities Related to Settlement Services, • Local Archaeological and Historical Monument Information, • Perceptions on the Project
Focus Group Interview	Focus group meetings are detailed interviews conducted with selective groups in accordance with an objective. The main purpose of the focus group meeting is to identify priorities and necessities of PAPs and vulnerable groups and also to identify direct and indirect effects of the Project. These meetings, which are important for taking stakeholders' thoughts, were applied by meeting moderator and an assistant. Within the scope of Supplementary ESIA studies, eight (8) focus group interviews were conducted with households and mukhtars in affected neighborhoods: Serik Merkez, Taşağıl, Kalemler, Ulukapı, Hacıisalı, Karakaya-Çakallar-Alara, Akdam, and Toslak-Telatiye (Konaklı)-Alara and vulnerable group interviews were conducted in those areas.
	Focus Group Interviews with Vulnerable Groups: In the case of reaching vulnerable/ disadvantaged groups (women-head households, unemployed young women/men, people with disabilities, older/young people in need of care, etc.), a separate semi-structured focus group study was conducted where possible with relevant questions. In the scope of ESIA studies, four (4) vulnerable groups' interviews were conducted.
Affected People / Key Stakeholders Interview	The interview gathered insights from key stakeholders, including NGOs, national / local organizations, and academic experts in the region. Five (5) unstructured interviews were conducted during the social field study to gather expert opinions and judgments.

The objective of the social field study (conducted on June 3-6, 2024) is to identify the area affected by the Project due to land acquisition and to assess the current socio-economic characteristics of the settlements. The interviews also aim to establish a database of measures and management strategies to evaluate potential social and economic impacts and prevent adverse effects on the socioeconomic living conditions in the settlements.

Socio-economic fieldwork is conducted to gain insight into the impact of settlements within a specific area and to collect both quantitative and qualitative data on the settlements being studied. Key informant and focus group interviews were conducted at intervals of approximately 20-25 km along the project route to gather a comprehensive understanding of the socio-economic environment. The goal was to cover about 15% of the road and surrounding corridor settlements.

Sample photographs from the field study are presented in between Figure XIV.1and Figure XIV.6. Additionally, in Figure XIV.7, a map shows the locations of the social field interviews were conducted.



Figure XIV.1 Interview with Woman in Kalemler Neighborhood



Figure XIV.2 Focus Group Interview with Women in Ulukapı Neighborhood



Figure XIV.3 Focus Group Interview in Taşağıl Neighborhood



Figure XIV.4 Meeting with academicians at Akdeniz University



Figure XIV.5 Focus Group Interview in Akdam Neighborhood



Figure XIV.6 Key Informant Interview with Mukhtar in Ulukapı Neighborhood



Figure XIV.7 The Map of Conducted Social Field Study Locations

XIV.2. Baseline Conditions

The project is carried out in Antalya, one of the provinces in West Mediterranean Region. It is a prominent city in Türkiye's Mediterranean Region, covering an area of approximately 20,177 km² with an average altitude of around 40 meters. The province comprises 77.8% mountains, 10.2% plains, and 12% rugged terrain. The Taurus Mountains cover three-quarters of the province's area, with many peaks exceeding 2500-3000 meters. Known for its stunning coastlines and rich cultural heritage, Antalya is considered Türkiye's capital city of tourism. It is the largest province in the Mediterranean region in terms of population. With a population of over 2.5 million (TURKSTAT, 2024), the GDP per capita in Antalya is around $14.828 (TURKSTAT, 2024). .

The province is well known for its tourism but also significantly contributes to agricultural production, exceeding the average by 4.3%. In areas where intensive agriculture is practiced, employment opportunities are abundant, and the province's agricultural production is essential for its diversity and market-oriented approach. Antalya is one of the most important citriculture provinces in the country, leading in orange production with a 30% share. Additionally, 80% of Türkiye's glass greenhouse area and 50% of the plastic greenhouse area are located in Antalya. The province also has a 90% share of cut flower production for the foreign market.

Regarding livestock activities, Antalya Province in Türkiye plays a key role in this area, with its significant population of small cattle. The province's landscape makes it conducive to goat farming, with goats being the predominant livestock. In the highland areas *(Yayla)*, goat and sheep breeding and some dairy cattle breeding are prominent, while dairy cattle and poultry farming dominate the coastal areas. While beekeeping primarily takes the form of migratory beekeeping, Antalya Province is an excellent region for wintering bees.

Specific indicators for the socio-economic development level of Antalya are presented in Table XIV.4. The table indicates that the number of automobiles per thousand people is approximately 178 for Türkiye on average. For Antalya, the number is 247, significantly higher than the national average. Another important indicator is the total electricity consumption per person, which are 3,348 KWh for Antalya and 3,386 KWh on average in Türkiye.

Table XIV.4 Indicators for Development Level of Antalya (TurkStat)

Indicators of Development Level	Türkiye	Antalya
Total Electricity Consumption per Person, 2023 (KWh)	3,390	3.736
Net Schooling Rate in Secondary School, 2022-2023 (%)	91.7	93.6
Level of Happiness by Provinces*, 2013 (%)	49.45	37.49
Number of Automobiles per thousand People (2023)	178	247
Number of Hospital Beds per Hundred Thousand People (2022)	307	282

**Note: Level of Happiness by Provinces is the proportion of surveyed population who declared that they are happy (Level 2)*

According to nomenclature of units for territorial statistics, Antalya is named as TR61 Level 2 territory together with Isparta and Burdur. Labor and Employment data and employment distribution by sectors are disclosed in Table XIV.5 and Table XIV.6, respectively below. According to data labor force participation rate in TR61 region is slightly higher than the Türkiye's average. While labor force participation in Türkiye is 53.3%, in TR61 it is more than 58.5%. Unemployment rate is significantly lower in TR61 region. The unemployment rate of Türkiye is around 9.4% and the rate is 7.2% in TR61. However, it is more than 7.4% in Antalya. As Table XIV.6 shows the sectoral distribution of employment in TR61 region, it is clearly seen that the agricultural employment is higher than the average. Compared to Istanbul (TR10), which is highly industrialized in Türkiye, agriculture and industry are in similar proportions in Antalya and its surrounding areas. While agricultural employment

is around 14.8% in Türkiye and less than 1 % in İstanbul, it is 16.1% of total employment in TR61 region.

Table XIV.5 Labor and Employment Data for 15+ Age Group (TurkStat, 2024)

Regions	Labor Force Participation (%)	Unemployment (%)	Non-agricultural Unemployment Rate (%) 2022	Employment Rate (%)
Türkiye	54.2	8.7	16,8	49.5
TR61 (Antalya, Isparta, Burdur)	58.1	5.8	-	54.7
Antalya	59	5.9	-	55.5

Table XIV.6 The Distribution of Employment by Sectors for 15+ Age Group (TurkStat, 2024)

Regions	Agriculture (%)	Industry (%)	Service (%)
Türkiye	14.8	27.3	57.9
TR10(İstanbul)	0.6	28.7	70.7
TR61 (Antalya, Isparta, Burdur)	16.7	16.6	66.7

XIV.2.1. Population

According to the data received from the Address-Based Population Registration System carried out in TurkStat, 2024, the population of Antalya Province is 2,722,103. The population of the province was 2,288,456 in 2015. Accordingly it can be said that the population of Antalya presents an increasing trend over the past years, with a population growth rate of 9.5 per thousand in 2024.

According to migration statistics, the net migration trend of Antalya is positive. In 2023, net migration in Antalya is 11.04 per thousand. Antalya province received the most immigrants from Konya. In addition, Antalya is a city that experiences both immigration and emigration from both domestic and foreign countries. Figure XIV.8 show the population change in years between 2015 and 2023 for Antalya.

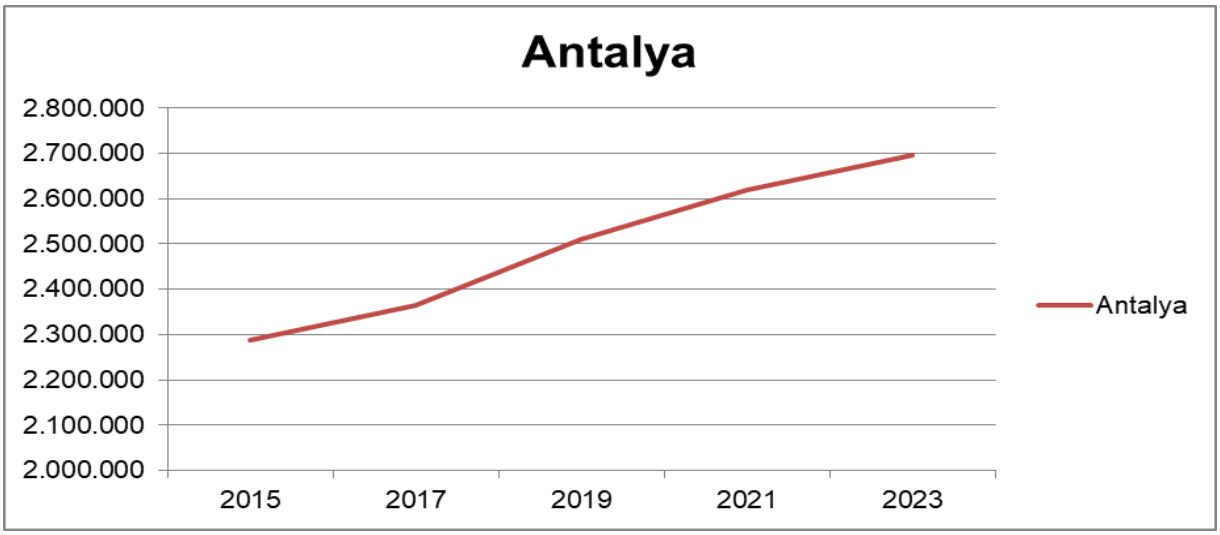


Figure XIV.8 Population Change of Antalya Province by Years (TurkStat, 2023)

The total fertility rate of Antalya province was 1.31 children per woman in 2023. By considering that the fertility rate of the province was 1.99 children per woman in 2015, it is understood that the fertility

rate has decreased within last years. In addition based on the results of TurkStat 2023; these rates are significantly lower than the fertility rate of Türkiye which is 1.51 children per woman.

When the age distribution of Antalya examined separately, it seems that the age group of 35-39 (8.41%) has the highest ratio within the population. Table XIV.7 and Figure XIV.9 shows the population distribution of Antalya province by age groups and gender.

Table XIV.7 Age Groups and Male-Female Population Distribution of Antalya Province (TUIK, 2024))

Antalya				
Age Group	**Female**	**Male**	**Total**	**Percentage (%)**
0-4	68,429	72,819	141,248	5.19%
5-9	91,667	97,114	188,781	6.94%
10-14	94,735	101,007	195,742	7.19%
15-19	92,051	98,927	190,978	7.02%
20-24	88,453	94,316	182,769	6.71%
25-29	97,348	102,193	199,541	7.33%
30-34	99,791	100,414	200,205	7.35%
35-39	107,644	105,987	213,631	7.85%
40-44	114,214	114,809	229,023	8.41%
45-49	104,748	107,290	212,038	7.79%
50-54	96,521	98,003	194,524	7.15%
55-59	77,968	80,504	158,472	5.82%
60-64	70,870	69,631	140,501	5.16%
65-69	54,044	51,058	105,102	3.86%
70-74	38,990	35,035	74,025	2.72%
75-79	26,842	21,575	48,417	1.78%
80-84	15,658	11,951	27,609	1.01%
85-89	7,855	5,244	13,099	0.48%
90+	4,105	2,293	6,398	0.24%
Total	**1,351,933**	**1,370,170**	**2,722,103**	**100%**

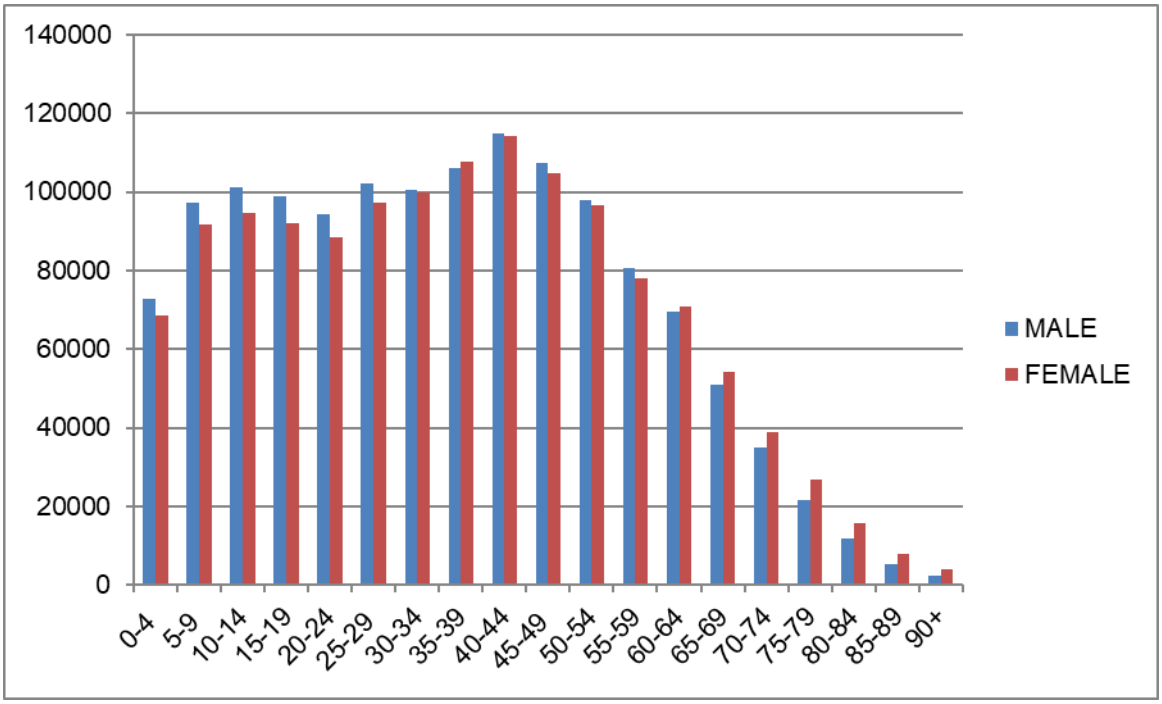


Figure XIV.9 Population of Antalya with Age Group and Gender Distribution (TUIK, 2024)

These population charts show that the population between the ages of 15-64 is predominant age group in the population of the city. As the total fertility rates show, the birth rates begin to decline yet the population growth rate of Antalya tends to increase. This indicates rapid immigration to Antalya.

Districts' populations of the province are given in Table XIV.8. According to the table, it is seen that Kepez is the most populous district in Antalya with 629,479 inhabitants, Muratpaşa (509,444 inhabitants), and Alanya (361,873 inhabitants) are the second and third and Manavgat (262,576 inhabitants) is the forth. On the other hand, İbradı (3,411 inhabitants) is considered to be the district with the lowest population.

Table XIV.8 District Populations of Antalya (TurkStat, 2024))

Districts of Antalya	Male	Female	Total	Percentage
Akseki	5,312	5,234	10,546	0.39%
Aksu	42,187	40,373	82,560	3.03%
Alanya	183,503	178,370	361,873	13.29%
Demre	14,291	13,523	27,814	1.02%
Döşemealtı	47,781	42,791	90,572	3.33%
Elmalı	22,174	19,679	41,853	1.54%
Finike	25,837	25,783	51,620	1.90%
Gazipaşa	27,975	27,387	55,362	2.03%
Gündoğmuş	3,677	3,676	7,353	0.27%
İbradı	1,760	1,651	3,411	0.13%
Kaş	32,988	30,933	63,921	2.35%

Districts of Antalya	Male	Female	Total	Percentage
Kemer	26,006	24,430	50,436	1.85%
Kepez	319,578	309,901	629,479	23.12%
Konyaaltı	93,551	102,528	196,079	7.20%
Korkuteli	29,552	29,176	58,728	2.16%
Kumluca	37,962	37,079	75,041	2.76%
Manavgat	135,252	127,324	262,576	9.65%
Muratpaşa	247,953	261,491	509,444	18.72%
Serik	72,831	70,604	143,435	5.27%

XIV.2.2. Education

Education in Turkey is administered under the oversight of the Ministry of National Education and the Council of Higher Education. Since a 2012 reform, the country mandates 12 years of formal schooling, divided into three stages: primary (grades 1–4), lower secondary (grades 5–8), and upper secondary (grades 9–12). While public schooling is provided free of charge and enrollment rates at the primary and secondary levels have improved significantly over the past two decades, disparities persist in terms of quality, infrastructure, and access - particularly between urban and rural areas.

Overall literacy in Turkey stands at approximately 97%, with a notable closing of the gender gap over recent years. Nevertheless, regional variations in educational attainment remain considerable. Urban centers typically offer better access to schools, qualified teachers, and extracurricular services, while smaller rural settlements often contend with limited resources, fewer qualified staff, and logistical challenges in accessing higher-level schools. In many rural areas, secondary education is only accessible via bus transportation systems provided by provincial authorities.

Antalya Province, as one of Turkey's key coastal and tourism hubs, generally fares well in national education rankings. The province enjoys relatively high literacy levels - around 99% - and hosts a dense network of schools and vocational training centers, particularly in the city of Antalya. Higher education opportunities are anchored by institutions such as Akdeniz University, which serves tens of thousands of students including those in regional campuses like Alanya. However, despite these provincial-level strengths, intra-provincial disparities persist. In districts such as Serik, Manavgat, and parts of Alanya, particularly in villages along the proposed motorway corridor, field assessments indicate variable access to educational infrastructure and services.

These dynamics are further illustrated in the tables below, which provide disaggregated data on education levels by gender and age group for Antalya Province, as well as specific indicators from the districts of Serik, Manavgat, and Alanya. These tables help contextualize the educational landscape of the project-affected areas and inform potential mitigation strategies.

Table XIV.9 Educational Level of Male Population in Antalya by Age Group (TurkStat,2024)

Educational Level	Age Group												
	6-13	14-17	18-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Illiterate	3972	4	3	4	26	118	206	193	518	158	150	146	1117
Literate without Formal Education	79,757	613	417	238	408	831	784	546	1170	389	392	520	5601
Primary School	70617	4472	688	141	504	931	3228	11,849	23780	17,670	17,704	20,928	56,361
Lower Secondary or Equivalent Vocational School	896	70,328	17,701	9327	21,969	17,754	8,381	16,167	12,067	14,366	11,725	8,619	10,774
Upper Secondary or Equivalent Vocational School		2237	50636	32670	35,649	29,778	37,056	37,824	27,031	27,115	19,996	16852	18,680
College or University			1728	12,406	36,623	34,399	30,397	26,748	20,559	18,337	13,205	10061	19,848
Master's Degree (Including 5- or 6-Year Integrated Programs)				257	2441	3871	4090	4331	2607	2267	1750	1046	1444
Doctorate (PhD)					15	169	434	602	647	674	581	347	557

Table XIV.10 Educational Level of Female Population in Antalya by Age Group (TurkStat,2024)

Educational Level	Age Group												
	6-13	14-17	18-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Illiterate	3237	3	4	10	105	422	584	623	13	593	743	1117	1117
Literate without Formal Education	74,604	637	456	329	819	1632	1570	1235	52	1694	2290	4023	4023
Primary School	66883	3529	734	179	980	1624	7768	20,076	2604	28,306	28,204	31,949	31,949
Lower Secondary or Equivalent Vocational School	1173	65458	8,718	5,075	13,638	12,110	7,492	13,014	1,927	12,134	8,571	5,632	5,632
Upper Secondary or Equivalent Vocational School		3376	51,617	24,610	24,530	23,362	29,862	30,137	4,196	21,029	14,995	11898	11,898
College or University			2936	20,444	46,452	39,353	32,349	26,903	2,301	13,946	9,153	6061	6,061
Master's Degree (Including 5- or 6-Year Integrated Programs)				418	3826	4874	4421	4332	369	1547	976	549	549
Doctorate (PhD)					28	238	493	581	86	478	338	154	154

Table XIV.11 Formal Education Statistics of Antalya (TurkStat,2023)

Number of Students per Classroom	Vocational and Technical Upper Secondary Education	20
	Upper Secondary Education	22
	Primary Education	22
Number of Students per School	Vocational and Technical Upper Secondary Education	386
	Lower Secondary School (Middle School)	263
	Upper Secondary Education	374
	Primary School	282
Number of Students per Teacher	Vocational and Technical Upper Secondary Education	11
	Lower Secondary School (Middle School)	13
	Upper Secondary Education	11
	Primary School	17
Number of Students per Class Branch	Upper Secondary Education	25
	Primary School	22
	Vocational and Technical Upper Secondary Education	25
	Lower Secondary School (Middle School)	23

In Antalya Province, educational attainment levels show clear variation across age and gender groups. Among the male population (Table XIV.9), secondary and higher education degrees (middle school, high school, and university) are more common in the younger cohorts (ages 6–44), while the number of primary school graduates and individuals with no formal education increases significantly among those aged 45 and above. The number of postgraduate (master's and doctoral) graduates remains limited across all age groups and declines with age.

Among women, overall literacy and educational attainment are consistently lower than those of men across all age brackets. Illiteracy and primary-level education are especially prevalent among women aged 55 and over. In contrast, university and higher education degrees among women are primarily concentrated in the younger cohorts, with a significant drop observed in older age groups. The number of women with postgraduate degrees is markedly lower than that of men, further emphasizing the gender gap in educational outcomes (Table XIV.10).

These patterns suggest a strong age-related decline in educational attainment and highlight a persistent gender disparity across generations. The data indicates that women in Antalya, regardless of age, tend to have lower access to formal education compared to men.

According to 2023 data from the Turkish Statistical Institute (TurkStat), Antalya's total population stands at 2,722,103, with approximately 21% comprising individuals aged 5-19 - the core target group for formal education. This demographic structure has significant implications for educational infrastructure planning in the province.

Education statistics reveal that the average number of students per classroom is 22 for both primary and secondary schools, and 20 in vocational and technical secondary education (Table XIV.11). These figures suggest a generally manageable classroom density, although certain areas may face capacity pressure. The average number of students per school is 282 in primary, 263 in lower secondary, and 374 in upper secondary education, indicating the need for improved spatial distribution and planning of educational institutions.

The student–teacher ratio is highest in primary education at 17 students per teacher, potentially limiting individualized interaction at early stages of learning. Meanwhile, the number of students per class section ranges from 22 to 25 across all education levels, indicating a generally balanced classroom allocation.

Taken together, Antalya's demographic trends and existing education infrastructure suggest that the formal education system is largely capable of meeting current demand. However, continued population growth and regional disparities necessitate proactive measures - particularly capacity expansion at the primary level - to ensure equitable access and sustained quality across the province.

Table XIV.12 Educational Level of Male Population in Alanya by Age Group (TurkStat,2024)

Educational Level	Age Group												
	6-13	14-17	18-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Illiterate	487		1	2	2	8	20	18	13	17	11	13	133
Literate without Formal Education	10.142	117	58	36	40	107	110	80	52	56	45	63	814
Primary School	9.073	497	71	13	50	8	501	2.088	2604	2.936	2.689	2.785	6.112
Lower Secondary or Equivalent Vocational School	142	9.172	2.294	1.237	3.179	2.582	1.140	2.277	1.927	1.920	1.472	1.040	1.196
Upper Secondary or Equivalent Vocational School		357	7.126	4.498	4.728	3.697	4.527	4.386	4.196	3.182	2.272	1,859	1.924
College or University			187	1.545	4.419	3.707	3.186	2.855	2.301	1.877	1.317	938	1.868
Master's Degree (Including 5- or 6-Year Integrated Programs)				46	270	398	450	456	369	243	177	108	129
Doctorate (PhD)					1	20	79	79	86	70	57	24	55

Table XIV.13 Educational Level of Female Population in Alanya by Age Group (TurkStat,2024)

Educational Level	Age Group												
	6-13	14-17	18-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Illiterate	385	1	1	2	5	33	47	41	36	41	11	13	133
Literate without Formal Education	9.671	114	78	36	61	176	164	123	136	232	45	63	814
Primary School	8.533	335	46	26	90	136	1.201	3.175	3.653	4.029	2.689	2.785	6.112
Lower Secondary or Equivalent Vocational School	198	8.507	1.045	567	1.885	1.813	1.105	1.736	1.636	1.535	1.009	1.040	1.196
Upper Secondary or Equivalent Vocational School		564	7.972	3.453	3.296	2.897	3.330	3.218	2.910	2.266	1.520	1,859	1.924
College or University			398	2.530	5.384	4.077	3.159	2.684	1.951	1.302	833	938	1.868
Master's Degree (Including 5- or 6-Year Integrated Programs)				53	394	519	432	397	224	135	86	108	129
Doctorate (PhD)					2	31	62	77	56	34	25	24	55

Table XIV.14 Educational Level of Male Population in Manavgat by Age Group (TurkStat,2024)

Educational Level	Age Group												
	6-13	14-17	18-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Illiterate	430	2			1	14	22	19	14	12	38	13	170
Literate without Formal Education	8.384	75	54	22	33	75	52	39	37	34	134	50	729
Primary School	7.301	408	59	12	32	59	348	1.184	1.402	1.674	2.651	1.964	4.937
Lower Secondary or Equivalent Vocational School	74	7.382	1.834	977	2.346	1.887	967	1.847	1.683	1.639	1.299	871	825
Upper Secondary or Equivalent Vocational School		218	5.278	3.390	3.853	3.442	4.439	4.756	4.387	3.382	1.985	1539	1.182
College or University			164	1.188	3.368	2.823	2.507	2.107	1.783	1.498	1.027	708	1.065
Master's Degree (Including 5- or 6-Year Integrated Programs)				25	197	263	289	298	233	149	93	66	49
Doctorate (PhD)						10	13	29	24	30	17	21	23

Table XIV.15 Educational Level of Female Population in Manavgat by Age Group (TurkStat,2024)

Educational Level	Age Group												
	6-13	14-17	18-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Illiterate	317			1	7	35	46	41	39	38	46	84	84
Literate without Formal Education	7.756	70	33	32	72	130	135	123	71	134	226	539	539
Primary School	6.896	344	47	17	80	173	841	3.175	2.192	2.651	2.456	2.828	2.828
Lower Secondary or Equivalent Vocational School	115	6.897	707	453	1.405	1.235	818	1.736	1.350	1.299	824	500	500
Upper Secondary or Equivalent Vocational School		295	4.913	2.384	2.366	2.542	3.270	3.218	2.767	1.985	1.186	768	768
College or University			277	2.111	4.215	3.508	2.796	2.684	1.568	1.027	559	306	306
Master's Degree (Including 5- or 6-Year Integrated Programs)				35	327	378	320	397	159	93	52	18	18
Doctorate (PhD)					3	8	10	77	16	17	14	7	7

Table XIV.16 Educational Level of Male Population in Serik by Age Group (TurkStat,2024)

Educational Level	Age Group												
	6-13	14-17	18-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Illiterate	178	1			2	4	7	12	4	6	38	10	8
Literate without Formal Education	4.324	16	23	11	20	41	43	32	25	39	112	30	29
Primary School	3.932	277	59	9	22	47	177	643	814	1.063	1.753	1.383	571
Lower Secondary or Equivalent Vocational School	55	3.794	1.107	608	1.333	984	458	887	757	835	679	514	860
Upper Secondary or Equivalent Vocational School		135	2.547	1.692	1.944	1.521	2.061	2.007	1.937	1.589	870	929	556
College or University			91	628	1.768	1.552	1.287	990	766	681	392	316	3.672
Master's Degree (Including 5- or 6-Year Integrated Programs)				14	77	137	137	128	94	69	36	29	584
Doctorate (PhD)					1	6	5	4	13	14	15	7	39

Table XIV.17 Educational Level of Male Population in Serik by Age Group (TurkStat,2024)

Educational Level	Age Group												
	6-13	14-17	18-21	22-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Illiterate	160	1			6	33	45	41	46	38	32	39	39
Literate without Formal Education	4.047	24	29	15	48	108	98	123	79	112	178	341	341
Primary School	3.623	248	101	13	70	83	476	3.175	1.502	1.753	1.705	2.016	2.016
Lower Secondary or Equivalent Vocational School	69	3.569	521	365	890	679	370	1.736	635	679	456	293	293
Upper Secondary or Equivalent Vocational School		197	2.555	1.180	1.298	1.172	1.406	3.218	1.094	870	590	360	360
College or University			160	1.119	2.266	1.778	1.240	2.684	634	392	193	125	125
Master's Degree (Including 5- or 6-Year Integrated Programs)				25	147	184	158	397	51	36	13	8	8
Doctorate (PhD)					1	3	9	77	12	15	5	7	7

Educational Profile by Gender: Alanya, Manavgat, and Serik Districts

The educational profiles of Alanya, Manavgat, and Serik (Table XIV.12, Table XIV.13, Table XIV.14, Table XIV.15, Table XIV.16, and Table XIV.17) districts indicate a general trend of increasing educational attainment across generations and a narrowing gender gap, especially in younger cohorts. Illiteracy rates are relatively low overall but remain more prevalent among women in older age groups, particularly in Serik. This reflects historical barriers to female education access, which have gradually diminished in recent decades.

In all three districts, the number of individuals who are literate but have not completed any formal education is low and largely concentrated among the elderly, indicating improvements in the reach of basic education over time. Primary education levels are broadly comparable across districts, with slightly higher male representation in older age groups, reflecting earlier limitations in female enrollment and school completion.

Notably, women consistently outnumber men at the lower and upper secondary education levels, particularly in Alanya and Manavgat, suggesting enhanced access and retention for girls in recent decades. The trend is less pronounced but still visible in Serik (Table XIV.16, and Table XIV.17). At the tertiary level, including university and postgraduate education, male representation remains slightly higher, especially at the doctoral level. However, the increasing number of women attaining university and master's degrees across all three districts reflects shifting societal norms and improved educational opportunities for women.

These patterns collectively illustrate an upward trajectory in educational access and gender equity, although targeted interventions may still be necessary to address persistent disparities in higher education participation and adult literacy, particularly among women in older age groups.

XIV.2.3. Health Status

Aligned with IFC Performance Standard 4 (Community Health, Safety, and Security), this section presents a comprehensive assessment of the current health profile of Antalya Province, drawing upon statistical data from 2023. The analysis encompasses key factors such as demographic trends, healthcare infrastructure, service accessibility, health workforce distribution, emergency response capacity, and major health outcomes. This overview aims to evaluate the baseline conditions against which potential health-related impacts of the Project can be assessed, especially in terms of community vulnerability, system capacity, and service resilience.

Demographic and Dependency Characteristics

Antalya has a total population of approximately 2.7 million, characterized by a strikingly high urbanization rate of 99.1%, which is well above the national average of 88.8%. Only 0.9% of the population resides in rural areas, making it one of the most urbanized provinces in Türkiye. This reflects a densely populated urban structure, likely to affect both the demand for healthcare services and the spatial distribution of health infrastructure.

The province also exhibits a relatively young population profile. Individuals under the age of 15 make up 19.9% of the population, while only 9.7% are aged 65 or older. This results in a lower total dependency ratio (42.1%) than the national average (46.3%), particularly driven by a lower elderly dependency rate. These figures imply that the working-age population in Antalya carries a slightly lighter socio-economic burden, which can translate into increased healthcare utilization capacity and more predictable health-seeking behavior.

The demographic pattern indicates potential long-term stability in demand for maternal and child health services, alongside a future increase in demand for elderly care services. The table showing the relevant information is presented in Table XIV.18 below.

Health Infrastructure and Capacity

Antalya is currently served by 46 hospitals, offering a total of 7,545 beds, which equates to 28 beds per 10,000 residents - a figure slightly below the national average of 31.2. Despite this quantitative shortfall, the province compensates through quality: 89.4% of hospital beds are classified as qualified, reflecting modern equipment, adequate staffing levels, and compliance with national and international healthcare standards.

The number of intensive care unit (ICU) beds stands at 1,444, corresponding to 5.4 beds per 10,000 population, which is only marginally below the national rate of 5.7. These indicators suggest that the infrastructure is well-developed by national standards, particularly in terms of technical adequacy.

However, Antalya experiences significant seasonal fluctuations in population size due to its status as a major domestic and international tourist destination. These fluctuations - particularly during summer - can place severe stress on health infrastructure, especially ICU capacity, which is crucial for handling both trauma cases and complications of infectious diseases. The situation necessitates contingency planning, including surge capacity mechanisms for hospital admissions and emergency response. The table showing the relevant information is presented in Table XIV.19 and the spatial distributions are illustrated in Figure XIV.10 and Figure XIV.11 below.

Human Resources in Healthcare

Antalya's health workforce comprises 7,005 physicians, 6,921 nurses, and 8,635 other healthcare personnel, including technicians, paramedics, and support staff. The number of general practitioners (1,718) and specialist physicians (3,822) is indicative of a robust healthcare delivery model that combines primary and tertiary care services.

Nonetheless, when adjusted for population and seasonal influx, the healthcare worker-to-population ratio falls under pressure, especially during tourist seasons. Emergency departments, ICUs, and maternity wards are particularly susceptible to staffing strain. Strategic health workforce planning - including seasonal deployment of temporary personnel, training of local health professionals, and collaboration with national emergency medical services - can help alleviate this burden. The table showing the relevant information is presented in Table XIV.20 below.

Health Services Utilization

According to 2023 data, healthcare utilization rates in Antalya are high. Residents recorded over 14.4 million visits to primary healthcare facilities and 17.6 million visits to secondary and tertiary institutions, totaling more than 32 million medical encounters annually. On a per capita basis, physician visits reached 11.9, exceeding the national average of 11.4. Similarly, the per capita dentist visit rate is 0.70, slightly above the national rate (0.68).

These high rates of utilization indicate not only adequate access to healthcare services but also a high degree of trust in public health infrastructure. However, they also signal a need to ensure that infrastructure and human resources can keep pace with demand, especially in light of projected population growth and seasonal spikes. Preventive healthcare programs, such as regular screenings, vaccination campaigns, and family planning services, should be reinforced to reduce the burden on tertiary care. The table showing the relevant information is presented in Table XIV.21 below.

Emergency Health Services

Antalya operates 72 emergency care stations and is equipped with 118 ambulances. While this infrastructure appears adequate in absolute terms, a closer look reveals that each ambulance serves approximately 22,850 residents, which is considerably above the national average of 14,450 residents per ambulance. Similarly, each emergency care station serves about 37,448 people, again indicating potential service saturation.

Given the high rates of motor vehicle accidents during tourism seasons, combined with increased demand from non-residents, Antalya's emergency services may face delays in response times, limited coverage in rural or mountainous terrain, and reduced capacity for mass-casualty events. The table showing the relevant information is presented in Table XIV.22 below.

Mortality and Public Health Outcomes

Between 2020 and 2023, the leading causes of death in Antalya were cardiovascular diseases, neoplasms (cancers), and respiratory system diseases. COVID-19 significantly impacted mortality in 2020–2021, contributing to a temporary increase in total deaths, but its effect waned by 2023.

Notably, Antalya's infant mortality rate was 5.9 per 1,000 live births in 2023, which is substantially lower than the national rate of 10.0. Similarly, the under-five mortality rate stood at 7.7, compared to the national average of 14.5. These figures reflect effective maternal and child health services, access to immunization, and early disease detection mechanisms.

However, the region has seen increasing numbers of deaths due to chronic, non-communicable diseases, such as diabetes and neurodegenerative disorders, pointing to the need for expanded screening and lifestyle modification programs. Tables containing relevant information are presented between Table XIV.23 and Table XIV.26 below.

Table XIV.18 General Demographic Indicators, 2023

City	Total Population	Rural Population Ratio (%)	Urban Population Ratio (%)	0-14 Aged Population Ratio (%)	65 and Over Aged Population Ratio (%)	Child Dependency Ratio (Aged 0-14) (%)	Elderly Dependency Ratio (Aged 65 and Over) (%)	Total Age Dependency Ratio (%)
Antalya	2.696.249	0,9	99,1	19,9	9,7	28,3	13,8	42,1
Türkiye	85.372.377	11,2	88,8	21,4	10,2	31,4	15,0	46,3

Table XIV.19 Information on healthcare institutions in Antalya, 2023

City	Number of Hospital	Number of Bed	Number of Hospital Bed per 10.000 Population	Number of Qualified Bed	Number of Intensive Care Unit Bed	Proportion of Qualified Bed *	Intensive Care Unit Bed per 10.000 Population	Number of Family Medicine Unit	Population per Family Medicine Unit
Antalya	46	7.545	28,0	5.455	1.444	89,4	5,4	889	3.033
Türkiye	1.566	266.594	31,2	179.597	48.966	82,5	5,7	28.054	3.043

*Source: General Directorate of Health Services, General Directorate of Public Health
*Intensive care unit beds are not included.

Table XIV.20 Information on healthcare sector employees in Antalya, 2023

City	Specialist Physician	General Practitioner	Medical Resident	Total Physician	Total Dentist	Pharmacist	Nurse	Midwife	Other Health Personnel
Antalya	3.822	1.718	1.465	7.005	2.251	1.651	6.921	1.790	8.635
Türkiye	101.233	54.899	48.091	204.223	45.718	40.610	248.287	59.750	266.217

*Source: General Directorate of Health Services

Table XIV.21 Some Health Indicators in Antalya, 2023

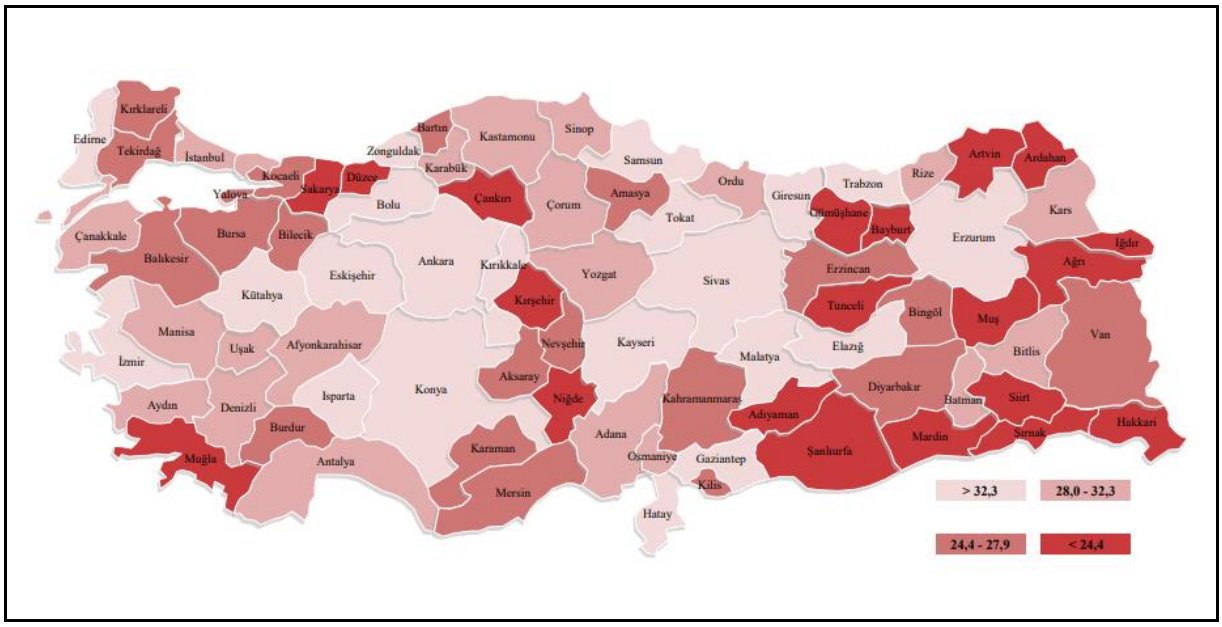
City	Primary Health Care Facilities Visits	Secondary and Tertiary Health Care Visits	Per Capita Physician Visits	Number of Dentist Visits	Per Capita Dentist Visits
Antalya	14.473.256	17.643.707	11,9	1.886.509	0,70
Türkiye	421.121.236	552.397.851	11,4	58.367.835	0,68

*Source: General Directorate of Public Health, General Directorate of Health Services

Table XIV.22 Emergency Response Resources in Antalya, 2023

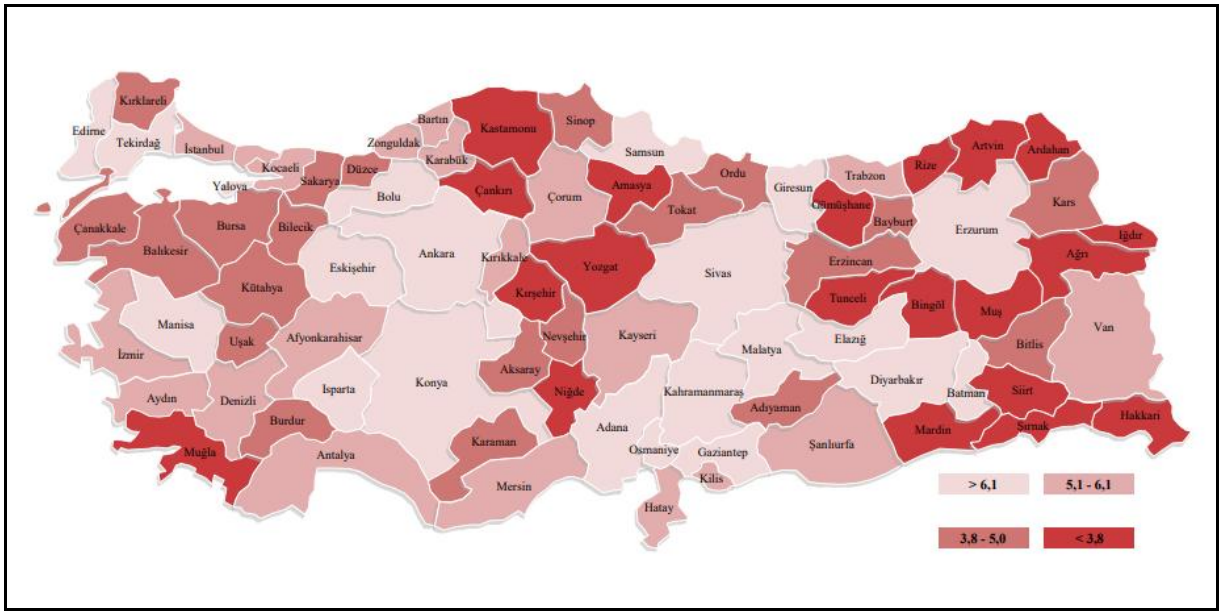
City	Number of Emergency Care Station	Population per Emergency Care Station	Number of Emergency Care Ambulance	Population per Emergency Care Ambulance	The Rate of Unfounded Incidents (%)
Antalya	72	37.448	118	22.850	10,3
Türkiye	3.420	24.963	5.908	14.450	11,1

**Source: General Directorate of Emergency Health Services*



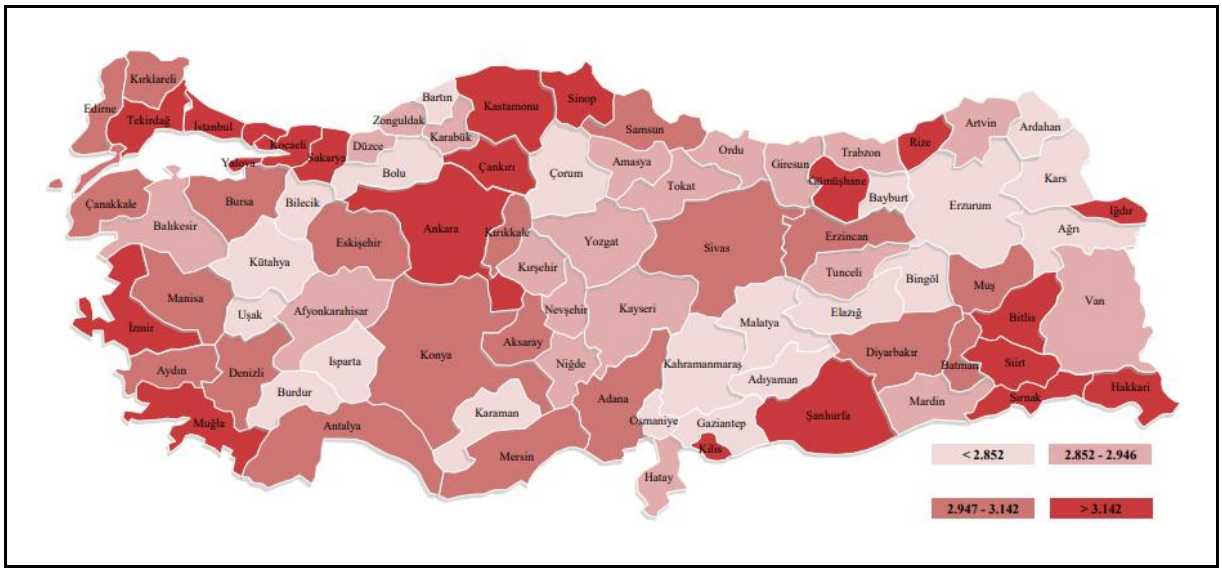
Source: General Directorate of Health Services

Figure XIV.10 Number of Hospital Beds per 10.000 Population by Provinces, All Sectors, 2023



*Source: General Directorate of Health Services

Figure XIV.11 Number of Intensive Care Unit Beds per 10.000 Population by Provinces, All Sectors, 2023



*Source: General Directorate of Public Health

Figure XIV.12 Populations per Family Medicine Unit by Provinces, 2023

Table XIV.23 Mortality by Cause Statistics (TurkStat, 2020-2023)

Province	Year	Total	Diseases of the circulatory system	Neoplasms	Diseases of the respiratory system	Diseases of the nervous system and the sense organs	Endocrine,nutritional and metabolic diseases	External causes of injury and poisoning	COVID-19	Other	Unknown
Antalya	2020	**12 342**	4 674	2 440	1 508	636	674	651	223	1 337	199
	2021	**15 647**	5 408	2 351	1 824	648	818	864	1 522	1 925	287
	2022	**14 228**	5 123	2 301	1 595	643	852	877	682	1 800	355
	2023	**13 722**	5 105	2 310	1 691	542	838	902	45	1 774	515

Table XIV.24 Infant mortality rate by provinces, 2018-2023 (per 1,000 live births)

Province	2018	2019	2020	2021	2022	2023
Türkiye	**9,3**	**9,3**	**8,7**	**9,3**	**9,2**	**10,0**
Antalya	7,1	6,6	5,8	6,9	6,8	5,9

* Source: TURKSTAT

Table XIV.25 Under five mortality rate by provinces, 2018-2023 (per 1,000 live births)

Province	2018	2019	2020	2021	2022	2023
Türkiye	**11,4**	**11,4**	**10,7**	**11,4**	**11,2**	**14,5**
Antalya	8,5	8,2	7,2	8,9	9,0	7,7

* Source: TurkStat, 2023

Table XIV.26 Mortality Statistics (TurkStat, 2023**)**

Mortality Statistics (2023)	Antalya	Antalya, Isparta, Burdur	Akdeniz	Türkiye
Infant Mortality Rate (per 1,000 live births)	5,9	6,5	12,3	10
Under-Five Mortality Rate (per 1,000 live births)	7,7	8,3	27,4	14,5
Crude Death Rate (per 1,000 population)	5,1	5,6	8,5	6,2

XIV.2.4. Socio-economic Baseline and Project-Affected People by Settlement

This section presents a detailed socio-economic baseline of the neighborhoods studied through key informant and focus group interviews, complemented by expropriation data and field surveys conducted between April and May 2025. The information highlights the primary economic activities and the extent of project impact on local livelihoods.

The total populations of the affected settlements are shown in Table XIV.27, with 2024 results announced by TurkStat. According to the 2024 data, the total population of the affected neighborhoods is 152,085 including district centers listed below.

In 2024, in Antalya, the Merkez neighborhood of the Serik District had the highest population with 17,969 residents, while the Sağırin neighborhood of the Manavgat District had the lowest with 163 residents. The population of the affected settlements, nearest motorway, and their proximity to the closest Project component are presented in Table XIV.27. Although not all are classified as settlement centers within the socio-economic area of influence, neighborhoods with land located within the expropriation corridor are also included in this table. Besides, within the corridor, distances are recorded as "0" if the Project Route passes directly over the closest building(s) of the settlement to the route.

Table XIV.27 Total Population of the Affected Settlements in Motorway's Corridor (TurkStat, 2024)

Districts	Neighborhoods	Nearest Approximate Motorway Km	Approximate Distance of the Settlement Center to Nearest Motorway Components (the nearest building) (m)	Direction with respect to Main Carriageway	Population (TurkStat, 2024)
Serik	Kozağacı	D400	0	South	1,005
	Yukarıkocayatak	D400	0	North	4,293
	Aşağıkocayatak	D400	5	South	1,393
	Kayaburnu	D400	10	North	983
	Dikmen	D400	17	South	836
	Çandır	D400	20	North	1,819
	Aşağıçatma	D400	1,175	South	204
	Cumalı	D400	20	Southeast	2,011
	Burmahancı	Serik Interchange Access Road	100	Northwest	1,193
	Merkez	Serik Interchange Access Road	25	Southeast	17,969
	Üründü	Serik Interchange Access Road	0	Northwest	889
	Kökez	Serik Interchange Access Road	12	Southeast	15,011
	Deniztepesi	Km 52+500	0	Northwest	982
	Sarıabalı	Km 53+500	0	South	1,117
Manavgat	Çakış	Km 57+000	0	South	1,818
	Sağırin	Km 57+500	540	Northeast	1,63
	Taşağıl	Km 60+500	0	Southwest	4,813
	Hocalar	Km 67+000	170	Southwest	477
	Gündoğdu	Km 70+000	65	Southwest	2,158

Districts	Neighborhoods	Nearest Approximate Motorway Km	Approximate Distance of the Settlement Center to Nearest Motorway Components (the nearest building) (m)	Direction with respect to Main Carriageway	Population (TurkStat, 2024)
	Yavrudoğan	Km 72+000	0	Southwest	1,853
	Kalemler	Km 76+000	12	South	341
	Evren	Manavgat Interchange Access Road	1,000	South	3756*
	Seki	Manavgat Interchange Access Road	100	South	3756*
	Ilıca	Manavgat Interchange Access Road	0	East	13,689
	Yeniköy	Km 79+000	125	Southwest	763
	Şişeler	Km 81+000	80	North	236
	Evrenleryavşı	Km 81+500	40	North	443
	Dolbazlar	Km 82+500	115	South	665
	Yukarıışıklar	Km 83+500	0	North	888
	Dikmen	Km 85+000	0	South	1,261
	Bucakşeyhler	Km 87+000	0	North	737
	Ulukapı	Km 90+000	0	Southwest	3,797
	Aşağıışıklar	Km 92+000	10	Southwest	1,595
	Demirciler	Km 93+000	320	Southwest	1,566
	Karaöz	Km 94+000	30	South	1,102
	Aksaz	Km 95+500	10	Southwest	786
	Hacıali	Km 97+000	40	South	332
	Cevizler	Km 98+500	5	Southwest	242
	Sülek	Km 100+000	360	Southwest	1,162
	Hacıisalı	Km 101+000	0	Northeast	364
	Hacıobası	Manavgat East Interchange Access Road	0	Southwest	581
	Karacalar	Manavgat East Interchange Access Road	1,375	Southwest	2,123
	Kızılot	Manavgat East Interchange Access Road	390	South	2,015
	Uzunlar	Km 106+000	0	North	348
	Çavuşköy	Km 106+000	300	Southwest	994
	Kadılar	Km 108+000	35	North	173
	Örenşehir	Km 110+500	0	South	998
	Yalçıdibi	Km 112+000	30	South	224
	Odaönü	Km 113+500	875	Southwest	308
	Karakaya	Km 115+000	0	North / South	452
Alanya	Çakallar	Km 117+500	0	Northeast	599

Districts	Neighborhoods	Nearest Approximate Motorway Km	Approximate Distance of the Settlement Center to Nearest Motorway Components (the nearest building) (m)	Direction with respect to Main Carriageway	Population (TurkStat, 2024)
	Alara	Alarahan Interchange Access Road	0	South	624
	İncekum	Km 122+000	430	Southwest	3,361
	Avsallar	Km 125+000	0	South	16,118
	Akdam	Km 127+000	0	South	1,393
	Türkler	Km 130+000	0	Southwest	4,949
	Soğukpınar	Km 133+000	0	North	401
	Emişbeleni	Telatiye (Konaklı) Interchange Access Road	0	South	1,607
	Toslak	Km 136+000	0	Northeast	3,722
	Telatiye (Konaklı)	Km 140+000	0	East	17,927
	Elikesik	Alanya West Interchange Access Road	10	Northeast	2,212

Distances are given as "0" if the Project Route passes directly over the closest building(s) of the settlement to the route.

**There are not two separate neighborhoods as Evren and Seki in TurkStat, the population of Evrenseki Neighborhood is written in both Evren and Seki neighborhoods in the table.*

The information regarding household/family size is obtained with key informant questionnaire and the data is analyzed based on settlements separately. According to the data, the common average number of household size in all four settlements is 3.8 people. Accordingly TurkStat, the average size of household in Antalya is 2.94 people. The average household sizes of the four settlements are presented in Table XIV.28.

Table XIV.28 Average Household Sizes in the Surveyed Neighborhoods (Social Field Study, June, 2024)

Neighborhood	Population (TurkStat 2023)	(A) Population (According to the Muktars,2024)	(B) Number of Household (According to the Mukhtars,2024)	(A/B) Average Household Size
Merkez	17,583	20,000	5,000	4.0
Ulukapı	3,689	4,000	1,200	3.3
Karakaya	461	470	120	3.9
Toslak	3,666	3,700	1,000	3.7
Total	**25,399**	**28,170**	**7,320**	**3.8**

Economic Activities in Surveyed Settlements

In the four primary villages where key informant interviews were conducted - Serik/Merkez, Manavgat/Ulukapı, Manavgat/Karakaya, and Alanya/Toslak - agriculture remains the cornerstone of the local economy. Mukhtars and community members consistently emphasized agriculture as the primary livelihood source. Specifically, irrigated agriculture and greenhouse farming dominate economic practices, supplemented by small-scale livestock husbandry, which functions as a secondary income stream.

The region's strong ties to tourism also mean that many households engage in tourism-related activities as a tertiary income source, often seasonally. Additionally, retirement pensions provide a supplementary financial base, though the relative economic contribution of livestock and agriculture to household income remains limited in some settlements (Encon Social Field Study, June 2024). The distribution of income sources by neighborhood is summarized in Table XIV.29.

Table XIV.29 Main Sources of Income in the Surveyed Settlements (Social Field Study, June, 2024)

Neighborhood	Primary Income Source	Secondary Income Source	Tertiary Income Source
Serik/Merkez	Tradesperson/Crafts	Tourism	Merchant
Manavgat/Ulukapı	Greenhouse cultivation -	Small ruminant farming	Irrigated agriculture
Manavgat/Karakaya	Greenhouse cultivation	Irrigated agriculture	Tourism
Alanya/Toslak	Greenhouse cultivation	Irrigated agriculture	Tourism

Project-Affected People by Settlement

This section presents a detailed socio-economic baseline of the neighborhoods studied, based on data obtained through key informant interviews, focus group discussions, field surveys (conducted in June 2024 by ENCON and in April–May 2025 by GEM Sustainability Services and Consultancy Inc. for the RAP Scoping Report), and expropriation records.

Serik District

In Serik district, the Project mainly affects agricultural parcels and greenhouse areas. Larger-scale parcel impacts are concentrated in certain neighborhoods, while smaller and fragmented plots create a risk of leaving orphan land behind. The presence of informal or non-formal structures in some settlements adds complexity to the compensation process.

Table XIV.30 Affected Parcels in Neighborhoods of Serik

Settlement	No. of Affected Parcels	Houses	Greenhouses	Workplaces
Deniztepesi	25	2	4	0
Sarıabalı	136	14	13	0
Üründü	74	10	14	0
Belpınarı	5	-	1	0
Burmahancı	75	2	3	0
Cumalı	71	1	3	1
Aşağıçatma	17	4	3	4
Çandır	35	-	-	-
Kayaburnu	10	-	-	-
Aşağıkocayatak	2	-	-	-
Yukarıkocayatak	9	-	-	-
Dikmen	3			

Manavgat District

Manavgat district records the highest number of affected parcels overall, reflecting its strong dependence on agriculture and pasture-based livelihoods. Greenhouses and residential structures are significantly impacted in several settlements, indicating a high level of vulnerability among households reliant on land-based income. Some neighborhoods are further challenged by informal tenure arrangements, which complicate expropriation and compensation. In addition, areas with elderly populations and the presence of common or forest lands display heightened social sensitivity and limited livelihood alternatives.

Table XIV.31 Affected Parcels in Neighborhoods of Manavgat

Settlement	No. of Affected Parcels	Houses	Greenhouses	Workplaces
Çakış	42	7	3	-
Taşağıl	226	15	11	1
Hocalar	136	1	-	-
Gündoğdu	14	-	-	-
Yavrudoğan	62	1	1	-
Çolaklı	49	3	-	-
Seki	57	3	1	-
Kalemler	213	5	8	-
Evren	95	4	6	4
Ilıca	26	1	1	-
Yeniköy	13	-	-	-
Şişeler	52	2	3	-
Evrenleryavşı	43	-	1	-
Dolbazlar	2	-	-	-
Yukarıışıklar	54	10	8	-
Dikmen	33	1	-	-
Bucakşeyhler	43	3	-	-
Ulukapı	27	-	2	-
Aşağıışıklar	93	2	2	-
Demirciler	4	-	-	-
Karaöz	44	-	1	-
Aksaz	26	2	3	-
Hacıali	39	-	-	-
Cevizler	29	-	-	-
Sülek	2	-	-	-
Hacıisali	91	-	1	-
Hacıobası	105	11	8	2
Kızılot	1		-	
Uzunlar	107	4	7	-
Kadılar	62	2	3	-
Örenşehir	23	2	6	-
Yalçıdibi	128	-	3	-
Odaönü	22	-	-	-
Karakaya	94	10	17	-

Alanya District

In Alanya district, intensive horticulture and greenhouse production dominate the local economy. Alara, Çakallar, and Akdam stand out with the densest concentration of affected greenhouses. Toslak and Emişbeleni are also significantly impacted, highlighting the vulnerability of households reliant on agricultural livelihoods.

Table XIV.32 Affected Parcels in Neighborhoods of Alanya

Settlement	No. of Affected Parcels	Houses	Greenhouses	Workplaces
Alara	354	16	15	-
Çakallar	143	13	12	-
Avsallar	6	2	-	-
İncekum	11	-	-	-
Akdam	105	11	29	-
Türkler	17	2	2	-
Payallar	4	-	2	-
Emişbeleni	154	14	52	3
Toslak	167	22	49	1
Elikesik	44	9	12	-
Telatiye	75	20	37	6

Sewerage and Waste Disposal

Based on the information gathered from key informant interviews, both surface and groundwater are commonly used for domestic and agricultural purposes in the Project-affected region. Typically, there are no sewage systems in the neighborhoods, but septic tanks are used in Ulukapı, Karakaya, and Toslak neighborhoods. Domestic solid waste is collected by the Municipality in each neighborhood. This situation is similar in the settlements where focus group interviews were conducted. The different infrastructure systems in the Merkez neighborhood can be attributed to its proximity to the city center and its more urbanized demographic profile. This neighborhood is urbanized in terms of both economic activity and settlement. Table XIV.33 provides details on the sewage and waste disposal methods in the neighborhoods that were interviewed.

Table XIV.33 Sewerage and Waste Disposal Methods in the Neighborhoods (Encon Social Field Study, June, 2024)

Neighborhood	Domestic Water	Quality of Domestic Water	Usage of Drinking Water	Type of Sewerage	Waste Disposal
Merkez	Municipal Water/ Spring water	Potable	Bottled water	Sewage System	Collects by Municipality
Ulukapı	Groundwater	Potable	Bottled water/ Groundwater	Septic Tank	Collects by Municipality
Karakaya	Surface Water (Alara Stream)	Potable	Surface Water	Septic Tank	Collects by Municipality
Toslak	Groundwater	Potable	Bottled water/ Groundwater	Septic Tank	Collects by Municipality

XIV.2.5. Ecosystem Services Review

In accordance with PS6, the Project's impact on ecosystem services, and the benefits that local communities derive from these services, must be assessed. Ecosystem services are utilized for domestic consumption and recreational activities. This evaluation is conducted through an integrated analysis of both biodiversity studies and socio-economic data gathered in the ESIA. These findings provide a comprehensive understanding of how ecosystem services in the Project area are utilized and the potential effects of Project activities on these services.

Most considerations of ecosystem services, including IFC PS6, group them into the following four categories:

- **Provisioning Services (Type I)**: These are the goods or products obtained from ecosystems include resources such as agricultural land, pastureland, beekeeping, forest products, and fisheries, which local communities rely on for income, consumption, and medicinal use.
- **Regulating Services (Type II)**: These involve the contributions to human well-being arising from an ecosystem's control of natural processes, such as climate regulation, disease control, erosion prevention, and essential water resources that support the local population.
- **Cultural Services (Type III)**: These are non-material benefits that people obtain from ecosystems such as recreation, spiritual values, and aesthetic enjoyment.
- **Supporting Services (Type IV)**: These are natural processes that sustain other ecosystem services such as nutrient cycling and primary production that maintain the other services.

Socio-economic and biodiversity studies conducted within the scope of the ESIA process identify relevant ecosystem services as explained in Table XIV.34.

Table XIV.34 Ecosystem Service

Ecosystem Service	Sub-Category	Ecosystem Service on the Project Route	Status
Provisioning Services			
Food	Crops	Grains	Mostly for household consumption;
		Vegetables	Greenhouse production is practiced in some villages.
	Livestock	Large / small cattle	Livestock and greenhouse farming are significant sources of

		Poultry	income, with animal husbandry playing an important role in rural livelihoods.
		Grazeland	
		Fisheries	Not practiced currently, previously small-scale for household consumption. (Israeli carp introduction caused people to stop fishing.)
	Apiculture	Beehives	Practiced as a hobby; not a significant income source.
	Wild food	Citrus fruits	The most significant produce in terms of income generation (citrus fruits generating the most)
		Olives	
		Pomegranates	
		Mushroom, herbs	Collected mostly for household consumption (e.g., thyme, sage).
Biological raw material	Timber and other wood products	Firewood	Collected from local forested areas for household use; most villages have no forest, except Sarıabalı (forest village) and small patches in Burmahancı, Deniztepesi, Üründü.
Freshwater	Agricultural irrigation		Irrigation uses rivers, reservoirs, and groundwater. Drip and sprinkler systems are common, though some areas still use traditional methods.

XIV.3. Social Impact Baseline and Risk Analysis

This section provides a focused assessment of human rights, gender issues, vulnerable groups, displacement, and cumulative social risks in line with the International Finance Corporation (IFC) Performance Standards (PS1, PS5, PS7) and Equator Principles (EP4). These assessments aim to identify groups that may face disproportionate impacts from the Project and propose mitigation strategies tailored to their needs. Data collection was based on primary field studies, including key informant interviews, focus group discussions, and demographic analysis.

XIV.3.1. Human Rights Assessments

In accordance with IFC PS1 and PS2, the Project commits to upholding international human rights and preventing discrimination based on gender or social status. Women in rural settlements often participate in informal agricultural labor without compensation or legal protection, making them economically and socially vulnerable. Gendered constraints in mobility, access to credit, and land ownership compound these risks. To address these concerns, a confidential and inclusive Grievance Redress Mechanism (GRM) will be implemented, ensuring that women have equal access to complaints mechanisms and project benefits.

XIV.3.1.1. Methodology

The assessment of social impacts and human rights risks associated with the project was carried out using a mixed-methods approach that integrated both qualitative and quantitative tools. To establish a comprehensive understanding of the local context, a detailed desktop review was conducted, focusing on secondary data sources, national legal frameworks, and relevant international standards. This was complemented by multiple site visits to project-affected areas, where direct observations were made regarding local socio-economic conditions, settlement patterns, and daily community life. In addition, semi-structured interviews were held with a wide range of stakeholders, including women, elderly individuals, local leaders (muhtars), small business owners, and representatives of public institutions such as the General Directorate of Highways (KGM) and the Manavgat Municipality. Social baseline data collection was conducted by ENCON and GEM using participatory methods that are consistent with international best practices, including IFC Performance Standard 1. This multi-layered methodology was designed to ensure that the perspectives of vulnerable groups and key actors were meaningfully incorporated into the assessment.

Identification of Vulnerable Groups

In accordance with international social standards and based on field data, the following groups have been identified as vulnerable due to their exposure to disproportionate risks and limited capacity to cope with project-related impacts:

Table XIV.35 Identification of Vulnerable Groups

Vulnerable Group	Risk Factors	Potential Impacts
Children	Age-related dependence; lack of protection mechanisms	Increased exposure to risks during construction; potential interruption in schooling
Children with Special Needs	Physical/mental developmental challenges	Limited access to education and health services; heightened vulnerability in emergencies
Out-of-School Children	Poverty, migration, or lack of educational infrastructure	Long-term social exclusion; reduced livelihood opportunities
Elderly (75+)	Frailty, limited mobility	Dependence on local care and health services; high risk of social isolation
Elderly Requiring Care (65+)	Chronic illness, inability to live independently	Disruption of caregiving networks; increased reliance on social assistance
Illiterate Adults	Lack of literacy skills	Exclusion from consultations, grievance mechanisms, and decision-making
Persons with Chronic Illness (heart, diabetes, kidney, etc.)	Health fragility	Limited ability to adapt to displacement or livelihood changes; higher health expenditures
Other Serious Health Conditions (cancer, Alzheimer, etc.)	Severe medical dependency	Barriers to mobility and participation; dependence on specialized care
Persons with Physical Disabilities	Mobility and accessibility barriers	Reduced access to health, employment, consultation, and grievance systems
Persons with Mental Disabilities	Cognitive/behavioral limitations	Risk of exclusion from support services; dependency on caregivers
Unemployed (actively seeking work)	Lack of stable income	Increased economic insecurity and stress due to project impacts
Seasonal Agricultural Workers	Informal and insecure employment conditions; lack of social protection	Risk of labor rights violations; limited access to healthcare, housing, and safe transport
Dependence on Natural Resources	Reliance on small-scale farming, livestock grazing, and collection of forest products; limited livelihood diversification	Loss of agricultural income; reduced access to pastures and forest resources; heightened livelihood insecurity
Green Card Holders	Reliance on state health support	Limited access to private health or social protection mechanisms
State Aid Beneficiaries	Poverty, dependence on social transfers	High vulnerability to shocks; limited capacity for self-recovery
Informally Employed Workers (no social security)	Precarious employment	Risk of labor rights violations; exclusion from compensation systems
Economically Displaced Households	Loss of >20% of productive assets	Food insecurity, income loss, potential migration
Female-Headed Households	Gendered division of labor; limited resources	Economic insecurity; risk of exclusion from decision-making
Landless Households	No secure tenure	Exclusion from land-based compensation schemes
Low-Income Households (below minimum wage)	Chronic poverty	Persistent economic marginalization; dependence on aid
Migrant Households (e.g., Syrian, Afghan)	Unsecure legal status, mobility	Exclusion from grievance systems, labor markets, and social protection
Ethnic or Linguistic Minorities	Language barriers; underrepresentation in governance	Risk of exclusion from consultations and compensation; cultural marginalization
Semi-Nomadic Yörük Communities	Seasonal migration routes; dependence on livestock and pastures	Disruption of transhumance patterns; loss of traditional livelihoods and cultural identity
Households Previously Affected by Expropriation	Cumulative dispossession	Heightened vulnerability to further livelihood disruption

The table below summarizes key rights-holder groups potentially affected by the Project, along with associated human rights risks and potential adverse impacts. The mitigation measures are detailed in XIV.5. Additionally, labour rights and child labour-related human rights risks, potential adverse impacts and mitigation methods are also discussed in detail in Chapter XVI.

Table XIV.36 Rights-Holders and Potential Human Rights Risks

Human Right / Group	Potential Human Rights Risk	Risk Level	Potential Adverse Impact	Mitigation Section
Housing (Physical Displacement)	Right to adequate housing	High	Loss of shelter; violation of settlement rights	RAP; compensation; resettlement
Economically displaced households	Loss of >20% of productive assets	High	Food insecurity; livelihood disruption; forced migration	RAP; Livelihood Restoration
Landless households	Lack of secure tenure	High	Exclusion from land-based compensation schemes	RAP
Livelihood (Agriculture / Livestock)	Right to livelihood	High	Loss of income; restricted access to productive land	RAP; Land access; support measures
Seasonal agricultural workers	Informal and insecure employment	High	Labor exploitation; income loss; OHS risks	LMP; OHS Plan; RAP
Low-income households	Chronic poverty; below minimum wage	Medium	Dependence on aid; exclusion from markets	RAP; Livelihood Restoration
Informally employed workers	Lack of social security	High	Exclusion from compensation; vulnerability to exploitation	LMP; RAP
Dependence on Natural Resources	Right to maintain livelihoods linked to agriculture, grazing, and forest products	High	Loss of agricultural income, reduced pasture/forest access, livelihood insecurity	RAP; Livelihood Restoration
Vulnerable Groups (Participation & Equality)	Right to participation and non-discrimination	High	Exclusion from consultations; unequal access to support	SEP; outreach measures; grievance mechanism
Illiterate adults	Limited literacy skills	Medium	Inability to understand project information or grievance procedures	SEP; tailored communication
Women / female-headed households	Gender inequality; unpaid care burden	High	Discrimination; loss of informal income; limited participation	Gender Action Plan; RAP
Elderly / chronically ill / disabled	Frailty; mobility and health limitations	High	Social isolation; barriers to services; higher health costs	RAP; Community health services
Migrants & refugees	Insecure legal status; lack of documentation	High	Exclusion from grievance systems; labor exploitation; marginalization	RAP; SEP (language-sensitive outreach)
Ethnic or linguistic minorities	Language barriers; underrepresentation	Medium	Exclusion from consultations; risk of cultural marginalization	SEP (Kurdish/Arabic materials)
Cultural Rights (Nomadic / Traditional Communities)	Right to cultural identity	Medium	Disruption of Yörük migration routes; loss of traditional practices	RAP; Cultural heritage management; route preservation
Labor Rights (Workers)	Right to safe and fair working conditions	Medium	Risks to OHS, fair wages, and access to remedies	LMP; HR procedures; worker grievance mechanism
Health & Safety (Dust, Noise, Traffic)	Right to health and a safe environment	Medium	Respiratory and psychosocial health risks; traffic accidents	H&S Plan; noise/dust control; traffic safety

XIV.3.2. Vulnerability Assessment

In accordance with IFC Performance Standards (2012), identifying and assessing vulnerable groups is essential, especially in projects involving land acquisition and potential displacement. These groups often experience disproportionate and sometimes irreversible impacts due to pre-existing disadvantages. Therefore, they are specifically recognized and integrated into both the Environmental and Social Impact Assessment (ESIA) and the Stakeholder Engagement Plan (SEP).

A targeted vulnerability assessment was conducted via social field studies in eleven neighborhoods within or near the project area. The assessment framework followed nine IFC risk factors:

- **Gender**: Female-headed households, widows, and divorced women
- **Age**: Elderly individuals living alone or without caregivers
- **Ethnicity**: Ethnic minorities or culturally marginalized groups
- **Poverty**: Individuals dependent on charity or unstable income
- **Disability**: Persons with physical or mental disabilities
- **Health Status**: Chronically ill or housebound individuals
- **Literacy**: Individuals with little or no formal education

- **Dependence on Natural Resources**: Households reliant on agriculture, livestock, or forest products
- **Migratory Status**: Unregistered or undocumented migrants (e.g., Syrians, Afghans)

In accordance with international social standards and based on field data collected by ENCON and GEM, the following groups have been identified as vulnerable due to their exposure to disproportionate risks and limited capacity to cope with project-related impacts: elderly individuals, children, households with chronic illnesses, female-headed households, low-income families, illiterate adults, state aid beneficiaries, and seasonal agricultural workers. The table below provides a summary of the identified vulnerabilities across the affected districts and neighborhoods within the Expropriation Corridor. While this table presents a qualitative overview of the key vulnerabilities observed at the neighborhood level, detailed quantitative data regarding the number of households and individuals under each vulnerability category are comprehensively presented in the Resettlement Action Plan (RAP). In addition, specific findings on Migratory Status and Nomadic Populations (Yörük Communities) have been presented separately below the table, as the former draws on both ENCON fieldwork and data from the Refugees Association, while the latter was identified during the desk study stage.

Table XIV.37 Vulnerable Groups in the Expropriation Corridor

District	Neighbourhood	Vulnerable Groups
Serik	Deniztepesi	Other significant health issues, Economically displaced household
	Sarıabalı	Physically displaced household, Economically displaced household, Landless household, Household s who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Unemployed (Although looking for a job), Chronic diseases, Children of school age who do not attend school, Illiterate, Mental Disability/ Issues, People who do not speak and/or understand Turkish
	Çandır	Economically displaced household, Household s who lose more than 20 percent of their total productive area
	Cumalı	Economically displaced household, Chronic diseases, Physical Disability, Mental Disability/ Issues
	Burmahancı	Economically displaced household, Landless household, Low income household, Household s who lose more than 20 percent of their total productive area
	Üründü	Economically displaced household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases
Manavgat	Çakış	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Elderly (over 65) in need of care, Illiterate, Physical Disability
	Taşağıl	Economically displaced household, Landless household, Household s who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Other significant health issues
	Gündoğdu	Economically displaced household, Low-income households, Chronic diseases
	Hocalar	Economically displaced household, Landless household, Household s who

District	Neighbourhood	Vulnerable Groups
		lose more than 20 percent of their total productive area, Low-income households, Elderly (over 65) in need of care, Illiterate, Chronic diseases, Unemployed (Although looking for a job)
	Yavrudoğan	Economically displaced household, Households who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Illiterate, Chronic diseases
	Çolaklı	Physically displaced household, Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Seasonal agricultural worker, Illiterate, Chronic diseases
	Seki	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Chronic diseases
	Kalemler	Economically displaced household, Households who lose more than 20 percent of their total productive area, Landless household, Women-headed household, Low income household, Elderly (over 65) in need of care, Chronic diseases, Physical Disability
	Evren	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases
	Yeniköy	Economically displaced household, Elderly (over 65) in need of care, Chronic diseases
	Şişeler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Children with special needs, Chronic diseases
	Evrenleryavşi	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Children with special needs, Chronic diseases, Unemployed (Although looking for a job)
	Yukarıışıklar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Illiterate, Physical Disability, Chronic diseases, Mental Disability/ Issues, Seasonal agricultural workers
	Dikmen	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area
	Bucakşeyhler	Economically displaced household, Low

District	Neighbourhood	Vulnerable Groups
		income household, Illiterate, Physical Disability, Chronic diseases
	Ulukapı	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Aşağıışıklar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Physical Disability, Chronic diseases, Other significant health issues
	Karaöz	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Aksaz	Economically displaced household, Landless household, Low income household, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Chronic diseases
	Hacıali	Economically displaced household, Low income household, Household resettled in the neighborhood after earthquake or other disasters (Fire), Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Illiterate, Chronic diseases
	Cevizler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Chronic diseases
	Hacıisalı	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Other significant health issues
	Hacıobası	Economically displaced household, Women-headed household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75, Chronic diseases, Physical Disability, Other significant health issues
	Uzunlar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75, Chronic diseases, Elderly (over 65) in need of care, Physical Disability, Other significant health issues
	Kadılar	Economically displaced household, Women-headed household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases,

District	Neighbourhood	Vulnerable Groups
		Other significant health issues, Beneficiary of governmental aid
	Örenşehir	Economically displaced household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Yalçıdibi	Economically displaced household, Women-headed household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75, Chronic diseases, Elderly (over 65) in need of care, Illiterate, Physical Disability, Other significant health issues
	Odaönü	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Karakaya	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Seasonal agricultural workers
Alanya	Alara	Economically displaced household, Women-headed household, Landless household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Illiterate, Chronic diseases
	Çakallar	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Chronic diseases, Mental Disability/ Issues, Beneficiary of governmental aid
	İncekum	Economically displaced household
	Türkler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases, Physical Disability
	Emişbeleni	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Illiterate
	Toslak	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Elderly (over 65) in need of care, Illiterate, Chronic diseases, Physical Disability, Mental Disability/ Issues, Employed without social security
	Telatiye	Economically displaced household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Elikesik	Economically displaced household, Landless household, Low income household, Illiterate, Chronic diseases, Seasonal agricultural workers

Migratory Status: Field research conducted by Encon in June 2024 identified Syrian citizens and other migrant groups under temporary protection, particularly in the Central District of Serik. Greenhouse owners in Serik, Manavgat, and Alanya districts have stated that they employ migrant workers. Seasonal workers are primarily Afghan and Syrian nationals. According to the RAP Report, registered and unregistered migrant workers are present in the neighborhoods of Emişbeleni, Aşağıçatma, Evren (registered), Toslak, and Çakış. According to the Refugees Association, as of May 2025, there are approximately 6,839 Syrians residing in Antalya. Tensions toward refugees have been reported, particularly in Serik. Project materials will be provided in Arabic to support inclusive participation. Additionally, necessary information will be communicated specifically by CLOs.

Nomadic Populations (Yörük Communities): Seasonal nomadic groups such as the Yörüks were identified along migration routes passing near the project alignment (~1,200 m away at times). Semi-nomadic communities are also present in Toslak, Ulukapı, and Karakaya. These groups often:

- Rely heavily on livestock grazing and pasture access
- Have low literacy rates and limited access to health services
- Are excluded from formal consultation due to their mobile lifestyle

To support them, the project will incorporate culturally sensitive engagement methods, preserve grazing corridors where feasible, and consider compensation or assistance through the Livelihood Restoration Plan.

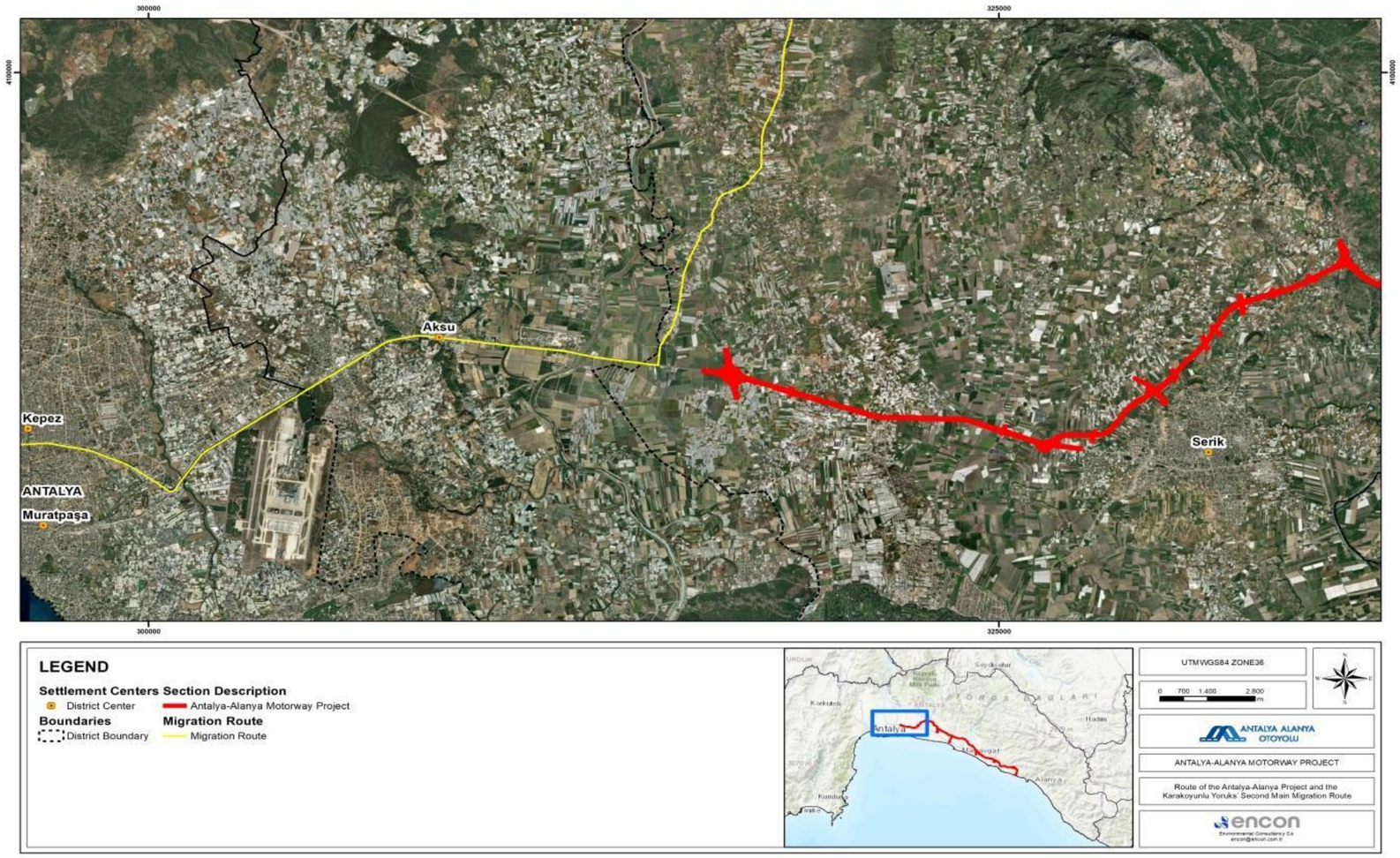


Figure XIV.13 The Migration Pathway of Nomads in the Region

XIV.3.3. Gender Assessment

The gender assessment for the Project has been conducted in line with international best practices, including the IFC Performance Standard 1 and 2, as well as relevant national policies promoting gender equality. The methodology is designed to identify and assess potential gender-specific impacts throughout the Project lifecycle and to inform appropriate mitigation and enhancement measures.

The gender assessment for the Project was conducted using a multi-faceted methodology aligned with international standards, aiming to identify gender-specific risks and opportunities throughout the Project lifecycle. As part of baseline data collection, available gender-disaggregated data on education levels, labor force participation, and access to services within the Area of Influence (AoI) were reviewed. This was supplemented by secondary data from national statistics and reports from NGOs working on women's rights and gender-based violence in Türkiye.

A stakeholder engagement analysis was also carried out to assess the participation of women in consultations and to evaluate the effectiveness of methods used to reach women and other marginalized groups, identifying any barriers in access to information and decision-making processes. Gender-related risks were then assessed separately for the construction and operation phases, focusing on potential constraints to employment, limited access to project information, and exposure to gender-based violence or harassment.

This analysis considered the local socio-cultural context, including entrenched patriarchal norms and the presence of a transient construction workforce. Findings from this process were integrated into the broader social impact assessment, ensuring a comprehensive understanding of how different demographic groups, particularly women, may be affected by the Project.

Finally, targeted mitigation measures were developed based on the identified risks and local context, aiming to promote gender equity, prevent gender-based violence, and ensure women's meaningful access to the benefits of the Project. This methodology ensures that gender is not addressed in isolation but is mainstreamed throughout project design, implementation, and monitoring activities.

XIV.3.4. Ecosystem Services

The assessment of ecosystem services impacts follows a structured, stepwise methodology. First, the relevant ecosystem services that may be affected by the Project are identified and prioritized according to their significance and connection to Project activities. Baseline data are then collected and analyzed to establish the current status of these priority services. Based on this information, the services are categorized according to their importance and the potential level of impact. The Project's likely effects on these services are subsequently evaluated, and appropriate mitigation measures are defined to minimize adverse impacts and ensure sustainable management of ecosystem services.

Ecosystem services provide a wide range of benefits; however, this Project primarily focuses on Provisioning Services (Type I) and Regulating Services (Type II), as these are most directly linked to the Project's activities and environmental aspects. There are no anticipated Project activities or effects associated with cultural services, such as sacred or recreational sites (Type III), or supporting services, such as soil formation and nutrient cycling (Type IV).

Accordingly, this section evaluates the Provisioning and Regulating Services, with emphasis on how Project activities may influence these services and the potential impacts on local communities and the surrounding environment.

Table XIV.38 Project Impacts Related to Ecosystem Services

Service	Ecosystem Service Type	Description	Impact Significance (Prioritization)	Mitigation
Agricultural land use, pastureland use, forest	Provisioning Services (Type I)	Greenhouse farming and animal husbandry are the predominant livelihood sources in the	High – direct impact due to land acquisition and	RAP including LRP is developed to provide fair compensation,

Service	Ecosystem Service Type	Description	Impact Significance (Prioritization)	Mitigation
products collection, beekeeping, fishing		settlements. Beekeeping practiced as a hobby practice. Certain agricultural lands and greenhouses will be acquired for the Project. Forest use and beekeeping activities are not common within Project AoI.	livelihood disruption	alternative livelihood support and resettlement assistance.
Water sources	Regulating Services (Type II)	Some settlements in the regions use spring and well water. These water sources are not expected to be impacted by Project activities since no water abstraction is anticipated for the Project, and surface waters will not be used as a water supply. As discussed in the Physical Impact section, if the construction of a groundwater well becomes necessary, this issue will be included in Water Quality, Wastewater and Storm Water Management Plan which will be prepared and implemented, and the impact factor of groundwater depletion will be assessed.	Low – no significant impact expected	Regular monitoring of water sources and quality; Development and implementation of a Water Quality, Wastewater and Storm Water Management Plan.
Sacred sites, scenic landscapes, recreational areas	Cultural Services (Type III)	No cultural services such as spiritual or recreational land use are present in the Project Area.	None	No mitigation needed.
Natural processes (nutrient cycling, pollination, habitat provision)	Supporting Services (Type IV)	No significant supporting services are identified in the Project Area.	None	No mitigation needed.

The Project's main impacts relate to provisioning services**,** particularly the loss of agriculture and pastureland. These impacts were addressed through RAP with livelihood restoration measures to provide compensation and alternative income opportunities. Early and continuous stakeholder engagement will ensure community participation and allow for the timely integration of additional mitigation measures where required.

XIV.4. Potential Impacts

Motorway projects have both negative and positive impacts from socio-economic standpoint. Loss of livelihoods (such as agricultural lands, structures, greenhouses etc.), impacts on social infrastructures, noise and dust emissions generated by construction activities can be characterized as negative impacts; while short and long term employment opportunities and transportation benefits can be described as positive impacts.

This section outlines the anticipated socio-economic impacts of the Project under two distinct phases:

- **Construction Phase**
- **Operation Phase**

In this ESIA Report, socio-economic impacts of other issues in relation to Chapter 5 ("Land Use and Property") and Chapter 15 ("Community Health and Safety") are dealt within more detail in the relevant chapters.

XIV.4.1. Land Preparation and Construction Phase

The construction phase - lasting approximately 3 years - will require significant workforce mobilization and large-scale infrastructure activities along the corridor. With an estimated peak workforce of 3,300, local employment from Serik, Alanya, and Manavgat districts will be prioritized; however, pressure on local infrastructure and services may arise depending on actual recruitment patterns.

Various social impacts are expected to occur within the scope of the Project's land preparation and construction phase. These impacts can be categorized as follows:

- Impacts on livelihoods due to the expropriation and land acquisition activities.
- Restriction of access to the agricultural and pasturelands due to the route design.
- Impacts on local business.
- Impacts of noise and dust emissions generated by construction activities on human health and livelihoods.
- Effects on infrastructures and distribution of utility services.
- Short and long term employment opportunities created by project activities.
- Changes in the demographic structure of the settlements.
- Increase of tensions and conflicts in the local community.

Livelihood, Economic and Physical Displacement

Despite efforts to minimize physical displacement through route selection, the current alignment of the Project still intersects with privately owned and public parcels containing residences, greenhouses, and commercial structures. According to expropriation data (GEM, May 2025), 935 structures will be affected in total, comprising 299 houses, 599 greenhouses, and 37 business structures (include 8 informal business structure in RAP).

Impacts on livelihood related to the project are addressed in detail through land acquisition studies and RAP. The primary impact related to the project is the loss of land and assets due to expropriation and land acquisition. Such processes, if unmanaged, can disrupt communities, reduce available agricultural land, and weaken cultural and social ties to the land. Alongside this, affected households and businesses face resettlement and livelihood displacement, leading to a potential decline in income, food security, and living standards if no restoration efforts are provided.

Another important impact arises from the shift in agricultural practices. The Project may disrupt greenhouse operations, affecting both owners and long-term tenants. Impacts include relocation to alternative land, partial loss of land or assets, or termination of operations where no suitable land is available. This can lead to temporary or permanent loss of income for affected households and businesses. This transition carries risks of skill gaps, adaptation challenges, and vulnerability to market fluctuations. To address these issues, LRP which packages have been developed as part of the RAP have been developed to mitigate the impact of knowledge and technical limitations, ensuring that farmers receive the necessary training and consultancy support to successfully adopt greenhouse farming, pest management, and modern cultivation techniques.

At the household and community level, displacement can create further social and psychological impacts, including stress, weakened social cohesion, and a sense of loss tied to farming traditions. Effective livelihood restoration and income-generating activities are therefore essential to maintain community well-being and stability. Finally, the mitigation measures also respond to the long-term economic risks associated with new livelihoods such as banana and tropical fruit farming, which may face challenges from pests, environmental factors, and uncertain market demand. By offering diverse and resilient livelihood options, the project aims to reduce these vulnerabilities and secure sustainable income sources for all affected groups.

These figures demonstrate that the Project's impacts extend beyond physical displacement to include significant risks to agricultural production systems and local economic activities. Displacement is expected to affect owners, tenants, and informal users in different ways, potentially leading to loss of shelter, livelihood insecurity, and psychosocial stress.

Although the overall scale of displacement is limited compared to the total project footprint, the impacts are nonetheless significant at the household level. Owners may face uncertainties regarding compensation or rental income, while tenants and informal users may struggle with the loss of housing or productive assets. Such stressors - emotional, economic, and social - must be anticipated and addressed in both compensation and resettlement planning.

In line with IFC Performance Standard 5 (PS5) and national legislation, a Resettlement Action Plan (RAP) has been prepared to address these risks. The RAP provides detailed socio-economic assessments and defines compensation, livelihood restoration, and support mechanisms, with a particular focus on vulnerable groups such as female-headed households, elderly persons, and people with disabilities. For a comprehensive breakdown of displacement impacts and settlement-specific data, reference should be made to the RAP Report.

Restriction of Access to the Agricultural Lands and Greenhouses

The motorway alignment intersects agricultural lands, greenhouses, and forest parcels, leading to the fragmentation of land and restricted access between separated plots. This is particularly disruptive in regions where irrigated citrus orchards and greenhouse farming are prevalent, as it directly affects agricultural productivity and operational efficiency.
According to findings from the social field study, such fragmentation may reduce yields, increase transportation and labor costs, and create logistical challenges - particularly for non-mechanized, small-scale farmers who rely on direct and continuous access to their plots. While pasturelands are not expected to be significantly affected, citrus and greenhouse cultivation areas face notable risks.
Key locations where access restrictions are expected to be most severe include:

- Emişbeleni (Alanya): 52 affected greenhouse plots,
- Toslak (Alanya): 49 affected greenhouse plots,
- Karakaya (Manavgat): 17 affected greenhouse plots.

In response, the Project design incorporates engineering structures - such as underpasses, culverts, and overpasses - to facilitate continued access. These structures are dimensioned to accommodate agricultural vehicles, including harvesters. However, residual access limitations may persist depending on local topography and land use intensity.

Spatial analysis further illustrates the site-specific variation in impact severity. For instance:

- In Merkez and Ulukapı, the alignment avoids core agricultural and residential areas.
- In Karakaya and Toslak, the route intersects directly with both residential zones and cultivated lands.
- In Taşağıl, the motorway cuts through forested areas, which may impact access and ecosystem continuity.

These differences are visually demonstrated in Figure XIV.14 through Figure XIV.18, which present route overviews near the respective neighborhoods.

These risks are addressed in accordance with the principles of IFC Performance Standard 5 (Land Acquisition and Involuntary Resettlement), which considers loss of access to land-based resources as a form of economic displacement. The Project will ensure that affected individuals - including informal and seasonal land users - are consulted and compensated where appropriate, and that access restrictions are minimized through design and mitigation measures. Accordingly, mitigation measures will be tailored to the local context of each affected settlement. Continued stakeholder consultation will be conducted throughout construction, and where technically feasible, design adjustments may be introduced to address access-related concerns raised by local communities.



Figure XIV.14 Overview of the Route Passing in Vicinity of Merkez (Serik) Neighborhood



Figure XIV.15 Overview of the Route Passing in Vicinity of Ulukapı Neighborhood



Figure XIV.16 Overview of the Route Passing in Vicinity of Karakaya Neighborhood

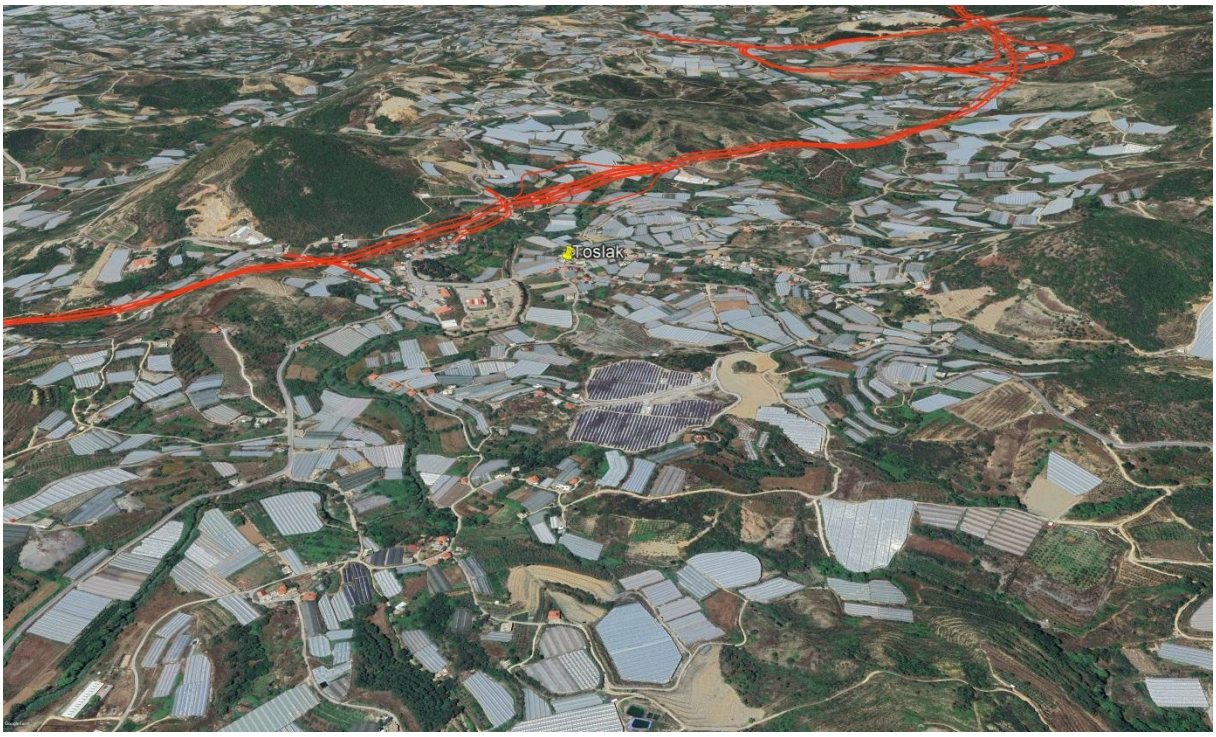


Figure XIV.17 Overview of the Route Passing in Vicinity of Toslak Neighborhood



Figure XIV.18 Overview of the Route Passing in Vicinity of Taşağıl Neighborhood

Impacts on Local Business

Economic displacement of local businesses - particularly tenant-run shops - is expected during the construction phase due to:

- Temporary road closures or detours,
- Dust, noise, and other nuisances,
- Reduced accessibility and customer traffic.

While local businesses are not highly concentrated, a total of 37 business structures have been identified as affected by the Project. These include small enterprises such as shops, workshops, and service providers.

These businesses, especially in tourism-dependent economies, may suffer seasonal revenue losses, particularly if construction overlaps with the high summer season. Where applicable, the Project will assess economic loss claims and compensate in accordance with Turkish law and IFC standards.

Effects on Infrastructures and Distribution of Utility Services

During the construction phase of the Project, the transportation of materials, equipment, and personnel will substantially increase traffic on the existing road network - particularly around campsites, quarries, and borrow pits. This additional traffic, primarily composed of heavy construction vehicles, is expected to result in travel delays, congestion, and accelerated deterioration of local roads, especially unpaved or poorly maintained ones.

Moreover, the use of heavy machinery and excavation works may place considerable strain on local infrastructure and utility systems. The risk of service interruptions is especially high where construction activities intersect with underground infrastructure such as:

- **Water pipelines**
- **Electricity lines**
- **Sewer systems**

Specific concerns include:

- **Road Network**: Vulnerable segments, especially gravel or dirt roads, may experience structural damage or temporary closures.
- **Public Utilities**: There is potential for unintentional disruptions to essential services, which could impact households and businesses in nearby communities.

Where planned utility disruptions are unavoidable, local authorities and affected communities will be notified in advance. In cases where disruptions are unplanned, information will be provided immediately, and a response mechanism will be triggered through the Project's grievance system to resolve the issue efficiently and transparently.

Noise and Dust Emissions Generated by Construction Activities

Construction activities, expected to span 2–3 years, will generate considerable levels of noise and dust, particularly in areas where surface works and earthmoving are taking place. These impacts, although temporary, are anticipated to be disruptive - especially during nighttime operations and in proximity to residential or agricultural zones.

Noise Pollution is expected to arise from excavation works, the movement of heavy vehicles, and general construction operations. Continuous exposure, especially at night, can affect the well-being of nearby communities and disturb local living conditions.

Dust Emissions will mainly result from surface excavation, transportation of materials, and the disturbance of potentially contaminated soil. These emissions will be most pronounced during dry and windy weather conditions and may:

- Affect nearby households,
- Impact respiratory health - particularly among children, the elderly, and individuals with pre-existing conditions,
- Negatively influence greenhouse crops and open-field agricultural production.

Such environmental nuisances are of particular concern in rural and semi-rural settlements along the Project corridor where agricultural activities and vulnerable populations coexist.

Changes in the Demographic Structure of the Settlements

During the construction phase of the Project, temporary employment opportunities - both direct and indirect - are expected to influence the demographic composition of the project area. In particular, the arrival of workers may result in temporary population growth in settlements near construction sites and campsites.

Although the total number of jobs and the exact source of labor (local, provincial, or national) cannot yet be determined, demographic changes are anticipated. Workers will primarily be accommodated in self-sufficient construction camps, which are designed to reduce unnecessary interaction with local communities. Nevertheless, the presence of a concentrated, transient workforce can alter local social dynamics, even when interaction is limited.

Key anticipated effects include:

- **In-Migration**: A temporary influx of non-local construction workers, altering the demographic profile of host communities.
- **Out-Migration**: Some residents, especially from more sensitive or traditionally structured communities, may relocate due to noise, perceived insecurity, or disruptions.
- **Resource Pressure**: Local services and infrastructure (e.g., housing, water supply, sanitation) may be strained, especially in smaller or underserved settlements.
- **Increased Social Risks**: The influx of male-dominated labor forces can, in some contexts, heighten the risks of gender-based violence and tensions within the host community.
- **Burden on Public Services**: Schools, healthcare centers, and community services may experience increased demand, albeit temporarily.

Increase of Tensions and Conflicts in the Local Community

During the construction phase, there is potential for increased tensions and conflicts both within and between communities affected by the Project. These tensions may stem from a variety of direct and indirect factors related to land use, resource access, and the social dynamics introduced by the Project workforce.

One significant source of friction is the perception of unfairness - particularly with regard to expropriation and compensation processes. If landowners or users believe that land acquisition activities are not implemented in an equitable and transparent manner, mistrust may develop, leading to disputes among landholders or between communities and project authorities.

Furthermore, frustration may arise when economic benefits, such as employment or procurement opportunities, are perceived to be unevenly distributed. This could lead to feelings of exclusion or neglect, especially among vulnerable or historically disadvantaged groups within the local population.

Another factor that may increase social tension is the influx of workers employed directly or indirectly by the Project. In areas where construction camps are located near settlements, close contact between workers and local residents may lead to:

- Disruption of daily life due to increased noise, traffic, and dust,
- Strain on shared resources such as water, sanitation, and housing,
- Cultural or behavioral clashes between local customs and the conduct of incoming workers.

These dynamics are especially critical in smaller or more traditional communities where sudden social shifts can have a more pronounced effect on community cohesion.

Locals and Non-Locals Employment Opportunities Created by the Project

The construction phase of the Project will create both direct and indirect employment opportunities across various skill levels. The recruitment strategy will prioritize hiring from the project's area of influence - particularly from Serik, Alanya, and Manavgat districts and nearby neighborhoods along the motorway corridor. If suitable candidates are not available locally, recruitment will expand to the wider Antalya region, followed by the broader Mediterranean Region, and then nationally.

Local employment, though limited in scale compared to the overall workforce, can yield important social and economic benefits. Employing residents from surrounding settlements fosters goodwill, strengthens ties between the Project and the host communities, and contributes to local acceptance and support for construction activities.

In addition to direct employment, the Project is expected to stimulate indirect employment opportunities. These include jobs generated along the supply chain - such as local procurement of goods and services - and roles linked to the increased consumption of Project staff within the local economy (e.g., food vendors, retail, accommodation services).

While the arrival of non-local workers and the increased income of employed locals may lead to a modest economic boost in the area through higher spending, this effect is expected to remain limited due to the proximity of large urban settlements with established service networks. Therefore, while the economic ripple effects exist, their scope may not be extensive.

The Project will implement a transparent, inclusive, and non-discriminatory recruitment process, ensuring equal opportunity regardless of ethnicity, language, gender, or religion. Employment-related announcements will be disseminated through local communication channels such as village mukhtars and community centers, and job descriptions will be clearly defined with information about roles, responsibilities, and working conditions.

To ensure compliance with Turkish labor legislation and international labor standards (e.g., IFC PS2), the Project Sponsor will develop a Human Resources Management Procedure. This will cover fair hiring practices, working conditions, rights and responsibilities of employees, and a grievance mechanism to address labor-related complaints.

Gender-Specific

During the construction phase of the Project, women in rural areas may be disproportionately impacted due to prevailing patriarchal social structures and generally lower levels of education. These factors can lead to gender-specific vulnerabilities and limit women's ability to benefit from the opportunities associated with the Project. Identified gender-related risks and inequalities within the Project's Area of Influence (AoI) include:

- Limited access to timely and accurate information about the Project,
- Barriers to participation in employment and skills development opportunities due to traditional gender roles and lower educational attainment,
- Increased risk of gender-based violence and sexual harassment (GBVH).

The risk of GBVH is particularly relevant in the national context. According to Human Rights Watch (Combatting Domestic Violence in Türkiye, 2023), nearly 40% of women in Türkiye have experienced

physical and/or sexual violence during their lives. Although legal frameworks such as Law No. 6284 exist to protect women, Türkiye's withdrawal from the Istanbul Convention in 2021 has reportedly weakened preventive mechanisms and accountability. Women's rights organizations and independent media continue to document high numbers of femicides annually, highlighting the critical need for strengthened protection and enforcement measures.

XIV.4.2. Operation Phase

The operation phase will begin immediately after construction is completed and will continue for 12 years under the 15-year Build-Operate-Transfer (BOT) contract. Approximately 250 personnel will be employed during this phase to manage toll collection, traffic control, routine maintenance, and service area operations. While direct impacts during operation are limited, ongoing labor presence and associated service areas may influence land use, traffic patterns, and socio-economic dynamics in nearby communities. Key areas of potential impact include:

Improved Regional Connectivity and Access to Services

The new motorway will enhance the connection between Antalya and broader national and regional transportation networks. This improved accessibility is anticipated to:

- Enable faster, safer, and more efficient travel between rural and urban centers,
- Improve access to critical services such as healthcare, education, and markets, especially for previously underserved communities,
- Strengthen logistics and supply chains for agricultural producers in remote areas.

The enhanced transport infrastructure will significantly reduce travel times and transportation costs, contributing to greater economic inclusion, particularly for low-income and geographically isolated households.

Employment Opportunities and Indirect Economic Benefits

Although direct employment opportunities during the operation phase (such as maintenance, toll collection, and monitoring) will be limited, the Project is expected to drive broader regional economic growth by:

- Attracting investments in logistics hubs, service sectors, and transportation-based industries, particularly at motorway junctions and rest stops,
- Supporting the development of tourism in popular destinations like Alanya, Side, and Manavgat,
- Stimulating local entrepreneurship, including the establishment of road-side businesses such as fuel stations, markets, restaurants, and agritourism ventures.

The project will also contribute to an increase in property values, particularly near motorway interchanges, potentially creating a gentrification effect in some areas. While this may benefit landowners, it should be closely monitored to prevent displacement of vulnerable residents.

Risk of Unequal Distribution of Benefits

Despite the overall economic uplift, some areas may not benefit equally. Specifically:

- Communities bypassed by the motorway may experience a decline in commercial traffic, leading to reduced revenue for existing roadside businesses,
- The Project may inadvertently exacerbate spatial inequalities between well-connected and disconnected regions.

To address this, inclusive development strategies and continuous impact monitoring are necessary. This includes supporting secondary road connections to ensure broader access to the motorway's benefits.

Road Safety and Traffic Risk

The introduction of high-speed infrastructure increases road safety risks, particularly in zones where the motorway intersects local paths or is adjacent to residential areas. Vulnerable groups such as:

- Pedestrians and cyclists,
- Children and the elderly, especially near entry and exit ramps are at elevated risk. To mitigate these risks, the Project will implement:
- Adequate signage, fencing, and lighting,
- Underpasses and overpasses for safe pedestrian crossings,
- Road safety awareness programs, particularly in schools and community centers.

Noise and Air Emissions

While reduced congestion on older roads may lead to emission reductions in urban centers, areas directly adjacent to the motorway may face:

- Chronic noise exposure, particularly near interchanges and toll plazas,
- Air quality degradation, largely due to increased freight transport.

To protect public health, long-term environmental monitoring will be conducted in compliance with national regulations and IFC guidelines. Where necessary green buffer zones and noise barriers will be established.

Land Use Change and Urban Sprawl

The motorway's presence is likely to trigger speculative development and land use change, particularly around new exits and service areas. This may include:

- The spread of informal or unplanned settlements,
- Increased pressure on agricultural land and natural resources.

Such changes can transform the socio-economic fabric of rural regions. Therefore, local governments must integrate the motorway into spatial planning frameworks and apply land-use regulations that encourage sustainable and inclusive development.

This comprehensive approach ensures that the operation phase of the Project contributes to regional growth while minimizing long-term social and environmental risks.

Gender-Specific

During the operation phase of the Project, gender-related impacts may persist, albeit in different forms and to a lesser extent than during construction. Key potential impacts on women include:

- **Limited Access to Information:** Women may continue to experience difficulties in accessing up-to-date information regarding ongoing Project activities and opportunities. This limited access can hinder their ability to engage with or benefit from the Project's long-term outcomes.
- **Risks of GBVH:** While the number of employment opportunities is significantly reduced during the operation phase, the risk of GBV and sexual harassment remains a concern. Nonetheless, the likelihood of such incidents may be lower compared to the construction phase, as the operational workforce is expected to be smaller and primarily composed of local residents

rather than transient workers. Local recruitment can contribute to a safer and more socially cohesive environment, given existing social ties and shared community norms.

- **Limited Employment Opportunities for Women:** Due to the relatively low number of jobs available during this phase, women may face challenges in accessing employment, especially in technical or operational roles traditionally dominated by men. As a result, their ability to benefit economically from the Project may be limited in comparison to the construction phase.

XIV.5. Mitigation Measures

Mitigation measures are proposed in accordance with Turkish legislation and international standards (e.g. IFC PS 5). Relevant mitigation measures will be taken against potential social impacts during the Project's all phases are described under this section.

XIV.5.1. Land Preparation and Construction Phase

The construction phase of the Project is expected to last approximately 3 years and will involve extensive civil works, infrastructure development, and workforce mobilization across the Antalya–Alanya Motorway corridor. Up to 3,300 personnel - including both direct employees and subcontracted workers - will be employed during peak periods. The workforce, comprising white-collar and blue-collar workers such as engineers, drivers, and unskilled laborers, will be deployed across construction sites and administrative offices. In line with the recruitment strategy, priority will be given to hiring from the project's area of influence - particularly from Serik, Alanya, and Manavgat districts and nearby neighborhoods along the corridor. If needed, recruitment will be expanded to the wider Antalya region, the Mediterranean Region, and then nationally.

Livelihood and Economic and Physical Displacement

Mitigation measures related to displacement impacts are designed in alignment with the principles of IFC Performance Standard 5 (Land Acquisition and Involuntary Resettlement). PS5 aims to avoid or minimize involuntary resettlement and, where unavoidable, ensure that displaced persons are compensated for their losses and supported in improving or at least restoring their livelihoods and standards of living.

To address the livelihood of the project, a comprehensive set of mitigation measures has been developed through the RAP and related land acquisition studies. The focus is on compensating affected households and businesses for the loss of land and assets, ensuring timely and fair compensation to prevent disruptions to income, food security, and living standards. For agricultural stakeholders, especially greenhouse operators, targeted support is provided through LRPs, which include technical training, consultancy services, and guidance on modern cultivation practices, pest management, and greenhouse farming techniques. Alternative land and resources are made available where possible to maintain continuity of operations and reduce income loss. Additionally, diverse and resilient livelihood options, including banana and tropical fruit farming, are promoted to reduce economic vulnerability and enhance long-term income stability, while providing training to manage environmental and market-related risks.

All expropriation and land acquisition processes will be carried out in compliance with both national legislation and IFC PS5. The General Directorate of Highways (KGM) is the competent authority responsible for the implementation of expropriation, while the Project Sponsor will support the process, including the provision of required technical inputs and funding of valuation and other services.

In cases where displacement is unavoidable, Project-affected persons (PAPs) will be compensated for losses at full replacement cost. In addition to compensation mechanisms governed by Turkish law, affected families may also benefit from government-assisted resettlement under the 5543 Resettlement Law (Articles 9 and 12). These provisions define the eligibility and scope of support, including housing, agricultural inputs, workspaces, and relocation allowances, particularly for those residing on or using expropriated land.

Additional assistance (e.g., temporary housing, food, and relocation support) may be made available to eligible households in need as defined by the Ministry of Environment, Urbanization and Climate Change (MoEUCC). All expenditures for land acquisition and resettlement are allocated under a single budget item managed by KGM, as per Article 33 of Law No. 5543.

Restriction of Access to the Agricultural Lands and Pasturelands

Expropriation of privately-owned agricultural lands will be done by KGM in accordance with the relevant provisions of the Expropriation Law. In accordance with Turkish Expropriation Law, if the land portion remaining from expropriation would not be viable anymore, eligible persons have the right to request the expropriation of the entire parcel (application has to be in line with the requirements of the Law) including the remaining portion, even if this portion is out of the expropriation corridor.

- Several underpasses and culverts have been included in the design to ensure access of local people to agricultural lands. These underpasses and culverts will ensure sufficient dimensions for the passage of harvesters, vehicles, etc. where required. Detailed lists of underpasses and culverts planned in the Project are provided in Chapter 3 (“Project Description”).
- Access roads will be constructed adjacent to the Motorway near agricultural areas/zones to provide access to agricultural lands, if/where necessary.
- Legitimate requests of local people regarding the avoidance and/or minimization of the restriction of access between their settlement areas and agricultural lands will be considered by the Project Sponsor’s design team and feasible solutions will be developed and implemented, where possible.
- For the agriculture lands that will be separated by the Motorway (fragmentation of land), impacts on the public users of the lands will be mitigated by ensuring access between severed lands. In this scope, culverts, underpasses and over bridges have already been included in the design. However, additional passage ways that will be requested by local communities will be added in the design.
- It should be noted that, any change on Project design could be materialized once approved by KGM.

Impacts on Local Business

While business owners may be entitled to compensation under applicable regulations, proactive planning and community engagement will be key in minimizing disruptions and sustaining the resilience of the local economy throughout the construction phase.

- The affected business owners will be notified by the Community Liaison Officers (CLOs) under the supervision of the Social Chief and Environment and Social Manager at least 15 days before the start of construction activities.
- Construction scheduling will avoid peak touristic season.
- Compensation for temporary economic displacement will be provided in accordance with national guidelines and IFC PS5 guidelines.

Effects on Infrastructures and Distribution of Utility Services

The mitigation of impacts on infrastructures and utility distribution will partially address in the Supplementary ESIA Annex as "Solid Waste Management Procedures". The following mitigation measures will be applied throughout the construction phase:

- Mobile schooling times will be taken into account during the transportation of construction materials. The notification to local mukhtars regarding construction activities and mobile schooling times will be managed by the Community Liaison Officers (CLOs).

- All utility distribution networks intersected by Project components will be identified and appropriate construction techniques will be used to reduce disruptions to the extent possible All actions related to utility mapping, disruption management, and risk analysis will be coordinated by the Environment and Social Manager.
- Any planned disruption of utility distribution services will be communicated to local authorities and local communities with at least 72 hours' notice by the Community Liaison Officers (CLOs), under the coordination of the Environment and Social Manager. If planned disruptions are expected to last more than 12 hours, the Environment and Social Manager will ensure a specific risk analysis is conducted to assess the potential impacts on local communities and to identify additional mitigation measures.
- Any damage to utility distribution networks will be repaired promptly in accordance with the network owner or operator. Any unplanned disruption of utility distribution services will be managed through communication to local communities, written and/or verbal information to explain event occurred and repair measures needed. Grievance mechanism will be used to record and solve the relevant incidents results.
- Access to properties will be guaranteed or appropriate alternative access solutions that are agreed with users will be implemented. The existing irrigation networks affected by Project activities will be mapped and appropriate technical solutions will be implemented to reduce possible interferences; and if interferences are unavoidable, appropriate alternative solutions will be agreed with irrigation water users.

During the course of construction phase, grievance mechanism will be in effect in order to receive local community's nuisance and disturbance.

Noise and Dust Emissions Generated by Construction Activities

- Emission levels will be monitored by the Environmental Engineer, under the supervision of the Environment and Social Manager. Monitoring results will comply with national legislation and IFC EHS (Environment, Health and Safety) standards.
- Dust suppression measures (e.g. water spraying) during dry weather conditions will be implemented under the responsibility of the Environmental Engineer and H&S Chief, in coordination with the site technical team.
- Night-time construction activities will be limited, and inspection and oversight will be carried out by the Environmental Engineer and H&S Chief, in coordination with the Environment and Social Manager.
- Where necessary, the Environmental Engineer will supervise the installation of noise barriers to reduce noise levels in sensitive areas.
- Complaints regarding noise and dust will be received through the Grievance Mechanism operated by the Community Liaison Officers (CLOs). The complaint assessment and resolution process will be coordinated with the Social Chief and documented by the Environment and Social Manager.

Relevant mitigation measures regarding the noise emissions are given in Chapter 11 ("Noise and Vibration") while dust emissions are given in Chapter 10 ("Air Quality and Climate Change"). Additionally, potential impacts and mitigation measures regarding to the local communities' health and safety issues are explained in Chapter 15 ("Community Health and Safety").

Changes in the Demographic Structure of the Settlements

- Construction workers will be housed in self-sufficient camps to reduce interaction with local communities.
- Social impact monitoring will be carried out regularly.
- Community liaison officers will monitor social dynamics.
- Stakeholder engagement and grievance mechanisms will remain active throughout the phase.

Locals and Non-Locals Employment Opportunities Created by the Project

To maximize local benefits and ensure fair labor practices, the Project Sponsor will implement the following measures in line with Turkish legislation and IFC Performance Standard 2 (PS2):

- **Prioritization of Local Employment**: Where feasible, local labor will be prioritized for employment during the construction phase to enhance local economic participation and strengthen relations with host communities.
- **Transparent and Inclusive Recruitment**: The recruitment process will be designed to be transparent, publicly accessible, and non-discriminatory, providing equal opportunity regardless of ethnicity, language, religion, gender, or sexual orientation.
- **Human Resources Management Procedure**: A comprehensive Human Resources Management Procedure will be developed to ensure compliance with Turkish Labor Law and IFC PS2. This will cover recruitment, contracts, working conditions, and worker rights.
- **Community-Based Communication**: Employment opportunities will be announced through community-based channels such as local mukhtars, associations, and public notice boards. Informational materials (e.g., brochures, posters) will be distributed in Turkish. It is mandatory to provide information materials in different languages if needed.
- **Clarity in Employment Terms**: All job roles will have clearly defined job descriptions and working conditions. Employment contracts will include comprehensive information and will comply with national labor regulations. Contracts will be signed by both parties and a copy will be provided to the worker.

These measures aim to ensure that employment opportunities created by the Project are accessible, fair, and beneficial to local populations, while also upholding labor rights and international standards.

Increase of Tensions and Conflicts in the Local Community

To reduce the risk of social tension and conflict during the construction phase, the following mitigation measures will be implemented by the Project's internal social and environmental team:

- **Transparent Communication:** Community Liaison Officers (CLOs), under the supervision of the Social Chief and the Environment and Social Manager, will organize quarterly local consultation meetings and distribute printed informational materials (e.g., brochures, posters) in Turkish through village mukhtars and community associations. These materials will include information on land acquisition, employment opportunities, construction schedules, and community benefits to ensure transparency and awareness.
- **Codes of Conduct and Worker Training:** The Human Resources Manager, in collaboration with the H&S Chief, will implement a mandatory Code of Conduct for all employees. Induction training on community relations, local customs, and cultural sensitivity will be provided to all new workers. Refresher training sessions will be conducted every 6 months at worker accommodation sites.
- **Community Liaison and Grievance Mechanism:** Dedicated CLOs will actively engage with community stakeholders to identify concerns early. A formal and accessible Grievance Mechanism will be operated by the CLOs, with oversight from the Environment and Social Manager, to ensure timely and transparent resolution of community concerns.
- **Local Procurement and Hiring:** The Procurement Officer(s), under the coordination of the SPV General Manager, and the Human Resources Manager will implement a local-first approach in both procurement and recruitment. Locally available materials such as aggregates, concrete, and asphalt will be sourced from nearby quarries and suppliers when feasible. Local service providers for transportation, catering, and maintenance will be prioritized if they meet the required standards. Procurement practices will be reviewed quarterly to identify new local engagement opportunities.
  For recruitment, the Human Resources Manager will prioritize hiring from within the Project's area of influence, especially from Serik, Alanya, and Manavgat. Job announcements will be shared through local channels such as mukhtars and municipal notice boards. If no suitable local candidates are available, the recruitment scope will expand gradually - from local to national levels. Recruitment practices will be monitored for fairness and transparency.

- **Health and Safety Screening:** Pre-employment medical examinations will be conducted by the Site Doctor and Paramedics, under the supervision of the H&S Chief, to minimize the risk of disease transmission. The Environment and Social Manager will coordinate with local health authorities regarding communicable disease risks linked to labor influx.
- **Stakeholder Engagement:** Ongoing consultations with local authorities and affected communities will be conducted by the CLOs, following the procedures outlined in the Stakeholder Engagement Plan (SEP). The Environment and Social Manager will oversee these efforts to ensure transparency and build trust.
- **Compensation for Accidental Damages:** Any damages caused by Project activities - including to property, infrastructure, or agricultural assets - will be assessed and compensated by the Environment and Social Manager, in line with national standards and project-specific commitments.

These measures aim to proactively manage community relations and maintain a stable and cooperative environment in all areas affected by construction activities.

XIV.5.2. Operation Phase

Improved Regional Connectivity and Access to Services

- The Environment and Social Manager, in collaboration with the Social Chief, will organize semi-annual training workshops and capacity-building sessions in coordination with local chambers of commerce to support local entrepreneurs and small businesses.
- Micro-procurement mechanisms to engage local vendors in minor highway maintenance activities (e.g., cleaning, landscaping) will be coordinated by the Environment and Social Manager, with oversight from relevant technical departments.
- During the first two years of operation, the Environment and Social Manager will coordinate with local tourism associations to explore public-private partnerships for the development of culturally reflective rest stop services along the motorway corridor. The plan will be reviewed and updated annually in cooperation with local stakeholders.

Employment Opportunities and Indirect Economic Benefits

- The Environment and Social Manager, in coordination with the Social Chief, will organize semi-annual training workshops and capacity-building sessions in collaboration with local chambers of commerce to support local entrepreneurs and small businesses.
- Minor highway maintenance activities (e.g., cleaning, landscaping) will be implemented through micro-procurement mechanisms coordinated by the Environment and Social Manager, with technical oversight from the Environmental Engineer. Local vendors will be prioritized on a rolling basis, depending on their capacity and compliance with relevant standards.
- During the first two years of operation, the Environment and Social Manager, in collaboration with the Social Chief, will engage with local tourism associations to explore opportunities for public-private partnerships. These efforts aim to establish culturally reflective rest stop services along the corridor. The development plan will be reviewed and updated annually.

Risk of Unequal Distribution of Benefits

- The Social Chief, in coordination with Community Liaison Officers (CLOs) and under the supervision of the Environment and Social Manager, will carry out annual socio-economic assessments to identify disparities in income levels and access to basic services among affected communities.
- Community Liaison Officers (CLOs) will coordinate with Local Development Authorities to advocate for infrastructure investments - such as secondary roads - in communities bypassed by the highway. Progress will be monitored and reported every 12 months.

- The Social Chief, in collaboration with CLOs, will design and implement targeted local development initiatives for disadvantaged settlements. These initiatives will be reviewed semi-annually to track effectiveness and identify areas for improvement.

Road Safety and Traffic Risk

The H&S Chief, in coordination with local traffic authorities and under the supervision of the Environment and Social Manager, will oversee the installation of traffic safety infrastructure - including signage, lighting, fencing, and pedestrian crossings (e.g., overpasses and underpasses) - at high-risk junctions and settlements during the first year of operation. Necessary updates will be made as required.
Community Liaison Officers (CLOs), in collaboration with the Social Chief, will organize annual road safety awareness programs in local schools and community centers to promote safe behavior among children and community members.
Local traffic enforcement teams will carry out joint inspection campaigns every six months, supported by the Project's H&S Chief and H&S Specialist.
Emergency response protocols will be developed and reviewed annually by the H&S Chief, in coordination with municipal emergency services, including fire departments, police, and medical responders. The Environment and Social Manager will oversee coordination with public institutions.

Noise and Air Emissions

The Environmental Engineer, under the supervision of the Environment and Social Manager, will conduct quarterly air quality monitoring - including PM_{10}, $PM_{2.5}$, NO_x, SO_x, VOCs, and dust - at operational sites such as construction camps, borrow pits, asphalt and concrete plants, and surrounding residential areas.
Community Liaison Officers (CLOs), in coordination with the Social Chief, will review grievances related to air emissions every three months to ensure timely resolution and documentation in accordance with the Project's Grievance Mechanism.
The Environmental Engineer will also be responsible for the installation and maintenance of green buffer zones and noise barriers in sensitive areas. These measures will begin in the first operational year, with annual assessments to evaluate their effectiveness.

Land Use Change and Urban Sprawl

The Environment and Social Manager, in collaboration with the Environmental Engineer and relevant municipal urban planning departments, will implement annual awareness campaigns and provide regulatory support to prevent the formation of informal settlements and to protect agricultural land.
The Environmental Engineer, under the coordination of the Environment and Social Manager, will monitor land use changes through satellite imagery and site visits twice a year. Irregular developments or encroachments will be reported to local authorities for appropriate enforcement actions.

XIV.6. Summary of Assessment and Residual Impacts

Table XIV.39 provides a summary on the social impact assessments. Significance of the identified impacts before and after the implementation of mitigation measures are summarized in this table. As can be seen from the Table XIV.39, in general, potential impacts on the livelihoods, infrastructures and utility services and demographic characteristics etc. are anticipated to be reduced to low levels in the long-run with effective implementation of mitigation measures, with the exception of impacts on livestock activities within the affected settlements. However, residual impacts related to the livestock owners and land owners have been evaluated as medium due to their importance.

Table XIV.39 Summary of Social Impact Assessment

Affected Socio - economic Component	Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Expected Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phases												
Construction Phase	Livelihood, Economic and Physical Displacement	Adverse	Restricted	Long	Medium	Irreversible	One-off	Moderate (B)	High (3)	High (B2)	● Activities will follow national laws and IFC PS5. ● Displacement will be avoided/minimized; compensation at replacement cost. ● No forced evictions. ● Continuous consultation with affected communities. ● Livelihoods and living standards will be restored/improved. ● Physically displaced persons will receive secure housing. ● KGM will handle expropriation and valuation; costs covered by Project Sponsor. ● Government-assisted resettlement available under Law No. 5543, Article 12. ● Eligible households may receive housing, land, credits, and in-kind/cash aid. ● Support includes basic needs and free transportation. ● Resettlement budget under KGM per Article 33 of Law No. 5543.	Low
	Restriction of Access to the Agricultural Lands and Greenhouses	Adverse	Restricted	Long	Medium	Irreversible	One-off	Moderate (B)	High (2)	High (B2)	● Expropriation of agricultural lands will be conducted by KGM under Turkish Expropriation Law. If the remaining land after partial expropriation is not viable, owners may request full expropriation of the entire parcel. ● Multiple underpasses and culverts are included in the Project design to ensure continued access to agricultural lands, enabling the passage of agricultural machinery and vehicles. ● Additional access roads will be constructed near agricultural areas if/where necessary. ● Project design team will consider legitimate requests by local communities to avoid/minimize restriction of access to farmlands, and feasible design modifications will be implemented accordingly. ● Fragmentation of agricultural lands will be mitigated by ensuring access between severed parcels through culverts, underpasses, and overpasses. ● Community requests for additional passageways will be evaluated and incorporated into the design, subject to KGM approval.	Low

Affected Socio - economic Component	Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Expected Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
	Impacts on Local Business	Adverse	Restricted	Long	High	Irreversible	One-off	Major(A)	High(3)	High(A3)	• Affected business owners will be notified 15 days in advance by CLOs. • Notification process will be supervised by Social Chief and E&S Manager. • Construction works will avoid peak touristic season. • Compensation for temporary economic displacement will follow national legislation. • Compensation process will be overseen by Social Chief and E&S Manager..	Low
	Effects on Infrastructures and Distribution of Utility Services	Adverse	Local	Medium	Low	Short term reversible	Intermittent	Moderate (B)	Medium (2)	Medium (B2)	• CLOs will inform mukhtars; supervised by Social Chief. • Environmental Engineer will identify utilities; E&S Manager will supervise. • CLOs will notify planned outages; Environmental Engineer will conduct risk analysis. • CLOs will communicate unplanned outages; Social Chief will manage grievances. • CLOs will ensure property access; coordinated by Social Chief. • Environmental Engineer will map irrigation; E&S Manager will oversee solutions. • CLOs will manage complaints; monitored by Social Chief.	Low
	Noise and Dust Emissions Generated by Construction Activities	Adverse	Local	Medium	Low	Short term reversible	Intermittent	Moderate (B)	Medium (2)	Medium (B2)	• Emissions will be monitored by the Environmental Engineer and supervised by the Environment and Social Manager, in line with national law and IFC EHS standards. • Dust suppression (e.g. water spraying) will be applied in dry conditions under the responsibility of the Environmental Engineer. • Night works will be limited; monitored jointly by the Environmental Engineer and the Environment and Social Manager. • Noise barriers will be used when necessary, installed under the supervision of the Environmental Engineer. • Complaints on noise/dust will be managed via the Complaint Mechanism by CLOs, coordinated by the Social Chief.	Low
	Changes in the Demographic Structure of the Settlements	Adverse	Local	Medium	Low	Short term reversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	• Construction workers will be housed in self-sufficient camps to limit interaction with locals. • Regular social impact monitoring will be conducted. • Community Liaison Officers (CLOs) will monitor local social dynamics. • Stakeholder engagement and grievance mechanisms will remain active throughout the	Low

Affected Socio - economic Component	Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Expected Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											construction phase.	
	Increase of Tensions and Conflicts in the Local Community	Adverse	Wide	Medium	Low	Short term reversible	Intermittent	Moderate (B)	Medium (2)	Medium (B2)	● CLOs will organize quarterly consultation meetings; printed materials (e.g., brochures, posters) will be distributed through mukhtars and associations covering project updates and community-related topics. ● Environmental and Social Manager will implement a mandatory Code of Conduct; training on cultural sensitivity and community behavior will be provided at hiring and every 6 months. ● A Grievance Mechanism will be accessible; CLOs will proactively engage with the community to identify concerns early. ● Local-first procurement and hiring will be applied; materials and services will be sourced locally when feasible; job announcements will target project-affected districts first. ● Pre-employment medical screenings will be conducted; communicable disease risks will be managed with local health authorities. ● Ongoing consultation with stakeholders will be conducted as part of the SEP. ● Accidental damages to property or crops will be compensated in line with standards.	Low
	Locals and Non-Locals Employment Opportunities Created by the Project	Beneficial	Wide	Medium	Medium	Short term reversible	Intermittent	Moderate (B)	Medium (2)	Medium (B2)	● Local labor will be prioritized during construction to support local economies. ● Recruitment will be transparent, inclusive, and non-discriminatory. ● HR Management Procedure will comply with Turkish Labor Law and IFC PS2, covering contracts, working conditions, and rights. ● Job postings will be shared through mukhtars, associations, and public boards in Turkish (additional languages if needed). ● Job descriptions and employment contracts will be clear and legally compliant; signed contracts will be provided to workers.	Low
	Gender Specific Risks	Adverse	Local	Long	Medium	Long term reversible	Intermittent	Moderate (B)	Medium (2)	Medium(B2)	● Ensure that project-related information is shared in ways accessible to women, including through women-focused meetings, use of local languages, and culturally appropriate formats. ● Engage female community members in consultation processes to ensure their concerns and expectations are addressed. ● Promote the inclusion of women in the workforce by reserving a percentage of non-technical roles for female applicants. ● Offer vocational training and capacity-building programs tailored to women to increase their employability during construction.	Low
Operation Phase												
Operation Phase	Improved Regional Connectivity and Access to Services	Adverse	Local	Medium	Low	Long term reversible	Intermittent	Moderate (B)	Medium (2)	Medium (B2)	● Environment and Social Manager, in coordination with the Social Chief, will organize semi-annual training workshops and capacity-building sessions in collaboration with local chambers of commerce to support local entrepreneurs and small businesses.	Low

Affected Socio - economic Component	Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Expected Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											• Environment and Social Manager will implement micro-procurement mechanisms to engage local vendors in minor highway maintenance activities (e.g., cleaning, landscaping) on a rolling basis. • Environment and Social Manager, in collaboration with the Social Chief, will coordinate with local tourism associations to develop culturally reflective rest stop services through public-private partnerships, starting within the first two years of operation and updating the plan annually.	
	Employment Opportunities and Indirect Economic Benefits	Beneficial	Local	Medium	Low	Long term reversible	Intermittent	Moderate (B)	Medium (2)	Medium (B2)	• Semi-annual workshops for capacity-building with local chambers of commerce. • Micro-procurement programs for local vendor participation in maintenance tasks. • Partnership development with tourism associations to establish culturally appropriate rest areas.	Low
	Risk of Unequal Distribution of Benefits	Adverse	Restricted	Long	Medium	Irreversible	One-off	Moderate (B)	Medium (2)	Medium (2)	• Social Chief and Community Liaison Officers (CLOs) will conduct annual socio-economic assessments to monitor disparities in income and service access. • CLOs will coordinate with Local Development Authorities to advocate for infrastructure investment (e.g., secondary roads) in bypassed communities, with yearly progress updates. • Social Chief, in coordination with CLOs, will implement targeted development initiatives for disadvantaged settlements with semi-annual reviews.	Low
	Road Safety and Traffic Risk	Adverse	Local	Long	High	Long term reversible	Continuous	Moderate (B)	Medium (2)	Medium (B2)	• H&S Chief, in coordination with traffic authorities, will install road safety infrastructure (signage, lighting, fencing, crossings) at high-risk locations in the first operational year, with updates as needed. • Community Liaison Officers (CLOs) will conduct annual road safety education programs in schools and community centers. • Joint inspection campaigns by traffic enforcement teams and the Project H&S Chief and H&S Specialist will occur every six months. • Emergency response protocols will be prepared and updated annually through coordination with municipal emergency services (fire, police, medical) by the H&S Chief, under the supervision of the Environment and Social Manager..	Low
	Noise and Air Emissions	Adverse	Local	Long	Medium	Long term reversible	Intermittent	Moderate (B)	Medium (2)	Medium(B2)	• Environmental Engineer will perform quarterly air quality monitoring (PM_{10}, $PM_{2.5}$, NO_x, SO_x, VOCs, dust) at operational sites and nearby residential areas. • Community Liaison Officers (CLOs) and the Social Chief will evaluate air quality-related grievances every three months to ensure timely resolution. • Environmental Engineer will oversee the setup and maintenance of green buffer zones and noise barriers in sensitive locations starting from the	Low

Affected Socio - economic Component	Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Expected Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											first operational year, with annual performance evaluations.	
	Land Use Change and Urban Sprawl	Adverse	Restricted	Long	Medium	Short term reversible	One-off	Minor (C)	High (3)	Medium (B2)	● Environment and Social Manager, together with the Environmental Engineer and municipal urban planning departments, will run annual awareness campaigns and offer regulatory guidance to prevent informal settlements and protect agricultural land. ● Environmental Engineer will use satellite imagery and site visits to monitor land use changes twice a year, reporting unauthorized developments to local authorities.	Low
	Gender Specific Risks	Adverse	Local	Long	Medium	Long term reversible	Intermittent	Moderate (B)	Medium (2)	Medium(B2)	● Maintain transparent communication channels with local communities, with specific efforts to reach women (e.g., through women's cooperatives or local health/social units). ● Use local media, bulletin boards, and social workers to share updates and opportunities in an inclusive manner. ● Work with local organizations, women's groups, and authorities to raise awareness about GBV and support the development of local prevention mechanisms.	Low
Potential Human Rights Risks	Housing (Physical Displacement)	Adverse	Restricted	Long	Major	Irreversible	One-off	Major	High	High	● RAP implementation ● Compensation for expropriated property ● Resettlement support	Low
	Livelihood (Agriculture & Livestock)	Adverse	Local	Long	Major	Short term reversible	Continuous	Major	High	High	● RAP implementation ● Livelihood restoration support ● Compensation mechanisms	Low
	Vulnerable Groups (Participation & Equality)	Adverse	Wide	Medium	Moderate	Reversible	Intermittent	Moderate	High	High	● RAP implementation ● Targeted support mechanisms ● Monitoring of inclusion ● Language/culture-sensitive engagement if required	Low
	Cultural Rights (Nomadic / Traditional Communities)	Adverse	Restricted	Medium	Moderate	Short term reversible	Intermittent	Moderate	Mrdium	Medium	● Route preservation ● Consultation with affected communities ● Cultural heritage assessment	Low
	Labor Rights (Workers)	Adverse	Wide	Long	Moderate	Reversible	Continuous	Moderate	Medium	Medium	● Implementation of Labor Management Plan (LMP) ● Worker Grievance mechanism ● Monitoring fair wage compliance	Low
	Health & Safety (Dust, Noise, Traffic)	Adverse	Local	Long-	Major	Reversible	Intermittent	Major	Medium	Medium-High	● Community Health and Safety Plan (CHSP) ● Occupational Health and Safety Plan (OHSP) ● Noise, dust, traffic mitigation	Low

XV. CHAPTER - COMMUNITY, HEALTH AND SAFETY

The Antalya-Alanya Motorway Project will involve typical community health and safety impacts and/or risks applicable in most large-scale infrastructure projects. Especially the construction phase will include significant earth-moving activities and the involvement of many workforces. However, due to the temporary nature of the construction activities, associated impacts on the health and safety of the community will be short-term and temporary. During the operation phase, pedestrian safety, traffic safety, and emergency preparedness and response would be among the most critical community health and safety issues to be managed appropriately throughout the long-term operational activities. It should be noted that, with the improved road standards, accident rates for the associated routes are anticipated to reduce, providing an overall benefit to community safety and public welfare. The Project's socioeconomic impacts and benefits related to public welfare are discussed in Chapter-14 in the ESIA ("Socio-economic Environment").

The main community health and safety issues to be covered in the following sections are summarized below:

- Traffic safety.
- Impacts of blasting operations during construction.
- Impacts on water quality and availability.
- Airborne/communicable diseases due to construction workforce inflow.
- Pedestrian safety.
- GBVH
- Community Severance
- Use of Chemical
- Emergency preparedness and response.
- Disturbance of public health and welfare due to air emissions, noise generation, water-borne, and water-related.
- Security personnel arrangements.
- Structural safety.

XV.1. Assessment Methodology and Data Sources

Impacts of the Project on the community health and safety will be assessed based on qualitative approaches. As some of the potential impacts on the community health and safety are primarily associated with other direct environmental impacts such as air emissions, noise generation, wastewater and waste production, etc., methods are available on how to analyze and interpret the results of the assessments made for these impacts in the previous sections of this Draft ESIA Report, see in Chapter 4 in the ESIA (“Methodology”).

This chapter is developed and interpreted based on the following data sources.

- TurkStat’s transportation statistics (accidents, fatalities, etc.)
- TurkStat’s population statistics
- TurkStat’s woman statistics
- TurkStat’s health statistics
- Antalya Metropolitan Municipality’s database
- ENCON Environmental and Social Field Studies
- GEM Field Studies

Study area for the community health and safety impacts have been determined as 2 km corridor (1 km from each side of the Motorway axis) as the settlements located within this area would be more likely to be subject to associated risks and impacts when compared to the settlements located at farther distances.

Significance Criteria

The significance criteria for the impacts on community health and safety will be determined as high, medium, or low based on evaluating the magnitude of impact and sensitivity/value of the receptors/resources. The criteria previously presented in Chapter 4 ("ESIA Methodology") will be used to determine the magnitude of impact on the health and safety components, while sensitivity/value criteria to be used in the scope of impact assessment is summarized in Table XV.1. A detailed explanation of the sensitivity components for each resource/receptor is provided in the following "Baseline Conditions" section.

Table XV.1. Criteria for Sensitivity/Value of Resource/Receptor

Resource/Receptor		Sensitivity/Value Level		
		High (3)	**Moderate (2)**	**Low (1)**
Local Communities (Risk of Construction Accidents)		Settlements within the expropriation corridor having affected population of >500 habitants Settlements within the study corridor having affected population of >1,000	Settlements within the study corridor (inc. exp. corridor) having affected population of 500-1.000 habitants	Settlements within the expropriation corridor having affected population<500 habitants
Local Communities (Blasting Effects)		Settlements where number of residential buildings within the expropriation corridor	Settlements where number of residential buildings within the expropriation corridor between10-20	Settlements where number of residential buildings within the expropriation corridor<10
Local Communities (Water Supply)		Settlements with limited water availability	-	Settlements with sufficient water availability
Local Communities (Airborne/ communicable diseases)		Settlements with particular sensitivity/past issues related with improper acts of security	-	Settlements with no existing health issue
Local Communities (Disturbance due to acts of security personnel)		Located directly adjacent to construction sites or security-controlled areas Includes vulnerable groups (women, children, minorities) Limited access to grievance mechanisms or legal protection History of complaints or past tensions with security personnel	Near access roads or logistics areas with periodic presence of security personnel Partially urbanized or semi-rural areas Existing local governance or municipal channels to report incidents-	Urban settlements or municipalities with full legal protection and visibility Rare or no direct interaction with security staff Effective law enforcement and grievance response systems
Local Communities or Road Users (Risk of Chemicals and Fuels)		Settlements located in close proximity (<500 m) to chemical or fuel storage areas, refueling points, or construction/operation sites where large volumes of fuels and hazardous substances are handled. Communities relying on local water resources or agricultural lands that could be directly affected by leaks/spills. Presence of vulnerable groups (e.g., children, elderly)	Settlements located near transport routes frequently used for fuel and chemical delivery (e.g., <2 km from access or haul roads). Medium-level population exposure (500-1,000 inhabitants). Limited but potential risk of contact through air emissions, odors, or minor spillages.	Settlements or road users located far from chemical and fuel storage/usage areas (>2 km). Population exposure <500 inhabitants. Low frequency of fuel/chemical transportation through the area. Strong management systems, spill containment, and emergency preparedness plans in place.
GBVH	Seasonal Agricultural Workers (Women)	Isolated in mixed-gender accommodation areas Employed informally or daily without contracts No access to grievance mechanisms Hired via intermediaries without oversight	Shared accommodation but with gender separation Basic orientation or awareness training provided Grievance system exists but limited accessibility	Separate and safe accommodations ensured Formal contracts and safe transportation provided Access to female staff and active awareness initiatives available
	Female Tourists	Staying in rural or unsupervised areas	Short-term stays near project roads or facilities	Staying in regulated hotels or monitored areas

Resource/Receptor		Sensitivity/Value Level		
		High (3)	**Moderate (2)**	**Low (1)**
		Unable to access complaint channels due to language barriers Unmonitored interactions with security personnel	Limited access to information materials, but public institutions are accessible	Informed through brochures and emergency hotlines Minimal contact with security or project personnel
	Local Women in the Region	Frequent contact with project workers Silence due to social or patriarchal pressure Living in socially isolated or conservative rural areas	Living near access routes or contractor zones Some engagement with NGOs or community groups	Residing near urban centers with functioning support systems Engaged with municipalities, NGOs, or healthcare services Accessible and trusted grievance channels
Displacement		Entire households subject to physical relocation Loss of primary residences or agricultural lands Presence of vulnerable groups (e.g., women-headed households, elderly, ethnic minorities) No or limited access to legal land titles	Economic displacement without physical relocation (e.g., loss of farmland, grazing land, roadside businesses) Some access to support mechanisms and compensation frameworks	Only minor restrictions on land use or temporary impacts (e.g., access limitations during construction) No physical relocation or significant income loss Legal land tenure in place
Local Communities or Road Users (Traffic accidents)		Road sections with high traffic density (>5,000 vehicles/day), continuous heavy truck movements, and frequent pedestrian crossings. Settlements with >1,000 affected inhabitants located directly along project access or haul roads. Presence of sensitive receptors such as schools, hospitals, or markets adjacent to the road.	Road sections with medium traffic density (1,000–5,000 vehicles/day) and periodic heavy vehicle use. Settlements with 500-1,000 inhabitants located near construction access routes. Limited but existing pedestrian activity.	Road sections with low traffic density (<1,000 vehicles/day) and minimal heavy vehicle use. Settlements with <500 inhabitants or sparsely populated rural areas. Few or no sensitive receptors adjacent to roads.

XV.2. Baseline Conditions

An analysis of baseline conditions and infrastructures related to the road network, traffic volume load, and traffic accidents in Türkiye are detailed under the following subheadings.

Existing Transportation Infrastructure

State Highways and Provincial Roads are vital components of regional infrastructure, linking major areas and facilitating transportation. Their conditions and expansions can significantly impact community health and safety by improving access to essential services and reducing travel times.

Over the years, there has been a significant increase in the length of divided roads and motorways, indicating efforts to enhance safety and traffic flow. For example, the length of divided roads expanded from 1,798 km in 1990 to 21,680 km in 2023, potentially reducing the risk of head-on collisions and enhancing traveler safety. Additionally, the total length of motorways increased from 241 km in 1990 to 3,726 km in 2023, indicating an investment in high-speed, safer travel routes.

Motorway network of Türkiye is currently under development. As of 2023, total length of the Motorways was recorded as 3,726 km, which is around 5% of the total length of the road network in the country. The 2035 target of KGM is to complete construction of 7,800 km of motorway. Increase in the length of the roads in Türkiye between 1990 and 2023 is summarized in Table XV.2

Table XV.2 Road Lengths in Türkiye

Year	General Total (km)	State highways		Provincial roads		Motorways (km)	Village road (km)
		Divided road (km)	Other (km)	Divided road (km)	Other (km)		
1990	**367,956**	1,798	29,351	111	27,868	241	308,587
1991	**368,165**	1,836	29,426	136	27,824	342	308,602
1992	**387,079**	1,890	29,454	153	28,346	716	326,521
1993	**388,035**	2,018	29,407	167	28,179	1.012	327,253
1994	**381,012**	2,149	29,240	202	28,241	1.151	320,029
2002	**427,411**	3,859	27,459	467	29,583	1.714	364,329
2003	**428,415**	4,926	26,432	521	29,612	1.753	365,171
2004	**349,215**	6,735	24,711	575	29,793	1.662	285,739
2005	**349,238**	7,917	23,454	594	29,974	1.667	285,632
2006	**349,304**	9,135	22,200	642	29,787	1.908	285,632
2007	**350,708**	10,387	20,946	678	29,901	1.908	286,888
2008	**351,958**	11,747	19,564	789	29,923	1.922	288,013
2009	**362,660**	13,606	17,665	852	30,096	2,036	298,405
2010	**367,263**	15,788	15,607	996	30,394	2,080	302,398
2011	**370,276**	17,033	14,339	1,122	30,436	2,119	305,227
2012	**385,748**	17,886	13,489	1,181	30,699	2,127	320,366
2013	**388,783**	18,524	12,817	1,311	30,844	2,244	323,043
2014	**236,794**	18,944	12,336	1,361	31,113	2,278	170,762
2015	**238,899**	19,357	11,856	1,467	31,598	2,282	172,339
2016	**242,590**	19,790	11,316	1,499	32,014	2,542	175,429
2017	**247,514**	20,237	10,829	1,613	32,283	2,657	179,895
2018	**247,553**	20,475	10,546	1,796	32,357	2,842	179,537
2019	**250,731**	20,723	10,283	1,922	32,243	3,060	182,500
2020	**256,328**	21,023	9,951	2,100	32,036	3,523	187,695
2021	**257,345**	21,292	9,673	2,149	31,880	3,532	188,819
2022	**259,072**	21,467	9,473	2,258	31,858	3,633	190,383
2023	**261, 156**	21,680	9,184	2,294	31,770	3,726	192,502

Source: TurkStat, 2023

The number of vehicle ownership, vehicle movement density, and usage rate of the roads (vehicle kilometers) has increased rapidly, parallel to population growth, since the beginning of the 2000s. Türkiye's growing population and increasing urbanization necessitate the expansion and modernization of infrastructure. It is crucial to improve roads to support economic development and connectivity. Some regions, especially rural and less developed areas, may still require assistance developing adequate infrastructure. It is important to ensure equitable development to reduce regional disparities.

Table XV.3 below shows the change in the number of registered vehicles, the number of accidents, and the number of deaths by year. In the road network of Türkiye, a total of 1,314,136 traffic accidents occurred during the year 2023. Among all those accidents, 1,079,065 accidents resulted in material loss, while 235,071 accidents led to death or injury. Of the accidents involving death or injury, 83.1% of them occurred in inhabited areas, whereas 16.9% occurred in uninhabited regions.

Table XV.3 Number of vehicles registered, accident, persons killed and injured, 2009-2023

Year	Total Number of Vehicles Registered	Total Number of Accidents	Accidents Involving Material loss only	Accidents involving death or injury	Persons Killed (1)			Number of persons injured
					Total	At accident scene	Accident follow-up	
2009	14,316,700	1,053,346	942,225	111,121	4,324	4,324	-	201,380
2010	15,095,603	1,106,201	989,397	116,804	4,045	4,045	-	211,496
2011	16,089,528	1,228,928	1,097,083	131,845	3,835	3,835	-	238,074
2012	17,033,413	1,296,634	1,143,082	153,552	3,750	3,750	-	268,079
2013	17,939,447	1,207,354	1,046,048	161,306	3,685	3,685	-	274,829
2014	18,828,721	1,199,010	1,030,498	168,512	3,524	3,524	-	285,059
2015	19,994,472	1,313,359	1,130,348	183,011	7,530	3,831	3,699	304,421
2016	21,090,424	1,182,491	997,363	185,128	7,300	3,493	3,807	303,812
2017	22,218,945	1,202,716	1,020,047	182,669	7,427	3,534	3,893	300,383
2018	22,865,921	1,229,364	1,042,832	186,532	6,675	3,368	3,307	307,071
2019	23,156,975	1,168,144	993,248	174,896	5,473	2,524	2,949	283,234
2020	24,144,857	983,808	833,533	150,275	4,866	2,197	2,669	226,266
2021	25,249,119	1,186,353	998,390	187,963	5,362	2,421	2,941	274,615
2022	26,482,847	1,232,957	1,035,696	197,261	5,229	2,282	2,947	288,696
2023	28,740,492	1,314,136	1,079,065	235,071	6,548	2,984	3,564	350,855

Source: TurkStat, 2023
(1) Includes the deaths within 30 days after the traffic accidents due to related accident and its impacts for people who were injured and sent to health facilities.
- Denotes magnitude null.

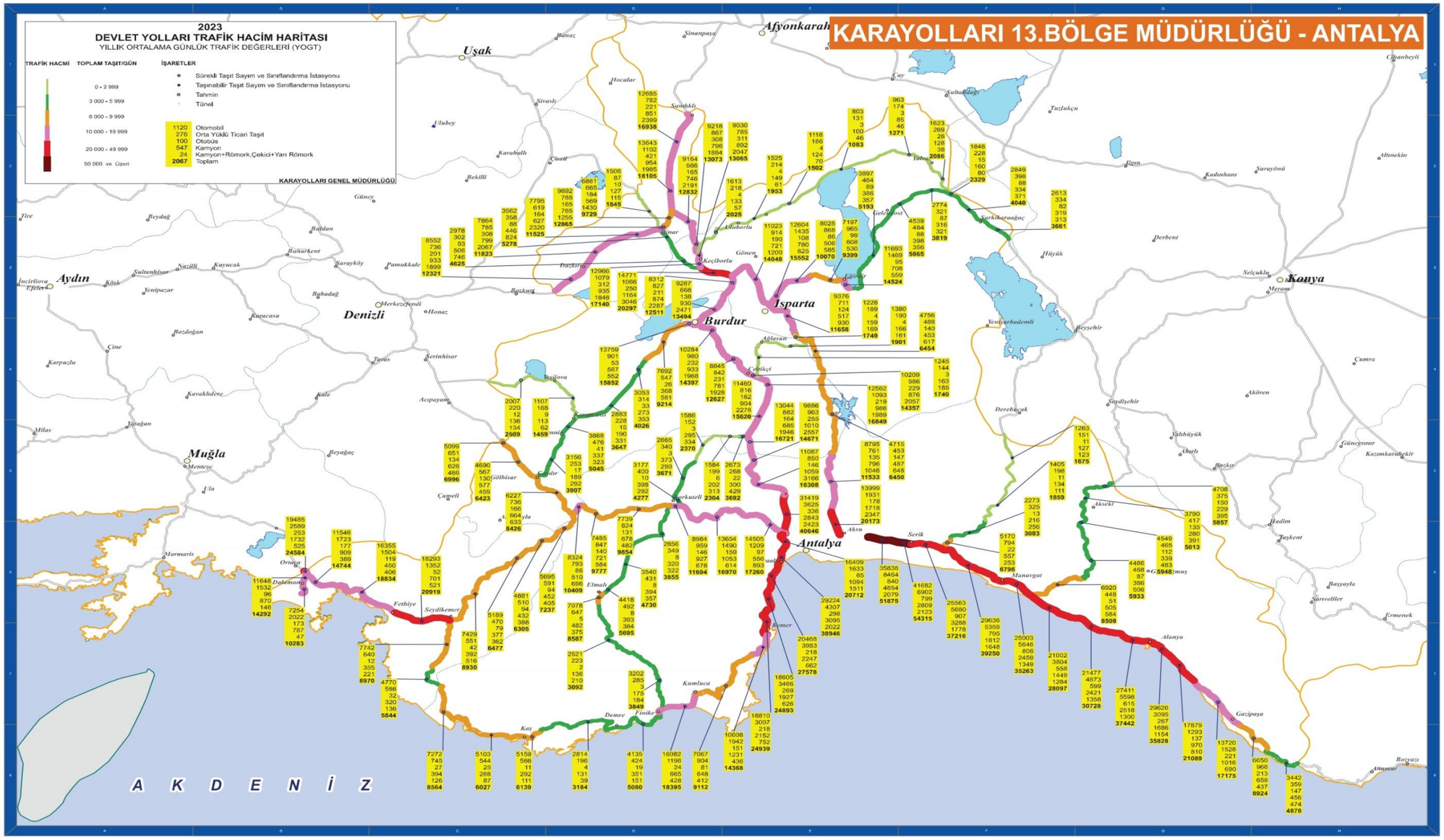
When comparing accident trends and numbers with road lengths in Türkiye, two issues should be considered for community safety and sustainable development: balanced development and safety integration. While expanding divided roads and motorways is essential, it is crucial to integrate these developments with comprehensive road safety strategies. This includes improved enforcement, better driver education, and maintenance. Additionally, it's important to ensure that road infrastructure keeps pace with increases in vehicle numbers and changes in traffic patterns, significantly reducing traffic accidents. Increasing public awareness about road safety and implementing stricter regulations for driving behavior can contribute to lowering accident rates.

The Motorway Project is located within the authority and responsibility area of KGM's Antalya (13th) Regional Directorate. Relevant network and traffic volume maps of 2023 within this area are presented in Figure XV.1 and Figure XV.2.



Source: KGM, 2023

Figure XV.1 Map of the Road Network within KGM's: Antalya (13th) Regional Directorate Authority Area (in Turkish)



Source: KGM, 2023

Figure XV.2 Map of the Existing Daily Traffic Volumes (Annual Average for 2023) on State Roads within KGM's Antalya (13Th) Regional Directorate Authority Area (In Türkiye)

Existing Health Status

This section provides a general assessment of the existing health status of the local population within the province of Antalya and the project's area of influence. The assessment is based on regional health statistics published by the Ministry of Health of the Republic of Türkiye and demographic and health indicators provided by the Turkish Statistical Institute (Turkstat). These data are essential for identifying potential risks that may affect community health during project implementation and for planning the necessary preventive and corrective measures. This analysis also serves as a baseline reference for monitoring and evaluation activities conducted in accordance with IFC Performance Standard 4.

Initially, data on the population and demographic characteristics of Antalya Province will be presented. Subsequently, the section will be further elaborated with public health data.

Demographic information for Antalya Province is presented in Table XV.4.

The number of applications to healthcare institutions and services in Antalya, as well as the number of hospital beds and healthcare personnel, can be accessed through Table XV.5, Table XV.6, and Table XV.7.

Table XV.4 General Demographic Indicators, 2023

City	Total Population	Rural Population Ratio (%)	Urban Population Ratio (%)	0-14 Aged Population Ratio (%)	65 and Over Aged Population Ratio (%)	Child Dependency Ratio (Aged 0-14) (%)	Elderly Dependency Ratio (Aged 65 and Over) (%)	Total Age Dependency Ratio (%)
Antalya	2.696.249	0,9	99,1	19,9	9,7	28,3	13,8	42,1
Türkiye	85.372.377	11,2	88,8	21,4	10,2	31,4	15,0	46,3

* Source: TURKSTAT

Table XV.5 Information on healthcare institutions in Antalya, 2023

City	Number of Hospital	Number of Bed	Number of Hospital Bed per 10.000 Population	Number of Qualified Bed	Number of Intensive Care Unit Bed	Proportion of Qualified Bed *	Intensive Care Unit Bed per 10.000 Population	Number of Family Medicine Unit	Population per Family Medicine Unit
Antalya	46	7.545	28,0	5.455	1.444	89,4	5,4	889	3.033
Türkiye	1.566	266.594	31,2	179.597	48.966	82,5	5,7	28.054	3.043

*Source: General Directorate of Health Services, General Directorate of Public Health
*Intensive care unit beds are not included.

Table XV.6 Information on healthcare sector employees in Antalya

City	Specialist Physician	General Practitioner	Medical Resident	Total Physician	Total Dentist	Pharmacist	Nurse	Midwife	Other Health Personnel
Antalya	3.822	1.718	1.465	7.005	2.251	1.651	6.921	1.790	8.635
Türkiye	101.233	54.899	48.091	204.223	45.718	40.610	248.287	59.750	266.217

*Source: General Directorate of Health Services

Table XV.7 Some Health Indicators in Antalya, 2023

City	Primary Health Care Facilities Visits	Secondary and Tertiary Health Care Visits	Per Capita Physician Visits	Number of Dentist Visits	Per Capita Dentist Visits
Antalya	14.473.256	17.643.707	11,9	1.886.509	0,70
Türkiye	421.121.236	552.397.851	11,4	58.367.835	0,68

*Source: General Directorate of Public Health, General Directorate of Health Services

Table XV.8 Emergency Response Resources in Antalya

City	Number of Emergency Care Station	Population per Emergency Care Station	Number of Emergency Care Ambulance	Population per Emergency Care Ambulance	The Rate of Unfounded Incidents (%)
Antalya	72	37.448	118	22.850	10,3
Türkiye	3.420	24.963	5.908	14.450	11,1

*Source: General Directorate of Emergency Health Services

An analysis of the general demographic structure of Antalya reveals that 99.1% of the population resides in urban areas, a figure significantly higher than the national average of 88.8% (Table XV.4). The same table indicates that the proportion of children (aged 0-14) and elderly (aged 65 and over) in Antalya is slightly below the national average (19.9% and 9.7%, respectively), resulting in a total age dependency ratio of 42.1%. This demographic profile suggests that health service planning in Antalya is primarily shaped around the needs of an active working-age urban population, with relatively limited rural access challenges.

Regarding health infrastructure, Antalya hosts 46 hospitals with a total of 7,545 beds, translating to 28 beds per 10,000 populations. While this is slightly below the national average of 31.2, the proportion of qualified hospital beds in Antalya stands at 89.4%, which is well above the national average of 82.5 (Table XV.5). The number of intensive care unit beds per 10,000 populations is 5.4, closely aligned with the national rate of 5.7. Additionally, the number of people per family medicine unit in Antalya is 3,033-very close to the national figure of 3,043. These indicators suggest that the physical health infrastructure in Antalya is balanced and adequate, though seasonal pressures on hospital bed capacity in certain districts should be taken into consideration.

In terms of human resources, Antalya has a strong health workforce comprising 7,005 physicians, 6,921 nurses, 1,790 midwives, and 8,635 other healthcare personnel (Table XV.6). This distribution supports the sustainability of both primary and secondary health services. Furthermore, the presence of 2,251 dentists and 1,651 pharmacists indicates robust access to dental and pharmaceutical services.

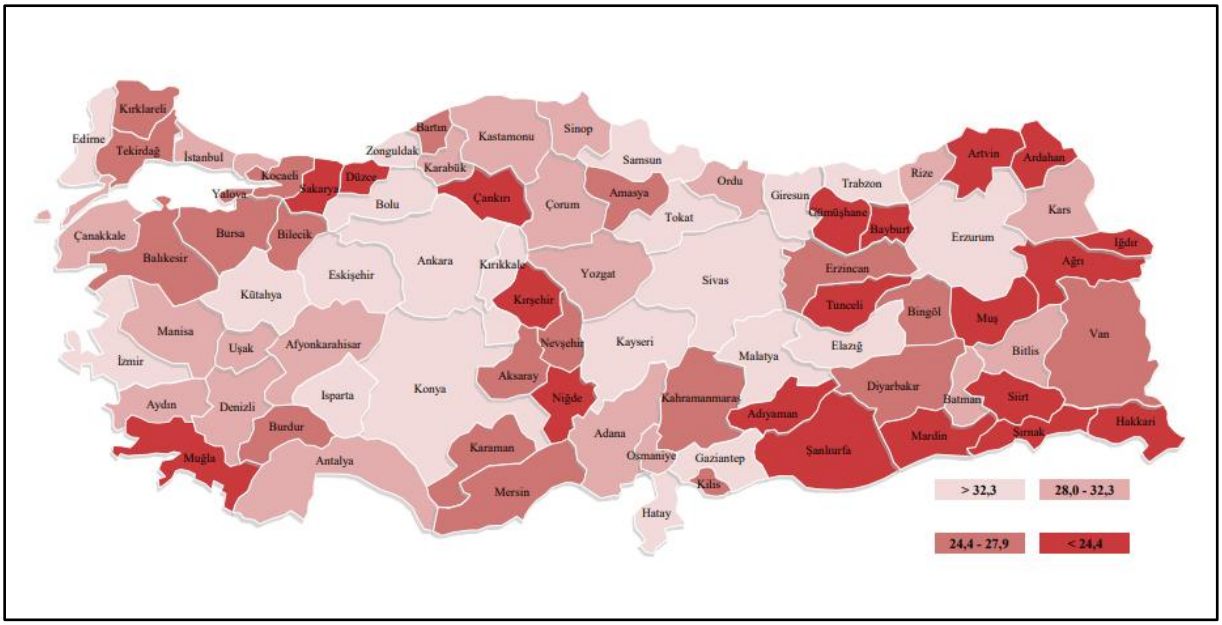
Healthcare utilization data show that the annual number of physician visits per capita in Antalya is 11.9, which is higher than the national average of 11.4 (Table XV.7). Similarly, the annual number of dentist visits per capita in Antalya is 0.70, compared to the national average of 0.68. These figures indicate that the public in Antalya has good access to healthcare services and actively utilizes the system.

However, some capacity limitations are evident in emergency healthcare services. Antalya has 72 emergency medical stations and 118 ambulances, equating to one emergency station per 37,448 people and one ambulance per 22,850 people. Nationally, these ratios are 24,963 and 14,450, respectively (Table XV.8). Therefore, Antalya-especially as a tourism destination with a rapidly increasing summer population-falls below the national average in terms of per capita emergency response capacity. This underlines the need for seasonal capacity planning and the strengthening of emergency medical infrastructure.

Overall, Antalya presents a solid healthcare access profile. Nevertheless, when evaluating the impacts of the project during the construction phase and beyond, special attention should be paid to the following issues:

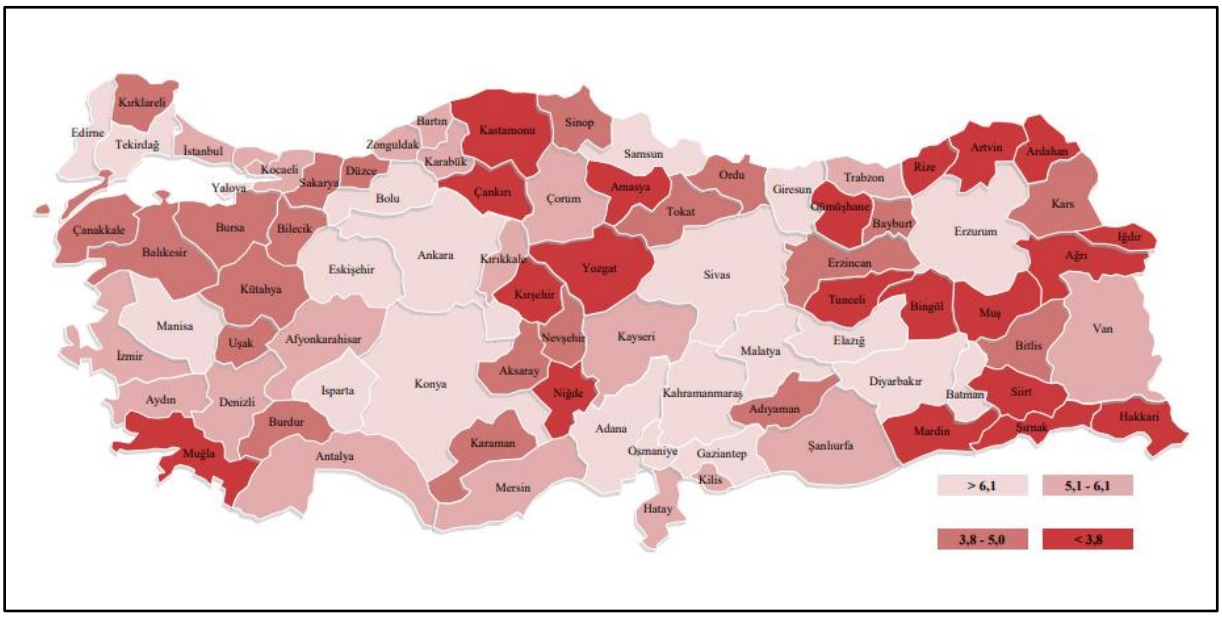
- The vulnerability of the healthcare system to seasonal population surges,
- Limited emergency response capacity in peak periods,
- Potential delays in healthcare access for local residents due to temporary closures, route changes, or construction-related disruptions.

Accordingly, the project will ensure close coordination with local healthcare institutions, keep emergency access routes operational, provide temporary support through mobile health services, and actively monitor access-related grievances through community-based complaint mechanisms.



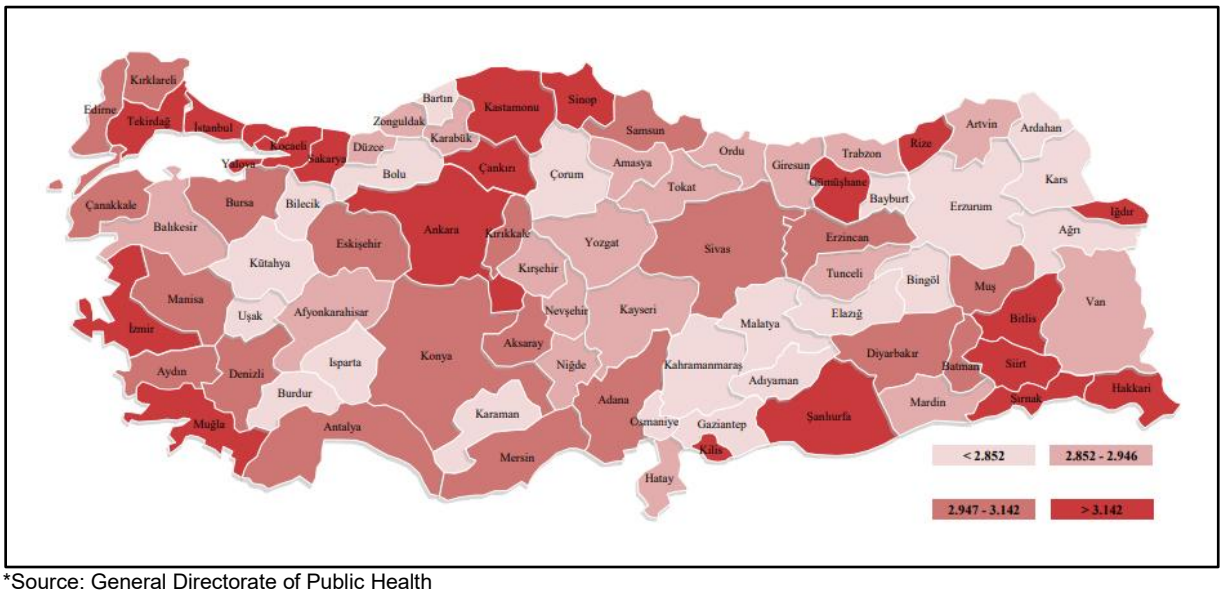
*Source: General Directorate of Health Services

Figure XV.3 Number of Hospital Beds per 10.000 Population by Provinces, All Sectors, 2023



*Source: General Directorate of Health Services

Figure XV.4 Number of Intensive Care Unit Beds per 10.000 Population by Provinces, All Sectors, 2023



*Source: General Directorate of Public Health

Figure XV.5 Populations per Family Medicine Unit by Provinces, 2023

In conclusion, based on the data presented below (Figure XV.3, Figure XV.4, Figure XV.), it is observed that the province of Antalya has better healthcare conditions compared to the national average in Türkiye. Since the majority of the personnel to be employed under the project are expected to be recruited from local settlements, no significant change in the regional population is anticipated. Therefore, the project is not expected to have any adverse impact on healthcare services or cause any disruption in service provision.

Table XV.9 Mortality by Cause Statistics (2020-2023)

Province	Year	Total	Diseases of the circulatory system	Neoplasms	Diseases of the respiratory system	Diseases of the nervous system and the sense organs	Endocrine, nutritional and metabolic diseases	External causes of injury and poisoning	COVID-19	Other	Unknown
Antalya	2020	**12 342**	4 674	2 440	1 508	636	674	651	223	1 337	199
	2021	**15 647**	5 408	2 351	1 824	648	818	864	1 522	1 925	287
	2022	**14 228**	5 123	2 301	1 595	643	852	877	682	1 800	355
	2023	**13 722**	5 105	2 310	1 691	542	838	902	45	1 774	515

* Source: TURKSTAT

Table XV.10 Infant mortality rate by provinces, 2018-2023 (per 1,000 live births)

Province	2018	2019	2020	2021	2022	2023
Türkiye	**9,3**	**9,3**	**8,7**	**9,3**	**9,2**	**10,0**
Antalya	7,1	6,6	5,8	6,9	6,8	5,9

* Source: TURKSTAT

Table XV.11 Under five mortality rate by provinces, 2018-2023 (per 1,000 live births)

Province	2018	2019	2020	2021	2022	2023
Türkiye	**11,4**	**11,4**	**10,7**	**11,4**	**11,2**	**14,5**
Antalya	8,5	8,2	7,2	8,9	9,0	7,7

* Source: TURKSTAT

Table XV.12 Mortality Statistics (2023)

Mortality Statistics (2023)	Antalya	Antalya, Isparta, Burdur	Akdeniz	Türkiye
Infant Mortality Rate (per 1,000 live births)	5,9	6,5	12,3	10
Under-Five Mortality Rate (per 1,000 live births)	7,7	8,3	27,4	14,5
Crude Death Rate (per 1,000 population)	5,1	5,6	8,5	6,2

* Source: TURKSTAT

When Table XV.9 is examined, it is observed that the most common cause of death in Antalya during the 2020-2023 period was diseases of the circulatory system. Deaths attributed to this cause increased from 4,674 in 2020 to 5,105 in 2023. Neoplasms (tumors) ranked second, showing a stable trend with an average of approximately 2,300 deaths per year.

COVID-19-related deaths were recorded as 223 in 2020, peaked at 1,522 in 2021-the height of the pandemic-and then declined significantly to 45 in 2023. This indicates that while COVID-19 posed a serious public health issue in Antalya in 2021, its impact was temporary.

Deaths due to respiratory system diseases rose from 1,508 in 2020 to 1,691 in 2023, indicating an upward trend. This suggests that factors such as air quality and the aging population should be taken into account.

External causes of injury and poisoning (e.g., traffic accidents, occupational accidents) accounted for 651 deaths in 2020 and increased to 902 in 2023. This rise points to the need for specific preventive measures against potential safety risks that may arise from the project.

When Table XV.10 is examined, it is observed that Antalya's infant mortality rate remains significantly below the national average in Türkiye. In 2023, the national infant mortality rate was 10.0 per 1,000 live births, whereas in Antalya it was recorded as 5.9 per 1,000. This gap reflects the effectiveness of maternal and child health services in Antalya, as well as the adequacy of the region's healthcare infrastructure.

When Table XV.11 is examined, a similar trend is observed in terms of under-five mortality rates. In 2023, the national rate was 14.5 per 1,000 live births, whereas in Antalya it was measured at only 7.7 per 1,000. Although there was a temporary increase in 2021 and 2022, the rate declined again in 2023. This indicates that Antalya is effective both in early childhood health services and in vaccination and monitoring systems.

When Table XV.12 is examined, the 2023 data shows that Antalya's crude death rate (5.1 per 1,000 population) is lower than both the Mediterranean Region average (8.5) and the national average (6.2). Similarly, the infant mortality rate (5.9 per 1,000 live births) and under-five mortality rate (7.7 per 1,000 live births) in Antalya are also significantly lower compared to other regions (Mediterranean Region: 12.3 and 27.4, respectively). These differences indicate that Antalya holds a relatively advantageous position in terms of healthcare infrastructure within Türkiye and that its public health indicators are generally strong.

Based on the evaluation of current statistical data, Antalya province demonstrates performance above the national average in terms of public health indicators. In particular, infant and under-five mortality rates are significantly lower than both the national and regional averages. This reflects the effectiveness of maternal and child health services in Antalya, the level of access to primary healthcare, and the success of the preventive healthcare system.

Furthermore, the fact that the crude death rate in Antalya remains below both the national and Mediterranean Region averages indicates that the province enjoys a high overall quality of life, effective management of chronic diseases, and a healthcare infrastructure with sufficient capacity to meet regional needs. The elevated mortality rates observed during the COVID-19 pandemic have almost entirely subsided by 2023, which demonstrates the resilience and recovery capacity of the local health system in the face of public health emergencies.

In this context, the planned project is not expected to result in any lasting, systemic, or widespread disruption to Antalya's existing healthcare system. Local capacity is deemed adequate to meet the essential healthcare demands. However, potential public health risks arising from dynamics such as temporary population movements, intensive construction activities, and increased traffic volume must not be overlooked during the project implementation phase.

In particular, the following areas require close attention:

- Traffic accidents and road safety,
- Construction-related occupational injuries and physical accidents,
- Risk of communicable diseases associated with temporary workforce (e.g., airborne or waterborne diseases).

To mitigate these risks, the project will incorporate preventive public health strategies, effective communication and awareness campaigns for the local population, enhancement of mobile health services, and the development of emergency preparedness protocols.

Within this framework, the public health management planned not only to preserve existing infrastructure but also to safeguard public health by preventing potential adverse impacts that may arise during project activities.

Existing Gender Based Violence and Harassment Status

Unfortunately, data specific to Antalya are not regularly disclosed by public institutions at the national level. According to data from the WWSFP, 13 femicides were committed in the province during the first ten months of 2024[3].

The “Provincial Action Plan for Combating Violence Against Women (2022-2025)”, prepared by the Antalya Provincial Directorate of Family and Social Services and approved by the Antalya Governorship, provides a comprehensive framework for combating GBVH at the provincial level [4]. The plan sets targets aligned with the national action plan under the headings of preventing violence, protecting survivors, punishing perpetrators, and developing policies and strategies. It also includes activities such as strengthening inter-institutional cooperation at the local level, conducting awareness campaigns, implementing training programs, and ensuring accessible support services through Violence Prevention and Monitoring Centres (ŞÖNİM). This action plan serves as a strategic roadmap for combating GBVH in Antalya[1].

Under the scope of employment, according to the Household Labour Force Survey, the employment rate of the population aged 15 and over was 48.3% in 2023. This rate was 31.3% for women and 65.7% for men. The highest employment rate was 54.5% in TR21 (Tekirdağ, Edirne, Kırklareli), while the lowest employment rate was 37.5% in TRC3 (Mardin, Batman, Şırnak, Siirt). Regarding female employment specifically, the highest rate was 38.9% in TR61 (Antalya, Isparta, Burdur), and the lowest rate was 19.8% in TRC3 (Mardin, Batman, Şırnak, Siirt) [2].

[1] Antalya Provincial Directorate of Family and Social Services. (2022). Provincial Action Plan for Combating Violence Against Women (2022–2025). Approved by Antalya Governorship.
[2] TurkStat, Women Statistics, 2024
[3] We Will Stop Femicide Platform, 2024. ‘Femicide Report, January–October 2024.’ Istanbul.

XV.3. Potential Impacts

Similar to most large-scale construction projects, the Antalya-Alanya Motorway Project is expected to present several community health and safety concerns during its construction phase and operation phase.

These include:

- Dust, noise, and vibration generated by construction equipment and vehicles,
- Social impacts potentially associated with the influx of temporary male construction workers,
- Increased risk of traffic accidents, particularly for pedestrians and vulnerable road users,
- Fire risks in proximity to construction areas, rest facilities and natural landscapes.

Mobile vehicle traffic throughout both the construction and operation phases may pose risks such as air and noise pollution, traffic congestion, and accidents, requiring proactive and continuous management. However, the improved road conditions offered by high-standard motorway infrastructure are also expected to reduce the overall number of accidents in the region, enhancing long-term community safety.

In addition, fire hazards-stemming from construction machinery, fuel storage, or surrounding vegetation-represent a significant risk to the health and safety of both nearby communities and motorway users. This is particularly critical for immobile populations such as the elderly, persons with disabilities, or informal settlement residents located near the alignment.

The following table outlines key community health and safety risks across project phases, specifically identifying vulnerable groups (e.g., women, children, elderly, low-income households, and persons with disabilities) and proposing tailored measures.

Recommended location-based measures for vulnerable groups are provided in Table XV.13

Table XV.13 Recommended location-based measures for vulnerable groups

Project Phase	Impact Source	Community Exposure	Some Affected Vulnerable Groups	Mitigation / Preventive Measures
Land Preparation	Vegetation clearance, excavation	Dust formation and increased equipment movement near settlements; disturbance to daily life	Elderly with chronic illnesses or limited mobility (e.g., in Taşağıl and Konaklı); housebound or chronically ill individuals (Ulukapı, Konaklı); illiterate elderly women (Toslak, Alara)	Advance community notification; distribution of protective masks to sensitive households; coordination with mobile health services; dust suppression through water spraying; ensuring safe pedestrian access near work zones
Construction	Heavy machinery operation	Increased noise and vibration levels; sleep disturbance and discomfort	Elderly individuals or chronic illness (e.g., Taşağıl, Konaklı); illiterate elderly women with low awareness (Toslak, Alara); people with mental disabilities (Akdam, Taşağıl)	Targeted noise reduction near elderly areas; awareness outreach through mukhtars and health workers; distribution of printed and verbal guidance
Construction	Influx of large male workforce from outside	Social tension or harassment risk, especially for women and girls	Women and girls in Merkez, Ulukapı and Konaklı; female-headed households ; widowed/divorced women	Mandatory gender-sensitive code of conduct for all workers; establishment of grievance mechanism; GBVH (Gender-Based Violence) awareness campaigns; assignment of woman liaison officers
Construction	Increased road traffic and heavy vehicles	Risk of traffic accidents for pedestrians, especially children and the elderly	Children walking to school; elderly individuals with mobility impairments; seasonal agricultural workers	Pedestrian safety training in schools; traffic signs and crossing guards at sensitive locations; rerouting of traffic during peak hours; targeted safety campaigns for rural households
Construction	Temporary labor camps	Strain on local resources (water, healthcare); risk of gender-based violence (GBVH)	Women in neighboring communities (especially in Merkez and Ulukapı); charity-dependent households; individuals with disabilities	Short-term skill development and employment programs can be developed based on local labor market needs.
Operation	High-speed traffic	Traffic accidents involving local vehicles or livestock	Rural families relying on small-scale livestock (Kalemler, Alara); illiterate drivers in agricultural areas	Installation of animal fencing in high-risk segments; reflective signs or underpasses for animal crossings
Operation	Continuous emissions and noise from vehicles	Chronic exposure, especially in roadside homes; long-term health impacts	Chronically ill or housebound individuals (Ulukapı, Konaklı); elderly and disabled persons in roadside villages	Noise barriers in densely populated areas; regular air quality monitoring
All Phases	Fire risks from fuels, equipment, and vegetation	Fire-related health threat for immobile or hard-to-evacuate individuals	People with physical or mental disabilities (Taşağıl, Akdam, Konaklı); elderly living alone; informal housing residents near forested zones	Community fire drills in high-risk areas; fire equipment in labor camps; bilingual awareness campaigns (Turkish and other); early alert systems via mukhtars and clergyman (they will make an announcement in case of emergency)

XV.3.1. Land Preparation and Construction Phase

Land preparation and construction phase impacts of the Project would include emissions of dust, noise, and vibration from earthmoving activities, construction vehicle transit, increased traffic load, water supply, material extraction, blasting, and communicable/airborne diseases (respiratory or allergic) associated with the influx of temporary construction labor. Workers' influx in the vicinity of a community may also strain existing infrastructure, in particular the water and sanitation, electricity, and transport systems (IFC/EBRD, 2009). These impacts can be managed through good management practices, and the significance of impacts would then be reduced to acceptable levels. Assessment of specific community health and safety issues associated with the land preparation and construction phase is provided below. Traffic-related impacts are addressed in the relevant management plan, while impacts caused by workers are examined in Chapters 15 and 16 in the ESIA. Detailed assessments of the impacts caused by air emissions and noise generation have been discussed in Chapter 10 in the ESIA ("Air Quality and Climate Change") and Chapter 11 in the ESIA ("Noise and Vibration"), respectively.

Vegetation Clearance and Excavation Activities

Vegetation clearance and excavation activities, particularly when conducted near residential areas, may pose short-term but locally significant risks to community health and safety. The increased movement of heavy machinery, elevated dust emissions, and construction-related noise may disrupt daily life and negatively impact public health.

Dust emissions generated during such activities are of particular concern for vulnerable population groups, including elderly individuals with chronic respiratory or cardiovascular conditions In the absence of timely information and protective measures, these individuals are at increased risk of experiencing acute respiratory symptoms such as eye irritation, coughing, and shortness of breath.

In addition, reduced visibility due to airborne dust can compromise pedestrian safety, especially in areas where excavation work is ongoing. Vulnerable individuals such as children and the elderly may face increased risk of accidents while crossing roads or passing near active construction zones. Furthermore, noise and visual disturbances associated with construction may contribute to psychological stress, discomfort, and perceived health risks among some community members.

Construction Traffic Safety

Significant numbers of trucks and other construction machinery will be involved in the land preparation and construction activities increasing the risk of accidents. Since the heavy machinery will work within the construction corridor, the risks posed on the users of public roads would be insignificant. On the other hand, delivery of the construction materials extracted at the quarries and material borrow sites to the construction site and transportation of the unused excavated materials from the work sites to the storage sites by means of trucks, delivery of construction materials (steel, beams, concrete, etc.) by means of trailers and trucks, transportation of personnel accommodating at campsites to the work sites will be the main activities associated with increased traffic.

Some of the public roads may need to be diverted or closed for a certain period of time during the construction and if these activities are conducted in the lack of proper measures (i.e. putting road signs, providing adequate lightning at night), risk of accidents may increase.

Especially, routes passing through settlements may pose significant risks and disturbances on the health and safety of the local communities including those who are the most vulnerable to road traffic accidents (e.g. animals, pedestrians, motorcyclists, children, and elderly).

During the construction of motorways, heavy vehicles operating on narrow village roads should be vigilant in observing small animals and take necessary precautions to prevent accidents. The presence of these vehicles close to wildlife can lead to dangerous encounters, especially as animals might unexpectedly cross paths or be startled by the noise and movement. Ensuring that drivers are aware of and prepared for such scenarios is essential for minimizing harm to both animals and pedestrians.

Behaviors of the drivers and construction machinery operators are among the most important factors related with the risk of traffic accidents, thus requirements for the training of drivers and operators would reduce the associated risks.

Community Severance

The construction approximetly 120-kilometer road corridor has the potential to create community severance, physically and functionally disconnecting local settlements from essential services such as healthcare, education, economic infrastructure, and public institutions. This impact will be particularly significant for rural, low-income households and vulnerable groups such as the elderly, women, children, and persons with disabilities who rely heavily on safe, short-distance, and pedestrian-based access to services.

The Project area-stretching across the Antalya-Alanya corridor is not only home to permanent residents but also characterized by intense seasonal population influx. During the summer months, the region experiences a significant increase in:

- Seasonal tourism workers who commute daily between accommodation sites and hotels,
- Temporary workers in tourism, domestic, service, and agriculture sectors who often reside in informal or isolated areas,
- Tourists and families staying in coastal areas with high pedestrian circulation.

As such, potential access disruption may not only affect local residents, but also temporary and tourism-related populations, in the following ways:

- Tourism workers may face extended or unsafe commutes between their accommodation and workplaces due to lack of designated crossings.
- Temporary female workers may lose access to critical public health services (e.g, emergency clinics).
- Local businesses, including small hotels and restaurants, may suffer from decreased customer and staff flow, affecting the regional economy.

From a broader social perspective, the road may fragment small rural settlements, weaken community cohesion, and reduce participation of women and youth in public life-particularly where physical barriers limit access to shared spaces or essential services.

Blasting Operations

Blasting operations planned at multiple quarry sites along the project route may pose localized but significant risks to the health, safety, and well-being of nearby communities and land users. If not properly managed, such activities may result in vibration, air shock, and fly rock, potentially affecting nearby settlements, agricultural areas, greenhouses, and public road users.

While some quarries are located away from residential zones, others are in close proximity to settlements or productive agricultural land, thereby increasing the risk of community disturbance, property damage, or disruption to agricultural activities. For example, Çakış (TOY4a) Quarry and Dikmen Quarry are located near residential areas, while Uzunlar, Sarıabalı, and Karamanlar Quarries are adjacent to active farmland and greenhouses. These sensitive receptors are more likely to be exposed to blasting-related nuisances, including noise, dust, and structural vibrations.

Furthermore, the cumulative operation period of up to 36 months at several quarry sites increases the likelihood of long-term community exposure, especially for vulnerable populations such as the elderly, children, and agricultural workers who spend significant time outdoors.

To minimize adverse effects, blasting activities must be carefully planned and executed with strict safety zones,, prior public notifications, and coordination with local authorities. Risk assessments should

consider site-specific conditions including distance to receptors, local topography, and the timing of agricultural activities.

Information regarding the quarry activities to be carried out is provided in Table XV.14

Table XV.14 Information on quarry activities

Quarry	Description
Çakış TOY4a - Quarry	TOY4a Quarry is located around Km 56+500 near Sarıabalı neighborhood of Serik district of Antalya province. The closest settlement is Çakış neighborhood. The quarry is 25 ha with a capacity of 375 m^3/h. The operational duration is planned to be 36 months.
Kuruçay (TOY4b) Quarry	Kuruçay (TOY4b) Quarry is located on an area of 24.3 hectares around Km 58+500. The operation period is planned for 36 months and has a capacity of 375 m3/h.
TO2, Bademliyar Quarry	TO2, Bademliyar Quarry is located around Km 104+750 near in Manavgat district of Antalya province. There are no nearby residential areas, but the quarry's location is very close to agricultural areas and another quarry. The quarry is 17.9 ha with a capacity of 375 m^3/h. The operational duration is planned to be 36 months
Çengel Stream Material Quarry	Çengel Stream Material Quarry is located on an area of 19 hectares around Km 105+000. The operation period is planned for 36 months and has a capacity of 375 m3/h.
Uzunlar TOY5 Quarry	TOY5 Quarry is located around Km 106+000 near Uzunlar neighborhood of Manavgat district of Antalya province. The quarry's location is very close to agricultural areas and greenhouses. The quarry is 24.7 ha with a capacity of 375 m^3/h. The operational duration is planned to be 16 months
Karakaya Quarry	Karakaya Quarry is located on an area of 25 hectares around Km 114+200. The operation period is planned for 16 months and the facility has production capacity of 375 m3/h
Saburlar Quarry	Saburlar Quarry is located on an area of 25 hectares around Km 117+000. The operation period is planned for 16 months and the facility has production capacity of 375 m3/h.
Karamanlar Quarry	Karamanlar Quarry is located on an area of 25 hectares around Km 119+500. The operation period is planned for 16 months and the facility has production capacity of 375 m3/h.
Soğukpınar Quarry	Soğukpınar Quarry is located on an area of 25.1 hectares around Km 134+000. The operation period is planned for 16 months and the facility has production capacity of 375 m3/h.
Sarıabalı Quarry	Sarıabalı Quarry is located around Km 53+800 near Sarıabalı neighborhood of Serik district of Antalya province. The quarry's location is very close to agricultural areas and greenhouses. The borrow pit is 24.9 ha with a capacity of 375 m^3/h. The operational duration is planned to be 36 months
Dikmen Quarry (Manavgat Connection Road)	Dikmen quarry (Manavgat Connection Road) is located around Km 83+000 near Yukarıışıklar neighborhood of Manavgat district of Antalya province. Besides, it is close to agricultural areas, greenhouses, and settlements. The borrow pit is 24.5 ha with a capacity of 375 m^3/h. The operational duration is planned to be 36 months.

Chemicals and Fuels

During the construction phase of the motorway project, a variety of chemicals and fuels will be used, including diesel fuel, lubricants, hydraulic oils, paints, solvents, adhesives, and cleaning agents. In addition, explosives and blasting materials will be required for quarry operations and rock excavation works.

If not properly managed, these substances pose significant risks to community health and safety. Potential risks include:

- Civilian access to the construction site may lead to risks
- Leakage or spills of fuels, oils, and solvents may lead to soil and groundwater pollution, potentially affecting agricultural lands, local water resources, and thereby public health.
- Improper storage and handling of fuels and explosives can create fire and explosion risks, which may endanger both workers and nearby communities.
- Direct or indirect exposure to hazardous chemicals (vapors, dust, or accidental contact) may result in respiratory issues, skin irritation, or other health problems for workers and local populations.

- Improper handling of chemicals, such as paints and solvents, may create strong odors that disturb nearby settlements and affect quality of life.

GBVH

The construction phase of the project overlaps with periods of high seasonal activity along the Project corridor, during which a large, male-dominated workforce-including subcontractors and security personnel-will be mobilized. This region is known for its high concentration of seasonal female agricultural workers and female tourists, both of whom are potentially vulnerable to gender-based violence and harassment (GBVH) risks.

Many of the seasonal female workers are employed informally, live in isolated and often mixed-gender accommodations, and lack access to support or complaint mechanisms. Female tourists, particularly those staying in rural or unmonitored areas, may also be at risk of unwanted interactions with project workers or third parties. For local women, traditional gender roles, patriarchal structures, and social pressures often act as barriers to reporting GBVH incidents, and access to grievance mechanisms tends to be limited or inadequate.

In this context, GBVH risks during the construction phase may not only result in individual harm but could also lead to loss of trust, social tension, and even community-level conflict between the project and surrounding populations.

Camp Site

If not properly planned, managed, and monitored, workers' camps established under the scope of the project may pose significant risks to the health of nearby communities. Overcrowded living conditions, inadequate sanitation, insufficient wastewater management, and contamination of drinking water sources can increase the spread of infectious diseases. Moreover, interactions between camp workers and local populations may facilitate the transmission of communicable diseases such as sexually transmitted infections (STIs), including HIV/AIDS. Therefore, the establishment, operation, and monitoring of workers' camps will be carried out in full compliance with IFC Performance Standard 4 and national legislation, with strict implementation of necessary health, safety, and hygiene measures.

Water Quality and Availability

During land preparation and construction activities, such as water extraction, wastewater discharges, and impoundment, there may be potential impacts on groundwater and surface water. This could affect the local community, especially if they rely on these resources for drinking or irrigation. As part of ESIA studies, a social field study was conducted to identify the situation of the local people (include water resources) living near the Motorway and construction sites. In Chapter 14 ("Socio-economic Environment") of the ESIA report, further details and findings from the social field study are given.

Additionally, Table XV.15 in the report summarizes the water resources and wastewater removal methods used by the settlements interviewed. According to the neighborhood representative (mukhtar), all the neighborhoods along the Motorway route rely on municipal distribution, groundwater, and surface water as sources of domestic water.

Table XV.15 Water Resources and Wastewater Management in the Settlements Interviewed

Name of the Settlement	Source of Water Used for Domestic Purposes	Perceived Quality of Domestic Water Source	Wastewater Management Method
Merkez	Municipal Water/ Spring water	Good	Sewage System
Ulukapı	Groundwater	Good	Septic tank
Karakaya	Surface Water (Alara Stream)	Good	Septic tank
Toslak	Groundwater	Good	Septic tank

Source: Social Field Study, June 2024

According to TurkStat (2022) data, daily water drawn per person (liters/person-day) is 229 L in Türkiye and 349 L in Antalya. It is assumed that the Project personnel in the campsites use %70 of average daily per capita water amount. As a result, Table XV.16 shows that 806.2 tons/day is expected to be drawn for the Project's personnel water demand.

Table XV.16 Daily Water Demand at Neighborhoods and Campsites

Location	Number of Personnel (Anticipated)	Estimated Daily Water Demand (tons/day)	Possible Source of Water Supply
Construction Camp Site 1 (near Taşağıl neighborhood)	3300	806.2 tons/day	Municipal Water
Construction Camp Site 2 (near Bucakşeyhler neighborhood)			
Construction Camp Site 3 (near Avsallar and Incekum neighborhoods)			

The wastewater generated at the campsites will be treated at the package wastewater treatment plants and then released into the nearest water bodies in accordance with the discharge permits from the MoEUCC. Since these water bodies are not used as drinking water sources for the communities, this process is not expected to have any significant impact.

Airborne/Communicable Diseases

Large-scale development projects involving significant workforce mobilization can pose considerable risks to community health. In particular, if worker camps are characterized by poor sanitation standards, inadequate wastewater management, limited access to clean drinking water, and insufficient food safety measures, the risk of communicable disease transmission increases. Such conditions may lead not only to health problems among workers but also to the spread of respiratory diseases, gastrointestinal infections, and skin conditions within local communities.

For local populations, an additional risk stems from potential water- and food-borne diseases originating in the camps. Contamination of drinking water sources or the improper handling of food can result in outbreaks of diseases such as typhoid, cholera, and hepatitis A. Moreover, the presence of a predominantly workforce in the area can create potential risks for the transmission of sexually transmitted infections (STIs), including HIV/AIDS, particularly affecting vulnerable groups such as informally employed women, youth, and seasonal agricultural workers.

Beyond communicable diseases, frequent interactions between workers and local communities may also lead to psychosocial impacts. Increased perceptions of health risks among community members can create anxiety, mistrust, and social tensions. This, in turn, may escalate into a loss of confidence in the Project and strained relations between the Project and surrounding communities.

Security Personnel Arrangements

Involvement of security personnel to control unauthorized access to work sites and safeguard the Project personnel and property would be another issue related with the community safety and welfare. Risks that may be posed by security arrangements may be due to use of disproportionate use of force and where applicable firearms, inappropriate conduct toward workers and local people. In the scope of the Motorway Project's security services will be provided by the Project Sponsor. Unarmed security service will be provided within the scope of Project Sponsor's support services unit. The working area of these personnel will be limited with the Project borders (e.g. campsites).

Straight forward measures such as proper inquiries to be done at the hiring stage for the personnel to be employed, good management of the related personnel, trainings to be provided to security personnel in relevant subjects, monitoring of legal compliance of the acts of the personnel, applying contractual sanctions, etc. would be effective in avoiding and/or minimizing associated risks so that no significant impact is anticipated due to security personnel arrangements of the Project.

Emergency Preparedness and Response

An emergency is an unplanned event when a project activity/operation loses control, or could lose control, of a situation that may result in risks to human health, property, or the environment, either within the facility or in the local community. Emergencies do not normally include safe work practices for frequent upsets or events that are covered by occupational health and safety (IFC, January 2012).

Emergency situations that may be encountered during the land preparation and construction phase of the Project may include accidents, fires, spills, leakages, and geotechnical stability issues for the large engineering structures, earthquakes, etc. Suppose the consequences of these situations cannot be controlled within the borders of the work sites (e.g., construction corridors, campsites, quarries, etc.). In that case, risks may be posed to the health, safety, and security of the local communities. Nevertheless, with effective implementation of the measures/actions defined in the Project's Emergency Preparedness and Response Plan, (Annex-3) emergency situations can be controlled without causing significant risks and/or impacts on the health and safety of the local communities.

Risk of forest fires and spills/leakages have been covered in Chapter 5 in the ESIA ("Land Use and Property") and Chapter 6 in the ESIA ("Topography, Soils and Geology")

Public Health and Welfare

Air emissions and noise generation during land preparation and construction activities, especially at dry periods, may cause disturbance and discomfort for some of the local people, especially in settlements living in close distance to the construction/working sites. Impacts caused by construction phase emissions will be removed upon the completion of construction activities, nevertheless gaseous emissions and traffic noise will remain to be a concern of the subsequent operation phase. Impacts on public health and welfare due to air emissions and noise have been covered in Chapter 10 in the ESIA ("Air Quality and Climate Change") and Chapter 11 in the ESIA ("Noise and Vibration").

Campsites will be established in the construction sites in sufficiently large areas, and most of the construction workers are expected to be accommodated in these sites. Precautions will be taken to prevent GBVH and sexual abuse, exploitation, and harassment in the controlled areas where the Project employees are accommodated. The risks to the local community due to the influx of a large number of workers to the region will be evaluated primarily for the campsites that are located in the vicinity of settlements and a basic training program for the Project workers regarding these subjects will be provided by Project Sponsor.

Displacement

During the construction and operation phases of the project, there is a risk of physical (loss of housing) and/or economic (loss of livelihoods) displacement, particularly due to land acquisition and site installations. In this regard, the project will act in compliance with IFC Performance Standard 5 (Land Acquisition and Involuntary Resettlement), implementing a transparent, fair, and participatory displacement process aimed at restoring or improving the living conditions and livelihoods of affected persons. For this cause, Resettlement Action Plan (RAP) is developed, and compensation will be provided in a timely, fair, and adequate manner.

In addition to land acquisition and physical resettlement, temporary economic displacement is expected during the construction phase due to reduced accessibility, road closures, and increased nuisance (dust, noise). These effects may negatively impact local businesses-especially those located along main roads and in tourism-dependent areas-by limiting customer access and reducing daily revenue.

Examples of areas where displacement will occur are provided in Table XV.17

Table XV.17 Examples of Locations at Risk of Displacement and Experience Partial Loss of Land and/or Assets

Location	Type	Status
Emişbeleni (Alanya)	Local market and barbershop (tenant-operated)	Currently operational
Telatiye (Alanya)	Auto repair shop (formerly tenant-run)	Not operational; renter moved to Antalya
Emişbeleni (Alanya)	Multi-storey apartment building used as permanent residences by multiple households, including a formal tenant on the ground floor	The structure is currently in use
Telatiye (Alanya)	Multi-storey apartment building used as permanent residence by multiple households (relatives); egg packaging facility owned and operated by households on the ground floor	The structure is currently in use
Taşağıl (Manavgat)	House used as permanent residence by a single household	The structure is currently in use
Bucakşeyhler (Manavgat)	Vacant vineyard house	Not operational
Evren, Manavgat	Retail Stores	Currently operational
Hacıobası, Manavgat	Roadside Local Product Vendors	Currently operational
Hacıobası, Manavgat	Roadside Local Product Vendors	Currently operational
Evren, Manavgat	Retail Stores	Currently operational
Evren, Manavgat	Workshop (marble)	Currently operational
Taşağıl, Manavgat	Local Cafe	Currently operational
Telatiye, Alanya	Retail Store (Tent, Awning, Tarpaulin)	Currently operational
Telatiye, Alanya	Retail Store (Pool Chemicals)	Currently operational
Toslak, Alanya	Retail Milk Production and Store	Currently operational

Despite efforts to avoid residential areas during route selection, a limited number of buildings and houses are expected to be physically displaced within the expropriation corridor. Physical displacement may cause psychological stress, emotional detachment, and uncertainty for both owners and tenants.

Households engaged in agriculture, greenhouse farming, and livestock will experience economic displacement due to land acquisition. Seasonal revenue loss risk is particularly high in tourism-dependent regions and agricultural zones. Businesses located near construction zones may face reduced customer traffic due to access restrictions, dust, and noise.

For more detailed information, please refer to the Resettlement Action Plan (RAP) in the ESIA.

XV.3.2. Operation Phase

Once the Project is taken into operation, it is anticipated to host significant numbers of motor vehicles, including passenger cars and heavy vehicles. The feasibility study for the AAOİAŞ assumes that the number of motor vehicles that will use the Motorway would increase from year to year. As the traffic density on the Motorway increases, risks on the safety of the traffic may also increase. Details about the minimum guaranteed traffic for the duration of operation, as outlined in the relevant terms of the BOT contract, will be available in the "Traffic Projections" section in Chapter-III in the ESIA “Project Description”.

Together with traffic safety, structural safety is essential for community health and safety issues during the operation phase. Pedestrian safety and emergency preparedness and response are other issues that need proper management to avoid/minimize risks on the Project. Additionally, air emissions, noise, and vibration may disrupt the populations along the motorway route. Further assessment of impacts during the operation phase is provided below.

Structural Safety

The Project involves several large and small engineering structures. Safety failure of these structures (i.e. culverts, viaducts, bridges, etc.) may pose significant risks on the health and safety of the community. The Project are located in second degree earthquake zone according to Earthquake Zoning Map of Türkiye, thus failures that may be triggered by earthquake events are among the most important design considerations for the Project.

On the other hand, since the Project will be designed in accordance with KGM’s technical specifications and international standards (including seismic), structural failure risks have already been minimized by design. Seismic and other geotechnical risks have been covered in Chapter 6 in the ESIA (“Topography, Soils and Geology”).

Traffic Safety

Traffic accidents, which have become one of the most significant causes of injuries and fatalities among public members, may be mainly related to the driver's behavior, the quality of the vehicles used, and/or the road's design, construction, and maintenance conditions. Accordingly, improved driving conditions provided by the new Motorway will likely prompt some drivers to speed up traffic, increasing the risk of accidents. On the other hand, this risk may be contra-balanced by the overall reduction of traffic accidents related to improved driving conditions for more fluent and safe traffic on motorways having high physical and geometrical standards (JASPERS, 2010). Also, snow and ice, if not properly and timely removed, may reduce or eliminate the vehicle's friction ability and road holding capacity, resulting in risks to traffic safety. Thus, snow and ice removal is a vital operation phase activity (IFC, 2012)

With the Antalya-Alanya Motorway Project, other motorways and divided roads in the country are anticipated to contribute to the improvements in the fatality rate reductions targeted to be achieved in the following decades despite the expected increase in vehicle ownership and vehicle kilometers. Since Turkish authorities publish no statistical information or analyses about the effect of Motorway on the number of accidents and fatality rates that would support this assessment, the study “Road Safety Statistics at Regional Level” published by Eurostat (the Directorate General of the European Commission responsible for providing statistical information to the institutions of the European Union-EU, road safety statistics in the EU, as well as the European Free Trade Association (EFTA) and candidate countries) have been reviewed1. Motorway density and risk based on the total number of fatalities in road traffic accidents have been a particular topic under this study.

Based on the analysis, regions with high traffic volumes have a lower rate of road accident fatalities. This is particularly true for many areas in western Germany, England, and most parts of the Netherlands, especially in major cities and around transport hubs. The congestion caused by high traffic volumes near major cities and transport hubs reduces average speeds and the likelihood of fatalities in case of

[1] *http://ec.europa.eu/eurostat*

accidents. Many of these regions with low fatalities have a high density of motorways in relation to their total territory. In general, motorways are safer than secondary roads. Additionally, transit traffic primarily uses the motorway network, further reducing road accidents despite high total traffic volumes[2].

In contrast, fatality rates are high in regions with a low motorway density, such as most regions in Romania, Hungary and the Czech Republic, except their capital regions, all Bulgarian and Polish regions, the Baltic Member States[3], and many rural areas in France and Spain. These data suggest that the high proportion of road traffic using motorways is an essential factor behind the low number of road fatalities in many regions.

In addition to the share of the total road network accounted for by motorways, the significant reductions in the number of road deaths are also due to a combination of high in-vehicle and out-of-vehicle safety standards, better-enforced speed limits and a general 'safety culture', including the quality of the emergency and healthcare systems.

Pedestrian Safety

Pedestrians and bicyclists are at the greatest risk of serious injury from collisions with moving vehicles. Children are generally the most vulnerable due to lack of experience and knowledge of traffic related hazards, their behavior while at play, and their small size making them less visible to motorists. In addition, collisions and accidents can involve a single or multiple vehicles, pedestrians or bicyclists, and animals.

Many factors contribute to traffic accidents. Some are associated with the behavior of the driver or the quality of the vehicle, while others are linked to the road design, or construction and maintenance issues. For example, risks that emerge during rainy weather conditions because of the wet road surface may be properly managed by drivers strictly obeying the traffic rules (IFC, January 2012).

Ensuring that drivers are aware of and prepared for such scenarios is essential for minimizing harm to both animals and pedestrians. Implementing measures such as reduced speed limits, increased driver training on wildlife awareness and the use of warning signs can significantly improve safety for all road users and help protect the local wildlife.

Chemicals And Fuels

During the operation phase of the motorway, various chemicals and fuels will be regularly used in connection with fuel stations, rest areas, maintenance and service facilities established along the road. These include gasoline, diesel, LPG, lubricants, antifreeze, cleaning agents, and maintenance/repair chemicals. In addition, road maintenance works will require asphalt repair materials, paints, and de-icing chemicals (e.g., salt and special solutions)

- Leaks and spills from fuel stations may infiltrate groundwater and agricultural lands, contaminating drinking water resources.
- Accidents during the storage and transportation of flammable and explosive fuels may cause severe fires and explosions.
- Vapors from fuels, solvents, and other volatile chemicals may result in respiratory problems and long-term health impacts for both facility workers and users.
- Improper storage or handling of chemicals in rest areas may directly endanger road users.
- Any chemical incident at fuel stations or rest areas may directly affect not only employees but also road users and nearby communities.

2http://ec.europa.eu/eurostat
3https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Baltic_countries

Gender-Based Violence and Harassment (GBVH)

It is anticipated that the risk of GBVH within the scope of the Project will continue during the operation phase. Some dynamics may lead to increased incidents of GBVH in both public and private domains, potentially compromising the physical safety, psychological well-being, and social inclusion of vulnerable groups, particularly women and children. Although employment dynamics will change during the operation phase, it will be important to maintain the same level of sensitivity in terms of measures and working conditions.

From a policy and technical perspective, inadequate integration of gender-responsive occupational health and safety (OHS) measures may restrict female workers' access to appropriately designed personal protective equipment (PPE) and safe facilities, thereby exacerbating workplace vulnerabilities.

Public Health and Welfare

The new Motorway route may be a source of dust and gaseous emissions and traffic noise that may cause disturbance of the local people living, conducting agricultural, grazing or other economic activities, etc. along the route.

Emergency Preparedness and Response

Emergency situations most commonly associated with road operations include accidents involving single or multiple vehicles, pedestrians, and/or the release of oil or hazardous materials. Thus, an Emergency Preparedness and Response Plan, covering the emergency situations (involving vehicles and pedestrians) that may occur during the Motorway's operation, has to be prepared and implemented by trained personnel (IFC, January 2012).

XV.4. Mitigation Measures

The design, construction and operation of the Motorway will be done in accordance with most recent project standards and technical specifications of KGM as well as robust engineering design criteria. KGM will control the works to be conducted by the Project Sponsor during the BOT contract.

An Emergency Preparedness and Response Plan, describing the targets and framework regarding the means for dealing with possible emergency situation during the construction and operation phases will be prepared for the Project. With effective implementation of this Plan, The Project Sponsor will aim to prevent emergencies and respond to unavoidable incidents that could not be prevented by taking relevant measures properly so that no significant risk is posed to health and/or safety of the public.

Throughout the project life-cycle, specialized engineers will be engaged to ensure the structural safety of the works. The safe construction of major engineering structures within the scope of the Project will be subject to regular inspections to continuously safeguard structural integrity.

A notification and reporting procedure will be established to address accidents and incidents. This procedure will serve as a key tool in lessons-learned and continuous improvement meetings. In addition, notifications made to the relevant state authorities will provide an additional mechanism for oversight and monitoring. The reporting of occupational accidents shall constitute a legal obligation pursuant to Turkish legislation. Pursuant to Law No. 6331 on Occupational Health and Safety and the relevant secondary regulations, employers shall be obliged to notify the Social Security Institution and the competent authorities of any occupational accidents.

Through the Grievance Mechanism to be implemented throughout the life-cycle of the Project, local communities and road users will be able to submit their complaints and suggestions. This mechanism, encompassing multiple communication channels, will serve as a key means of ensuring effective engagement with stakeholders. Complaint boxes to be placed in neighborhood mukhtars' offices and rest facilities, a toll-free hotline, a complaint/suggestion link on the Project website, and national

grievance channels (e.g., CİMER) will enable the submission of complaints anonymously; thereby safeguarding the principle of protection against retaliation, as emphasized in the IFC Good Practice Note for the Private Sector: Addressing the Risks of Retaliation Against Project Stakeholders (2021). In addition, Community Liaison Officers (CLOs) employed within the scope of the Project will conduct regular site visits to directly listen to the concerns and suggestions of local communities, and will ensure that the forms collected from complaint boxes are regularly reported. (see Annex-9 in the ESIA)

These measures will contribute to ensuring the safety of the public (including local communities and road users) and will also strengthen compliance with the IFC Performance Standards.

Specific measures to be taken during the land preparation and construction as well as operation phases of the Project are described in the following sub-sections.

XV.4.1. Land Preparation and Construction Phase

During the land preparation and construction phase, primarily, access to construction/work sites will be restricted by means of proper measures such as fencing, signage, etc. Other specific measures to be taken for particular risk subjects to ensure community health and safety and public welfare during the land preparation and construction phases of the Project are described below.

Vegetation Clearance and Excavation Activities

Due to the sensitive receptor designation of Hacıali neighborhood, an air quality monitoring point has been determined, monitoring will be carried out every three months and in case of complaints.

The Health & Safety (H&S) team member or CLO assigned within the Project will visit households and carry out community information activities and free mask distribution (including spares) before construction works approach within 1,000 meters of any residential area.

If dust levels reduce visibility, safety personnel will be stationed at pedestrian crossings to ensure safe passage for individuals.

Dust emissions will be controlled by water spraying. In cases where excavation trucks must pass close to residential areas, the loads will be covered to minimize dust spread during transport.

Heavy Machinery Operation

As one of the key avoidance and mitigation measures to protect community safety, truck movements should be determined based on the routes in a way that avoids residential areas and noise-sensitive zones as much as possible. Drivers will be informed about the haulage routes, and they will be regularly reminded of the rules to be followed within residential areas, and additional measures such as speed restrictions, regular vehicle maintenance, and safe driving practices will be implemented.

The professional competency certificates of operators and drivers will be checked during the recruitment process, and the validity of these certificates will be ensured by the relevant department in cooperation with the OHS Committee, OHS Department, and HR Department. The relevant documents will be archived in the personnel files.

Community Severance

As part of the project, a series of measures have been planned to mitigate the potential community severance impacts that may arise during road construction. In particular, in areas where the project route intersects with existing village roads, farm tracks, or rural connection routes, temporary access solutions such as gravel service roads, temporary bridges, and directional signage should be provided. Before any temporary closure is implemented, local residents should be informed at least 7 days in

advance through verbal channels (e.g., public announcements, village offices), and maps showing alternative routes should be posted on-site.

In locations where the project intersects with main roads, secondary roads, or internal access routes within settlements, construction activities should be phased to reduce disruption. Night-time construction should be limited, and temporary traffic signals or trained traffic marshals should be deployed where necessary. Especially near sensitive areas such as schools, health clinics, mosques, and marketplaces, safe pedestrian access must be maintained at all times. Where necessary, temporary pedestrian overpasses, protective barriers, and metal crossing structures should be installed, along with adequate lighting and traffic-calming measures.

Close coordination with tourism facility managers is essential to minimize disruptions to visitor movement and local economic activity. Additionally, in situations where children, patients, or other residents are unable to access schools, healthcare services, or public transport due to temporary construction closures, the Project Sponsor may provide shuttle services or temporary transport support as needed.

All construction teams should be explained with a site-specific access protocol, outlining key rules such as no road closures without prior notification, informing the Community Liaison Officer (CLO) before placing barriers, and taking into account the daily movement patterns of local residents. Furthermore, equity-based measures should be implemented to ensure safe and dignified access to essential services for women, the elderly, and persons with disabilities through inclusive design and targeted communication.

Finally, in order to ensure uninterrupted access to essential destinations such as schools, health centers, markets, and places of worship, permanent safe crossing structures (pedestrian overpasses, underpasses, or at-grade crossings) should be strategically constructed along the road corridor. These facilities must be accessible and inclusive, incorporating features such as ramps, handrails, and adequate lighting, particularly for women, children, elderly individuals, and people with disabilities. Throughout the construction phase, the access plan should remain flexible and adaptive, supported by a community grievance mechanism that enables timely and transparent resolution of access-related complaints.

Influx of a Large Male Workforce

The influx of a large male workforce as part of the project has the potential to alter local social dynamics, especially in rural and vulnerable communities, leading to various social risks. To manage these risks, a set of comprehensive social mitigation measures has been developed. All workers will receive orientation training on local cultural norms, community values, and national laws, and will be required to sign a binding Code of Conduct to ensure respectful and ethical behavior toward host communities.

To minimize direct contact with local populations, labor camps will be located away from residential areas, and public access to camp premises will be strictly limited. . The camp perimeter should be fenced, and entry/exit points should be controlled (without restricting individuals' freedom of movement). In order to deter potential criminal activities and facilitate the detection of any incidents, both the interior and perimeter of the camp area should be monitored through security cameras. To support these objectives, the perimeter of the camp should be illuminated to a level equivalent to that of the interior. These measures will contribute to ensuring the safety of local communities and temporary settlers (workers), while also ensuring compliance with the IFC Performance Standards.
To prevent GBVH, awareness campaigns should be carried out targeting both workers and local communities. Labor camps will be equipped with safe, well-lit, and gender-segregated accommodation, toilet and shower facilities. In addition, confidential and accessible grievance mechanisms should be established, including the assignment of specially trained gender liaison officers to support women and vulnerable individuals.

In order to ensure transparent and sustainable engagement, regular consultation meetings will be held with local people (especially women’s groups), local authorities and village heads (mukhtars), and community concerns will be carefully considered. To balance the social impacts of incoming labor, local hiring will be prioritized, and goods and services will be sourced from local businesses to support the

local economy. All these measures will be supported by ongoing social monitoring and reporting mechanisms to allow for early detection of social tensions or grievances. This holistic approach aims to safeguard community health and safety while maintaining a long-term relationship of trust between the project and local communities.

Complaint boxes will be placed in the headman's (mukhtar) offices of all villages within the Project's area of influence. These boxes will be checked at least once every 7 days, and all complaints will be formally recorded. Even if the complaint boxes are empty, their status (being empty) and the date of opening will be reported. This practice will allow for an evaluation of the number of complaints received within a given period. In addition, a toll-free grievance hotline will be established, a grievance section will be created on the project website.

All employees will be provided with training on the grievance mechanism and communication rules with the community. Participation will be mandatory. Trainings will be documented and reported by the Community Liaison Officer (CLO). For details of the training, which will be conducted one hour per month, refer to the table in Chapter-16 in the ESIA entitled 'Training Program to be Organized for Personnel'.

Increased Road Traffic and Heavy Vehicles

- Speed limits will be enforced in sensitive areas (e.g., near schools and health facilities).
- Traffic marshals or traffic lights will be deployed in necessary locations to ensure safe passage.
- Vehicles and machinery shall not deviate from the designated route.
- Local communities will be informed at least 7 days in advance of any road closures.
- Alternative routes will be provided during temporary road closures, and information about these routes will be shared verbal formats.
- CLO's employed under the Project will visit households and conduct awareness-raising activities before construction activities approach within 1000 meters of any settlement.
- All employees operating vehicles will receive safe driving training. Participation will be mandatory. Trainings will be documented and reported by the HR Department or H&S Department.
- Maximum vehicle speed in and around settlements should be limited to 30 km/h.

Temporary Labor Camps

Due to the large number of personnel, camps will be located at a safe distance from settlements to avoid interference with the daily lives of local communities and minimize complaints.

The implementation of hygiene measures will help prevent the spread of infectious diseases, thus alleviating potential strain on local healthcare services.

As one of the three worker camps is located in close proximity to a residential area, a range of measures will be implemented to prevent potential risks and minimize adverse impacts on community health and safety. A physical boundary (such as fencing or a green buffer zone) will be established between the camp and the settlement to ensure controlled access. Entry and exit points of the camp will be monitored by security personnel to prevent unauthorized access. Behavioral Codes of Conduct and GBVH (Gender-Based Violence and Harassment) awareness trainings will be mandatory for workers who may interact with the local community. Special supervision and guidance protocols will be applied for situations involving direct community engagement. Environmental impacts such as noise, waste, water use, and traffic will be regularly monitored and managed to avoid deterioration in the quality of life for nearby residents. The grievance mechanism will be made accessible to local communities, and all submissions will be addressed promptly. These measures aim to ensure a respectful and safe coexistence between the camp and the surrounding community.

The map showing the locations of the camps is provided in Figure XV.6

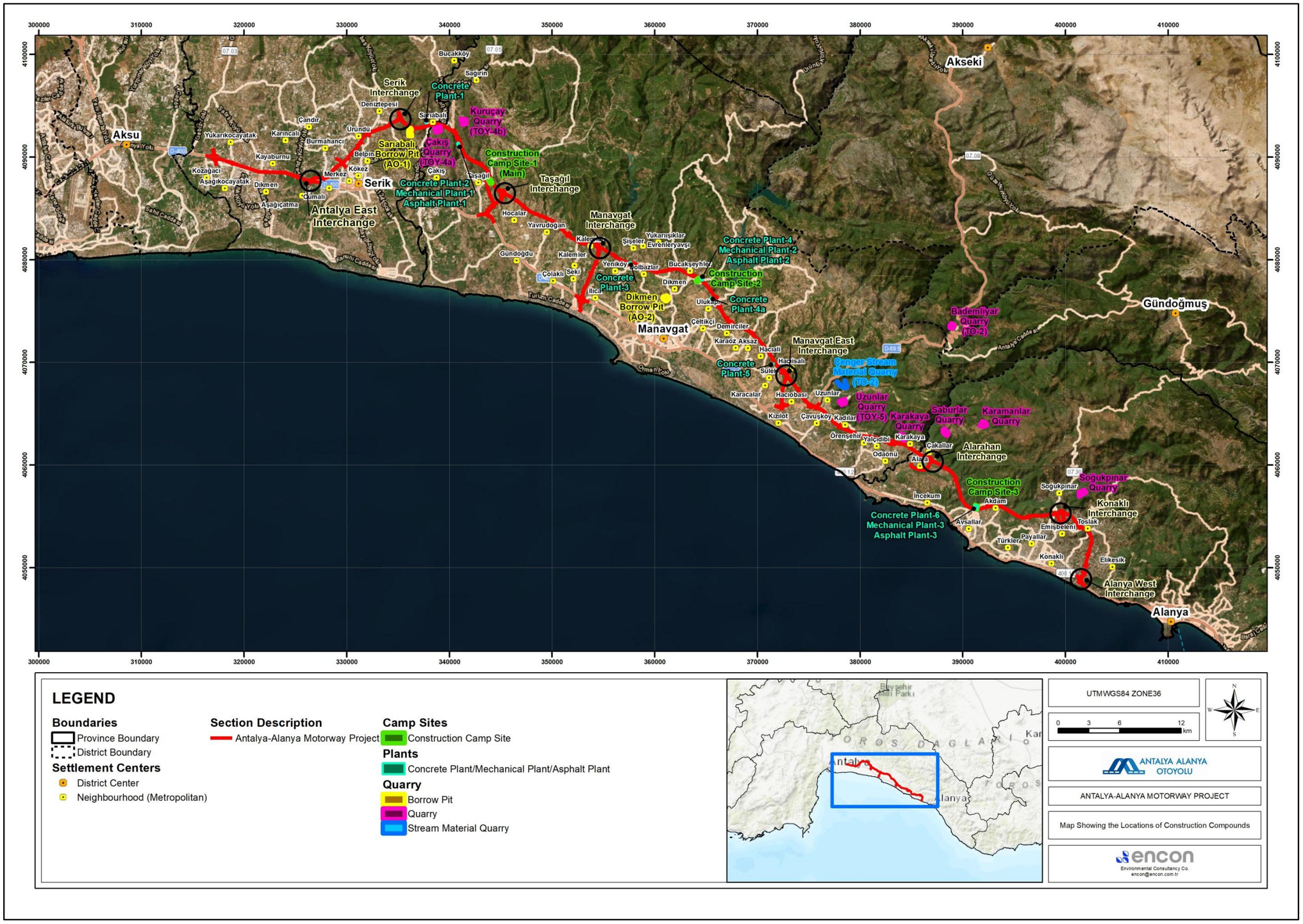


Figure XV.6 Map showing the camps

Construction Traffic Safety

In this regard, following measures will be taken in accordance with the KGM's Technical Specifications for Motorways and relevant international standards to ensure traffic safety at the construction sites and minimize the risk of accidents:

- Construction works on existing roads will not be started until relevant traffic safety measures (including traffic signing and placement of equipment) are taken on roads serving pedestrian and vehicle traffic. These measures will be designed to ensure the safety of life and property of the local people and the users of the roads.
- In the scope of the better working organization, construction traffic routes will be strictly defined, and road construction machinery will use only these routes.
- Passage of the routes through the settlements (i.e., neighborhoods) will be avoided where alternative routes are available. Dangerous routes that are to be avoided, if there is any, will be specified and drivers will be informed. In this scope, construction contractors will construct service roads in order to avoid effecting (such as by increasing the heavy traffic load) the natural flow on the existing roads and to avoid the passage of heavy vehicles through residential areas, whenever feasible. In addition, the traffic will be temporarily diverted where the service roads will be constructed. Furthermore, service roads will be used for the transportation of the construction machinery, equipment, and materials used for the Project.
- Pedestrian interaction with construction vehicles will be minimized by taking appropriate measures in and around the construction corridor.
- Valid licenses will be required for the drivers and operators.
- Drivers and operators will be provided with relevant training that emphasizes the safety aspects.
- Working hours of the day for the drivers/operators should be specified and informed to relevant personnel.
- Limits will be defined for the working/trip duration for the drivers and operators to avoid extreme fatigue.
- Speed control devices should be used on trucks.
- All the construction machinery and equipment will be operated in alignment with the direction of the traffic flow.
- Rigid objects will not be used for the purpose of traffic diversion.
- Unused construction materials, equipment, or machinery will not be left on the road in an uncontrolled way. They will be put in designated places.
- Road signing for night traffic will be provided with reflectors and flashing signals of sufficient number.
- Relevant dust control measures will be taken at the road construction sites to maintain safe sight distances on the existing roads under service.
- Upon the completion of works, signing equipment will be immediately removed, and standard signing will be provided.
- To reduce transportation distances, services and materials required for construction works will be aimed to be primarily supplied from local sources, wherever possible.
- The professional competency certificates of operators and drivers will be checked during the recruitment process, and the validity of these certificates will be checked by the cooperation with the OHS Committee, OHS Department, and HR Department. The relevant documents will be archived in the personnel files.

Disturbance due to Blasting Operations

- Relevant permits will be obtained from the security authorities for the delivery, transportation, and use of explosives in the scope of the blasting operations to be conducted on the Motorway route and the quarries.
- Blasting operations, including their transportation, storage, preparation, utilization, discharge of surplus explosives or unblasted materials, etc., will be carried out by competent, trained experts under the control of the technical supervisor.
- Explosives will be kept within permitted storage areas with isolated capsule divisions.
- Blasting operations will be carried out only after the necessary announcements are made to the local population (The blasting schedule should be shared with the neighborhood mukhtars, and blasting activities should be announced to the local population through the mukhtars.). Accordingly, a blasting schedule will be prepared and activities will be conducted in line with this schedule.
- Warning signs explaining the blasting schedule will be posted at proper locations within the construction sites and the nearby roads and passageways.
- The flagged signal person will be located at designated locations prior to each blasting activity in the risks locations.
- Blasting operations will be conducted daytime between 08:00-18:00. No blasting operation will be conducted on Sundays and holidays in the crowded settlements.
- Blasting calculations will be done, and a maximum number of holes to be blasted at one shot and total charge amounts per shot that would not cause significant environmental impacts (i.e. vibration, air shock, fly rock, etc.,) will be determined prior to execution of operations in consideration of the manufacturers' suggestions. Prior to blasting operations, calculations made to consider of the type of explosive and blasting method will be rechecked.
- Safety distances ensuring no hazard to Project personnel and local people will be determined and maintained during blasting operations. Where required, structures preventing the scattering of materials will be used.
- Locations of holes will be measured and marked before the execution of blasting operations to ensure that blasting energy will be effectively distributed.
- Blasting operations should not be performed during stormy weather conditions.
- Access by unauthorized persons to blasting sites will be prevented.
- If required, cooperation will be made with local authorities to ensure the safety of nearby roads by controlling traffic during blasting.
- Prior to the blasting operations, the sensitivity of nearby settlements/buildings against noise and vibration will be assessed. Buildings located within 100 meters of major vibration sources will be identified and assessed for vibration sensitivity prior to construction. Structural conditions of buildings located within 100 meters of the motorway alignment will be recorded before and after construction works to assess any possible vibration-induced damage. .
- During the entire construction phase, regular surveys will be carried out throughout blasting and drilling activities by the contractor, capturing photographic records of all structures adjacent to blasting areas to detect and evaluate any damage that may occur post-blasting.Explosive charges will be optimized accordingly. Detailed records of blasting operations will be kept and blasting related impacts will be closely monitored.
- Following the post-blasting vibration survey, if any receptor is found to have been adversely affected by the blasting activities, appropriate compensation will be provided.
- Modern blasting techniques will be employed to minimize vibration, including the use of millisecond delays with low charge weights, which will be determined based on geological formation and rock density.
- The number of blasted holes per shot and total charge amounts per shot will be optimized to comply with the regulatory limit values and minimize fly rock incidents. All blast vibrations will be monitored by using vibrometers to be placed at appropriate locations, with records kept on charge amounts, delays, distance to blast sites, and resulting vibration levels.
- Blasting activities will adhere to the limit values specified in the Regulation on Environmental Noise Control for ground vibrations. Records of air shock and vibration measurements will be maintained, and compliance with regulatory limit values will be monitored to minimize impacts on local residents.

Chemicals And Fuels

Chemicals and fuels used during the construction phase can pose serious threats to community health and safety if not properly managed. Incidents such as spills, leaks, fires, or explosions may directly affect not only the workers but also the health, safety, and quality of life of local communities within the Project's area of influence. In addition, environmental pollution may cause long-term adverse impacts, including damage to agricultural lands and contamination of water resources. Therefore, the implementation of strict management practices in line with national legislation and international standards is of critical importance to effectively control these risks.

- All fuels and chemicals will be stored in sealed, properly labeled, and licensed storage facilities. Separate storage arrangements will be ensured for flammable and explosive materials.
- Spill containment systems, secondary containment structures, and absorbent materials will be available at storage and use areas. Emergency spill kits will always be kept accessible.
- Vehicles, equipment, and storage tanks will undergo regular maintenance and inspections, and any equipment with leakage risks will be repaired immediately.
- All personnel handling chemicals will receive regular training on safe storage, transportation, usage, and emergency response. Participation will be mandatory, and trainings will be documented.
- Storage areas will be fire-resistant, and firefighting equipment will be available at all times. Explosives will only be handled by competent and authorized personnel.
- During the transportation of chemicals and fuels, vehicles compliant with national regulations will be used, and transport routes will be planned to avoid residential areas as much as possible
- Local communities will be informed about potential risks and the preventive measures taken, and they will be able to communicate their concerns through the grievance mechanism. (see Annex-9 in the ESIA)
- An Emergency Preparedness and Response Plan (EPRP) will be implemented for potential spill, fire, or explosion scenarios, and its effectiveness will be tested through regular drills. (see Annex-3 in the ESIA)
- Air, soil, and water quality will be regularly monitored, and rapid response will be ensured in case of detected contamination.
  An inventory of all chemicals and fuels used during the Project will be established and continuously updated to ensure proper tracking, management, and compliance with applicable regulations.

GBVH (Gender-Based Violence and Harassment)

Within the scope of the Project, a set of preventive and institutional measures has been developed to effectively manage the risk of Gender-Based Violence and Harassment (GBVH) during the construction phase. All project personnel - particularly subcontracted workers and security staff - will receive mandatory training on GBVH awareness and appropriate conduct. These trainings will begin prior to employment. Training content will cover gender equality, boundaries and consent, types of harassment, and procedures for reporting incidents.

To prevent any form of verbal, physical, or psychological harassment by male workers toward female tourists, local women, or temporary female populations residing near the construction corridor, specific mitigation measures will be implemented. Key areas of potential contact will be identified, and environmental precautions such as site lighting, surveillance, and safe-zone demarcation near camps and transit points will be put in place.

In addition, accessible and anonymous grievance mechanisms tailored to women will be established. These will include phone hotlines, complaint boxes, and in-person reporting options. Female CLOs will be appointed in Project area to provide a direct communication channel for women and to ensure that complaints can be submitted safely and confidentially.

All security personnel deployed in the project will be required to complete specialized training on human rights and gender sensitivity. Completion of this training will be a prerequisite for site assignment. Interactions between security personnel and the community will be closely monitored, and any inappropriate behavior will be addressed through strict disciplinary procedures.

For local women and female tourists, multilingual informational materials, emergency contact numbers, and visual awareness materials should be distributed in locations. These outreach activities should be implemented with the support of local women's organizations and community-based stakeholders to ensure cultural appropriateness and inclusion.

Institutional responsibilities for the implementation of these measures are clearly defined. The Project Sponsor and main contractor are responsible for establishing GBVH-related corporate policies, securing subcontractor commitments, and conducting overall compliance monitoring. The Social Chief will oversee the organization of trainings, tracking of grievances, and reporting of key performance indicators such as the number of complaints and response times. The Human Resources department will ensure ethical hiring practices and develop protection measures for female staff. Community Liaison Officers (CLOs) will manage direct engagement with local women, lead information campaigns, and promote grievance mechanisms. In addition, local NGOs and Women's Organizations should support outreach, monitoring, and referrals where needed.

Airborne / Communicable Diseases

Involving large numbers of workforce, large development projects are seen as a factor for health hazards among local communities due communicable and vector-borne diseases, especially if sanitation standards and living conditions at the campsites remain insufficient.

In the Project, campsites areas have been determined in sufficiently large areas. Most of the construction workforce will be accommodated in these campsites. The sanitation and living conditions provided at the campsites will be sufficient. Drinking water to be provided to the Project workforce will meet the Regulation on Water Intended for Human Consumption requirements so that diseases related to low-quality drinking water are not anticipated to emerge. Additionally, domestic wastewater and solid wastes will be managed in accordance with waste management procedures, meeting the requirements of the national waste management regulations and international standards so that hygienic problems related to insufficient management of wastewaters and solid waste are not anticipated.

- Health awareness training will be provided to all workers, including contractors and subcontractors. The training will include briefings on hygiene practices such as handwashing, prevention of communicable and infectious diseases, and key facts on transmission routes and symptoms of high-risk illnesses.
- Surveillance and active screening and treatment of workers will be provided.
- Immunization programs will be conducted for workers to improve health and guard against infection.
- Infirmaries and Health Team with competent personnel will be available at campsites.
- Measures will be taken for pest control whenever required.
- Infectious disease screening protocols will be implemented for all workers, including those of subcontractors, particularly at the time of initial recruitment. All protocols will comply with the most up-to-date national health guidelines issued by the relevant authorities.

Security Personnel Arrangements

In the scope of the Project, security services will be provided by the Project Sponsor. Unarmed security service will be provided within the scope of the Project Sponsor's support services unit.

In consideration of good international practices, training will be provided to these personnel covering the following subjects:

- Legal requirements regarding their acts under the applicable Turkish legislation
- Principles of proportionality
- Use of force
- Legitimate preventive and defensive purposes for the use of force (in proportion to the nature and extent of the threat),
- Code of Conduct related with Project workers and local people.

Security personnel will be required to act in accordance with the requirements of the applicable Turkish legislation through contractual agreements with the contracting companies.

The Grievance Mechanism established by the Project Sponsor (see Chapter 19, "Public Consultation") is a mechanism for the local communities to express their concerns about the security arrangements and acts of security personnel, if there are any. This mechanism will be kept operational throughout the entire BOT contract duration. In case of any grievance or allegations of unlawful or abusive acts of security personnel, Project Sponsor will take all the necessary measures to prevent recurrence and take action in accordance with legal requirements.

Emergency Preparedness and Response

During the construction phase of the Project, a comprehensive approach has been adopted to address potential emergencies such as fires, explosions, hazardous material spills, traffic accidents, natural disasters, infectious disease outbreaks, or occupational accidents. This approach is guided by the Project's Emergency Preparedness and Response Plan (EPRP), which has been prepared in full alignment with IFC Performance Standard 4 and relevant national legislation, covering all construction and campsite areas.

To ensure readiness, each work and camp site will be equipped with fire extinguishers, first aid kits, emergency exit signage, and designated assembly points. Dedicated emergency response teams will be assigned to each location and will regularly participate in drills based on predefined scenarios, including fire outbreaks, injuries, and explosive-related incidents. Region-specific risks-such as forest fires or earthquakes-have also been assessed and incorporated into localized prevention strategies.

Campsites will host on-site infirmaries staffed by trained health professionals to provide initial response in case of injuries or health incidents. In the event of an emergency, coordination with local authorities-including village headmen, municipalities, healthcare units, and law enforcement-will enable swift and organized action. Where necessary, evacuation, quarantine, or temporary access restrictions will be implemented, and directly affected communities will be informed promptly through written and verbal means.

All project personnel will receive mandatory training on emergency response procedures both before starting work and at regular intervals. These trainings will include information on evacuation routes, emergency contact numbers, and individual responsibilities. Awareness-raising materials and informational campaigns will also be provided for local communities, ensuring broad preparedness. Moreover, grievance and feedback mechanisms will remain accessible to report any concerns related to emergency response.

Public Health and Welfare

Following measures will be taken to minimize impacts of Project on public health and welfare:

- To minimize the impacts on community health and safety and local disturbances due to air emissions, noise, and vibration, new, highly efficient, and reliable road construction machinery, equipment and high quality fuels will be used in the scope of construction works.
- Only construction machinery and equipment having proper emission controls and certificates in the scope of relevant Turkish regulations will be used.
- Well-balanced measures will be developed to limit worker movements to minimize disruption of local people while providing the workers with the right of movement freedom.
- Vehicle/wheel wash basins will be constructed at suitable locations to minimize transportation of sediments/mud and pollution/dustiness of public roads.
- Throughout the road construction process, specialized engineers will be engaged to ensure the structural safety of the works.
- Compliance of drivers and operators with professional competency requirements will be ensured.
- Complaint boxes will be placed in all mukhtar offices within the area of influence, and the grievance mechanism will be introduced during the site visits conducted by the CLOs.

Measures to Mitigate Displacement Impacts

The measures taken in relation to displacement are provided in Table XV.18

Table XV.18 Measures related to displacement

Measures to Mitigate Displacement Impacts	Description
Avoidance through alternative project design	Repositioning project components to minimize impact on settlements and livelihoods.
Detailed socio-economic survey and impact assessment	Identifying all affected households, lands, and businesses; assessing the extent of physical and economic displacement.
Voluntary land acquisition and negotiated settlements	Preferring voluntary land transfer where possible; conducting documented, fair negotiations.
Provision of fair and adequate compensation	Timely payment of compensation at market value for assets and income loss, including for tenants and users.
Preparation of Resettlement Action Plan (RAP)	If physical displacement occurs, develop a plan including housing and livelihood support with attention to vulnerable groups.
Livelihood restoration support	Offering agricultural support, vocational training, or grants for small businesses to restore income.
Establishment of grievance mechanism	Accessible grievance mechanism for displaced persons to raise concerns and seek resolution.
Continued stakeholder engagement	Maintaining continuous communication and participation with affected persons throughout the process.
Monitoring and evaluation	Periodic evaluation of RAP implementation and livelihood outcomes by independent experts.

NOTE: For more detailed information, please refer to the Resettlement Action Plan (RAP) in the ESIA.

XV.4.2. Operation Phase

Traffic and pedestrian safety risks that may emerge during the operation of the Motorway can be reduced by proper Motorway design including safe crossing, fencing, installation of warning signs, etc. (IFC,2012). In the scope of the Antalya-Alanya Motorway Project, such measures will be taken in accordance with KGM's technical specifications and international standards, as detailed below.

In accordance with the terms of the BOT contract, the Project Sponsor will be responsible for taking necessary traffic safety measures under the relevant national legislation. In this respect, Project Sponsor will cooperate with the related government agencies and institutions where required. In case of situations that may emerge to violate traffic and environmental safety during the operation period, the Project Sponsor will be liable for taking immediate actions to ensure the safety of relevant aspects. The Project Sponsor will also take all the necessary measures to avoid damage to life and/or any private or legal property, structure, infrastructure, existing traffic, or environmental resources.

Measures to be taken to ensure community health and safety during the operation phase of the Motorway are described below.

Public Health and Welfare

Air emissions and noise to be sourced by the Motorway traffic should be monitored at selected/sensitive locations along the route (see Chapter 20 in the ESIA "Environmental and Social Management System"). Additionally, complaints related to air quality or noise impacts would be delivered to the Project Sponsor through the Project-specific grievance mechanism established (see Chapter 19 in the ESIA ("Public Consultation")). If the measurement results or the grievance mechanism indicate impacts on the public's health and welfare at certain locations, effective and feasible corrective measures will be planned and implemented by the Project Sponsor.

Field studies will be continuously conducted by CLOs, and impact, risk, and mitigation measures for identified vulnerable groups will be reorganized and documented within the scope of public health and safety, taking into account specific situations.

High-Speed Vehicle Traffic

- Warning signs will be placed in areas where animal crossings are known to occur.
- Physical safety measures such as speed bumps, pedestrian crossings, and traffic warning signs will be installed.
- Drivers will be monitored through warning signs and speed control measures, including radar enforcement where applicable.
- A grievance mechanism accessible to the community will be established to address complaints related to traffic issues.
- Targeted awareness efforts will be carried out to ensure cautious and low-speed driving in areas frequented by the local population.
- All personnel operating vehicles will receive safe driving training. Participation will be mandatory. All trainings will be documented and reported by the H&S Team.
- Uncontrolled wildlife crossings on highways pose a serious threat to both drivers and animals. Large mammals (such as wild boars, deer, cattle, etc.) suddenly entering the road can result in high-speed collisions, which often lead to fatal traffic accidents. These incidents not only endanger the lives of drivers and passengers but also create chain-reaction risks for other road users, causing significant property damage and loss of life. Therefore, controlling animal crossings and implementing appropriate measures (such as fencing and warning signs) is of critical importance for traffic safety and the protection of human life. Details of the precautions to be taken can be found in Chapter-9 in the ESIA.

Continuous Emissions and Noise from Vehicles

- .
- All vehicles and machinery used during construction and operation will be subject to regular maintenance and inspection programs to minimize emission and noise levels.
- Speed limits will be enforced in areas close to settlements to reduce both noise and emission levels.
- An effective and accessible grievance mechanism will be in place for complaints related to noise or emissions. Corrective measures will be implemented based on community feedback.
- Air quality will be monitored at regular intervals. The monitoring and management approaches related to air quality in the Project are detailed in the Air Quality Management Plan (Annexes-4 in the ESIA).

Fire Risk from Fuels, Equipment, and Vegetation

- Fire drills will be organized one a year (The number of drills may be increased if deemed necessary.), specifically for campsites, facilities, tunnels, and forest-adjacent areas, and these drills will be documented and reported by the H&S Team.
- All personnel should receive one-hour fire safety training sessions each semi-annually for a period of one year.
- An early warning system will be established through coordination with local headmen (mukhtars). In case of an emergency, the CLO will directly contact the mukhtars to initiate a localized response.
- Adequate firefighting equipment, such as extinguishers, hydrants, and water tanks, will be installed in campsites, storage areas, and construction sites, with regular maintenance checks to ensure functionality.
- Fuels and hazardous chemicals will be stored in designated, fireproof, and ventilated storage areas equipped with spill kits, fire suppression systems, and clear warning signs.
- Vegetation near camps, storage areas, and construction sites will be regularly cleared to minimize the risk of fire spread. Buffer zones will be established in forest-adjacent areas.
- Continuous collaboration will be maintained with local fire departments and emergency response authorities to ensure preparedness and effective coordination during potential fire incidents.

Structural Safety

The structural safety of the Project components will be ensured by design, engineering, and construction in accordance with the most recent project standards and international codes, as well as KGM's technical specifications. Following KGM's specifications, safety and durability have been the primary considerations in the design and engineering of the structures.

Static and dynamic stability analyses and cross-section calculations of the engineering structures have been done using internationally accepted computer programs approved by the KGM. In the design of the engineering structures, the Standard Specifications for Highway Bridges published by the American Association of State Highway and Transportation Officials (AASHTO) has been used. In the seismic calculations, the Standard Specifications used for the seismic design of the highway bridges have been taken as basis. Where required, Project-specific revisions have been done with the approval of KGM to adapt these specifications adequately to the Project.

In accordance with the KGM the technical specifications, design of the traffic safety measures including guardrails, wire fences, horizontal and vertical traffic signs, and markings and signalization implementations will also meet KGM standards. Guardrails will fulfill the internationally accepted standards. KGM will control the operation works during the BOT contract.

In case of natural disasters that may risk the structural safety of the Project structures, the operation personnel will conduct visual inspections, take immediate actions (e.g., communication with local people, restricting access to risky areas, etc.), and collaborate with local emergency response

authorities to prevent any adverse impact on the health and safety of the local people or users of the Motorway.

Traffic Safety

Traffic accidents directly related to the drivers' behavior and quality of the vehicles will not be under the control of the Motorway's operators. Additionally, legal speed limits for different types of vehicles driving on Motorways are defined in relevant Türkiye laws and regulations. Thus, all the Motorway drivers will be obliged to comply with the legal speed limitations.

On the other hand, design, construction, and maintenance measures can contribute to minimizing traffic safety risks to a certain extent. In particular, maintenance of the Motorway and the planning of traffic safety signings may be effective in preventing, minimizing and controlling risks to the community from traffic accidents and ensuring the safety of the traffic. Measures to be taken by the Project Sponsor in this context are provided below:

- Motorway's horizontal (i.e., shoulder lines, traffic lines, parking lines, etc.) and vertical signing (i.e., traffic signs, plates, etc.) will be following KGM's technical specifications.
- Rescue vehicles and tow trucks will be kept ready in adequate numbers to promptly respond to probable accidents and vehicles that may cause the closure of the road.
- The pavement structure of the Motorway will be subject to routine maintenance works in order to remove any impairment on the road surface that may risk traffic safety, reduce driving comfort and decrease the structural strength. Large-scale repair and reconstruction works will also be conducted as required to maintain the functionality of the road.
- Wire fences will be installed along the risk border of the Motorway to minimize the risk of collisions between animals and vehicles and direct the animals towards crossing structures (i.e., culverts) to be built.
- Wire fences, welded wires, and walls to be used to enclose the area to be allocated to the Motorway will be continuously checked to prevent any uncontrolled intrusion of wild animals to the Motorway corridor that may pose a risk to traffic safety and damage the landscape components. Any damaged enclosure component will be immediately repaired/maintained.
- Intelligent Traffic System (ITS) will be installed in the scope of the Project. Through the ITS, real-time warning systems with signage to warn drivers of congestion, accidents, adverse weather-road conditions, and other potential hazards ahead will be used.
- Snow and ice removal works will be conducted within the Motorway corridor when icing occurs to ensure safe and secure driving conditions for the vehicles and users of the road (including interchanges, access roads, and service areas) during severe winter conditions.
- If necessary, precautionary salt application will be done before the start of snowfall.
- Where required, road deicing will be done by application of a suitable agent in solid or solution forms such as salt (NaCl), calcium chloride ($CaCl^2$), magnesium chloride ($MgCl^2$), etc., directly or blended in proper ratios depending on road and weather temperature.
- In case of continuous snowfall periods, the effectiveness of the chemicals applied may become insufficient in removing snow and ice. In such situations, mechanical snow and ice removal works will be conducted using suitable and adequate vehicles and/or equipment.
- In the event of a spill of oil or other hazardous liquids, absorbent equipment will be used for the initial response, and the road surface will be cleaned with water until the spilled material is completely removed.
- Measures will be taken to prevent parking vehicles at the entrance and exit roads of the service areas.

Service areas that will serve as roadside rest areas for the drivers have been planned in by KGM's technical specifications and international standards. In this regard, to minimize driver fatigue and provide resting facilities to the users of the Motorway, service areas will be constructed along the motorway route.

Pedestrian Safety

To ensure pedestrians safely pass/cross the Motorway and avoid population disruption, culverts and underpasses/overpasses have been included in the design and will be constructed. Culverts and underpasses will be planned in each section and the settlements and roads connected by overpasses have been provided in Chapter-3 in the ESIA ("Project Description").

In this regard, to prevent a crossing of the Motorway by pedestrians and wildlife animals in an uncontrolled and unsafe way, wire fences will be installed along the expropriation border of the Motorway, except the designated crossing points, following the technical specifications of the KGM.

The structures constructed for pedestrian safety are provided in Table XV.19.

Table XV.19 Crossings Constructed Within the Scope of the Project

Engineering Structure	Number
Overpass	56
Underpass	43

The KGM requirements for pedestrian safety are provided in Table XV.20

Table XV.20 Specifications of the General Directorate of Highways

Category	Requirement
Pedestrian Crossings	Must be designed based on road width and traffic density. At-grade pedestrian crossings are not allowed on roads wider than 10 meters unless central refuge islands are provided.
Underpasses / Overpasses	Underpasses must be designed for pedestrian, animal, and tractor crossings. Dimensions vary by road type: Village roads: 9.00 m x 5.00 m Provincial roads: 10.00 m x 5.00 m State roads: 12.00 m x 5.00 m Rural tracks: 5.00 m x 5.00 m Pedestrian/animal crossings: 3.00 m x 3.00 m If vertical clearance is insufficient, overpasses with a minimum width of 8.00 m must be constructed.
Markings and Signage	All pedestrian crossings must include horizontal and vertical signage. Missing or non-compliant markings must be corrected. "Yield to Pedestrians" icons must be painted at all unsignalized pedestrian and school crossings.
Fencing	Wire fences must be installed along expropriation borders (except designated crossings) to prevent uncontrolled pedestrian and animal entry onto highways.
Lighting	Road work areas in residential zones must be properly lit during nighttime operations.
Monitoring & Enforcement	Regular inspections must be scheduled monthly for pedestrian crossings. Enforcement should be active, continuous, and effective.
Education & Awareness	Public awareness campaigns and training should be conducted to promote pedestrian safety.

Chemicals And Fuels

During the operation phase, the safe management of chemicals and fuels is of critical importance for community health and safety. Even minor leaks, spills, or improper storage practices at fuel stations, rest areas, or maintenance facilities may lead to severe environmental pollution, fire and explosion risks, and direct health impacts such as poisoning or respiratory problems. Such incidents may endanger not only workers but also road users and nearby communities. Therefore, the safe storage, transportation, monitoring, and preparedness for emergencies regarding chemicals are essential for the sustainability of the Project and for ensuring compliance with international standards, particularly the IFC Performance Standards.

- A detailed inventory of all fuels and chemicals will be established and regularly updated.
- Fuels and chemicals will be stored in sealed tanks and facilities in compliance with national and international standards.
- Secondary containment systems, spill basins, and emergency kits will be installed at fuel stations and storage facilities.
- Groundwater, surface water, and soil quality will be regularly monitored, with immediate response in case of contamination.
- Firefighting systems will be installed at fuel and chemical storage areas, and regular drills will be conducted.
- Used oils, filters, cleaning agents, and other hazardous wastes will be sent to licensed disposal facilities.
- Local communities and road users will be informed about emergency procedures and safety measures.
- The Emergency Preparedness and Response Plan (EPRP) will remain active during the operation phase and will be regularly updated.
- Spill kits and MSDSs (Material Safety Data Sheets) will be kept in the areas where chemicals are stored.

Emergency Preparedness and Response Plan

The Emergency Preparedness and Response Plan prepared for the Project is presented in Annex-3 in the ESIA. The main objective of this Plan is to establish strategies and procedures for managing all aspects of emergency situations associated with Project components.

- Prevention and preparation measures (actions to be taken before emergency).
- Response measures (actions to be taken during emergency).
- Damage assessment and recovery measures (actions to be taken after an emergency).

The Emergency Preparedness and Response Plan covers the actions to be implemented by the Project to ensure emergency preparedness. These actions are mainly associated with proper planning and design of the Project units, construction in accordance with specifications and operation and maintenance in line with project safety requirements, as well as the actions to be taken for preparing for an emergency such as installation of monitoring and warning systems, communication systems, and carrying out impact studies, training of staff for awareness, procedures for warning, communication, mobilization of emergency forces and equipment, responsibilities, and evacuation practices.

The general emergency response procedures that will be given in the Emergency Preparedness and Response Plan covers the whole Motorway including engineering structures for major hazards such as accidents, spills/leakages fires, and earthquakes.

Finally, the actions to be taken following emergency response and further actions to be taken for recovery management purposes is included in the Plan. An operation phase–specific Emergency Preparedness and Response Plan (EPRP) shall be prepared no later than three months prior to the commencement of the operation phase.

Gender-Based Violence and Harassment

GBVH constitutes a serious violation of human rights, threatening the safety, dignity, and equality of individuals. Implementing robust preventive mechanisms is not only a legal obligation, but also essential for ensuring an inclusive, respectful, and safe environment for both workers and community members. Preventive actions enhance overall well-being, safeguard the project's social license to operate, and support the proactive mitigation of reputational and social risks. Therefore, the Project will enforce a zero-tolerance policy on GBVH, implement targeted awareness-raising efforts, and ensure transparent and accessible grievance mechanisms are in place and effectively functioning.

A comprehensive GBVH program will be implemented to mitigate these risks. The details of this program are provided in Table XV.21

Table XV.21 GBVH Program within the Project Scope

Aspect	Description
Risk Assessment and Monitoring	Regular assessment of GBVH risks and continuous monitoring of worker behavior and community interactions to identify potential hotspots or incidents early. (CLO)
Community Engagement and Awareness	Active engagement with local communities and workers to raise awareness of GBVH, its impacts, and the importance of respectful, safe interactions through culturally sensitive outreach programs and education campaigns (CLO)
Worker Education and Training	Mandatory GBVH prevention training for all workers and contractors covering respectful workplace behavior, zero tolerance policies, and clear incident reporting channels.
Safe and Inclusive Environment	Provision of gender-sensitive facilities such as separate sanitation and rest areas. Adequate lighting of communal areas
Grievance and Support Mechanisms	Establishment of confidential, accessible grievance reporting systems and rapid response teams (CLO) to investigate and address GBVH complaints effectively. Implementation of the GBVH incident response procedure
Coordination with Local Authorities and NGOs	Collaboration with local law enforcement, healthcare providers, and NGOs to ensure victim support services and enforcement of legal and social protections.
Monitoring and Reporting	Regular reporting on GBVH incidents and community safety issues, with adaptive management to improve policies and interventions throughout the project lifecycle
Overall Objective	Protect community and workforce health and safety, foster a culture of respect, equality, and zero tolerance for GBVH throughout the project duration.

GBVH Incident Response Procedure for Community Members

The procedure to be followed in the event of a GBVH incident involving individuals is provided in Table XV.22

Table XV.22 GBVH Response Procedure for Community Members

GBVH Response Procedure for Community Members
Reporting
Community members can report GBVH (harassment/violence) incidents involving project workers through the following channels: • Female Community Liaison Officer (CLO) • Community grievance mechanisms (hotline, email, complaint boxes) • A trusted mediator (Trusted figures in the community may include the mukhtar/mukhtar's wife, a female teacher, or a female nurse or doctor.) • Community-based organizations or local NGOs • Directly to the security or social team at the project site Anonymous or named complaints are accepted and are handled with confidentiality and seriousness.
Immediate Response and Safety Measures
The CLO or the Social & Environmental Team shall: • Ensure the safety of the complainant and provide psychosocial support if needed • Assess the risk of retaliation and implement protective measures (e.g., no-contact order) • Cooperate with local authorities to facilitate medical or legal support if necessary
Internal Review and Investigation
The GBVH Response Committee (CLO) or an independent expert shall: • Review the complaint in confidentiality • Interview witnesses, employees, and the complainant (with consent) • Evaluate whether the incident violates the worker code of conduct Target resolution timeframe: within 14 working days
Disciplinary and Corrective Actions
If the involved worker is found responsible: • Disciplinary action will be applied (warning, suspension, termination) • The worker may be permanently removed from community-facing roles • If the incident constitutes a crime, legal authorities will be notified
Community Support and Communication
The Project Sponsor shall maintain respectful and transparent communication with the complainant and community representatives. Referrals for legal, psychological, and medical support will be provided. Informative sessions will be held for community members regarding grievance mechanisms and their rights.
Prevention and Awareness
All workers will receive training on the following topics: • Rules of respectful conduct toward community members • GBVH risks and consequences • Code of Conduct and responsibilities

Note: The specified GBVH Response Procedure will also remain in effect throughout the construction phase of the Project and will be fully implemented during this period.

XV.5. Summary of Assessment and Residual Impacts

While the expansion of road infrastructure in Türkiye brings significant benefits in terms of connectivity and economic growth, it is essential to address the associated negative impacts through careful planning and management. Sustainable development practices, environmental protection measures, and attention to social equity are crucial for ensuring that road infrastructure improvements meet the population's needs while minimizing adverse effects. Regular assessment and adjustment based on evolving needs and impacts are necessary to determine if the current level of infrastructure development is truly adequate.

Project-related risk would be minimized by taking relevant planning and design measures and implementation of the Emergency Preparedness and Response Plan, which will meet the international requirements. On the other hand, some of the traffic and pedestrian safety risks will be mostly related with the users of the road on which the Project Sponsor will only have limited control. Summary of the community health and safety assessments are provided in Table XV.23.

Table XV.23. Summary of the Community Health and Safety Assessments

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity /Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phases												
Increased risk of accidents due to operation of heavy construction machinery or disturbance on the health, safety and welfare of local communities due to road closure, traffic passing through settlement centers, etc.	Local communities	Adverse	Restricted	Medium	Moderate (machinery will not be localized but distributed along the linear route)	Short term reversible	Continuous	Moderate (B)	High (3) Settlements within the expropriation corridor having affected population >500 habitants; Settlements within the study corridor having affected population>1.000;	High (B3)	• Construction works on existing roads will not be started until relevant traffic safety measures (including traffic signing and placement of equipment) are taken on roads serving pedestrian and vehicle traffic. These measures will be designed to ensure the safety of life and property of the local people and the users of the roads. • In the scope of better working organization, construction traffic routes will be strictly defined and road construction machinery will use only these routes. • Passage of the routes through the settlements (i.e. neighborhoods) will be avoided where alternative routes are available. Dangerous routes that are to be avoided, if there is any, will be specified and informed. In this scope, construction contractors will construct service roads in order not the affect (such as increasing the heavy traffic load) the natural flow on the existing roads and for avoiding the passage of heavy vehicles through residential areas to the extent possible. In addition service roads will be constructed where the traffic will be temporarily diverted. Furthermore, service roads will be used for transportation of the construction machinery, equipment and materials used for Project. • Pedestrian interaction with construction vehicles will be minimized by taking appropriate measures in and around the construction corridor. • Valid licenses will be required for the drivers and operators. • Drivers and operators will be provided with relevant trainings that emphasize the safety aspects. • Working hours of the day for the drivers/operators will be specified and informed to relevant personnel. • Limits will be defined for the working/trip duration for the drivers and operators to avoid overtiredness. • Speed control devices will be used on trucks. • All the construction machinery and equipment will be operated in alignment with the direction of the traffic flow. • Rigid objects will not be used for the purpose of traffic diversion. • Unused construction materials, equipment or machinery will not be left on the road in an uncontrolled way. They will be put in designated places. • Construction-related traffic delays will be minimized. Flow of traffic will be allowed periodically. • Road signing for night traffic will be provided with reflectors and flashing signals of sufficient number. • Relevant dust control measures will be taken at the road construction sites so that safe sight distances could be maintained on the existing roads under service. • Upon the completion of works, signing equipment will be immediately removed and standard signing will be provided. • To reduce transportation distances, services and materials required for construction works will be aimed to be primarily supplied from the local sources, wherever possible	Low
		Adverse	Restricted	Medium	Moderate (machinery will not be localized but distributed along the linear route)	Short term reversible	Continuous	Moderate (B)	Medium (2) Settlements within the study corridor (Inc. exp. corridor) having affected population 500-1.000;	Medium (B2)		Low
		Adverse	Restricted	Medium	Moderate (machinery will not be localized but distributed along the linear route)	Short term reversible	Continuous	Moderate (B)	Low (1) Settlements within the expropriation corridor having affected population<500 habitants.	Low (B1)		Low
Displacement.		Adverse	Local	Long	High	Long term reversible	Continuous	Major (A)	High (3) (Number of residential buildings within the expropriation corridor>20)	High (B3)	• Advance notification and scheduling of construction activities • Compensation for verified income losses • Maintaining alternative access to affected businesses • Support programs for re-establishing livelihoods (e.g., farming assistance, training) • Preparation of a detailed Resettlement Action Plan (RAP) • Provision of fair and timely compensation • Psychological and logistical support for affected households • Prioritization of vulnerable groups (e.g., women-headed households, elderly, persons with disabilities)	Medium
GBVH		Adverse	Restricted	Long	High	Long term reversible	Continuous	Major (A)	High (3) (women from the local community, seasonal female workers in agriculture and tourism, and female tourists)	High (B3)	• Regular assessment of GBVH risks and continuous monitoring of worker behavior and community interactions to identify potential hotspots or incidents early. (CLO) • Active engagement with local communities and workers to raise awareness of GBVH, its impacts, and the importance of respectful, safe interactions through culturally sensitive outreach programs and education campaigns (CLO • Mandatory GBVH prevention training for all workers and contractors covering respectful workplace behavior, zero tolerance policies, and clear incident reporting channels • Provision of gender-sensitive facilities such as separate sanitation and rest areas. Adequate lighting of communal areas. • Establishment of confidential, accessible grievance reporting systems and rapid response teams (CLO) to investigate and address GBVH complaints effectively. Implementation of the GBVH incident response procedure • Collaboration with local law enforcement, healthcare providers, and NGOs to ensure victim support services and enforcement of legal and social protections. • Protect community and workforce health and safety, foster a culture of respect, equality, and zero tolerance for GBVH throughout the project duration.	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity /Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phases												
											• Regular reporting on GBVH incidents and community safety issues, with adaptive management to improve policies and interventions throughout the project lifecycle	
Blasting operations to be conducted at road construction sites, quarries etc.		Adverse	Restricted	Medium	Medium	Short term reversible	Intermittent	Moderate (B)	High (3) (Number of residential buildings within the expropriation corridor>20)	High (B3)	• Blasting operations will be conducted in full compliance with the Occupational Health and Safety Law (Law No. 6331) to protect workers, and with the Regulation on the Assessment and Management of Environmental Noise to control noise and vibration impacts on nearby communities. • Unauthorized access will be prevented • Safety distances will be maintained; protective barriers will be used • Warning signs and flagmen will be placed in risky areas.	Low
		Adverse	Restricted	Medium	Medium	Short term reversible	Intermittent	Moderate (B)	Medium (2) (Number of residential buildings within the expropriation corridor between10-20)	High (A2)	• Blasting should only take place during daytime (08:00-18:00), excluding Sunday and holidays. • Photographs and vibration records taken after the explosion will be stored if there are nearby structures. • Blasting program will be prepared and announced to local communities and gendarmerie • Compensation will be provided if damage occurs	Low
		Adverse	Restricted	Medium	Medium	Short term reversible	Intermittent	Moderate (B)	Low (1) (Number of residential buildings within the expropriation corridor<10)	Medium (A1)	• Blasting operations will be conducted in full compliance with the Occupational Health and Safety Law (Law No. 6331) to protect workers, and with the Regulation on the Assessment and Management of Environmental Noise to control noise and vibration impacts on nearby communities. • Unauthorized access will be prevented • Compensation will be provided if damage occurs • Blasting program will be prepared and announced to local communities and gendarmerie	Low
Blasting operations to be conducted at quarries		Adverse	Restricted	Medium	High	Short term reversible	Intermittent	Major (A)	Low (1) (Number of residential buildings within the AoI<10)	Medium (A1)	• Blasting operations will be conducted in full compliance with the Occupational Health and Safety Law (Law No. 6331) to protect workers, and with the Regulation on the Assessment and Management of Environmental Noise to control noise and vibration impacts on nearby communities. • Blasting program will be prepared and announced to local communities and gendarmerie	Low
Water supply		Adverse	Local	Medium	High	Long term reversible	Continuous	Major (A)	Low (1)	Medium (A1)	• Collaboration with local law enforcement, healthcare providers, and NGOs to ensure victim support services and enforcement of legal and social protections.	Low
Health risks (spreading of airborne/ communicable diseases) due to population influx		Adverse	Wide	Medium	Low (Project will give priority to employment of local people, number of incoming workers is anticipated to be low)	Short term reversible	One-off	Minor (C)	Low (1) No existing health issues have been identified in the area.	Low (C1)	• Regular reporting on GBVH incidents and community safety issues, with adaptive management to improve policies and interventions throughout the project lifecycle. • All workers should undergo pre-employment and periodic health screenings; immunization programs should be implemented against communicable diseases. • Clean drinking water, sufficient toilet/shower facilities, and regular wastewater/solid waste management should be ensured at the campsites. • Workers and subcontractors should be regularly trained on handwashing, food hygiene, disease symptoms, and transmission routes. • Daily health records should be maintained through infirmaries; suspected cases should be promptly reported and isolated, and local health authorities should be informed when necessary. • Regular pest control should be carried out, and water stagnation around camps should be prevented to control mosquitoes, rodents, and other disease vectors	Low
Disturbance of local communities due to improper acts of security personnel		Adverse	Local	Medium	Low	Short term reversible	One-off	Minor (C)	Low (1) No particular sensitivity/past issues have been identified in the area	Low (C1)	• Protect community and workforce health and safety, foster a culture of respect, equality, and zero tolerance for GBVH throughout the project duration.	Low
Use Of Chemical And Fuels	Local Communities And workers	Adverse	Local	Medium	Medium	Short term reversible	Intermittent	Moderate (B)	Medium (2)	Medium (A1)	• Civilian access to the construction site will be restricted to the greatest extent possible. • Leakage or spills of fuels, oils, and solvents may lead to soil and groundwater pollution, potentially affecting agricultural lands, local water resources, and thereby public health. • Improper storage and handling of fuels and explosives can create fire and explosion risks, which may endanger both workers and nearby communities. • Direct or indirect exposure to hazardous chemicals (vapors, dust, or accidental contact) may result in respiratory issues, skin irritation, or other health problems for workers and local populations. • Improper handling of chemicals, such as paints and solvents, may create strong odors that disturb nearby settlements and affect quality of life.	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity /Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Operation Phase												
GBVH		Adverse	Restricted	Long	High	Long term reversible	Continuous	Major (A)	High (3)	High (A3)	• Regular assessment of GBVH risks and continuous monitoring of worker behavior and community interactions to identify potential hotspots or incidents early. (CLO) • Active engagement with local communities and workers to raise awareness of GBVH, its impacts, and the importance of respectful, safe interactions through culturally sensitive outreach programs and education campaigns (CLO • Mandatory GBVH prevention training for all workers and contractors covering respectful workplace behavior, zero tolerance policies, and clear incident reporting channels • Provision of gender-sensitive facilities such as separate sanitation and rest areas. Adequate lighting of communal areas. • Establishment of confidential, accessible grievance reporting systems and rapid response teams (CLO) to investigate and address GBVH complaints effectively. Implementation of the GBVH incident response procedure • Collaboration with local law enforcement, healthcare providers, and NGOs to ensure victim support services and enforcement of legal and social protections. • Protect community and workforce health and safety, foster a culture of respect, equality, and zero tolerance for GBVH throughout the project duration. • Regular reporting on GBVH incidents and community safety issues, with adaptive management to improve policies and interventions throughout the project lifecycle	Low
Accident risks (involving vehicles or pedestrians) due to speedy traffic by some of the drivers on the new Motorway route	Local Communities	Adverse	Restricted	Long	High	Irreversible	One-off	Major (A)	High (3)	High (A3)	• To minimize driver fatigue and provide resting facilities to the users of the Motorway, Service areas that will serve as roadside rest areas for the drivers have been planned in accordance with KGM's technical specifications and international standards. In this regard, to minimize driver fatigue and provide resting facilities to the users of the Motorway, service areas (Type B and Type C) will be constructed along the motorway route. • Horizontal (i.e. shoulder lines, traffic lines, parking lines, etc.) and vertical signing (i.e. traffic signs, plates, etc.) of the Motorway will be in accordance with KGM's technical specifications. • Rescue vehicles and tow trucks will be kept ready in adequate numbers to promptly respond to probable accidents and slippery vehicles that may cause the closure of the road. • Pavement structure of the Motorway will be subject to routine maintenance works in order to remove any impairment on the road surface that may risk traffic safety, reduce driving comfort and decrease the structural strength. Large-scale repair and reconstruction works will also be conducted as required to maintain the functionality of the road. • Wire fences will be installed along the expropriation border of the Motorway to minimize the risk of collisions between animals and vehicles and direct the animals towards crossing structures (i.e. culverts) to be built. • Wire fences, welded wires, walls to be used to enclose the area to be allocated to the Motorway will be continuously checked to prevent any uncontrolled intrusion of wild animals to the Motorway corridor that may pose risk to traffic safety and damage the landscape components. Any damaged enclosure component will be immediately repaired/maintained. • Intelligent Traffic System (ITS) will be installed in the scope of the Project. By means of the ITS, real-time warning systems with signage to warn drivers of congestion, accidents, adverse weather road conditions, and other potential hazards ahead will be used. • Snow and ice removal works will be conducted within the Motorway corridor when the temperature is between 0^0C and -12^0C to ensure safe and secure driving conditions for the vehicles and users of the road (including interchanges, access roads, service areas) during severe winter conditions. • If necessary, precautionary salt application will be done before the start of snowfall. • Where required, road deicing will be done by application of a suitable agent in solid or solution forms such as salt (NaCl), calcium chloride (CaCl2), magnesium chloride (MgCl2), etc. directly or blended in proper ratios depending on road and weather temperature. • In case of continuous snowfall periods, effectiveness of the chemicals applied may become insufficient in removing snow and ice. In such situations, mechanical snow and ice removal works will be conducted by using suitable and adequate vehicles and/or equipment. • In case of oil spill or spill of other hazardous liquids, road surface will be washed with water until the spilled material is removed completely. • Measures will be taken to prevent parking vehicles at the entrance and exit roads of the services areas. • To ensure safe passage/crossing of the Motorway by the pedestrians and avoid population disruption, culverts and underpass/overpasses included in the design will be constructed. • To prevent crossing of the Motorway by pedestrian and wild life animals in an uncontrolled and unsafe way, wire fences will be installed along the expropriation border of the Motorway, except the designated crossing points, in accordance with the technical specifications of the KGM.	Medium
Traffic Safety	Local Communities, Road Users	Adverse	Local	Long	Medium	Long term reversible	Continuous	Moderate (B)	Medium (2)	Medium (A1)	• Motorway's horizontal (i.e., shoulder lines, traffic lines, parking lines, etc.) and vertical signing (i.e., traffic signs, plates, etc.) will be following KGM's technical specifications. • Rescue vehicles and tow trucks will be kept ready in adequate numbers to promptly respond to probable accidents and slippery vehicles that may cause the closure of the road.	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity /Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											• The pavement structure of the Motorway will be subject to routine maintenance works in order to remove any impairment on the road surface that may risk traffic safety, reduce driving comfort and decrease the structural strength. Large-scale repair and reconstruction works will also be conducted as required to maintain the functionality of the road. • Wire fences will be installed along the expropriation border of the Motorway to minimize the risk of collisions between animals and vehicles and direct the animals towards crossing structures (i.e., culverts) to be built. • Wire fences, welded wires, and walls to be used to enclose the area to be allocated to the Motorway will be continuously checked to prevent any uncontrolled intrusion of wild animals to the Motorway corridor that may pose a risk to traffic safety and damage the landscape components. Any damaged enclosure component will be immediately repaired/maintained. • Intelligent Traffic System (ITS) will be installed in the scope of the Project. Through the ITS, real-time warning systems with signage to warn drivers of congestion, accidents, adverse weather-road conditions, and other potential hazards ahead will be used. • Snow and ice removal works will be conducted within the Motorway corridor when the temperature is between 00C and -120C to ensure safe and secure driving conditions for the vehicles and users of the road (including interchanges, access roads, and service areas) during severe winter conditions. • If necessary, precautionary salt application will be done before the start of snowfall. • Where required, road deicing will be done by application of a suitable agent in solid or solution forms such as salt (NaCl), calcium chloride (CaCl2), magnesium chloride (MgCl2), etc., directly or blended in proper ratios depending on road and weather temperature. • In case of continuous snowfall periods, the effectiveness of the chemicals applied may become insufficient in removing snow and ice. In such situations, mechanical snow and ice removal works will be conducted using suitable and adequate vehicles and/or equipment. • In case of an oil spill or spill of other hazardous liquids, the road surface will be washed with water until the spilled material is removed completely. • Measures will be taken to prevent parking vehicles at the entrance and exit roads of the service areas.	
Public Health and Welfare (High-Speed Vehicle Traffic, Continuous Emissions and Noise from Vehicles, Fire Risk from Fuels, Equipment, Hazardous Materials and Vegetation, Structural Safety)	Local Communities, Road Users	Adverse	Local	Long	Medium	Long term reversible	Continuous	Moderate (B)	Medium (2)	Medium (A1)	• Warning signs will be placed in areas where animal crossings are known to occur. • Physical safety measures such as speed bumps, pedestrian crossings, and traffic warning signs will be installed. • Drivers will be monitored through warning signs and speed control measures, including radar enforcement where applicable. • A grievance mechanism accessible to the community will be established to address complaints related to traffic issues. • Targeted awareness efforts will be carried out to ensure cautious and low-speed driving in areas frequented by the local population. • All personnel operating vehicles will receive safe driving training. Participation will be mandatory. All trainings will be documented and reported by the H&S Team. • . • Air quality will be monitored at regular intervals • Fire drills will be organized twice a year, specifically for campsites, facilities, tunnels, and forest-adjacent areas, and these drills will be documented and reported by the H&S Team. • All personnel will receive one-hour fire safety training sessions each semi-annually for a period of one year. • Spill kits and MSDSs (Material Safety Data Sheets) will be kept in the areas where chemicals are stored. • Fuels and chemicals will be stored in sealed tanks and facilities in compliance with national and international standards. • Secondary containment systems, spill basins, and emergency kits will be installed at fuel stations and storage facilities.	Low

XVI. LABOR AND WORKING CONDITIONS

Throughout the construction and operation phases of the Antalya-Alanya Motorway Project, labor management, working conditions and occupational health and safety practices will be implemented in full compliance with both the Labor Law of the Republic of Türkiye and the International Finance Corporation (IFC) Performance Standards. In this context, IFC Performance Standard 2 and Performance Standard 4 serve as primary references. Given the employment of hundreds of direct and subcontracted personnel and the execution of large-scale earthworks involving heavy machinery, ensuring a safe and equitable working environment will be one of the core responsibilities of project management.

Fundamental labor rights, including fair remuneration, non-discrimination, contractual employment conditions, and the right to freedom of association, will be safeguarded. Subcontractor companies will be informed of the relevant requirements in accordance with national labor legislation and IFC standards, and will be contractually obligated to comply with them. Furthermore, an effective and transparent grievance mechanism will be established and actively operated to allow employees to safely report concerns and complaints.

From an occupational health and safety (OHS) perspective, preventive measures will be taken against physical and chemical risks during both construction and operation phases. Engineering controls, use of personal protective equipment (PPE), and regular site inspections will be implemented to mitigate risks such as noise, dust, working at height, falls, collisions, electric shock, and exposure to explosive or flammable substances. Material Safety Data Sheets (MSDS) will be maintained for all chemicals used and stored on site, and personnel will be trained in their safe handling. Workplace hygiene, ventilation, fire safety, safe access routes, lighting, and cleanliness will also be integral elements of the OHS management system.

In addition, a comprehensive Emergency Preparedness and Response Plan (EPRP) has been developed to address potential emergency situations. This plan will be regularly reviewed and tested through drills and simulations. Emergency Response Teams (ERT) will be established to respond to incidents such as fires, explosions, collapses, chemical spills, and traffic accidents. Ambulances, fire suppression systems, and first aid equipment will be maintained in a state of readiness at all times for rapid intervention. During the operation phase, specific risk assessments will be carried out for maintenance and repair activities, and appropriate control measures will be implemented prior to commencement.

These measures aim not only to fulfil legal obligations comprehensively, but also to enhance employee well-being and ensure the alignment of the project with international principles of social sustainability.

XVI.1. Assessment Methodology and Data Sources

The labor and occupational health and safety dimensions of the Project have been analyzed based on qualitative assessment approaches, taking into account the typical risks associated with large-scale infrastructure projects. The activities planned within the scope of the Project and their potential impacts have been evaluated by subject-matter experts. The project area was visited by technical teams, and the most suitable alignment for the motorway under the scope of the Project was identified. Considering the geographical and environmental characteristics of the route, the proposed structures were finalized and submitted to the relevant ministries for approval. Subsequently, the Project's Area of Influence was determined, and the process was transparently shared with stakeholders.

As part of stakeholder engagement, household surveys and focus group discussions were conducted with local communities and village headmen (mukhtars) within the Project's Area of Influence. In addition, a Public Participation Meeting was organized to provide information and address community concerns. The Project Sponsor is committed not only to engagement during the Environmental and Social Impact Assessment (ESIA) process but also to maintaining ongoing communication with stakeholders throughout the entire Project lifecycle through continued field studies and consultations.

In this context, conducting a project-specific risk assessment and managing the process in collaboration with stakeholders ensures the identification of key risks, development of appropriate mitigation measures, establishment of an efficient work program, and protection of worker and community health.

The main national legislation, international standards, and guidance documents considered within the scope of this assessment are listed below:

- Turkish Labor Law
- Turkish Occupational Health and Safety Law and related regulations
- IFC's Performance Standard 2: Labor and Working Conditions (2012)
- Guidance Note by IFC/EBRD on Worker's Accommodation: Processes and Standards (2009)
- The World Bank ESS2: Labor and Working Conditions
- TurkStat. Statistics on Child Labor (2012 and 2019) and Work Accidents (2020)
- Focus Group Interview will be conducted with employees in the scope of Social Field Study
- Structured survey interviews conducted with local village headmen (mukhtars) within the Project's Area of Influence

Significance Criteria

The significance of impacts on labor will be assessed as high, medium, or low based on the magnitude of the impact and the sensitivity and value of the affected receptors, in accordance with IFC Performance Standard 2. The methodology described in Chapter IV ("ESIA Methodology") will be applied for determining impact magnitude, taking into account aspects such as working conditions, labor rights, occupational health and safety, and the nature of employment.

Sensitivity/value criteria will reflect factors such as health and safety risks, access to freedom of association, reliance on income from employment, availability of social protection, and the ability of workers to be re-employed. Impacts affecting basic rights or worker health and safety will be considered of high sensitivity. In cases of retrenchment, sensitivity will be evaluated based on the affected workers' vulnerability, access to alternative livelihoods, and the strength of existing support mechanisms. In line with IFC guidance, any retrenchment process must include timely notification, consultation, adequate compensation, and assistance in securing alternative employment.

In the context of Türkiye, gender-related disparities in workforce participation, risks of gender-based discrimination, unequal pay, and limited access to maternity protections are particularly relevant. As per IFC PS2 and its commitment to gender equality and non-discrimination, impacts affecting female workers will be treated with high sensitivity. Risks such as workplace harassment,

underrepresentation, and inequity will be specifically assessed, and mitigation measures will be developed accordingly.

Child labor is strictly prohibited under IFC Performance Standard 2, Türkiye's Labor Law, and international conventions such as ILO Conventions No. 138 and 182. Any risk of child labor will be classified as a high significance negative impact. The project will not engage any individuals below the legal minimum working age. Where permitted by law, young workers may be employed under controlled and non-hazardous conditions, with strict supervision to ensure their physical and psychological well-being.

Other vulnerable groups-including persons with disabilities, older workers, seasonal agricultural laborers, and migrant or refugee workers will be assessed in line with IFC's principles of inclusivity and non-discrimination. Their access to fair working conditions, safety, and legal protection will be carefully evaluated, and inclusive employment practices will be promoted throughout the project.

Detailed information on the sensitivity of each impact type is provided in the following section titled "Baseline Conditions", while the corresponding mitigation measures and monitoring mechanisms are elaborated in the Environmental and Social Management Plan (ESMP).

The sensitivity assessment will be carried out based on the information provided in Table XVI.1.

Table XVI.1 Sensitivity/Value Criteria for Labor Impact Receptors

Topic	High (3)	Moderate (2)	Low (1)
Physical Hazards	Workers exposed to high-risk tasks (e.g., lifting, working at heights, heavy equipment, subcontractors)	Support workers with limited safety controls	Administrative staff working in low-risk, indoor environments
Chemical Hazards	Workers handling hazardous substances directly (e.g., solvents, jet grout, paints)	Occasional contact with chemicals (e.g., support staff near storage areas)	Staff with no exposure to chemicals (e.g., clerical workers)
Retrenchment	Informal workers, short-term contractors, older workers, sole earners with no alternative income	Contracted workers with social security but limited employment alternatives	Long-term, skilled employees with full legal protections
Workers' Accommodation Conditions	Workers in overcrowded, mixed-gender, or remote accommodation camps	Shared facilities with some oversight and basic hygiene standards	Separate, well-equipped facilities with regular inspections
Child Labor	Children under legal working age employed in hazardous or heavy work (prohibited)	Young workers (aged 16–18) employed in light, legal duties under supervision	Youth employed under legal and controlled, non-hazardous conditions
GBVH (Gender-Based Violence and Harassment)	Female workers in informal roles, housed in male-dominated camps, with no complaint mechanisms	Workers with limited access to reporting systems and basic awareness training	Workers in safe housing with access to female CLOs and effective GBVH protocols
Human Rights	Undocumented migrant workers, ethnic minorities, or persons with disabilities lacking protections	Vulnerable groups with limited voice or legal support	Workers with access to unionization, legal recourse, and formal protections

XVI.2. Baseline Conditions

The International Labor Organization (ILO) is a specialized agency of the United Nations[1] for the world of work. It sets international labor standards, promotes rights at work, and encourages decent employment opportunities, the enhancement of social protection and the strengthening of dialogue on work-related issues. Türkiye became a member state of the ILO in 1932 and ratified 59 ILO Conventions (4 of them have been denounced) including the ones related with occupational health and safety, minimum age, forced labor, weekly rest, equality treatment.

In 1992 Türkiye was one of the initial six countries to undertake direct action to combat child labor. On the other hand, the problem of child labor is one that Türkiye, as every country in transition, needs to address. The problem needs to be viewed in terms of demography, educational levels, economics and social development. Similar to global statistics for child labor, agriculture is by the most important sector where child laborers can be found.

Türkiye has ratified relevant ILO Conventions on improvement of gender equality and women employment. On the other hand low women's labor force participation and employment rates are among the most important issues in the field of employment in Türkiye. Compared to EU, Türkiye's female employment rates are extremely low.

Within the scope of the ESIA studies, focus group meetings will be held with the workers in the scope of the socio-economic field study. These meetings will be held at three different planned construction site campsites. Participants will be selected through random sampling for these three focus group discussions. In these meetings, which will be held on subjects such as working, housing, OHS and other related issues at the construction sites, it is aimed to get a general idea about the work and working conditions of the personnel.

In addition, a grievance mechanism based on anonymity will be established for all personnel employed under the Project, including subcontracted workers. This mechanism will consist of complaint boxes, a dedicated phone line and others (see Annex-9 in the ESIA). Through these channels, employees will be able to submit their requests and complaints directly to the Project Sponsor. The Project Sponsor will be responsible for formally documenting the grievance process and taking appropriate action for all complaints submitted-even in cases where a complaint is found to be unsubstantiated, the process followed will still be recorded and archived. The grievance mechanism will also serve as an effective tool for managing complaints submitted by female workers.

Accordingly, Turkish labor law and related regulations covers the basic principles of international labor standards and the IFC PS 2 in the issues of equal treatment of employees, restrictions on the working age and employment of children, avoidance of forced labor and ensuring occupational health and safety at the workplaces. On the other hand, monitoring of the implementation is essential to ensure full compliance of the activities with the relevant legislation. Figure XVI.1 presents a comparison of child labor in different sector in year 2012 and 2019. While 68.5% of children between the ages of 5-14 worked in the agricultural sector in 2012, this rate decreased to 64% in 2019. While the rate of working in the service sector for children of the same age group was around 18% in 2012, it increased to over 24% in 2019. In 2012, 37.4% of children aged 15-17 took part in the service sector. This rate increased to 51% in 2019. Also, Table XVI.2 presents Child Labor statistics in comparative perspective between 2012 and 2019.

1 *https://www.un.org/*

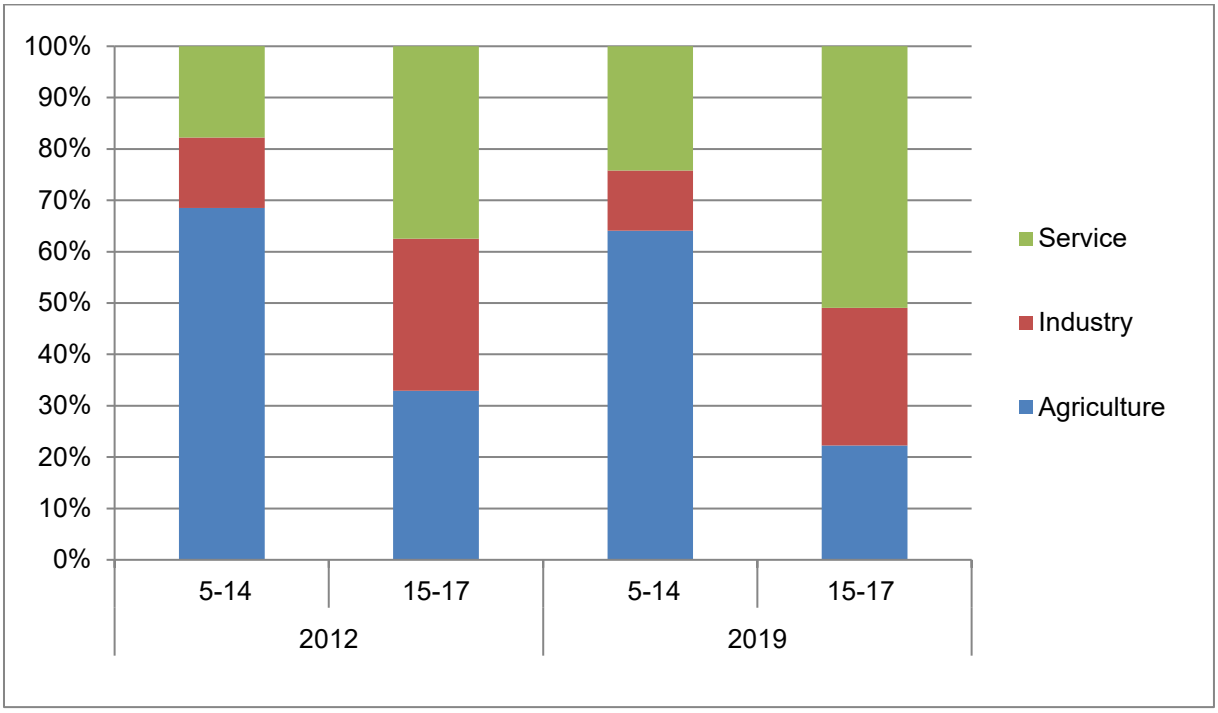


Figure XVI.1 Comparison of the Ratio of Children Working in Different Economic Sectors in Years 2012 and 2019

Table XVI.2 Child Labor Statistics for Türkiye (years 2012 and 2019)

Years	2012		2019	
Age Group	**5-14**	**15-17**	**5-14**	**15-17**
Agriculture	68.5%	32.9%	64.1%	22.3%
Industry	13.7%	29.6%	11.7%	26.8%
Service	17.8%	37.4%	24.2%	51%

Source: TurkStat, 2019[2]

In 2015, Türkiye made moderate progress in efforts to eliminate the worst forms of child labor. The government, in cooperation with the ILO, implemented a project providing services to more than 1,000 children working in commercial hazelnut production and amended the Labor Code to provide protection for children working in the arts and commercial advertising.

Also in 2020, within the scope of the National Programme to End Child Labor (2017-2023), the "Project to End the Worst Forms of Child Labor in Seasonal Agriculture in Hazelnut Harvesting" and the second phase (2024-2027) is being launched in cooperation with ILO tripartite partners (government, workers' and employers' organizations) within the framework of a public-private partnership, with the aim of sharing experiences in combating child labor, particularly in the hazelnut supply chain.

However, children in Türkiye are still being employed in street labor and mobile seasonal work in agriculture. The government does not have laws protecting children working in agricultural enterprises employing less than 50 workers. While the government has taken important steps to increase Syrian refugee children's access to education and other services across the country, many Syrian refugee children in urban areas of Türkiye have little or no access to education and other social services, leaving significant numbers at risk of exploitation in the worst forms of child labor.

It is estimated that the increase in the number of Syrian refugees in the country in the recent years had led to a rise in child labor rates. Table XVI.3 provides an overview of child work by sector and activity.

Table XVI.3 Overview of Children's Work by Sector and Activity

Sector/Industry	Activity
Agriculture	Production of cotton, hazelnuts, citrus fruits, sugar beets, cumin, peanuts, pulses, apricots, melons, and cherries
Industry	Production of furniture, bricks, shoes, leather goods, and textiles; auto repair; mining
Services	Street work, including vending small items, carrying bundles in market areas, cleaning car windshields, collecting recyclable materials, and begging ; working in restaurants and small shops

Source: US Department of Labor, 2018.

In the examination by gender, it is observed that of the working children, 70.6% are identified as male, and 29.4% as female. Education is attended by 65.7% of these children, with attendance rates being 65.6% for males and 66.1% for females. The motivation for children's engagement in economic activities primarily includes helping in the household's economic activities, and followed by learning a profession or skills for a job. In relation to the sectors of employment, working children are found in agriculture (30.8%), industry (23.7%), and the service sector (45.5%) in Türkiye. By age, those in the 5-14 age groups are predominantly found in agriculture (64.1%), whereas the 15-17 age group is more significantly represented in the service sector (51%) (ILO, 2021;TurkStat, 2019).

Statistics on work accidents for the insured personnel working in different industries are published by TurkStat. Statistics kept for the insured personnel (under Article 4-1/a of the Law on Social Security and General Health Insurance Law) working in road and motorway construction sector works are provided in Table XVI.4.

Table XVI.4 Statistics on Work Accidents and Occupational Diseases for Road and Motorway Construction

Activity Classification	Number of Insured Persons Having Work Accident by Incapacity Days in 2020		
	Male	Female	Total
Construction of roads and motorways	1,769	10	1,779

**Source: TurkStat, 2020. Work Accidents and Occupational Diseases.*

State and private hospital located in the district where the Project is located are listed in Table XVI.5.

Table XVI.5 Health Facilities in the Vicinity of the Project

Province	District	State and Private Hospitals
Antalya	Serik	Anatolia Hospital Aspendos
		Serik State Hospital
		Private Aspendos Hospital
	Manavgat	Manavgat Yaşam Hospital
		Manavgat State Hospital
		Private Akdeniz Hospital
		Manavgat Private Hisar Medical Centre
		Private Manavgat Eslem Hospital
		Anatolia Hospital Side
		Private Manavgat Medical Centre
		Medicus Clinic
	Alanya	Private Alanya Yaşam Hospital
		Anatolia Hospital Alanya
		Alanya Education and Research Hospital
		Başkent University Alanya Hospital
		Private Alanya Şifa Medical Centre

XVI.3. Potential Impacts

In projects involving large numbers of personnel, such as the Project, effective management of working relationships and employment terms is essential. The provision of adequate accommodation and working conditions is also critical. Ensuring non-discrimination, equal opportunity, and promoting employee satisfaction are key factors. Additionally, establishing feedback mechanisms is crucial for fostering a strong worker-management relationship. This relationship would ensure efficiency and productivity of the activities/operations and avoid any reputational risk that may jeopardize the Project/Project Sponsor. Accordingly, issues related with labor and working conditions, including safety and security of the workers, will have to be properly managed during the construction and operation phases of the Project.

Occupational health and safety impacts are another important aspect of the construction and operation of large infrastructure projects, especially during the construction phase of the project when large number of direct and contracted personnel is involved to perform large-scale earthwork and construction activities. Key labor and occupational health and safety issues associated with the construction of motorways primarily include the following:

- Labor issues and working conditions
- Workers' accommodation conditions and general occupational health and safety issues
- Physical and chemical hazards
- Emergency preparedness and response

Detailed staffing information for the Project is presented in Table XVI.6.

Table XVI.6 Information Regarding Staff To Be Hired Under The Project

INFORMATION REGARDING STAFF TO BE HIRED UNDER THE PROJECT	
Construction Phase	**Operation Phase**
The construction phase of the Project is expected to last approximately three years and will involve extensive civil works, infrastructure development, and workforce mobilization across the Antalya-Alanya Motorway corridor. Up to 3,300 personnel - including both direct employees and subcontracted workers - will be employed during peak periods. The workforce, comprising white-collar and blue-collar workers such as engineers, drivers, and unskilled laborers, will be deployed across construction sites and administrative offices. In line with the recruitment strategy, priority will be given to hiring from the project's area of influence-particularly from Serik, Alanya, and Manavgat districts and nearby neighborhoods along the corridor. If needed, recruitment will be expanded to the wider Antalya region, the Mediterranean Region, and then nationally.	The operation phase will begin immediately after construction is completed and will continue for 12 years under the 15-year Build-Operate-Transfer (BOT) contract. Approximately 250 personnel will be employed during this phase to manage toll collection, traffic control, routine maintenance, and service area operations. The recruitment strategy will prioritize hiring from the project's area of influence - particularly from Serik, Alanya, and Manavgat districts and nearby neighborhoods along the corridor. If suitable candidates are not available locally, recruitment will expand to the wider Antalya region, the Mediterranean Region, and then nationally. Staff will be stationed at toll plazas, control centers, and maintenance facilities to support 24/7 operations, including snow removal, road repairs, and system monitoring. Additional indirect employment will be generated through local service areas along the motorway, which will include restaurants, fuel stations, cafés, and small retail outlets.

XVI.3.1. Land Preparation and Construction Phase

Large-scale employment of workforce will occur during the land preparation and construction phase of the Project. Activities of the site personnel will involve typical construction risks observed at construction sites such as risks due to moving equipment, elevated work, chemical hazards, exposure to noise and dust emissions (*IFC, April 2007*). The rate of accidents will be highly dependent on the consciousness and cautiousness of the personnel regarding the specific hazards of the construction work they are involved in. These risks together with labor issues and working conditions have to be managed in accordance with the good management approaches and international construction site practices to avoid problems with the worker-employer relations and significant occupational health and safety risks.

Since the construction activities will be completed in 3 years, retrenchment will be an issue at the end of the construction phase that needs proper management. Additionally, resolving the complaints of the workers within the Project through an effective grievance mechanism would be very important to protect the reputation of the Project/Project Sponsor.

The number of workers planned to be hired for the construction phase is 3300. Workers are planned to work 10 hours a day in two shifts.

Although the daily working time of the workers within the scope of the project is specified as 10 hours by the company, this practice is only possible within the scope of overtime with the consent of the workers in accordance with the Labor Law No. 4857, published in the Official Gazette No. 25425 in April 2004. The employer is required not to exceed this period, to pay the necessary wages for overtime work and to provide workers with adequate rest periods. The Project is obliged to observe compliance with ILO standards and national legislation in this regard.

Accommodation will be provided for the personnel to be employed during the construction phase of the Project. Details of the campsite locations and facilities are presented in Table XVI.7

Table XVI.7 Proposed Construction Camp Site Locations

Location (Km)	Province	District	Nearest Neighborhood	Description
Km 64+500	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)
Km 87+800	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2
Km 123+000	Antalya	Alanya	İncekum	Construction Camp Site-3

Gender Based Violence, Harassment and Inequalities

The construction of the roadway will result in changes in local communities, including worker influx and changes in households' dynamics which can exacerbate the risk of Gender Based Violence and Harassment (GBVH) in both public and private spaces.

Women and men have different economic opportunities in Turkey. Traditionally, males tend to dominate leadership positions and women are marginalized in the decision-making process, therefore making them vulnerable.

Women may also be at risk of being discriminated against, as they are often not offered the same opportunities to get paid employment or are limited to taking on certain roles such as cooking food or providing laundry services at the camps. During recruitment, women could be suffering discrimination and may not be provided with the same working conditions as men once recruited.

Lastly, when performing the work, OHS decisions may not use a gender-responsive approach resulting in women not having access to PPE specifically designed for them. Wearing overalls designed for men or outsized safety shoes, gloves or coats could lead to additional health and safety hazards. The impact of Gender Based Violence, Harassment and Inequalities is considered high.

Supply Chain

The Project will require extensive sourcing of construction materials such as aggregate, sand, asphalt, concrete, and steel, as well as chemical substances to be used during various construction processes. These materials will be procured from quarries and construction material production facilities such as concrete and asphalt plants, which are integral components of the Project. As such, the Project's supply chain may involve indirect labor through third-party contractors and suppliers.

In line with IFC PS2, the Project acknowledges the potential labor and human rights risks associated with its supply chain, especially in relation to material suppliers such as quarry operators, concrete and asphalt producers, and chemical suppliers. Key risks include child labor, forced labor, and poor working conditions, particularly among subcontracted or informal workers.

Given the increasing incidence of child labor among refugee and migrant communities in Türkiye, the Project recognizes the elevated risk of such practices occurring within its indirect workforce. Based on the nature of these sectors and the regional context, the following potential labor-related risks have been identified in relation to the Project's supply chain:

- Workers engaged in the Project's construction activities may be subject to long working hours, inadequate rest periods, and inadequate access to protective equipment (PPE), especially in non-unionized or subcontracted facilities.
- Handling and transport of hazardous substances (e.g., asphalt binders, chemical admixtures, diesel fuels) involve risks such as chemical burns, respiratory issues, and fire hazards. Inadequate training or enforcement of safety protocols among supply chain workers can increase the likelihood of incidents.
- Limited traceability in sourcing (e.g., the origin of aggregates or cement) may result in materials being procured from suppliers with poor human rights records or who operate in environmentally or socially sensitive areas, thereby indirectly exposing the Project to reputational and compliance risks.

The impact of Supply Chain is considered High.

Child Labor and Forced Labor in the Supply Chain

Under IFC Performance Standard 2, the risk of child labor and the involvement of youth aged 16-18 in hazardous work within the supply chain should be significantly mitigated through the implementation of effective measures.. Managing these risks within the supply chain is a critical component of social responsibility requirements and international standards compliance for projects. Strengthening knowledge and practices for preventing and managing child labor within contracted and supplier companies, in accordance with IFC standards, holds potential for positive and lasting legacy effects.

The proposed mitigation measures are expected to substantially reduce the use of forced labor, rendering such incidents non-routine events. However, should such incidents occur, the impacts on affected individuals may remain unchanged, underscoring the need for effective support mechanisms. The impact of Child Labor is considered High.

Workers Accommodation Conditions

Ensuring good standards in accommodation facilities is important in order to avoid safety hazards and to protect workers from diseases and/or illness resulting from humidity, bad/stagnant water (or lack of water), cold, spread of fungus, proliferation of insects or rodents, as well as to maintain a good level of morale. In this scope, the standards of the rooms or dormitory facilities are important to allow workers to rest properly and to maintain good standards of hygiene.

Conditions that ensure a high standard of personal hygiene and clean cafeterias must be maintained to prevent contamination and the spread of diseases. Such diseases, often resulting from inadequate sanitary facilities, can also impact community health and safety. Medical facilities (first-aid facilities, additional medical facilities) are also important to maintain workers' health and to provide adequate responses in case of health emergency situations.

Additionally, basic leisure, social and telecommunication facilities are important for workers to rest and also to socialize during their free time (*IFC/EBRD, 2009*). Since accommodation will be provided at campsites in the scope of the Project, all these requirements at the facilities will need to be optimized to minimize potential impacts on the workers' welfare and risk of work-related accidents and maximize the overall productivity.

Retrenchment

Upon completion of the construction phase, during which approximately 3,300 workers were employed, the Project will transition into the operation phase with a significantly reduced workforce of around 250 employees. This shift represents a substantial retrenchment process. Although the workforce was employed under fixed-term, project-based contracts, the social and economic impacts of job loss-particularly for local workers-are considered noteworthy.

The retrenchment may result in sudden decreases in household income, local employment imbalance, psychological stress, reduced livelihood opportunities, and disruption of social dynamics within communities. These impacts may be more pronounced in rural or semi-rural areas where alternative employment opportunities are limited. Moreover, the uncertainty faced by workers after short-term employment may contribute to increased social vulnerability and challenges in reintegration into the labor market.

In this context, the termination of employment following the construction phase is assessed as having a high level of potential adverse socioeconomic impact.

Physical Hazards

Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity. Road construction personnel may be exposed to physical hazards during the land preparation and construction phase of the Project. These hazards may be due to the operation of heavy construction vehicles during the earthworks, working at height for the construction of bridges, overpasses, viaducts, exposure to severe weather conditions, exposure to high noise levels caused by construction machinery and equipment.

Poorly trained or inexperienced drivers would increase risk of accident with other vehicles, pedestrians, and equipment. Additionally, heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. These risks would be similar to any large scale infrastructure project and can be managed effectively with good management and implementation of occupational health and safety measures (*IFC, 2007*).

Chemical Hazards

Significant volumes of earthworks and paving activities will be conducted within the long construction corridor of the Project. The exhaust emissions from large number construction machinery, hazardous materials used for painting and paving operations are among main sources of chemical hazards for construction workforce (*IFC, April 2007*).

The chemicals used in the Project are presented in the Table XVI.8

Table XVI.8 Chemical List

Unit	Chemicals in Use
Machinery Unit	Diesel, AdBlue, Hydraulic Oils, Engine Oils
Construction Unit	Concrete Admixture, Mould Release Oil
R&D Unit	Methylene Blue Powder, Magnesium Sulfate Solution, Trichloroethylene

Emergency Preparedness and Response

As discussed in details in Chapter 15 and Emergency Preparedness and Response Plan (EPRP) (see Annex-3 in the ESIA), emergencies such as accidents, fire, natural hazards, etc. may occur during the land preparation and construction phase of the Project and if not properly managed, associated risks may occur on the health and safety of the Project personnel. The ineffective implementation of the EPRP may result in the inability to manage risks effectively and could lead to adverse impacts on health and safety.

XVI.3.2. Operation Phase

In the operation phase, maintenance personnel (i.e. road maintenance and landscaping workers), especially workers on foot, may be subject to occupational health and safety risks if not properly mitigated. Road repairs have to be managed within a structured plan to ensure safety zone and minimize relevant risks. In addition to the maintenance, personnel will be employed at toll plazas and control centers. Sub-contractors may also be involved in the operation of service areas.

During the operational phase, it is anticipated that labor and occupational health and safety issues may be neglected, as the number of personnel involved in activities will be significantly reduced compared to the land preparation and construction phases.

Gender Based Violence, Harassment and Inequalities

During the operation phase of the motorway project, although the workforce will be significantly reduced compared to the construction phase, certain risks related to Gender Based Violence, Harassment, and Gender Inequalities may still persist, particularly in relation to toll booth operators, maintenance personnel, subcontracted workers, and public interactions at service areas.

In Türkiye, women and men continue to face unequal access to economic opportunities. Leadership roles are predominantly held by men, and women may experience exclusion from decision-making processes, making them more vulnerable to gender-based risks, even during the operation phase.

Women employed during operation may still face risks of discrimination, particularly in terms of unequal access to employment opportunities or being confined to specific roles such as clerical or service-based work. Ensuring equal treatment during hiring, assignment of duties, and provision of working conditions remains essential.

Moreover, gender-responsive occupational health and safety practices must continue during the operation phase. Personal Protective Equipment (PPE) and uniforms should be available in appropriate sizes and designs for both women and men to avoid discomfort or additional safety risks.

Although accommodation camps are not expected during the operation phase, facilities such as rest areas, toll stations, and administrative units should include adequate and safe sanitation infrastructure, well-lit areas, and privacy measures for female employees, in line with the Project's Gender Action Plan (GAP).

Due to its tourism-driven and export-oriented economy, the province of Antalya is a highly frequented region with significant population mobility. This dynamic leads to frequent and diverse interactions among different social groups, which may increase the risks of gender-based violence, harassment, and inequality.

In this context, the risk level of gender-based violence, harassment, and inequality during the operation phase of the Project is assessed as high.

Supply Chain

During the operation phase of the highway project, supply chain-related risks are expected to be lower compared to the construction phase but still require ongoing monitoring. Key risks are primarily associated with outsourced services such as routine road maintenance, toll operations, security, cleaning, and landscaping. These activities may involve informal or short-term employment arrangements, especially among low-skilled or migrant workers, creating potential risks related to underpayment, lack of social security, excessive working hours, or poor occupational health and safety conditions.

In addition, procurement of consumables and spare parts (e.g., paints, lubricants, road marking materials, and electronic equipment) may involve supply chain transparency risks, including unethical sourcing, or limited oversight on labor conditions in the supply chain. The risk of non-compliance with

labor standards can increase over time if supplier and contractor performance is not regularly reviewed.

Child Labor and Forced Labor

During the operation phase of the motorway project, although the intensity of procurement and subcontracting activities is lower compared to the construction phase, certain risks related to child labor and forced labor within the supply chain may still exist, particularly in relation to service providers such as cleaning, maintenance, toll operations, security, and facility management companies.

In line with IFC Performance Standard 2, the presence of child labor and the involvement of youth aged 16-18 in hazardous work must continue to be proactively mitigated through the implementation of appropriate contractual provisions, supplier assessments, and ongoing monitoring efforts. Although the likelihood of such incidents may be reduced through these measures, their potential impact on affected individuals would remain significant if they occur.

Managing these risks throughout the operational supply chain is a critical element of the Project's social responsibility commitments and international compliance requirements. Promoting awareness and capacity building among subcontractors and service providers on the prevention of child and forced labor will contribute to long-term positive outcomes and reputational sustainability.

The implementation of effective mitigation measures is expected to substantially reduce the risk of forced labor, making such cases rare. Nevertheless, if such cases do arise, the adverse effects on individuals highlight the continued need for effective redress and support mechanisms.

For the operation phase, the overall risk related to child labor and forced labor is assessed as moderate, depending on the strength of supply chain oversight and contractor performance monitoring.

Workers' Welfare and Facility Conditions

During the operation phase of the motorway project, the need for large-scale worker accommodation (e.g., campsites) will significantly decrease; however, the welfare and working conditions of the personnel responsible for toll operations, routine maintenance, emergency response, cleaning, and security must still be carefully managed. Ensuring that these workers have access to basic and safe facilities - such as clean restrooms, break rooms, and shelter from adverse weather - is essential to protect their health, safety, and overall morale.

Although full dormitory facilities may no longer be required, staff working in shifts or in remote locations (e.g., toll booths, maintenance depots, or roadside service areas) should be provided with clean and adequately ventilated rest areas. These facilities must comply with national hygiene regulations and be equipped to prevent health issues that may arise from poor sanitation, insufficient water supply, or inadequate temperature control.

Additionally, maintaining basic first-aid services, communication systems, and secure storage areas for personal belongings or work equipment is necessary to support worker safety and comfort. Even during the operation phase, the risk of fatigue, accidents, and health issues can remain if rest and hygiene needs are not properly addressed - especially for shift workers performing repetitive or prolonged tasks.

Ensuring that workplace facilities support personal hygiene, provide privacy, and allow workers to take breaks under appropriate conditions will contribute to both compliance with international standards (e.g., IFC/EBRD) and the long-term operational efficiency of the Project.

Physical and Chemical Hazards

Road maintenance personnel, as the workers on foot, may be exposed to physical hazards during the operation phase of the Project. Similar to the construction phase, operation, maintenance and landscaping personnel working on the Motorway may be subject to the chemical hazards due to exhaust emissions of the vehicles driving on the road or passing through the toll plazas or due to hazardous dust or asphalt fumes generated during activities such as pavement, painting, vegetation removal.

The ineffective implementation of the Emergency Preparedness and Response Plan (EPRP) prepared within the scope of the Project may lead to various hazards and risks. Failure to implement occupational health and safety (OHS) measures may lead to adverse impacts on employees' health and safety.

Emergency Preparedness and Response

The ineffective implementation of the Emergency Preparedness and Response Plan (EPRP) prepared within the scope of the Project may lead to various hazards and risks. Failure to implement occupational health and safety (OHS) measures may lead to adverse impacts on employees' health and safety.

The exclusion of OHS rules, emergency preparedness measures, and response procedures from trainings may lead to the occurrence of accidents and the escalation of minor emergencies. This situation may endanger the health and safety of employees, nearby settlements, and road users.

XVI.4. Mitigation Measures

Project Sponsor will strictly comply with the requirements of the Turkish Labor Law and Occupational Health and Safety Regulation regarding the management of occupational health and safety risks and protection of the health and safety of Project workers including the direct and contracted personnel. Additionally, Project's policy on Labor, Employment and Occupational Health and Safety are described in the Environmental and Social Management System (see Chapter 20 in the ESIA), which will be implemented during the land preparation, construction and operation phases of the Project to ensure compliance with international standards on labor and working conditions. Contracted workers and Project Sponsor will also be required to comply with the Project policy on Labor, Employment and Occupational Health and Safety through contractual requirements.

Project Sponsor will ensure that the sub-contractors have the technical capability to manage the occupational health and safety issues of their employees. Accordingly, all the sub-contractors who will be involved in the Project will be required to be subject to the same contractual conditions with the Project Sponsor in the issue of occupational health and safety and will be required to implement Project's occupational health and safety policies.

Regarding the labor conditions, sub-contractors will be subject to the same contractual conditions with the Project Sponsor. Duration of the contracts to be made with the sub-contractors will not exceed the duration of BOT Contract.

In the management of occupational health and safety hazards, preventive and protective measures will be taken in the following order of priority in accordance with the following approach as recommended by IFC both during the construction and operation phases of the Project:

- The activity causing the hazard will be eliminated from the work process;
- Hazard will be controlled at its source through use of engineering controls.
- Hazard will be minimized through design of safe work systems and administrative or institutional control measures.
- Appropriate personal protective equipment (PPE) will be provided in conjunction with training, use, and maintenance of the PPE.

With effective implementation of occupational health and safety measures including compliance with the requirements of the relevant regulations, implementation of safe practices and procedures when conducting assignments, provision of occupational health and safety trainings, proper use of PPE and monitoring of occupational health and safety impacts, number of accidents/incidents would be effectively reduced and associated risks with significant consequences are likely to be well managed throughout the construction and operation phases of the Project.

A comprehensive grievance mechanism has been established to enable Project workers to submit their complaints and suggestions (see Annex-9 in the ESIA). Under this mechanism, all workers (including contractor and supply chain workers) will be able to raise their grievances through a dedicated phone hotline, the Project website, complaint boxes located at the Project site, or through national-level channels (e.g., GİMER, YİMER, and the Social Security Institution). The grievance mechanism includes an anonymous option to safeguard against retaliation. In addition, complaint boxes will be placed in areas without cameras (e.g., changing rooms) to prevent the identification of complainants.

Sensitive grievances will be addressed under a specific procedure (see Table XVI.11). A confidentiality-based approach will be adopted for the complainant, case-specific remedial actions will be developed, and additional preventive measures will be implemented to avoid recurrence.

XVI.4.1. Land Preparation and Construction Phases

Land preparation and construction phases will involve a significant number of workforces, including both direct and contracted workers. Accommodation will be provided at campsites in the scope of the Project. Thus, promotion of safe and healthy working conditions and provision of good labor and accommodation conditions will be important during this phase of the Project. Good management of the potential issues would positively affect not only the quality, efficiency and productivity but also the reputation of the Project and its Sponsor.

Retrenchment of the construction workforce following the completion of construction activities will be done in compliance with all legal and contractual requirements.

Gender Based Violence, Harassment and Inequalities

Table XVI.9 presents comprehensive and systematic measures that need to be implemented to prevent and manage risks related to gender-based violence, harassment, and inequalities that may arise within the scope of the project. These measures aim not only to ensure occupational health and safety but also to establish social justice and equality, thereby guaranteeing that the project is conducted in accordance with principles of social responsibility and sustainability.

Separate accommodation will be organized for female employees based on the requirements of the Gender Action Plan (GAP) developed for the Project which will include lockable doors and windows, well maintained lighting throughout the facilities and measures to avoid overcrowding and lack of privacy (for example: enough women-only bathrooms and changing rooms).

Table XVI.9 Measures taken under GBVH

Risk Area	Detailed Measures to be Taken
Community and Workforce Management	Regularly monitor the volume and demographic profile of the workforce and analyses social impacts (CLO). Enhance security measures in worker camps and surrounding areas; establish social cohesion and support mechanisms. Cooperate with local authorities and NGOs.
Awareness and Training	Implement culturally and gender-sensitive training programs on GBVH for workers and local communities. Trainings should cover definitions of violence and harassment, prevention methods, and reporting mechanisms. Prepare training materials in accessible formats.
Policies to Combat Violence and Harassment	Establish and enforce clear zero-tolerance GBVH policies throughout the project. Create safe, confidential, and accessible complaint mechanisms. Ensure rigorous follow-up and response to reported incidents. Assign trained personnel to handle cases sensitively and effectively.
Equal Employment and Non-Discrimination	Ensure women are assessed fairly and equally during recruitment. Prevent limiting women to traditional roles; support their access to diverse job positions. Guarantee equal pay, working hours, and social benefits. Promote a culture of equality in the workplace.
Gender-Appropriate OHS Equipment	Provide personal protective equipment (PPE) specifically designed for women. Prevent women from using equipment designed for men. Ensure PPE is ergonomic and comfortable. Provide separate rest and hygiene facilities for women.
Separate Accommodation for Women	Provide separate, secure, and private accommodation for female workers per the Gender Action Plan (GAP) requirements. Ensure lockable doors and windows, adequate lighting, and ventilation. Provide sufficient women-only toilets, showers, and changing rooms. Implement measures to avoid overcrowding and protect privacy.

Occupational Training Measures to Prevent Gender-Based Violence, Harassment and Inequalities

All workers engaged in the project will be required to attend mandatory training sessions on gender-based violence, sexual exploitation and abuse (SEA), and workplace harassment. The training will be delivered by qualified professionals prior to site mobilization and repeated at regular intervals. Attendance will be monitored, and understanding will be assessed. The training program will be supported by a worker Code of Conduct (see Annex-15 in the ESIA) and a confidential grievance mechanism.

To prevent the occurrence of gender-based violence and harassment (GBVH), including sexual exploitation and abuse (SEA) and sexual harassment (SH), all project-related workers (including contractors, subcontractors, and third-party service providers) will receive mandatory awareness and behavioral training aligned with the requirements of IFC PS2, EBRD PR2, and national labor law.

The training details are provided in Table XVI.10.

Table XVI.10 Training Details

Scope of Training	
Mandatory for	**Training will cover**
All site workers (construction, security, transport) Contractor and subcontractor staff Community Liaison Officers and site managers	Definitions and examples of GBVH, SEA, and SH Acceptable and unacceptable workplace behavior Protection against infectious and non-infectious disease risks Power dynamics and gender sensitivity. Reporting channels and protections for whistleblowers. Sanctions and zero-tolerance policy
Timing and Frequency	
Initial onboarding (before starting work on-site) Refresher training every 6 months during construction phase Ad-hoc sessions in case of reported incidents or high-risk observations	
Trainer and Method	
Delivered by	**Method**
A certified gender and GBVH specialist (external consultant or NGO) Or by in-house E&S staff trained in GBVH prevention	Separate sessions for workers and supervisors Gender-segregated sessions where culturally appropriate Role-playing, visuals, and storytelling-based learning for low-literacy participants o Language support (e.g., interpretation for migrant workers)
Monitoring and Compliance	
Training attendance logs and feedback forms collected Random post-training assessments for understanding Monitoring included in contractor performance reviews Non-compliance may result in removal from site	
Integration into Code of Conduct (see Annex-15 in the ESIA)	
All workers must sign a Code of Conduct that includes: Zero tolerance for GBVH Clear disciplinary measures Commitment to report witnessed abuse	

Under the Antalya-Alanya Motorway Project, GBVH training is mandatory for all personnel and aims to raise awareness on key issues such as gender equality, power dynamics, and sexual exploitation and abuse (SEA/SH). The training targets all site workers-including contractors, subcontractors, security, and transportation staff-as well as Community Liaison Officers and site managers.

The curriculum covers definitions and examples of GBVH, acceptable and unacceptable workplace behavior, protection against infectious and non-infectious diseases, grievance mechanisms and whistleblower protections, and sanctions under a strict zero-tolerance policy.

Training sessions will be conducted during the onboarding process, before workers begin duties on site, and will be repeated every six months throughout the construction phase. In addition, ad-hoc sessions will be arranged in response to any reported incidents or increased risk levels. Training will be delivered by certified GBVH specialists (either external consultants or NGOs) or by in-house environmental and social (E&S) staff trained in GBVH prevention. Where culturally appropriate,

separate sessions will be organized for male and female participants. Interactive methods such as role-playing, visual materials, and storytelling will be used to support participants with limited literacy. Language interpretation will be provided for migrant or non-native-speaking workers.

To ensure traceability and effectiveness, attendance logs will be maintained, knowledge assessments will be conducted post-training, and participant satisfaction will be monitored. Training compliance will be integrated into contractor performance reviews, and failure to participate may result in removal from the site. All workers will be required to sign a Code of Conduct that outlines the Project's zero-tolerance approach to GBVH, specifies disciplinary consequences, and emphasizes the duty to report any witnessed abuse or misconduct.

Gender-Based Violence and Harassment (GBVH) Incident Response Procedure

The procedure to be followed in the event of a workplace incident is provided in Table XVI.11

Table XVI.11 GBVH Response Procedure

GBVH Response Procedure
Reporting
The employee can report a harassment incident through one of the following channels: - Female Community Liaison Officer (CLO) and Social Chief - A trusted mediator (colleague, female manager, female security guard, female CLO) - Anonymous complaint boxes - Human Resources Department (with confidentiality guaranteed) Complaints can be made anonymously or by name; both types are taken seriously and handled with care.
Initial Response and Safety
The CLO or relevant unit shall: - Immediately assess the physical and psychological safety of the complainant. - If necessary, arrange for the temporary reassignment of the complainant to another unit. - Apply temporary suspension or separation measures for the alleged perpetrator if appropriate.
Investigation
- An impartial internal audit team or external expert shall carry out the investigation. - All parties involved will be interviewed, and witnesses (if any) will be heard. - The process will be conducted confidentially; only directly involved individuals will be informed. - The investigation is targeted to be completed within a maximum of 14 working days.
Resolution
Based on the outcome of the investigation, the following actions may be taken: - Disciplinary sanctions (warning, reprimand, suspension, dismissal) - Reassignment of either or both parties - Referral for psychological support - Cooperation with local authorities (if the case involves criminal behavior)
Follow-up & Monitoring
- After the incident, periodic check-ins will be conducted to monitor the complainant's safety and psychological condition. - A satisfaction survey regarding the complaint process may be conducted. - Preventive training sessions will be implemented in the relevant units to avoid recurrence
Prevention and Training
Regular training will be provided to all employees on the following topics: - GBVH awareness and rights - Information on the reporting and response process - Guidelines for respectful communication and behavior - Empathy and inclusive behavior training for all employees

Child Labor and Forced Labor

- Within the scope of the project, clear and binding policies will be established to prevent child labor and forced labor throughout all stages of the supply chain, especially in high-risk areas.
- Age verification and identity checks will be mandatory in recruitment and procurement processes, with rigorous field and management inspections to enforce compliance.
- Contracts with suppliers and subcontractors will explicitly prohibit child labor and forced labor, and sanctions will be applied in cases of violation.
- The obligations under IFC Performance Standards, ILO conventions, and Turkey's national labor legislation will be fully adopted and implemented.
- All project stakeholders will be recognized as socially responsible parties in preventing child labor and forced labor, and this commitment will be integrated into the project culture.
- Field managers and relevant personnel (Community Liaison Officers - CLOs) will be equipped and tasked with identifying and reporting potential violations.
- Special audit and support units focused on this issue (CLOs) will be established within the project to effectively manage risks in the supply chain.
- Employees' identity information, working conditions, and wage rights will be transparently and reliably recorded.
- All personnel will be ensured to receive a copy of the Code of Conduct document and their employment contract.
- Overtime will be carried out on a voluntary basis, and the annual legal limit of 270 hours will be strictly observed.

Supply Chain

To address supply chain risks, the Contractor Management Plan includes a specific section on supply chain management, which outlines procedures for:

- Screening and selecting suppliers based on their compliance with national labor laws and international labor standards,
- Requiring suppliers to sign a code of conduct or contract clauses committing to the prohibition of child and forced labor,
- Monitoring supplier performance through audits, inspections, or grievance mechanisms, where applicable,
- Taking corrective actions or terminating contracts with suppliers found in breach of labor requirements.

In addition, the Project will ensure that:

- Procurement contracts contain clauses aligned with the core principles of IFC PS2;
- Tenders and procurement documents emphasize the requirement for ethical labor practices;
- Workers employed by suppliers have access to grievance mechanisms either directly through their employer or, where possible, through the Project's established grievance channels. (Confidentiality and anonymity will be fully maintained.)

Child Labor and Forced Labor in the Supply Chain

- The Project Sponsor will oversee whether suppliers comply with all applicable child labor laws and will only permit the employment of workers who meet the applicable minimum legal age requirements; this practice will be in accordance with international standards.
- Contractor agreements will specify the contractor's right to monitor and audit all main contractors and subcontractors under the project, and the consequences they face if found to be in violation of national legal requirements, international standards, policies, or contractual clauses related to forced labor. Furthermore, the main contractor agreements will explicitly state that their subcontractors and suppliers must also comply with the same standards.
- All contractor agreements will clearly state the requirement to comply with Turkish legislation and international standards related to child labor for the project.

Practices such as identity checks at project site entrances and the complete recording of personal identification details in the visitor logbook will be utilized to enable the early detection of child labor and forced labor cases. Security personnel will be specifically informed and sensitized on this critical issue. A worker's ability to present their own identification is an indication that their ID has not been confiscated by a third party for the purpose of forced labor. Additionally, verifying the date of birth on the identification document serves as an effective measure for the early detection of child labor.

General Workers Accommodation Measures

The campsites will include facilities such as cafeteria, medical room, showers and toilets, wastewater treatment plants/septic tanks, water supply facilities (i.e. water well). Concrete plants will be located at the campsites; asphalt and mechanical plants will be sited at campsites and close to the quarries to the extent feasible (see Chapter 3 in the ESIA for the description of campsites). General measures to be taken at the workers accommodation facilities will be as follows:

- The accommodation to be provided will be clean and safe and meet the basic needs of workers, providing minimum amounts of space for each worker; sanitary, laundry and cooking facilities. Overcrowding will be avoided.
- Heating, air-conditioning and ventilation will be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.
- Drinking water to be provided to Project workforce and water to be supplied to food preparation, washing and bathing areas will meet the requirements of the Regulation on Water Intended for Human Consumption.
- Adequate lavatory facilities (toilets, urinals, washbasins and showers) will be provided for the number of people expected to work in the facility and allowances will made for indicating whether the toilet facility is "In Use" or "Vacant". Toilet facilities will also be provided with adequate supplies of hot and cold running water, soap, and hand drying devices.
- Domestic wastewater and waste to be produced at campsites will be properly managed and disposed of in line with the requirements of relevant Turkish regulations as well as good site practices described in this ESIA Report (see Chapter 8 for the management of wastes; see Chapter 7 for the management of wastewater).
- First aid and medical facilities as well as provisions for safety against potential hazards (fire, etc.) will be provided at the campsites.
- Residents of the campsites will be made aware of any rules governing the accommodation.
- Project's Grievance Mechanism to be established will provide means to the Project personnel to express their complaints. Project Sponsor will ensure that the workers are informed of the grievance mechanism at the time of recruitment and make it easily accessible to them.
- Camp-related waste will be managed in accordance with relevant Waste Management Plans (e.g., solid waste, wastewater, hazardous waste, zero waste).

- Emergency response equipment will be available on-site in compliance with legal requirements to respond to fire, medical, and environmental emergencies.
- Access to and from the camp site will be controlled in accordance with the provisions outlined in the Security Management Plan.
- Hygienic and legally compliant meal service areas will be established within the camp to meet workers' nutritional and health needs.
- Adequate quantities of safe and hygienic drinking water will be supplied and maintained at all times in compliance with national health regulations.
- Toilet, shower, laundry, changing, and dressing areas will be provided in sufficient quantity, in hygienic conditions, and in accordance with legal requirements.
- Comfort conditions (ventilation, lighting, heating, etc.) in on-site office buildings will be ensured in line with applicable occupational health and safety regulations.
- A drainage system will be installed across the camp site to prevent water accumulation and runoff, in accordance with relevant legislation.
- Legally compliant medical units and first-aid equipment will be established within the camp site and made readily accessible to all personnel.
- Workshop areas (such as those used for equipment maintenance and repair) within the camp will be managed to prevent adverse impacts on the environment, community, and worker health.
- Waste and hazardous materials generated in these areas will be stored separately in sealed, leak-proof containers and in designated enclosed areas, in line with related management plans.
- Measures will be taken to prevent the release of contaminants into soil and water, including the implementation of spill containment protocols and secondary containment systems.
- Building materials used in worker accommodation will comply with applicable fire safety and hygiene regulations.
- Accommodation units will be positioned at a reasonable distance from active construction zones to ensure worker safety and comfort.
- Legally compliant drainage and wastewater collection systems will be installed to prevent contamination risks within worker living areas.
- Safe, clean, and adequate drinking water will be provided in all worker accommodation areas in line with national hygiene standards.
- Comfort conditions-such as ventilation, lighting, and heating-will be ensured in worker housing to meet seasonal needs and legal requirements.
- Systems for the organized collection and disposal of domestic and operational waste will be established, including clearly designated bins and regular collection services.
- Routine pest control will be implemented to maintain sanitary conditions in worker accommodation facilities.
- Each worker will be assigned a personal bed, and all rooms will be equipped with operable windows, secure door locks, and pest prevention measures.
- Separate storage areas for personal protective equipment, including boots and other gear, will be provided to avoid cross-contamination and ensure organization.
- Regular cleaning of sleeping quarters and bedding will be carried out to maintain hygiene and prevent health issues.
- Toilets and sleeping quarters will be located within the same building to enhance accessibility, safety, and convenience for workers.

Worker accommodation areas, where large numbers of people live in close proximity for extended periods, pose a high risk for the transmission of infectious diseases. In the event of an outbreak during the site preparation and construction phases of the Project, the Project Sponsor will implement the following measures to ensure appropriate accommodation conditions:

- Entry of infected individuals into worker accommodation will be strictly prohibited, and where necessary, such individuals will be quarantined in accordance with the applicable national health regulations.

- Common surfaces, including the interiors of worker transport vehicles, workbenches, floors, walls, and shared areas, will be considered potentially contaminated and will be disinfected regularly.

Retrenchment

To minimize the adverse socioeconomic impacts of workforce downsizing following the completion of the construction phase, a Retrenchment Plan will be prepared in line with IFC Performance Standard 2. This plan will be developed through consultation with affected workers and shared transparently with all personnel at least three months prior to the transition to the operation phase. Regular information sessions will be held in coordination with labor representatives and local authorities. All employment terminations will follow fair, lawful, and non-discriminatory procedures, and workers will receive all legally due severance payments, entitlements, and benefits in a timely and complete manner.

Support will be provided to affected personnel through re-employment assistance programs. In cooperation with public employment agencies, vocational training centers, or local institutions, job placement support, resume writing and interview workshops, and short-term skill-building trainings will be offered. Additional support mechanisms will be designed for vulnerable groups such as women, persons with disabilities, elderly workers, or migrant laborers. Furthermore, access to counseling services should be provided to help workers manage psychological stress and uncertainty caused by sudden job loss.

The Project's existing Grievance Mechanism (GM) will be updated to include retrenchment-related issues during the retrenchment process. A designated person within the Community Liaison Team will ensure safe, confidential, and timely handling of complaints. To monitor the long-term impacts of retrenchment, a post-employment tracking system should be established to follow up on livelihood conditions of a representative sample of retrenched workers over time, and to evaluate the effectiveness of support mechanisms. This comprehensive approach aims to protect labor rights, ensure social responsibility, and maintain the Project's long-term social sustainability.

Measures against Physical Hazards

- Safe work zone will be established to separate workers on foot from the traffic.
- For the construction works to be conducted at location where traffic exists, safe work zones will be established by taking relevant measures (closure of roads, diversion of traffic, use of protective barriers, cones, warning lights, etc.)
- The area around which elevated work is taking place will be barricaded to prevent unauthorized access and working under personnel on elevated structures will be avoided.
- Hoisting and lifting equipment will be rated and properly maintained, and operators trained in their use. Elevating platforms will be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings), equipment movement protocols (e.g. movement only when the lift is in a retracted position), repair by qualified individuals, and installation of locks to avoid unauthorized use by untrained individuals.
- Ladders will be used according to pre-established safety procedures for proper placement, climbing, standing, as well as the use of extensions.
- When working at height, proper fall protection measures will be implemented. Fixtures will be installed on bridge components. Safety belts with proper thickness and of suitable materials ensuring sufficient strength will be used. Rope safety belts will be replaced before signs of aging or fraying of fibers become evident. When operating power tools at height, workers will use a second (backup) safety strap.
- Personnel exposed to high levels of noise will be required to use personal hearing protection devices/equipment that will be provided by the Project Sponsor at no cost. Where required for specific works, work rotation programs will be implemented to reduce cumulative exposure.

- Weather forecasts will be monitored for outdoor work to provide advance warning of extreme weather and schedule the work accordingly. Protective clothing will be used where required.

Measures against Chemical Hazards

- Properly maintained construction machinery, equipment and vehicles will be used to minimize exhaust emissions.
- Engine idling time will be reduced in construction sites.
- Direct diesel exhaust will be properly redirected to minimize exposure of the operators.
- Indoor working areas where vehicles or engines are operated will be ventilated or the exhaust gases will be properly diverted.
- Lead-containing paint will be avoided and appropriate respiratory protection will be used when cutting galvanized steel.
- Hazardous materials will be replaced with a less hazardous substitute whenever feasible.
- Engineering and administrative control measures will be performed in order to prevent or reduce the release of hazardous materials into the work site. Level of exposure will be kept below internationally established or recognized limits.
- The number of workers to be exposed will be kept in minimum.
- Hazardous materials will be labeled and marked properly considering national and international regulations and guidelines. Materials Safety Data Sheets (MSDS) will be prepared. All written communication will be readable and available to workers to be exposed and first-aid personnel.
- Workers will be trained in use of information related to hazardous materials (MSDSs etc.), safe work practices and appropriate use of PPE.
- Spill kits must be available, placed in easily accessible locations, and regularly inspected.
- Emergency showers and eyewash stations must be installed to provide workers with rapid response capability against chemical splashes and spills.
- Incompatible chemicals (e.g., acids and bases, oxidizers and flammables) must be stored in separate compartments or containers.
- Chemicals must be stored in sealed, capped containers made of appropriate materials.
- Storage areas must be ventilated, well-lit, and protected from direct sunlight.
- Secondary containment systems (e.g., leak-proof pallets, collection basins) must be in place in storage areas.
- Fire extinguishers of the appropriate type (e.g., ABC or CO_2 extinguishers for chemical fires) must be provided and kept in easily accessible locations.
- Warning and safety signs (flammable, toxic, corrosive, etc.) must be posted at the entrance of storage areas and on shelves.
- Only authorized personnel must be allowed to enter the storage area.
- Evacuation procedures must be visibly posted in the storage area.

The details of the chemicals to be used in the project are provided in Table XVI.12.

Table XVI.12 The details of the chemicals to be used in the Project

Chemicals	
Hydraulic Oil	Hydraulic oil is considered low-risk; however, prolonged or repeated skin contact may lead to irritation and eye discomfort. During handling, chemical-resistant gloves, protective goggles, and long-sleeved clothing should be used. In cases where vapor concentration may occur, respiratory protection is advised. Spills should be contained using absorbent materials such as dry sand or vermiculite and must not be allowed to enter soil or sewage systems.
AdBlue	AdBlue has low toxicity but may cause mild skin and eye irritation. At high temperatures, it may release ammonia gas, requiring caution in enclosed spaces. In the event of a spill, the product should be contained using absorbent materials like sand or soil to prevent environmental contamination. Recommended PPE includes nitrile gloves, protective goggles, chemical-resistant clothing, and ammonia/NOx-compatible respirators.
Mould Release Oil	This product poses a significant health hazard if swallowed or inhaled due to its aspiration toxicity. It may also irritate the skin and eyes. Spills should be cleaned with sawdust or absorbent materials and kept away from drains or soil. Personal protective measures should include nitrile or neoprene gloves, face shields, and masks suitable for hydrocarbon vapors.
Magnesium Sulfate	Generally considered non-hazardous, magnesium sulfate may cause mild irritation if inhaled as dust. Contact with skin and eyes may result in mechanical irritation. Spilled material should be collected with a shovel and disposed of properly, followed by thorough washing with water. Dust masks, safety gloves, goggles, and protective clothing are advised.
Methylene Blue Solution	This chemical is toxic and flammable. It can cause organ damage if swallowed, inhaled, or absorbed through the skin. In case of a spill, absorbent materials should be used and disposed of as hazardous waste. PPE must include full safety goggles, chemical-resistant gloves, antistatic protective clothing, and an ABEK-type respirator for vapors.
Diesel Fuel	Diesel fuel poses significant health hazards, including suspected carcinogenicity, and may cause toxicity through inhalation and skin contact. Symptoms include dermatitis, dizziness, nausea, and CNS depression. Spills should be isolated, absorbed with inert materials, and handled by trained personnel. Appropriate PPE includes a vapor-resistant mask (type A), hydrocarbon-resistant gloves and clothing, and face shields.
Sika Sigunit L-25 (Shotcrete Additive)	Due to its high alkalinity, this shotcrete accelerator may cause skin and eye irritation. It should be applied in closed systems where possible, and any contact surfaces should be washed thoroughly with water. Protective goggles, gloves, and long-sleeved clothing are required during application to prevent splashes.
Trichloroethylene	Trichloroethylene is a highly hazardous chemical classified as carcinogenic and potentially mutagenic. It may cause eye and skin irritation and central nervous system effects if inhaled. Use is restricted to trained personnel under strict controls. PPE includes chemical-resistant suits, gloves, sealed goggles, and A-type respirators or SCBA units. Spills must be absorbed with suitable materials and disposed of as hazardous waste.

General Occupational Health and Safety Measures

Following additional measures will be taken in accordance with the KGM's Technical Specifications for Motorways to avoid and/or minimize risks due to moving equipment and vehicles or works to be conducted at height or elevated/overhead works:

- Project Sponsor will ensure that qualified first-aid can be provided at all times at the working/construction sites.
- Adequate lightning (that would not distract drivers' sight) will be provided for works to be conducted at night-time. Lightning system will be moved forward in parallel to the progress of works.
- All the vehicles that will operate at night will have yellow colored overhead flashlights that will be activated during the time of works.
- Good cooperation with the local medical services will be ensured.
- A system will be established for the reporting and recording of occupational accidents and dangerous occurrences/incidents.
- Personal protective equipment/devices (PPE/PPD) and seasonal working outfits, meeting the requirements of the relevant Turkish regulations and good site practices, will be provided to all construction personnel by the Project Sponsor at no cost. Effective use of the PPEs/PPDs by the construction personnel will be monitored and ensured by the Project Sponsor.
- Sub-contractor workers will also be strictly required to use necessary PPEs/PPDs by means of contractual stipulations to be done with the sub-contracting companies.

- In the selection of personal protective equipment (PPE), suitability to the individual as well as compatibility with the nature of the work and specific working conditions (e.g., location, time, and environmental factors) will be ensured.
- In addition to having first aid equipment and H&S Committe in theProject Area, it is recommended to cooperates with private hospitals in the surrounding area, as these measures may not be enough in possible situations.

The risks related to the project site and the measures taken against these risks are presented in Table XVI.13.

Table XVI.13 Site Risks and Occupational Health and Safety (OHS) Measures

Risk Area	OHS Measures
Traffic and Equipment Safety	Use of cameras, alarms, and flagmen for mobile equipment. Temporary traffic management plans implemented.
Working at Heights	Double-hook harnesses, safety nets, scaffold checks, and health clearance for workers.
Excavation and Tunneling	Slope stability analysis, shoring systems, tunnel ventilation, and gas monitoring.
Material Transport and Blasting	Dust control during transport, secure loading, and explosive handling by certified personnel only.
Fire and Chemical Safety	Fire stations, controlled storage of flammables, PPE use for hot asphalt and chemicals.
Dust and Noise Exposure	Use of respirators, hearing protection, regular environmental monitoring.
Emergency Preparedness	EPRP, mobile medical unit, evacuation routes and drills.
Worker Camps	Safe accommodation, hygiene control, clean water, waste management, and grievance mechanisms.

Occupational Health and Safety Trainings

Training of the Project workers and other personnel including the management, supervisors, and even occasional visitors is a key measure in reducing the number of accidents during the land preparation and construction phases. Basic occupational health and safety orientation trainings will be provided to all new personnel including direct and contracted workers, management, supervisors and occasional visitors. These trainings will include specific occupational health and safety subjects that include, but not limited to the following:

- Basic site rules and hazard awareness
- Hygiene requirements
- Potential risks to health
- Site-specific hazards
- Safe work practices
- Knowledge of materials, equipment and tools
- Wearing and use of protective equipment and clothing
- Hazards of working on foot around equipment and vehicles;
- Preventing injury to fellow workers
- Safe practice for work at night and in other low-visibility conditions (e.g. use of high-visibility safety apparel and proper illumination for the work space while controlling glare)
- Emergency procedures (e.g. during fires, natural disasters, etc.)

In addition to orientation trainings, all the direct and contracted workers will be provided with relevant trainings prior to commencement of new assignments (change of workplace/task, change of working machinery and equipment, introduction of new technologies, etc.). Workers with rescue and first-aid duties will be provided with dedicated training. Through appropriate contract specifications and monitoring, Project Sponsor will ensure that service providers, as well as contracted and subcontracted labor, are trained adequately before assignments begin.

A visitor orientation and control program will be established to ensure visitors do not enter hazard areas unescorted. In this respect, relevant checkpoints and record keeping practices will be used for ensuring both safety of the works and the visitors.

The training program to be organized by the project sponsor for its personnel is presented in Table XVI.14

Table XVI.14 Training program to be organized for personnel

Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
1.Orientation Training / Induction Training							
Orientation Training	1-Introduction of the Project 2-Project OHS and Environmental Rules 3-Duties, Authorities, and Responsibilities 4-Emergencies, Emergency Response Methods, and Actions to Take in Emergencies 5-Hazards and Risks in the Work Area, Precautions Against These Hazards and Risks, Safe Working Methods, and Establishing Safe Working Environments	All Newly Recruited Employees	Visual Training Presentation (Before each new worker starts working on site)	2 Hours	Every Month	Training Room	Until the Basic OHS trainings are provided, employees are informed about the Project, made aware of the OHS and Environmental rules and instructions that must be implemented in the Project, and are aimed to gain knowledge about the hazards and risks in the work areas, the precautions to be taken against these hazards and risks, and the necessary actions in case of emergencies.
2.Basic Occupational Health and Safety Trainings							
General Topics	a) Information on labor legislation b) Legal rights and responsibilities of employees c) Workplace cleanliness and order d) Legal consequences of occupational accidents and diseases e) Use of Personal Protective Equipment (PPE) f) General Occupational Health and Safety rules and safety culture	All Newly Recruited Employees	Relevant Legal Requirements and Procedures	2 Hours	Every Month	Training Room, Worksite	At the time of recruitment (in-person/remote) and at one-year intervals, the trainings specified under General Occupational Health and Safety topics are provided to employees and documented. Following the training, it is expected that employees will demonstrate changes in behavior regarding occupational health and safety knowledge and safe working methods, and they will be subject to supervision.
		All Employees	Toolbox Talks				
Health Topics	a) Causes of occupational diseases b) Principles of disease prevention and implementation of protection techniques c) Biological and psychological risk factors d) First aid e) Harmful effects of tobacco products and passive exposure	All Newly Recruited Employees	Special Training Documents			Training Room, Worksite	
		All Employees	Toolbox Talks				
Technical Topics	a) Chemical, physical, and ergonomic risk factors b) Flammability, explosion, fire, and fire prevention c) Working with display screen equipment d) Safety and health signs e) General occupational health and safety rules, safety culture, and behavior-based OHS	All Newly Recruited Employees	Special Training Documents			Training Room, Worksite	
		All Employees	Toolbox Talks				
	Safe Manual Lifting and Handling	Newly Recruited Employees and All Employees	Special Training Documents	30 Minutes	Every Month	Training Room, Worksite	Employees are informed about the hazards and risks involved in manual lifting and handling activities, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods for manual lifting and handling. A change in behavior is expected following the training.
			Toolbox Talks	15 Minutes			
	Safe Use of Work Equipment	Newly Recruited Employees and All Employees	Special Training Documents	30 Minutes	Every Month	Training Room, Worksite	Users of work equipment are informed about the potential hazards and risks that may arise during the use of such equipment, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods based on the equipment's user manual. It is expected that the equipment will be used safely following the training.
			Toolbox Talks	15 Minutes			
	Electrical hazards, risks, precautions, electrical hand tools, and cable management	Newly Recruited Employees and All Employees	Special Training Documents	30 Minutes	Every Month	Training Room, Worksite	Users of electrical hand tools are informed about electrical hazards and risks in the work areas, as well as the safe use of electrical hand tools.
			Toolbox Talks	15 Minutes			
	Causes of Occupational Accidents, Legal Responsibilities, and Reporting	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the causes of occupational accidents, the legal responsibilities of managers and workers, and the legislation related to the reporting of occupational accidents.
			Toolbox Talks	15 Minutes			
	Evacuation and Rescue	Newly Recruited Employees and All Employees	Specialized Training Documents	30 Minutes	Every Month	Training Room, Worksite	In situations requiring evacuation, employees are informed about the necessary actions to quickly reach the assembly point from the work areas.
			Toolbox Talks	15 Minutes			
Other Topics	Safe Working at Heights	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the existing hazards and risks associated with working at heights, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods at heights. Compliance with rules and instructions is expected.
			Toolbox Talks	15 Minutes			
	Safe Working in Confined/Restricted Spaces/Environments	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the existing hazards and risks in confined/restricted spaces, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods for tasks performed in confined/restricted spaces. Compliance with instructions is expected.
			Toolbox Talks	15 Minutes			
	Safe Working During Hot Work (Welding, Grinding, Cutting, etc.)	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the existing hazards and risks during hot work (welding, grinding, cutting), the necessary OHS precautions to be taken against these hazards and risks, and safe working methods for hot work activities.
			Toolbox Talks	15 Minutes			
	Safe Working with Chemical Substances	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the hazards and risks of the chemicals used according to their SDS (Safety Data Sheets) forms, as well as the necessary OHS precautions to be taken against these hazards and risks. Compliance with instructions is expected.
			Toolbox Talks	15 Minutes			
	Safe Working in Areas with Radiation Risk	Newly Recruited Employees and All Employees	Specialized Training Documents	30 Minutes	Every Month	Training Room, Worksite	Employees are informed about radiation-related hazards and risks, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods in radiation areas.
			Toolbox Talks	15 Minutes			

Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
	Safe Working in Lifting Operations	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the hazards and risks related to lifting machines and equipment or lifting operations, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods during lifting operations.
			Toolbox Talks	15 Minutes			
	Working with Special Risk Equipment	Newly Recruited Employees and All Employees	Specialized Training Documents	30 Minutes	Once every 2 months	Training Room, Worksite	Users of special risk or specific work equipment are informed about the safe use of the machine/equipment they will operate before starting work.
			Toolbox Talks	15 Minutes			
	Potential Health Risks Caused by Carcinogenic Substances	Newly Recruited Employees and All Employees	Specialized Training Documents	30 Minutes	Every Month	Training Room, Worksite	Lists of materials with carcinogenic effects are prepared, their SDS (Safety Data Sheets) are obtained, and employees are provided with training on safe working methods related to these materials.
			Toolbox Talks	15 Minutes			
	Safe Working at Night/In the Dark	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Once every 2 months	Training Room, Worksite	Employees are informed about the hazards and risks that may occur in environments without daylight or in darkness, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods for working at night or in the dark.
			Toolbox Talks	15 Minutes			
	Safe Working in Excavation Operations	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the hazards and risks involved in all excavation works, as well as the measures to be taken to eliminate or reduce these hazards and risks to an acceptable level. They are expected to apply this knowledge in practice
			Toolbox Talks	15 Minutes			
	Safe Working in Tunnel Operations	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the existing hazards and risks in energized areas (mechanical, electrical), the precautions to be taken against these hazards and risks, and safe working methods.
			Toolbox Talks	15 Minutes			
	Return-to-Work Training for Employees Who Have Experienced a Work Accident or Occupational Disease	Employees Who Have Experienced a Work Accident or Contracted an Occupational Disease	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees who have experienced a work accident or contracted an occupational disease are informed about the root causes of the accident or disease, and all employees are educated to prevent similar incidents from occurring in the future.
			Toolbox Talks	15 Minutes			
3.Emergency Training							
General Emergency Training	Emergency Response Plan Training of Emergency Teams Training on Emergency Response Methods Testing of Response Plans (Drills) and Subsequent Performance Evaluation	All Employees, Emergency Teams	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Emergency teams are informed about their duties, authorities, and responsibilities in potential emergency situations according to the emergency response plan. Practical field drills are conducted to reinforce the training.
			Toolbox Talks	15 Minutes			
First Aid	First Aid Training (Certified)	First Aiders	Legal Requirements	3 Days	Once every 3 months	Training Room	First aid personnel are provided with information about their duties, authorities, and responsibilities, and their qualifications are documented.
Fire Safety	Fire Formation, Types of Fire Extinguishers, and Their Use	All Employees	Specialized Training Documents	1 Hour	Once a month for 4 months	Training Room, Worksite	Employees are informed about fire formation, combustible materials, fire prevention methods, types of fire extinguishers, and fire-fighting techniques. They are expected to know how to respond in the event of a fire.
			Toolbox Talks	15 Minutes			
4.Risk Assessment Trainings							
Risk Assessment	Concept of hazard and risk Identification of hazards in the workplace Evaluation of risks arising from hazards Risk assessment Elimination of risks or reduction to an acceptable risk level	Risk Assessment Team and All Employees	Specialized Training Documents	1 Hour	Once a month for 6 months	Training Room, Worksite	The risk assessment team and employees are informed about the identification, analysis, and evaluation of hazards and risks that may arise in all ongoing project activities, as well as the implementation of OHS measures. A change in OHS awareness is expected.
			Toolbox Talks	15 Minutes			
5.Specialized Trainings							
Visitor Training	Hazards and risks that guests and visitors may encounter in the work area, the precautions to be taken to protect against these hazards and risks, safe working practices, and safe working environments.	Guests and Visitors	Special Training Documents	1 Hour	Every Month	Training Room	Personnel who come to the work area as visitors, guests, etc. are informed about the hazards and risks in the work area, the precautions to be taken to protect against these hazards and risks, and safe working environments.
Training of Apprentices, Interns, and Individuals Requiring Special Policies	Apprentices, interns, and individuals requiring special policies are informed about the project, the rules to be followed within the project, their specific rules and instructions, working conditions, and hazards and risks in the work areas.	Apprentices and Interns	Special Training Documents	2 Hour	Every Month	Training Room	Hazards and risks in the work area, the OHS measures to be implemented against these hazards and risks, and safe working methods are communicated to apprentices, interns, and individuals requiring special policies by the relevant personnel when they start working.
Hygiene Training	Training and information for personnel involved in cleaning and food handling on prevention of infectious diseases and skin conditions.	Kitchen and Cleaning Staff	Authorized Organization/Person	8 Hour	Once	Training Room	Canteen, tea kitchen, and cleaning staff are expected to comply with hygiene rules.
Employee Representative / Support Staff	Duties, Authorities, and Responsibilities of Employee Representatives and Support Staff	Employee Representatives, Support Staff	Special Training Documents	1 Hour	Twice	Training Room	Designated employee representatives and support staff are informed about their duties, authorities, and responsibilities.
Occupational Health and Safety (OHS) Committee Training	Duties and authorities of the committee National legislation and standards on OHS Common occupational accidents and their causes Basic principles of occupational hygiene Communication techniques Emergency measures Occupational diseases Specific risks related to workplaces Risk assessment	OHS Committee Members	Relevant Legal Requirements and Special Training Documents	2 Hours	Once	Training Room	Occupational Health and Safety committee members are informed about their duties, authorities, and responsibilities as defined in the relevant legislation. They are expected to perform and implement their roles accordingly throughout the committee's term.
Safe Driving Training	Project-specific rules and instructions regarding the safe use of company vehicles	All Personnel Who Drive Vehicles	Relevant Legal Requirements and Special Training Documents	1 Hour	First 3 months, then twice	Training Room, Worksite	All personnel driving vehicles on the project are informed about the driving rules they must follow, and compliance with the specified

Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
							rules and instructions is expected.
6.Environmental Trainings							
Environmental Cleanliness and Waste Management	Legal legislation and project plans and procedures related to environmental cleanliness and waste management	All Employees	Documents specially prepared for the training content: ● Solid Waste Management Plan and Hazardous Materials Management Plan ● Relevant legal legislation ● Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	Employees are informed about the disposal of waste in the work area, housekeeping and waste management procedures in the work areas, and the existing procedures are explained to them. A change in behavior is expected.
Environmental Emergency Management	What are environmental emergencies? Which procedures should be followed? What actions need to be taken? What are the duties, authorities, and responsibilities of employees?	All Employees	Documents specially prepared for the training content: ● Emergency Management Plan ● Relevant legal legislation ● Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	Communication and response methods during environmental emergencies are explained.
Biodiversity Awareness and Code of Conduct	What are the sensitive areas and species that may be encountered within the project sites? What should the rules be for working in natural environments? What actions should be taken when encountering fauna species within the site or during transportation? What are the endemic species in and around the project area? What measures should be taken to protect wildlife?	All Employees	Documents specially prepared for the training content: ● Biodiversity Action Plan ● Relevant legal legislation ● Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	The precautions to be taken in field operations are explained according to the Biodiversity Management Plan prepared for the project.
Water and Energy Efficiency	What is efficiency in water consumption? What is efficiency in energy consumption? What is the importance of saving water and energy for the project, the country, and the world? How can individuals contribute to water and energy efficiency?	All Employees	Documents specially prepared for the training content: ● Water, Wastewater, and Surface Water Management Plan ● Relevant legal legislation ● Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	During the project, both on-site and in camp areas, the necessary actions to be taken regarding water and energy efficiency are explained.
Rules for Communication with the Community	What are the general characteristics of the local population in the area? What should be considered when establishing communication with the community? Are there any local communities specific to the project area and its surroundings? If so, what are the important points to consider when communicating with these communities? What are the correct communication methods within the construction site?	All Employees	Documents specially prepared for the training content: ● Stakeholder Engagement Plan ● Public Health and Safety Management Plan ● Human Resources and Employee Management Plan ● Relevant legal legislation ● Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	The rules for communication with the community are explained throughout the duration of the project.
Grievance Mechanism	What is a grievance mechanism? What is the purpose of the grievance mechanism? Who are the persons responsible for the grievance mechanism? Explanation of how employees can submit all their requests, demands, and complaints, including their personal rights and living standards, to the company.	All Employees	Documents specially prepared for the training content: ● Stakeholder Engagement Plan ● Relevant legal legislation ● Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	Both project employees and stakeholders affected by the project are informed about how to submit complaints related to the project and how to follow up on the outcomes.

**This program has been prepared for the year 2025 and will be updated accordingly.*

Use of Personal Protective Equipment's (PPEs)

Within the scope of the Project, Personal Protective Equipment (PPE) will be considered as an additional protection measure for workers, complementing all technical and administrative measures taken to prevent and reduce potential risks on the construction site. Appropriate PPE will be identified based on the type of work performed and the potential hazards to which workers may be exposed, and it will be provided to all personnel in need. In order to ensure the correct and effective use of PPE, a training program will be organized, with mandatory participation for all relevant personnel. This training will be compulsory for all new personnel prior to starting work and should be organized once within the first three months of the project and then repeated at least twice per year. The training will include topics such as the correct selection, wearing, removal, cleaning, and storage of PPE.

The Project will be carried out in compliance with the Turkish Law on Occupational Health and Safety and the Regulation on the Use of Personal Protective Equipment in Workplaces, which is aligned with relevant European Union Directives. All PPE will bear CE certification and meet EU standards. The use of PPE will be tailored to different work areas and job types across the site. For example, workers on high structures such as bridges and viaducts will use double-hook safety harnesses and fall arrest systems; those working with hot asphalt or welding will wear heat-resistant gloves, welding masks, and fireproof aprons. Tunnel workers will be equipped with gas masks and headlamps, while reflective vests and proper lighting systems will be used for night shifts. Personal protective equipment (PPE) appropriate to the risks associated with electrical works will be provided to personnel engaged in such tasks. In work situations that require special safety precautions -such as working alone or near water- supervisors will be required to exercise due diligence and ensure that all relevant safety measures are fully implemented.

In areas where heavy machinery is operated, visible safety measures will be implemented to reduce risks of collision or crushing. These include placing warning signs and safety barriers around active machinery zones and assigning flaggers to guide operations. Additionally, all machinery operating in reverse will be equipped with audible warning systems, and spotters will be deployed in low-visibility areas. Records related to PPE use, safety briefings, and trainings will be kept up to date and monitored regularly. Any nonconformities identified will be promptly corrected, and occupational health and safety practices will be continuously improved.

Emergency Preparedness and Response

In response to potential emergency situations that may occur at construction and campsite areas (e.g., fire, explosion, natural disasters, chemical spills, occupational accidents), the necessary preparedness and response measures will be implemented in line with:

- Law No. 6331 on Occupational Health and Safety (Türkiye)
- The Regulation on Emergency Situations in Workplaces (Official Gazette No. 28681, dated 18.06.2013)
- IFC Performance Standard 1 (Assessment and Management of Environmental and Social Risks and Impacts)
- ILO Convention No. 155 on Occupational Safety and Health

In this context, emergency scenarios specific to site-related risks have been developed, and the corresponding Emergency Preparedness and Response Plan has been prepared and is presented in Annex-3 in this ESIA. The plan outlines procedures for protecting the safety of workers, contractors, and visitors, minimizing environmental damage, and ensuring timely and effective response and recovery actions.

All employees will receive training on emergency procedures, and regular practical drills will be conducted. In addition, the plan will be reviewed and updated periodically to ensure its continued effectiveness. Physical emergency preparedness measures - including fire suppression systems, first aid stations, evacuation routes, and designated assembly points - will be installed across all active sites. Responsibilities of relevant emergency personnel will be clearly defined and communicated.

XVI.4.2. Operation Phase

Some of the occupational health and safety measures described for the land preparation and construction phases for the mitigation of physical and chemical hazards, provision of occupational health and safety trainings, use of PPE and etc. would also be applicable for the management of operation phase risks and thus be implemented during the operation phase. Specific measures for the operation phase risks and impacts are described below. Regarding the management of emergencies, measures specified in the Emergency Preparedness and Response Plan will be implemented.

In accordance with the related terms of the BOT contract, Project Sponsor will ensure that the operation and maintenance personnel are properly trained in their specialty and successfully completed the necessary security investigations. Operation and Maintenance Plan will be submitted to the KGM according to the time set in BOT contract. In accordance with the related terms of the BOT contract, 1 year ahead of the end of the contract duration, personnel designated by the KGM will be trained by the Project Sponsor on the aspects related with the operation and maintenance works of the Motorway.

Sub-contractors to be involved in the operation of service areas will be subject to the same contractual conditions with the Project Sponsor, sub-contractors will be required to comply with occupational health and safety measures that are set by the Project Sponsor.

Gender Based Violence, Harassment and Inequalities

All employees and contractors are required to acknowledge and comply with the Project Sponsor's environmental and social work practices; additionally, they must report safety hazards, unsafe working conditions, unacceptable situations, and environmental and social issues in accordance with the Code of Conduct and Zero Tolerance Policy. Furthermore, the Project Sponsor will appoint a suitable CLO to ensure gender-responsive practices across different policies.

All contractor agreements will explicitly state the requirement to comply with Turkish legislation and the Project Sponsor's health and safety standards and policies. Contracts must also include clauses requiring contractors to adhere to the Project Sponsor's GBVH policies; these clauses should clearly specify the specific GBVH risks and agreed measures to address them, emphasizing the Project Sponsor's zero-tolerance approach toward GBVH.

Training and orientation programs focused on respecting local communities and vulnerable populations will be organized. These programs will place special emphasis on gender, human rights, and GBVH awareness, providing clear guidelines to create a safe environment for women and children.

Monitoring systems will be established to ensure regular reporting on GBVH. These systems will include confidential and anonymous grievance mechanisms, complaint referral processes, and support provisions for workers. Personnel responsible for handling complaints will receive specialized training on conducting GBVH-related investigations and providing appropriate responses.

In addition to the Code of Conduct and Zero Tolerance Policy, the project has tools such as the Security Management Plan, Gender Action Plan, and Labor Management Plan to ensure the prevention of GBVH. These plans also include grievance mechanisms to facilitate communication regarding any potential incidents throughout the construction and operation phases of the project.

The Gender-Based Violence and Harassment (GBVH) procedures and related measures implemented during the construction phase will remain applicable throughout the operation phase. The Project Sponsor has adopted a formal policy to reflect its commitment and sensitivity on this matter. This policy aims to ensure that employees' opinions and complaints are taken seriously, that complaint processes are conducted transparently with strict confidentiality for the complainant, and that appropriate measures are in place to prevent any form of retaliation against individuals who submit complaints. In this context, the policy seeks to maintain a safe, inclusive, and accessible working environment for all personnel.

Supply Chain

During highway operations, most supply-chain exposure arises from outsourced services (road maintenance, toll-booth operation, cleaning/landscaping, security) and the periodic purchase of consumables and spare parts. To manage these risks, the Project Sponsor will:

- Extend PS2 clauses and the Project Code of Conduct to all long-term maintenance and service agreements, including sub-tiers.
- Carry out an annual E&S audit of high-risk service providers, focusing on working hours, wage payment, social security registration, migrant-worker protection and occupational health & safety.
- Require suppliers of paints, lubricants, electronics and road-marking materials to provide traceability and compliance declarations.
- Keep grievance channels open to subcontracted workers and track any supply-chain-related complaints through to resolution, reporting trends in the annual ESG report.
- Provide refresher training to procurement and contract-management staff on supply-chain due-diligence procedures and red-flag indicators of child or forced labor.

These measures collectively ensure that labor and working-condition risks in the supply chain remain controlled and that the Project continues to comply with IFC PS2 throughout the asset's life-cycle.

Child Labor and Forced Labor

In order to eliminate the risks of child labor and forced labor during the operation phase, the Project Sponsor will implement a comprehensive set of measures. The zero-tolerance policy against child and forced labor will remain in effect throughout the operation period and will be clearly reflected in binding contractual provisions with all service providers. These contracts will explicitly state requirements such as minimum working age, prohibition of employing young workers in hazardous activities, the principle of voluntary employment, and appropriate working conditions.

Regular social compliance audits will be conducted for service providers operating in areas such as cleaning, security, toll operations, maintenance, and facility management. Identity verification and age control procedures will be strictly enforced. In the event of any violations, corrective action plans will be implemented, and repeated non-compliance may result in contractual termination.

In addition, awareness-raising training sessions on the prevention of child labor and forced labor will be organized for managers and HR personnel of contractors and subcontractors. These trainings will cover national legislation, IFC Performance Standard 2, and the ethical principles of the Project Sponsor in detail.

Confidential, accessible, and, if necessary, anonymous grievance mechanisms will be maintained throughout the operation phase, ensuring a safe and non-retaliatory process for raising concerns. An independent monitoring system will also be established to ensure timely and impartial handling of complaints.

Finally, at least once a year, a risk assessment related to child and forced labor will be conducted for all active contractors during the operation phase. The results of these assessments will be documented by the Project Sponsor and used in internal audits and stakeholder reporting. This integrated approach aims to ensure compliance with international standards and uphold the long-term social responsibility commitments of the Project.

Workers' Welfare and Facility Conditions

During the operation phase of the motorway project, the need for large-scale worker accommodation (e.g., campsites) will significantly decrease; however, the welfare and working conditions of the personnel responsible for toll operations, routine maintenance, emergency response, cleaning, and security must still be carefully managed. Ensuring that these workers have access to basic and safe facilities -such as clean restrooms, break rooms, and shelter from adverse weather- is essential to protect their health, safety, and overall morale.

Although full dormitory facilities may no longer be required, staff working in shifts or in remote locations (e.g., toll booths, maintenance depots, or roadside service areas) should be provided with clean and adequately ventilated rest areas. These facilities must comply with national hygiene regulations and be equipped to prevent health issues that may arise from poor sanitation, insufficient water supply, or inadequate temperature control.

Additionally, maintaining basic first-aid services, communication systems, and secure storage areas for personal belongings or work equipment is necessary to support worker safety and comfort. Even during the operation phase, the risk of fatigue, accidents, and health issues can remain if rest and hygiene needs are not properly addressed -especially for shift workers performing repetitive or prolonged tasks.

Ensuring that workplace facilities support personal hygiene, provide privacy, and allow workers to take breaks under appropriate conditions will contribute to both compliance with international standards (e.g., IFC/EBRD) and the long-term operational efficiency of the Project.

General Occupational Health and Safety Measures

Occupational health and safety (OHS) measures implemented during the operation phase are critically important not only for protecting the workforce but also for ensuring the safety of road users. As toll booth personnel, maintenance crews, and control center operators are continuously exposed to specific operational risks, adequate ventilation, ergonomic workstations, carbon monoxide monitoring, high-visibility equipment, and effective traffic management are essential. Maintaining strong emergency response capacity and safe working conditions enhances service quality and helps prevent accidents that could result in injury, loss of life, or reputational damage to the operator. Therefore, sustaining a robust safety culture throughout the operation phase is fundamental to the long-term success of the project.

Operational Phase OHS Measures are given in Table XVI.15.

Table XVI.15 Operational Phase OHS Measures

Risk Area	OHS Measures
Routine Road Maintenance	Temporary lane closures, traffic signs, lighting for night work, and visibility clothing for workers.
Toll Booth Safety	Ventilation and air filtration systems in toll cabins, carbon monoxide exposure monitoring.
Control Center Operations	Ergonomic furniture, screen time management, and indoor air quality controls.
Emergency Response on Road	Deployment of rapid intervention teams, satellite communications, and portable traffic signs.
Worker Comfort	Ventilation, heating, lighting systems in operational buildings and rest areas.

Measures against Physical Hazards

Following measures will be taken to ensure safety during the road maintenance or landscaping works:

- Safe work zones will be established to separate workers on foot from the traffic by using proper methods/devices (e.g. use of protective barriers, traffic cones, barrels)
- When possible, traffic will be rerouted to alternative roads.
- Proper land closure or traffic diversion measures will be taken, in consideration of the width of the road.
- Protective barriers will be used to shield workers where required.
- Traffic flow will be primarily regulated by warning lights and use of flaggers will be avoided where possible.
- Maximum speed limits will be reduced in the work zones.
- Blind spots will be avoided to the maximum extent possible by means of proper design of the work space.

Measures against Chemical Hazards

- Machines with ventilation systems should be used to protect workers from dust and asphalt fumes, and these systems should be regularly maintainedCorrect asphalt product will be used for each specific application and application at the correct temperature will be ensured to reduce the fuming of bitumen during normal handling.
- Adequate ventilation will be provided in necessary areas with limited natural air circulation.
- Tollbooths will be equipped with proper ventilation and air filtration systems.
- Protective clothing will be used when working with cutbacks (a mixture of asphalt and solvents for the repair of pavement), diesel fuel, or other solvents.
- Appropriate respiratory protection will be used when removing paints.

Emergency Preparedness and Response

While the current Emergency Preparedness and Response Plan (EPRP) has been developed specifically to address emergency scenarios associated with construction and campsite activities, it is acknowledged that the risks and emergency contexts during the operation phase of the motorway differ significantly. Therefore, a separate and dedicated Emergency Preparedness and Response Plan will be developed for the operation phase. This plan will consider risks such as road traffic accidents, vehicle fires, hazardous material spills during transport, medical emergencies at toll booths or rest areas, and security incidents.

The operational phase EPRP will be prepared in line with national legislation, IFC Performance Standards, and best international practices, ensuring the protection of road users, operation and maintenance personnel, and surrounding communities. It will include clearly defined emergency scenarios, response protocols, roles and responsibilities, communication strategies, and coordination mechanisms with local emergency services. Regular training and emergency drills will also be implemented for relevant operational personnel to ensure preparedness and rapid response capacity throughout the operational period of the motorway.

The EPRP will be finalized at least three months prior to the commencement of the operation phase.

XVI.5. Summary of Assessment and Residual Impacts

Project-related occupational health and safety risks would be minimized by taking relevant design, operational and administrative measures and implementation of an Emergency Preparedness and Response Plan, which meet the international requirements. Control of risks caused by third parties is more challenging, but they can also be properly mitigated by means of good management, contractual obligations and effective monitoring. Summary of the labor and working conditions risk assessments are presented in Table XVI.16.

Table XVI.16. Summary of the Assessments on Labor and Working Conditions

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
Land Preparation and Construction Phase												
Poor accommodation conditions resulting on safety hazards, spread of disesases and reduced level of morale	Project Personnel	Adverse	Restricted	Medium	Medium (personnel will not be localized but distributed along the linear route and campsites, quarries, etc.)	Short-term reversible	Continous	Moderate (B)	High (3)	High (B3)	• The accommodation to be provided will be clean and safe and meet the basic needs of workers, providing minimum amounts of space for each worker; sanitary, laundry and cooking facilities. Overcrowding will be avoided. • Heating, air-conditioning and ventilation will be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time. • Drinking water to be provided to Project workforce and water to be supplied to food preparation, washing and bathing areas will meet the requirements of the Turkish Regulation on Water Intended for Human Consumption. • Adequate lavatory facilities (toilets, urinals, washbasins and showers) will be provided for the number of people expected to work in the facility and allowances will made for indicating whether the toilet facility is “In Use” or “Vacant”. Toilet facilities will also be provided with adequate supplies of hot and cold running water, soap, and hand drying devices. • Domestic wastewater and waste to be produced at campsites will be properly managed and disposed of in line with the requirements of relevant Turkish regulations as well as good site practices described in this ESIA (see Chapter 7 for the management of wastes; see Chapter 8 for the management of wastewater). • First aid and medical facilities as well as provisions for safety against potential hazards (fire, etc.) will be provided at the campsites. • Residents of the campsites will be made aware of any rules governing the accommodation. • Project’s Grievance Mechanism to be established will provide means to the Project personnel to express their complaints. Project Sponsor will ensure that the workers are informed of the grievance mechanism at the time of recruitment and make it easily accessible to them. • Project Sponsor prevents infected persons from entering workers’ accommodations areas, and if applicable or necessary, quarantine these persons per local regulations and/or recommendations from relevant international organizations. • Common surfaces, including ones in vehicles transporting workers from their accommodations to the workplace, counters, floors, and walls, should be treated as potentially contaminated and be cleaned regularly.	Low
Supply Chain	Project Personnel	Adverse	Restricted	Long	High	Long-term reversible	Continous	Restricted (C)	High (3)	High (B3)	• The Contractor Management Plan will be followed during the land preparation and construction phase of the project. • Procurement contracts contain clauses aligned with the core principles of IFC PS2; • Tenders and procurement documents emphasize the requirement for ethical labor practices; • Workers employed by suppliers have access to grievance mechanisms either directly through their employer or, where possible, through the Project’s established grievance channels.	Low
Child Labor	Project Personnel	Adverse	Restricted	Long	High	Long-term reversible	Continous	Restricted (C)	High (3)	High (B3)	• Within the scope of the project, clear and binding policies will be established to prevent child labour and forced labour throughout all stages of the supply chain, especially in high-risk areas. • Age verification and identity checks will be mandatory in recruitment and procurement processes, with rigorous field and management inspections to enforce compliance. • Contracts with suppliers and subcontractors will explicitly prohibit child labour and forced labour, and sanctions will be applied in cases of violation. • The obligations under IFC Performance Standards, ILO conventions, and Turkey’s national labor legislation will be fully adopted and implemented. • Field managers and relevant personnel (Community Liaison Officers - CLOs) will be equipped and tasked with identifying and reporting potential violations. • Special audit and support units focused on this issue (CLOs) will be established within the project to effectively manage risks in the supply chain. • Employees’ identity information, working conditions, and wage rights will be transparently and reliably recorded.	Low
Gender Based Violence and Harassment	Local communities, Project Personnel	Adverse	Restricted	Long	High	Long-term reversible	Continous	Moderate (B)	High (3)	High (B3))	• Develop and enforce zero-tolerance GBVH policies; provide training and support services • Ensure equal employment opportunities and non-discriminatory practices; monitor recruitment and working conditions • Provide gender-specific PPE; organize separate accommodation complying with GAP standards • Strengthen social safeguards; community awareness and monitoring	Low
Phsyical and chemical hazards due to operation of	Project Personnel	Adverse	Restricted	Medium	Medium (machinery /	Short term reversible	Intermittent	Moderate (B)	High (3)	High (B3)	• Emergency Preparedness and Response Plan will be implemented.	Low

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
heavy vehicles, earthworks, exposure to noise, emissions					activities will not be localized but distributed along the linear route, use of chemicals will be limited)						• Hazardous materials will be replaced with a less hazardous substitute whenever feasible. • Engineering and administrative control measures will be performed in order to prevent or reduce the release of hazardous materials into the work site. Level of exposure will be kept below internationally established or recognized limits. • The number of workers to be exposed will be kept in minimum. • Hazardous materials will be labeled and marked properly considering national and international regulations and guidelines. Materials Safety Data Sheets (MSDS) will be prepared. All written communication will be readable and available to workers to be exposed and first-aid personnel. • Workers will be trained in use of information related to hazardous materials (MSDSs etc.), safe work practices and appropriate use of PPE. • Safe work zone will be established to separate workers on foot from the traffic. • For the construction works to be conducted at location where traffic exists, safe work zones will be established by taking relevant measures (closure of roads, diversion of traffic, use of protective barriers, cones, warning lights, etc.) • The area around which elevated work is taking place will be barricaded to prevent unauthorized access and working under personnel on elevated structures will be avoided. • Hoisting and lifting equipment will be rated and properly maintained, and operators trained in their use. Elevating platforms will be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings), equipment movement protocols (e.g. movement only when the lift is in a retracted position), repair by qualified individuals, and installation of locks to avoid unauthorized use by untrained individuals. • Ladders will be used according to pre-established safety procedures for proper placement, climbing, standing, as well as the use of extensions. • When working at height, proper fall protection measures will be implemented. Fixtures will be installed on bridge components. Safety belts with proper thickness and of suitable materials ensuring sufficient strength will be used. Rope safety belts will be replaced before signs of aging or fraying of fibers become evident. When operating power tools at height, workers will use a second (backup) safety strap. • Personnel exposed to high levels of noise will be required to use personal hearing Protection devices/equipment that will be provided by the Project Sponsor at no cost. Where required for specific works, work rotation programs will be implemented to reduce cumulative exposure. • Weather forecasts will be monitored for outdoor work to provide advance warning of extreme weather and schedule the work accordingly. Protective clothing will be used where required. • Properly maintained construction machinery, equipment and vehicles will be used to minimize exhaust emissions. • Engine idling time will be reduced in construction sites. • Direct diesel exhaust will be properly redirected to minimize exposure of the operators. • Indoor working areas where vehicles or engines are operated will be ventilated or the exhaust gases will be properly diverted. • Lead-containing paint will be avoided and appropriate respiratory protection will be used when cutting galvanized steel. • At work sites where dust levels are excessive, dust masks will be used by relevant personnel.	
Emergencies such as accidents, fires, natural hazards, etc.	Project Personnel	Adverse	Restricted	Medium	Medium	Short-Term Reversible	One-off	Moderate (B)	High (3)	High (B3)		Low
Emergencies such as accidents, fires, natural hazards, etc.	Project Personnel	Adverse	Restricted	Medium	High	Irreversible	One-off	Moderate (B)	High (3)	High (B3)		Low
Retrenchment of construction workforce at the end of construction phase	Project Personnel	Adverse	Restricted	Short	High	Short-term reversible	One-off	Moderate (B)	Medium (2) (Since the Project will not cause retrenchment of personnel from an existing workplace but from a Project construction with predefined limited duration sensitivity of personnel is asummed as medium instead of high)	Medium (B2)	• Retrenchment of the construction workforce following the completion of construction activities will be done in compliance with all legal and contractual requirements. • A Retrenchment Plan in compliance with IFC PS2 will be prepared and implemented during the retrenchment process.	Low
Operation Phase												
Phsyical and chemical hazards during road maintenace and landscaping works.	Project personnel and/or subcontractor personnel	Adverse	Restricted	Long	Medium (stationary personnel, road maintenance personnel and workers on foot)	Long-term reversible	Continous	Restricted (C)	Low (1)	Low (C1)	• In accordance with the related terms of the BOT contract, Project Sponsor will ensure that the operation and maintenance personnel are properly trained in their specialty and successfully completed the necessary security investigations. Operation and Maintenance Plan will be submitted to the KGM 4 months ahead of the start of Motorway's operation. In accordance with the related terms of the BOT contract, 1 year ahead of the end of the contract duration, personnel designated by the KGM will be trained by the Project Sponsor on the aspects related with the operation and	Negiligible

Definition of Potential Impact	Affected Ecosystem Component	Type of Impact	Impact Magnitude						Sensitivity/Value of Resource/Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts
			Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude				
											maintenance works of the Motorway. • Sub-contractors to be involved in the operation of service areas will be subject to the same contractual conditions with the Project Sponsor, sub-contractors will be required to apply occupational health and safety measures to be taken by the Project Sponsor. • Safe work zones will be established to separate workers on foot from the traffic by using proper methods/devices (e.g. use of protective barriers, traffic cones, barrels) • When possible, traffic will be rerouted to alternative roads. • Proper land closure or traffic diversion measures will be taken in consideration of the width of the road. • Protective barriers will be used to shield workers where required. • Traffic flow will be primarily regulated by warning lights and use of flaggers will be avoided where possible. • Maximum speed limits will be reduced in the work zones. • Blind spots will be avoided to the maximum extent possible by means of proper design of the work space. • Pavers with exhaust ventilation systems will be used and proper maintenance of such systems will be ensured to maintain worker exposure to crystalline silica (millers and grinders) and asphalt fumes (pavers) below applicable occupational exposure levels. • Correct asphalt product will be used for each specific application and application at the correct temperature will be ensured to reduce the fuming of bitumen during normal handling. • Adequate ventilation will be provided in necessary areas with limited natural air circulation; • Tollbooths will be equipped with proper ventilation and air filtration systems; • Protective clothing will be used when working with cutbacks (a mixture of asphalt and solvents for the repair of pavement), diesel fuel, or other solvents. • Appropriate respiratory protection will be used when removing paints..	
Gender Based Violence and Harassment	Project personnel and/or subcontractor personnel	Adverse	Restricted	Long	High	Long-term reversible	Continous	Moderate (B)	High (3)	High (B3))	• Develop and enforce zero-tolerance GBVH policies; provide training and support services • Ensure equal employment opportunities and non-discriminatory practices; monitor recruitment and working conditions • Provide gender-specific PPE; organize separate accommodation complying with GAP standards • Strengthen social safeguards; community awareness and monitoring	Low
Child Labor	Project personnel and/or subcontractor personnel	Adverse	Restricted	Long	High	Long-term reversible	Continous	Restricted (C)	High (3)	High (B3)	• Within the scope of the project, clear and binding policies will be established to prevent child labour and forced labour throughout all stages of the supply chain, especially in high-risk areas. • Age verification and identity checks will be mandatory in recruitment and procurement processes, with rigorous field and management inspections to enforce compliance. • Contracts with suppliers and subcontractors will explicitly prohibit child labour and forced labour, and sanctions will be applied in cases of violation. • The obligations under IFC Performance Standards, ILO conventions, and Turkey's national labor legislation will be fully adopted and implemented. • Field managers and relevant personnel (Community Liaison Officers - CLOs) will be equipped and tasked with identifying and reporting potential violations. • Special audit and support units focused on this issue (CLOs) will be established within the project to effectively manage risks in the supply chain. • Employees' identity information, working conditions, and wage rights will be transparently and reliably recorded.	Low
Supply Chain	Project personnel and/or subcontractor personnel	Adverse	Restricted	Long	High	Long-term reversible	Continous	Restricted (C)	High (3)	High (B3)	• Extend PS2 clauses and the Project Code of Conduct to all long-term maintenance and service agreements, including sub-tiers. • Carry out an annual E&S audit of high-risk service providers, focusing on working hours, wage payment, social security registration, migrant-worker protection and occupational health & safety. • Require suppliers of paints, lubricants, electronics and road-marking materials to provide traceability and compliance declarations. • Maintain a live supplier risk register to capture changes in ownership, workforce profile or geographic risk (e.g., influx of migrant labour, conflict-affected sourcing). • Keep grievance channels open to subcontracted workers and track any supply-chain-related complaints through to resolution, reporting trends in the annual ESG report. • Provide refresher training to procurement and contract-management staff on supply-chain due-diligence procedures and red-flag indicators of child or forced labour.	Low

XVII. CUMULATIVE IMPACT ASSESSMENT

Project-level environmental and social impacts of the project have been evaluated in the previous sections of this ESIA Report. This Section aims to assess the potential cumulative impacts that may arise from incremental impacts from other past, current or future (reasonably foreseeable) developments/activities implemented or planned in the region.

XVII.1. Definitions, Methodology Assessment and Data Sources

XVII.1.1. Definitions

Cumulative Impact

The Cumulative Impact Assessment (CIA) study to be undertaken under this ESIA will follow the core principles of the International Finance Corporation's (IFC, August 2013) Good Practice Handbook (IFC, August 2013) that is one of the most recent and up-to-date work on the Cumulative Impact Assessment and Management Guidelines. It compiles the most comprehensive document available to CIA practitioners and key approaches to the assessment of cumulative impacts from key reference documents. Additional key references to be used in the assessment will include:

- Sample Guidelines: Cumulative Environmental Impact Assessment for Hydropower Projects in Turkey (ESMAP, 2012) published under the World Bank's Energy Sector Management Assistance Programme,
- Cumulative Impact Assessment and Management Guidelines published by the International Association for Impact Assessment (IAIA) (Canter L. and William R., 2009; http://www.iaia.org/),
- European Commission's (EC) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (May, 1999),
- Canadian Environmental Assessment Agency (Hegmann, GC Cockling, R. Creasey, S. Dupuis, Kennedy, L. Kingsley, W. Rodd, H. Spaling and D. Stalker; February, 1999).

The International Finance Corporation (IFC) defines cumulative impacts as “Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as “developments”) when added to other existing, planned, and/or reasonably anticipated future ones.” (IFC, August 2013).

Cumulative impacts occur in the form of interaction. This interaction can be between actions and/or between actions and environmental components. The magnitude of the cumulative impacts may equal the sum of the individual effects (aggregate effect) or result in an incremental effect (synergistic effect) (World Bank, June 2012). Several independent activities/projects/developments with insignificant effects on their own can together cause a cumulative impact that can be significant (EC, May 1999; see Figure XVII.1).

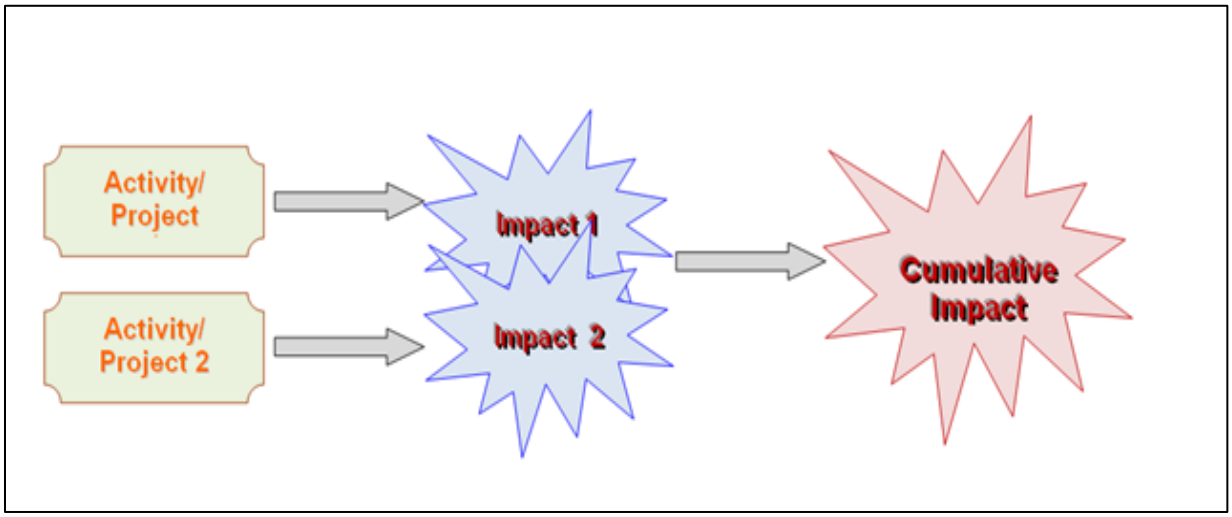


Figure XVII.1 Illustration of Cumulative Impacts (adapted from EC, May 1999)

Valued Ecosystem Components (VECs)

Valued Ecosystem Components that is one of the main components of cumulative impact assessment processes are defined as “Any part of the environment that is considered important by the proponent, public, scientists or government involved in the assessment process.” (Hegmann et al., 1999).

In the cumulative impact assessment, the environmental and social impacts and risks of a project or activity are determined through VECs. VECs may include the following environmental and social elements. (IFC, August):

- Physical features, habitats, wildlife populations (e.g., biodiversity),
- Ecosystem services,
- Natural processes (e.g., water and nutrient cycles, microclimate),
- Social conditions (e.g., health, economics), or
- Cultural aspects (e.g., traditional spiritual ceremonies).

Area of Impact

The concept of “Area of Impact” in the CIA process (named CIA in this report) describes the boundaries of the spatial area where the assessment will be made, as in an EIA study. Area of impact is defined as the minimum study area where EIA and/or CIA for a project will be carried out (World Bank, June 2012; World Bank ESMAP, December 2012).

Identifying spatial boundaries is one of the key and most challenging stages of the CIA process. Spatial boundaries should be determined by striking an appropriate balance, taking into account the budget, available data, practical constraints, and the geographic and temporal dimensions of complex environmental interactions (World Bank, June 2012; World Bank ESMAP, December 2012).

Limits of Acceptable Change and Limit Values

Since thresholds play a key role in determining the severity of impacts, setting thresholds is an important process for both assessing and managing cumulative impacts. Thresholds are limits where cumulative change becomes a concern when exceeded, and can also be expressed as a target, standard, carrying capacity, or limits of acceptable change (World Bank, June 2012; World Bank ESMAP, December 2012).

A threshold value may be the maximum intensity at which a given pollutant will adversely affect health if exceeded, or the maximum amount at which the natural state of an area will change unacceptably (e.g., reduction of forest or agricultural land). To reach a conclusion about the significance of the cumulative impacts, a certain limit of variation is required that can be used to compare the effects. Theoretically, if the cumulative impacts of all combined actions in a region do not exceed a limit or threshold, that action may be considered acceptable. However, in practice, the absence of such thresholds is a constraint on the assessment of cumulative impacts. This is especially true for the terrestrial components of ecosystems. Pollutants affecting human health and components in air and water are generally subjected to legal regulations. Therefore, the necessary threshold values for the assessment of the effects on these components are defined in the regulations or included in the guidelines (World Bank, June 2012; World Bank ESMAP, December 2012).

The concept of “Limits of Acceptable Change” is based on describing the acceptable level of environmental conditions rather than determining appropriate use levels (World Bank, June 2012). In this approach, after the acceptable conditions are identified, the necessary practices are determined in order to maintain these conditions.

Cumulative Impact Assessment (CIA)

Cumulative Impact Assessment (CIA), assessment of the possible impacts and risks of planned actions, projects or activities (development), together with other human activities and natural environmental and social external factors, on selected VECs and reducing or mitigating the identified cumulative impacts and risks of the process that involves proposing concrete measures as far as possible.

In this context, the two main components that form the basis of CIA are (IFC, August 2013):

- The contribution of the activity subject to the assessment to the cumulative impacts;.
- Expected future conditions after the aggregate impact of other past, present and reasonably foreseeable future activities and natural, external environmental and social factors.

In the region where the Project route passes, there are projects in different sectors within the scope of EIA Regulation Annex-I and Annex-II lists. In accordance with good practices of CIA, the possible cumulative impacts of the projects in and around the Motorway on VECs will be evaluated within the scope of this study.

XVII.1.2. Cumulative Impact Assessment Methodology

Cumulative Impact Assessment (CIA) aims to determine how the potential impacts of a project will cumulatively combine with the potential impacts of other human activities and natural factors (e.g. floods or extreme climatic events) (IFC, August 2013).

Identifying the cumulative environmental impacts of a project requires a much broader and regional perspective beyond the direct and immediate impacts of the project. CIA requires a broader scope for impact assessment and a more complex consideration of the interaction between human activities and VECs compared to a general EIA study. In this context, in a general EIA study, the evaluation focuses on the project that caused the impact, while the CIA study keeps the affected VECs at its center.

CIA studies basically have the same logical framework and analytical process as EIA studies. Within this scope, as generally the case with EIA studies, CIA studies consist of the basic stages of scoping, existing situation determination, impact assessment and management, which follow each other.

IFC describes the CIA process in six steps in its Good Practice Handbook on Cumulative Impact Assessment and Management:

Step 1:	Scoping Phase I – VECs, Spatial and Temporal Boundaries
Step 2:	Scoping Phase II – Other Activities and Environmental Drivers
Step 3:	Establish Information on Baseline Status of VECs
Step 4:	Assess Cumulative Impacts on VECs
Step 5:	Assess Significance of Predicted Cumulative Impacts
Step 6:	Management of Cumulative Impacts – Design and Implementation

This six-step process generally coincides with the process (Canter L., and William, R., 2009. IAIA Wiki: Cumulative Impact Assessment and Management) described by the International Association for Impact Assessment (IAIA), which gathers similar principles adopted in EU countries, Australia, New Zealand and other countries where implementation is carried out, in six steps and the cumulative impact assessment and management frameworks published in the USA and Canada. Similarly, the cumulative impact assessment process described in the Cumulative Environmental Impact Assessment for Hydropower Projects in Turkey Sample Guideline developed by the World Bank within the scope of the Energy Sector Management Support Program also basically adopts the principles of this processes proposed by IFC.

Cumulative impacts are considered separately for the physical, biological and socio-economic environment while evaluating the construction and operation phases. In each case, after the projects are classified under the following three groups, a cumulative impact assessment can be made under different scenarios consisting of combinations of these groups (World Bank, June 2012; World Bank ESMAP, December 2012):

- Project subject to evaluation (source project).
- Other existing projects (secondary projects) that have an impact on VECs.
- Future projects (confirmed, reasonably foreseeable and probable).

Antalya-Alanya Motorway Project Cumulative Impact Assessment

In the CIA study conducted for the Antalya-Alanya Motorway Project, the six-step process presented above was followed.

For the project, a CIA study was conducted to achieve the following outputs in accordance with international standards. These are;

- Identification of VECs that are likely to be affected by the activities under evaluation in the project in question.
- Identification of all other existing, certain, reasonably foreseeable and/or likely to be triggered developments and natural environmental and external social factors likely to affect the selected VECs.
- Evaluation of the future status of VECs by comparing them with current or foreseeable limit/reference values.
- Preventing or mitigating potential impacts on VECs during the life of the activity or during the lifetime of the activity, in accordance with the mitigation hierarchy.
- Monitoring and managing risks to the existence or sustainability of VECs throughout the life of the operation or the duration of the operation's effects, whichever is longer.

Within the scope of the Cumulative Impact Assessment, Antalya-Alanya Motorway Project will be considered as a resource Project that may cause cumulative impacts together with other projects/activity/developments affecting the same VECs.

Step 1: Scoping Phase I – VECs, Spatial and Temporal Boundaries

Valued Ecosystem Components (VECs)

Valued Ecosystem Components (VECs), which are one of the main elements of the cumulative impact assessment process, are defined as “parts of the environment that are considered important by the organization that proposes the project, the public, scientists or the public administration involved in the evaluation process”, and the selection criteria in international standards are explained under the title of “Valued Ecosystem Components”.

Identifying the cumulative environmental impacts of a project requires a much broader and regional perspective beyond the direct and immediate impacts of the project. CIA requires broader scope for impact assessment and more complex consideration of the interaction between human activities and VECs compared to general EIA study. In this context, in a general EIA study, the evaluation focuses on the project causing the impact, while the CIA study keeps the affected VECs in its center. The project-centered approach of a general EIA process and the VEC-centered approach of the CIA process are represented in Figure XVII.2 and Figure XVII.3, respectively.

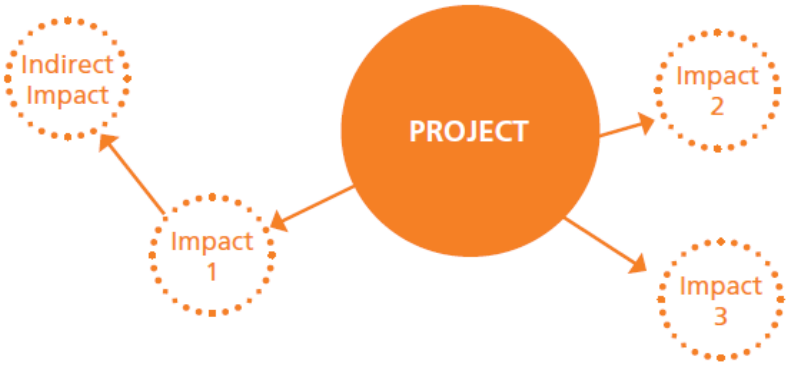


Figure XVII.2 EIA Approach

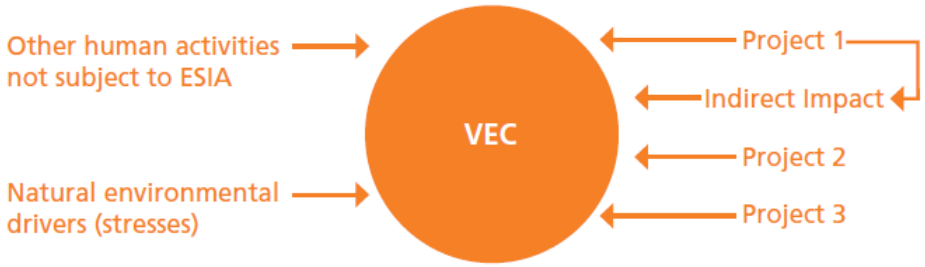


Figure XVII.3 CIA Approach

With CIA study, it is aimed to understand the situation of VECs as a result of the effects of one or more actions, projects or activities and/or natural factors. A good CIA study focuses on understanding whether the cumulative impacts of planned developments have a significant impact on the existence and sustainability of VECs. Evaluation of expected conditions after potential impacts of VECs forms the basis of this approach (IFC August 2013).

International good practice on impact assessment recommends focusing on the evaluation and method of "VECs" in CIA studies, since it would not be realistic to reasonably include every environmental and social component that would be exposed to cumulative impacts in a Project within the CIA process. The Figure XVII.4 below represents the VEC-driven impact assessment approach.

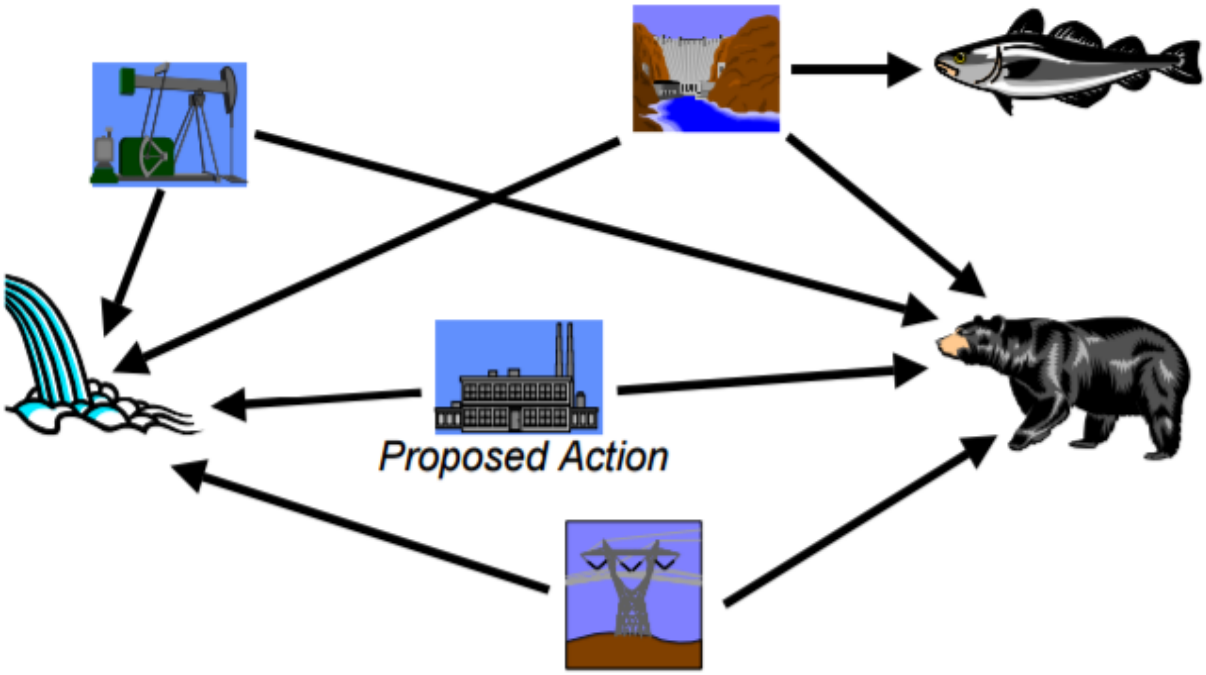


Figure XVII.4 Focusing on Impacts on VECs

For example, fish affected by one of the other projects as shown according to the VEC focused approach should not be considered as VEC in the CIA process of the proposed project, as they are not affected by the proposed project. In this direction, since the selection of VECs will affect the entire CIA process, the first step of the scoping phase is the identification of VECs (IFC, August 2013).

In the cumulative impact assessment to be made within the scope of the Antalya-Alanya Motorway Project, only VECs that will be affected by the Antalya-Alanya Motorway Project will be considered. In other words, any VEC that is not affected by the Antalya-Alanya Motorway Project but will be affected by other developments (e.g. protected areas, sensitive habitats, water resources, etc.) will not be taken into account in the assessment.

Determination of Temporal and Spatial Boundaries

In the first scoping phase of CIA, it is an important step to determine the temporal and spatial (geographical) boundaries on which impact assessment will be made. This step provides an understanding of the temporal and geographic dimensions of potential impacts on VECs during the duration of project impacts. Geographical boundaries within the scope of CIA are likely to exceed the direct impact area of the project (IFC, August 2013).

International good practices provide some suggestions for basic steps to be followed in determining geographical boundaries within the scope of CIA (IFC, August 2013):

i. The area that will be directly affected by the project or activity is determined (The area where direct impacts will be seen in a generally in EIA report - the direct impact area);
ii. VECs within the direct impact area are identified;

iii. Examined whether the boundaries of the determined VECs extend beyond the direct impact area;
iv. Geographical boundaries are set taking into account the distance that possible cumulative impacts can reach and affect VECs; Activities that do not affect VECs outside the geographic boundary and that do not make it technically or scientifically reasonable to participate in the evaluation are eliminated.

Similarly, recommended steps for determining the temporal limits of evaluation are also included in international standards:

i. The estimated life of the project subject to evaluation (source project) is taken into account;
ii. It is determined whether the potential impacts of the source project will continue after the project life is completed;
iii. The most conservative time interval between (i) and (ii) is chosen;
iv. In line with the evaluation of the experts who make the cumulative impact assessment, a balance is established for the time limit that will not be too long or too short.

Step 2: Scoping Phase II – Other Activities and Environmental Drivers

In the second scoping phase of the CIA process (Step 2), studies are carried out to determine whether there is an existing or planned activity ("secondary activities") or natural external factor affecting the same VECs within the analytical framework determined in the previous step.

Other (Secondary) Activities

The aim of the studies to be carried out in this step is to determine the activities (secondary activities) that can affect the status of VECs evaluated within the scope of CIA, in addition to the source project. Secondary activities may include existing and future activities (IFC, August 2013). Future activities, on the other hand, can be grouped into certain activities, reasonably foreseeable activities and hypothetical activities.

Within these three groups, certain activities represent activities that are certain to occur or are expected to occur with a very high probability. Reasonably foreseeable activities include activities that are likely to occur but involve uncertainty. Hypothetical activities include activities for which there is a serious uncertainty about their realization. The criteria for how future activities can be classified under these three groups are summarized in the graph presented in the Figure XVII.5 below.

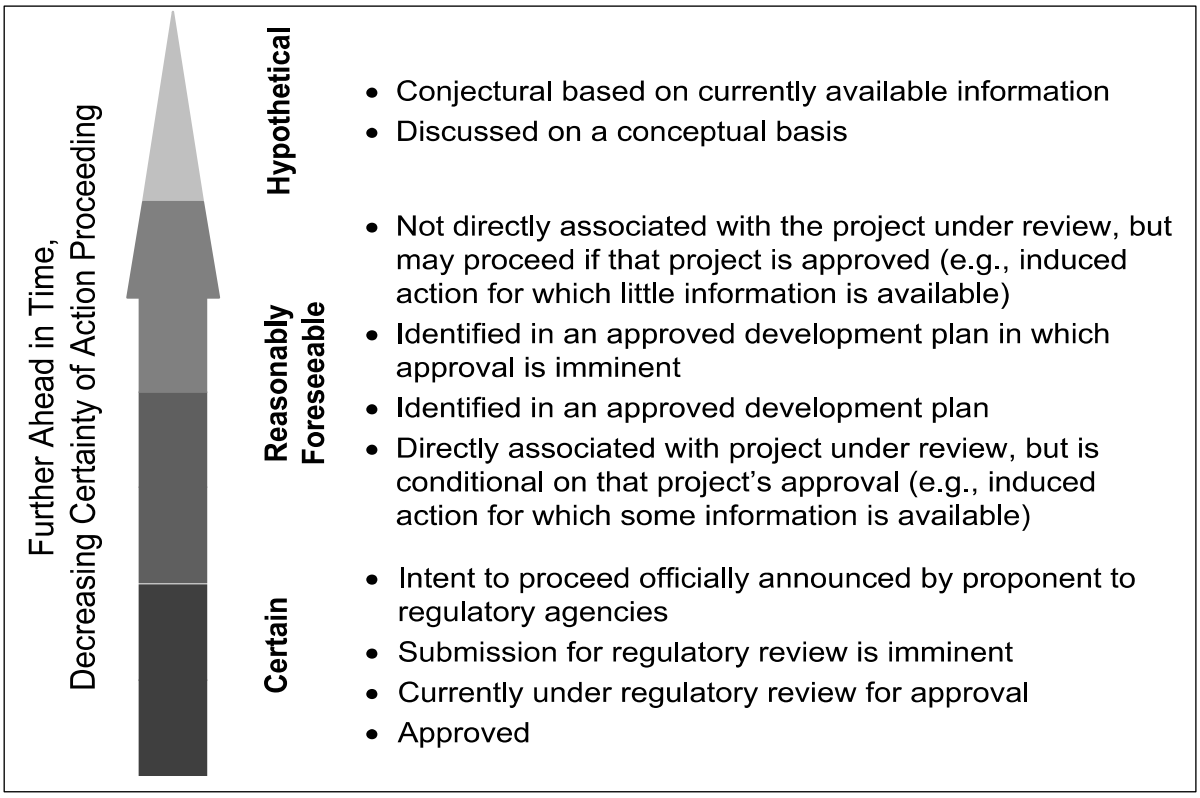


Figure XVII.5. Classification of Future Actions

In the classification described in the Figure XVII.5 above, it will create difficulties in practice if the certain and reasonably foreseeable projects can be clearly differentiated according to certain criteria. Therefore, within the scope of the CIA study of the Antalya-Alanya Motorway Project, all of the projects that are certain and reasonably foreseeable will be named as “reasonably foreseeable” projects.

In determining reasonably foreseeable projects, it is recommended to refer primarily to local, regional and national plans, and to consider a generally not very long time frame due to uncertainties in long-term investment plans. This period is accepted as 3-4 years in the European Union. Good practice recommends that where local, regional and national plans are not available, activities that are in the planning stage and whose official permit processes are in progress (e.g. EIA Report has been prepared, permit application has been made, etc.) should be considered. However, it is not possible for this approach to reveal a certainty about which activity will take place. It will always be possible that some of the activities in the planning phase will not be realized within the stipulated time, or that an unforeseen project will be developed and implemented. At this point, it is important that the time limits taken into account in the evaluation and all the developments and factors included in the evaluation are clearly explained in the CIA report (IFC, August 2013).

While the evaluation of past and current projects within the scope of CIA can be mostly based on tangible data, the existence of different possibilities regarding the realization status of the projects included in the evaluation with the definition of "Reasonably Foreseeable" may cause uncertainties within the scope of CIA. International good practices suggest that “scenario analyzes” be included in the evaluation to eliminate such uncertainties. The purpose of scenario analysis is not to identify the most probable scenario, but to enable assessment based on the consequences of uncertainties and, if necessary, the development of measures for cumulative impact management (IFC, August 2013).

After the Cumulative Impact Assessment area is determined in the assessment to be made within the scope of the Antalya-Alanya Motorway Project, other activities and environmental factors that will affect the status of VECs selected for the Cumulative Impact Assessment within this geographical boundary, available resources (e.g. Master Plans, EIA Positive Decisions for Projects etc.) and the infrastructure databases of the Ministry of Transport and Infrastructure, which are made available to Project Sponsor, will primarily focus on transportation infrastructure projects.

Step 3: Establish Information on Baseline Status of VECs

In the third step of the CIA process, the current status of VECs is determined. The main purpose of this step is to understand the response of a VEC to the impact, its resilience and the time it will need to recover, and to determine the trend of change in the conditions of VECs (IFC, August 2013). In this step, first of all, the scope and adequacy of the available data should be evaluated. It is important to anticipate the need for data at this early stage of the scoping process. If the available data provide sufficient information to fully assess the cumulative impacts, no additional data collection process will be needed (IFC, August 2013).

In a typical CIA study, since a larger area is studied compared to a typical EIA study, it is generally not possible to create a database as comprehensive as an EIA. In this respect, data focusing on especially on important VECs are taken into account within the scope of the CIA study. The need for new baseline data collection is often limited and, if needed, these efforts focus on indicators to assess changes in the state of VECs (IFC, August 2013; World Bank ESMAP, December 2012).

Historical information on the status of VECs is important in determining trends in conditions, thereby assessing important issues within the scope of cumulative impacts. For example, if there is a prolonged/significant deterioration in the conditions of a particular VEC, this may be an indication that the threshold (limit) values are approaching at which change is no longer acceptable (IFC, August 2013). For this reason, the development of the required database on the current status of the selected VECs by utilizing the current sources constitutes an important part of the CIA process.

For the Antalya-Alanya Motorway Project, the basic conditions for VECs to be evaluated within the scope of this study will be based on the information collected for each environmental and social issue under the ESIA process. Relevant information on VECs is provided in the relevant sections of this ESIA Report.

Step 4: Assess Cumulative Impacts on VECs

Cumulative impacts on VECs will be analyzed by estimating the future state of VECs under the collective influence of past, present and future (reasonably foreseeable activities/projects/developments). The purpose of this step is to make an assessment of what conditions VECs will have as a result of the combined impact of all relevant resources.

The assessment made in this context should reveal the possible impacts and risks that may threaten the long-term existence and sustainability of VECs. Also, in this step, the total impact on VECs and the contribution of the source project to this impact (World Bank ESMAP, December 2012) should also be revealed, as well as the known or predictable cause-effect relationships and whether impacts and risks will interact with each other (IFC, August 2013).

The assessment will be based on a qualitative approach and will focus on the final state of the relevant VEC under the influence of all impact factors.

Potential cumulative impacts will be estimated with a holistic approach, considering the possible impacts (project impacts) of the activities carried out within the scope of the Antalya-Alanya Motorway Project and the possible impacts of external factors, if any. If the source project does not have any impact on a VEC, the possible cumulative impacts on that VEC (cumulative impacts on the VEC of other projects other than the source project) will not be considered within the scope of this study.

The cumulative impacts of the project, which are estimated using the results of the EIA study, will show what kind of mitigation measures will be required for the project. On the other hand, the cumulative impact assessment, taking into account all sources of impact on a VEC, will provide a description of the measures that will need to be implemented by all parties/project owners contributing to the total impact (IFC, August 2013).

Step 5: Assess Significance of Predicted Cumulative Impacts

Potential cumulative impacts will be estimated with a holistic approach, considering the possible impacts (project impacts) of the activities carried out within the scope of the Antalya-Alanya Motorway Project and the possible impacts of external factors, if any (see Table XVII.1). If the source project does not have any impact on a VEC, the possible cumulative impacts on that VEC (cumulative impacts on the VEC of other projects other than the source project) will not be considered within the scope of this study.

Table XVII.1. Criteria for Determining the Significance of Cumulative Impacts

Significance	Impacts
Severe	Impacts that the decision maker should consider when the Recipient/Source is irreversibly compromised.
Major	Impacts that may become key decision-making issue.
Moderate	Impacts that are unlikely to become issues on whether the project design should be selected, but where future study may be needed to improve on current performance.
Minor	Impacts those are locally significant.
Not Significant	Impacts that are beyond the current forecasting ability or are within the ability of the resource to absorb such change.

Source: UK Highways Agency 205/08: Design Manual for Roads and Bridges; http://www.standardsforhighways.co.uk/ha/standards/dmrb/

Current practice shows that setting thresholds is an important part of the process, not only for assessing cumulative impacts, but also for developing management strategies. In order to assess the significance of cumulative impacts, it is necessary to define the limits at which change in the conditions of VECs is acceptable. These limits will allow comparison of incremental effects. In practice, the activity will be considered acceptable if the cumulative impact of all relevant actions, projects and activities on a VEC does not exceed a certain threshold (IFC, August 2013).

Step 6: Management of Cumulative Impacts - Design and Implementation

The last step of the CIA process describes how the cumulative impacts identified in the previous steps will be managed. Management practices required to prevent anticipated cumulative impacts are shaped by both how the impacts arise (e.g. through other projects and natural factors affecting VECs)

and the characteristics of impacts. At the end of this step, after taking preventive and mitigation measures, the importance of residual effects is evaluated (e.g. by matrix method), and if there is a residual effect, measures for their management are recommended (IFC, August 2013).

Although the management of impacts at the project level and the reduction of the contribution to cumulative impacts are the responsibility of the contributing projects, the highest level of responsibility in cumulative impact management rests with the relevant government authorities. In this context, government authorities should establish a framework for the identification of interested/contributory parties within the scope of CIA, selection of VECs and impact management processes (IFC, August 2013).

XVII.2. Potential Impacts

The cumulative impact assessment will be carried out step by step below in accordance with the methodology described in the previous section.

Step 1: Scoping Phase I - Valued Ecosystem Components (VECs), Spatial and Temporal Boundaries

For the initial determination of VECs, environmental and social issues within the scope of the impact assessment conducted for the Antalya-Alanya Motorway Project in the previous sections of this ESIA report will be taken into account. VECs to focus on in the Cumulative Impact Assessment were selected as follows:

- Land use
  - Forests
  - Agricultural Lands
- Water Bodies
  - Dam Lake
- Key Biodiversity Areas (KBAs)
  - Antalya Plains
  - Kızılot
- Protected areas
  - Nature parks
  - Specially Protected Environment Area (Belek SEPA)
- Local communities
  - Belpınar, Hocalar, Ilıca, Kalemler, Yeniköy, Hacıisalı, Hacıali, Hacıobası, Uzunlar, Kadılar, Örenşehir, Yalçındibi, Alara, Akdam, Üründü, Merkez Neighbourhoods where secondary projects intersect with the Motorway Project.

With regard to the temporal dimension of impacts, the assessment covers, to the maximum extent possible, the impacts of past, present and reasonably foreseeable future developments over the economic life of the Project.

The cumulative impact assessment area for the motorway project was defined by considering the spatial extent of potential overlapping impacts from similar linear infrastructure developments, particularly road and utility corridors, on shared Valued Environmental and Social Components (VECs). The area was delineated using GIS-based analysis and a desk-based review of regional planning data and project locations.

Although the irrigation projects—Serik–Deniztepesi Irrigation, Manavgat–Naras Irrigation, Manavgat Irrigation, Oymapınar Dam Access Road, Köprüçay Irrigation, Yavrudoğan Dam Irrigation, Alanya–Yeniköy–Yerköprü Dam Irrigation, and Yeniköy Dam Irrigation—have been identified within the broader region, their implementation timelines do not coincide with the construction or operation phases of the motorway project. As such, no temporal overlap is expected, and these projects are not anticipated to contribute to cumulative impacts during the project's lifecycle.

As mentioned in Chapter 4 ("ESIA Methodology"), The Area of Influence (AoI) for the Antalya-Alanya Motorway Project has been determined separately for each different environmental and social component. Study areas and AoI's for each environmental and social component are listed in Table XVII.2. Accordingly, the Area of Influence (AoI) has been determined by considering the direct impact area of the Project activities. In this respect, the motorway width (35.5 m) and the minimum width of the expropriation corridor (55 m) had been considered. It should be noted that the expropriation corridor will extend up to maximum 450 m at the locations of interchanges, large embankment and cut sites, service areas, etc. In addition, some of the quarries and disposal areas are located out of the expropriation corridor. Thus, in consideration of such components, study area had to be expanded exceptionally as needed. The study area determined for Land Use and Property, Topography, Soil and Geology, Ecology and Biodiversity, Landscape and Visual Environment, Protected Areas and Cultural Heritage is 400 m.

The overall study area covering all sub study areas has been determined as 4,000 m corridor (2,000 m from each side of the Motorway axis) on the basis of the air quality and socio-economic environment components.

Table XVII.2. Proposed Study Area for the Motorway

Environmental and Social Component	Study Area (m)*	Possible AoI / SAoI (m)
Air Quality	4,000	2,000
Topography, Soils, and Geology	400	100
Water Resources	1,000	500
Noise and Vibration	2,000	1,000
Landscape and Visual Environment	400	400
Ecology and Biodiversity***	400	100
Protected Areas	400	100
Cultural Heritage	400	100
Land Use and Property	400	100
Socio-economic Environment **	4,000	2,000
Community Health and Safety	2,000	1,000
Cumulative Impact Assessment ****	10,000	10,000

** Represents the total width. For example; a 400 m study area is composed of 2 x 200 m corridors (200 m located in the left side and 200 m located in the right side of the Motorway's axis, making a total of 400 m in total).*

*** It should be noted socio-economic environment, due to its nature, propound a distinction in the ESIA approach; thus the study area specified in the table for socio-economic environment should be considered as the minimum study area. Settlements, whose lands extend beyond the proposed study area, have also been included in the scoping assessments and will be included in the scope of ESIA assessments as well, wherever necessary.*

**** For biodiversity, the area of influence was initially defined based on the project's direct impacts. Nevertheless, the impact assessment and field surveys extended beyond the 400 m study area, and wider components of the project footprint were incorporated into the evaluation.*

***** Within the scope of cumulative impact assessment studies, an area of 5 km north and 5 km south from the Project area was determined.*

The area where the cumulative impacts are evaluated, apart from the study areas within the scope of the project, is defined as the area where the activities to be carried out in the project are likely to cause changes on the environmental and social components together with the activities within the scope of other nearby projects. This area is much wider than the direct impact area of the project and has been chosen to include impacts on different environmental and social components (air, water, socio-economics, etc.).

However, as a result of the preliminary evaluations made, considering the prevailing wind direction of the secondary projects around the project area, climatic characteristics, the distribution of the effects on air quality, the spread of the noise effect, the dimensions of the change to be observed on the flora and fauna, the project route should be 5 km in the north and south directions as a total of 10 km corridor cumulative impact assessment area has been selected. It is clear that this area is wide enough to allow appropriate assessment of the cumulative impacts that may be on VECs.

The study areas and cumulative impact assessment area determined within the scope of the Antalya-Alanya Motorway Project are presented in Figure XVII.6.

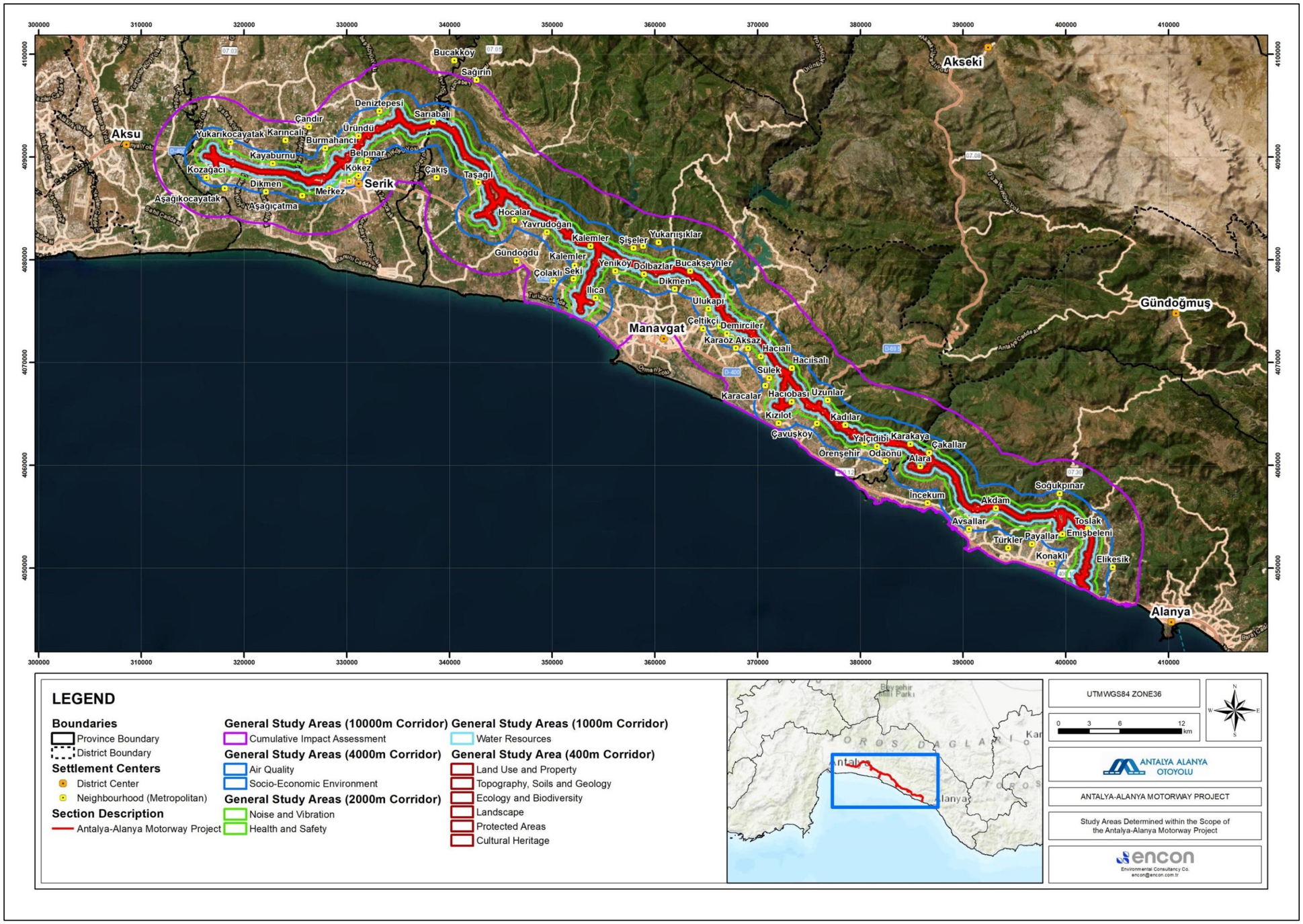


Figure XVII.6 Study Areas Determined within the Scope of the Antalya-Alanya Motorway Project

Step 2: Scoping Phase II – Other Activities and Environmental Drivers

Within the scope of the project, other past, ongoing, and reasonably foreseeable transportation-related infrastructure projects (such as railway constructions and natural gas pipelines, energy transmission lines) located in Antalya Province were considered in the second stage of the CIA. These projects were evaluated through a desk-based review of relevant databases to assess their potential cumulative effects on the selected VECs.

Ministry of Transport and Infrastructure and other available resources (e.g. Environmental Master Plans, EIA Positive Decisions for Projects, etc.) are as listed in Table XVII.3.

It should be noted that the list given in Table XVII.3 is a comprehensive list covering all other projects in the region. The last column of the table describes the potential of other projects/activities/developments to influence selected VECs. In the scope of the cumulative impact assessment, the Railway Line, two Energy Transmission Lines (ETL) and the Natural Gas Pipeline project were included due to their linear nature and spatial relevance to the motorway route. Given the linear nature of the motorway project, point-source projects were not included, as they are not expected to generate overlapping or synergistic effects on the selected VECs within the defined assessment area.

The projects in Table XVII.3 are the projects selected within the scope of the CIA study in the first place. Secondary projects within the CIA Area are given in
Figure XVII.7**Error! Reference source not found.**

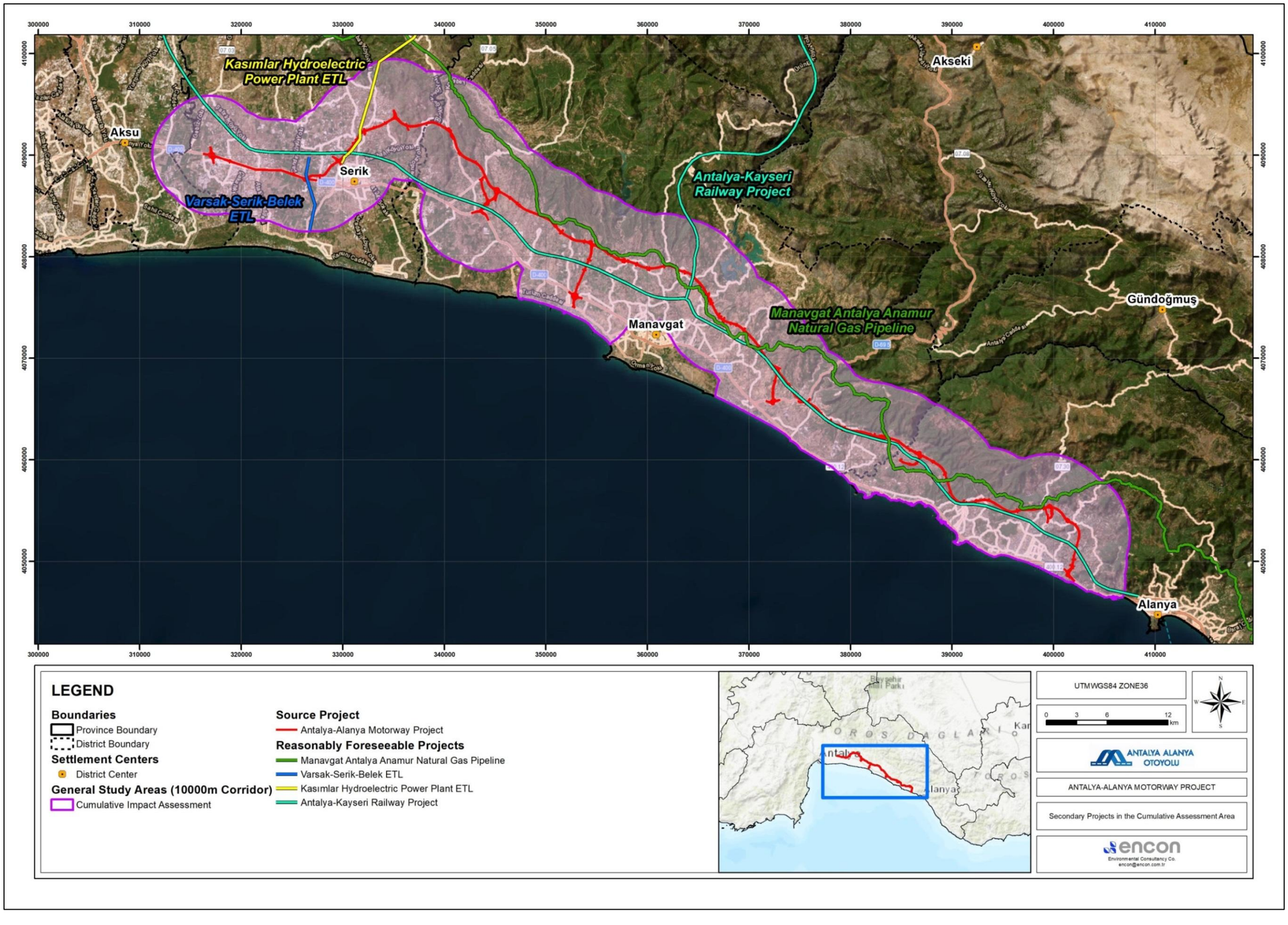


Figure XVII.7 Secondary Projects in the Cumulative Assessment Area

As mentioned before, in the Cumulative Impact Assessment for the Antalya-Alanya Motorway Project, only the projects/activities/developments that have the potential to affect selected VECs are marked as "Yes" in the last column of Table XVII.3. Cumulative Impact Assessment practices will be considered in accordance with the VEC-centered perspective. Projects in operation will be considered as existing projects within the scope of evaluation.

Table XVII.3 Other Projects/Activities/Developments in Antalya Province

Industry Sector	Other Project/Development	Status	Construction		Project Cost	Potential for Affecting the Selected VECs	
			Start	End		Yes	No
Infrastructure-Railway	Antalya- Kayseri Railway Project	Project Design	Not known at this stage		-		
Infrastructure – Natural Gas	Manavgat Antalya Anamur Natural Gas Pipeline	Project-Design	Not known at this stage but Construction period will take 3 years		458,000,000 TL		
Infrastructure – Energy Transmission Line (ETL)	Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	Operation	Operation Phase		16,000,000 TL		
	Varsak-Serik-Belek ETL	Operation	Operation Phase		2,700,000 TL		

The cumulative impact assessment considers the spatial and temporal overlaps between the Antalya–Alanya Motorway Project and other relevant developments in the region. Both the railway project and the natural gas pipeline are currently under design phase, and their construction timelines are expected to overlap with that of the motorway, particularly between 2025 and 2028. Although the two energy transmission lines are in the operational phase, their spatial proximity to the motorway corridor may contribute to long-term residual impacts, particularly in terms of land use and ecological fragmentation.

Step 3: Establish Information on Baseline Status of VECs

The baseline conditions for VECs to be assessed in this study are based on information collected for each environmental and social issue under the ESIA process. Relevant information on VECs is provided in the relevant sections of this ESIA Report.

Step 4: Assess Cumulative Impacts on VECs

The results of the evaluation of the cumulative impacts of the Antalya-Alanya Motorway Project on the selected VECs along with other projects/activities/developments identified in the region are summarized in
Figure XVII.8.

Within the scope of the assessment, the cumulative impact potential on the VECs was evaluated by considering the "***Infrastructure Projects***" affecting the Antalya-Alanya Motorway Project.

In this context, the potential for cumulative impacts on each VEC has been classified as none, low, moderate or high depending on the criteria described below.

- None; if the VEC will only be affected by the Antalya-Alanya Motorway Project.
- Low; if VEC will be affected by only 1 other project in addition to the Antalya-Alanya Motorway Project.
- Moderate; if VEC will be affected by 2 more projects in addition to the Antalya-Alanya Motorway Project.
- High; if the VEC will only be affected by 3 or more projects in addition to the Antalya-Alanya Motorway Project.

As can be seen from the assessment, there are three projects interacting with the Antalya-Alanya Motorway Project and there is a VEC that causes two “High” cumulative impact potential.

It should be noted that the assessment is limited to the level of technical knowledge currently available to practitioners of this Cumulative Impact Assessment. In addition, the assessment is based on currently known routes, so any changes to projects' route could change the impact status of VECs. A table summarizing the Interaction of Projects with Selected VECs is presented in Table XVII.4.

Table XVII.4 Interaction of Projects with Selected VECs

VECs	Source Project	Other Projects				Cumulative Impact Potential
	Antalya Alanya Motorway Project	*Manavgat-Antalya-Anamur Natural Gas Pipeline*	*Varsak-Serik-Belek Energy Transmission Line*	*Kasımlar Hydroelectric Power Plant Energy Transmission Line*	Antalya-Kayseri Railway Project	
Protected Areas						
Nature Park						Low
Specially Protected Environment Area						Moderate
Water Bodies						
Dam Lake						Low
Land Use						
Forests						High
Agricultural Lands						High
Key Biodiversity Areas (KBAs)						
Antalya Plains						Low
Kızılot						None
Local communities						
Belpınar						None
Hocalar						Moderate
Ilıca						None
Kalemler						Moderate
Yeniköy						Moderate
Hacıisalı						Moderate
Hacıali						Moderate
Hacıobası						Low
Uzunlar						Moderate
Kadılar						Moderate
Örenşehir						Low
Yalçıdibi						Moderate
Alara						Moderate
Akdam						Moderate
Üründü						Moderate
Merkez						Moderate

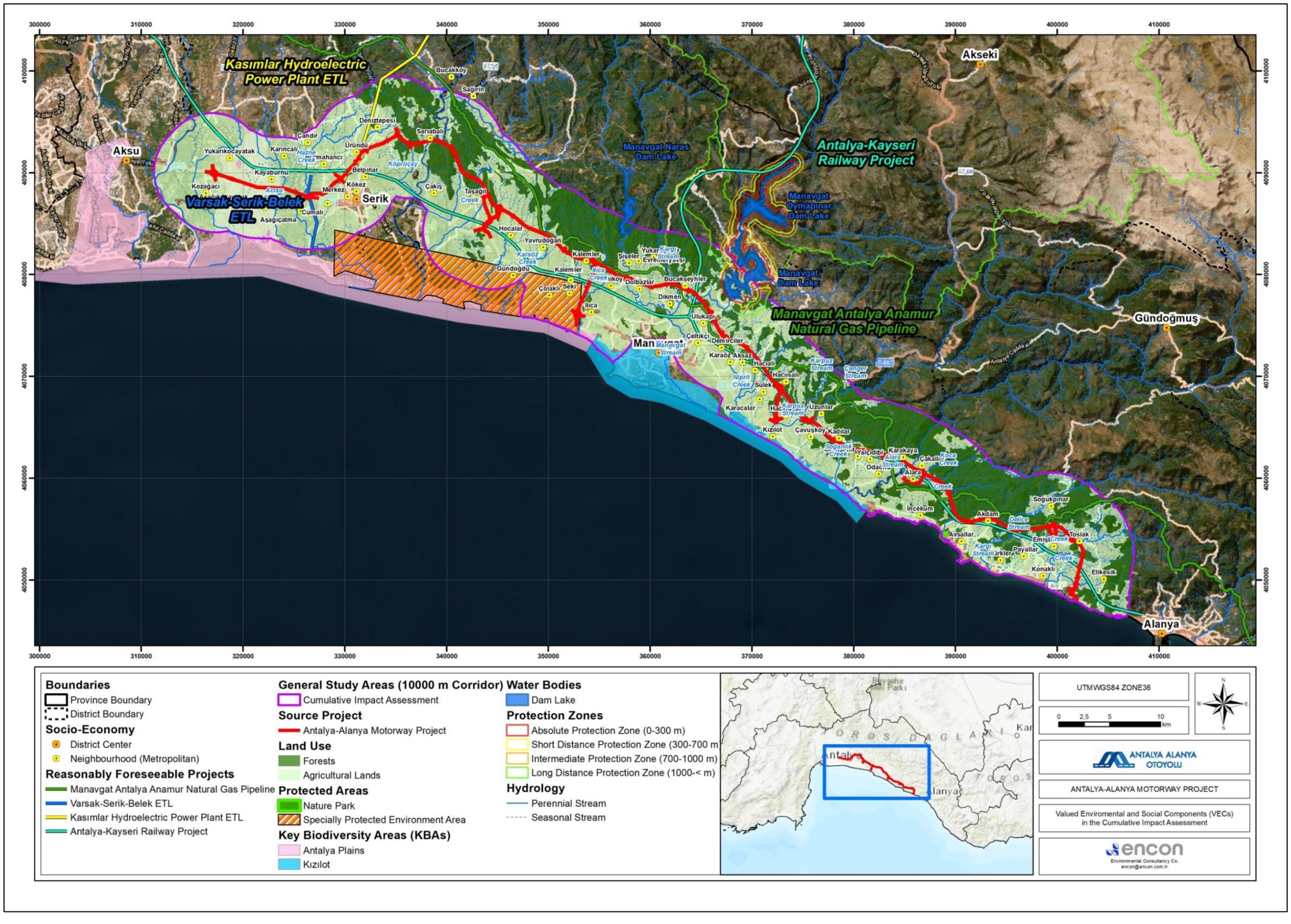


Figure XVII.8 Valued Enviromental and Social Components (VECs) in the Cumulative Impact Assessment

Step 5 and Step 6: Assess Significance of Predicted Cumulative Impacts and Management of Cumulative Impacts – Design and Implementation

Table XVII.5 lists VECs with low, moderate, or high cumulative impact potential (as assessed in Step 4). The significance of the cumulative impacts was then determined according to the criteria given section of assessment methodology.

Table XVII.5 Significance of Potential Cumulative Impacts

VECs	Cumulative Impact Potential	Significance of Cumulative Impact
Protected Areas		
Nature Park	None	-
Specially Protected Environment Area	Moderate	Moderate
Water Bodies		
Dam Lake	None	-
Land Use		
Forests	High	High
Agricultural Lands	High	High
Key Biodiversity Areas (KBAs)		
Antalya Plains	Low	Low
Kızılot	None	-

The purpose of this section is to identify and assess the cumulative impacts that may arise from the Antalya–Alanya Motorway Project in combination with other existing or planned infrastructure developments in the region. These include the railway project and the natural gas pipeline, both currently under design phase and with potential spatial and temporal overlap with the motorway. Additionally, two energy transmission lines (ETLs), while already operational, have been considered due to their spatial proximity and potential contribution to residual environmental and social impacts.

The cumulative impact assessment focuses on a range of Environmental and Social Components, including but not limited to air quality, noise and vibration, water resources, land use, biodiversity, cultural heritage, socio-economic environment, and community health and safety. The assessment evaluates how overlapping project activities may interact and collectively affect these components.

In addition, the assessment also identifies the VECs that are most affected by the cumulative impacts. The “Affected VECs” column in the table highlights the specific components of concern, providing a clearer link between the identified impacts and the environmental and social values at risk. This ensures that the evaluation not only considers impacts on environmental and social components in general but also explicitly addresses how these impacts influence key VECs shared across multiple projects.

The table below summarizes the identified cumulative impacts, their assessed significance (categorized as High, Medium, Low, or Negligible), proposed mitigation measures, and the expected level of residual impact after mitigation. The assessment aims to inform impact management planning

and ensure that cumulative effects are adequately addressed through coordinated and proportionate mitigation strategies.

Since cumulative impacts result from the actions of more than one stakeholder, responsibility for the management of these impacts encompasses all stakeholders. It is important that individual development requires individual actions to eliminate or minimize their contribution.

The identified cumulative impacts, along with their significance levels, proposed mitigation measures, and expected residual impacts, are summarized in Table XVII.6.

The mitigation measures outlined in Table XVII.6 are indicative and conditional in nature, developed solely for the purpose of addressing potential cumulative impacts that may arise if and when nearby or associated projects become active during overlapping timeframes and within shared zones of influence.

These measures do not represent firm commitments or obligations either by this Project or by any third-party entities referenced. They are based on current publicly available information, and in most cases, the implementation timelines, design details, and exact footprints of the other projects are unknown or remain unconfirmed. As such, these measures are to be regarded as considerations to be further evaluated in the event that the relevant external projects proceed to execution.

Where such potential overlaps may materialize and where technical feasibility and jurisdictional authority allow, good-faith engagement with the relevant third parties may be pursued. However, the success of any collaborative mitigation effort remains outside the direct control of this Project and will depend on future developments.

Table XVII.6 Table including Suggested Mitigation to be Considered

Other Projects	Affected VECs	Assessment of Cumulative Impact with the Antalya-Alanya Motorway Project	Mitigation Measures	Residual Cumulative Impact
Air Quality				
Antalya- Kayseri Railway Project	➢ Nature Park ➢ Specially Protected Environment Area ➢ Forests ➢ Agricultural Lands ➢ Local communities (Hocalar, Kalemler, Yeniköy,Hacıali, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Alara, Akdam Neighbourhoods)	➢ Increase in dust emission levels due to simultaneous construction activities with the motorway project. ➢ Cumulative dust generation and emissions in shared air basins, especially near settlements and agricultural areas. ➢ Risk of exceeding local air quality thresholds. The expected cumulative impact of these projects will be ***Medium***.	➢ If possible coordinated scheduling, dust suppression (e.g. watering), covering trucks, low-emission equipment, air quality monitoring in overlapping zones, buffer zones near communities.	**Low**
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Forest ➢ Agricultural Land ➢ Local communities(Hocalar, Kalemler, Yeniköy, Hacıisalı, Hacıali, Uzunlar, Kadılar, Yalçındibi, Alara, Akdam Neighbourhoods)	➢ The Manavgat–Antalya–Anamur Natural Gas Pipeline is currently in the construction phase; construction may coincide with the motorway project. ➢ If construction phases overlap, emissions from excavation, pipe-laying, and heavy machinery use could add to the overall air quality burden. ➢ Combined activities may result in increased levels of particulate matter (PM10) and nitrogen oxides (NO_x) in the project region. ➢ The cumulative impact could be particularly critical in environmentally sensitive areas and residential zones located near both projects. ➢ Without coordinated planning, temporary exceedances of air quality standards may occur during the peak construction period. The expected cumulative impact of these projects will be ***Medium***.	➢ Early inter-project coordination, permitting-stage CIA requirements, shared dust suppression, real-time monitoring if overlap occurs.	**Low**
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Specially Protected Environment Area ➢ Forest ➢ Agricultural Land ➢ Local communities (Belpınar, Üründü Neighbourhoods)	➢ No direct emissions; minor indirect impacts may occur due to permanent vegetation clearance and maintenance-related dust or vehicle emissions. The expected cumulative impact of these projects will be ***Negligible.***	➢ Best practices will be implemented during ETL maintenance. ➢ Simultaneous maintenance and highway works will be avoided in shared corridors.	**Negligible**
Varsak-Serik-Belek ETL	➢ Agricultural Lands ➢ Antalya Plains ➢ Local communities (Cumalı, Merkez Neighbourhoods)			
Topography, Soils, and Geology				
Antalya- Kayseri Railway Project	➢ Forests ➢ Agricultural Lands	➢ Significant earthworks may overlap with motorway construction, increasing erosion and topsoil loss. The expected cumulative impact of these projects will be ***High*** (due to simultaneous, large-scale excavation).	➢ If possible coordinated excavation, erosion control, topsoil reuse, slope stabilization	**Low-Medium**
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Forest ➢ Agricultural Land	➢ Potential future trenching could compound soil disturbance in shared zones. The expected cumulative impact of these projects will be ***Medium***.	➢ Make reccomendation to the gas pipeline project to include a cumulative impact assessment at the permitting stage, with specific attention to avoiding simultaneous trenching in areas with high erosion risk.	**Low**
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Agricultal Lands	➢ Minor indirect effects from vegetation clearance and access road erosion, especially on steep terrain. The expected cumulative impact of these projects will be ***Low.***	➢ If possible coordinate with ETL operators to share erosion-related observations during routine motorway inspections.	**Negligible**
Varsak-Serik-Belek ETL	➢ Agricultural Lands			
Water Resources				
Antalya- Kayseri Railway Project	➢ Nature Park ➢ Specially Protected Environment Area ➢ Dam Lake ➢ Forests	➢ The railway construction involves extensive excavation and use of machinery, which may coincide with similar activities in the motorway project. This can lead to increased surface runoff, sedimentation in nearby water bodies, and temporary degradation of water quality.	➢ If possible coordinate water extraction planning to avoid overuse of local sources, especially in dry periods or in hydrologically sensitive basins. ➢ Limit construction activities near water bodies during heavy rainfall	**Low-Medium**

Other Projects	Affected VECs	Assessment of Cumulative Impact with the Antalya-Alanya Motorway Project	Mitigation Measures	Residual Cumulative Impact
	➢ Agricultural Lands ➢ Local communities (Hocalar, Yeniköy,Hacıali, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Alara, Akdam Neighbourhoods)	The expected cumulative impact of these projects will be ***High***.	periods to reduce sediment transport risk	
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Forest ➢ Agricultural Land ➢ Local communities(Hocalar, Kalemler, Yeniköy, Hacıisalı, Hacıali, Uzunlar, Kadılar, Yalçındibi, Alara, Akdam Neighbourhoods)	➢ If constructed during motorway works, trenching and hydrotesting could increase water use and contamination risk near surface waters. The expected cumulative impact of these projects will be ***Medium***.	➢ If possible avoid construction in shared watershed zones at the same time.	**Negligible**
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Agricultural Land ➢ Local communities (Belpınar, Üründü Neighbourhoods)	➢ Minimal ongoing impact; however, historic land clearance and road access in hydrologically sensitive zones may contribute to runoff and erosion. The expected cumulative impact of these projects will be ***Low.***	➢ Observe ETL access routes during rainfall; include water-sensitive areas in visual site inspections.	**Negligible**
Varsak-Serik-Belek ETL	➢ Agricultural Lands ➢ Local communities (Cumalı, Merkez Neighbourhoods)			
Noise and Vibration				
Antalya- Kayseri Railway Project	➢ Nature Park ➢ Specially Protected Environment Area ➢ Forests ➢ Agricultural Lands ➢ Local communities (Hocalar, Yeniköy,Hacıali, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Alara, Akdam Neighbourhoods)	➢ Simultaneous construction may increase daytime and possibly night-time noise levels in nearby settlements. Overlapping activities may amplify vibrations. The expected cumulative impact of these projects will be ***High***.	➢ If possible coordinate working hours; restrict night works near sensitive receptors; use low-vibration equipment; install noise barriers.	**Medium**
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Forest ➢ Agricultural Land ➢ Local communities(Hocalar, Kalemler, Yeniköy, Hacıisalı, Hacıali, Uzunlar, Kadılar, Yalçındibi, Alara, Akdam Neighbourhoods)	➢ If constructed concurrently, overlapping truck movements and excavation may increase local noise levels. The expected cumulative impact of these projects will be ***Medium.***	➢ If possible and not inconvenient avoid simultaneous heavy machinery use near communities; If possible coordinate haul routes and work shifts.	**Low**
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Specially Protected Environment Area ➢ Forest ➢ Agricultural Land ➢ Local communities (Belpınar, Üründü Neighbourhoods)	➢ No significant operational noise, but occasional maintenance may add minor disturbance in rural areas. The expected cumulative impact of these projects will be ***Low.***	➢ If possible align maintenance timing with low-impact periods; notify communities in advance.	**Negligible**
Varsak-Serik-Belek ETL	➢ Agricultural Lands ➢ Antalya Plains ➢ Local communities (Cumalı, Merkez Neighbourhoods)			
Landscape and Visual Environment				
Antalya- Kayseri Railway Project	➢ Nature Park ➢ Specially Protected Environment Area ➢ Forests ➢ Agricultural Lands ➢ Local communities (Hocalar, Kalemler, Yeniköy,Hacıali, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Alara, Akdam Neighbourhoods)	➢ Railway and motorway may result in significant visual alterations, especially in natural landscapes or touristic zones. The expected cumulative impact of these projects will be ***High***.	➢ If possible align design to existing topography; use vegetative screening; prioritize underpasses or tunnels in scenic areas.	**Medium**
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Forest ➢ Agricultural Land ➢ Local communities(Hocalar, Kalemler, Yeniköy, Hacıisalı, Hacıali, Uzunlar, Kadılar, Yalçındibi,	➢ If constructed above ground in parts, additional linear infrastructure could increase visual fragmentation. The expected cumulative impact of these projects will be ***Medium.***	➢ Avoid visible components in scenic areas; co-locate with existing corridors where possible.	**Low**

Other Projects	Affected VECs	Assessment of Cumulative Impact with the Antalya-Alanya Motorway Project	Mitigation Measures	Residual Cumulative Impact
	Alara, Akdam Neighbourhoods)			
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Specially Protected Environment Area ➢ Forest ➢ Agricultural Land ➢ Local communities (Belpınar, Üründü Neighbourhoods)	➢ Existing ETLs already contribute to visual impact; their presence combined with new infrastructure may degrade landscape quality. The expected cumulative impact of these projects will be ***Low.***	➢ No new impact; visual integration of new elements should consider existing visual clutter; consult local land use planning.	**Negligible**
Varsak-Serik-Belek ETL	➢ Agricultural Lands ➢ Antalya Plains ➢ Local communities (Cumalı, Merkez Neighbourhoods)			
Ecology and Biodiversity				
Antalya- Kayseri Railway Project	➢ Nature Park ➢ Specially Protected Environment Area ➢ Dam Lake ➢ Forests ➢ Agricultural Lands	➢ Habitat fragmentation, noise disturbance, and fauna displacement may combine with motorway works in ecologically sensitive areas or near KBAs. The expected cumulative impact of these projects will be ***Medium.***	➢ Coordinate vegetation clearance timing; avoid breeding seasons; implement ecological monitoring	**Low**
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Forest ➢ Agricultural Land	➢ Temporary vegetation removal and disturbance may overlap with motorway works. Impacts are limited if construction avoids sensitive timing. The expected cumulative impact of these projects will be ***Medium.***	➢ Implement basic habitat restoration post-construction.	**Low**
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Specially Protected Environment Area ➢ Forest ➢ Agricultural Land	➢ As the ETLs are already operational and no new land clearance is expected. The expected cumulative impact of these projects will be ***Negligible.***	➢ No mitigation is required beyond routine vegetation maintenance within existing right-of-way boundaries.	**Negligible**
Varsak-Serik-Belek ETL	➢ Agricultural Lands ➢ Antalya Plains			
Land Use and Property				
Antalya- Kayseri Railway Project	➢ Forests ➢ Agricultural Lands ➢ Local communities (Hocalar, Yeniköy,Hacıali, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Alara, Akdam Neighbourhoods)	➢ Railway and motorway may both require land acquisition in the same regions, increasing land pressure and causing more extensive fragmentation of farmland. The expected cumulative impact of these projects will be ***High.***	➢ If possible coordinate land acquisition planning; inform landowners early; provide fair and timely compensation.	**Medium**
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Forest ➢ Agricultural Land ➢ Local communities(Hocalar, Kalemler, Yeniköy, Hacıisalı, Hacıali, Uzunlar, Kadılar, Yalçındibi, Alara, Akdam Neighbourhoods)	➢ Pipeline construction may temporarily restrict access to agricultural land, especially if aligned parallel to the motorway route. The expected cumulative impact of these projects will be ***Medium.***	➢ If possible limit construction footprint; maintain access routes.	**Low**
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Forest ➢ Agricultural Land ➢ Local communities (Belpınar, Üründü Neighbourhoods)	➢ No new land use change expected; existing ETLs already define the current land pattern. The expected cumulative impact of these projects will be ***Negligible.***	➢ No additional mitigation required.	**Negligible**
Varsak-Serik-Belek ETL	➢ Agricultural Lands ➢ Antalya Plains ➢ Local communities (Cumalı, Merkez Neighbourhoods)			

Other Projects	Affected VECs	Assessment of Cumulative Impact with the Antalya-Alanya Motorway Project	Mitigation Measures	Residual Cumulative Impact
Socio-economic Environment				
Antalya- Kayseri Railway Project	➢ Local communities (Hocalar, Yeniköy,Hacıali, Kalemler, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Alara, Akdam Neighbourhoods)	➢ Combined with the motorway, the railway project may increase competition over local employment, housing, and services, and cause pressure on local infrastructure. The expected cumulative impact of these projects will be ***High.***	➢ Prioritize local hiring; coordinate with municipalities on service planning; monitor social dynamics.	**Medium**
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Local communities(Hocalar, Kalemler, Yeniköy, Hacıisalı, Hacıali, Uzunlar, Kadılar, Yalçındibi, Alara, Akdam Neighbourhoods)	➢ Short-term increase in workforce and vehicle traffic may affect rural livelihoods and create temporary disruptions in agricultural areas. The expected cumulative impact of these projects will be ***Medium.***	➢ Use local suppliers/workers; maintain access to agricultural fields; if possible avoid peak harvest times.	**Low**
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Local communities (Belpınar, Üründü Neighbourhoods)	➢ No direct ongoing socio-economic impact expected; previous land acquisition and employment phase completed. The expected cumulative impact of these projects will be ***Negligible.***	➢ No additional mitigation required.	**Negligible**
Varsak-Serik-Belek ETL	➢ Local communities (Cumalı, Merkez Neighbourhoods)			
Community Health and Safety				
Antalya- Kayseri Railway Project	➢ Local communities (Hocalar, Yeniköy,Hacıali, Kalemler, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Alara, Akdam)	➢ Increased heavy vehicle traffic, noise, and dust may collectively elevate accident risks and public health concerns in overlapping communities. ➢ Combined workforce and equipment mobilization may raise safety concerns in rural communities and increase risks of social tension. ➢ Lack of coordination between projects may overwhelm local health or emergency services if an incident occurs. The expected cumulative impact of these projects will be ***High.***	➢ If possible coordinate construction schedules to avoid simultaneous peak traffic in shared access routes, especially near settlements. ➢ Place clear signage and speed control measures near community areas affected by construction traffic. ➢ Inform local communities in advance about construction activities and expected disturbances through local channels (e.g. muhtars, notice boards). ➢ Coordinate with local emergency and health services to align response protocols in case of incidents involving multiple projects. ➢ Provide SEA/SH (Sexual Exploitation, Abuse, and Harassment) awareness training to all site workers.	**Medium**
Manavgat – Antalya- Anamur Natural Gas Pipeline	➢ Local communities(Hocalar, Kalemler, Yeniköy, Hacıisalı, Hacıali, Uzunlar, Kadılar, Yalçındibi, Alara, Akdam)	➢ Combined workforce and equipment mobilization may raise safety concerns in rural communities and increase risks of social tension. ➢ Community members may unintentionally enter construction zones, increasing the risk of injury in the absence of proper fencing and signage. The expected cumulative impact of these projects will be ***Medium***.	➢ Prioritize local workforce recruitment and clearly communicate hiring criteria to avoid perception of unfairness. ➢ Ensure proper fencing and signage around active construction zones to prevent unauthorized access. ➢ Provide SEA/SH (Sexual Exploitation, Abuse, and Harassment) awareness training to all site workers.	**Low**
Kasimlar Hydroelectric Power Plant Energy Transmission Line (ETL)	➢ Local communities (Belpınar, Üründü Neighbourhoods)	➢ No new physical activities; minimal residual risk related to periodic maintenance access in rural zones. The expected cumulative impact of these projects will be ***Negligible.***	➢ No additional mitigation required.	**Negligible**
Varsak-Serik-Belek ETL	➢ Local communities (Cumalı, Merkez Neighbourhoods)			

The impacts of the projects on VECs are shown in Table XVII.4. Local communities within the AoI (e.g., Hocalar, Kalemler, Yeniköy, Hacıali, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Alara, Akdam) are expected to experience cumulative impacts from simultaneous motorway, railway, and pipeline construction activities. Increased traffic volumes, dust, and noise emissions may heighten health and safety risks, while competition for local employment and housing could generate socio-economic pressures. The overlapping presence of multiple workforces may also raise risks related to community relations and SEA/SH concerns. Effective mitigation requires inter-project coordination on construction schedules, health and safety measures, and proactive stakeholder engagement to reduce social tension and safeguard public well-being.

Forests and agricultural lands are highly sensitive VECs due to their ecological, economic, and livelihood functions. Simultaneous land clearance, trenching, and excavation for the motorway, railway, and pipeline projects could lead to cumulative soil erosion, habitat fragmentation, and reduced agricultural productivity. These pressures may result in long-term landscape degradation if not managed collectively. Coordinated land acquisition planning, erosion control measures, and restoration of temporarily disturbed lands will be critical to minimize residual impacts on these VECs.

Protected areas located within or adjacent to the AoI face heightened risks of cumulative disturbance, particularly from noise, vibration, and dust generated by overlapping construction phases of large-scale infrastructure projects. These disturbances can adversely affect biodiversity, visitor experience, and the ecological integrity of protected sites.

Water resources may face cumulative risks of contamination and over-extraction due to multiple projects operating concurrently in the same hydrological basins. Activities such as trenching and large-scale excavation could intensify sedimentation, increase surface runoff, and reduce water quality in nearby lakes and rivers. The risk is particularly critical in dry seasons or during heavy rainfall events. Coordinated water use planning, seasonal construction scheduling, and shared monitoring of water quality will be essential to manage these cumulative impacts.

Socio-economic pressures are expected to intensify as multiple projects operate simultaneously in the region. Local labor demand, migration of non-local workers, and increased competition for services such as housing, healthcare, and transportation may create stress on municipal capacities. These cumulative pressures can affect community cohesion and overall quality of life. Mitigation should focus on prioritizing local hiring, coordinating with municipalities to expand social services, and monitoring socio-economic dynamics to ensure that cumulative impacts remain within manageable levels.

Ecological receptors, particularly Natural Habitats (e.g. Mediterranean maquis, garrigue and coniferous forests) and Key Biodiversity Areas and nationally protected (Antalya Plains and Belek SEPA, which partially intersects with the Project Area) areas within and near the Project Area, are at risk of cumulative habitat fragmentation and disturbance. Concurrent vegetation clearance, noise, and human activity may reduce species abundance and disrupt breeding or migration patterns. The residual impacts could be significant if projects are not harmonized. Coordinated ecological surveys, biodiversity minimization and offset strategies, and alignment of construction schedules with seasonal ecological sensitivities are necessary to limit cumulative impacts on biodiversity.

The cumulative impact assessment has been undertaken based on a worst-case scenario, considering the potential overlap of the identified projects, most of which are still in the planning stage. The assessment does not imply that all impacts will occur simultaneously or at their maximum intensity, but rather provides a precautionary evaluation in line with IFC good practice. Furthermore, cumulative impacts are the result of multiple projects implemented by different stakeholders; therefore, they cannot be addressed solely by the Project Sponsor. Effective management of these impacts will require coordination among all project proponents, regulatory authorities, and local stakeholders to

ensure that risks to valued environmental and social components (VECs) are minimized and managed proportionately.

XVIII. ANALYSIS OF ALTERNATIVES

As already mentioned in previous chapters, the Project is one of the two sub-projects that constitute the Afyonkarahisar-Alanya Motorway Project and is designed to connect Serik and Alanya districts through Manavgat district of Antalya province. The EIA Report for the Project has been prepared and submitted to the MoEUCC and an "EIA Positive Decision" issued on August 17, 2018. Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways, as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). As a result of the tendering process, KGM has awarded AAOİAŞ (the Project Sponsor) with a BOT contract for the implementation of the Project. Following the signing of the BOT Contract, Project Sponsor has continued route, and Project optimization and design work in cooperation with KGM and other related state authorities. Throughout the Project history, alternative routes were evaluated from a technical, economic and social point of view. These alternatives were generated to address the challenges that emerged during the feasibility and tender stages and requests of the KGM, and then studied and screened out with the KGM authorities. In the following paragraphs, the criteria that affected the route selection during the feasibility and tender stages and optimization of the route in the scope BOT Contract are explained.

XVIII.1. Route Selection Alternatives

Route selection for the Project has been made in two stages. The first stage included the selection of the route by the KGM during the feasibility and tender stages. Following the BOT tender and appointment of the relevant company, Project Sponsor has conducted further work to optimize the route and the locations, numbers, and/or lengths of the road structures such as viaducts, interchanges, overpasses, underpasses, culverts, etc. to achieve the most suitable design in terms of technical, environmental and economic considerations. The third and final stage of the alternative route selection commenced during the post-design phase and continued until the beginning of the construction phase. During this stage, revisions to the route were made based on findings from field studies and/or insights provided by assigned expert(s). In particular, detailed site investigations carried out during the pre-construction phase necessitated changes in certain sections of the route. The primary reason for these revisions was the identification of cultural heritage sites during field activities. A comprehensive field study was conducted along the Project route to detect and assess cultural heritage assets. Following this process, additional studies will be carried out during the construction phase under the supervision of a cultural heritage expert to be employed by the Project Sponsor. It should be noted that all route revisions proposed by the Project Sponsor are subject to the approval of the General Directorate of Highways (KGM).

In the selection of the route by KGM at the feasibility and tendering stages, the following environmental, social, and economic criteria were taken into consideration to the extent the specified physical and geometric standards of the Motorway specifications allowed:

- Avoidance of impacts on legally protected areas, including cultural heritage sites;
- Avoidance and/or minimization of impacts on ecologically sensitive forests;
- Avoidance and/or minimization of the crossing of residential and industrial areas;
- Keeping sufficient distance to the borders of the residential areas to the extent possible;
- Avoidance and/or minimization of the impacts on essential water resources (rivers, lakes, reservoirs, ponds, etc.) and their protection of these areas where applicable;

- Integration with existing transportation infrastructure so that the existing traffic loads/problems can be mitigated and potential needs of future industrial and residential developments;
- Geotechnical/geological conditions/risks (i.e., landslide sites, hills, seismicity);
- Minimization of the expropriation costs;
- Minimization of construction costs (i.e., need for soil works, optimized number and length of viaduct etc. requirements, costs for access roads);
- Operation costs (i.e., fuel, amortization, workforce losses, etc.);
- Interaction potential with existing infrastructure (e.g., energy transmission lines, water supply/distribution, sewerage system, oil and natural gas pipelines, water channels, telecommunication lines, railways, etc.);
- Local climate conditions that may affect maintenance and operation of the Motorway;
- Existing and planned zoning plans within the municipality borders.

The details of the alternative route generation and selection processes, driven by various considerations at each stage, are provided in the subsequent subsections.

XVIII.1.1. Alternative Route Selection during Feasibility and Tender Stages

The main reasons that cause changes in route selection at feasibility and tender stages are:

- Intersection of the Motorway route with legally protected or Cultural Heritage Sites or Protected Areas;
- Intersection of the Motorway route with settlements and/or their components (e.g., cemetery, power lines);
- Intersection of the Motorway route with existing master plans and/or land use licenses (e.g., mining license);
- Technical feasibility and/or restrictions due to geographical conditions;
- Land use characteristics;
- Economic feasibility.

To detail these considerations, a summary table containing information on the position and reasons for the significant route changes is provided in Table XVIII.1:

Table XVIII.1. Summary of Alternative Route Selection during Feasibility and Tender Stages

Position	Explanation
Km: 0+000	Due to the presence of residential areas and the area licensed for mining operations situated to the west of this location, the Project's starting point is shifted approximately 450 meters south of the initial planned starting point.
Km: 3+700 – 7+000	Due to the presence of mining licenses and to optimize land use, the route was shifted approximately 600 meters south.
Km: 8+000 – 10+500	During a field trip conducted with the relevant state institutions, a 1st Degree Cultural Heritage Site was identified. In the following process, this area was registered in the cultural heritage inventory. The route was shifted in line with the opinions received from the institution.
Km: 24+250 – 25+270	Planned filling application at the Aksu Valley crossing was changed to a viaduct pass due to the presence of agricultural areas, the route's intersection with the existing highway and irrigation channels, and the proximity of a cemetery.
Km: 25+900	Based on findings obtained during fieldworks, location of the planned motorway service building was anticipated to be negatively affected by potential flooding of the Aksu Stream. Additionally, placing the building on agricultural land would complicate the process of obtaining the necessary permits. Consequently, the location of the building was shifted forward to Km: 32+550.
Km: 51+892	In response to feedback from KGM officials, a bridge and junction that were not initially present/visible in the provided Project documents were added to the digital documentation of the Project. As a result, the route was shortened by approximately 35 kilometers.
Km: 66+024	As a result of the opening of Taşağıl-Beydiğin-Derebucak State Road (D-687) to traffic, Taşağıl junction and the access road are required to be revised. After the revision the motorway and D-687 junction will be shortened, motorway access from Taşağıl will be easier, thus reducing the time and fuel consumption.
Km: 82+744	Manavgat Access Route is mostly located on areas planned for zoning and as a result expropriation costs become quite high. If the access route is to be passed through the unhabited areas to the west the costs would be lower.
Km: 85.000	To avoid dividing the Boynuzlubelen neighborhood and to minimize the demolition and compensation of multiple properties, the route was shifted further north at the given location.
Km: 101+527	Since the Project route runs parallel to the railway route for an extended stretch, the planned junction was relocated approximately 130 meters to the east to avoid potential interactions.
Km: 146+111 – 146+120	The tunnel exits at the specified locations have been realigned to conform with the existing zoning plan. Additionally, four viaducts have been added to the route to prevent the division of residential areas resulting from the tunnel exit.

Source: Approved EIA of the Project (Afyonkarahisar-Antalya-Alanya Motorway Project (Antalya-Alanya Section) Environmental Impact Assessment Report).

As a result of the alternative route selection process outlined above, the final route, determined at the conclusion of the feasibility and tender stages, is presented in the Figure XVIII.1 below.

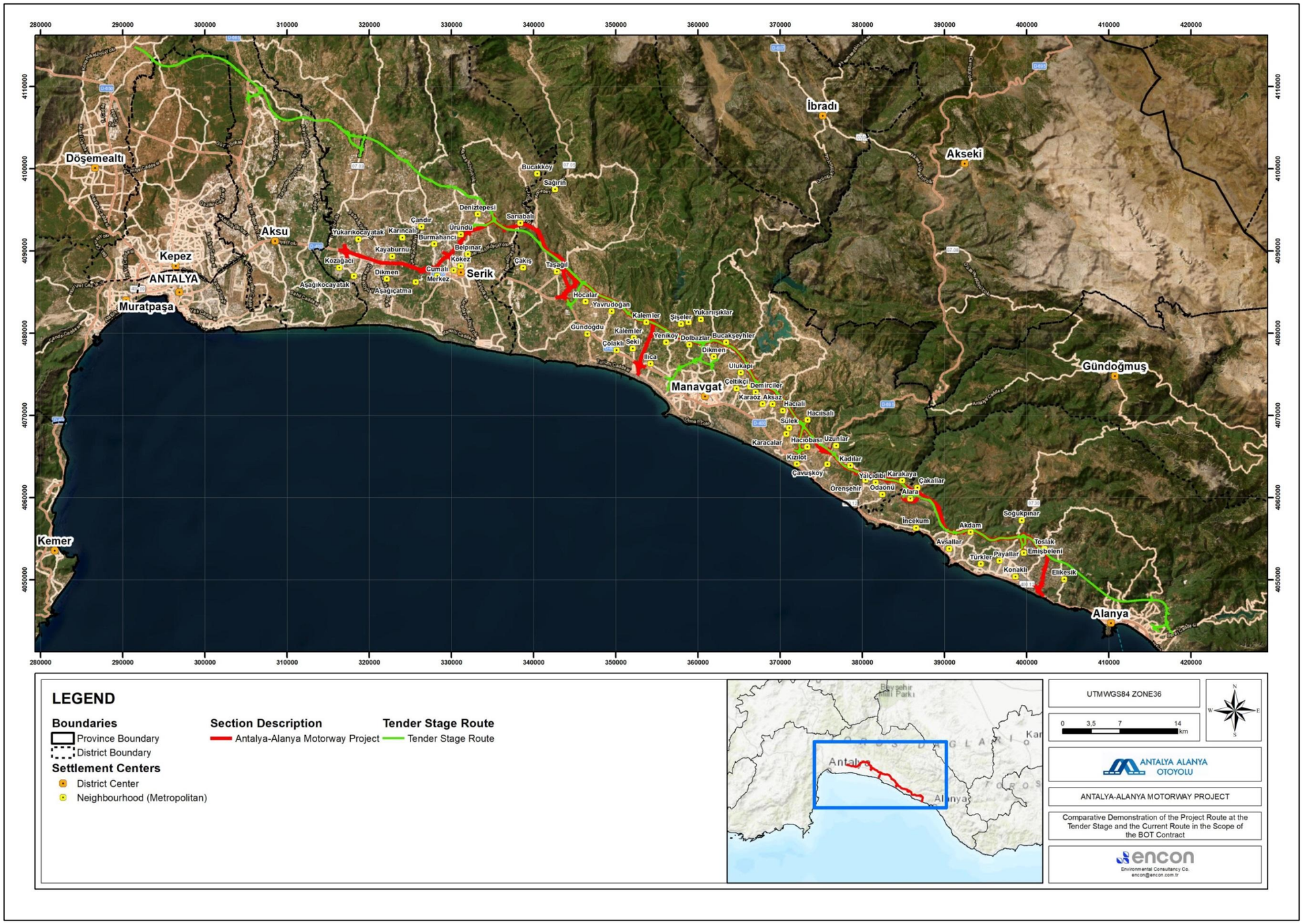


Figure XVIII.1. Comparative Demonstration of the Project Route at the Tender Stage and the Current Route in the Scope of the BOT Contract

XVIII.1.2. Alternative Route Selection during Design Stage

This stage begins after the completion of the feasibility and tender stages and establishment of BOT contract with the relevant contractor (Project Sponsor, in this case), concluding at the design freeze phase before the initiation of the construction works. The primary factors causing changes in route selection at this stage are generally similar with those in previous stages. Additionally, some of the alternative route generation and selection process result from alterations in tender conditions, laws, regulation, masterplans, infrastructure services that made between the feasibility stage and design stage. To outline these considerations, a summary table containing details for the significant changes requiring alternative route generation is provided in Table XVIII.2:

Table XVIII.2. Summary of Alternative Route Selection during Design Stage

Alternative Route Generation Reason*	Explanation
Necessary project revisions will be carried out by taking into account the existing and planned infrastructure projects intersecting with the approved route and changes in land conditions (BOTAŞ, DSİ, SİT, TEİAŞ, TEDAŞ, TELEKOM etc.).	Possible alternative route generation due to changes in infrastructure (water supply, and natural gas pipelines; power, internet and phone lines.) service coverage areas.
In accordance with the legislation and circulars on "Streambeds and Floods", the project will be designed and constructed in a way that the minimum culvert size is 2.00x2.00 m and all culverts are single-tab (as explained in Article 9.3).	Possible alternative route generation due to changes in legislations to enhance overall safety of the users.
Although the project design speed for motorways is stated as 120 km/h in the project criteria report, in line with the developments in the country, the motorway project design speed will be taken as 140 km/h for the main body of the motorway and 110 km/h for the connecting roads, and the necessary project design and construction works will be carried out according to these design speed values.	Possible alternative route generation due to changes in tender specifications. Maximum speed limits directly affect curve angles, curve approach angles, and road slope designs.
The steering arm of the Serik trumpet junction located on the main body of the motorway is in the direction of Antalya, but the said steering arm is altered to be constructed in the direction of Alanya.	Possible alternative route generation due to changes in tender specifications. This change may cause expropriation of new parcels.
The 10 km section of the D400 State Road, between the end of the Antalya Northern Ring Road and the Serik Junction, which serves as a divided road, was designed as 2x2. However it will be redesigned and constructed as 2x3.	Possible alternative route generation to enhance the overall safety and comfort of the users. This change may necessitate expropriation of additional parcels.
The Highway T-4 Tunnel around Km: 61+200, passes approximately 11.8 m below the Seydişehir-Antalya Railway Project route, redesigning and construction will be carried out in a way that will ensure tunnel safety in this section.	Possible alternative route generation due to other infrastructure projects (railway) to enhance overall safety of the users.
In the earthquake design of large engineering structures, the earthquake spectrum with a 50-year exceedance probability of 2% (2475-year return period) will be used. Details on the subject will be taken into consideration in the “Seismic Design Requirements for Bridges” section of the 3rd Section titled “Project-Related Information”.	Possible alternative route generation due to changes in binding documents to enhance overall safety of the users.

Source: Technical Requirements Document of the Project.

As a result of the alternative route selection process outlined above, an interim route and the final design stage route are presented in the

Figure XVIII.2 below to emphasize the evolution of the Motorway route. It should be noted that, the final design stage route provided in

Figure XVIII.2 is not definitive, since the Route may change in future due to cultural heritage finds and other safety, legal, economic and/or social reasons.



Figure XVIII.2. The Interim Routes and the Final Design Stage Route Map of the Project

XVIII.1.3. Alternative Route Selection after Design Stage

The third and final stage of alternative route selection will commence from the post-design phase and continue until the end of the construction phase. Changes in the route during this stage may occur due to findings obtained from the field studies and/or insights provided by employed expert(s). The most probable reason for such changes will be the discovery of cultural heritage sites during field studies and/or construction works. A comprehensive field study will be conducted along the route to detect, define, and assess cultural heritage assets. Upon completion of this field study, further cultural heritage studies will be continued by a cultural heritage expert employed by the Project Sponsor throughout the construction phase. Following field studies, in order to preserve and protect the cultural heritage assests, changes are going to be made on the locations of two intersections of the highway. The respective changes are shown on Figure XVIII.2.

XVIII.2. Motorway Design Parameters

Motorways are access-controlled highways with two or more traffic lanes in each direction and provide an uninterrupted flow. A median and collection of tolls that separate opposing traffic are performed at designated points. Some of the ideal design conditions for the motorways are specified in the Highway Capacity Manual 2000 (HCM 2000) as follows (KGM, August 2010):

- The maximum capacity for each traffic lane will be 2,400 passenger vehicles/hour;
- The minimum width of each traffic lane will be 3.6 m;
- Clearance of 1.8 m between the edge of the travel lanes and the nearest obstructions or objects at the roadside and in the median;
- Speed of the free flow will be 100 km/hour or more;
- Distance between interchanges will be 3 km or more;
- Terrain will be completely flat.

The Project has been designed in accordance with the KGM's technical specifications for motorways. The design speed for the Motorway has been determined as 140 km/hour along the main carriageway, while the design speed for the access roads will be 110 km/hour. In the current design, the width of the lanes is 3.75 m, whereas the lane width drops to 3.50 m on the access roads. The number of the traffic lanes will be 2x3 (dual carriageway with 3 lanes) in all sections along the main carriageway while access roads/connecting roads will be 2x2 (dual carriageway with 2 lanes).

In the Project, constructing the route on flat terrain has been the priority to the extent that it is feasible, however, where the environmental and/or social (i.e., topography, geology, geotechnics, ecological sensitivities, important water bodies, protected areas, cultural heritage sites, etc.) conditions do not allow, road structures such as viaducts, bridges, overpasses, underpasses, etc. have been added to the design to cross non-flat terrains.

XVIII.3. No Project Alternative

Motorway investments play an important role in the infrastructure development strategies of nations. This role is especially critical in Türkiye's transportation sector, where 95% of passenger transportation and 91% of freight transportation rely on road networks. Motorways offer efficient, safe, and rapid travel services, essential for overcoming the topographic and geological challenges present in Türkiye's terrain.

The Akdeniz (Mediterranean) Region of Türkiye holds a particular role in the tourism and agriculture sectors. The proposed Project aims to significantly enhance the region's capacity to fulfill this role in the most efficient and effective manner possible. This Project is an essential component of a broader motorway network initiative that seeks to improve the existing road infrastructure, thereby enhancing accessibility and coverage throughout the region. The region's geographical positioning, rich cultural heritage, historical landmarks, and favorable climate make it a key center for both tourism and agriculture in Türkiye.

Additionally, the urbanization rate of the region is high. As a result of rapid population growth, coupled with an increase in vehicle ownership, traffic problems (i.e., chronic congestion, frequent traffic jams) occur during peak hours, especially in the large cities. Therefore, there is always a significant demand for transportation both throughout and to the region.

In addition to these considerations, each year, over 4,000 lives are tragically lost in traffic accidents on Türkiye's roads, resulting in an annual economic loss of approximately 5 billion dollars, with an additional 180,000 individuals suffering permanent disabilities[1][2]. The Project is anticipated to reduce traffic accidents (assumed up to by 20% reduction), thereby safeguarding the valuable lives of people. This aligns with the fundamental responsibilities of all states, including Türkiye, as outlined in the Constitution of the Republic of Türkiye (Article 5, and 17) as well as international declarations, covenants, conventions (International Covenant on Civil and Political Rights, 1966, Article 6; United Nations Universal Declaration of Human Rights, 1948, Article 3; European Convention on Human Rights, 1950, Article 2), to uphold the most basic human right, the right to life.

The Project's benefits include enhancing the efficiency of transporting high-value agricultural commodities rapidly to both domestic and international markets, ensuring faster delivery, and consequently improving product freshness and quality by providing a safer and efficient transit corridor. Furthermore, the improved motorway infrastructure will provide essential services, education, and healthcare access for residents in remote locations, bridging the gap between rural and urban areas. It will also facilitate faster travel times for passengers and faster response times for emergency vehicles/services, ensuring a safer transportation network due to the reduction in traffic congestion.

As a result of the anticipated reduction in current traffic density due to the shift of a particular portion of vehicles to the new Motorway route, vehicle speeds on existing arteries are expected to increase, leading to reduced fuel consumption rates, air and noise emissions, and time and workforce losses. While the vehicles moving to the new Motorway will contribute to fuel consumption, air and noise emissions, and road accidents, there will be an economically and environmentally positive difference considering the design speed, geometric, and technical standards of the Motorway compared to the existing roads.

A "no project alternative analysis" for a motorway project is inherently challenging due to the lack of viable substitutes for the infrastructure projects. However, it is clear that the proposed Motorway is essential for the socio-economic development of the region. Improvements in transportation infrastructure will foster economic growth by stimulating trade and investment, enhancing safety, reducing congestion, and contributing to environmental sustainability. Thus, assuming the Project has conducted the appropriate studies, and documentation to secure final financial and technical approval from relevant authorities, the Project is a step toward to ensure the development and prosperity of the region, providing long-term benefits that far outweigh its potential drawbacks.

[1] *https://dergipark.org.tr/tr/download/article-file/2119555*
[2] *https://data.tuik.gov.tr/Bulten/Index?p=Karayolu-Trafik-Kaza-Istatistikleri-2023-53479*

XIX. PUBLIC CONSULTATION

XIX.1. INTRODUCTION

According to the current design, total length of the Antalya-Alanya Motorway Project, including the main carriageway and the access roads, is 117.8 km according to the current design. The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000).

The current Project design comprises 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. The motorway will be constructed as a dual carriageway with three lanes in each direction (3x2) along the main route and two lanes (2x2) on the access roads. Table XIX.1 provides the approximate lengths of each road.

Table XIX.1. Antalya-Alanya Project's Current Road

Project	Start and End Locations of the Section (Km)		Length of the Road (Km)		
	Start Location	End Location	Main Road (Motorway)	Access Roads	Total
Antalya-Alanya Motorway	Km 52+000	Km 136+000	84+000	33+800	117+800

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). As a result of the tendering process, KGM has awarded AAOİAŞ as a Project Sponsor with a Build, Operate and Transfer (BOT) contract for the implementation of the Project.

In accordance with the terms of the BOT contract signed between the KGM and the Project Sponsor, the Project includes financing, planning/design, building/construction, operation, full range of maintenance and repair works during the operation period and transfer of the Motorway to the KGM at the end of the contract duration free from any debt or commitment and in a well-maintained, operating, in-service condition, without any charge. The rights of the Project Sponsor to operate maintain and repair the Motorway will expire at the end of the contract duration.

Public consultations must be ongoing activities to maximize the Project's positive impacts and mitigate the negative impacts. Therefore, Stakeholder Engagement Plan (SEP) is a crucial document that outlines the Project's environmental and social impact assessment and management strategies. It is a living document, meaning it must be continuously monitored, reviewed, and updated throughout process of the Project implementation. This method ensures that the social management strategies are appropriate and effective at addressing any potential impacts that may arise during the Project's lifecycle.

As part of the Environmental and Social Impact Assessment (ESIA) process for the Antalya–Alanya Motorway Project (AAMP), a series of public consultations were held to ensure that potentially affected communities and stakeholders were informed, engaged, and able to express concerns or preferences related to the project. These consultations aimed to promote transparency, identify context-specific social and environmental risks, and support the design of appropriate mitigation measures.

Considering national and international principles, ENCON provides the consultation services that the Project could remain environmentally and socially sustainable, and the natural resources are used in a responsible and effective manner.

XIX.1.2. Objectives

The objectives of the public consultation process were to:

- Inform stakeholders about the proposed project design, route alternatives, and anticipated impacts;
- Understand local priorities, social dynamics, and vulnerable groups;
- Gather input for shaping the Environmental and Social Management Plan (ESMP) and Stakeholder Engagement Plan (SEP);
- Establish trust and communication pathways for future engagement during construction and operation.

XIX.2. Regulatory Requirements

The Project is intended to meet applicable national and international standards (Equator Principles 4: Principle 5, and IFC Performance Standard 1 and 5).

A detailed description of the national and international legal framework for the Project is provided in subheadings of this section. Based on a detailed review and evaluation of a number of screening criteria is defined in Turkish EIA Regulation as well as IFCs policies and guidelines, and Equator Principles 4 guidelines.

XIX.2.1. National Requirements

Environmental Law, which was ratified in August 1983, is one of the principal legislation related to the Project. Several by-laws and decrees are enforced under the Environmental Law. The Environmental Impact Assessment Regulation (Official Gazette date: November 25, 2014, Number: 29186) defines the administrative and technical procedures and principles to be followed throughout the Environmental Impact Assessment (EIA) process. When an activity (a Project) is planned, the Project developer is responsible for preparing an EIA report along with many other permits required to realize the Project. However, facilities are subject to the preparation of an EIA Report depending on the type of the facility, its capacity, or the location of the activity. The activities that are subject to the provisions of the Environmental Impact Assessment Regulation are listed in Annex 1 and Annex 2 of the Regulation. For Annex 1 activities, a full EIA report is required, and those Projects go through the entire EIA process. Since the Project is included in the Annex 1 list of the Turkish EIA legislation, the required EIA report was completed in January 2017 and approved by the Ministry of Environment, Urbanization and Climate Change (MoEUCC) on August 17th, 2018 (EIA positive decision number 5180).

The main Turkish Regulation requiring public consultation and stakeholder engagement for development/investment/infrastructure projects is the Environmental Impact Assessment Regulation. The 1st Clause of the 9th Article of the Turkish EIA Regulation defines the stakeholder participation process. In accordance with the related article, a project owner's legal responsibility is to organize an official Public Participation Meeting for the Projects that are included in Annex 1 of the Regulation (as the case in the EU EIA Directive).

Turkish national policy on the protection of the environment, cultural heritage, and conservation of biological resources has been constituted based on relevant international agreements that Türkiye has signed or ratified.

XIX.2.2. International Requirements and Standards

The Project specifically identified physical conditions, aspects, and facilities that are likely to generate potentially significant adverse environmental and social risks and impacts. As a result, it has been proposed as a “Category A” project. For “Category A” projects, a comprehensive full-scale ESIA is required to be conducted. Therefore, the SEP (Stakeholder Engagement Plan) has been prepared according to national standards and EP4, Principle 5, and IFC Performance Standard (PS) 1 and 5, considering relevant parts of other performance standards. The requirements and contents of the standards that are used as guidelines are explained in the following subsections.

XIX.2.2.1. Related Equator Principles 4

According to Equator Principles 4 (latest version, also known as EP4) Principle 5: Stakeholder Engagement, for all Category A and Category B Projects, the Equator Principles Financial Institutions (EFPIs) requires the client to demonstrate effective stakeholder engagement, as an ongoing process in a structured and culturally appropriate manner, with affected communities, workers and, where relevant, other stakeholders. In the context of EP4, to engage stakeholders, the client provides relevant assessment documents to affected communities and interested other stakeholders based on the project's risks and impacts. The client considers and documents the results of the stakeholder engagement process, including any actions agreed upon resulting from such process.

Principle 5: Stakeholder Engagement

For Projects with potentially significant adverse impacts on affected communities, the client will conduct an informed consultation and participation process. The client will tailor its consultation process to: the risks and impacts of the Project; the Project’s phase of development; the language preferences of the affected communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion and intimidation.

Principle 6: Grievance Mechanism

For all Categories A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the Environmental and Social Management System, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project’s environmental and social performance. The grievance mechanism is required to be scaled to the risks and impacts of the Project and have affected communities as its primary user.

The proposed Project is intended to meet applicable international standards. This document and SEP has been prepared in accordance with the guidance of the applicable IFC Performance Standards. In accordance with Equator Principles 4, Principle 5, and IFC Performance Standard 1, a process will be established by which people who deem that they have been adversely affected by the Project during planning, construction, or operation can bring grievances to the Project for consideration and, if required, resolution.

Where a project and a Project Owner receives project financing from IFC, or another financial institution adopting IFC requirements, IFC Performance Standards must be applied for the duration of that project finance. As of 2012, the following eight IFC Performance Standards are applicable to the Project as a whole:

XIX.2.2.2. IFC’s Standards and Guidelines

Performance Standard 1: Social and Environmental Assessment and Management System
Performance Standard 2: Labor and Working Conditions
Performance Standard 3: Pollution Prevention and Abatement
Performance Standard 4: Community Health, Safety and Security
Performance Standard 5: Land Acquisition and Involuntary Resettlement

Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management
Performance Standard 7: Indigenous Peoples
Performance Standard 8: Cultural Heritage

Performance Standard 1[1] specifically relates to stakeholder engagement on the basis that it establishes the importance of: (i) integrated assessment to identify the social and environmental impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) management of social and environmental performance throughout the life of the Project. The objectives of this standard are as follows[2]:

- To identify and assess social and environment impacts, both adverse and beneficial, in the Project's Area of Influence;
- To avoid, or where avoidance is not possible, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment;
- To ensure that affected communities are appropriately engaged on issues that could potentially affect them; and
- To promote improved social and environment performance of companies through the effective use of management systems.

IFC PS2 (Labor and Working Conditions) specifically addresses harassment, intimidation, and/or exploitation. According to IFC PS 2, the client has to take measures and design the mechanisms to prevent and address harassment, intimidation, and/or exploitation, particularly concerning women and minority groups.

The mechanism should be designed to receive and facilitate the resolution of grievances about the Projects' environmental and social impacts. It should aim to resolve concerns quickly and fairly through a transparent process that is easily accessible, free of charge, and without any retaliatory measures against the party that raised the issue or concern. The comprehensiveness of this mechanism is essential. Therefore, ensuring affected people of all genders, minorities, or ethnic groups have easy and fair access is necessary

To meet these objectives, a SEP is designed to guide stakeholder consultations leading up to and during the period of the ESIA studies, as well as during the further stages of project implementation, i.e. excavation, construction and operation (see Annex 2 - Stakeholder Engagement Plan).

Retaliation Risk Prevention and Safe Stakeholder Participation

The Project is committed to ensuring that all stakeholders can freely express their concerns without fear of retaliation. In alignment with *the IFC Good Practice Note for the Private Sector: Addressing the Risks of Retaliation Against Project Stakeholders (2021)*, a series of practical measures have been integrated into the Stakeholder Engagement Plan (SEP) to safeguard stakeholder participation.

As part of the stakeholder identification and mapping process, the Project conducts a risk assessment to identify potential threats of retaliation, particularly toward vulnerable or marginalized groups. This assessment is used to design safe and inclusive engagement approaches tailored to local sensitivities. To further support this, the Grievance Mechanism (GRM) offers multiple anonymous reporting options -such as locked suggestion boxes and secure hotlines -ensuring that all personal data is managed with strict confidentiality in line with national data protection laws and IFC Performance Standard 1.

Sensitive issues, especially those related to gender-based violence and harassment (GBVH), are handled by trained female Community Liaison Officers (CLOs), who adopt a survivor-centered approach and ensure privacy and trust throughout the reporting process. In addition, project staff and

[1] *PS1 is specifically relevant, because it contains clear requirements for community engagement, disclosure of information and consultation. These requirements are the main concerns of this Chapter.*
[2] *IFC Performance Standards, 2012.*

grievance handlers receive specific training to recognize and respond to signs of intimidation or retaliation, using appropriate internal protocols to ensure timely and secure handling of such cases.

Allegations or risks of retaliation are closely monitored and promptly escalated to senior management, where necessary. The Project has adopted a zero-tolerance policy for retaliation in any form -whether by project personnel, contractors, or third parties -reinforcing a culture of safety, respect, and open dialogue for all stakeholders involved.

XIX.3. STAKEHOLDER ENGAGEMENT ACTIVITIES

Within the scope of the EIA studies, public consultation meetings were held alongside the route. The aim of the public participation meeting is to inform people who may be potentially affected about the Project and to understand their concerns, opinions and suggestions about the project. Also, it aims including people into decision making process in terms of the project. This process is the only formal requirement for stakeholder engagement according to Turkish legislation.

As part of the Stakeholder Engagement Activities, Serik and Alanya districts were visited in addition to Antalya to conduct interviews with key stakeholders such as Antalya Governorship and KGM Regional Directorates. Several Project Affected Persons (PAPs) were interviewed in addition to two muhtars of the affected settlements and a representative of Sera-Bir, a local NGO.

XIX.3.1. Stakeholder Engagement Methods

Table XIX.2 The consultations were conducted using a range of methods adapted to local contexts

Method	Description
Community meetings	Open gatherings in central village locations for general awareness and feedback
Focus group discussions	Small group meetings with women, elders, agricultural workers, and other vulnerable groups
Key informant interviews	Individual interviews with mukhtars, religious leaders, and local institution representatives
Household visits	Informal conversations with residents in affected neighborhoods, especially where digital access was limited
Meetings with institutions	Consultations with municipalities, provincial directorates, cooperatives, and relevant NGOs

XIX.3.2. Previous Stakeholder Engagement

The stakeholder engagement activities specific to the Project started at the time of the national EIA process. In this context, Antalya Provincial Directorate of Environment and Urbanization, relevant district Municipalities, District Governorships and Neighborhood/Village mukhtars were contacted in March 2016 to organize the stakeholder engagement activities. The formal stakeholder engagement meetings (public participation meeting), a requirement of the Turkish EIA Regulation, were held on April 7th, 2016, at Ekşili Village Coffeehouse, Alanya Municipality Çıplaklı Wedding Hall, and Manavgat Chamber of Commerce and Industry Assembly Meeting Hall. Therefore, a total of three consultation meetings were held at three different districts of the Project route (according to the Project's EIA Report, 2018): Döşemealtı, Alanya, and Manavgat districts of Antalya Province. The meetings were announced in one local and one national newspaper as per the regulatory requirements. The meetings included a presentation of the Project details, such as construction and operation activities, and recorded the comments and suggestions by participants.

Table XIX.3 Information of PCMs in EIA Process

PCMs	Districts	Date	Time	Location
1	Döşemealtı	07.04.2016	09:30	Ekşili Village Coffeehouse

PCMs	Districts	Date	Time	Location
2	Alanya	07.04.2016	11:00	Alanya Municipality Çıplaklı Wedding Hall
3	Manavgat	07.04.2016	15:00	Manavgat Chamber of Commerce and Industry Assembly Meeting Hall

Table XIX.4 Questions, Opinions, and Suggestions Submitted During the Public Consultation Meeting

Location – Date – Time	Question, Comment, or Suggestion	Response	Main Discussion Points & Feedback Summary
Ekşili Village Coffeehouse /07.04.2016 – 09:30	A specific location along the project route was mentioned, and concerns were raised regarding the expropriation of houses and pastures. A question was asked about the possibility of changing the route.	It was explained that due to elevation differences and geometric conditions at the connection point, the current route had been selected.	Local concern over property loss and desire for route revision; project constraints due to topography. This issue explained in the Institutional and Legal Framework Chapter.
	A question was raised about whether there is a railway project along the route.	The presence of a railway project was acknowledged, and it was explained that it is a separate and unrelated project.	Clarification requested regarding interaction with other infrastructure projects. This issue explained in the Cumulative Impact Assessment Chapter.
	Questions were asked regarding the expropriation process (e.g., number of affected properties, areas involved, and procedures).	It was stated that the entire process would be carried out in accordance with the Expropriation Law.	Community members requested clarification regarding the legal procedures and scope of land acquisition. This matter is addressed in detail within the Institutional and Legal Framework section and throughout the RAP.
Çıplaklı Wedding Hall / 07.04.2016 – 11:00	Concerns were raised about the environmental pollution that may occur during construction and operation phases, and its potential impact on nearby settlements and agricultural products. A request was made to change the route.	The route was shown on a map, and it was emphasized that expropriation is necessary to complete the road. Despite the increased cost, alternative solutions such as tunnels were considered in order to safeguard the well-being of the local community.	Participants raised concerns about environmental and agricultural risks and acknowledged the consideration of alternatives such as tunnels. These aspects are addressed in the Land Use and Property section and the Project Description chapter.
	It was stated that the road would divide the village by passing through its center, and a request was made to shift the route 200–300 meters northward (towards the forest).	It was explained that the requested area falls within a wildlife conservation zone and therefore cannot be used.	Route modification options are addressed in the Analysis of Alternatives section, with conservation considerations further discussed in the Protected Areas and Cultural Heritage chapters.
	Participants cited tunnels used in other villages and requested a similar tunnel for their own. They also expressed concerns about an inappropriate route selection for expropriation purposes.	Three participants submitted written statements (recorded in the minutes). No response was provided.	Tunnel requests were raised by the community. Relevant design adjustments are considered in the Project Description and Analysis of Alternatives sections.
Manavgat Chamber of Commerce and Industry – Assembly Hall / 07.04.2016 – 15.00	Negative environmental, agricultural, and tourism impacts were expressed.	It was stated that mitigation measures would be taken during construction, and that during the operation phase, the project would contribute positively to the transportation of agricultural products and increase tourism circulation.	The ESIA comprehensively assesses potential impacts during both construction and operation phases. Specific mitigation measures have been developed accordingly. Additionally, the potential benefits of the Project are also evaluated within the ESIA.

Location – Date – Time	Question, Comment, or Suggestion	Response	Main Discussion Points & Feedback Summary
	Negative feedback regarding the project route was shared (e.g., adverse impacts, expropriation issues).	Responses were provided, and it was mentioned that the route could be revised in coordination with relevant authorities, depending on stakeholder feedback.	Route modifications are considered in the Analysis of Alternatives section, based on stakeholder requests and in coordination with relevant authorities.
	Questions were raised regarding potential negative impacts on settlements and the mitigation measures to be taken.	It was explained that measures such as road watering to prevent dust, covering truck trailers, and installing noise barriers would be implemented.	Project routes are defined in the Project Description section of the ESIA, and potential impacts during construction and operation in these locations are addressed in detail throughout the report. Specific mitigation measures are developed in Chapter 15: Community Health and Safety.

During the Public Consultation Meetings (PCMs), the majority of questions, comments, and complaints were related to the proposed route of the Project. Local stakeholders expressed concerns about the potential impacts of land acquisition activities along the route, particularly regarding their effects on the agriculture and tourism sectors. Accordingly, a significant portion of the complaints received from local residents focused on the loss of agricultural lands and restricted access to tourism facilities.

In the meetings held in and around Manavgat, tourism-related questions predominated, as the proposed Project route passes near touristic areas. Participants frequently requested revisions to the route and raised concerns about the expropriation process. In response, representatives of the relevant authorities emphasized that all procedures will be carried out in compliance with the Expropriation Law No. 2942, ensuring full adherence to national legal frameworks.

Topics such as archaeological sites and protected cultural heritage areas were mentioned less frequently. However, for the questions raised on these matters, project officials clarified that appropriate mitigation measures will be implemented, and coordination with relevant heritage protection authorities will be ensured throughout the project lifecycle.

In June 2024, ENCON conducted a comprehensive four-day field study aimed at gathering qualitative data from a wide range of stakeholders across various regions in Antalya province. The study included interviews and focus group discussions with academics, local authorities, and community members, targeting diverse demographic and occupational groups. The detailed breakdown of the activities conducted during the field study is presented in Table XIX.5. The feedback received during the interviews and how they were responded to is presented in Table XIX.6.

Table XIX.5 Summary of Field Study Activities Conducted by Encon in June 2024

No	Work Items	Locations
1. Day		
1	Academician Interview	Akdeniz University/Faculty of Agriculture
2	Academician Interview	Akdeniz University / Faculty of Tourism and Biology
2. Day		
3	Official Institution Interview	Serik District Governor
4	NGO Interview	Head of Serik Chamber of Tradesmen and Craftsmen
5	Key Informant Interview	Serik/ Mukhtar of Merkez Neighborhood
6	Focus Group Interview	Serik / Merkez Neighborhood

No	Work Items	Locations
7	Focus Group Interview	Manavgat/Taşağıl Neighborhood
8	Vulnerable Group (Elderly) Interview	Manavgat/ Taşağıl Neighborhood
3. Day		
9	Focus Group Interview	Manavgat/Kalemler Neighborhood
10	Vulnerable Group (Women) Interview	Manavgat/Kalemler Neighborhood
11	Focus Group Interview	Manavgat/Ulukapı Neighborhood
12	Vulnerable Group (Women) Interview	Manavgat/Ulukapı Neighborhood
13	Key Informant Interview	Manavgat/ Mukhtar of Ulukapı Neighborhood
14	NGO Interview	Manavgat Head of the Chamber of Agriculture
15	Official Institution Interview	Manavgat Directorate of Technical Affairs
16	Focus Group Interview	Manavgat/Hacıisalı Neighborhood
17	Vulnerable Group (Elderly) Interview	Manavgat/Hacıisalı Neighborhood -Ayrancılar
4. Day		
18	Key Informant Interview	Manavgat/ Mukhtar of Karakaya Neighborhood
19	Focus Group Interview	Manavgat/ Mukhtar of Karakaya Neighborhood
		Alanya/ Mukhtar of Çakallar Neighborhood
		Alanya/ Alara Neighborhood Household
20	Focus Group Interview	Alanya/Akdam Neighborhood
21	Focus Group Interview	Alanya/Toslak Neighborhood
		Alanya/Konaklı Neighborhood
		Alanya/Alara Neighborhood
		Mukhtars and Households
22	Key Informant Interview	Alanya/ Mukhtar of Toslak Neighborhood

Table XIX.6 Summary of Field Study Interview Conducted by Encon in June

Interview Type and Location	Summary of the Interview	Main Discussion Topics and Responses
Akdeniz University / Faculty of Agriculture – Academic Interview	Emphasis was placed on the protection of agricultural lands, prevention of zoning pressure, and continued support for small-scale producers. Protection of underground water resources was also requested.	Agricultural lands will be preserved, and monitoring and preventive measures for water resources will be implemented to support farmers' activities.
Akdeniz University / Faculty of Tourism and Biology – Academic Interview	Recommendations included preventing fragmentation of natural habitats, using local plant species (olive, carob) in medians, and declaring the Alarahan area a nature park.	The route was planned to avoid habitat fragmentation. Local species will be used in landscaping, and coordination with relevant institutions will be ensured.
Serik District Governorate – Official Institution Interview	The project is viewed positively; however, it was requested that construction not coincide with tourism and agricultural seasons.	Efforts will be made to ensure that construction activities do not overlap with peak tourism and harvest periods.
Serik Chamber of Tradesmen and Craftsmen – NGO Interview	The road is expected to benefit tradespeople and farmers; it was requested that rest areas be designed to support commercial activities.	Rest facilities will be made accessible to local producers and tradespeople to support commercial activities.
Serik / Merkez Neighborhood – Mukhtar	Requests included ensuring road access to	Noise and air quality control measures will

Interview Type and Location	Summary of the Interview	Main Discussion Topics and Responses
Interview and Focus Group	villages, controlling dust/noise, and increasing information dissemination.	be implemented and monitored. Village access will be maintained with planned connection roads. An inclusive grievance mechanism has also been developed.
Manavgat / Taşağıl Neighborhood – Focus Group and Elderly Group	Elderly individuals face challenges accessing information; it was suggested to use audio announcements.	Information access for the elderly will be provided through public announcements in spaces such as mosques and mukhtar offices.
Manavgat / Kalemler Neighborhood – Focus Group and Women Group	The road's positive contribution to health and agricultural access was noted; women expressed social support needs.	Social support requests specific to women will be considered.
Manavgat / Ulukapı Neighborhood – Focus Group, Women Group, Mukhtar	Requested the preservation of field roads and uninterrupted access during construction.	Field roads and connections between settlements will be maintained with underpasses and overpasses ensuring uninterrupted access.
Manavgat Chamber of Agriculture – NGO Interview	Support for producers and participation in decision-making processes were requested.	Regular coordination and information meetings will be held with producer unions.
Manavgat Directorate of Technical Affairs – Official Institution Interview	Requested compatibility with urban planning and integration with public infrastructure.	Planning will be coordinated with municipalities, and infrastructure transitions will be integrated into the project.
Manavgat / Hacıisalı Neighborhood – Focus Group and Elderly Group	Requested reduction of social isolation and safe crossings.	Safe pedestrian crossings and transport services will be provided.
Manavgat / Karakaya Neighborhood – Mukhtar and Focus Group Interview	Suggested preventing the village from being divided and constructing tunnels/underpasses.	Underpasses and bridges will be evaluated for critical crossing areas.
Alanya / Akdam, Toslak, Konaklı, Alara - Focus Group and Mukhtars	Requested support for loss of agricultural land, routing away from residential areas, and eco-tourism-oriented rest areas.	Support will be provided to affected producers and alternative route scenarios have been evaluated. Eco-tourism-focused designs will be considered for rest areas.

The EIA Review and Evaluation Commission set up by the MoEUCC; General Directorate of EIA, Permit and Inspection at the scoping stage of the national EIA processes included the governmental stakeholders listed in Table XIX.7

Table XIX.7 Governmental Stakeholders Involved in the Scoping, Review and Evaluation of the National EIA Process

Organization	Directorate/ Administration
General Directorate of Highways	General Directorate of Highways 13th Regional Directorate
Governorship of Antalya	Investment Monitoring And Coordination Department Antalya Governorship Repealed Provincial Directorate of Agriculture Antalya Governorship Provincial Directorate of National Education
Antalya Metropolitan Municipality	Department of Housing and Urbanization Department of Real Estate and Expropriation
Ministry of Transport and Infrastructure	Antalya Airport Chief Directorate
General Directorate of Mineral and Research and Exploration	General Directorate of Mining Affairs, Exploration Department
Ministry Of Agriculture And Forestry	General Directorate of State Hydraulic Works Department of Survey, Planning and Allocations Directorate General of Agricultural Reform General Directorate of Nature Conservation and National Parks General Directorate of Forestry Department of Permits and Easements

Organization	Directorate/ Administration
Ministry of Forestry And Water Affairs	Repealed Ministry of Forestry and Water Affairs 6th Regional Directorate Antalya Branch Directorate
Turkish Electricity Transmission Corporation (TEIAŞ)	General Directorate of Electricity Generation Corporation
Ministry of Culture and Tourism	Directorate General of Investments and Enterprises Regional Board of Protection of Cultural Heritage
Ministry of Environment, Urbanization and Climate Change	General Directorate of Conservation of Natural Assets Provincial Directorate of Environment, Urbanization and Climate Change
Ministry of Interior	Provincial Directorate of Disaster and Emergency
Ministry of National Defense	General Directorate of Machinery and Chemical Industry Corporation
Ministry Of Industry And Technology	Directorate General for Industrial Zones

The EIA Application File was prepared on behalf of General Directorate of Highways and submitted to the Ministry of Environment and Urbanization by the e-EIA system on March 4th, 2016, and the EIA process was initiated. During the preparation of the Project's EIA Report, the comments and opinions expressed by the local communities during the Public Participation Meeting, and the official views of the governmental stakeholders that formed the EIA Review and Evaluation Commission, were incorporated. Following the finalization of the report, the EIA was disclosed to the public via the MoEUCC and the Provincial Directorate of the Environment, Urbanization and Climate Change as per the requirements of the national EIA Regulation.

XIX.3.3. Stakeholder Engagement as part of the ESIA Process

The expert team in Encon held two separate field studies as part of the ESIA study, as summarized in Table XIX.8. The first one was a reconnaissance study carried out on May 2024 with the main objective of identifying the environmental and social features and sensitivities of the Project. This included planned art structures along the motorway route, campsites, quarries, and facilities such as the concrete plant, asphalt, and mechanical plan.

The second field study, conducted on June 2024, focused on key informant, focus group, vulnerable groups, and other stakeholders (NGOs, Academicians, Communities, etc., in the region) interviews. During the social field study, key informative interviews were conducted with the mukhtars of four (4) settlements previously determined. Focus group interviews were held in eight (8) settlements, including mukhtars and households of 12 neighborhoods in the impact areas. Focus group interviews in Serik Merkez, Taşağıl, Kalemler, Ulukapı, Hacıisalı, Karakaya-Çakallar-Alara, Akdam, and Toslak-Konaklı-Alara neighborhoods; and vulnerable group interviews were conducted in those areas. Additionally, other stakeholders such as academics, local officials, and local communities were interviewed to gather expert opinions on the socio-economic impacts of the Project.

Table XIX.8 Summary of the Social Field Studies Conducted as part of the ESIA

Tasks	Date of the Field Study	Scope of the Field Study
Site visit	May 2024	• The reconnaissance study started at Km: 52+000, and ended at Km: 135+000 • Visiting the license area: planned tunnel, viaduct, quarry, facility area, and construction site and storage area.

Tasks	Date of the Field Study	Scope of the Field Study
Key Informant Interviews Focus Group Interviews, Other Stakeholder Meetings	June 2024	• Four (4) key informant interviews in Serik/Merkez, Manavgat/Ulukapı, Manavgat/Karakaya, and Alanya/Toslak neighborhoods • Eight (8) Focus group interviews in Serik Merkez, Taşağıl, Kalemler, Ulukapı, Hacıisalı, Karakaya-Çakallar-Alara, Akdam, and Toslak-Konaklı-Alara • Interviews with Academics, local officials, and local communities
Road Trip Study Public Consultation Meetings (PCMs)*	August 2025	• Informing the local community about the Project and collecting feedback from stakeholders, including complaints, suggestions, and opinions.

**Shuttle vehicles were arranged for appropriate residential areas in order to facilitate access to the Public Participation Meetings and to increase attendance rates.*

In parallel to the ESIA studies, the Company has started to establish close relationships. In this scope, Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş participate the reconnaissance study in the project area May, 2024.

A Stakeholder/Public Consultation Meeting (PCM) had been organized after the finalization of the expropriation plan by the General Directorate of Highways (KGM). During the meeting, details about the project, its potential environmental and social impacts/risks, mitigation measures to be taken, and implementation/ monitoring/reporting responsibilities of different parties had been shared with the stakeholders; and then their opinions and suggestions received during the question-answer (Q&A) session are recorded and included in Table XIX.12.

XIX.3.4. Road Trip

In December 2024, Public Consultation Meetings (PCMs) was planned to be held in the four most affected locations related to the "Road Trip" study. However, due to delays in the completion of expropriation procedures, these meetings have been postponed and will be organized once sufficient progress has been made. These meetings aim to disclose Project impacts and planned mitigation measures, while creating a space for meaningful public feedback prior to the commencement of construction.

For the Project, four Public Consultation Meetings (PCMs) were held in selected locations Orta (Serik, Antalya), Yukarıpazarcı (Manavgat, Antalya), Avsallar (Alanya, Antalya), and Konaklı (Alanya, Antalya). Venues within local neighborhoods, which possess adequate capacity and appropriate physical conditions, were used for these meetings. This preference was based on the observation that participation levels are generally higher in such local venues, according to past experiences. Moreover, selecting the exact place/location were considered to create a more inclusive environment that enables women and vulnerable groups to participate. Figure XIX.2 and Figure XIX.1 shows the locations of the planned PCMs. and those that social field study was conducted.

To ensure broad awareness and community participation, announcements regarding the PCMs were made through multiple channels, including: public bulletin boards in central neighborhood locations, local mukhtars' offices, municipality websites, and local radio broadcasts where feasible. Additionally, printed invitations and visual materials such as posters and leaflets will be distributed, and mobile messaging applications (e.g., WhatsApp groups commonly used in local communities) may also be utilized to reach wider audiences. In addition to those the announcement at the national newspaper will also be done. All announcements will be made at least two weeks prior to the meetings and will be provided in Turkish, with Arabic translations where needed to ensure inclusivity for refugee or migrant populations.

PCMs took place along the entire Motorway route from the Serik district to the Alanya district of Antalya province. Table XIX.10 displays details about the planning of PCMs. The meeting locations were selected based on findings from key informant and focus group interviews conducted in the region by a social expert employed in ENCON. The overall motorway route spans 117.8 km, including

the main carriageway and the access roads. Since it would not be possible to organize a meeting in every settlement that is located within the study area, in the selection of the settlements at which the public consultation meetings are planned, it was aimed that a meeting location is determined every 30 (plus minus) km along the Motorway route to ensure to the extent possible that the meeting location was accessible for the local people from the surrounding settlements and in order to acquire a more inclusive Road Trip for all different stakeholders.

The meetings were held with the participation of representatives of Limak as Project Sponsors (senior officials and technical Project team members including design and expropriation), authorities from the 13th Regional Directorate of KGM, and the Environmental and Social Impact Assessment (ESIA) Consultant (ENCON Environmental Consultancy).

The ESIA Consultant moderated the meetings. The meetings commenced with an introduction and an explanation of the meeting's purpose and scope. This was followed by a presentation from the ESIA consultant and a final discussion session to address any questions, concerns, and suggestions. The main topics covered in the presentations were as follows:

- What is the Antalya-Alanya Motorway Project?
- Who are the project sponsor and ESIA Consultant?
- What are roles of the Project Sponsor and ESIA Consultant?
- What are the Anticipated Benefits of the Project?
- What is the Environmental and Social Impact Assessment Process?
- Stakeholder Engagement: How to Participate in the Process?
- Discussion (Questions and Answers) Session

Large-scale (in A0 format) maps showing the relevant part of the route in each meeting were posted on the walls of the meeting venue. In addition, project information brochures (including guide for land acquisition and compensation) was shared the participants. As a result of the information efforts, the attendance levels at meetings, particularly those that might be held in local neighborhood tea houses, will be adjusted to reach the expected number of participants. Different parties participated, including government officials or (significantly) from adjacent neighborhoods.

Table XIX.9 shows the expected local representatives of participant profile in planned PCMs. A list of participants will be maintained at the meeting.

Table XIX.9 Summary of Participants Profiles

PCM No	Meeting Location	Adjacent Neighborhoods from which Representatives (Mukhtar or Local People) will Participated in the Meeting
1	Serik / Merkez	Cumalı, Burmahancı, Deniztepesi, Kayaburnu, Çandır, Üründü, Aşağıkocayatak, Yukarıkocayatak, Sarıabalı, Aşağıçatma, Belpınarı and Abdurrahmanlar neighbourhoods
2	Manavgat / Merkezı	Çakış, Taşağıl, Gündoğdu, Hocalar, Yavrudoğan, Çolaklı, Seki, Kalemler, Evren, Ilıca, Yeniköy, Şişeler, Evrenleryahşi, Dolbazlar, Yukarıışıklar, Dikmen, Bucakşeyhler, Ulukapı, Aşağıışıklar, Demirciler, Karaöz, Aksaz, Hacıali, Cevizler, Sülek, Hacıisalı, Hacıobası, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Odaönü, Karakaya neighborhoods
3	Alanya / Avsallar	Avsallar, Akdam, İncekum, Alara, and Çakallar neighbourhoods
4	Alanya / Konaklı	Türkler, Emişbeleni, Toslak, Konaklı, Elikesik, Payallar neighbourhoods

Table XIX.10 Organizational Details of the Planning Public Consultation Meetings in Antalya*

PCM No	Province	District	Neighborhood	Km Chain age	Population (TURKSTAT, 2024)	Date of the Meeting	Time of the Meeting	Meeting Venue	Number of Participants
1	Antalya	Serik	Merkez	Km 52+000 (Access Road)	17,969	27.08.2025	09.00 - 12.00	Serik Multipurpose Cultural Hall	80-
2	Antalya	Manavgat	Merkez	Km 87+000	6,374	27.08.2025	15.00 - 18.00	Manavgat İbrahim Sözen Youth Center	187-
3	Antalya	Alanya	Avsallar	Km 125+000	16,118	26.08.2025	09.00 - 12.00	Avsallar Kör Ali Baysal Wedding Hall	200-
4	Antalya	Alanya	Konaklı	Km 141+000	17,927	26.08.2025	15.00 - 18.00	Alanya Municipality Konaklı Cultural Center	300-

**To facilitate access to the Public Participation Meetings and to increase attendance rates, shuttle vehicles were arranged for the eligible residential areas specified in Table XIX.9*



Figure XIX.1 Locations of Conducted Social Field Study



Figure XIX.2 Map of PCMs Locations

XIX.3.5. Field Study with Women

As part of the Project, Community Liaison Officers (CLOs) conducted a series of focus group discussions specifically with women in different districts and villages located along the Project corridor. These meetings were held between late July and late August 2025, covering Serik, Manavgat, and Alanya districts. The purpose of the discussions was to collect women's perspectives, identify their specific concerns, and ensure that their voices are incorporated into the Project's social assessment and engagement process. The record list of the meetings is presented in Table XIX.11

Table XIX.11 Focus Interviews Conducted by CLOs

No	Date	District	Village / Neighborhood	Facilitator	Meeting Status
1	7/28/2025	Serik	Sarıabalı	CLOs	Held
2	8/23/2025	Serik	Cumalı	CLOs CLOs	Held
3	8/24/2025	Serik	Üründü	CLOs	Held
5	8/24/2025	Manavgat	Taşağıl	CLOs	Held
6	8/22/2025	Manavgat	Yukarıışıklar	CLOs	Held
7	8/23/2025	Manavgat	Bucakşeyhler	CLOs	Held
8	8/24/2025	Manavgat	Ulukapı (Araplar Street)	CLOs CLOs CLOs	Held
			Ulukapı (Isparta Street)		
			Ulukapı (Alibazlı Street)		
9	8/23/2025	Alanya	Konaklı	CLOs CLOs	Held
10	8/23/2025	Alanya	Türkler	CLOs	Held
11	8/24/2025	Alanya	Avsallar	CLOs	Held

Each session was facilitated by a designated CLOs and provided an opportunity for women community members to share their expectations, highlight potential gender-related impacts, and discuss measures to address them. The outcomes of these meetings will serve as an important input for shaping the Project's Stakeholder Engagement Plan and informing mitigation strategies that are responsive to women's needs and priorities.

XIX.3.6. Public Consultation Meetings Summary

A detailed review of the PCMs held on August 26-27 as part of the project's ESIA process is presented below.
Figure XIX.3 shows the shuttle vehicle arranged to facilitate access to the PCM and used participation list form. The neighborhoods designated as shuttle points are listed under the meeting locations with transportation demand.


ANTALYA-ALANYA OTOYOLU PROJESİ HALKIN KATILIMI TOPLANTISI KATILIMCI LİSTESİ

MAHALLE: Avsallar

TARİH: 26.08.2025 SAAT: 10.00

KATILIMCILAR

İsim , Soyisim	Meslek	Temsil Ettiği Kurum / Yerleşim Yeri	Telefon Numarası	İmza

Figure XIX.3 Shuttle for PCM

Avsallar

The Public Consultation meeting was held on August 26, between 9 and 11 a.m, at the Kör Ali Baysal Avsallar Wedding Hall. To facilitate access to the PCM and to increase attendance rates, shuttle vehicles were arranged for the Alara, Akdam, Çakallar and Türkler. A total of 200 people attended the meeting, 34 of whom were women. It was observed that the majority of participants were between the ages of 35 and 64. It was also noted that 4-5 participants were aged 75+, and one physically disabled individual was present at the meeting. Before the meeting began, conversations were held with participants who had contacted, and their concerns were listened to. The project presentation began at 10 a.m. after which complaints, questions, and opinions were received. While the village heads and participants expressed their complaints, tensions arose among the participants from time to time. While a group of questions were being answered by project officials, the participants expressed their reactions by protesting the meeting, and as a result, the meeting could not be completed.

Figure XIX.4 shows the venue where the meeting took place, the layout of the meeting room, the project route maps hung on the walls for informational purposes, and the presentation made during the meeting. Figure XIX.5 shows the informational brochures. These include the Project information brochures distributed during the meetings and the informational brochures created regarding expropriation.

At the Avsallar - Kör Ali Baysal Wedding Hall, during part of the meeting and in the pre-meeting discussions, the main requests included shifting the route over the Alara River or constructing a tunnel through the forest corridor. Participants also emphasized the need to protect agricultural lands and to avoid adverse impacts on parks, greenhouses, irrigation canals, and residential houses. In addition, greater transparency was requested regarding information on quarries and their permitting processes.

On the other hand, the main concerns expressed were the increase in the number of houses affected due to the route change, grievances caused by the quarries, inappropriate working hours, and the risk posed to drinking water sources resulting from drillings. Concerns were also raised that expropriation compensation amounts would be too low. Prior to the meeting, the Expropriation Director provided information about the legal procedures, while ENCON Environmental Consultancy explained the compensation mechanisms foreseen within the RAP framework. The participants' Q&A table is presented in Table XIX.12.



Figure XIX.4 PCM in Avsallar



Figure XIX.5 The Informational Brochures in PCM

Konaklı

The Public Consultation meeting was held on August 26, between 3 and 6 p.m., at the Alanya Municipality Konaklı Cultural Center. The local headmen and residents stated that they would arrange their own transportation for the meeting held here. A total of 300 people attended the meeting, 26 of whom were women. Since the meeting in Avsallar could not be completed, some participants attended the meeting in Konaklı.

Figure XIX.6shows the venue where the meeting took place, the layout of the meeting room, the project route maps hung on the walls for informational purposes, and the presentation made during the meeting. Figure XIX.7 shows the informational brochures.

At the meeting held at the Alanya Municipality Konaklı Culture Center, the main requests included ensuring the continuity of the Konaklı–Alanya road, extending the road to Gazipaşa, and improving the design of the Konaklı junction. Tunnel and alternative crossing options were also suggested in order to prevent damage to agricultural lands. Complaints were mainly focused on the Konaklı junction dividing the neighborhood into two, the connection road design increasing traffic load, uncertainties regarding expropriation compensations and procedures, and concerns about 2B lands. In addition, the negative impacts of the Project on agricultural production and livelihoods were emphasized. Questions from participants regarding parcel and compensation information were answered by the AAOİAŞ Expropriation Director, while social impacts and measures under the RAP were explained by ENCON Environmental Consultancy and the AAOİAŞ Environment and Social Manager. CLOs conducted interview with local stakeholders prior to the session and also collected the contact information of participants who raised sensitivities during the meeting. The participants' Q&A Table is presented in Table XIX.12.



Figure XIX.6 PCM in Konaklı



Figure XIX.7 The Informational Brochures in PCM

Serik / Orta Neighborhood

The Public Consultation meeting was held on August 27, between 9 and 12 a.m., at the Antalya Metropolitan Municipality Multi-purpose Cultural Hall. The mukhtars and residents stated that they would arrange their own transportation for the meeting held here. A total of 80 people attended the meeting, 15 of whom were women.

At the meeting held at the Serik Multipurpose Cultural Center, the most frequently raised requests included a route change to protect the cemetery, the widening of the culvert under the D400 road, and ensuring access to greenhouses and houses through underpasses and connection roads.

The main complaints focused on the low level of expropriation compensations, the loss of value of payments due to inflation, the loss of fertile agricultural lands, and the risks faced by greenhouses built through loans. In addition, the absence of representatives from the General Directorate of Highways (KGM) was criticized. Questions related to the cemetery were addressed by AAOİAŞ representatives, who provided explanations on technical reasons and the inspections to be carried out. Details regarding expropriation compensations and legal procedures were provided by the Expropriation Director, while social impacts and livelihood losses were evaluated by the AAOİAŞ Environment and Social Manager. CLOs collected the addresses and contact numbers of households they had engaged with prior to the meeting as well as those who expressed sensitivities during the session.

The participants' Q&A Table is presented in Table XIX.12, while the meeting photos are presented in Figure XIX.8



Figure XIX.8 PCM in Serik / Orta Neighborhood

Manavgat / Yukarı Pazarcı Neighborhood

The Public Consultation meeting was held on August 27, between 3 and 6 p.m., at the Ibrahim Sözen Youth Center. To facilitate access to the PCM and to increase attendance rates, shuttle vehicles were arranged for the Yavrudoğan, Yeniköy, Dolbazlar, Karaöz, Hacıobası and Karakaya. A total of 187 people attended the meeting, 39 of whom were women.

At the meeting held at the Manavgat İbrahim Sözen Youth Center, the main complaints included uncertainties regarding expropriation negotiations and the payment schedule, issues related to fragmented parcels, risks of dust and asbestos as well as negative impacts from blasting, the risk of yield loss in olive trees, and the absence of representatives from the General Directorate of Highways (KGM). Questions concerning parcels and inherited properties were addressed by the AAOİAŞ Expropriation Director, while issues related to livelihood losses and vulnerable groups were answered by ENCON Environmental Consultancy and the AAOİAŞ Environment and Social Manager. Prior to the meeting, CLOs carried out information activities, and during the meeting, the addresses and contact details of participants who expressed sensitivities were collected in order to plan further engagements. The participants' Q&A Table is presented in Table XIX.12, while the meeting photos are presented in Figure XIX.9.



Figure XIX.9 PCM in Manavgat / Yukarı Pazarcı Neighborhood

Table XIX.12 Questions, Opinions, and Suggestions Submitted During the Public Consultation Meeting

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
Avsallar Kör Ali Baysal Wedding Hall / 26.08.2025 09:00-11.00	Headman of Akdam Neighborhood	It was emphasized that the Project would have negative impacts on agriculture and that both the local community and individuals would suffer losses.	A few questions, requests, and opinions were received first. Afterwards, while a representative from the General Directorate of Highways (KGM) was responding on behalf of the Project Officials, the meeting was interrupted and ended prematurely.	
	Resident	It was noted that the number of houses affected by the route change increased from 5 to 40, and a request was made to shift the route over the Alara River. It was also stated that parks, greenhouses, irrigation canals, and houses would be affected by the route.		
	Headman of Çakallar Neighborhood	It was stated that no prior notification had been provided regarding construction works, and that permission would not be granted once construction reached the village. A request was made for the Project		

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		route to pass through the forest instead of the settlement, including the construction of a tunnel if necessary. Objections to the quarries and the current route were reiterated, which were supported by applause from the community. Concerns were also expressed that the Project would not create employment, that people whose livelihoods depend on agriculture would lose their income sources, and that they would only be employed as cleaning staff.		
	Resident	It was stated that the local community did not want expropriations to be carried out. The procedures and legal processes related to expropriation were shared. It was also expressed that participants believed the compensation amounts for expropriation would be low.		
	Headman of Saburlar Neighborhood	It was stated that the motorway and quarries caused serious grievances and that the working hours were inappropriate. Questions were raised about whether EIA reports had been obtained for the quarries and who had granted the approvals. Concerns were expressed about the muddy water resulting from the drillings, noting that the Saburlar Quarry is located 200 meters upstream of the water source. It was further stated that a complaint petition had been submitted to the General Directorate of Highways (KGM) regarding this issue, but no action had been taken.		
Alanya Municipality Konaklı Culture Center / 26.08.2025 15:00-18.00	Resident	It was stated that there is a need for a road and that no alternative route exists, which causes heavy traffic. A request was made for the continuation of the Konaklı–Alanya road,		

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		noting that there is no entrance to Alanya after Konaklı.		
	Resident in Toslak Neighborhood	It was asked why the Project route had recently been changed and what the justification for this change was.	Representative of AAOİAŞ	Minor changes were made at the D-400 connection section in order to ease traffic.
	CHP District Chairman	It was stated that while the road is needed, it should not be constructed in its current form. The route passes through agricultural lands in Alarahan and Toslak, which constitute the livelihood of local people. It was requested that the complaints be taken into consideration, emphasizing that the destruction of agricultural lands would have significant impacts on climate and water scarcity. It was also noted that it currently takes one hour to travel 15 km, but congestion will still occur with the proposed connection roads.	Representative of ENCON	It was explained that in line with international standards, different solutions for expropriation activities and the associated costs are also being taken into account.
	Mayor of Konaklı (2014–2019)	It was stated that if the road is planned to be extended up to Gazipaşa, then the connection road in Konaklı (behind the New Hospital) should be cancelled. A concern was raised about whether it would first be constructed and then cancelled, emphasizing that people are already being adversely affected by the Konaklı connection road.	Representative of ENCON and AAOİAŞ	Reference was made to the Erdemli–Kızkalesi Project, where an extension was carried out as described. It was further explained that in addition to the motorway, certain connections are also included in the General Directorate of Highways' plans and will likely be expanded.
	Resident	Questions were raised regarding when the construction will take place and when it will be completed. Concerns were expressed about ongoing agricultural activities and related expenses (e.g., irrigation costs of 11,000 TL) as well as newly built structures (houses and buildings), and whether they would be demolished and compensated if affected.	Representative of AAOİAŞ	It was explained that initial assessments are being carried out, with inspections conducted by the General Directorate of Highways (KGM). The value of the land is determined based on the 2019 Expropriation Plan, taking into account unit costs and tax calculations. If any errors are identified during the assessments, these will be corrected. Notifications will be issued starting from March. Those seeking earlier information were

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
				advised to contact KGM directly. It was also stated that prices offered do not have to be accepted, and that lawsuits can be filed under Articles 27 and 10. Article 27 corresponds to an approximately two-month process, while Article 10 (Action for Price Determination and Registration) may take longer.
	Young Farmer Mustafa	A request was made for the service to be carried out properly, rejecting the route passing through fertile lands. It was stated that this is a wrong decision in the midst of a food crisis. It was further noted that ending the route in Konaklı would not solve the traffic problem, and that if the road is constructed in its current form, outward migration and unemployment will increase.	Representative of ENCON	It was stated that the concerns will be duly considered.
	Resident	It was stated that the area is not well known, and that traffic congestion occurs between Okurcular and Alanya. It was suggested that the Emişbeleni–Gazipaşa Tunnel Project should be implemented.	Representative of AAOİAŞ	It was stated that the concerns will be duly considered.
	Farmer, Resident	It was questioned whether this meeting would have been more effective if it had been held before the route was determined, and whether complaints would be taken seriously after the route has already been set.	Representative of ENCON	Complaints and requests will be taken into consideration to improve mitigation measures and the RAP. The necessary revisions and updates will continue to be implemented.
	Lawyer, Resident of Emişbeleni	It was stated that the Konaklı junction passes through the neighborhood, leading to the loss of greenhouses and damaging the efforts invested. It was questioned whether there is any land of equal value, emphasizing that the Project harms farmers.	Representative of ENCON	A RAP is being prepared within the scope of the Project, and losses will be compensated in line with international practices.
	Headman of Konaklı Neighborhood	It was stated that the approved Project route, particularly the junction on the Konaklı side, would negatively affect	Representative of AAOİAŞ	The settlement pattern is taken into account in the Project design, and necessary adjustments will be reviewed to

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		community life and divide the settlement into two.		minimize potential social impacts of the route.
		Concerns were raised that vehicles coming from the Alanya direction would increase the existing traffic load when connecting to the main route through the connection road due to the current design.	Representative of AAOİAŞ	Traffic impact analyses are being carried out, and measures to reduce traffic congestion will be considered in the junction designs.
		A request was made for the improvement of the junction design for these reasons.	Representative of AAOİAŞ	The matter will be re-evaluated with the relevant engineering design team, and appropriate technical solutions will be explored.
		An objection was expressed to the approved design, and an alternative route was requested.	Representative of AAOİAŞ	The approved route has been determined in line with national plans. However, the requests communicated will be recorded and forwarded to the relevant authorities.
		Questions were raised regarding the recent change in the Project route and the justification for this change.	Representative of AAOİAŞ	Route changes have been made by considering technical requirements and issues such as traffic safety.
		The possibility of further changes to the approved route was brought up.	Representative of AAOİAŞ	The Project route has been approved by the relevant authorities, and no substantial changes are foreseen.
		It was noted that the previous markings were more functional compared to the current design, and that the subsequent changes were negatively received.	Representative of ENCON	All markings and signages are implemented in compliance with national standards, and feedback received during implementation will be taken into account.
		It was emphasized that if improvements are made to the route, the community would show satisfaction, otherwise the reactions would continue.	Representative of ENCON	Stakeholder views will be regularly collected, and possible improvements will be made. The aim is to ensure community satisfaction.
		Participants expressed their discontent regarding the absence of representatives from the General Directorate of Highways (KGM) at the meeting.	Representative of AAOİAŞ	Participants' views in this regard have been recorded, and necessary steps will be taken to ensure the participation of the relevant authority representatives in future meetings.
	Resident in Emişbeleni	The local community stated that they did not want expropriations to be carried out.	Representative of AAOİAŞ	Expropriation will be carried out in accordance with the relevant national legislation and legal

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
				procedures, and the necessary information is being provided.
	Resident in Emişbeleni	Participants expressed their concern that the compensation amounts for expropriation would be low.	Representative of AAOİAŞ	Compensation amounts are determined through independent valuation studies, and participants were informed about the available legal appeal mechanisms.
	Resident in Akdam	The local community requested the implementation of the initial project design.	Representative of AAOİAŞ	The Project route has been updated considering technical requirements and traffic safety; however, the requests have been recorded and will be conveyed to the relevant authorities.
	Resident in Emişbeleni	Participants expressed concern about the potential loss of fertile agricultural lands.	Representative of AAOİAŞ	While determining the route, efforts were made to preserve fertile agricultural lands as much as possible; potential losses will be addressed through compensation mechanisms under the RAP.
	Resident	Participants mentioned that there are 2B lands in the area and stated that they did not know how to claim their rights.	Representative of AAOİAŞ	Processes related to 2B lands are carried out in line with the existing national legislation, and the rights holders have been provided with the necessary information.
	Resident	It was asked whether a new EIA Report would be required for route changes, noting that the road is shifted by 2 meters after the EIA Report is obtained.	Representative of AAOİAŞ	It was explained that before the tender, limited drilling works are carried out for design purposes. However, once the contractor takes over after the tender, the design cannot be finalized. Further drilling works are then conducted, and if the ground conditions are found unsuitable, route changes may occur.
	Resident in Akdam	Concerns were raised that the operating authorities did not act with due consideration and that construction works continued despite the complaints.	Representative of AAOİAŞ	Before construction, the headmen are informed and the CLOs provide relevant information. The address has been obtained and will be communicated to the CLOs.
	Resident in Emişbeleni	A question was raised regarding the possibility of reaching a settlement for the expropriation of the remaining portion of the land, as 73% has already been acquired.	Representative of AAOİAŞ	It was explained that a petition should be submitted for the expropriation of the remaining part. Depending on the assessment of the situation, the remaining

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
				portion may also be expropriated. For example, if access to the land is restricted, the petition would likely result in a favorable outcome.
	Resident in Konaklı	It was stated that the Konaklı junction has no benefit, and a request was made to return to the previous route. In addition, a request was made for the road to be extended to Gazipaşa. It was also suggested that Aksu should be connected to the Isparta road.	Representative of AAOİAŞ	The Konaklı junction and route designs have been prepared by taking into account traffic safety and transportation needs. Returning to the previous route is not technically feasible. The requests for extending the road to Gazipaşa and for connecting Aksu to the Isparta road have been noted and will be considered within the planning framework of the relevant authorities.
Serik Multipurpose Cultural Center / 27.08.2025 09.00-12.00	Headman of Yukarıkocayatak	A request was made for a route change due to the Mektebirli Cemetery located on parcel no. 1101. It was stated that 14–15 graves would be affected under the current route.	Representative of AAOİAŞ	It was explained that cancellation of the route is not possible. Following the meeting, a site inspection will be carried out to clarify the exact number of affected graves, as the figure was initially thought to be lower. It was further explained that the proposed route change does not comply with motorway standards; therefore, the current design must be maintained. A separate meeting will be organized with the headman and the concerned parties to share technical details, including why a change cannot be made and how the existing procedures will be followed. Further contact with the headman will be established at the beginning of the week.
	Headman of Kayaburnu	It was stated that the existing culvert under the D400 road is insufficient and needs to be widened. It was noted that the culvert is used by three neighborhoods, currently barely meets the demand, and may pose an overflow risk during sudden rainfall. It was asked whether the culvert could be widened	Representative of AAOİAŞ	It was noted that the issue will be reviewed with the relevant technical teams.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		during the D400 road expansion works. It was also stated that a petition had been submitted to KGM regarding this issue.		
	Headman of Deniztepesi	Concerns were raised that expropriation payments are too low and will lose value due to inflation by the time they are paid. A request was also made for land consolidation.	Representative of AAOİAŞ	It was clarified that there is a misunderstanding, as prices will be updated in the new year and payments will be made based on 2026 rates. It was also explained that land consolidation will not be possible after this stage of the process.
	Resident	It was asked whether compensation would be paid for greenhouses and structures.	Representative of AAOİAŞ	It was explained that compensation will be paid for structures. In the case of jointly owned lands, agreements may be reached through negotiation, or the matter can proceed to court.
	Resident	The public requested a clear timeline for the payment of expropriation compensations.	Representative of AAOİAŞ	It was stated that compensation amounts will be determined and paid according to the applicable legal schedule, and affected landowners will be informed individually.
	Resident	Information was requested regarding the size of the parcels to be expropriated.	Representative of AAOİAŞ	It was explained that the total area along the route has been calculated and that landowners of the affected parcels will be provided with specific information.
	Resident	Participants expressed that the offered expropriation compensations are significantly below market value.	Representative of AAOİAŞ	It was clarified that the compensations are determined through independent valuation studies, and landowners retain the right to appeal through legal mechanisms.
	Resident	Concerns were raised about the absence of representatives from the General Directorate of Highways (KGM) at the meeting.	Representative of AAOİAŞ	It was noted that this feedback has been recorded and will be conveyed to the relevant authority to ensure future participation.
	Resident	It was asked how payments would be made in parcels with multiple heirs.	Representative of AAOİAŞ	It was explained that payments will be made in accordance with inheritance shares, as determined under applicable legislation.
	Resident	Citizens requested adequate underpasses, culverts, and connection roads to ensure access to houses and greenhouses.	Representative of AAOİAŞ	It was stated that existing culverts will be extended and widened where necessary to maintain access.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
	Resident	Concerns were raised that cemeteries should not be affected by the Project.	Representative of AAOİAŞ	It was noted that measures will be taken to avoid impacts on cemeteries as far as possible, and any unavoidable cases will follow due procedures.
	Resident	It was stated that some parcels, houses, and greenhouses will be adversely affected by expropriation.	Representative of AAOİAŞ	It was explained that these impacts are recognized, and compensations will be provided in line with national legislation and the RAP framework.
	Resident	Concerns were expressed that expropriation payments would be insufficient to purchase new land.	Representative of AAOİAŞ	It was explained that compensations are based on independent valuations and legal requirements; however, concerns have been noted for further consideration in the RAP.
	Resident	It was noted that some greenhouses were built through loans, leading to additional grievances.	Representative of AAOİAŞ	It was explained that such cases will be reviewed on an individual basis, and compensation procedures will take account of legally recognized investments.
	Resident	Concerns were raised that certain routes may damage cemeteries and drinking water resources.	Representative of AAOİAŞ	It was stated that the Project design aims to avoid such sensitive areas; in cases where impacts are unavoidable, mitigation measures will be implemented in line with environmental and social standards.
	Resident in Kayaburnu (Parcel: 39 / 102)	Owns a single land plot of 11.5 decares with no other property. Stated that citrus trees planted in 2013 (12–13 years old) will be entirely affected, estimating a loss of 600–700 trees. Highlighted that the land is adjacent to a zoned area, making it highly valuable, and that acquiring new land under these conditions is impossible. Mentioned an annual income of 1,500–2,000 TL and stated that the road will not provide any benefit to him.	Representative of AAOİAŞ	The valuation of trees and land will be carried out through independent expert assessments. The proximity of the land to zoned areas, its current use, and agricultural productivity will be taken into account. Lost income and livelihoods will be addressed under the RAP.
	Resident in Burmahancı (Parcel: 102 / 88)	Raised concern that the KMZ is outdated at the location of the DSİ canal and needs to be checked. Noted that in the Ministry of Environment's e-Plan, the zoning plan attached	Representative of AAOİAŞ	The DSİ canal and existing roads will be reviewed by the technical teams. Discrepancies between the KMZ and the EIA plans will be checked, and the request

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		to the EIA report is updated, and the problem stems from the outdated report. Stated that there is already a DSİ road where lands are being taken, and that the additional T-junction road is unnecessary. Referred to the DSİ irrigation canal built in the 1970s.		regarding the additional connection road will be conveyed to the relevant authorities.
	Resident in Üründü	sked about the Project's start date. Stated that his greenhouse was divided and asked how water and electricity will be provided. Asked when he should stop agricultural activities, noting: "Should I plant or not?" Asked whether underpasses or culverts would be built since the route cuts through greenhouses and orange orchards. Asked how long before construction notification would be given.	Representative of AAOİAŞ	Notification will be given at least three months before construction begins.
		Asked whether there would be support for dismantling and transporting his greenhouse.	Representative of AAOİAŞ	Dismantling and transportation will be the responsibility of the landowner, but labor support may be provided.
	Resident in Cumalı (Parcel: 102 / 41)	Asked when the payments will be made and when construction will begin in their neighborhood.	Representative of AAOİAŞ	Expropriation payments and construction start dates will be determined in line with the official schedule, and landowners will be informed accordingly.
	Resident in Sarıbalı (Parcel: 249 / 5)	Stated that 10 households in the neighborhood are affected, 8 of which are in economic difficulty. Reported that 5 decares of his land will be lost, affecting his house and trees. Noted the presence of a tunnel passage on the route and asked whether there is a viaduct project to save his house.	Representative of AAOİAŞ	Yes, such a study is underway. Although the land is occupied, additional solutions are being explored.
	Resident in Üründü (Parcel: 135 / 6-4)	Noted that they are 5 co-heirs and the land originally belonged to their grandfather. Stated that the house, greenhouse, and orange orchard (approx. 300 trees, 20 years old) will be affected. Explained that this orchard is his livelihood, generating 2	Representative of AAOİAŞ	Üründü is not included in this year's construction plan.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		million TL annually, and that selling for 1 million TL is unacceptable. Emphasized that in 3 meetings held within 6 months, no clear information was provided about construction start dates or expropriation payments.		
	Resident in Burmahancı (Parcel: 102 / 40)	Reported that their 15-decare greenhouse will be completely lost and that they are 3 co-owners. Stated that their house and sources of income will disappear and that they had not been directly consulted before.	Representative of AAOİAŞ	Valuations will be carried out for greenhouses and houses affected by expropriation, and individual consultations will be held with the landowners. Loss of income will be considered under the RAP.
	Resident in Burmahancı	Asked why fertile agricultural lands are not being preserved as in countries like Germany. Stated that the Project design was made without consulting the local people and emphasized that fertile soils should not be lost. Noted that the local people are not involved in tourism but rely entirely on agriculture.	Representative of AAOİAŞ	Efforts have been made to avoid fertile agricultural lands as much as possible when determining the route. Public consultation meetings are being held to collect stakeholder opinions, and feedback from these meetings will be communicated to the relevant authorities.
	Resident in Üründü (Parcel: 117 / 5)	Reported that the 130-meter greenhouse is cut in half by the route, leaving unusable land on both sides. Noted that they took a 7-year loan from Ziraat Bank in 2021 and payments are still ongoing. Stated that the land represents years of labor, and despite health challenges (platinum in arm), agricultural production continues, but the Project disregards their efforts.	Representative of AAOİAŞ	Investments made with loans and agricultural facilities will be taken into account during expropriation valuation. Compensation mechanisms under the RAP will be evaluated to prevent grievances for landowners.
	Resident in Cumalı	Noted that apart from their 5-decare land on the route (Cumalı neighborhood, Antalya side), they have no other property. Previously, 10 decares had been requested for a hospital project (5 decares from a relative, 5 from themselves), but this project was later canceled due to the motorway. Requested that expropriation	Representative of AAOİAŞ	Expropriation compensation will be determined through independent expert assessments. Although losses arising from the cancellation of the hospital project cannot be considered under the official process, existing grievances will be assessed within the RAP framework. Social sensitivities have been conveyed to the project

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		compensation reflect not only the land value but also the economic losses from the canceled hospital project. Ali Bey added that his wife is a cancer patient who has undergone chemotherapy.		team.
Manavgat İbrahim Sözen Youth Center/ 27.08.2025 15.00-18.00	Resident	It was noted that there is no liaison office in Manavgat, and the Serik liaison office is not accessible for local citizens.	Representative of AAOİAŞ	Different communication channels (phone, email, CLO) will be used to facilitate citizens' access. Requests regarding office accessibility will be evaluated.
	Resident	Two lawyers attended the meeting and asked questions about expropriation processes.	Representative of AAOİAŞ	Answered questions regarding expropriation processes by Expropriation Director.
	Resident	The public requested a clear timeline for when expropriation negotiations and payments would be made.	Representative of AAOİAŞ	Expropriation payments and construction start dates will be determined in line with the official schedule, and landowners will be informed accordingly.
	Resident	Information was requested about the parcel sizes to be expropriated.	Representative of AAOİAŞ	It was explained that the total area along the route has been calculated and specific information will be provided to affected landowners.
	Resident	Participants stated that the offered expropriation compensations are far below market value.	Representative of AAOİAŞ	It was explained that landowners retain the right to appeal.
	Resident	Participants criticized the absence of representatives from KGM at the meeting.	Representative of AAOİAŞ	This feedback has been recorded; the necessary steps will be taken to ensure the participation of institutional representatives in future meetings.
	Resident in Örenşehir	Raised concerns about 15 years of income loss, asking who would cover this. Asked why shifting the road north is not possible, noting there are technical solutions. Asked what people will do for their livelihood after construction, emphasizing that they will not benefit from the motorway.	Representative of AAOİAŞ	Income losses and impacts on livelihoods will be assessed within the scope of the RAP. The road route has been determined based on technical requirements, and alternative requests will be recorded and forwarded to the relevant institutions.
	Resident in Hacıobası	Their house and business are affected. Asked why expropriation compensation is divided among all co-owners and	Representative of AAOİAŞ	Explained that consent must be obtained from other co-owners; if not, proof of ownership (e.g., bills) can be used. If

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		how they can ensure that only they receive payment.		necessary, a lawsuit can be filed to prove ownership.
	Resident in Taşağıl	Asked whether a study was carried out on dust and asbestos risks due to construction. Reported being close to the tunnel entrance and affected by blasting, leading to repeated complaints to the gendarmerie. Highlighted the presence of four elderly people (80+) and vulnerable individuals (Alzheimer's, visually impaired, broken arm), emphasizing negative impacts.	Representative of AAOİAŞ	Measures are being taken for dust control and blasting safety during the construction process, and regular measurements and inspections are being carried out. Vulnerable groups (the elderly, disadvantaged individuals) will be specifically assessed under the RAP and EIA.
	Headman of Taşağıl	Stated that the Taşağıl headman did not provide sufficient information about the meeting, and that they had difficulty learning about it.	Representative of AAOİAŞ	Meeting announcements were made through various channels (village council, public notice, website, newspaper). Feedback in this regard has been recorded. More frequent updates will be provided at subsequent meetings.
	Resident	Reported that her house and workplace at the Akseki road junction are affected by expropriation and that she has no other source of income. Asked how expropriation would be handled for inherited property. Expressed concern about losing her livelihood from running a roadside greengrocery.	Representative of AAOİAŞ	Payments for inherited land will be made in accordance with legal procedures. Loss of livelihood and damages will be addressed under the RAP.
	Headman of Gündoğdu	Reported that an electricity pole was placed on his land without official notification or expropriation information. Suggested that the route should pass 300–500 meters above the settlement to reduce impacts. Mentioned that high-voltage towers were initially placed in the middle of the road but later shifted to the side after consultations. Requested the installation of a low-voltage line. Another citizen reported that only 2 decares of land remained after	Representative of AAOİAŞ	The expropriation processes for power lines and poles will be carried out in coordination with the relevant institutions, and official notifications will be made to the rightful owners. The route has been determined in accordance with current design engineering and safety standards. Requests for low-voltage lines will be forwarded to the relevant institutions and evaluated based on technical suitability.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		expropriation and asked how the process would proceed. Criticized the absence of KGM at the meeting. Raised concerns that construction dust would prevent olive trees from yielding crops and asked how this would be compensated.		Dust control measures are being taken for trees, and compensation mechanisms will be activated under the RAP in case of damage.
	Resident in Çolaklı	Reported having olive groves on land with 42 inheritance division agreements, where his mother is a co-owner. Requested that compensation for his mother's share be paid directly to her.	Representative of AAOİAŞ	Provided an explanation regarding the process.
	Lawyer	Stated that her clients learned about the expropriation by chance rather than through official notification. Requested information specifically about parcel 138/1530.	Representative of AAOİAŞ	Provided an explanation regarding the parcel.
	Headman of Aksaz	Reported that he had given consent for the service road route and was promised a stabilized road in return. Requested a dedicated information meeting for Aksaz. Reiterated demand for route changes, suggesting the route should pass 20 meters above the settlement to reduce impacts.	Representative of AAOİAŞ	The request for a stabilized road has been recorded, and coordination with the relevant institutions will be ensured. Holding a special information meeting for Aksaz will be evaluated. The route has been determined according to engineering criteria; requests will be recorded and forwarded to the relevant institutions.
	Headman of Ulukapı	Noted that sociologists, engineers, and foremen were assigned for community information, but there is a lack of legal support. Suggested that lawyers should also be involved in the process to ensure that both community and company rights are properly understood.	Representative of AAOİAŞ	The necessary legal information will be provided so that stakeholders understand the process correctly. A proposal to include lawyers in the fieldwork has been recorded.

Across the four meetings, the most frequently raised issue was the demand for route changes. In particular, participants consistently emphasized the need to protect agricultural lands, cemeteries, and water resources. The view that the Konaklı junction would affect community life was also expressed. Concerns about level of expropriation payments and of the process were among the asked questions. On the other hand, some participants stressed the clear need for the road and the necessity of a new arrangement to reduce the heavy traffic load in the region. In addition, repeated requests were made

to ensure adequate underpasses, culverts, and connection roads to maintain access to houses, greenhouses, and agricultural lands.

During the meetings, questions regarding parcel information, payment schedules, and compensation mechanisms were answered by the Expropriation Director and the Environment & Social Manager. Furthermore, CLOs engaged in one-on-one communication with vulnerable groups both prior to and during the meetings. This approach ensured that the meetings were conducted in line with the principle of participation.

XIX.3.7. Internal Stakeholder Engagement Activities

Employee Satisfaction Survey

The internal stakeholders of a project are crucial for its healthy progress. The largest group of internal stakeholders in terms of quantity is the employees. Employees of the project sponsor and subcontractors are involved in all stages of the Project's life cycle. Therefore, engaging with internal stakeholders through stakeholder engagement activities is an essential and crucial key performance indicator criterion. The project sponsor is expected to conduct various stakeholder engagement activities with internal stakeholders.

As part of internal stakeholder engagement activities, the Project Sponsor may conduct an employee survey to gather feedback on the overall operation of the Project. This survey aims to identify areas for improvement in management and the workplace and emphasize the importance of gender equality. By doing so, the Project aspires to promote inclusivity and create a better working environment for all employees, ensuring that everyone's views are valued and considered in the quest to enhance workplace dynamics and fairness.

The suggested employee questionnaire is prepared with at least a 5-point Likert scale. The survey study is set up to analyze the answers given by the employees to the given statements. The answers are categorized as strongly disagree (1), disagree (2), partially agree (3), agree (4), and strongly agree (5). The statements given to the employees to express their opinions within the scope of the survey are as follows:

1. I am satisfied with the cafeteria and the food served.
2. In the workplace, cleanliness, organization, and order are given importance.
3. The company attaches great importance to occupational health and safety issues.
4. The company provides the personal protective equipment required for the job.
5. I am satisfied with the working hours.
6. The behavior of the employees towards each other is good.
7. I have access to the things I need to do my job well.
8. My salary makes me satisfied.
9. In general, I am happy with my supervisor/top manager.
10. I am satisfied with the Company's Management.
11. Necessary security measures (other than occupational health and safety issues) are taken in our company.
12. I recommend this company to work with.
13. I am satisfied with the possibilities offered for the service.
14. Social areas within the construction site where we can spend time outside work are sufficient.
15. I am happy with the laundry and dormitory conditions.
16. The company promotes gender equality and ensures equal opportunities for all employees.

This survey will be conducted separately by the female CLO for the female employees, and in order to avoid trust issues, it will be stated that the female employees will share all their problems except for the questions and that these will remain anonymous if they wish. How the process of complaints or requests received here will work is explained in the Grievance Mechanism section.

Provide SEAH and GBV training or develop a safety plan for women workers before the construction starts. It is detailed at Labor and Working Conditions chapter at ESIA.

XIX.4. STAKEHOLDER IDENTIFICATION

In order to develop an effective SEP, it is necessary to determine who is likely to be affected (both directly and indirectly) by the Project (“affected parties”); who may have an interest in the Project (“interested parties”); and have the potential to influence project outcomes or operations.

An important stage of the stakeholder identification is the groups that are likely to be affected by the Project more or differently than other stakeholders, and whose influence on these possible impacts is expected to be relatively low. These groups are defined as "vulnerable groups" in the literature. One of the aims of the stakeholder engagement plan is to carry out an effective and sustainable communication, information and consultation process with these vulnerable groups. For this purpose, this SEP covers the following objectives related to vulnerable groups:

- Identifying vulnerable groups
- The method and frequency of communication with vulnerable groups
- Opportunities and priorities for vulnerable groups
- Monitoring process

XIX.4.1. Stakeholder Identification Methodology

Stakeholders were identified through a structured and participatory methodology aligned with international best practices, including IFC Performance Standard 1, the Equator Principles..

The identification process aimed to ensure the inclusion of all individuals, groups, and organizations who may be directly or indirectly affected by the project or who may influence its outcomes. The detailed methodological steps followed during this process are presented in Table XIX.13.

Table XIX.13 Methodological Steps for Stakeholder Identification Aligned with International Standards

Method	Description	Key Focus Areas	Target Groups / Sources
Desk-Based Review	Review of existing documentation and spatial data	Identification of affected areas, land parcels, community assets	ESIAs, Resettlement Frameworks and Baseline Studies, Local government records and cadastral maps, Previous stakeholder engagement records
Field Visits & Observations	On-site visits along proposed motorway corridor	Land use, mobility, seasonal migration (e.g., Yörük routes), presence of informal or unregistered groups	Local terrain and communities along the corridor
Key Informant Interviews (KIIs)	Semi-structured interviews with diverse local actors	Local insights on social dynamics, vulnerabilities, potential project impacts	Mukhtars, women, elderly, farmers, Yörük communities, seasonal workers, NGOs, CSOs
Vulnerability Mapping	Identification and assessment of at-risk populations	Vulnerability related to land acquisition, access to information, livelihood risks, social marginalization	Illiterate adults, women-headed households, seasonal workers, elderly, disabled, refugees

XIX.4.2. Stakeholder Categorization

Stakeholders were categorized into Project-Affected People, Vulnerable Groups, Interested Parties, and Governmental and Regulatory Stakeholders. This multi-tiered classification ensured a comprehensive and inclusive approach focused on human rights risks related to displacement, participation, and access to remedies (see Table XIX.14).

Table XIX.14 Stakeholder Categorization

Category	Description / Details
Project-Affected People (PAPs)	Individuals and households directly impacted by land acquisition or construction activities; business owners
Vulnerable Groups	Those with limited capacity to participate in decision-making or to absorb adverse impacts
Interested Parties	Institutions, NGOs, unions, academic groups, business owners, or the general public with a stake in the project outcomes. This includes civil society actors and service organizations supporting local communities, including those involved in health, social welfare, gender-based violence response, shelter, or community development.
Governmental and Regulatory Stakeholders	Local, provincial, and national-level authorities responsible for project permitting and oversight. This also includes emergency response units (e.g., disaster management authorities, fire brigades), public health services, municipal utilities, and security or protection bodies involved in addressing GBV and community safety.

The vulnerable groups identified in the Project are as follows:

- Children
- Children with special needs
- Out-of-school children (school-age children who cannot attend school)
- Elderly people (75+)
- Elderly people requiring care and social assistance (65+)
- Illiterate adults
- Persons with chronic illness (e.g., heart, diabetes, kidney)
- Persons with other serious health conditions (e.g., cancer, Alzheimer)
- Disabled persons (physical / mental)
- Unemployed people (even though they are actively seeking work)
- Seasonal agricultural workers
- Households dependent on natural resources (agriculture, livestock, forest products)
- Green Card holders
- State aid beneficiaries
- Informally employed workers (without social security)
- Physically and Economically displaced households
- Female-headed households
- Landless households
- Low-income households (below minimum wage)
- Migrant and refugee households (e.g., Syrian, Afghan)
- Ethnic or linguistic minority groups
- Semi-nomadic Yörük communities
- Households previously affected by expropriation

Gender inequality may be seen in stakeholder engagement process. Although it is not defined as a vulnerable group on its own, it is necessary to be sensitive to situations where women cannot take part in these stakeholder engagement activities. Project Sponsor should consider gender equality in the stakeholder engagement processes of the project and should approach with sensitivity to the problems that may arise in this regard. Project Company will take short and long-term steps towards resolving these problems. Arranging time and space so that women can participate in meetings and other

events equally is one of the simplest and most effective steps that can be taken in this regard. In addition to the above-mentioned vulnerable groups, gender equality will be considered in the process of stakeholder identification, consultation with stakeholders and grievance management process.

In the context of the Project, women are identified as a vulnerable group due to a combination of socio-economic, cultural, and spatial dynamics that influence their exposure to project-related impacts. Because the location area of the project is rural and peri-urban areas, women often rely on informal or subsistence-based economic activities - such as agriculture, livestock care, and seasonal labor - which are typically unregistered and under-recognized in compensation and livelihood restoration schemes. Moreover, women may face mobility restrictions due to gender norms and lack of access to private transportation, which can be further exacerbated if the motorway alters local routes, increases travel distances, or reduces public transportation availability. In areas like Manavgat, where tourism and agriculture are dominant, women's economic roles are often linked to place-based activities (e.g., local markets, childcare close to home), making them more vulnerable to displacement or disruption. Additionally, the influx of a temporary male workforce during construction may elevate risks of gender-based violence and harassment, particularly in communities with limited protective infrastructure or social services. For these reasons, it is crucial that the project incorporates a gender-sensitive approach in its impact assessments, stakeholder engagement processes, and mitigation strategies to ensure that women's voices are heard, their specific risks addressed, and their livelihoods and well-being protected.

In the neighborhoods within the impact area of the project, especially in the Central neighborhood of Serik district, it was determined in the field study conducted by Encon in June 2024 that Syrians under temporary protection status and Syrian Migrants live. According to Refugees Association's May 2025 Report, the number of Syrians living in Antalya is 6839. Attacks against Syrian refugees, especially in Serik district, were reported in the news.

On the other hand, nomads living in the Antalya region go to the plateau at certain times of the year. Antalya-Serik-Ovacık plateau visited by Yoruks is located within the project area. Nomads who will pass through this region are a vulnerable group both in terms of the impact of construction on their journeys and in terms of accommodation. The migration pathway of nomads is given in FigureVII.1 as referenced to the motorway alignment.

On the other hand, nomads living in the Antalya region go to the yayla at certain times of the year. A section of the migration route to the Antalya-Serik-Ovacık yayla, which is visited by the Yörüks, is located 1,200 meters from the project area. Nomads passing through this region are a vulnerable group in terms of both the impact of construction on their journeys and accommodation. The migration route of the nomads is given in Figure XIX.10 according to the highway route.

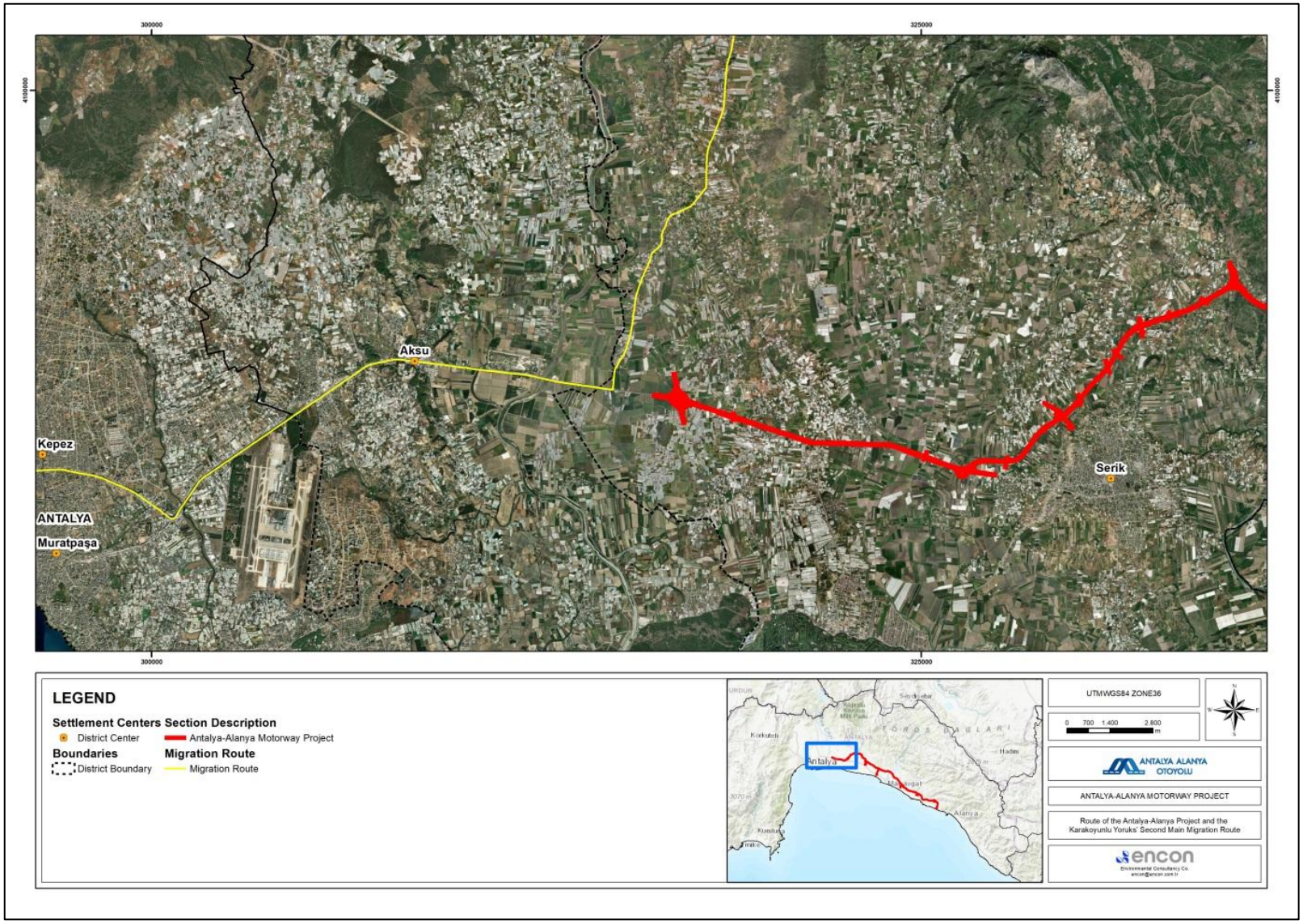


Figure XIX.10. The Migration Pathway of Nomads in the Region

XIX.4.2.1. Project-Affected People (PAPs)

Project-Affected People (PAPs) are defined as individuals, households, or communities who will experience either physical or economic displacement as a result of the Antalya–Alanya Motorway Project. The identification of PAPs is based on expropriation plans (as of April–May 2025), site-specific scoping studies, and preliminary stakeholder consultations. Impacts vary by geography, land tenure, land use, and vulnerability status. The categories of Project-Affected People (PAPs) identified for the Antalya–Alanya Motorway Project are summarized in Table XIX.15, based on expropriation plans, scoping studies, and preliminary consultations, reflecting variations in land tenure, land use, and vulnerability.

Table XIX.15 Categories of Project-Affected People (PAPs) for the Antalya–Alanya Motorway Project

Category	Description / Key Details
1. Landowners and Land Users	Privately-owned parcels will be subject to expropriation. These include agricultural fields, orchards, greenhouses, and constructible plots. Some parcels may become "orphaned land," and in addition, there are lands informally used by non-owners such as farmers or tenants.
2. Structure Owners	299 houses, 599 greenhouses, 37 business structures affected - many with multiple structures - Includes small-scale agricultural and informal businesses
3. Livelihood-Dependent Farmers	Households losing >20% of productive land, especially greenhouse/orchard farmers, at high economic displacement risk - Parcels <500 m² post-expropriation considered unviable for farming
4. Residents in Fragmented or Severed Parcels	Parcels divided by motorway causing difficult or impossible internal access - Planned engineering solutions (underpasses, culverts) to mitigate access loss; effectiveness to be confirmed via RAP consultations
5. Vulnerable and Marginalized Groups	Illiterate adults unable to comprehend expropriation/compensation - Elderly with limited mobility/access - Women without land title or informal income earners - Migrants, refugees, seasonal workers with undocumented tenure - Semi-nomadic Yörük communities with migration routes crossing project area
6. Users of State-Owned and Public Lands	Greenhouses/agricultural plots on state treasury or forest lands used informally by locals - May qualify for compensation or assistance under national policies or livelihood restoration programs

Project-Affected People by Settlement

Based on the expropriation data and field surveys from April–May 2025, the following neighborhoods are most significantly affected. In addition, specific findings on Migratory Status and Nomadic Populations (Yörük Communities) have been presented separately below the table, as the former draws on both ENCON fieldwork and data from the Refugees Association, while the latter was identified during the desk study stage.

Table XIX.16 Vulnerability Groups in the Expropriation Corridor

District	Neighbourhood	Vulnerable Groups
Serik	**Deniztepesi**	Other significant health issues, Economically displaced household
	Sarıabalı	Physically displaced household, Economically displaced household, Landless household, Household s who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Unemployed (Although looking for a job), Chronic diseases, Children of school age who do not attend school, Illiterate, Mental Disability/ Issues, People who do not speak and/or understand Turkish
	Çandır	Economically displaced household, Household s who lose more than 20 percent of their total productive area
	Cumalı	Economically displaced household, Chronic diseases, Physical Disability, Mental Disability/ Issues
	Burmahancı	Economically displaced household, Landless household, Low income household, Household s who lose more than 20 percent of their total productive area
	Üründü	Economically displaced household, Households who lose more than 20 percent

District	Neighbourhood	Vulnerable Groups
		of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases
Manavgat	**Çakış**	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Elderly (over 65) in need of care, Illiterate, Physical Disability
	Taşağıl	Economically displaced household, Landless household, Household s who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Other significant health issues
	Gündoğdu	Economically displaced household, Low-income households, Chronic diseases
	Hocalar	Economically displaced household, Landless household, Household s who lose more than 20 percent of their total productive area, Low-income households, Elderly (over 65) in need of care, Illiterate, Chronic diseases, Unemployed (Although looking for a job)
	Yavrudoğan	Economically displaced household, Households who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Illiterate, Chronic diseases
	Çolaklı	Physically displaced household, Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Seasonal agricultural worker, Illiterate, Chronic diseases
	Seki	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Chronic diseases
	Kalemler	Economically displaced household, Households who lose more than 20 percent of their total productive area, Landless household, Women-headed household, Low income household, Elderly (over 65) in need of care, Chronic diseases, Physical Disability
	Evren	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases
	Yeniköy	Economically displaced household, Elderly (over 65) in need of care, Chronic diseases
	Şişeler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Children with special needs, Chronic diseases
	Evrenleryavşi	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Children with special needs, Chronic diseases, Unemployed (Although looking for a job)
	Yukarıışıklar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Illiterate, Physical Disability, Chronic diseases, Mental Disability/ Issues, Seasonal agricultural workers
	Dikmen	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area
	Bucakşeyhler	Economically displaced household, Low income household, Illiterate, Physical Disability, Chronic diseases
	Ulukapı	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Aşağıışıklar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Physical Disability, Chronic diseases, Other significant health issues
	Karaöz	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Aksaz	Economically displaced household, Landless household, Low income household, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Chronic diseases
	Hacıali	Economically displaced household, Low income household, Household resettled in the neighborhood after earthquake or other disasters (Fire), Households who lose more than 20 percent of their total productive area, Significantly affected by

District	Neighbourhood	Vulnerable Groups
		expropriation of other past projects, Advance Old Age (over 75), Illiterate, Chronic diseases
	Cevizler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Chronic diseases
	Hacıisalı	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Other significant health issues
	Hacıobası	Economically displaced household, Women-headed household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75, Chronic diseases, Physical Disability, Other significant health issues
	Uzunlar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75, Chronic diseases, Elderly (over 65) in need of care, Physical Disability, Other significant health issues
	Kadılar	Economically displaced household, Women-headed household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Other significant health issues, Beneficiary of governmental aid
	Örenşehir	Economically displaced household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Yalçıdibi	Economically displaced household, Women-headed household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75, Chronic diseases, Elderly (over 65) in need of care, Illiterate, Physical Disability, Other significant health issues
	Odaönü	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Karakaya	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Seasonal agricultural workers
Alanya	**Alara**	Economically displaced household, Women-headed household, Landless household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Illiterate, Chronic diseases
	Çakallar	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Chronic diseases, Mental Disability/ Issues, Beneficiary of governmental aid
	İncekum	Economically displaced household
	Türkler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases, Physical Disability
	Emişbeleni	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Illiterate
	Toslak	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Elderly (over 65) in need of care, Illiterate, Chronic diseases, Physical Disability, Mental Disability/ Issues, Employed without social security
	Telatiye	Economically displaced household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Elikesik	Economically displaced household, Landless household, Low income household, Illiterate, Chronic diseases, Seasonal agricultural workers

Migratory Status: Field research conducted by Encon in June 2024 identified Syrian citizens and other migrant groups under temporary protection, particularly in the Central District of Serik. Greenhouse owners in Serik, Manavgat, and Alanya districts have stated that they employ migrant workers. Seasonal workers are primarily Afghan and Syrian nationals. According to the RAP Report, registered and unregistered migrant workers are present in the neighborhoods of Emişbeleni, Aşağıçatma, Evren (registered), Toslak, and Çakış. According to the Refugees Association, as of May 2025, there are approximately 6,839 Syrians residing in Antalya. Tensions toward refugees have been

reported, particularly in Serik. Project materials will be provided in Arabic to support inclusive participation. Additionally, necessary information will be communicated specifically by CLOs.

Nomadic Populations (Yörük Communities): Seasonal nomadic groups such as the Yörüks were identified along migration routes passing near the project alignment (~1,200 m away at times). Semi-nomadic communities are also present in Toslak, Ulukapı, and Karakaya. These groups often:

- Rely heavily on livestock grazing and pasture access
- Have low literacy rates and limited access to health services
- Are excluded from formal consultation due to their mobile lifestyle

To support them, the project will incorporate culturally sensitive engagement methods, preserve grazing corridors where feasible, and consider compensation or assistance through the Livelihood Restoration Plan.

Within the scope of the Project, it is important to identify stakeholders at the beginning of the process to inform key stakeholders (local people, relevant state institutions and NGOs) about the Project and provide effective participation of the stakeholders. To this end, the following individuals and groups should be considered specifically:

- People who are likely to be affected, directly or indirectly by the Project,
- People or institutions may have an interest in the Project,
- People or institutions that have the potential to influence
- Project outcomes or company operations.

Besides it is an important process to identify vulnerable or disadvantaged people or groups, who are likely to be affected by the Project in certain phases, accurately during the identification of stakeholders. Possible stakeholders who are likely to be affected by the Project or have an influence on the Project are listed below:

- Project employees, including Contractors. Project parties;
- National governmental and non-governmental organizations (NGOs);
- Local governmental organizations and NGOs;
- Local residents (potentially project affected persons including vulnerable groups); and
- Local businesses and universities

The stakeholders listed in **Error! Reference source not found.** are the most prominent in the Project. Organizations or groups not listed can contact the Project Sponsor and provide their contact information to be informed about the Project.

People living in residential areas near the Project will be considered as potential Project affected people/population (PAP) in this Stakeholder Engagement Plan (SEP). These settlements are also listed in **Error! Reference source not found.**. Therefore, one of the objectives of the SEP is to effectively consult and share information with these groups and address their concerns.

Table XIX.17 Project's Stakeholders List

Level	Category	Organization / Entity
Internal	**Appointed Company**	Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş
	Contractor's Personnel	Information N/A
	Sub-contractors	Information N/A
National	**Ministries and Relevant Authorities**	Ministry of Transportation and Infrastructure
		General Directorate of Highways
		General Directorate of Infrastructure Investments
		General Directorate of Transport Services Regulation
		Ministry of Agriculture and Forestry
		General Directorate of State Hydraulic Works (DSİ)
		General Directorate of Forestry
		General Directorate of Meteorology
		Ministry of Environment, Urbanization and Climate Change
		General Directorate of Spatial Planning
		General Directorate of Environmental Management
		General Directorate of Preservation of Natural Heritage
		General Directorate of Land Registry and Cadaster
		Ministry of Culture and Tourism
		General Directorate of Cultural Heritage and Museums
		Ministry of Energy and Natural Resources
		General Directorate of Mineral Research and Exploration
		General Directorate of Electricity Generation Corporation (EUAS)
		General Directorate of Electricity Transmission Company (TEIAS)
		Ministry of Interior
		Gendarmerie General Command
		General Directorate of Security Affairs
		Ministry of Labor and Social Security
		General Directorate of Turkish Employment Agency (ISKUR)
		Ministry of Development
		Ministry of Defense
		Petroleum Pipeline Company (BOTAS)
		Prime Ministry's Disaster and Emergency Management Presidency (AFAD)
	NGOs	The Union of Chambers and Commodity Exchanges of Turkey (TOBB)
		World Wide Fund for Nature (WWF)
		Foundation for the Protection and Promotion of the Environment and Cultural Heritage (CEKUL)
		Environment Foundation of Turkey

Level	Category	Organization / Entity
		Turkish Environmental and Woodlands Protection Society (TURCEK)
		Union of Forestry Workers (ORMAN-IS)
		Union of Turkish Roads, Buildings and Construction Workers (YOL-IS)
		Confederation of Unions of Turkish Workers (TURK-IS)
		Union of Construction Industry Employers (INTES)
		The Turkish Foundation for Combating Erosion Reforestation and the Protection of Natural Habitats (TEMA)
		Nature Association
Regional	**Governmental Agencies and Authorities**	Ministry of Agriculture and Forestry Regional Directorate
		Ministry of Transportation and Infrastructure Regional Directorate of Highways
		Antalya Regional Directorate of Forestry
		Antalya Water and Sewerage Administration
		Antalya Provincial Directorate of Employment Agency
		Antalya Regional Directorate of Cultural Heritage Preservation Board
		General Directorate of Highways 13th Regional Directorate
	NGOs	Greenhouse Investors and Producers Association
		Eastern Mediterranean Research Association
		Mediterranean Protection Association
		Turkish Foresters Association Western Mediterranean Branch
		Mediterranean Association
		Archaeologists Association Western Mediterranean Branch
		Mediterranean Archaeology Association
Local	**Governmental / Local Authorities and Agencies**	Antalya Governorate
		Antalya Metropolitan Municipality
		Serik District Governorate
		Manavgat District Governorate
		Alanya District Governorate
		Serik District Municipality
		Manavgat District Municipality
		Alanya District Municipality
		Antalya Provincial Police Department
		Antalya Provincial Gendarmerie Command
		Antalya Provincial Family and Social Policies Directorate
		Antalya Provincial Culture and Tourism Directorate
		Antalya Agriculture and Forestry Directorate
		Antalya Provincial Food, Agriculture and Livestock Directorate
		Antalya Forestry Regional Directorate

Level	Category	Organization / Entity
		Antalya Provincial Industry and Trade Directorate
		Antalya Environment, Urbanization and Climate Change Provincial Directorate
		Antalya Provincial Directorate of National Education
	NGO's	Antalya Orchids and Biodiversity Protection Association (ANTOK, TÜRKİYE)
		Antalya Chamber of Commerce and Industry
		Turkish Agriculturalists Association Antalya Branch
		Turkish Nature Protection Association Antalya Branch
		Natural Resources and Biodiversity Protection Association
		Antalya Cultural Heritage Association
		Women's Social Life Research and Examination Association Antalya Branch
		Antalya Environment Platform
		Antalya Women's Cooperative
		Antalya Businesswomen's Association (ANTİKAD)
		Serik Chamber of Agriculture Presidency
		Serik Chamber of Tradesmen and Craftsmen Presidency
		S.S. Serik Boğazkent Women's Initiative Production and Business Cooperative
		Manavgat Women of Taurus Cooperative
		Turkish Agricultural Credit Cooperatives- Antalya
		TMMOB Chamber of City Planners Antalya Branch
		TMMOB Chamber of Agricultural Engineers Antalya Branch
		TMMOB Chamber of Forest Engineers Western Mediterranean Branch
		Alanya Sera-Bir Association
		Culture Routes Society
		Mediterranean Youth Association
		Antalya Industrialists and Business People Association
		Serik Youth Education Culture, Environment and Sport Association
	Residential Areas/Local Communities/Mukhtars/Potentially Project Affected People*	**Antalya/Serik:**Yukarıkocayatak, Aşağıkocayatak, Kayaburnu, Çandır, Aşağıçatma, Burmahancı, Cumalı, Üründü, Deniztepesi,Sarıabalı, Belpınarı, and Abdurrahmanlar Neighborhoods
		Antalya/Manavgat: Çakış, Taşağıl, Gündoğdu, Hocalar, Yavrudoğan, Çolaklı, Seki, Kalemler, Evren, Ilıca, Yeniköy, Şişeler, Evrenleryahşi, Dolbazlar, Yukarıışıklar, Dikmen, Bucakşeyhler, Ulukapı, Aşağıışıklar, Demirciler, Karaöz, Aksaz, Hacıali, Cevizler, Sülek, Hacıisalı, Hacıobası, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Odaönü, Karakaya Neighborhoods
		Antalya/Alanya: Alara, Çakallar, İncekum, Avsallar, Akdam, Türkler, Payallar, Emişbeleni, Toslak, Telatiye (Konaklı), Elikesik Neighborhoods
		Users of the pasture located within the License Area of the Project*.
	Business Enterprises	Business enterprises located along the route
	Universities	Akdeniz University
		Alanya Alaaddin Keykubat University

Level	Category	Organization / Entity
		Antalya Bilim University
		Antalya Belek University
		Alanya University

XIX.4.3. Field Study Report

The result of the field study is shown in the **Error! Reference source not found.**. Processes like expropriation, public consultation meetings, working conditions will be advanced according to these results.

Table XIX.18 The Result of the Field Study

District	Neigborhood	Findings About Vulnerable Gruops
Serik	Merkez	There is no vulnerable group that does not receive support within the knowledge of the mukhtar. There is a high proportion of Syrian refugees/immigrants living in this neighborhood.
Manavgat	Taşağıl	Since the elderly population in the neighborhood is high and the elderly population in need of care and social assistance is the dominant group, a focus group study was conducted.
Manavgat	Kalemler	A focus group study was conducted since the female population of the neighborhood is dominated by divorced/divorced women. Generally, female heads of households and single women work or their children provide care for those who are unable to work. **It was identified that the house and adjacent agricultural land in the potential impact area of the highway project belongs to a physically disabled household head (male). This person stated that he lives on his own. He stated that there is a risk of losing 95% of his land due to expropriation. Parcels: 136/6, 136/7.
Manavgat	Ulukapı	Considering the neighborhood population, the female household head vulnerable group is in the majority. A vulnerable focus group interview was conducted with female participants.
Manavgat	Hacıisalı	A focus group study was conducted in the neighborhood as the population of women who have lost their spouses/divorced and elderly people in need of care are the dominant group. It was informed that there are 3 people who will lose more than 20% of their total productive area in this neighborhood in the potential impact area of the motorway project. Two people have olive groves and one person has a glass greenhouse on the project route. It was informed that the land and residence of the female-headed household will probably be affected by the project.
Manavgat	Karakaya	Considering the neighborhood population, no dominant vulnerable group has been identified. It was informed that the route of the highway passes through the agricultural land and residence of the disabled person.
Alanya	Alara	There may be farmers who have lost more than 20% of their total productive area due to expropriation.
Alanya	Çakallar	There may be farmers who have lost more than 20% of their total productive area due to expropriation.
Alanya	Akdam	There may be farmers who have lost more than 20% of their total productive area due to expropriation. It was also informed that the land and residence of the female-headed household would likely be affected by the project.
Alanya	Toslak	There may be farmers who have lost more than 20% of their total productive area due to expropriation.
Alanya	Konaklı	There may be farmers who have lost more than 20% of their total productive area due to expropriation.

*Source: ENCON Field Study (2024)

XIX.5. STAKEHOLDER ENGAGEMENT PLAN

This part of the SEP introduces the stakeholder engagement plan for the Project Company and gives a detailed description of the disclosure process and timeline. It then presents AAMP's methods and frequencies for stakeholder engagement, along with the proposed stakeholder engagement plan for the construction and operation phases.

XIX.5.1. Methods and Tools for Information Dissemination and Stakeholder Engagement

Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. used appropriate methods to disclose information about the planned Project, consult with stakeholders on potential benefits and risks of the planned project and potential adverse impact mitigation measures. Disclosure of relevant project information helps stakeholders better understand the risks, impacts and opportunities associated with the proposed projects. Information will be disclosed using methods, which is suitable for various groups of stakeholders at all project implementation stages. For all disclosure attempts IFC PS1 and EPFI Principle 5 is followed and by doing so, the Project is kept in international standards. The relevant means for consultations with stakeholders are provided in Table XIX.19 and with possible timing in Table XIX.26 .

Different engagement methods are proposed and cover different stakeholder needs as stated below:

- Formal/ informal face-to-face meetings,
- Focus group meetings,
- One-on-one interviews,
- Digital communication tools (including web pages, correspondence by phone/email, WhatsApp, short message service),
- Written materials,
- Grievance mechanism,
- Social Media promotions.

A range of tools are being utilized for stakeholder engagement under this Project. Stakeholder engagement will continue to utilize these already established communication mechanisms, along with new mechanisms to be used as needed to ensure efficient and effective engagement throughout the lifetime of the Project. The project has and will continue to use the following methods for interacting with stakeholders:

Table XIX.19 Stakeholders / Purpose of Communication / Communication Methods

Stakeholders	Purpose for Communication	Type and Method of Communication
Local communities/settlements in the area (See Table XIX.9 .) Farmers and owners of the agricultural fields around the motorway route Related local businesses near the motorway route Local Universities Vulnerable groups specified under the stakeholder identification section of this document which include as follows: • Children • Children with special needs • Out-of-school children (school-age children who cannot attend school) • Elderly people (75+) • Elderly people requiring care and social assistance (65+) • Illiterate adults • Persons with chronic illness (e.g., heart, diabetes, kidney) • Persons with other serious health conditions (e.g., cancer, Alzheimer) • Disabled persons (physical / mental) • Unemployed people (even though they are actively seeking work) • Seasonal agricultural workers • Households dependent on natural resources (agriculture, livestock, forest products) • Green Card holders • State aid beneficiaries • Informally employed workers (without social security) • Physically and Economically displaced households • Female-headed households • Landless households • Low-income households (below minimum wage) • Migrant and refugee households (e.g., Syrian, Afghan) • Ethnic or linguistic minority groups • Semi-nomadic Yörük communities • Households previously affected by expropriation	Providing information on the nature of the proposed Project, duration of the Project, potential environmental, social and economic impacts (positive and negative) Opportunities for the community to be actively involved in the project activities Mechanism / opportunities for suggestions and proposals Discussions on the potential adverse impacts	Information through the notice boards in public places,community liaison officers, project information desks, official website etc. Information about the prepared documents related to the project (ESIA report and SEP). Construction signs and warnings during the construction phase Group or individual meetings to identify impacts, agree and implement mitigation measures, project announcement (leaflets, etc.) as necessary

Stakeholders	Purpose for Communication	Type and Method of Communication
Representatives of local communities (See Table XIX.9)	Providing information on the nature of the Project, duration of the Project, potential environmental, social and economic impacts (positive and negative) To generate opportunities for the community to be actively involved in the project activities To create mechanisms and/or opportunities for suggestions and proposals To give rise to discussions on the potential adverse impacts	Official correspondence and meetings to provide information on project progress and issues that concern local communities and providing direct information Information through the notice boards in public places,community liaison officers, project information desks, official website etc. Information about the Project (ESIA, SEP, Management Plans) Formal/Informal Meetings with related parties
Interested national and local NGOs Other interested organizations will be added, as identified throughout the life of the Project	Providing information on the nature of the Project, duration of the Project, potential environmental, social and economic impacts (positive and negative) These organizations can potentially help to identify key issues pertaining to the local community (vulnerable groups) and the local environment	Information through the notice boards in public places,community liaison officers, project information desks, official website etc. Information about the Project (ESIA, SEP, Management Plans) Formal/Informal Meetings with related parties
AFAD Local emergency services, fire brigades, utility owners and operators, local police, coast guard, health services	Inform relevant local authorities about Project and undertake official correspondence when needed	Official correspondence and meetings to prepare for and coordinate activities during operation.
Local and Central Governmental Institutions/Agencies	Informing regarding Project progress and undertake official correspondence Getting necessary approvals/opinions during project execution	Official correspondence and meetings, information disclosure and consultation reporting, monitoring, permit requests
General Directorate of Highways (KGM)	Providing information about the operation process of the Project, providing necessary information and reporting on relevant stakeholder engagement activities	Official correspondence and regular meetings to provide information on project progress and address issues that concern local communities and stakeholders Official correspondence and meetings, information disclosure and consultation reporting, monitoring, permit requests

**The website allows for anonymous communication.*
**During phone conversations, individuals will not be pressured to share their identity information; however, they will be informed that, in the absence of contact details, follow-up responses may not be provided.*

To ensure inclusive and equitable participation in the project lifecycle, the following gender-sensitive engagement measures are being implementing:

- **Targeted Outreach to Women**: Separate consultation meetings with women in each affected settlement, facilitated by female staff at every neigborhood in the Project area without exception from beginning of the construction. .It is defined below at the Stakeholder Engagement Plan Section.
- **Accessible Meeting Formats**: The meetings are organized to start at 10.00 - 11.00 a.m. the most convenient time of the day for women,
- **Trusted Local Channels**: Utilize existing women's networks, cooperatives, health centers, and neighborhood heads to disseminate project-related information.
- **Language and Literacy Considerations**: Use visual materials and oral communication methods to accommodate illiterate and semi-literate women.
- **Safe Reporting Mechanisms**: Design grievance systems that allow confidential reporting of gender-based risks and ensure that women feel secure using these channels.

- The call center with the Grievance Mechanism will have a dedicated contact number for women and ensure that the staff listening to the complaint/request are women.
- **Continuous Feedback Loops**: Review and, where appropriate, integrate women's feedback into project decisions, and provide tailored updates to explain how their input has been addressed..

These measures aim to strengthen social inclusion and minimize unintended harms by addressing the gender-specific barriers that may prevent full participation and benefit sharing.

All neighborhood mukhtars (names of neighborhoods are given below) within the project impact area will be interviewed, active communication will be maintained throughout the construction phase, if the mukhtars approved, separate Whatsapp groups are established for each district and active communication is ensured.

Before the Public Participation Meetings, meetings will be held with the neighborhood headmen of each district in Alanya, Manavgat and Serik districts in August 2025, and information was given about both the project and the public participation meetings.

The WhatsApp groups with Muhtars are been used to inform about the meetings, monitoring the complaint boxes and unexpected developments.

XIX.5.2. Specific Communication Strategies

Neigborhoods:

Antalya/Serik: Yukarıkocayatak, Aşağıkocayatak, Kayaburnu, Çandır, Aşağıçatma, Burmahancı, Cumalı, Üründü, Deniztepesi,Sarıabalı, Belpınarı, and Abdurrahmanlar neighborhoods

Antalya/Manavgat: Çakış, Taşağıl, Gündoğdu, Hocalar, Yavrudoğan, Çolaklı, Seki, Kalemler, Evren, Ilıca, Yeniköy, Şişeler, Evrenleryahşi, Dolbazlar, Yukarıışıklar, Dikmen, Bucakşeyhler, Ulukapı, Aşağıışıklar, Demirciler, Karaöz, Aksaz, Hacıali, Cevizler, Sülek, Hacıisalı, Hacıobası, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Odaönü, Karakaya

Antalya/Alanya: Alara, Çakallar, İncekum, Avsallar, Akdam, Türkler, Payallar, Emişbeleni, Toslak, Telatiye (Konaklı), Elikesik

Table XIX.20 Serik- Merkez Neigborhood

Category	Details
Target Groups	Local women, refugee women (especially Syrians), elderly residents, small-scale farmers
Identified Barriers and Risks	Women have limited access to formal consultation mechanisms, language barriers (Arabic speakers), time limitations due to domestic responsibilities, and discomfort attending mixed-gender meetings
Recommended Meeting Frequency	Every 3 months during the construction phase
Suggested Venue	S.S. Serik Boğazkent Women's Initiative Production and Business Cooperative or another trusted, central, and accessible space for women such as a municipal social center
Suggested Time	Weekday mornings (e.g., 10:00–11:00) or early afternoon for increased flexibility
Pre-Meeting Notification Method	Physical announcements (posters) at mukhtar offices, women's cooperative, and local grocery stores Bilingual printed materials (Turkish–Arabic) to reach refugee women

	Coordination with NGOs experienced in refugee engagement and women participation
Suggested Partners |	S.S. Serik Boğazkent Women's Cooperative Serik Municipality's Women and Family Services Unit Local NGOs working with refugee or displaced populations (e.g. Refugees Association, SGDD-ASAM if active locally)

Table XIX.21 Manavgat- Taşağıl Neigborhood

Category	Details
Target Groups	Women, elderly, low-income households, informal agricultural workers
Identified Barriers and Risks	Strong gendered norms discourage women's active participation; women may perceive they are not allowed or not qualified to speak; informal workers lack official channels to express concerns
Recommended Meeting Frequency	Every 3 months, especially before and after major project milestones
Suggested Venue	Municipal social hall, women's training center (if any), or a local school building temporarily adapted for community meetings
Suggested Time	Mid-morning or early afternoon (when domestic obligations are lower)
Pre-Meeting Notification Methods	Leaflets/posters in Turkish displayed at local market, health centers, mosque entrance, and mukhtar's Office Mosque loudspeaker announcements coordinated with the mukhtar Verbal reminders during market days or in front of local bakeries Tea/snack service and seating arrangement that reduces formality Any active women-led cooperatives or school-parent associations (if discovered later)

Table XIX.22 Manavgat- Kalemler and Hacısali Neigborhoods

Category	Details
Target Groups	Women, elderly, subsistence farmers, seasonal workers
Identified Barriers and Risks	GBV/SEAH risks due to incoming male construction workers Literacy barriers, especially among elderly women
Recommended Meeting Frequency	Every 3 months, especially in coordination with seasonal work cycles |i.e. April-May
Proposed Meeting Venue(s)	Local school building, Open-air gathering space (market place)
Notification Methods (Pre-Meeting)	• Mosque loudspeaker announcements coordinated with the mukhtar • Printed flyers distributed at local markets and shops • Word-of-mouth through health workers or midwives • WhatsApp messages forwarded via local grocery shop owners
Suggested Partners	• Mukhtar's office • Local schoolteachers or volunteers • Community health workers or nurses • Religious leaders or imams (to increase neutrality and reach)

Table XIX.23 Alanya- Toslak and Konaklı Neigborhoods

Category	Details
Target Groups	Refugee/migrant women (Arabic speakers), seasonal workers, low-income families, elderly
Identified Barriers and Risks	• Language barrier (Arabic speakers with limited or no Turkish) •Limited mobility for women due to social norms and safety concerns • GBV and SEAH risks related to incoming male labor force
Recommended Meeting Frequency	Every 3 months; more frequently during peak construction or labor influx periods |
Proposed Meeting Venue(s)	Local school building, Open-air gathering space (market place)

Category	Details
Notification Methods (Pre-Meeting)	Bilingual flyers (Turkish–Arabic) distributed at grocery shops, mosque entrance, and via female market vendors Mosque loudspeaker announcements coordinated with the mukhtar In-person outreach by social workers, local women representatives, or trusted Arabic-speaking NGO staff Door-to-door info sharing by female CLO or female municipal outreach staff
Suggested Partners	• Municipality's Women and Family Services • Local Arabic-speaking outreach volunteers • NGOs working with refugee/migrant communities (e.g. ASAM, IBC, CARE if present) • Local health unit or midwife, local female health staff network

Table XIX.24 Serik- Çandır, Aşağıkocayatak and Kayaburnu Neigborhoods

Category	Details
Target Groups	Yörük families (especially women), agricultural workers, elderly residents
Identified Barriers and Risks	• Seasonal mobility due to Yörük transhumance (yayla migration) • Low formal education and digital connectivity • Limited visibility of women in public consultation processes • Male-dominated decision-making structures • Safety concerns during yayla migration especially for women
Recommended Meeting Frequency	Twice per year: once before migration (spring) and once after return (early autumn) Also, every 3 months for stayers
Proposed Meeting Venue(s)	• Mukhtar's garden or shaded outdoor space • Mosque courtyard (off-prayer hours) • Nearby school building or mobile tent
Notification Methods (Pre-Meeting)	• Personal outreach via mukhtar and Yörük elders (aksakallar) • Announcements via mosque and village gatherings • Informal visits by community liaison team a few days before the meeting • Verbal invitation delivered through animal feed sellers or shepherds' network • Women-to-women verbal invitations via relatives
Suggested Partners	• Mukhtar and community elders • Local agricultural cooperatives • Nomadic family associations (if any) • Female outreach staff or locally respected women (e.g., imam's wife, elder women)

Special communication channels may need to be developed for some disadvantaged groups. Different disadvantaged groups can be targeted through home visits or phone calls for individuals who cannot leave their homes; visually oriented leaflets and phone calls for illiterate individuals; leaflets and posters in different languages.

Among the vulnerable groups potentially affected by the Project are nomadic Yörük families, refugee/migrant women, the elderly, subsistence farmers, and seasonal workers, all of whom face various social, cultural, and economic barriers.

The seasonal migration patterns of the Yörük communities make it difficult for them to access information meetings, while women's participation in public consultation processes is often limited by traditional gender norms. Therefore, it is planned to hold at least two information meetings annually-before and after migration-and to organize these meetings in familiar community spaces such as the village head's (mukhtar's) yard, mosque courtyards, or mobile tents. The notification process will be conducted through mukhtars, community elders, herder networks, and verbal communication among

women. Additionally, mobile teams will visit highland settlements (yaylas), safe transportation support will be provided for women, and female CLO will be actively involved in the process.

For refugee and migrant women, the main barriers identified are language limitations, restricted mobility, and the risk of gender-based violence (GBV/SEAH). Meeting announcements will be made via bilingual Turkish-Arabic brochures, and face-to-face outreach will be carried out by trusted local Arabic-speaking actors. In addition, special consultation sessions for women will be organized, focus group discussions with interpreter support will be held, and mobile support teams and psychosocial assistance mechanisms will be introduced to address SEAH risks.

Among elderly individuals and low-income women, low literacy rates and traditional norms that discourage women from speaking publicly reduce active participation. Therefore, meetings are already planned to be held in the late morning or near noon, with tea/snack services provided to create an informal and welcoming atmosphere. In addition to brochure distribution, home visits will be conducted. Furthermore, to increase women's participation, neighborhood-based mini women's advisory groups will be established and regular women-only information sessions will be organized.

A common challenge for all these groups is the hesitancy and distrust related to accessing grievance and feedback mechanisms. Therefore, it is essential to enhance awareness of the Grievance Mechanism (GM), with installed locked complaint boxes to allow for anonymous submissions, and introduce female CLO members who handles complaints submitted by women. Additionally, it is recommended to display simplified visual explanations of the grievance process, including the follow-up, resolution, and feedback loops, on community bulletin boards.

XIX.5.3. Operation Phase Community Engagement Plan (Post-Construction)

The stakeholder engagements developed during the construction process will be used effectively both in terms of public participation and authorized institutions, like NGOs and trade unions, and the communication and relations will continue to be used during the operation phase.

Table XIX.25 Operation Phase Focus Category

Category	Operation Phase Focus
Communication Objective	Ensure that vulnerable community members (women, elderly, children, pastoralist groups) are informed and can provide feedback on operational impacts such as traffic safety, access restrictions, and long-term social concerns.
Frequency of Communication	Twice per year (at minimum): Spring (prior to tourism and migration season) Autumn (after peak seasonal activity) Additional ad-hoc meetings in case of complaints or operational disruptions.
Communication Methods	•Posters and flyers at local hubs (muhtar, mosque, health centers) •WhatsApp messages and voice notes via community focal points •Public information sessions when relevant (e.g., new signage, access road changes) •Mobile info team visit once a year per settlement (if available)
Ongoing Risks / Key Topics	•Road safety (especially for children, elderly, school routes) •Access to agricultural land for women and small farmers •Yörük livestock migration coordination and crossing points •Street lighting needs in isolated or unlit areas •Gender-based violence (GBV) risks around roadside zones •Bus stop placements and pedestrian safety for women and elderly
Feedback & Grievance Channels	•Maintain grievance redress mechanism (GRM) •Add suggestion box in local gathering points (especially for women) •Use female CLO or trusted female intermediary for verbal reporting
Partners and Outreach Actors	•Mukhtar offices •School teachers and health workers •Local women's cooperatives •Elder women or pastoralist representatives •Municipal transport and safety units

XIX.5.4. Schedule and Timetable

The timing and form of activities for stakeholder engagement activities given in the previous section are detailed in Table XIX.26 below.

Table XIX.26 Proposed Stakeholder Engagement Program during Project Implementation

Activity	Method	Timing*
Field Study	Key informant interviews, focus group interviews, stakeholder meeting etc.	June 2024
Road Trip	Four Public Consultation Meetings alongside the motorway route (*, **), key informant interviews, etc.	August 2025
Public Announcements	Social Media announcements, Website of AAMP Community liaison officesetc.	Whenever required
Disclosure of Environmental and Social Reports	Website of AAMP	Annually
Activities with relevant stakeholders	Formal/Informal Meetings with representatives of relevant stakeholders	Whenever required
Reporting to KGM	Official correspondences, meetings and reports	Meetings: Biweekly Reporting: Monthly

** Timing of the activities may change due to changes that may occur during the implementation of the Project.*
***Shuttle vehicles will be arranged for the relevant residential areas in order to facilitate access to the upcoming Public Participation Meetings and to increase attendance rates.*

XIX.6. ROLES AND RESPONSIBILITIES

The anticipated activities in the SEP will be conducted and completed by Project Company and KGM. In activities such as the grievance mechanism, Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. will be responsible for following requests, suggestions and complaints, and in the upcoming process, AAOİAŞ will fulfil the requirements by being responsible for this mechanism in accordance with the IFC PS1, EPFI Principle 5 and Principle 6.

The implementation of this SEP will be conducted and monitored by Project Sponsor's Environmental and Social Manager who is responsible to appoint the Social Chief and the Environment and Social Deputy Manager to be responsible for the stakeholder engagement for the Project, implementation of this SEP and grievance management. The Social Chef and the Environment and Social Deputy Manager will perform the following functions:

- Information disclosure and obtaining feedback;
- Processing, managing and tracking grievances, including ensuring timely responses to and closure of grievances;
- Control over the implementation of the corrective actions to remedy grievances;
- Regular review and if necessary, update of the SEP and stakeholder engagement mechanism to ensure it is effective and reflects Project circumstances;
- Participation in discussion on responses and the resolution of disputes, and
- Assistance in the preparation of the Environmental and Social Performance Reports.

Depending on the complexity of issues, Project Sponsor's project management and experts of KGM may also be involved.

XIX.7. GRIEVANCE MECHANISM

XIX.7.1. Purpose of the Grievance Mechanism

The purpose of this mechanism is to establish a system for handling, evaluation and resolution of all kinds of external grievances, concerns, queries and proposals of the affected communities and other stakeholders, regarding the project activities.

Managing grievances, including avoiding and minimizing them as well as effective handling, is an integral part of a sound stakeholder engagement strategy. Experience shows that significant numbers of grievances arise from misunderstandings, and that such grievances can be avoided, or their numbers reduced, through proactive and consistent engagement with communities. Engagement also helps anticipate and review community concerns to prevent them from escalating into grievances.

In accordance with IFC PS 2 and EPFI Principle 6, a process is established by which people who deem that they have been adversely affected by the Project during planning, construction or operation can bring grievances to the Project for consideration and, if required, resolution. A specific Project grievance mechanism (GM) is beneficial in addressing community and individual concerns and complaints before they escalate beyond control.

XIX.7.2. Responsible Stakeholders

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. is responsible for implementing the grievance mechanism during the land preparation and construction and operation phases.AAOİAŞ has to ensure that the grievance mechanism is implemented effectively.

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. Community Liaison Officers (CLOs), under the supervision of the Social Chief and Environment and Social Manager, are responsible for receiving and managing grievances, coordinating the actions to be taken for resolution, and keeping proper records. The Environment and Social Manager is responsible for compiling and reporting grievance-related information to the General Directorate of Highways (KGM).

XIX.7.3. Grievance Mechanism at the National Level

Presidency's Communication Centre:

The Presidency's Communication Centre (CIMER) provides a centralized complaint system for Turkish citizens, legal persons and foreigners. CIMER only allow applications in Turkish. Contact details of CIMER are given in Table XIX.27 .

Through CIMER, applicants can direct their requests directly to the relevant authorities. The requests submitted to CIMER are resolved within 30 days. If the applicants do not receive feedback within this period, they can re-submit their grievance to CIMER or elevate it to the Ombudsman Institution (www.ombudsman.gov.tr).

Table XIX.27 Contact Details of CIMER

Webpage:	www.CIMER.gov.tr/ www.turkiye.gov.tr/
Call Centre (hotline):	150
Phone number:	+90 312 590 20 00

Fax number:	+90 0312 473 64 94
Official Letter/Petition:	Republic of Türkiye, Directorate of Communications T.C. Cumhurbaşkanlığı Külliyesi 06560 Beştepe/ Ankara
Individual Application:	Community relations desks at governorates, ministries and district governorates.

CIMER will be available to Project stakeholders as an alternative and well-known channel for conveying their Project-related grievances and feedback directly to state authorities.

Foreigners Communication Centre:

The Foreigners Communication Centre (YIMER) provides a centralized complaint system for foreigners. YIMER will be available to Project stakeholders as an alternative and well-known channel for conveying their Project-related grievances and feedback directly to state authorities. Contact details of YIMER are given in Table XIX.28 .

Table XIX.28 Contact Details of YIMER

Webpage:	www.YIMER.gov.tr
Email:	YIMER@goc.gov.tr
Call Centre (hotline):	157
Phone number:	+90 312 515 11 22
Fax number:	+90 312 920 06 09
Official Letter/Petition:	Republic of Türkiye General Directorate of Migration Management, Çamlıca Mahallesi 122. Sokak No: 4 Yenimahalle/ Ankara
Individual Application:	Republic of Türkiye General Directorate of Migration Management

XIX.7.4. Community Grievance Mechanism at the Project Level

The main aim of the community grievance mechanism is to assist in resolving complaints and grievances in a timely, effective, and efficient manner that satisfies all parties involved. The GM is intended to serve as a mechanism to:

- Allow identification and impartial, timely and effective resolution of issues affecting the project,
- Strengthen accountability of the beneficiaries, including project-affected stakeholders, and,
- Provide channels for the stakeholders to provide feedback and raise concerns.

External stakeholders can initiate the grievance/comment mechanism by using the following methods:

- Grievance/comment boxes and forms have been placedin public places including places commonly/ comfortably visited by women)
- Verbally during face-to-face meetings/visits to be held by the Project personnel (e.g. chiefs/ managers, CLOs)
- CLO's contact numbers have been shared with the mukhtars and also information leaflets have been hanged in each neighborhood sharing the contach information of the CLO's.
- E-mail (the e-mail address for the submittal of grievances/comments have been shared with the local communities.
- Website (with the anonymous option)

On the website of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. there is a Contact page which is available in Turkish and English (https://www.antalyaalanyaotoyolu.com.tr/). The grievances/requests related to Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş activities can be communicated through this page and the resolution process is followed. The page includes information on email, phone number and mailing address of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. Name e-mail address, telephone number and explanation/message/grievance could be entered in the online platform. Notification that the application has been received is made via e-mail address.

If the grievance/comment holder would like to fill out the form Annex-1 anonymously, the form will allow the grievance/comment holder to file it without any personal contact information. For grievances/comments received verbally in person, the Project representatives will request the grievance/comment holder to fill in the form himself/herself by providing the required guidance, where necessary. If the grievance/comment holder wishes the form to be filled out by the Project representatives, they will fill the form on behalf of the grievance/comment holder. In such cases, the grievance/comment holder will be required to read the filled form and both the grievance/comment holder and the Project representative who filled in the form will be required to approve and sign the form. The Project representative will provide a copy of the filled form to the grievance/ comment holder stakeholder. The CLO will ensure that the grievance/comment forms are collected from the grievance/comment boxes weekly.

Grievance boxes and information leaflets were placed in all affected neighborhoods at mukhtar's offices and the installation have been completed. An example of the installed grievance mechanism is shown in Figure XIX.11.



Figure XIX.11. The Grievance and Suggestion Box at Mukhtar's Office

The office in Serik, where the address is written, also works as an information office: ORTA, BELEK CADDESI, NO: 7, IÇ KAPI NO: 9 SERIK/ANTALYA. The temporary construction site can also be used as an information office.

Within the scope of the project, threeCLOs started to work within SPV. In addition, a call center has been established and can be reached at 0850 202 07 07.

The roles and responsibilities of CLOs are presented inTable XIX.29 .

Table XIX.29 Roles and Responsibilities of the CLO and Social Chief

Role	Responsibilities
Community Liaison Officer (CLO)	○ Inform the public about the scope, progress, and potential impacts of the Project. ○ Organize and facilitate regular community meetings, focus group discussions, and engagement forums. ○ Maintain open communication channels with project-affected persons (PAPs), community leaders, and local institutions. ○ Develop and distribute communication materials tailored to various community audiences. ○ Ensure that all internal and external complaints, including those under the Stakeholder Engagement Plan (SEP), are managed in line with the Grievance Mechanism (GM). ○ Log, track, and resolve complaints and appeals in a timely and respectful manner. ○ Provide regular training to site personnel during the construction phase. ○ Conduct regular internal audits and report non-conformities. ○ Ensure that non-conformities are recorded and promptly addressed. ○ Participate in the development and follow-up of

Role	Responsibilities
	corrective and/or improvement actions. ○ Report on the implementation performance of this Plan. ○ Support the review and update processes of this Plan. ○ Ensure that lessons learned and field experiences are reflected in plan revisions and training updates. ○ Collaborate with Health & Safety (H&S) and Social teams to address cross-cutting issues. ○ Facilitate resolution of community disputes or concerns related to project activities. ○ Assess how vulnerable or marginalized groups may be affected by the Project. ○ Propose mitigation measures or tailored engagement approaches for at-risk or underrepresented populations. ○ Ensure equitable participation in consultation processes, particularly for women, youth, elders, and people with disabilities. ○ Support the monitoring and recording of the implementation of the social related issues, including activities carried out by subcontractors. ○ Support the evaluation of the SEP's implementation performance and community feedback ○ Contribute to regular internal audits and the reporting of non-conformities. ○ Ensure that relevant non-conformities are recorded and addressed immediately. ○ Participate in the development of corrective and/or improvement actions and support their follow-up. ○ Support the periodic review and update of the SEP and related procedures in coordination with the E&S Manager. ○ Provide input to lessons learned from engagement outcomes and grievance trends. ○ Maintain up-to-date records of all stakeholder meetings, grievances, resolutions, and community commitments. ○ Submit routine reports to the Social Chief and/or E&S Manager summarizing community feedback, grievance status, and engagement Milestones. ○ Ensure confidentiality and proper data handling, especially for sensitive community issues.
Social Chief	○ Supervise and mentor CLOs, ensuring their work aligns with project priorities and stakeholder engagement strategy. ○ Develop and implement work plans and schedules for the CLO team. ○ Ensure consistent messaging, processes, and reporting methods across all field teams. ○ Conduct regular team meetings to review community issues, grievances, engagement outcomes, and field updates. ○ Lead the implementation of the Stakeholder Engagement Plan SEP and ensure it reflects community realities. ○ Oversee the planning and execution of community consultations, public meetings, and disclosure activities. ○ Ensure that engagement activities are inclusive of

Role	Responsibilities
	vulnerable and marginalized groups. ○ Build and maintain positive, trust-based relationships with local communities, leaders, and institutions. ○ Supervise the effective functioning of the grievance mechanism (GM) at community and project levels. ○ Ensure all grievances are recorded, processed, and resolved in a timely and transparent manner. ○ Analyse grievance trends and escalate systemic issues to the E&S Manager. ○ Contribute to the continuous improvement of the GRM process based on community feedback and internal review. ○ Monitor the performance of social engagement activities and their compliance with SEP objectives. ○ Ensure accurate, timely, and complete reporting of CLO activities, stakeholder interactions, and grievance outcomes. ○ Review and validate weekly/monthly reports from CLOs and prepare consolidated updates for senior management. ○ Ensure all engagement activities meet national regulations and international standards (e.g., IFC PS, Equator Principles). ○ Identify training needs and deliver or coordinate training for CLOs on stakeholder engagement, conflict resolution, and field documentation. ○ Promote professional development and capacity building within the social team. ○ Train subcontractors and relevant staff on community interaction protocols and grievance management. ○ Contribute to the development, review, and periodic updating of the SEP and related social management plans. ○ Ensure CLOs support the implementation and documentation of these plans at the field level. ○ Support the integration of lessons learned into updated plans and engagement strategies. ○ Coordinate with the E&S Manager, E&S Specialists, H&S, legal, and construction teams to address community-related impacts. ○ Support alignment between community concerns and project execution through proactive communication with technical departments. ○ Contribute social performance inputs to reports for lenders, regulators, and corporate leadership.

The Community Liaison Officers (CLOs) appointed within the Project hold undergraduate and/or postgraduate degrees in disciplines such as sociology, social policy, public relations, and other social sciences. With both strong academic backgrounds and practical experience, they significantly contribute to the effective implementation of environmental and social management processes. In total, three experts are expected to undertake the role of CLOs within the scope of the Project.The CLOs work under the supervision of the Social Chief, who has extensive experience in stakeholder engagement, coordination with local NGOs and public institutions, gender-sensitive approaches, and the implementation of social development and awareness-raising initiatives in line with national legislation and IFC Performance Standards.

In addition to meeting the above-mentioned qualifications, the current CLOs also possess practical knowledge of social performance management in accordance with World Bank and IFC standards. These experts play an active role in areas such as social impact management, establishment and monitoring of grievance mechanisms, stakeholder engagement processes, gender-sensitive approaches, field research, reporting, and communication. Their key competencies include reporting, problem-solving, leadership, data processing with SPSS, engaging with communities, expertise in child and women's rights programs, and compliance with relevant national and international regulations.

Furthermore, the experts have completed various training and certification programs in areas such as "Community Engagement and Gender-Based Violence Prevention," "Stakeholder Engagement," "Digital Literacy," "Family Counseling," "NLP," and "Play Therapy," thereby enhancing their professional skill sets. The Social Chief has also received adequate training in handling sensitive grievances, ensuring that such cases are managed with professionalism, confidentiality, and care.

XIX.7.4.1. Worker's Grievance Mechanism

The main aim of the worker's grievance mechanism is to ensure that all project workers have access to a fair, transparent, and accessible process for raising and resolving workplace-related concerns in a timely, effective, and confidential manner. The worker's grievance mechanism is intended to:

- Enable workers to raise employment-related concerns, complaints, or suggestions and ensure their impartial, timely, and effective resolution,
- Promote accountability of the employer and management towards fair treatment and workplace rights,
- Provide clear channels for workers to safely provide feedback and report issues without fear of retaliation.

Workers who report violations such as forced labor, mistreatment, or wage exploitation within the scope of the Project shall be protected against any form of retaliation in line with IFC Performance Standard 2 and IFC's Good Practice Note: Addressing Risks of Retaliation Against Project Stakeholders (2021). To this end, the grievance mechanism is designed to allow for anonymous submissions. Workers will be able to submit grievances safely either through anonymous online forms available on the Project website or via locked complaint boxes installed at the Temporary Const. Site, Viaduct 4, Viaduct 8, T-5 Entry, Viaduct 12, and in HRM32 - Registered Archaeological Site. As part of this process, the Internal Grievance Form provided in Annex-2 will be used to ensure that complaints are collected and evaluated in a standardized format. Additionally, the procedural steps established for the grievance mechanism will apply to both internal and external complaints (Table XIX.31). In addition, workers may submit their grievances and feedback by calling the toll-free line 0850 202 07 07 or by visiting the Information Office.

During the grievance review process, the identity of the complainant will remain strictly confidential and will be stored in encrypted systems accessible only to designated Community Liaison Officers (CLOs), and will not be shared with other managers under any circumstances. Meetings related to sensitive issues will be conducted exclusively by authorized social specialists, in private and secure settings, to ensure the safety and privacy of the complainant. Any adverse actions taken against a complainant following the submission of a grievance - such as reassignment, wage deduction, intimidation, or exclusion - will be treated as retaliation. In such cases, disciplinary proceedings will be initiated against the responsible individuals, and contracts with subcontractors may be suspended or terminated if necessary. The effectiveness of these procedures will be monitored by CLOs, and any potential retaliation incidents following grievance submissions will be tracked, documented, and reviewed.

XIX.7.4.2. Gender-Sensitive Accessibility to the Grievance Mechanism

Grievances Related GBV/SH/SEA

To properly address SEA/SH risks, the GM will be in place prior to contractors mobilizing. For GBV- and particularly SEA/SH-complaints, there are risks of stigmatization, rejection and reprisals against complainant. This creates and reinforces a culture of silence so complainant may be reticent to approach the project directly. To enable women to safely access the GM, multiple channels through which complaints will be registered in a safe and confidential manner will be enabled. The GM operators and CLO will to be trained on how to collect SEA/SH cases confidentially and empathetically (with no judgement).

Projects will have multiple complaint channels. No identifiable information on the survivor will be stored in the GM. The GM will not ask for, or record, information on more than the following related to the SEA/SH allegation:

- The nature of the complaint (what the complainant says in her/his own words without direct questioning);
- If, to the best of the survivor's knowledge, the perpetrator was associated with the project;
- If possible, the age and sex of the survivor; and
- If possible, information on whether the survivor was referred to services.

The information in the GM will be confidential-especially when related to the identity of the complainant.

To ensure equitable access to the Grievance Mechanism (GM), gender-specific challenges have been identified across affected communities in Serik, Manavgat, and Alanya. Women, especially those in rural or conservative settings, often face social, mobility, and communication barriers that limit their ability to file formal complaints.

Barriers identified include:

- Limited mobility due to unpaid care work and household responsibilities
- Lack of awareness of complaint channels, particularly among refugee or elderly women
- Discomfort speaking in male-dominated spaces or to male project staff
- Low literacy or digital skills
- Cultural norms discouraging women from voicing dissatisfaction publicly

Table XIX.30 Gender-Sensitive Accessibility to the Grievance Mechanism

Measure	Description
Female CLOs or trusted intermediaries	Women will have the option to submit grievances through female liaison officers or locally respected women (e.g., women cooperative members or mukhtar's wife)
Anonymous feedback channels	Lockable complaint boxes in women-accessed locations (e.g., cooperatives, health centers) and verbal relay via trusted mediators
Outreach using local networks	Use of female-focused WhatsApp groups and word-of-mouth messaging to raise awareness of the GM
Language support	Bilingual grievance forms (Turkish and Arabic) for refugee women in areas like Serik and Toslak
Verbal grievance intake	Women will be allowed to submit complaints orally, especially in low-literacy or elderly populations (e.g. Kalemler, Hacısali)
Culturally appropriate meeting spaces	Women-only consultation sessions where grievances and concerns can be voiced safely and privately
Communication Line	A separate hotline will be set up for women, and it will be explained through CDCs and leaflets that the person answering the phone is a woman and will listen to complaints anonymously, without

	prejudice or comment, and that complaints will be recorded according to the request

Table XIX.31 Procedural Steps of Grievance Mechanism

Step	Description of Process	Time Frame	Responsibility
GM implementation structure	There exist two Grievance Mechanism at the National Level: • Presidency's Communication Centre and • Foreigners Communication Centre	-	Presidency's Communication Centre, and Foreigners Communication Centre and related authorities, CLO
Grievance uptake	Grievances can be submitted via the following channels: • Telephone • Verbally • E-mail • Website • Grievance/comment boxes • Letter to Grievance focal points at local facilities Complaint form to be logged via any of the above channels • Walk-ins may register a complaint in a grievance logbook at a facility or suggestion box Anonymous Grievances can be submitted via the following channels: • Telephone • Letter to Grievance focal points at local facilities • Grievance box in headman's office and the camp sites • Website	CLO must open grievance boxes every week during the construction phase and every 30 working days during the operational phase	CLO
Sorting, processing	Any complaint received is forwarded to Environment and Social Manager and SPV General Manager, Logged in the Grievance Log, and categorized according to the complaint types3: If the complaint is assessed to be out of the scope of the Grievance Mechanism, a grievant will be notified through the desired communication method and an alternative mode of solution will be suggested.	Within 3 business days of receipt	CLO
Acknowledgement and follow-up	Receipt of the grievance is acknowledged to the complainant by CLO through a personal meeting, phone call or letter as appropriate, within a target of 3 business days after submission. If the grievance is not well understood or if additional information is required, clarification will be sought from the complainant.	Within 3 business days of receipt	CLO
Verification, investigation, action	Investigation of the complaint is led by Environment and Social Manager and SPV General Manager. The SPV General Manageris notified of Level 1, 2 or 3 grievances. The Social Chief, as appropriate, support the Environment and Social Manager in deciding who should deal with the grievance and determines	Responses within 30 business days of receipt	SPV General Manager, E&S Manager, Social Chief, Community Liaison Officers

[3] *Level 1 Complaint: A complaint that is isolated or 'one-off' (within a given reporting period - one year) and essentially local in nature.*

Note: Some one-off complaints may be significant enough to be assessed as a Level 3 complaint e.g., when a national or international law is broken (see Level 3).

Level 2 Complaint: A complaint that is widespread and repeated (e.g., noise from the facilities, dust, etc.).

Level 3 Complaint: A one-off complaint, or one which is widespread and/or repeated that, in addition, has resulted in a serious breach of the Project's policies or National law and/or has led to negative national/international media attention, or is judged to have the potential to generate negative comment from the media or other key stakeholders (e.g., inadequate waste management).

Step	Description of Process	Time Frame	Responsibility
	whether additional support for the response is necessary. A proposed resolution is formulated by Social Chief, as appropriate, supports the Environment and Social Manager and is communicated to the complainant by CLO through the grievance/comment close-out form.		
Monitoring and evaluation	Data on complaints are collected in a database and reported to SPV General Manager, Environment and Social Manager and AAOİAŞ HQ every three months	Quarterly	CLO
Provision of feedback	Feedback from complainants regarding their satisfaction with complaint resolution is collected by CLO through phone calls or face-to-face interviews.	15 business days after the implementation of the resolution	CLO

Once all possible means to resolve the complaint have been proposed and if the complainant is still not satisfied, then they should be advised of their right to legal recourse including the right of petition, right to information and appeal to the ombudsperson (constitution, article 74) and right to constitutional complaint (constitution, article 148).

In addition to the project's GM for its internal and external stakeholders, EP 6: Grievance Mechanism requires the establishment of a Workers' Grievance Mechanism (WGM) for the project workers. The project workers will use the WGM to convey their concerns or suggestions regarding their working conditions and workplace. The Worker Grievance Mechanism is defined as the mechanism that receives complaints from Project employees (including both direct and indirect employees).

Any comments or concerns will be brought to the Company's attention verbally or in writing (by post or e-mail) or by filling in a grievance form. The grievance form will be made available on the Company website, at the Project site, at the mukhtar's office, alongside a description of the grievance mechanism. All grievances will be:

- Acknowledged within seven days after receipt;
- Responded no later than within 30 business days after receipt, and
- Specifically, nominated and trained members of staff will record grievance information in a grievance register. The information in the grievance register will include Stakeholder name and contact details and details of the grievance and how and when it was submitted, acknowledged, responded to and closed out.

Individuals can request the right to have their names kept confidential, and this mechanism does not preclude the right for stakeholders to process grievances through other judicial means.

- Step 1: Receipt of grievance and registering of grievance (3 business days),
- Step 2: Assessment,
- Step 3: Acknowledgement of grievance (acknowledged within 3 business days after receipt),
- Step 4: Investigation and resolution of grievance,
- Step 5: Closure; and (30 business days)
- Step 6: Outcome of the corrective action (15 business days after completion).

Appeals Committee

In case the complainants are not satisfied with the decision of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş and/or EPC on their complaints, they can refer to the Appeals Committee via Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş social impact team.

Appeals Committee consisting of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş management teams is responsible for ensuring grievance mechanism is effectively managed. Furthermore, the committee will directly investigate and respond grievances as well as grievances that are not closed when complainant refuses the corrective actions, or the actions are not closed on time.

The mandate of the Appeals Committee covers considering complaints on the issues listed below (excluding those related with Labor Law and Expropriation Law):

- Unsolved grievance related to damage to environment,
- Unsolved grievance related to damage to public assets and infrastructure,
- Unsolved grievance related to damage to private assets (land, crops, houses etc.),
- Unsolved grievance related to impacts on livelihood.

The Appeals Committee carries out the following tasks:

- Meeting at least once a month or more often depending upon the existence of unresolved disputes,
- Reviewing the complaints by hearing both complainants and LİMAK and/or EPC
- Investigating the complaints in accordance with project requirements, LİMAK Policies, legal framework and referring to relevant expertise where required,
- Preparing an evaluation report based on the inquiries,
- Making a proposal on resolution of the disputes between parties.

The decision of the Appeals Committee is not binding and if parties do not agree on the Appeals Committee proposal, they still have the opportunity to either negotiate or litigate.

The Appeals Committee consists of the following members:

- SPV General Manager
- Health and Safety Manager
- Environment and Social Manager
- Expropriation Manager
- Social Chief
- Community Liaison Officer
- Matter Expert, if required
- Relevant NGO officer or village leaders

The grievance mechanism will be widely announced to the public with stakeholder meetings held for project affected communities. Additional meetings will be organized to target women PAPs and vulnerable groups for sharing information on grievance mechanism that also allows anonymous grievances. The grievances will be reviewed by the team according to the Project human rights and grievance mechanism.

The relationships developed through effective stakeholder engagement activities and the involvement of local organizations in the appeals committee will reduce concerns about objectivity and ensure a more transparent process for the grievance mechanism and the right to appeal.

Rules and Procedures of the Appeals Committee

1. Purpose and Scope

This manual outlines the procedures and operating rules of the Appeals Committee established under the grievance mechanism of the Antalya-Alanya Motorway Project. The purpose of the Appeals Committee is to ensure an effective, transparent, and fair review of grievances that remain unresolved or are not accepted by the complainant after the initial resolution process.

The Committee is responsible for investigating grievances that fall under its mandate, ensuring alignment with project policies, applicable legislation, and international environmental and social standards.

The Appeals Committee shall consider complaints unresolved by Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş and/or EPC, specifically on the following issues (excluding matters under Labor Law or Expropriation Law):

- Environmental damage
- Damage to public assets and infrastructure
- Damage to private property (land, crops, houses, etc.)
- Impacts on livelihood

2. Committee Structure and Responsibilities

The Appeals Committee includes the following members:

- SPV General Manager (Chair)
- Health and Safety Manager
- Environment and Social Manager
- Expropriation Manager
- Social Chief
- Community Liaison Officer
- Subject Matter Expert (as needed)
- Representative of local NGOs or village leadership

The Committee may invite additional stakeholders or technical advisors as needed, based on the nature of the grievance under review.

The Committee is responsible for the following tasks:

- Reviewing unresolved or escalated grievances submitted via the Social Impact Team.
- Ensuring complainants are heard fairly and respectfully.
- Conducting investigations in line with project requirements, legal frameworks, and LİMAK Group's environmental and social policies.
- Seeking input from technical experts and community representatives where appropriate.
- Developing reasoned proposals to resolve disputes.
- Preparing detailed evaluation reports for each reviewed grievance.

3. Implementation

- Appeals must be submitted to the CLOs, which will forward them to the Appeals Committee Secretariat.
- Appeals are logged, assigned a case number, and acknowledged within 5 working days.
- The Committee shall meet at least once a month, or more frequently if required by the number or urgency of unresolved grievances.
- The Committee verifies the grievance falls under its mandate.
- Both the complainant and the project/EPC representatives are given the opportunity to present their perspectives.
- The Committee may conduct site visits, consult experts, and review relevant documentation.
- Committee members engage in internal review processes in a confidential manner and aim to reach decisions through consensus wherever possible."
- A written resolution proposal is shared with both parties within three (3) business days following the Committee meeting.
- The grievance case documentation, including the Committee's findings, rationale, and resolution recommendations, is securely archived and integrated into the project's grievance monitoring and reporting system.
- All Committee members shall maintain strict confidentiality.
- Any member with a potential conflict of interest must recuse themselves from the specific case.

- The effectiveness of the Appeals Committee and its procedures will be reviewed annually.
- Lessons learned will be incorporated into future updates of this manual and SEP revisions.

Grievances Related GBV/SH/SEA

To properly address SEA/SH risks, the GM will be in place prior to contractors mobilizing. For GBV-and particularly SEA/SH-complaints, there are risks of stigmatization, rejection and reprisals against complainant. This creates and reinforces a culture of silence so complainant may be reticent to approach the project directly. To enable women to safely access the GM, multiple channels through which complaints will be registered in a safe and confidential manner will be enabled. These channels will be designed to respect privacy, ensure accessibility, and allow for anonymous reporting, using approaches such as - but not limited to - confidential verbal reporting, written submissions, or digital tools, depending on the local context and available resources.Anonymous submissions are accepted and processed with the same level of seriousness.

The Social Chef and CLO is ensure on how to collect SEA/SH cases confidentially and empathetically (with no judgement). Where possible, at least one female CLO shall be available to receive SEA/SH-related complaints.

The Project has multiple complaint channels. No identifiable information on the survivor will be stored in the GM and all data related to GBV/SH/SEA grievances will be handled and stored securely in accordance with applicable data protection laws and the AAOİAŞ's confidentiality policies. The GM will not ask for, or record, information on more than the following related to the SEA/SH allegation:

- The nature of the complaint (what the complainant says in her/his own words without direct questioning);
- If, to the best of the survivor's knowledge, the perpetrator was associated with the project;
- If possible, the age and sex of the survivor; and
- If possible, information on whether the survivor was referred to services.

In line with IFC's Good Practice Note: Addressing Risks of Retaliation Against Project Stakeholders (2021),the information in the GM will be confidential-especially when related to the identity of the complainants or witnesses. Any form of retaliation against individuals submitting GBV/SH/SEA grievances is strictly prohibited. Such actions may result in disciplinary measures for company personnel and, where applicable, appropriate contractual follow-up or escalation with third-party actors, including contractors and service providers.

Complainants will be informed about and referred to appropriate support services, such as medical care, psychosocial support, legal aid, or protection services. AAOİAŞ will maintain an up-to-date referral list of local service providers for this purpose.

GBV/SH/SEA grievances will be acknowledged within 3 business days and resolved as quickly as possible, with sensitivity to the emotional and physical needs of the Complainants. Complainants shall be informed of outcomes or steps taken, as appropriate and with their consent.

All GBV/SH/SEA grievances will be documented separately and securely, with access limited to authorized personnel. Non-identifiable summary data may be used for monitoring, evaluation, and reporting purposes only.

External Grievance/Suggestion Register Form that will use in the grievance mechanism is presented the Figure XIX.12.

Figure XIX.12 External Grievance Form

Doküman *Document*		**DIŞ ŞİKÂYET/ÖNERİ TAKİP VERİ TABANI (***EXTERNAL GRIEVANCE/SUGGESTION REGISTER)*
Son Revizyon Tarihi *Date of Last Revision*		
Son Revizyonu Yapan Kişi *Person who made the Last Revision*		
A. Genel Bilgiler *General Information*	**Ref. No.**	
	Şikayet/Geri Bildirimin Yapıldığı Tarih *Date of Grievance/ Feedback Filed by the Grievance/ Feedback Holder*	
	Şikayet/Geri Bildirimin Şirkete Ulaştığı ve Veritabanına İşlendiği Tarih (Farklı ise) *Date of Grievance/ Feedback Lodged to the Company Database (if different)*	
	Şikayet/Geri Bildirimi Alan Proje Personelinin İsmi *Name of the Project Personnel who Received the Grievance/ Feedback*	
	Şikayet/Geri Bildirimi Alan Proje Personelinin Çalıştığı Şirket *Company of the Project Personnel who Received the Grievance/ Feedback*	
	Şikayet/Geri Bildirimi Şirket Veritabanına Kaydeden Personelin İsmi *Name of the Project Personnel who Registered the Grievance/ Feedback in the Company Database*	
	Şikayet/Geri Bildirim Sahibinin Şikayet/Geri Bildirimin Alındığına Dair Bilgilendirildiği Tarih *Date of Acknowledgement and Notification of the Grievance/Feedback Holder*	

Doküman *Document*		**DIŞ ŞİKÂYET/ÖNERİ TAKİP VERİ TABANI (***EXTERNAL GRIEVANCE/SUGGESTION REGISTER)*
Son Revizyon Tarihi *Date of Last Revision*		
Son Revizyonu Yapan Kişi *Person who made the Last Revision*		
	Şikayet/Geri Bildirimin Alınış Şekli (Yazılı ya da Sözlü, istişareler sırasında) *Method of Grievance/Feedback Receipt (Written or Oral, through consultations)*	
	Şikayet/Geri Bildirim Sahibinin İsmi (isteğe bağlı) *Name of Stakeholder who Lodged the Grievance/ Feedback (optional)*	
	Şikayet/Geri Bildirim Sahibinin Nereden Geldiği (Yerleşim, Şirket, vb.) *Origin of Stakeholder who Lodged the Grievance/Feedback (Settlement, Company, etc.)*	
B. Şikayet/Geri Bildirim ile ilgili Bilgileri *Information on the Grievance/Feedback*	**Geri Bildirimin Tipi (Şikayet, Yorum, İstek, Soru)** *Type of Feedback (Grievance, Comment, Recommendation, Request, Question)*	
	Geri Bildirimin Konusu *Subject of the Feedback*	
	Şikayet/Geri Bildirimin Detaylı Tarifi *Detailed Description of the Grievance/Feedback*	
	Şikayetin İlgili Olduğu Taraf (Şirket, Yüklenici, Altyüklenici, Üçüncü Taraf) *Relevant to Project Company, Contractor, Subcontractor, Third-party, etc.*	
	Aksyion Olup Olmadığı *Follow-up Action Required*	
kısım, Kolonu'na verilen cevabın "Evet" olması halinde doldurulacaktır) *Follow-up Actions (to be filled if the*	**Alınacak Düzeltici Aksiyon** *Corrective Action to be taken*	
	Aksiyondan Sorumlu Taraf *Responsible Party for the Action*	
	Aksiyonun Alınmasından Sorumlu Departman *Responsible Department (for*	

Doküman *Document*		**DIŞ ŞİKÂYET/ÖNERİ TAKİP VERİ TABANI (***EXTERNAL GRIEVANCE/SUGGESTION REGISTER)*
Son Revizyon Tarihi *Date of Last Revision*		
Son Revizyonu Yapan Kişi *Person who made the Last Revision*		
	implementation)	
	Aksiyonun Alınmasından Sorumlu Kişi *Name of the Responsible Person for the Action*	
	Aksiyonun Alınmasından Sorumlu Kişinin Pozisyonu *Position of the Responsible Person for the Action*	
	Aksiyonun Tamamlanacağı Tarihi *Due Date for Action*	
	Aksiyonun Durumu *Action Status*	
	Aksiyonun Tamamlandığı Tarihi *Completion Date for Action*	
	İlgili / Destekleyici Dokümanlar *Related / Supplementary Documents*	
D. Şikayetin/Geri Bildirimin Kapatılması **Grievance/Feedback Closure**	**Şikayet/Geri Bildirimin Durumu** *Status of the Grievance/Feedback*	
	Şikayet/Geri Bildirimin Kapatıldığını Teyit Eden Proje Personeli *Name of the Project Personnel who Confirmed Closure of the Grievance/ Feedback in the Database*	
	Paydaş Şikayet/Geri Bildirimin Kapatıldığına Dair Bilgilendirildiği Tarih *Date the Stakeholder Notified about the Closed Status*	
	Toplam Şikayet/Geri Bildirim Kapanış Süresi *Total Feedback/Grievance Closure Duration*	
	Paydaş Şikayet/Geri Bildirimin Kapatılmasından Memnun Mu? *Is the Stakeholder Satisfied about the Closure of the*	

Doküman *Document*		**DIŞ ŞİKÂYET/ÖNERİ TAKİP VERİ TABANI (***EXTERNAL GRIEVANCE/SUGGESTION REGISTER)*
Son Revizyon Tarihi *Date of Last Revision*		
Son Revizyonu Yapan Kişi *Person who made the Last Revision*		
	Grievance/Feedback?	
	Kapatılmadı ise Nedeni *Reason for Overdue Closure*	
	Kapanış ile İlgili / Destekleyici Dokümanlar *Related / Supplementary Documents for Closure*	

Appeals Committee

In case the complainants are not satisfied with the decision of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş and/or EPC on their complaints, they can refer to the Appeals Committee via Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş social impact team.

Appeals Committee consisting of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş management teams is responsible for ensuring grievance mechanism is effectively managed. Furthermore, the committee will directly investigate and respond grievances as well as grievances that are not closed when complainant refuses the corrective actions, or the actions are not closed on time.

The mandate of the Appeals Committee covers considering complaints on the issues listed below (excluding those related with Labor Law and Expropriation Law):

- Unsolved grievance related to damage to environment,
- Unsolved grievance related to damage to public assets and infrastructure,
- Unsolved grievance related to damage to private assets (land, crops, houses etc.),
- Unsolved grievance related to impacts on livelihood.

The Appeals Committee carries out the following tasks:

- Meeting at least once a month or more often depending upon the existence of unresolved disputes,
- Reviewing the complaints by hearing both complainants and LİMAK and/or EPC
- Investigating the complaints in accordance with project requirements, LİMAK Policies, legal framework and referring to relevant expertise where required,
- Preparing an evaluation report based on the inquiries,
- Making a proposal on resolution of the disputes between parties.

The decision of the Appeals Committee is not binding and if parties do not agree on the Appeals Committee proposal, they still have the opportunity to either negotiate or litigate.

The Appeals Committee consists of the following members:

- SPV General Manager
- Health and Safety Manager
- Environment and Social Manager
- Expropriation Manager
- Social Chief
- Community Liaison Officer
- Matter Expert, if required
- Relevant NGO officer or village leaders

The grievance mechanism will be widely announced to the public with stakeholder meetings held for project affected communities. Additional meetings will be organized to target women PAPs and vulnerable groups for sharing information on grievance mechanism that also allows anonymous grievances. The grievances will be reviewed by the team according to the Project human rights and grievance mechanism.

The relationships developed through effective stakeholder engagement activities and the involvement of local organizations in the appeals committee will reduce concerns about objectivity and ensure a more transparent process for the grievance mechanism and the right to appeal.

Rules and Procedures of the Appeals Committee

1. Purpose and Scope

This manual outlines the procedures and operating rules of the Appeals Committee established under the grievance mechanism of the Antalya-Alanya Motorway Project. The purpose of the Appeals Committee is to ensure an effective, transparent, and fair review of grievances that remain unresolved or are not accepted by the complainant after the initial resolution process.

The Committee is responsible for investigating grievances that fall under its mandate, ensuring alignment with project policies, applicable legislation, and international environmental and social standards.

The Appeals Committee shall consider complaints unresolved by Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş and/or EPC, specifically on the following issues (excluding matters under Labor Law or Expropriation Law):

- Environmental damage
- Damage to public assets and infrastructure
- Damage to private property (land, crops, houses, etc.)
- Impacts on livelihood

2. Committee Structure and Responsibilities

The Appeals Committee includes the following members:

- SPV General Manager (Chair)
- Health and Safety Manager
- Environment and Social Manager

- Expropriation Manager
- Social Chief
- Community Liaison Officer
- Subject Matter Expert (as needed)
- Representative of local NGOs or village leadership

The Committee may invite additional stakeholders or technical advisors as needed, based on the nature of the grievance under review.

The Committee is responsible for the following tasks:

- Reviewing unresolved or escalated grievances submitted via the Social Impact Team.
- Ensuring complainants are heard fairly and respectfully.
- Conducting investigations in line with project requirements, legal frameworks, and LİMAK Group's environmental and social policies.
- Seeking input from technical experts and community representatives where appropriate.
- Developing reasoned proposals to resolve disputes.
- Preparing detailed evaluation reports for each reviewed grievance.

3. Implementation

- Appeals must be submitted to the CLOs, which will forward them to the Appeals Committee Secretariat.
- Appeals are logged, assigned a case number, and acknowledged within 5 working days.
- The Committee shall meet at least once a month, or more frequently if required by the number or urgency of unresolved grievances.
- The Committee verifies the grievance falls under its mandate.
- Both the complainant and the project/EPC representatives are given the opportunity to present their perspectives.
- The Committee may conduct site visits, consult experts, and review relevant documentation.
- Committee members engage in internal review processes in a confidential manner and aim to reach decisions through consensus wherever possible."
- A written resolution proposal is shared with both parties within three (3) business days following the Committee meeting.
- The grievance case documentation, including the Committee's findings, rationale, and resolution recommendations, is securely archived and integrated into the project's grievance monitoring and reporting system.
- All Committee members shall maintain strict confidentiality.
- Any member with a potential conflict of interest must recuse themselves from the specific case.
- The effectiveness of the Appeals Committee and its procedures will be reviewed annually.
- Lessons learned will be incorporated into future updates of this manual and SEP revisions.

Grievances Related GBV/SH/SEA

To properly address SEA/SH risks, the GM will be in place prior to contractors mobilizing. For GBV- and particularly SEA/SH-complaints, there are risks of stigmatization, rejection and reprisals against complainant. This creates and reinforces a culture of silence so complainant may be reticent to

approach the project directly. To enable women to safely access the GM, multiple channels through which complaints will be registered in a safe and confidential manner will be enabled. These channels will be designed to respect privacy, ensure accessibility, and allow for anonymous reporting, using approaches such as - but not limited to - confidential verbal reporting, written submissions, or digital tools, depending on the local context and available resources.Anonymous submissions are accepted and processed with the same level of seriousness.

The Social Chef and CLO will to be trained on how to collect SEA/SH cases confidentially and empathetically (with no judgement). Where possible, at least one female CLO shall be available to receive SEA/SH-related complaints.

Projects will have multiple complaint channels. No identifiable information on the survivor will be stored in the GM and all data related to GBV/SH/SEA grievances will be handled and stored securely in accordance with applicable data protection laws and the AAOİAŞ's confidentiality policies (Please refer to Annex-3 for the Project Sponsor's confidentiality policy.). The GM will not ask for, or record, information on more than the following related to the SEA/SH allegation:

- The nature of the complaint (what the complainant says in her/his own words without direct questioning);
- If, to the best of the survivor's knowledge, the perpetrator was associated with the project;
- If possible, the age and sex of the survivor; and
- If possible, information on whether the survivor was referred to services.

In line with IFC's Good Practice Note: Addressing Risks of Retaliation Against Project Stakeholders (2021),the information in the GM will be confidential-especially when related to the identity of the complainants or witnesses. Any form of retaliation against individuals submitting GBV/SH/SEA grievances is strictly prohibited. Such actions may result in disciplinary measures for company personnel and, where applicable, appropriate contractual follow-up or escalation with third-party actors, including contractors and service providers.

Complainants will be informed about and referred to appropriate support services, such as medical care, psychosocial support, legal aid, or protection services. AAOİAŞ will maintain an up-to-date referral list of local service providers for this purpose.

GBV/SH/SEA grievances will be acknowledged within 3 business days and resolved as quickly as possible, with sensitivity to the emotional and physical needs of the Complainants. Complainants shall be informed of outcomes or steps taken, as appropriate and with their consent.

All GBV/SH/SEA grievances will be documented separately and securely, with access limited to authorized personnel. Non-identifiable summary data may be used for monitoring, evaluation, and reporting purposes only.

XX. ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

In accordance with the Technical Specifications of KGM, Project Sponsor will establish or utilize existing certified (ISO 9001, ISO 14001 and ISO 45001) Quality Management Systems. These systems will aim to ensure that all the construction activities and the services to be provided would cover quality assurance aspects. In addition to providing quality assurance, the Project will be implemented in accordance with the requirements of the national environmental legislation, international agreements and protocols and international environmental and social standards including the Equator Principles (EPs) and International Finance Corporation's (IFC) Policy (2012) and related Performance Standards (PSs) on Environmental and Social Sustainability that would be applicable to the Antalya-Alanya Motorway Project. This "Environmental and Social Management System" (ESMS) has been developed as a part of the Project's ESIA process in order to generate a systematic approach for daily implementations within the Antalya-Alanya Motorway Project.

This ESMS consists of the following elements:

(i) Project's policies on environmental, health, safety and labor aspects;
(ii) Organizational structure of the Project;
(iii) An integrated Environmental and Social Management Plan (ESMP) defining the main management approaches and mitigation measures for relevant environmental and social subjects;
(iv) Framework for the monitoring and review of the ESMP

In addition, the Stakeholder Engagement Plan prepared as part of the ESIA Report is presented in Annex-8.

The Project ESMS has been established to ensure that all the implementations within the Project will be carried out in an environmentally sound manner. The ESMS will also provide the main framework for implementation of health and safety measures for the employees and the affected communities.

As a part of the ESMS, the ESMP will consist of plans and procedures indicating the good practices, mitigation measures and monitoring plan. However the system will not be limited with the provisions laid out in the document since continuous improvement will be carried out through an ongoing process of reviewing, correcting and improving. The ESMS will be implemented by the Project Sponsor and all the subcontractors involved. With effective implementation of the ESMS, compliance with the applicable national and international legislation and standards will be guaranteed.

XX.1. Environmental and Social Policy Framework

The Project Sponsor is committed to implement the Project in line with the commitments and measures contained in this ESIA, which have been developed and proposed on the basis of the Equator Principles and the relevant requirements of the IFC performance standards and EHS Guidelines.

In this context, the Project follows the principles outlined in the ESMS (including the ESMP) and utilizes the established ISO 9001, ISO 14001 and ISO 45001 management systems covering quality, environment and occupational health and safety.

Within the framework of the ESMS, a Project-specific Environmental and Social Policy has been developed and is being implemented by the Project Sponsor, incorporating but not limited to the following key principles.

XX.1.1. Environmental Policy

The objective for setting out an environmental policy is to follow sustainability principle by implementing all the Project activities in accordance with national and international environmental requirements. Within this context, environmental compliance will be taken into account in all phases of the Project.

The potential impacts of the Project and the mitigation measures to be taken are defined in the ESIA Report and the ESMP. The Project Sponsor will be the responsible party for taking all necessary measures in order to prevent or at least minimize these impacts to environment. Project Sponsor embraces a sustainability approach aligned with global goals, taking its responsibilities towards society, the environment, and its employees seriously, while committing to continuous improvement in fulfilling these responsibilities. In this context:

- Through its strategic direction, the company aims to create a positive impact on society and the planet by adopting a holistic sustainability approach that incorporates environmental and social responsibilities in all regions and areas of operation.
- In every area where the company operates, legal obligations are fully met, and all environmental protection efforts are regarded not only as a regulatory requirement but also as a demonstration of respect towards society.
- With the awareness that environmental protection is a shared responsibility of humanity, the company contributes to building and enhancing environmental awareness and sensitivity among its employees, stakeholders, and society at large.
- Actions are taken to promote efficient and sustainable use of resources required during operations, in line with the prevention of pollution, environmental protection, mitigation of climate change, and the conservation of biodiversity and ecosystems.
- In terms of waste management, a “zero waste” philosophy is adopted. Activities are planned and conducted with a focus on first preventing waste generation, followed by reducing waste at its source, reusing, recycling, recovering, and finally disposing of waste responsibly.
- Efforts are undertaken to reduce carbon emissions arising from project activities.
- To ensure a livable world for future generations, actions are taken to protect natural water resources, reduce water consumption, promote water recycling and reuse within the scope of water management; and to reduce energy consumption, increase energy efficiency, and encourage the use of renewable energy sources to the extent possible within the scope of energy management.

XX.1.2. Integrated Management Systems Policy

Project Sponsor has implemented an Integrated Management System that covers Quality, Environment, Occupational Health and Safety (OHS), and Road Traffic Safety across all construction and maintenance activities. The system is designed to fulfill the expectations of stakeholders, ensure responsibility towards society, the environment, and employees, and support continuous improvement of service quality.

The company’s approach is based on the following principles:

- Ensuring high-quality production and customer-oriented service delivery in all projects;
- Creating positive environmental and social impact through a comprehensive sustainability approach aligned with its strategic direction;
- Complying with all applicable national and international legislation on Quality, Environment, OHS, and Road Traffic Safety;
- Promoting awareness among employees, stakeholders, and the wider public regarding Quality, Environment, OHS, and Road Traffic Safety;

- Providing safe and healthy working conditions to prevent work-related injuries, illnesses, and traffic accidents;
- Identifying and eliminating hazards and reducing operational risks to the extent possible;
- Encouraging sustainable resource use to prevent pollution and support environmental protection;
- Allocating resources for climate change mitigation and adaptation, as well as for the conservation of biodiversity and ecosystems;
- Using energy and natural resources efficiently;
- Continuously improving the performance of the Integrated Management System;
- Ensuring that activities related to Quality, Environment, OHS, and Road Traffic Safety are embraced as a shared responsibility across the organization, and promoting employee consultation and participation;
- Acknowledging human capital as the company's most valuable asset, and therefore prioritizing the employment of competent personnel and maintaining high levels of employee development and satisfaction.

XX.1.3. Quality Policy

Project Sponsor aims to fulfill the expectations and requirements of its stakeholders, uphold its responsibilities towards society, the environment, and its employees, and ensure the continuous improvement of service quality. In alignment with these objectives, the following commitments are adopted:

- Adopting quality production and customer-oriented service as fundamental principles across all projects, with a focus on achieving high levels of stakeholder satisfaction;
- Creating a positive impact on society and the environment through a holistic sustainability approach, guided by a strong sense of environmental and social responsibility;
- Ensuring full compliance with applicable national and international laws, regulations, standards, and sector-specific innovations;
- Continuously improving the performance of the Quality Management System by integrating acquired knowledge and experience with operational outcomes;
- Promoting a shared sense of responsibility among employees for quality-related matters, while enhancing quality awareness across the company, stakeholders, and society;
- Sustaining corporate competitiveness by aligning organizational objectives with the company's policies, mission, vision, and values, and promoting continuous improvement at all levels;
- Enhancing operational efficiency through modern management practices and institutionalizing knowledge and experience across all departments;
- Advancing technological capabilities and embracing innovation to maintain leadership in the sectors in which the company operates;
- Recognizing human capital as the company's most valuable asset by employing highly qualified personnel and investing continuously in employee development to maintain high levels of satisfaction and competence.

XX.1.4. Occupational Health and Safety Policy

Project Sponsor recognizes that its most valuable asset is its human capital. With this awareness, the company aims to minimize all types of potential losses by ensuring a safe and healthy working environment and considers continuous improvement a key organizational objective. The company fulfills its responsibilities toward society, the environment, and its employees in line with the following principles:

- Compliance with all applicable national and international laws, regulations, and standards in all areas of operation, with OHS practices seen not only as legal obligations but also as a reflection of the company's respect for society and its workforce;
- Provision of safe and healthy working conditions to prevent occupational injuries and illnesses;
- Adoption of the "zero accident" and "zero occupational disease" targets, and implementation of proactive risk assessments and root cause analyses to identify and eliminate unsafe conditions and actions that could lead to accidents or health deterioration for employees, subcontractors, suppliers, and visitors;
- Promotion of shared responsibility for occupational health and safety at all levels of the organization, ensuring effective consultation and participation of employees in all OHS-related matters;
- Training of employees to establish and enhance OHS awareness, and ensuring that subcontractors, suppliers, and visitors comply with established safety procedures and rules;
- Continuous investment in employees to maintain high levels of competence, quality, and satisfaction.

XX.1.5. Sustainability Policy

Project Sponsor acknowledges that ensuring a sustainable future requires collective global effort in harmony with nature. Guided by this awareness, the company integrates sustainability into all aspects of its operations and decision-making processes. The Sustainability Policy is built upon the founding values, ethical principles, and global sustainability goals of its parent company, Limak Holding, and serves as a framework for all stakeholders within the company's value chain.

Business Approach Focus Areas

The Sustainability Policy is structured around three interrelated pillars. Antalya Alanya Motorway Construction, Investment and Operation Inc. is committed to the belief that sustainable economic development can only be achieved through environmental and social responsibility on a healthy planet.

Inclusive Development

In line with Limak's global sustainability vision, the company adopts an inclusive approach to economic development by actively engaging with employees, business partners, and stakeholders. Key commitments under this focus area include:

- Aligning operations with the United Nations Sustainable Development Goals (UN SDGs);
- Complying with the 10 Principles of the United Nations Global Compact, to which Limak is a signatory;
- Allocating resources to research and development across operational sectors;
- Supporting the development and implementation of innovative technologies that contribute to sustainability;
- Encouraging stakeholder participation in decision-making processes;

- Fostering a company-wide culture of sustainability through awareness-raising and internal communication;
- Sharing experiences and best practices through international partnerships and platforms;
- Promoting sustainability across the entire supply chain;
- Measuring and evaluating the economic, environmental, and social impacts of operations to identify areas for improvement;
- Publishing periodic sustainability reports in accordance with international standards;
- Maintaining a transparent, ethical, and anti-corruption business approach.

People-Centered Approach

The company prioritizes the protection of human health, support for personal development, and promotion of equal opportunities across all activities. Sustainability is considered inseparable from social development and employee commitment. Project Sponsor aims to create safe, accessible, and innovative environments that foster individual and social well-being.

Core actions under this pillar include:

- Ensuring and maintaining equal opportunity and public health, with particular attention to vulnerable groups;
- Monitoring and enhancing energy efficiency across all sectors, and investing in infrastructure improvements;
- Promoting the use of renewable energy sources in operations;
- Supporting projects that increase water efficiency and awareness among employees and stakeholders;
- Calculating, verifying, and monitoring emissions generated by operational activities as part of climate change mitigation efforts.

XX.1.6. Human Resources Policy

The Project Sponsor adopts a participatory and value-generating human resources management approach shaped by the vision, mission, competencies, and ethical values of Limak Holding, in line with principles of change and transformation.

In line with the Corporate Equality Policy, the Project Sponsor aims to raise awareness among all employees by providing a fair, transparent, efficient, healthy, and development-oriented working environment that supports gender equality. Based on the principles of equality and inclusiveness, all human resources practices—such as recruitment, training, promotion, performance management, career development, and remuneration—are free from discrimination based on gender, age, marital status, religion, language, ethnicity, pregnancy status or potential, and other personal characteristics. In addition, the Project Sponsor strictly opposes any forms of physical punishment, psychological pressure, verbal abuse, or mistreatment that may undermine human dignity in disciplinary actions.

An inclusive and equality-based communication approach is adopted in all internal and external communication, supporting skills and competencies. The Project Sponsor acts with full social responsibility awareness in line with national regulations, and does not employ children and/or individuals under the age of 18.

Except for short-term exceptional circumstances, working hours are maintained within the limits set by applicable labor legislation. In recruitment processes, priority is given to women candidates where male and female applicants have equal qualifications.

The following are actively supported as part of the company's commitment to gender equality and inclusion:

- Increasing the representation of women in middle and senior decision-making roles,
- Supporting the return of female employees to work after maternity leave and eliminating career development losses,
- Enhancing the participation of women in traditionally male-dominated sectors and roles, and of men in traditionally female-dominated fields,
- Promoting work-life balance, including equitable sharing of unpaid domestic responsibilities,
- Supporting paternity involvement and shared parental responsibilities in childcare and development.

A fair, transparent, and competitive remuneration system is implemented, based on job grades and competencies, aligned with market conditions and sensitive to the principle of equality. In accordance with the principle of "equal pay for work of equal value," all employee rights are protected.

A performance evaluation system is applied that fairly, transparently, and inclusively assesses knowledge, effort, and behavior. The outputs of this system form the basis for development and promotion processes. Career paths of all employees are managed with a development-focused approach, and access to personal, technical, and professional training programs is ensured based on identified needs. Internship opportunities are provided to students to support their professional growth.

The Project Sponsor adopts a Zero Tolerance Policy against workplace violence, domestic violence, and violations of sexual integrity in relationships among employees, between employees and stakeholders, and among stakeholders themselves. All necessary disciplinary measures are taken in the event of any violations.

The Project Sponsor also supports practices aimed at enhancing employee motivation and strengthening organizational loyalty by acting on insights gained from employee satisfaction initiatives conducted across group companies. Ensuring work-life balance through effective implementation of related policies and procedures is considered a priority.

XX.1.7. Data Privacy and Security Policy

This policy outlines the principles and measures to be followed by all employees of the Project Sponsor to ensure the confidentiality, security, integrity, and continuity of sensitive information. Employees acknowledge that unauthorized use or disclosure of confidential information may damage the organization's competitiveness and reputation. All employees are therefore responsible for managing confidential information in accordance with this policy.

Confidental Information

Confidential information includes, but is not limited to:

- Commercial, financial, operational, contractual, and technical data
- Trade secrets, inventions, intellectual property, and business methods
- Personal data, internal documentation, project details, pricing strategies, and software
- Information protected under confidentiality agreements with third parties

This information may pertain to the Project Sponsor or to related stakeholders such as employees, business partners, suppliers, clients, and even competitors.

Disclosure and Use

Confidential information must not be disclosed or used outside the permitted purposes unless:

- Disclosure is essential for business operations and covered by a Non-Disclosure Agreement (NDA);
- Required by law, regulatory orders, or court decisions (with prior notice to management);
- Written consent is obtained from third parties in case their confidential data is involved;
- Prior written authorization is granted by the relevant authority for exceptions.

Employees must ensure that:

- All information reasonably deemed confidential, even if not marked, is treated accordingly;
- Disclosure is limited to those with a legitimate “need-to-know”;
- Reproduction, alteration, or destruction of confidential information requires prior approval;
- Confidential information is not discussed in public areas or shared via social media;
- Confidential third-party data is handled with the same level of care as internal data;
- All suspected breaches are reported immediately to management;
- No employee may pressure another into disclosing confidential information;
- The Law on the Protection of Personal Data (No. 6698) is strictly followed;
- Confidential information is safeguarded per IT security protocols and returned upon termination of employment.

Information Security

The Project Sponsor implements necessary measures to ensure the confidentiality, integrity, and availability of information stored physically or electronically. Employees are expected to:

- Use information only within legal and internal policy limits;
- Follow proper procedures when disclosing data to third parties;
- Maintain user access credentials securely and never share them;
- Take necessary actions when a data breach is suspected;
- Store physical documents securely in designated areas;
- Seek authorization before removing any data from the premises;
- Use only designated equipment for handling sensitive data.

Information security protocols include:

- Regular staff training and awareness-raising
- Controlled access management (authorization matrix, logs, backups)
- Cybersecurity measures to prevent data loss, unauthorized access, or tampering
- Ongoing audits to monitor compliance

In case of uncertainty regarding policy implementation, or awareness of a possible violation, employees are required to consult or report the matter to the Ethics Committee for evaluation.

XX.1.8. Zero Tolerance Policy Against Violence and Violation Of Sexual Inviolability

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş (''AAOİAS'') is determined to provide a safe environment to its entire employees and other people with whom it has a business relationship which is free from all kinds of violence and violation of sexual inviolability, including sexual harassment and assault, and discrimination on any grounds.

Through this policy, it aims to implement the necessary application and referral procedures to ensure a working environment free from all cases of violence and violation of sexual immunity, including gender-based violence and harassment. AAOİAS aims to establish a corporate culture that does not tolerate any violence against employees and violation of sexual inviolability in order to ensure gender mainstreaming within the corporation. AAOİAS considers violence and violation of sexual inviolability not only as a violation of human rights, but also as a problem that negatively affects the effective participation of employees in business life and the working environment and acts with this awareness.

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş adopts a zero-tolerance policy for cases of violence and violation of sexual inviolability, dealing with all cases seriously and carries out all relevant transactions respectfully and ensures that all allegations of violence or violations of sexual inviolability are investigated on the basis of trust without delay. It accepts and is committed to providing a decent and safe working environment and adopting a holistic approach to combating violence and violations of sexual immunity. AAOİAS applies disciplinary actions that may lead to dismissal of an employee who is found to have committed violence to a person or violated his/her sexual inviolability.

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş takes the principles of confidentiality and acting upon with care and trust as basis in the implementation of the policy. AAOİAS protects the information of parties who alleged and witnessed violence or violation of sexual inviolability, takes the necessary measures to minimize any potential negative effects in the application process and behaves in a manner that does not damage the sense of trust in entire organization and among the parties with whom there are business relationships. In case the victim is not willing to share their identity information, AAOİAS ensures an anonymous complaint/application mechanism.

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş has prepared this policy on the basis of national legislation and international human rights conventions.

XX.2. Environmental and Social Management System Structure

The ESIA resulted in the identification of E&S risks and potential impact factors for which specific mitigation measures were identified to mitigate the effects of the impact factors. The ESIA was prepared in accordance with both National Regulations and applicable international standards. The ESIA process included the following steps:

- Review of available Project and environmental and social documentation
- A Scoping report was prepared prior to the ESIA process and included general project information, legal framework, baseline and preliminary impact assessment and a methodology for ESIA process.
- An Inception Report was submitted in the first phase of the ESIA process. This report served as a foundational document to validate and ensure compliance with the scope, methodological approach, study boundaries and stakeholder expectations for environmental and social assessments.

- Biological and physical baseline surveys have been performed for physical (air quality, noise and vibration measurements at sensitive receptors, soil, groundwater) and biological (flora, fauna) components to provide an understanding of the environmental context in the Regional Study Area (RSA) and the Area of Influence (AoI) of the Project before its realization.
- A Biodiversity Action Plan (BAP) has been developed to manage and mitigate potential impacts on critical and natural habitats identified during the baseline ecological surveys. The BAP sets out actions to conserve biodiversity and ensure no net loss, in line with IFC Performance Standard 6.
- A Stakeholder Engagement process including community-level surveys, focus group discussions, key informant interviews
- A Resettlement Action Plan (RAP) is being prepared in line with relevant national legislation and international standards to address potential physical and economic displacement impacts. The RAP will outline compensation mechanisms, livelihood restoration strategies and stakeholder engagement procedures specifically targeting affected persons.
- An ESIA report has been prepared and includes the results of the ESIA process carried out as well as an assessment of the Project's adverse and positive impacts and includes mitigation measures that will be the basis for the preparation of ESMPs, a component of the Project's ESMS. The ESIA report includes a Non-Technical Summary (NTS) prepared for disclosure.

As the potential impacts and impact levels of the Project vary according to different phases of the Project (construction, operation and decommissioning) environmental and social management of the Project are assessed separately. ESIA consists of three main components in that scope, which are as follows:

- Mitigation Plan
- Monitoring Plan
- Monitoring Report

The graphical representation of the environmental and social management structure is given in Figure XX.1.



Figure XX.1 Environmental and Social Management Structure

XX.3. Environmental and Social Management Plans (ESMPs)

Environmental and Social Management Plans (ESMPs) are set forward to implement principles that are required to prevent, control and minimize potential impacts of the Project on the natural environment, wildlife and local communities. The idea is to apply environmentally sound management strategies in line with related national legislation, international agreements and protocols, and international standards to carry out project activities conserving the integrity of natural systems without negatively affecting the surrounding environment. As a part of the ESMS, an ESMP, consisting of sub-procedures on the management of environmental (e.g. water and wastewater, waste, hazardous materials, wildlife, etc.) and health and safety (occupational and community related) aspects of the Project has been prepared.

Within the scope of the ESMP, several topic-specific procedures have been developed that set out the main management approaches and mitigation measures, together with a monitoring plan to assess the effectiveness of the mitigation measures to be implemented. The Project ESMP including those procedures, as listed below, is presented in Annex-4 of the ESIA Report.

- Environmental Management Plan
  - Air Quality and Emissions Management Procedure
  - Water Quality, Wastewater and Stormwater Management Procedure
  - Solid Waste Management Procedure
  - Hazardous Waste Management Procedure
  - Noise Management Procedure
  - Habitat Alteration, Fragmentation and Wildlife Management Procedure
  - Quarry Management Procedure

- Occupational Health and Safety Management Plan
  - Physical Hazards Management Procedure
  - Chemical Hazards Management Procedure
  - Noise Management Procedure
  - Personal Protective Equipment (PPE) Management Procedure
  - Communication and Training Management Procedure
  - Workers Accommodation Procedure

- Community Health, Safety and Security Plan
    - Fire Management Procedure
    - Traffic Management Procedure

- Other Relevant Plans and Procedures
    - Subcontractor Management Plan
    - Change Management Procedure
    - Emergency Preparedness and Response Plan
    - Stakeholder Engagement Plan
    - Resettlement Action Plan
    - Chance Find Procedure.

In addition, an Emergency Preparedness and Response Plan and a Stakeholder Engagement Plan (including the Grievance Mechanism) were prepared as part of the ESIA Report and is submitted as annexes to this ESIA Report.

In addition to the topic-specific procedures incorporated under the ESMP, the following project-specific sub-management plans have been developed to ensure the effective implementation of the Environmental and Social Management System (ESMS) during the construction phase. These plans provide detailed guidance tailored to the specific activities, risks, and impacts anticipated during construction and are fully aligned with the overarching ESMP framework. Each sub-plan is designed to address particular environmental and social risks that may arise throughout the construction period. These Plans are:

- Air Pollution and Emissions Management Plan
- Hazardous Material Management Plan
- Solid Waste Management Plan
- Environmental Accident and Spill Response Management Plan
- Water Quality Wastewater and Storm Water Management Plan
- Noise and Vibration Management Plan
- Change Management Plan
- Community Health and Safety Management Plan
- Construction Camp Site Management Plan
- Emergency Preparedness and Response Management Plan
- Human Resources and Labor Management Plan
- Security Management Plan
- Supply Chain and Subcontractor Management Plan
- Traffic Management Plan
- Training and Communication Management Plan
- Occupational Health and Safety Plan
- Resource Efficiency Management Plan
- Excavated Material Management Plan
- Soil Management and Erosion Control Plan
- Cultural Heritage Management Plan
- Blasting Management Plan
- Quarry Management Plan

- Demolition Management Plan
- Environmental and Social Management and Monitoring Plan

An Operation Phase Environmental and Social Management Plan (O-ESMP) will be developed at least three months prior to the commencement of the operation phase, as required. This overarching plan will guide the implementation of environmental and social mitigation and monitoring measures during operation.

In addition, a set of operation phase sub-management plans will be prepared to address project-specific environmental and social risks. These plans will include, but are not limited to, the following:

- Waste Management Plan
- Noise Management Plan
- Emergency Preparedness and Response Plan
- Labour Management Plan
- Occupational Health and Safety Plan
- Traffic Management Plan
- Sub-contractor Management Plan

These plans will be aligned with the O-ESMP and the overall Environmental and Social Management System (ESMS) to ensure effective risk management and regulatory compliance during operation.

These sub-management plans serve as key implementation tools of the ESMP and are binding for all Project personnel, including contractors and subcontractors. Together, they ensure alignment with applicable national laws, IFC Performance Standards, and Good International Industry Practice (GIIP).

XX.4. Roles and Responsibility

The organizational structure presented in Figure XX.2 outlines the key management roles and reporting lines for the construction phase of the Project. This structure defines the hierarchical distribution of responsibilities and facilitates coordination among various departments involved in the execution of environmental and social management plans. Each role within this structure should ensure that assigned tasks are executed in line with the Project's ESMS requirements and that inter-departmental coordination is maintained effectively. In addition to the construction phase structure, the SPV (Special Purpose Vehicle) will assume overall responsibility for ensuring the implementation and oversight of the Environmental and Social Management System during the operation phase of the Project.

In support of this structure, Table XX.1 is provided to outline the roles and responsibilities specifically related to the implementation, monitoring, and reporting requirements of ESMPs. The table clarifies the functional duties of each party involved in ensuring the effective execution of the measures described herein and reinforces accountability across all relevant units.

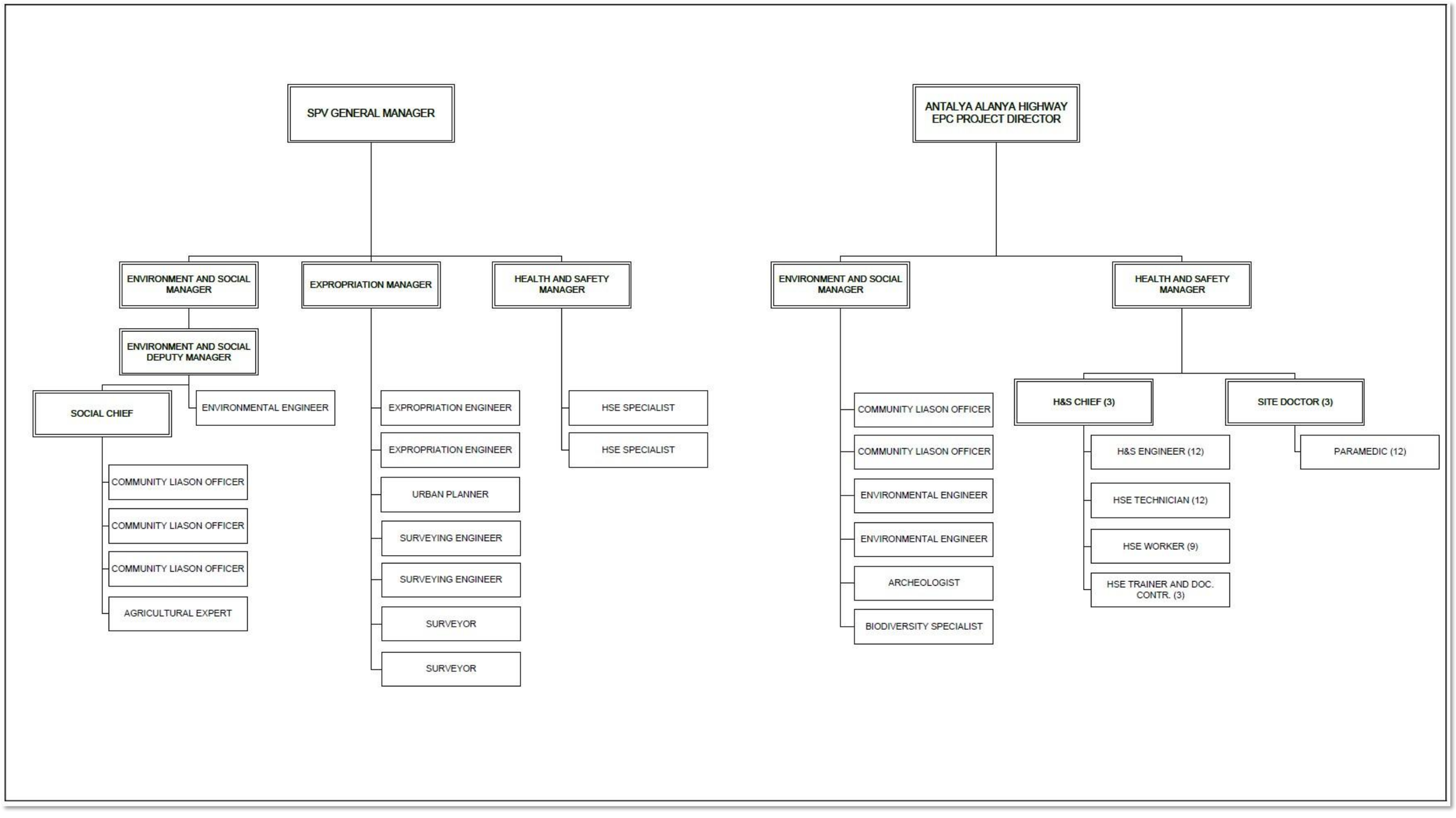


Figure XX.2 Organizational Structure of the Project Sponsor (AAOİAŞ) for the Project

Table XX.1 Allocation of Roles and Responsibilities for Plan Implementation

Roles	Responsibilities
General Manager (SPV)	○ Define and implement the overall business strategy and direction of the SPV in alignment with shareholder and stakeholder expectations. ○ Ensure the development, revision, and execution of project-specific management plans, including the Environmental and Social Management Plan (ESMP) in accordance with company policies and international standards. ○ Ensure the provision of necessary resources and organizational support for the implementation of all SPV plans, including E&S and H&S. ○ Oversee the day-to-day operations of the SPV to ensure project milestones and deliverables are achieved efficiently and sustainably. ○ Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases. ○ Ensure that managerial decisions are made regarding the implementation of all SPV policies and plans by EPCs and subcontractors. ○ Ensure the preparation, dissemination, and implementation of the Environmental and Social Management Plan, and that it is communicated clearly to all EPC contractors and subcontractors. ○ Supervise and ensure contractor/subcontractor compliance with E&S and H&S plans and standards. ○ In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the EPC, SPV's E&S Manager, and H&S Manager. ○ Coordinate internal intervention and emergency response procedures in case of environmental, social, or safety-related incidents. ○ Make executive decisions on project budgeting, resource allocation, and capital management to support project execution and sustainability, H&S and E&S compliance. ○ Ensure sufficient funding and personnel are dedicated to environmental, social, and H&S obligations under the project's contractual and regulatory frameworks. ○ Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to stakeholders and investors. ○ Promote a culture of environmental and social responsibility across the SPV and its stakeholders. ○ Ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements. ○ Liaise with legal counsel to manage the SPV's legal framework, mitigate risks, and fulfil all contractual obligations. ○ Provide timely updates, reports, and presentations on the SPV's performance, risks, compliance status, and community engagement efforts. ○ Foster positive relationships with government agencies, financial institutions, civil society, and project-affected communities. ○ Lead the development and execution of the exit strategy or asset disposal plan upon project maturity or completion. ○ Oversee the financial and legal wind-down of the SPV in accordance with regulatory and shareholder requirements.
E&S Manager (SPV)	○ Review and ensure the preparation, revision, and implementation of E&S Management Plans in accordance with national laws, regulations, company policies, international standards and lender requirements. ○ Develop and manage the overall E&S management system and project-specific sub-plans. ○ Review and update the E&S Management Plan in coordination with the EPC's E&S Manager and construction teams. ○ Ensure that environmental, and community safety measures are implemented through method statements and site practices.

Roles	Responsibilities
	○ Ensure that all construction site activities are carried out safely by EPC and subcontractors. ○ Ensure that EPC and subcontractors correctly implement site practices. ○ Provide technical support to EPC and subcontractors for the implementation of E&S Plans. ○ Collaborate with internal teams (e.g., H&S, Legal, Procurement) to integrate E&S criteria into project operations and contracts. ○ Monitor the environmental and social performance of EPC and subcontractors to ensure compliance. ○ Monitor EPC and subcontractor adherence to the requirements of the E&S Management Plan. ○ Monitor EPC and subcontractor adherence to the requirements of the E&S Management Plan. ○ Ensure EPC and subcontractors maintain accurate records, including those of corrective and preventive actions. ○ Supervise the E&S Deputy Manager oversee the implementation of monitoring systems. ○ Ensure that EPC and subcontractors provide required E&S training. ○ Review and validate training records and related documentation. ○ Ensure effective investigation and documentation of environmental and social incidents. ○ Lead or support the implementation of corrective actions and incident prevention measures. ○ Coordinate emergency preparedness and community safety procedures. ○ Prepare and submit E&S compliance and performance reports to internal and external stakeholders, including lenders and regulators. ○ Maintain documentation related to site compliance, audits, training, and grievances. ○ Support stakeholder engagement activities and consultations with local communities. ○ Oversee the Grievance Mechanism (GM) and ensure timely resolution of community and worker complaints. ○ Engage with regulatory authorities, auditors, and NGOs on E&S compliance and performance matters ○ Coordinate obtaining environmental related permits
H&S Manager (SPV)	○ Ensure the preparation, revision, and implementation of the health, safety, community related plans and documents in accordance with company policies, regulatory obligations, international standards and lender requirements. ○ Ensure the conditions and obligations specified in the health, safety, community related plans and documents are implemented and adhered to by EPC and subcontractors in accordance with company policies, regulatory obligations, international standards and lender requirements. ○ Contribute to project risk assessments and job hazard analyses (JHAs) and ensure these are updated regularly. ○ Ensure that all construction site activities are carried out safely by EPC and subcontractors. ○ Ensure that safety, health, and community safety measures are implemented by EPC and subcontractors through appropriate method statements and site practices. ○ Ensure that physical site boundaries are clearly defined and maintained by EPC and subcontractors to control site access and protect public safety. ○ Provide technical support to EPC and subcontractors for the proper implementation of the safety, health, and community safety related plans. ○ Supervise the integration of safety controls into daily work permits, toolboxes, and field activities. ○ Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.

Roles	Responsibilities
	○ Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites. ○ Track and analyze safety performance metrics (e.g., LTIs, near misses, TRIR) and recommend corrective measures. ○ Participate in and oversee comprehensive investigations of accidents and incidents. ○ Ensure root causes are identified, documented, and that corrective actions are implemented and verified. ○ Ensure timely and appropriate resolution of complaints related to public health and safety. ○ Support EPC and subcontractors in the development and delivery of site-specific H&S training programs. ○ Ensure safety inductions, toolbox talks, and job-specific training are conducted and recorded. ○ Maintain accurate records of inspections, incidents, safety meetings, and corrective actions. ○ Report on H&S performance, non-compliance, and corrective actions to Project General Manager and external stakeholders. ○ Coordinate with health and safety teams to align safety measures with broader site and community risk controls. ○ Engage with regulatory authorities on inspections, audits, and compliance verification.
Expropriation Manager (SPV)	○ Implement the Resettlement Action Plan (RAP) or equivalent frameworks in alignment with national regulations and international standards. ○ Identify affected lands, properties, and stakeholders in collaboration with survey, legal, and engineering teams. ○ Coordinate with government bodies and legal authorities for expropriation procedures and approvals. ○ Engage with landowners, occupants, and project-affected communities to explain project scope, land requirements, compensation processes, and grievance redress mechanisms. ○ Mediate and resolve disputes related to land ownership, valuation, or resettlement with tact and legal support where necessary. ○ Coordinate resettlement efforts where required, including livelihood restoration programs. ○ Maintain detailed documentation of compensation agreements, payments, and relocations. ○ Ensure expropriation processes comply with national laws, international standarts, lender requirements, and the SPV's internal policies. ○ Collaborate with E&S teams to ensure that land acquisition activities do not lead to violations of environmental or social management plans. ○ Track and report progress of land acquisition and resettlement activities to senior management and external stakeholders. ○ Provide input for audits, investor updates, and compliance reviews related to expropriation. ○ Identify and mitigate risks related to delayed acquisition, legal disputes, or community opposition. ○ Implement contingency plans to avoid disruption to project timelines due to expropriation issues.
Deputy E&S Manager (SPV)	○ Lead the development, implementation, and continuous improvement of the Environmental and Social Management. ○ Implement all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements. ○ Provide strategic leadership and oversight to the E&S team, including Managers, Specialists, Engineers, and Community Liaison Officers, ensuring effective coordination and resource allocation.

Roles	Responsibilities
	○ Ensure EPC contractors and subcontractors consistently comply with E&S requirements through monitoring, audits, corrective actions and training programs. ○ Oversee incident and non-compliance management, including investigations, corrective/preventive measures, and stakeholder communication. ○ Serve as the principal liaison for all environmental and social matters with government regulators, financial institutions, communities, NGOs, and other stakeholders. ○ Promote a culture of environmental and social responsibility across the SPV and its stakeholders, driving continuous improvement and risk mitigation. ○ Support executive decision-making by providing timely reports and insights on E&S performance, risks, and emerging trends. ○ Lead community engagement strategies in collaboration with the Environmental Engineer, Agricultural Expert, Social Chief and CLOs to ensure effective grievance management and positive relations with project-affected communities. ○ Ensure E&S considerations are integrated into project planning, budgeting, and closure activities, including restoration and post-construction monitoring. ○ Support the environmental and community safety measures are implemented through site practices and method statements by the EPC and subcontractors. ○ Ensure that the EPC and subcontractors carry out site practices correctly. ○ Ensure that EPC and subcontractors maintain relevant records. ○ Ensure that EPC and subcontractors maintain records of corrective and preventive actions. ○ Ensure that Management Plans are prepared, revised, and implemented in accordance with company policies. ○ Ensure that EPC and subcontractor provide the necessary training through the review of training records and relevant training documents. ○ Conduct comprehensive investigations in case of accidents and incidents. ○ Manage waste within the entire project footprint and area of influence, prioritizing the designated areas to be used under the scope of the Project. ○ Coordinate environmental and social monitoring programs
Social Chief (SPV)	○ Supervise and mentor CLOs, ensuring their work aligns with project priorities and stakeholder engagement strategy. ○ Develop and implement work plans and schedules for the CLO team. ○ Ensure consistent messaging, processes, and reporting methods across all field teams. ○ Conduct regular team meetings to review community issues, grievances, engagement outcomes, and field updates. ○ Lead the implementation of the Stakeholder Engagement Plan (SEP) and ensure it reflects community realities. ○ Oversee the planning and execution of community consultations, public meetings, and disclosure activities. ○ Ensure that engagement activities are inclusive of vulnerable and marginalized groups. ○ Build and maintain positive, trust-based relationships with local communities, leaders, and institutions. ○ Supervise the effective functioning of the grievance redress mechanism (GRM) at community and project levels. ○ Ensure all grievances are recorded, processed, and resolved in a timely and transparent manner. ○ Analyse grievance trends and escalate systemic issues to the E&S Manager. ○ Contribute to the continuous improvement of the GRM process based on community feedback and internal review. ○ Monitor the performance of social engagement activities and their compliance with SEP objectives. ○ Ensure accurate, timely, and complete reporting of CLO activities, stakeholder interactions, and grievance outcomes. ○ Review and validate weekly/monthly reports from CLOs and prepare consolidated updates for senior management.

Roles	Responsibilities
	○ Ensure all engagement activities meet national regulations and international standards (e.g., IFC PS, EBRD PR, Equator Principles). ○ Identify training needs and deliver or coordinate training for CLOs on stakeholder engagement, conflict resolution, ○ and field documentation. ○ Promote professional development and capacity building within the social team. ○ Train subcontractors and relevant staff on community interaction protocols and grievance management. ○ Contribute to the development, review, and periodic updating of the SEP and related social management plans. ○ Ensure CLOs support the implementation and documentation of these plans at the field level. ○ Support the integration of lessons learned into updated plans and engagement strategies. ○ Coordinate with the E&S Manager, E&S Specialists, H&S, legal, and construction teams to address community-related ○ impacts. ○ Support alignment between community concerns and project execution through proactive communication with ○ technical departments. ○ Contribute social performance inputs to reports for lenders, regulators, and corporate leadership.
Agricultural Expert (SPV)	○ Assess project impacts on agricultural land, productivity, and rural livelihoods in coordination with the expropriation and E&S teams. ○ Support the development and implementation of livelihood restoration strategies for project-affected farmers and agricultural households. ○ Conduct field visits to gather agricultural baseline data, monitor changes, and evaluate effectiveness of mitigation measures. ○ Provide technical input to social risk assessments, Resettlement Action Plans (RAPs), and Livelihood Restoration Plans (LRPs). ○ Engage with local agricultural institutions, cooperatives, and extension services to coordinate support and training programs. ○ Participate in community consultations with a focus on agricultural concerns and provide input into grievance resolution related to land use, crop loss, or livelihood impacts. ○ Help identify and implement sustainable farming initiatives and compensation strategies aligned with local practices and market trends. ○ Monitor and report on agricultural livelihood indicators, ensuring alignment with project and lender requirements. ○ Contribute to the review and update of relevant social and livelihood management plans. ○ Support the Social Chief and Community Liaison Officers in field-level implementation, training, and stakeholder engagement related to agricultural matters.
Expropriation Engineer (SPV)	○ Review and validate cadastral maps, land parcel data, and expropriation plans in coordination with the design and survey teams. ○ Prepare and update technical drawings, parcel-level expropriation maps, and cross-sections for engineering verification. ○ Ensure that technical documentation aligns with the project's legal, spatial requirements, international standards and lenders requirements for expropriation. ○ Support the preparation of expropriation folders with complete technical details for each parcel. ○ Conduct field inspections and site verifications to confirm parcel boundaries, existing structures, crops, and utilities. ○ Record and document physical conditions of affected properties, including GPS coordinates and photographic evidence.

Roles	Responsibilities
	○ Collaborate with surveyors, property evaluators, and legal experts during field visits and technical assessments. ○ Maintain a database of technical information related to affected parcels, expropriation status, and engineering reviews. ○ Prepare technical summaries, verification reports, and progress updates for the Expropriation Manager. ○ Assist in tracking parcel-by-parcel technical clearance and report on delays or technical discrepancies. ○ Support interactions with landowners during technical inspections, mapping explanations, and asset identification. ○ Coordinate with municipal engineers, cadastral offices, and other public institutions to resolve technical inconsistencies. ○ Assist the legal and valuation teams by providing technical input for asset valuation and compensation processes. ○ Ensure all engineering-related activities comply with national laws, environmental and social standards, international standards, lender requirements and project guidelines. ○ Support the preparation of technical annexes for land acquisition reports, grievance responses, and audit documentation. ○ Provide support during audits by lenders or regulatory agencies on technical matters related to expropriation.
Urban Planner (SPV)	○ Conduct land use assessments and spatial analysis to support expropriation, resettlement planning, and infrastructure alignment. ○ Identify and evaluate potential resettlement areas in collaboration with the social and engineering teams, ensuring suitability in terms of accessibility, services, and community integration. ○ Prepare or review layout plans for resettlement sites or impacted urban areas in compliance with national and local planning standards. ○ Support the preparation of expropriation and land-use strategy documents that align with municipal and regional development plans. ○ Ensure that project land acquisition activities are consistent with zoning, land classification, and regulatory requirements. ○ Liaise with urban planning authorities and municipalities to facilitate approvals, permits, and community development. ○ Work with the Legal and Expropriation teams to resolve spatial planning disputes or challenges related to land classification. ○ Participate in field visits, stakeholder consultations, and public meetings to present planning proposals and gather community feedback. ○ Prepare maps, presentations, and reports to communicate spatial strategies and resettlement layouts to stakeholders.
Surveying Engineer (SPV)	○ Plan, coordinate, and supervise all surveying activities related to the project, including topographic, cadastral, and engineering surveys. ○ Review and validate survey data, maps, and drawings prepared by EPC contractors or subcontractors to ensure accuracy and compliance with project requirements. ○ Support the expropriation process by verifying parcel boundaries, land ownership, and physical asset inventories. ○ Ensure that all survey activities are conducted using appropriate instruments (e.g., GPS, total station, drones) and are aligned with national and international standards. ○ Coordinate with design, engineering, and legal teams to resolve discrepancies in land measurements, maps, and legal documentation.

Roles	Responsibilities
	○ Maintain an up-to-date geospatial database of all surveyed areas and assets affected by the project. ○ Participate in site inspections and field verifications alongside Expropriation Engineers, CLOs, and property evaluators. ○ Provide technical inputs for land acquisition documentation, grievance resolution, and community consultation processes. ○ Ensure survey documentation is archived properly and is accessible for audits, regulatory reviews, and internal controls. ○ Supervise EPC and subcontractor survey teams to ensure the implementation of safe and efficient survey operations within the project area. ○ Liaise with relevant public institutions (e.g., cadastral offices, municipalities) for official validation of survey outputs when required. ○ Contribute to the preparation of maps, cross-sections, and spatial plans for environmental, social, and engineering applications.
Surveyor (SPV)	○ Conduct detailed topographic and cadastral surveys of affected land parcels and assets using appropriate tools and technologies. (e.g., total stations, GPS, drones) ○ Mark land boundaries in coordination with landowners, communities, and relevant authorities to support clear delineation for expropriation. ○ Assist in preparing and verifying land acquisition maps, parcel boundaries, and infrastructure alignments based on project design and engineering data. ○ Support inventory of physical assets (buildings, trees, irrigation systems, crops, etc.) for compensation assessment purposes. ○ Ensure coordination between survey data and GIS systems, and assist in maintaining an up-to-date spatial database of all expropriation-related parcels and assets. ○ Work closely with the Expropriation, Legal, Social, and Civil Engineering teams to ensure consistency and technical accuracy in documentation. ○ Participate in site verification visits with stakeholders, ensuring transparency and consensus during boundary marking and inventory. ○ Provide survey data and documentation required for legal registration, compensation, and permitting processes. ○ Ensure the safe, efficient use and maintenance of all surveying equipment. ○ Maintain clear records and archives of field data, survey results, and maps in compliance with company and regulatory standards.
HSE Specialist (SPV)	○ Support the execution of the safety, health and community safety related plans, and ensure site activities are carried out safely by EPC contractors and subcontractors in-line with applicable laws, international standards and lender requirements. ○ Conduct regular site inspections, hazard identification, and risk assessments; follow up on corrective and preventive actions. ○ Monitor compliance with safety protocols and ensure H&S measures are integrated into method statements and work procedures. ○ Maintain H&S documentation, including safety permits, incident records, and training logs, etc. ○ Participate in accident and incident investigations, ensuring findings are documented and lessons are communicated across teams. ○ Support H&S training delivery for all relevant site personnel and review contractor training records for adequacy. ○ Ensure the construction site is properly demarcated and safety signage and barriers are in place and maintained. ○ Assist in resolving complaints related to occupational health, site safety, and community safety in coordination with relevant teams. ○ Contribute to the review and update of safety plans and procedures based on field experience and audit findings. ○ Provide technical guidance to contractors and subcontractors to improve health and safety performance.

Roles	Responsibilities
	○ Implement the integration of safety controls into daily work permits, toolboxes, and field activities. ○ Assist to H&S manager to monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements. ○ Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites. ○ Prepare safety performance metrics (e.g., LTIs, near misses, TRIR) and recommend corrective measures. ○ Participate in and oversee comprehensive investigations of accidents and incidents. ○ Implement corrective actions and conduct root causes analysis. ○ Prepare documentation of remedial and corrective actions. ○ Conduct safety inductions, toolbox talks, and job-specific training are conducted and recorded. ○ Engage with regulatory authorities on inspections, audits, and compliance verification.
Project Director (EPC)	○ Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards. ○ Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones. ○ Make strategic decisions regarding project resourcing, budget allocation, and the efficient use of materials and personnel. ○ Ensure all project personnel are fully informed of and compliant with project plans and standards. ○ Coordinate internal management intervention in case of emergencies. ○ Ensure the preparation, revision, and implementation of project management plans (HSE, E&S, QA/QC, etc.) in line with company policies, legal frameworks, international standards, SPV and lender requirements. ○ Communicate all relevant plans clearly to subcontractors and monitor their performance. ○ Approve and monitor regular site inspections and safety reviews. ○ Track project KPIs, timelines, and budgets to ensure performance objectives are met. ○ Ensure that all employees comply with the obligations specified in the project's management plans during activities. ○ In case of non-compliance, ensure appropriate corrective and preventive actions are taken in coordination with the E&S Manager and H&S Manager ○ Ensure all personnel receive necessary training in health, safety, environment, and social performance. ○ Approve training plans and assess their implementation across EPC and subcontractor teams. ○ Serve as the primary EPC representative to the SPV, client, and key stakeholders. ○ Maintain communication channels with project owners, subcontractors, and vendors to ensure alignment and compliance. ○ Coordinate with regulatory authorities, community representatives, and auditors as required. ○ Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters. ○ Oversee risk management and mitigation strategies related to technical, health, safety, community safety, environmental, and social aspects. ○ Ensure quality management systems are applied consistently across project phases. ○ Supervise the preparation and approval of documentation related to claims, variations, and commercial issues. ○ Monitor third-party inspections, audits, and due diligence efforts.

Roles	Responsibilities
	○ Supervise and coordinate subcontractors to ensure proper execution of construction phases.
E&S Manager (EPC)	○ Ensure the preparation, revision, and implementation of E&S Management Plans in accordance with company policies, international standards, and lender requirements. ○ Review and update the environmental and social management plans in coordination with relevant contractor specialists and construction teams. ○ Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting. ○ Implement environmental and social measures through site practices and method statements. ○ Ensure that all conditions and obligations outlined in the environmental and social management plans are implemented and adhered to during project activities. ○ Ensure employees and contractors in fulfilling the requirements and relevant trainings of the environmental and social management plans. ○ Ensure the environmental and social management plans are communicated and implemented by Contractors/Subcontractors. ○ Monitor compliance of Contractors/Subcontractors with environmental and social management plans requirements. ○ Ensure implementation of safety measures such as traffic regulation and utility protection. ○ Ensure site boundaries are properly defined and monitored. ○ Participate in regulatory inspections and third-party assessments. ○ Integrate E&S KPIs into contractor evaluations and performance reviews. ○ Ensure all site personnel receive appropriate E&S training. ○ Oversee subcontractor E&S onboarding and refresher sessions. ○ Promote toolbox talks and informal training to reinforce E&S awareness. ○ Monitor E&S performance of subcontractors and ensure compliance. ○ Supervise the Environmental Engineers, Biodiversity Specialist, Archaeologist, CLOs and oversee monitoring systems. ○ Ensure the development and follow-up of corrective/improvement actions. ○ Lead E&S performance reporting to the Project Director ○ Promote continuous improvement via lessons learned and incident analysis. ○ Conduct comprehensive investigations of accidents and incidents. ○ Ensure prompt resolution of complaints related to environmental and social issues. ○ Enforce behaviour protocols related to community safety. ○ Establish emergency preparedness and response procedures for E&S incidents. ○ Ensure inclusive practices by integrating gender, vulnerability, and social inclusion principles into site-level practices.
H&S Manager (EPC)	○ Ensure the safe execution of all construction site activities in accordance with project standards, procedures, legal requirements, international standards, lender and SPV requirements. ○ Ensure the preparation, revision, and continuous improvement of Health & Safety Management Plans in accordance with EPC and SPV policies. ○ Ensure the implementation and compliance of the conditions and obligations specified in the H&S Plan during project activities. ○ Support all employees in fulfilling the conditions and obligations of this health and safety plans during project activities. ○ Provide technical support to Contractors/Subcontractors for the implementation of health and safety plans. ○ Monitor the compliance of Contractors/Subcontractors with the requirements of the health and safety plans and report non-conformities. ○ Maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project. ○ Implement health, safety and community safety measures through site practices and method statements.

Roles	Responsibilities
	○ Ensure that construction site boundaries are well-defined, adequately marked, and routinely monitored for safety. ○ Ensure the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site. ○ Oversee the implementation of safety measures including traffic management, safe work zones, and protection of aboveground and underground utilities. ○ Coordinate emergency preparedness and response procedures, including drills and communication protocols, in collaboration with relevant departments. ○ Ensure toolbox talks, safety briefings, and daily pre-task planning meetings to reinforce safety culture and awareness on site. ○ Ensure that all personnel on-site, including contractors and subcontractors, receive regular and adequate safety training aligned with the obligations of the H&S Plan. ○ Ensure that this Plan is understood by all employees and Contractor/Subcontractor staff through regular training programs that include the obligations of this Plan. ○ Review and validate training records and related documentation from Contractor/Subcontractor. ○ Conduct and lead comprehensive investigations in the event of accidents, incidents, or near misses, ensuring findings are documented and corrective actions are implemented. ○ Ensure the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks. ○ Analyse trends from incidents and near-misses to identify systemic issues and develop long-term preventive strategies. ○ Ensure prompt and structured resolution of complaints related to public health, safety, and security. ○ Prepare regular reports to Project Director summarizing H&S performance, compliance status, and key risks. ○ Foster a safety-first culture by promoting active participation, feedback, and ownership of safety responsibilities at all levels of the workforce.
Site Doctor (EPC)	○ Provide on-site medical care, first aid, and emergency response to site personnel. ○ Monitor the health status of workers through routine check-ups and assessments. ○ Maintain accurate and confidential health records and incident logs. ○ Identify and manage occupational health risks and recommend preventive measures. ○ Ensure availability and readiness of medical equipment, first aid kits, and emergency protocols. ○ Conduct health awareness sessions and support mental health and wellness programs. ○ Coordinate with H&S teams to implement hygiene, sanitation, and disease control measures. ○ Ensure compliance with local occupational health laws and project-specific health standards. ○ Collaborate with external hospitals or clinics for referrals and medical emergencies. ○ Participate in site inspections and contribute to health-related sections of HSE audits. ○ Provide medical input to risk assessments, method statements, and H&S Plans. ○ Support COVID-19 or other outbreak response procedures as needed. ○ Detect occupational injuries and illnesses and prepare relevant prevention plans. ○ Track of all health records of all employees including occupational injuries and illnesses.
Archaeologist (EPC)	○ Conduct archaeological surveys and assessments within the project footprint prior to and during construction activities. ○ Monitor excavation and earthworks to identify and document any archaeological or cultural heritage findings. ○ Implement and support the continuous update of the Cultural Heritage Management Plan (CHMP) in compliance with national laws, project policies, international standards and SPV&Lender requirements.

Roles	Responsibilities
	○ Supervise the application of chance-find procedures across all construction areas and ensure proper documentation, preservation, or relocation of discovered artifacts. ○ Liaise with national and local cultural heritage authorities to secure necessary permits and approvals, and report findings as required. ○ Train construction personnel and subcontractors on cultural heritage awareness, including chance-find protocols and legal obligations. ○ Collaborate with Environmental, Social, and H&S teams to integrate cultural heritage considerations into broader site management and daily operations. ○ Participate in stakeholder engagement processes where cultural heritage concerns arise. ○ Coordinate with external experts or labs for advanced assessment and preservation strategies, when needed. ○ Maintain accurate records of archaeological work, including GPS data, photos, catalogues, and reports. ○ Promote community awareness and sensitivity toward cultural heritage protection where applicable. ○ Review contractor method statements and work plans to confirm inclusion of archaeological mitigation measures.
Biodiversity Specialist (EPC)	○ Conduct baseline biodiversity assessments to understand and document existing habitats, species, and ecosystem conditions in and around the project footprint. ○ Monitor biodiversity risks during construction activities, ensuring sensitive habitats, critical species, and ecological corridors are not adversely affected. ○ Ensure compliance with national environmental legislation and international biodiversity standards. ○ Implement Biodiversity Action Plan (BAP) and Biodiversity Management Plan (BMP) and associated mitigation measures in coordination with the Environmental Engineer and E&S Manager. ○ Implement ecological mitigation measures (e.g., habitat restoration, species relocation, buffer zones) by contractors and subcontractors. ○ Train construction and environmental teams on biodiversity protection requirements and promote awareness of key species and habitats on-site. ○ Monitor biodiversity indicators and report findings in line with project performance monitoring systems and environmental management plans. ○ Ensure corrective actions are taken promptly when biodiversity-related non-compliances are observed. ○ Liaise with local environmental authorities, consultants, and NGOs on biodiversity matters as required. ○ Support environmental inspections and audits related to biodiversity performance. ○ Maintain biodiversity records and contribute to periodic reports and updates to the E&S Manager and Project Director. ○ Assist with community awareness activities related to biodiversity conservation in collaboration with the Community Liaison Officer when relevant. ○ Ensure integration of biodiversity considerations into site planning, construction methods, and landscape rehabilitation. ○ Review contractor/subcontractor method statements and work plans to confirm inclusion of biodiversity mitigation measures.
H&S Chief (EPC)	○ Implement the safe execution of all construction site activities in accordance with project standards, procedures, legal requirements, international standards, lender and SPV requirements. ○ Implement the preparation, revision, and continuous improvement of Health & Safety Management Plans in accordance with EPC and SPV policies. ○ Perform the implementation and compliance of the conditions and obligations specified in the H&S Plan during project activities. ○ Support all employees in fulfilling the conditions and obligations of this health and safety plans during project activities. ○ Provide technical support to Contractor.

Roles	Responsibilities
	○ Monitor the compliance of Contractors/Subcontractors with the requirements of the health and safety plans and report non-conformities.rs/Subcontractors for the implementation of health and safety plans. ○ Maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project. ○ Implement health, safety and community safety measures through site practices and method statements. ○ Implement that construction site boundaries are well-defined, adequately marked, and routinely monitored for safety. ○ Ensure the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site. ○ Perform the implementation of safety measures including traffic management, safe work zones, and protection of aboveground and underground utilities. ○ Perform emergency preparedness and response procedures, including drills and communication protocols, in collaboration with relevant departments. ○ Ensure toolbox talks, safety briefings, and daily pre-task planning meetings to reinforce safety culture and awareness on site. ○ Ensure that all personnel on-site, including contractors and subcontractors, receive regular and adequate safety training aligned with the obligations of the H&S plans. ○ Ensure that H&S plans are understood by all employees and Contractor/Subcontractor staff through regular training programs that include the obligations of H&S plans. ○ Review and validate training records and related documentation from Contractor/Subcontractor. ○ Review and validate training records and related documentation from Contractor/Subcontractor. ○ Conduct and lead comprehensive investigations in the event of accidents, incidents, or near misses, ensuring findings are documented and corrective actions are implemented. ○ Ensure the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks. ○ Follow prompt and structured resolution of complaints related to public health, safety, and security. ○ Prepare regular reports to H&S manager summarizing H&S performance, compliance status, and key risks. ○ Foster a safety-first culture by promoting active participation, feedback, and ownership of safety responsibilities at all levels of the workforce.
H&S Engineer (EPC)	○ Implement the safe execution of all construction site activities in accordance with project standards, procedures, legal requirements, international standards, lender and SPV requirements. ○ Implement the preparation, revision, and continuous improvement of Health & Safety Management Plans in accordance with EPC and SPV policies. ○ Perform the implementation and compliance of the conditions and obligations specified in the H&S Plan during project activities. ○ Support all employees in fulfilling the conditions and obligations of this health and safety plans during project activities. ○ Provide technical support to Contractors/Subcontractors for the implementation of health and safety plans. ○ Monitor the compliance of Contractors/Subcontractors with the requirements of the health and safety plans and report non-conformities. ○ Maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project. ○ Implement health, safety and community safety measures through site practices and method statements. ○ Implement that construction site boundaries are well-defined, adequately marked, and routinely monitored for safety. ○ Ensure the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site.

Roles	Responsibilities
	○ Perform the implementation of safety measures including traffic management, safe work zones, and protection of aboveground and underground utilities. ○ Perform emergency preparedness and response procedures, including drills and communication protocols, in collaboration with relevant departments. ○ Ensure toolbox talks, safety briefings, and daily pre-task planning meetings to reinforce safety culture and awareness on site. ○ Ensure that all personnel on-site, including contractors and subcontractors, receive regular and adequate safety training aligned with the obligations of the H&S plans. ○ Ensure that H&S plans are understood by all employees and Contractor/Subcontractor staff through regular training programs that include the obligations of H&S plans. ○ Review and validate training records and related documentation from Contractor/Subcontractor ○ Conduct and lead comprehensive investigations in the event of accidents, incidents, or near misses, ensuring findings are documented and corrective actions are implemented. ○ Ensure the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks. ○ Follow prompt and structured resolution of complaints related to public health, safety, and security. ○ Prepare regular reports to H&S manager summarizing H&S performance, compliance status, and key risks. ○ Foster a safety-first culture by promoting active participation, feedback, and ownership of safety responsibilities at all levels of the workforce.
HSE Technician (EPC)	○ Support the implementation of the Health, Safety, and Environmental (HSE) Management Plans on-site. ○ Conduct field-level hazard identification and risk assessments under the supervision of the HSE Engineer or H&S Manager. ○ Assist in the inspection of site conditions, equipment, and practices to ensure compliance with HSE protocols. ○ Monitor proper use of PPE by workers and subcontractors and ensure daily compliance. ○ Assist in the documentation of incidents, near-misses, and unsafe acts/conditions. ○ Support the organization of safety toolbox talks and drills, and participate in site safety briefings. ○ Assist in maintaining updated HSE records, permits to work, and site-specific risk registers. ○ Coordinate with site teams to ensure safe work zones and adherence to safety signage and barriers. ○ Escalate HSE issues and observations to senior HSE personnel for timely corrective actions. ○ Promote a proactive safety culture through daily site presence and informal engagement with workers.
HSE Worker (EPC)	○ Perform routine safety checks and observations on construction activities to support accident prevention. ○ Support field-level enforcement of basic HSE requirements such as PPE usage, housekeeping, and emergency access. ○ Report unsafe behaviours, near-misses, or incidents to the HSE Technician or Engineer. ○ Assist with basic safety logistics such as placement of safety signs, first aid kits, and fire extinguishers. ○ Provide assistance during emergency drills and real-time evacuations if needed. ○ Participate in on-site HSE briefings and serve as a communication link between labour teams and HSE staff. ○ Support the distribution and collection of HSE materials, permits, and records. ○ Assist in controlling site entry for compliance with safety rules (e.g., helmet, vest, ID badge).

Roles	Responsibilities
	○ Support spill response and clean-up efforts as guided by supervisors
HSE Trainer and Document Controller (EPC)	○ Develop and deliver HSE training modules tailored to job roles and risk levels in collaboration with the HSE Manager. ○ Maintain training matrices, attendance records, and competency certifications for all EPC and subcontractor staff. ○ Organize safety induction programs for new employees and visitors. ○ Organize refresher trainings, emergency drills, and awareness campaigns (e.g., heat stress, confined space). ○ Ensure that all training materials, method statements, and HSE procedures are up-to-date and properly archived. ○ Manage document control systems related to HSE plans, permits, inspection reports, and safety data sheets. ○ Ensure traceability of document revisions and compliance with audit requirements. ○ Support internal and external audits by providing required HSE documentation and evidence. ○ Contribute to the improvement of training content based on site observations and lessons learned.
Paramedic (EPC)	○ Provide immediate emergency medical care, stabilize patients, and coordinate medical evacuation when necessary. ○ Assist the Site Doctor in conducting health checks, maintaining patient records, and supporting follow-up treatments. ○ Monitor the stock and condition of emergency medical supplies, medicines, and first aid kits. ○ Respond to health-related incidents, accidents, or illnesses on-site and record incident details accurately. ○ Participate in health and safety drills and emergency response exercises. ○ Support hygiene monitoring and health awareness campaigns. ○ Maintain clean, safe, and operational medical facilities and first aid stations. ○ Contribute to incident investigations involving health or medical issues. ○ Report health risks or trends to the Site Doctor and H&S Manager.
Environmental Engineer (SPV and EPC)	○ Implement the monitoring and recording of this Plan's execution (including implementation by Subcontractors). ○ Ensure project activities comply with national environmental legislation, permits, international standards and lender requirements. ○ Implement and monitor the Environmental & Social Management Plans and its site-specific sub-plans to ensure compliance with national legislation, international standards, and lender requirements. ○ Conduct routine environmental inspections and ensure that all site activities by contractors and subcontractors are carried out in accordance with approved method statements and mitigation measures. ○ Implement environmental monitoring programs. ○ Maintain up-to-date environmental records and databases; support preparation of reports for regulatory or lender audits. ○ Manage waste within the entire project footprint and area of influence, prioritizing designated areas to be used under the scope of the Project. ○ Monitor contractor and subcontractor adherence to approved waste storage, segregation, and disposal practices. ○ Provide regular training to site personnel during the construction phase. ○ Ensure that necessary training on environmental management is provided and that all personnel receive the required training. ○ Support toolbox talks and induction sessions to raise site-level environmental awareness. ○ Conduct regular internal audits and report non-conformities. ○ Ensure that non-conformities are recorded and immediately addressed. ○ Participate in the development and follow-up of corrective and/or improvement actions.

Roles	Responsibilities
	○ Support investigation of environmental incidents and assist in root cause analysis and follow-up reporting. ○ Report the implementation performance of this Plan. ○ Support the review and update of this Plan. ○ Ensure lessons learned and field experiences are incorporated into plan revisions and training updates. ○ Collaborate with the H&S and Social teams to address cross-cutting issues. ○ Coordinate with subcontractors to ensure implementation of project-specific environmental measures. ○ Liaise with external laboratories, consultants, or regulators as needed for environmental monitoring or reporting. ○ Support obtaining environmental related permits ○ Ensure all environmental permits are obtained, renewed, and complied with throughout the project lifecycle. ○ Contribute to the periodic review and revision of environmental plans based on site experience, regulatory changes, and stakeholder feedback. ○ Prepare and submit environmental performance reports to the E&S Manager and relevant stakeholders. ○ Coordinate with construction teams to integrate environmental requirements into work plans. ○ Ensure appropriate waste management practices are applied across the site, including segregation, storage, transportation, and disposal in designated and approved facilities. ○ Conduct internal audits and inspections; identify non-conformities and follow up on corrective and preventive actions.
Community Liaison Officer (CLO) (SPV and EPC)	○ Inform the public about the Project's scope, progress, and potential impacts. ○ Organize and facilitate regular community meetings, focus groups, and engagement forums.. ○ Maintain open lines of communication with project-affected persons (PAPs), community leaders, and local institutions. ○ Develop and distribute communication materials tailored to various community audiences. ○ Ensure that all internal and external complaints, including those under the SEP, are managed in accordance with the Grievance Mechanism (GM). ○ Log, track, and follow up on grievances and appeals in a timely and respectful manner. ○ Facilitate resolution of community disputes or concerns related to project activities. ○ Assess how vulnerable or marginalized groups may be affected by the Project. ○ Propose mitigation measures or tailored engagement approaches for at-risk or underrepresented populations. ○ Ensure equitable participation in consultation processes, particularly for women, youth, elders, and people with disabilities. ○ Support the monitoring and recording of the implementation of the social related issues, including activities carried out by subcontractors. ○ Support the evaluation of the SEP's implementation performance and community feedback ○ Contribute to regular internal audits and the reporting of non-conformities. ○ Ensure that relevant non-conformities are recorded and addressed immediately. ○ Participate in the development of corrective and/or improvement actions and support their follow-up. ○ Support the periodic review and update of the SEP and related procedures in coordination with the E&S Manager. ○ Provide input to lessons learned from engagement outcomes and grievance trends. ○ Maintain up-to-date records of all stakeholder meetings, grievances, resolutions, and community commitments. ○ Submit routine reports to the Social Chief and/or E&S Manager summarizing community feedback, grievance status, and engagement Milestones.

Roles	Responsibilities
	○ Ensure confidentiality and proper data handling, especially for sensitive community issues.
All Personnel (including Contractor/Subcontractor Personnel)	○ Follow this Plan and all related Plans and Procedures, and carry out all activities in accordance with the requirements of this Plan. ○ In case of any non-compliance related to the implementation of this Plan, report it first to the CLO and the E&S Manager. ○ Participate in relevant trainings. ○ Ensure self-sufficiency in the implementation of this Plan. ○ Fulfil and ensure the implementation of the requirements of this Plan

XX.5. Organization Capacity and Competency

In line with IFC Performance Standard 1, a tailored organizational chart is prepared before the construction phase, outlining the main roles, responsibilities, and authorities necessary for the effective implementation of the Environmental and Social Management System (ESMS). As of May 2025, both the SPV and EPC Contractor have partially mobilized their Environmental and Social (E&S) and Health and Safety (H&S) teams in accordance with the ESMS organizational structure.

As the Project Owner, key responsibilities of KGM will include the approval of Motorway route and design; execution of the expropriation works in line with the relevant provisions of the Expropriation Law, acquisition of other land use (forestry, agricultural, pasture, etc.) permits, easement rights, etc. in accordance with relevant Turkish legislation and ensuring minimum traffic guarantee.

The Project Sponsor will be the main responsible party for the implementation of the ESMS including the ESMP, while it will also have a coordinating role in the actions to be undertaken by the third parties (i.e. sub-contractors, Provincial Directorate of Environment, Urbanization and Climate Change, other related authorities), as required. Expropriation works will be conducted by the Project Sponsor and financed by KGM.

The project proponent remains committed to ensuring full staffing of the ESMS organizational structure as outlined in the Figure XX.2. Updates on staffing progress will be included in the regular monitoring reports.

XX.5.1. Construction Phase

During the construction phase, workforce requirements of the Project will be large-scale (including the sub-contractors, anticipated to reach up to a 2,300 during the peak phase of the activities). According to the BOT Contract, Contract Duration covers both the construction and operation phases. Contract duration for the Project has been specified as 15 years, within which construction phase will be completed in 3 years. Though the construction phase will be temporary, the Project Sponsor will ensure that an organizational capacity sufficient for the implementation of the ESMS is established and maintained throughout the construction phase.

In order to ensure the effective implementation of the Environmental and Social Management Plan (ESMP), a comprehensive organizational structure has been established, encompassing both the Project Sponsor (or SPV) and the Engineering, Procurement and Construction (EPC) Contractor (see Figure XX.2). This structure outlines the distribution of responsibilities across environmental, social, land acquisition, and occupational health and safety domains.

A dedicated RAP Implementation Team, highlighted with dashed outlines in the organizational chart, has also been established to carry out land acquisition and livelihood restoration activities in line with the Resettlement Action Plan (RAP).

XX.5.2. Operation Phase

Following the completion of construction, the operation phase of the Contract duration which is specified as 15 years, will start. If the construction period, which is specified as 3 years, exceeds, the delay time (the time after 3 years) will be deducted from the operation period. If the construction of the Motorway is completed before the end of construction period (3 years), the remaining time will be added to the end of the operation period.

In the operation phase, approximately 250 personnel will be employed across the control, operation and maintenance centers, toll plazas, and service areas. At each toll plaza, 4-5 personnel will provide services in shifts for the arrangement of cash payments. Similarly, 4-5 personnel will work at each control center established at the toll collection areas. The operation and maintenance centers will employ both white and blue-collar workers who will be responsible for snow removal services as well as maintenance, technical, repair and workshop operations. Additionally, the Project will create employment opportunities for local people at the service areas, which will include restaurants, tea and coffee houses, shops, gas stations, kiosks, and similar facilities.

The SPV will continue to ensure that an organizational capacity sufficient for the implementation of the ESMS is maintained throughout the operation phase under the BOT Contract Duration. At the end of the contract duration, the Motorway will be transferred to the KGM. No guaranteed minimum vehicle traffic payment will be made for this additional period; however, if the number of vehicles exceeds the guaranteed minimum traffic amount, additional income will be shared between the operator (Project Sponsor) and the Administration (KGM) equally.

The organizational structure of the Project Sponsor will be adapted to the requirements of the operation phase prior to start of Motorway's operation. To ensure competency, the Project Sponsor will ensure that the operation and maintenance personnel are properly trained in their specialty and successfully completed the necessary security investigations in accordance with the related terms of the BOT Contract. For the same purpose, trainings on the aspects related with the operation and maintenance of Motorway will be provided by the Project Sponsor to KGM's designated operation and maintenance personnel one year ahead of the end of the contract duration.

The Project/Operating Manager on behalf of the Project Sponsor will coordinate the relations with the Provincial Directorate of Environment, Urbanization and Climate Change and other related authorities.

XX.6. Monitoring and Review

The effective implementation of the ESMS/ESMP will be monitored through appropriate tools such as site audits, environmental monitoring efforts, checking of related documents, etc. In this context, an Environmental and Social Monitoring Plan has been prepared for the Project. This program will be used as a tool to support the ESMP monitoring. Within this regard, internal and external monitoring will be carried out. Costs associated with the environmental monitoring will be supplied by the Project Sponsor from the Project Budget.

The ESMS is a living system which needs to evolve with the Project and should be reviewed and revised by the Environmental and Social Department of the Project Sponsor, if necessary, to do so. In this case, the supplementary documents should be submitted to Lenders for their approval as well.

XX.6.1. Internal Monitoring

Environmental and Social Manager of the Project Sponsor will conduct internal inspections and audits to verify compliance with the desired ESMS/ESMP outcomes. The frequency of the monitoring will be as follows:

- Quarterly during the construction phase;
- Bi-annually during first two years of operation phase then as agreed with lenders throughout the BOT Contract Duration.

The results of the environmental and social monitoring activities will be compiled in "ESMP Performance Review and Monitoring Reports (Monitoring Reports)" to be prepared according to the monitoring periods. The Monitoring Reports will include documentation of Project's compliance against ESIA commitments as well. Based on the monitoring results, necessary corrective and preventive actions will be identified and amendments will be made on the ESMS and the ESMP accordingly. Such amendments will be included in the monitoring program and followed up in the upcoming monitoring studies to ensure effective implementation. If requested the monitoring reports will also be shared with the governmental authorities.

The Environmental and Social Manager will also share the key monitoring results and performance review of the ESMS with the senior management (SPV-General Manager) and plan the necessary measures to be taken to ensure effective implementation of environmental and social measures.

XX.6.1.1. Project Area Inspection

The EPC Contractor will be responsible for conducting regular internal monitoring to ensure compliance with the project's environmental, health, and safety requirements during the construction phase. This will include:

- Weekly joint inspections of the construction sites and facilities, to be carried out in collaboration with the E&S Manager. These inspections aim to verify the effective implementation of environmental and social mitigation measures.
- Daily oversight by the EPC Contractor's site teams across all active work areas. These routine checks will provide ongoing assurance that the commitments outlined in the ESMP are being adhered to in practice.
- All findings from internal monitoring activities will be recorded, tracked, and reported as part of the project's Environmental and Social Management System (ESMS), and any non-compliance identified will be addressed promptly through corrective actions.

<u>Daily Oversight Monitoring</u>

Daily oversight monitoring is a core component of the E&S Management Plan and is conducted to assess whether the environmental, social, health, and safety (ESHS) mitigation measures are being properly implemented and are effective in ensuring compliance with the Project's requirements. This monitoring helps determine whether current practices are successfully avoiding or minimizing ESHS impacts, or if adjustments, improvements, or corrective actions are necessary.

Oversight monitoring is conducted on a daily basis by E&S Manager, who observe all active Project Area as part of their routine responsibilities. When necessary, the SPV General Manager may join these inspections to support decision-making or address emerging issues. Observations gathered during these site visits are reviewed with the E&S Manager to determine any required corrective actions.

The daily oversight monitoring serves a dual purpose: highlighting both good performance and instances of non-conformance. Where issues are identified, the necessary corrective actions are determined in coordination with the E&S Manager and discussed with the E&S Deputy Manager and EPC-E&S Manager responsible for the inspected activities.

All monitoring results, including identified issues and corrective actions, are recorded and followed up through the Monitoring Plan, ensuring continuous improvement and accountability throughout the construction phase.

XX.6.2. External Monitoring

In addition to internal monitoring, external monitoring activities will be carried out quarterly in the construction phase and semi-annually during the operation phase of the project by external/independent third party experts (ESAP monitoring experts) to verify environmental and social monitoring information and perform monitoring services. Within the scope of external monitoring, final external evaluation will be carried out to assess if the outcome of the ESMS/ESMP implementation is in conformity with the requirements of the national environmental legislation, international agreements and protocols and international environmental and social standards including the Equator Principles and IFC Policy (2012) and related Performance Standards on Environmental and Social Sustainability that would be applicable to the Antalya-Alanya Motorway Project as well as the commitments specified in the ESIA Report.

Besides, local authorities and the Ministry of Environment, Urbanization and Climate Change (MoEUCC) has the authority to execute monitoring and inspection activities to follow-up the conformity of the Project activities with the environmental requirements as per the relevant legislation.

Table XX.2 Environment and Social Monitoring Plan for the Project

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
Land Preparation and Construction							
C1	Environmental and Social Management System (ESMS)	C1.1. Policy and ESMP	-Project-specific Environment and Social Policy -Organizational Structure (number and CVs of the personnel employed under the Environmental and Social Interaction Department) -Periodical ESMP Performance Review and Monitoring Reports -Number of non-compliant situations -Project-specific Emergency Preparedness and Response Plan -Existence and validity of the legal environmental and health and safety permits -Number and scope of trainings, number of participants, training hours per employee, training materials, trainings provided to sub-contractors, etc. -Measures taken to ensure compliance of sub-contracts with ESMP measures	Project office	Document review	Monthly	SPV
C2	Land Use and Property	C2.1. Forest lands	-Forestry permits/applications -Afforestation protocols made with the Ministry of Agriculture and Forestry -Area of lost forestland (in hectare) -Number of the trees cut -Records on forest fires (if any)	Project office	Document review	Weekly	SPV
		C2.2. Agricultural lands	-List of expropriated agricultural parcels (inc. information on area and characteristics of the land plot) -Site allocation documents for expropriated lands; bilateral agreements, commitment and consent letters for non-expropriated lands	Project office	Document review	Weekly	SPV
			-Grievances received in the subjects of crossing of the expropriation borders, start of activities on non-expropriated lands, etc.	Project office	Review of grievance logs	Weekly	SPV
			-Number of cut trees	Project office	-Review of design documents -Site audit -Review of grievance logs	Weekly	-SPV -EPC
		C2.3. Pasturelands	-Area and number of pasturelands for which land use permits taken	Project office	Document review	Weekly	SPV
		C2.4. State-owned lands	-Area and number of state-owned lands for which land use permits taken	Project office	Document review	Weekly	SPV
		C.2.5. Privately-owned lands	-List and number of expropriated private parcels (inc. information on area and characteristics of the land plot) -Site allocation documents for expropriated lands; bilateral agreements, commitment and consent letters for non-expropriated lands	Project office	Document review	Weekly	SPV
			-Number of grievances received in the subjects of crossing of the expropriation borders, start of activities on non-expropriated lands, etc.	Project office	Review of grievance logs		SPV
C3	Topography and Soils	C3.1. Top soil management	-Grievances received in the subjects of crossing of the expropriation borders, start of activities on non-expropriated lands, etc.	-Expropriation boundaries	Site audit	Weekly	SPV
		C3.2.Earthworks	-Excavation and fill volumes (m^3) -Volume of reused materials (m^3) -Conditions at the storage sites -Inspection of dump sites and quarries	Excavated material storage sites (Km 52+544, Km 59+580, Km 61+500, Km 64+160, Km 71+800, Km 74+360, Km 76+240, Km 78+790, Km 86+340, Km 87+800, Km 95+410 , Km 95+410, Km 98+290, Km 100+000, Km 107+850, Km 110+820, Km 113+050, Km 123+000, Km 124+250, Km 127+000, Km 130+400, Km 132+720)	Site audit	Daily	-SPV -EPC -Sub-Contractor

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
			Grievance	All active construction and camp areas, dump sites	Number of grievances received regarding to excavated material management, will be recorded.	Weekly	-SPV -EPC
		C3.3. Erosion	-Erosion control measures taken (drainage channels, barriers, settling structures, etc.) -Area of exposed lands at each camp sites (m^2)	Locations of exposed lands within the expropriation corridor	Site audit	Daily	-SPV -EPC -Sub-Contractor
		C3.4. Quarry	- -Mining method applied -Blasting activities -Production amount (m^3/day) -Slope stability -Borders of the camp sites -Management of waste rock	Location of quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)	Site audit	Daily	SPV EPC -Sub-Contractor
		C3.5. Soil quality	-Number of spill/leakage incidents and corrective measures taken	-Camp Sites (Km 64+500, Km 87+800, Km 124+300) -Road construction sites -Quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)	Site audit	Daily	-SPV -EPC -Sub-Contractor
C4	Wastes	C4.1. Waste management	-Type (i.e. municipal, packaging, waste oil, etc.) and amount of wastes produced/disposed of	Camp Site-1 (Main) at Km 64+400, Camp Site-2 at Km 87+500, and Camp Site-3 at Km 124+300. Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300.	-Site audit -Document review	Monthly	-SPV -EPC -Sub-Contractor
			Validity and completeness of waste management/disposal agreements with licensed companies			Before every waste transfer	
			Review and implementation consistency of Waste Management Plans			Yearly	
			Inspection and condition of Temporary Waste Storage Areas			Monthly	SPV -EPC -Sub-Contractor
			-Site practices on waste management (e.g. general housekeeping rules, source separation practice, containers, containment structures, etc.)	Camp Site-1 (Main) at Km 64+400, Camp Site-2 at Km 87+500, and Camp Site-3 at Km 124+300	Visual inspection	Daily	-SPV -EPC -Sub-Contractor
		C4.2. Hazardous material management	-List of hazardous materials/chemicals supplied, stored and used (inc. information on type and amount/volume)	Camp Site-1 (Main) at Km 64+400, Camp Site-2 at Km 87+500, and Camp Site-3 at Km 124+300.	-Site audit -Document review	Monthly	-SPV -EPC -Sub-Contractor

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
				Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300.			
			Soil contamination risk from hazardous substances (e.g., fuel)	Project area and sensitive receiving environments (e.g., soil, surface water)	Visual inspection for signs of leakage or spills; inspection of storage and handling practices; SDS and training record review	Daily	SPV -EPC -Sub-Contractor
			General site practices related to hazardous materials management	Entire construction corridor	Field observations on container integrity, spill kits, PPE use, and storage conformity	Weekly	SPV -EPC -Sub-Contractor
			Environmental enforcement actions and non-compliance records	Project area	Review of regulatory audit reports, notifications, and enforcement communications	Monthly	SPV -EPC -Sub-Contractor
C5	Water Resources	C5.1. Water quality	Annex-5, Table 2 of the Regulation on the Surface Water Quality Regulation	-Receiving water bodies for treated wastewater discharges (Kaymazboğazı Stream)	-Water quality sampling, , laboratory analyses	Quarterly	-SPV -EPC - Acridities Laboratory
			Baseline monitoring surface and ground water quality measurement (Table 5, the Annex.5 of Regulation on Surface Water Quality, and IFC EHS Guideline Environmental Waste water and Ambient Water Quality)	ESIA baseline sampling points	Laboratory analyses	Annualy	-SPV -EPC
			Water supply point for humanitarian usage	Water quality sampling, laboratory analyses	Laboratory analyses	Quarterly	-SPV, -EPC, -Community Health Laboratory
		C5.2. Groundwater	- Groundwater usage permit - Water usage amount	Groundwater usage locations	-Water quality sampling, , laboratory analyses	Monthly	-SPV -EPC
		C5.3. Water supply	-Sources and amount of water supply -Water supply permits	All water usage areas (camp sites, concrete batching plants, dust suppression,etc.)	-Document review	Monthly	-SPV -EPC -Acridities Laboratory
			Suppliers' water availability and capacity	Project office	Document review	Monthly	-SPV -EPC
		C5.5. Wastewater management	-Environmental permits for package domestic wastewater treatment plant discharges -Wastewater disposal agreements/channel connection permits to be done with municipalities -Capacity of package domestic wastewater treatment plant	Package domestic wastewater treatment plants (Km 64+500, Km 87+800, Km 124+300)	-Document review	Quarterly	-SPV -EPC

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
			- Waste water treatment plant maintenance and inspection records				
			Quality of treated wastewater from the discharge of package domestic wastewater treatment plants (Water Pollution Control Regulation (Table 21.1))	Camp Sites(Km 64+500, Km 87+800, Km 124+300)	Water quality sampling, laboratory analyses	*In the period to be specified in the environmental permit	-SPV -EPC, -Accredited Laboratories
			Wastewater management practices at concrete plants	- -Concrete Plant locations (Km 55+450,00, Km 59+400,00, Km 80+400,00, Km 87+700,00, Km 89+700,00, KM 99+200,00, Km 123+900,00)	-Site audit -Document review	Weekly	-SPV -EPC
			-Maintenance (WWTP)	WWTPs (Camp Sites(Km 64+500, Km 87+800, Km 124+300))	as per the Plan relevant part	Daily, weekly, annually	-SPV, -EPC
C6	Ecology and Biodiversity	C6.1.Terrestrial Flora	*Pyrus serikensis* species	Maquis and rocky habitats around flora sampling points 11 (X: 344079,Y: 4087799) and 36 (X: 339991,Y: 4090218)	-Site survey	Annual (timing to be determined by experts)	-SPV
			Endemic plant species	At the flora sampling point 11 (X: 344079,Y: 4087799) for *Sideritis congesta,* sampling point 11 (X: 344079,Y: 4087799) and 25 (X: 394464,Y: 4055587) for *Phlomis leucophracta*, sampling point 25 (X: 394464,Y: 4055587for *Phlomis lycia*, sampling point 28 (X: 335259,Y: 4093731) for *Phlomis nissolii*			
			Maquis, Arboreal Matorral and Thermo-mediterranean Scrub	Maquis habitats along the motorway, especially at the maquis assessed as critical.		One-off (timing to be determined by experts)	
		C.6.2. Terrestrial Fauna	*Lyciasalamandra atifi*	Coniferous forest habitats in the AoI at the elevation between 200-500m	-Site survey	Annual (timing to be determined by experts)	-SPV
			Lacerta pamphylica	Coniferous forest habitats in the AoI			
			Myotis capaccinii	Rocky areas, caves and flight corridors within the AoI, especially at the location of quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)			
			Rhinolophus mehelyi				
			Animal passes	Culvert locations along the motorway, Culverts are strategically positioned along the motorway, providing adequate passage for wildlife crossing.			
		C.6.3 Aquatic Flora/Fauna	*Alburnus baliki, Capoeta antalyensis, Oxynoemacheilus eregliensis, Pseudophoxinus fahrettini*	Locations where the motorway crosses surface running waters, at aquatic sampling points	Site survey	Annual (timing to be determined by experts)	-SPV

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C7	Air Quality	C7.1. Dust and Gaseous Emissions	-PM_{10} -$PM_{2.5}$ -Settled dust -NO_x, SO_X, VOC	Sensitive receptors considering all project components including: Camp Site-1 (Main) at Km 64+400, Camp Site-2 at Km 87+500, and Camp Site-3 at Km 124+300. Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300. Bademliyar Quarry, Güçlüköy, Gençler, Taşkesiği Uzunlar, Hacıobası Districts, Saburlar, D-7 and Motorway Route -Villages where vehicles will pass while transporting materials (Bademliyar Quarry, Güçlüköy, Gençler, Taşkesiği Uzunlar, Hacıobası Districts, Saburlar, D-7 Locations)	-Site measurements	Quarterly or Upon Grievance	-SPV -EPC -Accredited laboratories
				-Hacıali Neighbourhood (Sensitive Receptor)	-Site measurements	Monthly and Upon grievance	

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
			-Number of water trucks -Frequency of road watering	-Camp Sites, road construction sites, quarries, stabilized roads) -	-Document review	Daily or more frequently	-SPV -EPC -Sub-Contractor
			-Grievances received on impacts related with dust, air emissions	-Project Office	-Review of grievance logs	Weekly	-SPV -EPC
		C 7.2 Emissions	-Exhaust emissions	-Project office	- Maintenance records	Annually	-SPV -EPC
		C 7.3 Weather conditions and humidity	Weather conditions and humidity	-High risk area due to flammable material storage and close to the forest area	-Weather forecast report changing	-Daily during summer period	-SPV -EPC
		C 7.4 Roads surface integrity and any damage	Roads surface integrity and any damage	-Vehicles	-Measurement	-Annually	-EPC Environmental Engineer
C8	Climate Change	C8.1 Emissions	-GHG emissions due to fuel consumption	-Project office	-Document review	Quarterly	SPV
			-Environmental permits for concrete plants, asphalt plants	-Project office	-Document review	Quarterly	SPV
			-Exhaust emissions	-Project office	- Maintenance records	Quarterly	SPV
		C8.2 Physical Risks	-Extreme Rainfall, Overflow and Floods -Wildfires -Cold Waves and Snowfall - Heatwaves	-Project office -On site	-Visual review	Daily	SPV
		C8.3 Transition Risks	-Policy and Legal Risks -Technology Risks -Market Risks -Reputational Risks	-Project office	-Document Review	Quarterly	SPV
C9	Environmental Noise and Vibration	C9.1. Environmental Noise	Environmental Noise (dBA)	Sensitive Receptors considering all Project components including: Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300.	-Site measurements (24 hour)	Quarterly/ Monthly and upon grievance (depending on the intensity of construction work and the sensitivity of location)	-SPV -EPC -Sub-Contractor -Accredited laboratories

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
				Sarıabalı District (Sensitive Receptor)		Quarterly/ Monthly and upon grievance (depending on the intensity of construction work)	
			Number of non-conformance records related to noise emission management	Project construction and operation areas	Review and control of non-conformance logs	Quarterly	Environmental Eng. (SPV) and Environmental Eng. (EPC)
			Statistics on the grievances received on impacts related with noise generation	Project office	-Review of grievance logs	Weekly	CLO - SPV and EPC
		C9.2. Vibration	Ground vibration value	Sensitive Receptors considering all Project components including: Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300.	-Measurement with vibrometer	Quarterly or Upon Grievance	-SPV -EPC -Sub-Contractor
			Number of non-conformance records related to vibration management	Project construction areas	Review and control of non-conformance logs	Quarterly	Environmental Eng. (SPV) and Environmental Eng. (EPC)
			Statistics on the grievances received on impacts related with blasting operations	-Project office	-Review of grievance logs	Weekly	-SPV -EPC

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
		C9.3. Noise and Vibration Training	Number of training sessions conducted	Project personnel and contractor workers	Tracking and recording training delivery	Quarterly	EPC E&S Manager / SPV Deputy E&S Manager
C10	Cultural Heritage	C10.1. Chance finds	-Employment data on cultural heritage expert/archaeologist -Number of chance finds procedure operated	Road construction sites	-Document review -Site audit	Weekly	SPV
		C10.2. Protected sites	Actions taken in accordance with the decisions of Conservations Boards (e.g. planning of bridges, embankments, etc.; number of georadar studies conducted, test or salvage excavations conducted, etc.)	Road construction sites	-Document review -Site audit	Quarterly	-SPV -EPC
C11	Socio-economy	C11.1. Employment	Employment statistics (direct and contracted workers, local/non-local/foreign)	Project office	-Document review	Monthly	SPV
			Employment agreements	Project office	-Document review	During the recruitment process	SPV EPC
		C11.2. Expropriation	-Agreement level for expropriation works -Number of court cases	Project office	-Document review	Monthly	SPV
		C11.3. Social responsibility/volunteer activities	Number and scope of social responsibility/volunteer projects/activities conducted	Project office	-Document review	Quarterly	SPV
		C11.4. Local Infrastructure	Local infrastructure (e.g. roads) relocated/maintained/improved	Project office	-Document review	Monthly	SPV
		C11.5. Land use restrictions	Locations and dimensions for culverts and underpasses that provide access to agricultural and/or pasturelands	Project office	-Document review -Site audit	Weekly	SPV
C12	Health and Safety/ Labour and Working Conditions	C12.1. Occupational Health and Safety/Labour and Working Conditions	-Number of work incidents/accidents/near misses -Number of personnel who are infected with an infectious disease -Source and quality of drinking water	-Project office -Camp Sites(Km 64+500, Km 87+800, Km 124+300)	-Document review	Weekly	-SPV -EPC
			-Use of PPEs -Health and safety signs -Fire safety equipment/systems -Accommodation conditions	Camp Sites(Km 64+500, Km 87+800, Km 124+300) -Road construction sites - Quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)	-Site audit -Visual observation	Daily	-SPV -EPC
			Number of health and safety trainings provided	-Project office -Camp Sites(Km 64+500, Km 87+800, Km 124+300)	-Document review	Monthly	SPV EPC
			-Number of drills conducted	Project office	-Document review	Semi-Annual	SPV EPC
			-Grievance mechanisms for Project personnel -Grievances received from Project personnel	Project office	-Document review	Weekly	SPV
			Number of trainings conducted related to traffic	Construction camp and administrative offices	Tracking the number of Project personnel and contractor workers who have received training	Quarterly	-SPV -EPC
		C12.2. Community Health and Safety	-Employment data on the security personnel	-Project office -Camp Sites(Km 64+500, Km 87+800, Km 124+300)	-Document review	Weekly	-SPV - EPC
			-Trainings provided to security personnel			Quarterly	
			-Grievances received and replied to regarding the acts of security personnel			Weekly	
			Number of complaints received on traffic	Public relations records and grievance system	Logging and monitoring of grievances as per the Grievance Mechanism Procedure	Weekly	-SPV - EPC
			Certificates of operators and drivers	Relevant department	Certificates will be ensured by the relevant department	During the recruitment process	-SPV - EPC
			Number of Trainings, participants, Conducted	Project personnel and contractor workers receiving training	Review of training records	Monthly	-SPV - EPC
C13	Visual Aesthetics	C13.1. Visual Disturbance	-Visual barriers	-Camp Sites(Km 64+500, Km 87+800, Km 124+300)	-Site audit -Review of grievance logs	Monthly	SPV

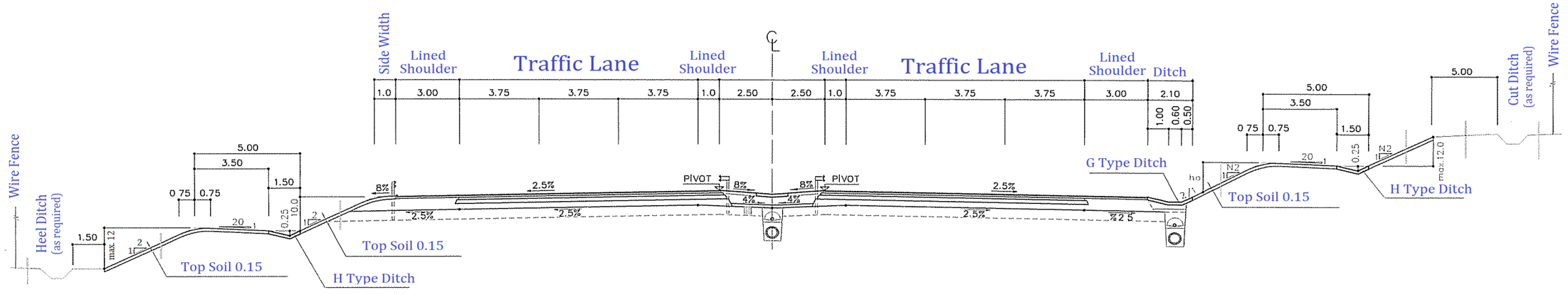
No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
				Quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000) -The settlements that are classified as the fully visible (Aşağıçatma, Çakallar, Kayaburnu, Kızılot, Kökez, Merkez (Serik), Sarılar, Soğukpınar, Sülek, Üründü, Uzunlar)			
C14	Public Consultation	C14.1. Stakeholder Engagement	-Implementation of Stakeholder Engagement Plan -Number of stakeholder engagement activities/events conducted -Presence and functionality of Project web-site	Project office	-Document review	Weekly	-SPV - EPC
		C14.2. Grievance Mechanism	-Statistics on the grievances received and solved	Project office	-Document review -Media screen	Monthly	SPV
Operation Phase							
O1	Environmental and Social Management System (ESMS)	O1.1. Policy and ESMP	-Project-specific Environment and Social Policy -Organizational Structure (number and CVs of the personnel employed under the Environmental and Social Interaction Department) -Periodical ESMP Performance Review and Monitoring Reports -Number of non-compliant situations -Existence and validity of the legal environmental and health and safety permits -Budget allocated/spent for ESMP implementation -Number and scope of trainings, number of participants, training hours per employee, training materials, trainings provided to sub-contractors, etc. -Measures taken to ensure compliance of sub-contracts with ESMP measures	Project office	Document review	Semi-Annual	SPV
O2	Land Use and Property	O2.1. Afforestation	Implementation of afforestation (area afforested, number of trees planted, success of planting, etc.)	Project office	-Document review -Site audit	Semi-Annual	SPV
O3	Topography, Soils and Geology	O3.1. Erosion	Erosion control measures taken (drainage channels, barriers, settling structures, etc.)	-Embankment locations -Motorway surroundings	Site audit	Semi-Annual	SPV
		O3.2. Quarry	Rehabilitated area	Location of quarries(Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)	Site audit	Semi-annually for the first two years, then annually	SPV
		O.3.3. Geotechnics	Structural motion, undermining, maintenance requirement of engineering structures	Foundations and legs of viaducts (between Km 55+456.830 and Km 134+759.809) and other structural elements	Site audit	Semi-annually for the first two years, then annually	SPV
O4	Wastes	O4.1. Waste management	-List of hazardous materials/chemicals supplied, stored and used (inc. information on type and amount/volume) -Type (i.e. municipal, packaging, waste oil, etc.) and amount of wastes produced/disposed of -Waste management/disposal agreements done with licensed companies -Waste Management Plans -Temporary Waste Storage Areas -Site practices on waste management (e.g. general housekeeping rules, source separation practice, containers, containment structures, etc.)	-Operation facilities/buildings(Serik Junction, Taşağıl Junction, Manavgat Junction, Manavgat East Junction, Alarahan Junction, Konaklı Junction, Alanya West Junction) -Service areas	-Site audit -Document review	Semi-annually for the first two years, then annually	SPV
O5	Water Resources	O5.1. Drainage	Presence and functionality of drainage system	-Motorway route	-Site audit	Semi-Annual	SPV
		O5.2. Water supply	-Sources and amount of water supply -Water supply permits	-Operation facilities/buildings -Service areas	-Site audit -Document review	Semi-annually for the first two years, then annually	SPV

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
		O5.3. Wastewater management	-Wastewater disposal agreements/channel connection permits to be done with municipalities	- Service Areas	-Document review	Semi-annually for the first two years, then annually	SPV
O6	Ecology	O6.1.Terrestrial Flora	*Pyrus serikensis* species	Maquis and rocky habitats around flora sampling points 11 (X: 344079,Y: 4087799) and 36 (X: 339991,Y: 4090218)	Site survey	Annually in the first two years of operation	SPV
			Endemic plant species	At the flora sampling point 11 (X: 344079,Y: 4087799) for *Sideritis congesta,* sampling point 11 (X: 344079,Y: 4087799) and 25 (X: 394464,Y: 4055587) for *Phlomis leucophracta*, sampling point 25 (X: 394464,Y: 4055587for *Phlomis lycia*, sampling point 28 (X: 335259,Y: 4093731) for *Phlomis nissolii*		
			Maquis, Arboreal Matorral and Thermo-mediterranean Scrub	Maquis habitats along the motorway, especially at the maquis assessed as critical.		One-off (timing to be determined by experts)	
		O.6.2. Terrestrial Fauna	*Lyciasalamandra atifi*	Coniferous forest habitats in the AoI at the elevation between 200-500m		Semi-Annual (timing to be determined by experts)	SPV
			Lacerta pamphylica	Coniferous forest habitats in the AoI			
			Myotis capaccinii	Rocky areas, caves and flight corridors within the AoI, especially at the location of quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)			
			Rhinolophus mehelyi				
			Animal passes	Culvert locations along the motorway		One-off	
		O.6.3 Aquatic Flora/Fauna	*Alburnus baliki, Capoeta antalyensis, Oxynoemacheilus eregliensis, Pseudophoxinus fahrettini*	Locations where the motorway crosses surface running waters, at aquatic sampling points		Semi-Annual (timing to be determined by experts)	SPV
O7	Air Quality	O7.1. Gaseous Pollutants	NO_x, SO_X, VOC	-Serik (UTM WGS84 ZONE 36 X: 330608/Y:4089427) and Taşağıl (UTM WGS84 ZONE 36 X: 343326/Y:4087476) Neighbourhoods	-Site measurements	Semi-annually for the first two years, then annually	SPV
			GHG emissions due to fuel and electricity consumption	Project office	-Document review	Semi-annually for the first two years, then annually	SPV
			Grievances received on impacts related with gaseous emissions	Project office	-Review of grievance logs	Semi-annually for the first two years, then annually	SPV
O8	Climate Change	O 8.1 Emissions	-GHG emissions due to fuel consumption	Project office	-Document review	Quarterly	SPV
			-Environmental permits for concrete plants, asphalt plants	Project office	-Document review	Quarterly	SPV
			-Exhaust emissions	Project office	- Maintenance records	Quarterly	SPV

No	Subject	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
		O 8.2 Physical Risks	-Extreme Rainfall, Overflow and Floods -Wildfires -Cold Waves and Snowfall - Heatwaves	Project office	-Visual review	Daily	SPV
		O 8.3 Transition Risks	-Policy and Legal Risks -Technology Risks -Market Risks -Reputational Risks	Project office	-Document Review	Quarterly	SPV
O9	Environmental Noise and Vibration	O9.1. Environmental Noise	Environmental Noise (dBA)	-At the points where baseline studies are carried out (Table IX.6) -Critical Receptors	-Site measurements	Semi-annually for the first two years, then annually	SPV
			Grievances received on impacts related with traffic noise	Project office	-Review of grievance logs	Upon Grievance	SPV
O10	Cultural Heritage	O10.1. Newly registered sites	Number of sites, which have been registered as a result of Project's cultural heritage studies	Project office Databases of Cultural Heritage authorities	-Document review	One-off at the beginning of operation	SPV
O11	Socio-economy	O11.1. Employment	Employment statistics (direct and contracted workers, local/non-local/foreign)	Project office	-Document review	Semi-Annual	SPV
		O11.2. Social responsibility/volunteer activities	Number and scope of social responsibility/volunteer projects/activities conducted	Project office	-Document review	Semi-Annual	SPV)
O12	Health and Safety/Labour and Working Conditions	O12.1. Occupational Health and Safety/Labour and Working Conditions	-Employment agreements -Number of work incidents/accidents/near misses during operation and maintenance works	-Project office -Operation facilities/buildings -Service areas	-Document review	Semi-Annual	SPV
			-Emergency Preparedness and Action Plan -Number of drills (e.g. spill response) conducted	Project office	-Document review	Semi-Annual	SPV
			-Grievance mechanisms for Project personnel -Grievances received from Project personnel	Project office	-Document review	Semi-Annual	SPV
		O12.2. Community Health and Safety	-Traffic safety measures taken (safety systems established, traffic signs, etc.) -Traffic accident records on the Motorway	-Motorway Route -Project office	-Site audit -Document review	Semi-Annual	SPV
O13	Public Consultation	O13.1. Stakeholder Engagement	-Implementation of Stakeholder Engagement Plan -Number of stakeholder engagement activities/events conducted -Presence and functionality of Project web-site	Project office	-Document review	Semi-Annual	SPV
		O13.2. Grievance Mechanism	Statistics on the grievances received and replied to	Project office	-Document review -Media screen	Semi-Annual	SPV
		O13.3. Information Disclosure	-Disclosure of ESIA documents	Project office	-Document review	Semi-Annual	SPV

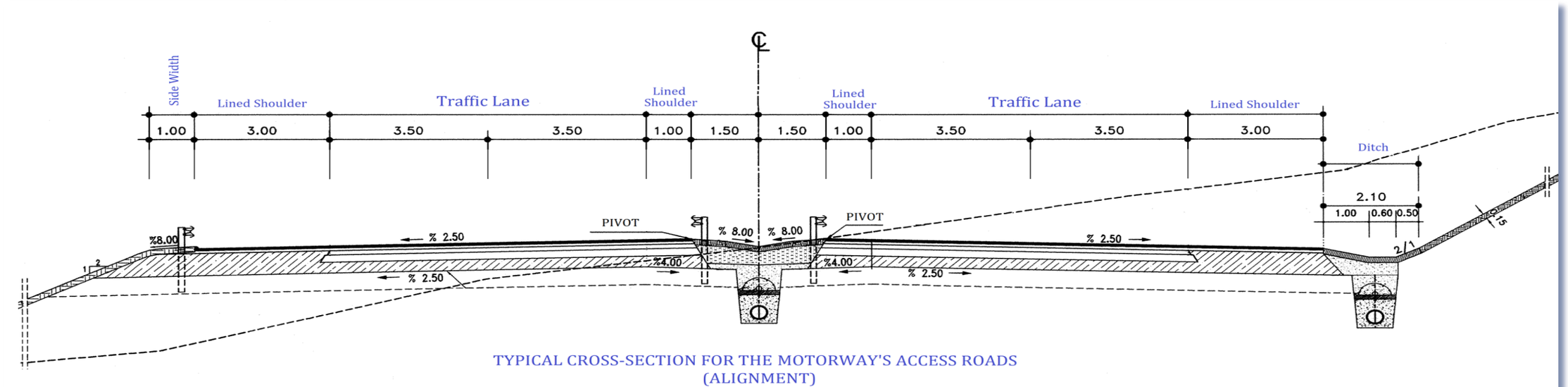
ANNEXES

Annex 9.1 Typical Cross-Section for the Motorway's Main Carriageway



TYPICAL CROSS-SECTION FOR THE MOTORWAY'S MAIN CARRIAGEWAY
(ALIGNMENT)

Annex 9.2 Typical Cross-section for the Motorway's Access Roads



TYPICAL CROSS-SECTION FOR THE MOTORWAY'S ACCESS ROADS
(ALIGNMENT)

AIR QUALITY MEASUREMENTS

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3011	**Sample Type**	PM 10
Sample Record No	NUM.24.3011	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Hacıali	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 370544/4070725		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12630	0.12882	0.12923	0.12923	18.09.2024	19.09.2024	55.08	45.93

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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AB-0168-T

LR.24.3012

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3012	**Sample Type**	PM 10
Sample Record No	NUM.24.3012	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Taşağıl	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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AB-0168-T | LR.24.3012 | 11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 343326/4087476		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12834	0.12895	0.12923	0.12923	19.09.2024	20.09.2024	55.08	11.26

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3013
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3013	**Sample Type**	PM 10
Sample Record No	NUM.24.3013	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Ulukapı	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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AB-0168-T | LR.24.3013 | 11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 365551/4075913		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12780	0.12891	0.12923	0.12923	20.09.2024	21.09.2024	54.88	20.41

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3014
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3014	**Sample Type**	PM 10
Sample Record No	NUM.24.3014	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Bademliyar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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21.11.2024		**21.11.2024**

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AB-0168-T | LR.24.3014 | 11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 389655/4072729		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12844	0.12902	0.12923	0.12923	21.09.2024	22.09.2024	55.06	10.72

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T | LR.24.3015 | 11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3015	**Sample Type**	PM 10
Sample Record No	NUM.24.3015	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Köprüçay	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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AB-0168-T | LR.24.3015 | 11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 339819/4095932		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12560	0.12655	0.12923	0.12923	22.09.2024	23.09.2024	55.12	17.42

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3016
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3016	**Sample Type**	PM 10
Sample Record No	NUM.24.3016	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Kalemler	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

ENCON LABORATUVARI A.Ş.
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mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 353691/4080989		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12916	0.12992	0.12923	0.12923	23.09.2024	24.09.2024	55.06	13.98

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3017	**Sample Type**	PM 10
Sample Record No	NUM.24.3017	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Bucakşeyhler	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 363395/4078780		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12668	0.12680	0.12923	0.12923	24.09.2024	25.09.2024	55.06	<6.00

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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3018	**Sample Type**	PM 10
Sample Record No	NUM.24.3018	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sarılar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 360448/4076493		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12705	0.12772	0.12923	0.12923	25.09.2024	26.09.2024	55.08	12.35

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3019	**Sample Type**	PM 10
Sample Record No	NUM.24.3019	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sarıobalı	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 337884/4093014		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12789	0.12879	0.12923	0.12923	26.09.2024	27.09.2024	55.12	16.51

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3020	**Sample Type**	PM 10
Sample Record No	NUM.24.3020	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sağırin	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 341974/4097230		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12700	0.12722	0.12923	0.12923	27.09.2024	28.09.2024	54.86	<6.00

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3021	**Sample Type**	PM 10
Sample Record No	NUM.24.3021	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sülek	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 371900/4068786		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12923	0.12961	0.12923	0.12923	28.09.2024	29.09.2024	55.04	7.09

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3022	**Sample Type**	PM 10
Sample Record No	NUM.24.3022	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Uzunlar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 376876/4066570		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12971	0.13062	0.12923	0.12923	30.09.2024	01.10.2024	54.86	16.77

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3023	**Sample Type**	PM 10
Sample Record No	NUM.24.3023	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Hacıobası	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 373104/4065985		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.13076	0.13122	0.12923	0.12923	01.10.2024	02.10.2024	55.06	8.54

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3024	**Sample Type**	PM 10
Sample Record No	NUM.24.3024	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Karakaya	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 385356/4061872		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12727	0.12788	0.12923	0.12923	02.10.2024	03.10.2024	55.12	11.25

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3025	**Sample Type**	PM 10
Sample Record No	NUM.24.3025	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Emişbeleni	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 399364/4055198		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12850	0.12916	0.12923	0.12923	03.10.2024	04.10.2024	54.88	12.21

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3026	**Sample Type**	PM 10
Sample Record No	NUM.24.3026	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Akdam	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 393414/4055623		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12784	0.12891	0.12923	0.12923	04.10.2024	05.10.2024	55.08	19.61

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LR.24.3027

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3027	**Sample Type**	PM 10
Sample Record No	NUM.24.3027	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Avsallar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK
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LR.24.3027
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 389720/4055765		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12784	0.12803	0.12923	0.12923	05.10.2024	06.10.2024	55.08	<6.00

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T

LR.24.3028

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3028	**Sample Type**	PM 10
Sample Record No	NUM.24.3028	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Çakallar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 386572/4060940		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.13103	0.13168	0.12923	0.12923	06.10.2024	07.10.2024	55.02	12.00

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T

LR.24.3029

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3029	**Sample Type**	PM 10
Sample Record No	NUM.24.3029	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Konaklı	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 401287/4049717		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12759	0.12841	0.12923	0.12923	07.10.2024	08.10.2024	55.08	15.07

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LR.24.3030

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3030	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3030	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Serik	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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LR.24.3030
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 330608/4089427		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12822	0.12864	0.12923	0.12923	16.09.2024	17.09.2024	54.86	7.84

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3031	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3031	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Deniz Tepesi	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 334640/4094389		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12968	0.13042	0.12923	0.12923	17.09.2024	18.09.2024	55.06	13.62

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AB-0168-T
LR.24.3032
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3032	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3032	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Hacıali	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 370544/4070725		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12995	0.13162	0.12923	0.12923	18.09.2024	19.09.2024	55.04	30.52

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3033	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3033	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Taşağıl	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 343326/4087476		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12897	0.12941	0.12923	0.12923	19.09.2024	20.09.2024	55.04	8.18

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3034	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3034	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Ulukapı	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 365551/4075913		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12950	0.13041	0.12923	0.12923	20.09.2024	21.09.2024	54.96	16.74

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3035	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3035	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Bademliyar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 389655/4072729		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12683	0.12733	0.12923	0.12923	21.09.2024	22.09.2024	55.04	9.27

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3036	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3036	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Köprüçay	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 339819/4095932		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12739	0.12802	0.12923	0.12923	22.09.2024	23.09.2024	55.08	11.62

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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3037	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3037	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Kalemler	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 353691/4080989		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12791	0.12857	0.12923	0.12923	23.09.2024	24.09.2024	55.12	12.16

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3038	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3038	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Bucakşeyhler	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 363395/4078780		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12916	0.12934	0.12923	0.12923	24.09.2024	25.09.2024	55.12	<6.00

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

ENCON LABORATUVARI A.Ş.
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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3039	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3039	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sarılar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 360448/4076493		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12736	0.12800	0.12923	0.12923	25.09.2024	26.09.2024	55.06	11.81

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3040	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3040	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sarıobalı	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 337884/4093014		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12969	0.13024	0.12923	0.12923	26.09.2024	27.09.2024	55.04	10.17

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PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3041	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3041	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sağırin	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 341974/4097230		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12719	0.12739	0.12923	0.12923	27.09.2024	28.09.2024	54.96	<6.00

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3042	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3042	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sülek	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 371900/4068786		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12957	0.12990	0.12923	0.12923	28.09.2024	29.09.2024	55.12	6.17

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

ENCON LABORATUVARI A.Ş.
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LR.24.3043

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3043	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3043	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Uzunlar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 376876/4066570		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12809	0.12875	0.12923	0.12923	30.09.2024	01.10.2024	54.84	<6.00

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3044	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3044	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Projec / Hacıobası	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

		Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis		GC Model Weighing Device	Sartorius/GC	18805603
		PM 2.5 Sampling Device	Leckel	LVS3-2796105
		Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location		36 S 373104/4065985		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12888	0.12921	0.12923	0.12923	01.10.2024	02.10.2024	55.10	6.17

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3045	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3045	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Karakaya	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 385356/4061872		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12795	0.12851	0.12923	0.12923	02.10.2024	03.10.2024	55.02	10.36

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3046	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3046	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Emişbeleni	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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LR.24.3046
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 399364/4055198		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12833	0.12897	0.12923	0.12923	03.10.2024	04.10.2024	54.96	11.83

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3047	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3047	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Akdam	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 393414/4055623		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12901	0.12987	0.12923	0.12923	04.10.2024	05.10.2024	55.12	15.78

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

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LR.24.3048

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3048	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3048	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Avsallar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
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mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

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AB-0168-T
LR.24.3048
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 389720/4055765		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12808	0.12834	0.12923	0.12923	05.10.2024	06.10.2024	55.04	<6.00

For the samples not taken by the ENCON laboratory Inc., uncertainty values indicated do not cover the uncertainties arising from the sampling.
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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T

LR.24.3049

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3049	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3049	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Çakallar	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

Remarks:
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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

ENCON LABORATUVARI A.Ş.
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LR.24.3049
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 386572/4060940		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12980	0.13034	0.12923	0.12923	06.10.2024	07.10.2024	55.06	9.99

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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

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LR.24.3050

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3050	**Sample Type**	PM 2.5
Sample Record No	NUM.24.3050	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Konaklı	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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LR.24.3050
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM 2.5 Sampling Device	Leckel	LVS3-2796105
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 401287/4049717		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM2.5 Result ($\mu g/m^3$)
0.12995	0.13066	0.12923	0.12923	07.10.2024	08.10.2024	55.12	13.06

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mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

PASSIVE REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3176	**Sample Type**	SO_2, NO_2
Sample Record No	NUM.24.3176	**Standard and Resources Applied in Measurement**	TS ISO 1996-2
Coordinates of Sampling Location	36S 401287/4049717	**Sampling Date**	21/09/2024-21/10/2024
Project Name / Sampling Location	Antalya-Alanya Motorway Project Konaklı	**Environmental Conditions During Sampling**	Açık (Sunny)
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

Açıklamalar/Remarks: (**) Parameters with "" are conducted at 'Segal Laboratory'**

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PASSIVE REPORT

Parameter	Unit	Result
SO_2	µg/m^3	<10.27
NO_2	µg/m^3	<4.24

Açıklamalar/Remarks: (**) Parameters with "" are conducted at 'Segal Laboratory'**

Sayfa No 2/2

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PASSIVE REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3177	**Sample Type**	SO_2, NO_2
Sample Record No	NUM.24.3177	**Standard and Resources Applied in Measurement**	TS ISO 1996-2
Coordinates of Sampling Location	36S 373104/4065985	**Sampling Date**	21/09/2024-21/10/2024
Project Name / Sampling Location	Antalya-Alanya Motorway Project Hacıobası	**Environmental Conditions During Sampling**	Açık (Sunny)
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PASSIVE REPORT

Parameter	Unit	Result
SO_2	µg/m^3	<10.27
NO_2	µg/m^3	<4.24

Açıklamalar/Remarks: (**) Parameters with "" are conducted at 'Segal Laboratory'**

Sayfa No 2/2

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PASSIVE REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3178	**Sample Type**	SO_2, NO_2
Sample Record No	NUM.24.3178	**Standard and Resources Applied in Measurement**	TS ISO 1996-2
Coordinates of Sampling Location	36S 360448/4076493	**Sampling Date**	21/09/2024-21/10/2024
Project Name / Sampling Location	Antalya-Alanya Motorway Project Sarılar	**Environmental Conditions During Sampling**	Açık (Sunny)
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PASSIVE REPORT

Parameter	Unit	Result
SO_2	$\mu g/m^3$	24.21
NO_2	$\mu g/m^3$	<4.24

Açıklamalar/Remarks: (**) Parameters with "" are conducted at 'Segal Laboratory'**

Sayfa No 2/2

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PASSIVE REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3179	**Sample Type**	SO_2, NO_2
Sample Record No	NUM.24.3179	**Standard and Resources Applied in Measurement**	TS ISO 1996-2
Coordinates of Sampling Location	36S 330608/4089427	**Sampling Date**	21/09/2024-21/10/2024
Project Name / Sampling Location	Antalya-Alanya Motorway Project Serik	**Environmental Conditions During Sampling**	Açık (Sunny)
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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PASSIVE REPORT

Parameter	Unit	Result
SO_2	$\mu g/m^3$	<10.27
NO_2	$\mu g/m^3$	<4.24

Açıklamalar/Remarks: (**) Parameters with "" are conducted at 'Segal Laboratory'**

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PASSIVE REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3180	**Sample Type**	SO_2, NO_2
Sample Record No	NUM.24.3180	**Standard and Resources Applied in Measurement**	TS ISO 1996-2
Coordinates of Sampling Location	36S 343326/4087476	**Sampling Date**	21/09/2024-21/10/2024
Project Name / Sampling Location	Antalya-Alanya Motorway Project Taşağıl	**Environmental Conditions During Sampling**	Açık (Sunny)
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

Açıklamalar/Remarks: (**) Parameters with "" are conducted at 'Segal Laboratory'**

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PASSIVE REPORT

Parameter	Unit	Result
SO_2	$\mu g/m^3$	<10.27
NO_2	$\mu g/m^3$	<4.24

Açıklamalar/Remarks: (**) Parameters with "" are conducted at 'Segal Laboratory'**

Sayfa No 2/2

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AB-0168-T
LR.24.3181
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3181	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3181	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Serik	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3181
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 330608/4089427	21.09.2024	21.10.2024	74.38

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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LABORATUVAR SONUÇ RAPORU FORMU			
Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
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AB-0168-T
LR.24.3182
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3182	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3182	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sarıobalı	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 337884/4093014	21.09.2024	21.10.2024	73.06

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

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11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3183	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3183	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Deniz Tepesi	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m²day)
36S 334640/4094389	21.09.2024	21.10.2024	12.33

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.002	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.002	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.002	VDI 2267 Bölüm 2

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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LR.24.3184
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3184	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3184	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Köprüçay	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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LR.24.3184
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 339819/4095932	21.09.2024	21.10.2024	72.30

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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LR.24.3185
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3185	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3185	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sağırin	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3185
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m²day)
36S 341974/4097230	21.09.2024	21.10.2024	29.60

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0007	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0007	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0007	VDI 2267 Bölüm 2

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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LR.24.3186
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3186	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3186	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Taşağıl	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 343326/4087476	21.09.2024	21.10.2024	55.41

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0004	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0004	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0004	VDI 2267 Bölüm 2

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ENCON LABORATUVARI A.Ş.
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LR.24.3187
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3187	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3187	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Kalemler	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

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SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 353691/4080989	21.09.2024	21.10.2024	65.28

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

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SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3188	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3188	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Konaklı	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 401287/4049717	21.09.2024	21.10.2024	73.06

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

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11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3189	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3189	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Emişbeleni	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 399364/4055198	21.09.2024	21.10.2024	56.55

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0004	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0004	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0004	VDI 2267 Bölüm 2

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11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3190	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3190	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Akdam	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 393414/4055623	21.09.2024	21.10.2024	12.33

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.002	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.002	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.002	VDI 2267 Bölüm 2

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

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11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3191	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3191	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Avsallar	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 389720/4055765	21.09.2024	21.10.2024	32.07

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.006	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.006	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.006	VDI 2267 Bölüm 2

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11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3192	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3192	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Çakallar	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
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mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.3192
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 386572/4060940	21.09.2024	21.10.2024	60.53

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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LABORATUVAR SONUÇ RAPORU FORMU			
Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3193	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3193	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Karakaya	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 385356/4061872	21.09.2024	21.10.2024	56.17

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0004	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0004	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0004	VDI 2267 Bölüm 2

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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LR.24.3194
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3194	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3194	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Hacıobası	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3194
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m²day)
36S 373104/4065985	21.09.2024	21.10.2024	45.35

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0004	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0004	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0004	VDI 2267 Bölüm 2

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3195	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3195	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Uzunlar	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3195
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 376876/4066570	21.09.2024	21.10.2024	72.49

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

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LR.24.3196
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3196	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3196	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Bademliyar	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3196
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m²day)
36S 389655/4072729	21.09.2024	21.10.2024	54.84

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0004	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0004	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0004	VDI 2267 Bölüm 2

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11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3197	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3197	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sülek	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3197
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 371900/4068786	21.09.2024	21.10.2024	42.13

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.005	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.005	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.005	VDI 2267 Bölüm 2

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LABORATUVAR SONUÇ RAPORU FORMU			
Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.3198
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3198	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3198	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Hacıali	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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LABORATUVAR SONUÇ RAPORU FORMU			
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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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AB-0168-T
LR.24.3198
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 370544/4070725	21.09.2024	21.10.2024	92.98

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0002	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0002	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0002	VDI 2267 Bölüm 2

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

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TÜRKAK
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LR.24.3199
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3199	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3199	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Ulukapı	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3199
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m²day)
36S 365551/4075913	21.09.2024	21.10.2024	73.62

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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LABORATUVAR SONUÇ RAPORU FORMU			
Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK
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AB-0168-T
LR.24.3200
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3200	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3200	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Bucakşeyhler	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	1/2

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LR.24.3200
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m^2day)
36S 363395/4078780	21.09.2024	21.10.2024	31.31

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0006	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0006	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0006	VDI 2267 Bölüm 2

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LABORATUVAR SONUÇ RAPORU FORMU			
Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.3201
11-24

SETTLED DUST REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3201	**Sample Type**	Settled Dust
Sample Record No	NUM.24.3201	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sarılar	**Environmental Conditions During Sampling**	Sunny
Date of Samples Received	22.10.2024	**Person /Firm Conducted Sampling**	Enes AKÇER

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3201
11-24

SETTLED DUST REPORT

Standard and Resources Applied in Measurement	TS 2342		
Device and Equipment Name Used in Analysis.	**DEVICE NAME**	**BRAND / MODEL**	**SERIAL NO**
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
	Settled Dust Device	-	-

Coordinates of Sampling Location	Sampling Start Date	Sampling End Date	Result (mg/m²day)
36S 360448/4076493	21.09.2024	21.10.2024	64.71

Parameter	Unit	Test Result	Method of Analysis
Kadmiyum	mg/kg	<0.0003	VDI 2267 Bölüm 2
Kurşun	mg/kg	<0.0003	VDI 2267 Bölüm 2
Talyum	mg/kg	<0.0003	VDI 2267 Bölüm 2

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	11/ 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK
Test
TS EN ISO/IEC 17025
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AB-0168-T
LR.24.3202
11-24

SAMPLE REPORT WITH PID DETECTOR

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	22.11.2024 / LR.24.3202		
Sample Record No	NUM.24.3202		
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Taşağıl	**Coordinates of Sampling Location**	343326/4087476
Person Conducted Sampling	Enes AKÇER	**Sampling Method**	PID Detector
Standard and Resources Applied in Measurement	In House Method	**Date/Time of Measurement**	17.10.2024
Device and Equipment Name Used in Analysis	**Device Name**	**Brand / Model**	**Serial No**
	Honeywell	MultiRAE Lite/(02- LEL-CO-H2S-VOC)	M01C034279

Remarks:

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.G	04.08.2023	-/-	1/2

ENCON LABORATUVARI A.Ş.
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11-24

SAMPLE REPORT WITH PID DETECTOR

Parameter	Result (mg/L)
VOCs	1.0

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ENC.P.14.F.67.G	04.08.2023	-/-	2/2

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TÜRKAK
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LR.24.3203
11-24

SAMPLE REPORT WITH PID DETECTOR

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	22.11.2024 / LR.24.3203		
Sample Record No	NUM.24.3203		
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Serik	**Coordinates of Sampling Location**	330608/4089427
Person Conducted Sampling	Enes AKÇER	**Sampling Method**	PID Detector
Standard and Resources Applied in Measurement	In House Method	**Date/Time of Measurement**	17.10.2024
Device and Equipment Name Used in Analysis	**Device Name**	**Brand / Model**	**Serial No**
	Honeywell	MultiRAE Lite/(02- LEL-CO-H2S-VOC)	M01C034279

Remarks:

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.G	04.08.2023	-/-	1/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.3203
11-24

SAMPLE REPORT WITH PID DETECTOR

Parameter	Result (mg/L)
VOCs	1.0

For the samples not taken by the ENCON laboratory Inc., uncertainty values indicated do not cover the uncertainties arising from the sampling.
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ENC.P.14.F.67.G	04.08.2023	-/-	2/2

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LR.24.3204

11-24

SAMPLE REPORT WITH PID DETECTOR

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	22.11.2024 / LR.24.3204		
Sample Record No	NUM.24.3204		
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Sarılar	**Coordinates of Sampling Location**	360448/4076493
Person Conducted Sampling	Enes AKÇER	**Sampling Method**	PID Detector
Standard and Resources Applied in Measurement	In House Method	**Date/Time of Measurement**	17.10.2024
Device and Equipment Name Used in Analysis	**Device Name**	**Brand / Model**	**Serial No**
	Honeywell	MultiRAE Lite/(02- LEL-CO-H2S-VOC)	M01C034279

Remarks:

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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SAMPLE REPORT WITH PID DETECTOR

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VOCs	1.0

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LR.24.3205

11-24

SAMPLE REPORT WITH PID DETECTOR

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	22.11.2024 / LR.24.3205		
Sample Record No	NUM.24.3205		
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Hacıobası	**Coordinates of Sampling Location**	373104/4065985
Person Conducted Sampling	Enes AKÇER	**Sampling Method**	PID Detector
Standard and Resources Applied in Measurement	In House Method	**Date/Time of Measurement**	17.10.2024
Device and Equipment Name Used in Analysis	**Device Name**	**Brand / Model**	**Serial No**
	Honeywell	MultiRAE Lite/(02- LEL-CO-H2S-VOC)	M01C034279

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	Laboratory Assistant Manager	Laboratory Manager
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21.11.2024		**21.11.2024**

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LR.24.3205
11-24

SAMPLE REPORT WITH PID DETECTOR

Parameter	Result (mg/L)
VOCs	2.0

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ENC.P.14.F.67.G	04.08.2023	-/-	2/2

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AB-0168-T
LR.24.3206
11-24

SAMPLE REPORT WITH PID DETECTOR

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	22.11.2024 / LR.24.3206		
Sample Record No	NUM.24.3206		
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Konaklı	**Coordinates of Sampling Location**	401287/4049717
Person Conducted Sampling	Enes AKÇER	**Sampling Method**	PID Detector
Standard and Resources Applied in Measurement	In House Method	**Date/Time of Measurement**	17.10.2024
Device and Equipment Name Used in Analysis	**Device Name**	**Brand / Model**	**Serial No**
	Honeywell	MultiRAE Lite/(02- LEL-CO-H2S-VOC)	M01C034279

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	Laboratory Assistant Manager	Laboratory Manager
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LR.24.3206
11-24

SAMPLE REPORT WITH PID DETECTOR

Parameter	Result (mg/L)
VOCs	2.0

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ENC.P.14.F.67.G	04.08.2023	-/-	2/2

SEGAL ÇEVRE ÖLÇÜM ve ANALİZ LABORATUARI
Aşağı Öveçler Mah. 1322.Cad (Eski 6.cad) No:12 Çankaya-ANKARA
Tel: 0 312 481 83 00 **Fax:** 0 312 481 83 99
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web: www.segalanaliz.com, www.segal.com.tr

R-80931/24
11/24

DENEY RAPORU / Test Report

Müşterinin Adı/ Adresi Customer Name / Address	ENCON Laboratuvarı A.Ş. Mutlukent Mah. Uluırmak Sok. No:23 Çankaya – ANKARA
Numunenin Adı ve Örnekleme Tarihi Name and Sampling Date of the Sample	21.09.2024 – 21.10.2024 Pasif Örnekleme
Proje Adı ve No Name and Number of the Project	P-35088/24
Numunenin Kabul Tarihi Date of Sample Acceptance	22.10.2024
Açıklamalar Remarks	5 noktada pasif NO_2 ve SO_2 analizi
Deneyin Yapıldığı Tarih Date of the Test	23.10.2024
Raporun Tarihi ve Sayfa Sayısı ***Number and date of the Pages of the Report***	05.11.2024 – 3 sayfa

Deney laboratuvarı olarak faaliyet gösteren SEGAL Çevre Ölçüm ve Analiz Laboratuarı Müh. Müş. Proje Hizm. San. Tic. Ltd. Şti. TÜRKAK'tan AB-0425-T ile TS EN ISO IEC 17025 standardına göre akredite edilmiştir. SEGAL Çevre Ölçüm ve Analiz Laboratuarı Müh. Müş. Proje Hizm. San. Tic. Ltd. Şti. accredited by TÜRKAK under registration number AB-0425-T for TS EN ISO IEC 17025 as test laboratory"
Türk Akreditasyon Kurumu (TÜRKAK) deney raporlarının tanınırlığı konusunda Avrupa Akreditasyon Birliği (EA) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanıma anlaşması imzalamıştır. Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of test reports
Deney ve/veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve deney/ölçüm metotları takip eden sayfalarda verilmiştir. The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Raporu Hazırlayan Prepared by	Raporu Onaylayan Confirm by
Hazal GÜNER Çevre Mühendisi	Fevzi KARAKAYA Laboratuar Müdürü

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Rapor tarihi, aynı zamanda yayımlanma ve onaylanma tarihidir. / The report date is also the date of publication and approval.
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DENEY RAPORU / Test Report

A. GİRİŞ

ENCON Laboratuvarı A.Ş. tarafından 5 noktada yapılan pasif örnekleme ile NO_2 ve SO_2 analizleri yapılmıştır.

B. ÖLÇÜM YAPILAN BÖLÜM, ÖLÇÜM PARAMETRELERİ, ÖLÇÜM YÖNTEMİ VE ÖLÇÜM CİHAZI VE SONUÇLARI

Ölçüm yapılan noktalara ait koordinatlar tablo-1 de verilmiştir.

Tablo 1: Ölçüm Noktası Koordinatları

Ölçüm Noktası	Koordinatlar
Konaklı	36S 401287 – 4049717
Hacıobası	36S 373104 – 4065985
Sarılar	36S 360448 – 4076493
Serik	36S 330608 – 4089427
Taşağıl	36S 343326 - 4087476

Analizde kullanılan ölçüm yöntemi tablo-2 de verilmiştir.

Tablo 2: Ölçüm Parametresine Göre Analiz Yöntemleri

Ölçüm Parametresi	Analiz Yöntemi	Örnekleme
*NO_2 ve SO_2 Analizi	Pasif Analiz Yöntemi (TS EN 13528-1, TS EN 13528-2, TS EN 13528-3, İşletme İçi Metot TA.152)	Pasif örnekleme tüpleri ile örnekleme

*işaretli örneklemeler ENCON Laboratuvarı A.Ş. tarafından yapılmış olup, analizler laboratuvarımızda akreditasyon kapsam dışı yapılmıştır.

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DENEY RAPORU / Test Report

C. ÖLÇÜM SONUÇLARI

Tablo 3: Ölçüm Sonuçları

Ölçüm Noktası	NO_2 (µg/m^3)	SO_2 (µg/m^3)
24.3176	<4,24	<10,27
24.3177	<4,24	<10,27
24.3178	<4,24	24,21
24.3179	<4,24	<10,27
24.3180	<4,24	<10,27

Laboratuar, yetkili personeli tarafından alınmayan ve/veya uygun koşullarda gelmeyen numunelerden, teknik ve hukuki olarak sorumluluk kabul etmemektedir.
Laboratuarımız tarafından alınmayan numunelere ait ölçüm belirsizliği değerleri, numune almadan kaynaklanan belirsizlik değerleri dâhil edilmeden belirtilmiştir.

Mühür
İmza

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T

LR.24.3009

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3009	**Sample Type**	PM 10
Sample Record No	NUM.24.3009	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Serik	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

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ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

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mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T
LR.24.3009
11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 330608/4089427		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12921	0.13081	0.12923	0.12923	16.09.2024	17.09.2024	55.06	29.24

For the samples not taken by the ENCON laboratory Inc., uncertainty values indicated do not cover the uncertainties arising from the sampling.
The Laboratory does not accept technical and legal responsibility for samples that are not sampled by authorized personnel and/or received under inappropriate conditions. The legal responsibility of the information provided by the customer belongs to the customer, our company waives the consequences arising from this information.

Remarks:
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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T

LR.24.3010

11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

Client Name	ENCON Çevre Danışmanlık LTD. ŞTİ.		
Client Address	Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA		
Proposal Number	LT24_0155		
Report Date / No	21.11.2024 / LR.24.3010	**Sample Type**	PM 10
Sample Record No	NUM.24.3010	**Sampling Method**	Gravimetric Method
Project Name / Sampling Location	Antalya-Alanya Motorway Project / Deniz Tepesi	**Environmental Conditions During Sampling**	Sunny
Person Conducted Sampling	Enes AKÇER		
Standard and Resources Applied in Measurement	TS EN 12341	**Time the Final Filter Arrives at Laboratory**	08.10.2024 17:30
Date of Empty Filter Weighing	13.09.2024 12:00	**Date of Final Filter Weighing**	17.10.2024 17:00

Remarks:

ENCON Laboratuvarı A.Ş. is accredited by TÜRKAK under registration number AB-0168-T for TS EN ISO/IEC 17025 as a test laboratory. Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of test reports. The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
21.11.2024		**21.11.2024**

Remarks:
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- (**) Parameters with "**" are conducted at '....., which is holding ISO-17025 accreditation.
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Doküman No	**İlk Yayın Tarihi**	**Revizyon No / Tarihi**	**Sayfa No**
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	1/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK Test TS EN ISO/IEC 17025 AB-0168-T

AB-0168-T | LR.24.3010 | 11-24

PARTICULATE MATTER (PM) ANALYSIS REPORT

	Device Name	Brand / Model	Serial No
Device and Equipment Name Used in Analysis	GC Model Weighing Device	Sartorius/GC	18805603
	PM10 Sampling Device	GmbH MCZ	LVS-1-1203-085
	Temperature and Humidity Data Collector	CEM (DT-172 Model)	9115542
Coordinates of Sampling Location	36 S 334640/4094389		

Empty Weight of Filter	Final Weight of Filter	*Blank first weighing*	*Blank last weighing*	Date of Filter Set	Date of Filter Take Off	Amount of Air Passes (m^3)	PM10 Result ($\mu g/m^3$)
0.12810	0.12916	0.12923	0.12923	17.09.2024	18.09.2024	55.12	19.41

For the samples not taken by the ENCON laboratory Inc., uncertainty values indicated do not cover the uncertainties arising from the sampling.
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Doküman No	İlk Yayın Tarihi	Revizyon No / Tarihi	Sayfa No
ENC.P.14.F.67.C	29.07.2011	12/15.01.2024	2/2

NOISE MEASUREMENTS

PROTOS
KALİBRASYON ÖLÇÜM EĞİTİM VE DANIŞMANLIK HİZMETLERİ TİCARET LTD. ŞTİ.
KALİBRASYON LABORATUVARI
Mehmet Akif Mh. Tavukçuyolu Cd. No: 150/1 Ümraniye İSTANBUL

TÜRKAK Kalibrasyon TS EN ISO/IEC 17025 AB-0078-K

Kalibrasyon Sertifikası
Calibration Certificate

AB-0078-K
08AK0323
03-23

Cihazın Sahibi/ adresi *Customer / address*	**: ANKALAB ÇEVRE ANALİZ LABORATUVARI SAN. TİC. LTD. ŞTİ** Gökkuşağı Mahallesi 1200. Sk. 12/13 Dikmen / Çankaya ANKARA
İstek Numarası *Order No.*	**: 422/2023**
Makine/Cihaz *Instrument/Device*	**: Ses Seviyesi Ölçer**
İmalatçı *Manufacturer*	**: SVANTEK**
Tip *Type*	**: SVAN957**
Seri Numarası *Serial Number*	**: 12366**
Kalibrasyon Tarihi *Date of Calibration*	**: 03.03.2023**
Sertifikanın Sayfa Sayısı *Number of pages of the Certificate*	**: 5**

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde(SI) tanımlanmış birimleri realize eden ulusal ölçüm standardlarına izlenebilirliği belgeler.
This calibration certificate documents the traceabilty to national standards,which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren PROTOS, TÜRKAK'tan AB-0078-K ile TS ISO IEC 17025: 2017 standardına göre akredite edilmiştir.

PROTOS accredited by TÜRKAK under registration number AB-0078-K for TS ISO IEC 17025: 2017 as Calibration Laboratory"

Türk Akreditasyon Kurumu(TÜRKAK) kalibrasyon sertifikalarının tanınırlığı konusunda Avrupa Akreditasyon Birliği(EA) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği(ILAC) ile karşılıklı tanıma anlaşması imzalamıştır.

Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of calibration certificates

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.

The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür/Kaşe *Seal*	**Yayınlandığı Tarih** *Date*	**Kalibrasyonu Yapan** *Calibrated by*	**Onaylayan** *Approval*
PROTOS KALİBRASYON	03.03.2023	e - imzalıdır. Haydar ÖZBEK	***Tarih/ Date*** e - imzalıdır. 2023.03.07 15:14:50 +03'00' Kadir Balcan FIRAT

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
İmzasız sertifikalar geçersizdir.
This certificate shall not be reproduced other than in full except with the permission of the laboratory
Calibration certificates without signature not valid.

KALİBRASYON ÖLÇÜM EĞİTİM VE DANIŞMANLIK HİZMETLERİ TİCARET LTD. ŞTİ. KALİBRASYON LABORATUVARI	AB-0078-K
	08AK0323
	03-23

1. Test Edilen Cihaz

Adı	Üretici	Model / Tip	Seri No	Ölçme aralığı veya Tanımlama
Ses Seviyesi Ölçer	SVANTEK	SVAN957	12366	SINIF:1 Frekans Ağırlığı: A,C,Lin
Ön Yükselteç	SVANTEK	SV12L	24173	Zaman Ağırlığı : Fast, Slow
Mikrofon	ACO	7052E	71251	

2. Kalibrasyonun Yapıldığı Yer : Protos Kalibrasyon Laboratuvarı

3. Cihazın Laboratuvara Kabul Tarihi : 02.03.2023

4. Kalibrasyonda Kullanılan Referans Cihazlar :

Adı	Üretici	Model / Tip	Seri No	İzlenebilirlik
Çok Fonksiyonlu Akustik Kalibratör	B&K	4226	2692346	TUBİTAK-UME-G2AK 0114/19.07.2022

5. Kalibrasyon Prosedürü : PR702.08

Ses düzeyi ölçerin (SLM) A-Ağırlıklı, C-Ağırlıklı ve LIN-Ağırlıklı filtrelerinin 31,5 Hz-16 kHz frekans aralığında tepkileri, doğrusallığı, F:Fast ve S:Slow zaman ağırlıklarının tepkileri ve yarım saatlik çalışmada kararlılığı kontrol edildi.Kalibrasyon sırasında referans cihaz tarafından üretilen ses basınç düzeyi değerleri ortam şartlarına göre düzeltilerek dikkate

6. Çevre Şartları

Sıcaklık: (24,3)°C Bağıl Nem:(42,7)%rh

Basınç: (100,0)kPa

7. Kalibrasyon Sonuçları

Ayar Öncesi Değer : 93,5 **dB**

Ayar Sonrası Değer : 94,1 **dB**

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz. 2/5
İmzasız ve mühürsüz sertifikalar geçersizdir.
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PROTOS

KALİBRASYON ÖLÇÜM EĞİTİM VE DANIŞMANLIK HİZMETLERİ TİCARET LTD. ŞTİ.
KALİBRASYON LABORATUVARI

AB-0078-K
08AK0323
03-23

1. Kalibrasyon Sonuçları

Tablo 1. SLM A-ağırlıklı filtrenin frekans tepkileri sonuçları

Frekans (Hz)	Nominal SPL (dB)	A-ağırlıklı filtrenin karakteristiği (dB)	Hesaplanan SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
31	93,9	-39,4	54,5	54,6	0,1	± 1,5
63	94,0	-26,2	67,8	68,1	0,3	± 1,0
125	94,0	-16,1	77,9	78,1	0,2	± 1,0
250	94,0	-8,6	85,4	85,5	0,1	± 1,0
500	94,0	-3,2	90,8	90,9	0,1	± 1,0
1000	94,0	0,0	94,0	94,1	0,1	± 0,7
2000	94,0	1,2	95,2	95,4	0,2	± 1,0
4000	94,0	1,0	95,0	95,1	0,1	± 1,0
8000	93,9	-1,1	92,8	92,0	-0,8	+1,5;-2,5
12500	93,8	-4,3	89,5	87,6	-1,9	+2,0;-5,0
16000	93,6	-6,6	87,0	85,3	-1,7	+2,5;-16,0

Tablodaki değerler SLM A-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Tablo 2. SLM C-ağırlıklı filtrenin frekans tepkileri sonuçları

Frekans (Hz)	Nominal SPL (dB)	C-ağırlıklı filtrenin karakteristiği (dB)	Hesaplanan SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
31	93,9	-3,0	90,9	91,1	0,2	± 1,5
63	94	-0,8	93,2	93,5	0,3	± 1,0
125	94	-0,2	93,8	94,0	0,2	± 1,0
250	94	0,0	94,0	94,1	0,1	± 1,0
500	94	0,0	94,0	94,1	0,1	± 1,0
1000	94	0,0	94,0	94,1	0,1	± 0,7
2000	94	-0,2	93,8	93,9	0,1	± 1,0
4000	94	-0,8	93,2	93,3	0,1	± 1,0
8000	93,9	-3,0	90,9	90,1	-0,8	+1,5;-2,5
12500	93,8	-6,2	87,6	86,9	-0,7	+2,0;-5,0
16000	93,6	-8,5	85,1	85,0	-0,1	+2,5;-16,0

Tablodaki değerler SLM C-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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Tablo 3. SLM Lin-ağırlıklı filtrenin frekans tepkileri sonuçları

Frekans (Hz)	Nominal SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
31	93,9	94,1	0,2	± 1,5
63	94	94,1	0,1	± 1,0
125	94	94,1	0,1	± 1,0
250	94	94,1	0,1	± 1,0
500	94	94,1	0,1	± 1,0
1000	94	94,1	0,1	± 0,7
2000	94	94,1	0,1	± 1,0
4000	94	94,0	0,0	± 1,0
8000	93,9	93,8	-0,1	+1,5;-2,5
12500	93,8	93,5	-0,3	+2,0;-5,0
16000	93,6	93,0	-0,6	+2,5;-16,0

Tablodaki değerler SLM Lin-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Tablo 4. SLM 1 kHz'deki doğrusallık kontrolü sonuçları

Frekans (Hz)	Uygulanan		Ölçülen		Tepki Farkı (dB)	Tolerans
	SPL (dB)	Seviye	SPL (dB)	Seviye		
1000	94,0	0,0	94,1	0,0	0,0	±0,3
	104,0	10,0	104,1	10,0	0,0	
	114,0	20,0	114,1	20,0	0,0	

Tablodaki değerler SLM A-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Tablo 5. SLM Zaman Ağırlıklı filtrelerinin Hızlı(Fast) ve Yavaş(Slow) Kontrolü Sonuçları

Frekans (Hz)	Hızlı			
	Nominal SPL (dB)	Olçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
1000	105,0	105,0	0,0	±0,5
2000	105,0	105,1	0,1	
4000	105,0	105,1	0,1	
Frekans (Hz)	Yavaş			
	Nominal SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
1000	101,9	102,0	0,1	±0,5
2000	101,9	102,1	0,2	
4000	101,9	102,1	0,2	

Tablodaki değerler SLM A-ağırlıklı filtre modunda iken elde edilmiştir.

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.

İmzasız ve mühürsüz sertifikalar geçersizdir.
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Tablo 6. SLM Yarım saatlik çalışmasında okunan değerdeki en büyük sapma sonuçları

İlk Değer SPL (dB)	Son Değer SPL (dB)	En büyük sapma * (dB)	Toleranı (dB)
94,1	94,1	0,0	± 0,3

*En büyük sapma, ölçülen değerdeki yarım saatlik okuma süresi boyunca olan değişimdir.
Tablodaki değerler SLM A-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

8. Ölçüm Belirsizliği
Ses düzeyi ölçerin kalibrasyonundaki belirsizlik 0,2 dB'dir.
Beyan edilen genişletilmiş ölçüm belirsizliği, standart belirsizliğin k=2 olarak alınan genişletme katsayısı ile çarpımı sonucunda bulunan değerdir ve %95 oranında güvenilirlik sağlamaktadır.

9. Görüşler, Açıklamalar
Kalibrasyon sonuçları sadece kalibrasyonu yapılan ses düzeyi ölçer cihazına aittir. Cihazın performansı için gerekli çevre şartlarında kullanımından ve uygun aralıklarla kalibrasyonunun sağlanmasından kullanıcı sorumludur.

10. Ölçüm Sonuçlarının Şartnamelere veya Standartlara Uygunluk Beyanı
Ölçüm sonuçları IEC 61672-1 standartında 1.Sınıf Ses Düzeyi Ölçerler için verilen toleranslarla karşılaştırılmıştır. Herhangi bir uygunluk beyanı talebi bulunmamaktadır.

11. Karar Kuralı
Karar kuralı yoktur.

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
İmzasız ve mühürsüz sertifikalar geçersizdir.
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ANKALAB ÇEVRE ANALİZ LABORATUVARI
ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMANLIK SAN. ve TİC. LTD. ŞTİ.
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e-mail: info@ankalab.com.tr

TÜRKAK Test TS EN ISO/IEC 17025 AB-0415-T

AB-0415-T
R-2024-146-00
11/24

MÜŞTERİNİN ADI/ADRESİ:	ENCON LABORATUVARI A.Ş /MUTLUKENT MAH: ULUIRMAK SK. NO: 23/1 ÇANKAYA/ANKARA
TEKLİF NUMARASI:	T-2024-1984-00
NUMUNENİN ADI VE TARİFİ:	ÇEVRESEL GÜRÜLTÜ SEVİYESİ ÖLÇÜMÜ
NUMUNENİN KABUL TARİHİ:	-
AÇIKLAMALAR:	AKUSTİK RAPOR
DENEYİN YAPILDIĞI TARİH:	16-18.09.2024, 21-22.09.2024
RAPORUN SAYFA SAYISI-NÜSHA ADEDİ	24 SAYFA (EKLER DAHİL)-2 NÜSHA

Ankalab Çevre Analiz Laboratuvarı, TÜRKAK' tan AB-0415-T Dosya numarası ile, TS EN ISO/IEC 17025:2017 Standardına göre akredite edilmiştir. Türk Akreditasyon Kurumu (TÜRKAK) deney raporlarının tanınırlığı konusunda Avrupa Akreditasyon Birliği (EA) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile Karşılıklı Tanıma Anlaşması İmzalamıştır.

Deney ve /veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri (olması halinde) ve deney metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.

Mühür/Kaşe	Yayım tarihi	Deney Sorumlusu	Raporu Yazan Personel	Onaylayan
	11/11/2024	Soner GÜLCAN Kimya Mühendisi	Mustafa AYTEN Kimyager	Soner GÜLCAN Kimya Mühendisi (11/11/2024)

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş** 'ye ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mührsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır.
*Bu rapor çevre mevzuatı kapsamında herhangi bir resmi işlemde kullanılamaz.

FR 66 REV 04 01.01.2023

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ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMANLIK SAN. ve TİC. LTD. ŞTİ.
Adres: Ata Mah.1069.Sk No:3/1 Çankaya/ANKARA
Tel: 0 312 472 66 64 Fax: 0 312 473 62 15
e-mail: info@ankalab.com.tr

AB-0415-T
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Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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1. GENEL BİLGİLER

Antalya-Alanya Otoyol Projesi için ENCON Laboratuvarı A.Ş için 16-18.09.2024 ve 21-22.09.2024 tarihlerinde 21 noktada gerçekleştirilen gündüz akşam gece çevresel gürültü ölçüm sonuçlarını içeren rapordur.

2. ÖLÇÜM NOKTALARI

Ölçüm koordinatları Tabloda bilginize sunulmuştur.

SIRA	NOKTA ADI	Koordinat
1	Konaklı	36S 401287/4049717
2	Çakallar	36S 386572/4060940
3	Avsallar	36S 389720/4055765
4	Akdam	36S 393414/4055623
5	Emişbeleni	36S 399364/4055198
6	Karakaya	36S 385356/4061872
7	Hacıobası	36S 373104/4065985
8	Uzunlar	36S 376876/4066570
9	Sülek	36S 371900/4068786
10	Sağırin	36S 341974/4097230
11	Sarıabalı	36S 337884/4093014
12	Sarılar	36S 360448/4076493
13	Bucakşeyhler	36S 363395/4078780
14	Kalemler	36S 353691/4080989
15	Köprüçay	36S 339819/409532
16	Bademliyar	36S 389655/4072729
17	Ulukapı	36S 365551/4075913
18	Taşağıl	36S 343526/4087476
19	Hacıali	36S 370544/4070725
20	Deniz Tepesi	36S 334640/4094389

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21	Serik	36S 330608/4089427

3. ÖLÇÜM YÖNTEMLERİ, STANDARTLAR

Ölçüm koordinatları Tabloda bilginize sunulmuştur.

Ölçümlerde TS 9315 ISO 1996-1 Akustik – Çevre gürültüsünün tarifi, ölçülmesi ve değerlendirilmesi - Bölüm 1: Temel büyüklükler ve değerlendirme işlemleri ve TS ISO 1996-2 Akustik - Çevre gürültüsünün tarifi, ölçülmesi ve değerlendirilmesi - Bölüm 2: Çevre gürültü seviyelerinin tayini standartları kullanılmıştır. Ölçüm cihazı olarak Svantek Marka Svan957 Svantek958 marka cihaz kullanılmıştır. 1/3 Oktav Bandta, A, C ve Z ağırlıklandırılmalarda ölçümler yapılmıştır.

4. YÖNETMELİK SINIR DEĞERLER

4.1. ÇEVRESEL GÜRÜLTÜNÜN DEĞERLENDİRİLMESİ VE YÖNETİMİ YÖNETMELİĞİ

Gürültü Kaynağı	Ölçülen Parametre	Çevresel Gürültü Düzeyi		
		Gündüz (07:00-19:00)	Akşam (19:00-23:00)	Gece (23:00-07:00)
Endüstri tesisleri, ulaşım kaynakları	$LA_{eq,5min.}$	65 dB(A)	60 dB(A)	55 dB(A)
Müzik yayını yapan işyerleri (1)	$LA_{eq\ 63\text{-}250\ Hz}$	60 dB(A)	55 dB(A)	50 dB(A)
İşyerleri (2)	$LA_{eq,5min.}$	Arka plan + 5 dB(A)		Arka plan + 3 dB(A)
Birden çok işyeri olması halinde (3)	$LA_{eq,5min.}$	Arka plan + 7 dB(A)		Arka plan + 5 dB(A)

4.2. INTERNATIONAL FINANCE CORPORATION (IFC)

Gürültü Kaynağı	Ölçülen Parametre	Gündüz (07:00-22:00)	Gece (22:00-07:00))
Konut, kurumlar, eğitim	$LA_{eq.}$	55 dB(A)	45 dB(A)
Endüstri tesisleri, iş yerleri	LA_{eq}	70 dB(A)	70 dB(A)

Bu ölçüm raporu ENCON LABORATUVARI A.Ş'ye ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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5. ÖLÇÜM SONUÇLARI

5.1. HAFTA İÇİ GÜNDÜZ AKŞAM GECE ÖLÇÜMLERİ

SIRA	NOKTA ADI	Tarih	Gündüz (Leq)	Akşam (Leq)	Gece (Leq)
1	Konaklı	17-18/09/2024	56.3	52.4	51.6
2	Çakallar	17-18/09/2024	58.3	56.5	41.9
3	Avsallar	17-18/09/2024	57.2	54.2	53.9
4	Akdam	17-18/09/2024	64.4	62.3	61.5
5	Emişbeleni	17-18/09/2024	59.8	59	52.2
6	Karakaya	17-18/09/2024	68.7	66.2	62.7
7	Hacıobası	17-18/09/2024	55.9	50.3	50.2
8	Uzunlar	17-18/09/2024	62.9	60.6	60.1
9	Sülek	17-18/09/2024	57.9	50.5	50
10	Sağırin	17-18/09/2024	70.7	64.6	64.3
11	Sarıabalı	16-17/09/2024	62.4	56.2	53.6
12	Sarılar	16-17/09/2024	65.5	63.7	62
13	Bucakşeyhler	16-17/09/2024	70.3	56.3	55
14	Kalemler	16-17/09/2024	57.6	52.7	45.7
15	Köprüçay	16-17/09/2024	63.9	58.6	58.5
16	Bademliyar	16-17/09/2024	71.8	56.9	55.5
17	Ulukapı	16-17/09/2024	60.2	59.8	59.4
18	Taşağıl	16-17/09/2024	79.1	68.5	56.4
19	Hacıali	16-17/09/2024	73.1	45.6	43.9
20	Deniz Tepesi	16-17/09/2024	63.9	55.2	54.8
21	Serik	16-17/09/2024	69.3	59.6	58.3

Bu ölçüm raporu ENCON LABORATUVARI A.Ş'ye ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mührsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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5.2. HAFTA İÇI - IFC GÜNDÜZ GECE ÖLÇÜMLERI

SIRA	NOKTA ADI	Tarih	Gündüz (Leq)	Gece (Leq)
1	Konaklı	17-18/09/2024	55.6	51.4
2	Çakallar	17-18/09/2024	57.9	48.7
3	Avsallar	17-18/09/2024	56.8	53.6
4	Akdam	17-18/09/2024	63.8	62.1
5	Emişbeleni	17-18/09/2024	59.8	52.2
6	Karakaya	17-18/09/2024	68.5	62.4
7	Hacıobası	17-18/09/2024	55.3	50.2
8	Uzunlar	17-18/09/2024	62.6	59.8
9	Sülek	17-18/09/2024	57.2	49.8
10	Sağırin	17-18/09/2024	70.1	64
11	Sarıabalı	16-17/09/2024	61.5	53.2
12	Sarılar	16-17/09/2024	65.1	62.5
13	Bucakşeyhler	16-17/09/2024	69.3	55.6
14	Kalemler	16-17/09/2024	57.1	45.6
15	Köprüçay	16-17/09/2024	63.2	58.8
16	Bademliyar	16-17/09/2024	70.9	55.3
17	Ulukapı	16-17/09/2024	60.4	59
18	Taşağıl	16-17/09/2024	78.3	56.5
19	Hacıali	16-17/09/2024	72.2	43.5
20	Deniz Tepesi	16-17/09/2024	63.1	54.8
21	Serik	16-17/09/2024	68.4	58.3

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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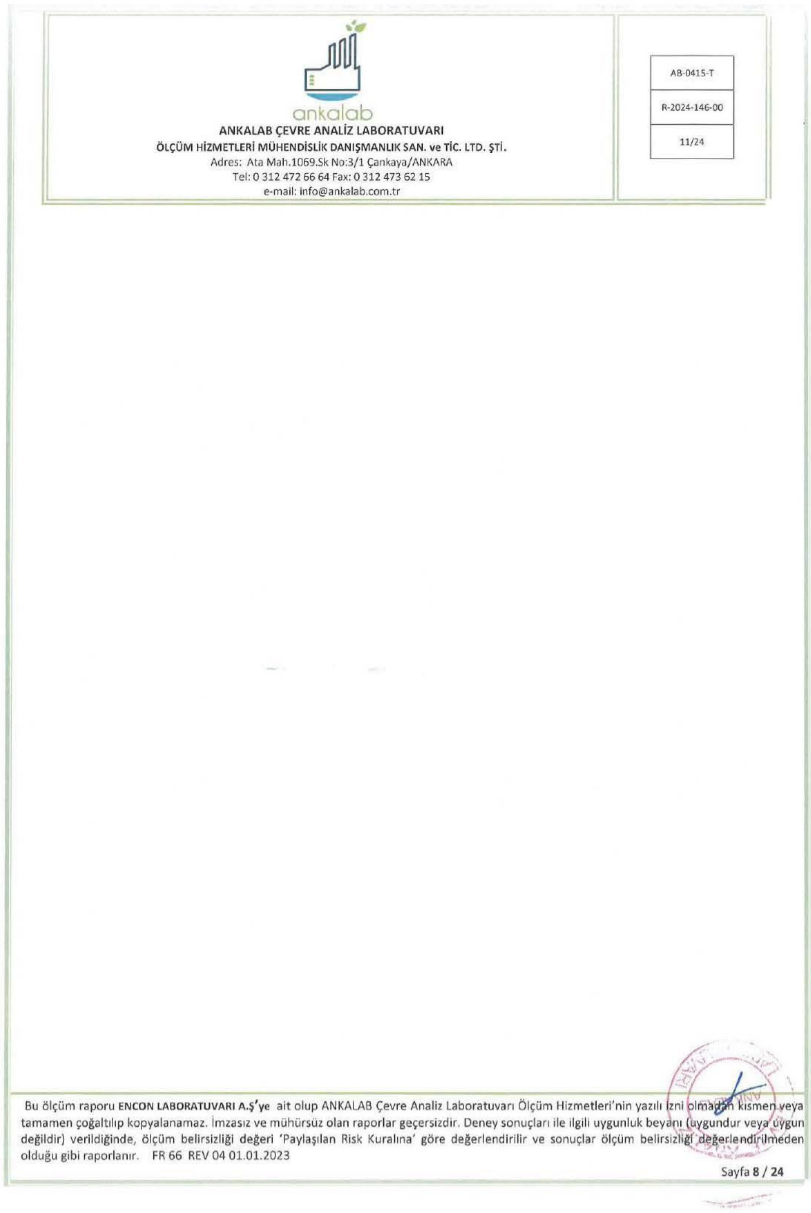
5.3. HAFTA SONU GÜNDÜZ AKŞAM GECE ÖLÇÜMLERI

SIRA	NOKTA ADI	Tarih	Gündüz (Leq)	Akşam (Leq)	Gece (Leq)
1	Konaklı	21-22/09/2024	64.4	63	60.4
2	Çakallar	21-22/09/2024	62.2	62.7	60.7
3	Avsallar	21-22/09/2024	61.6	61.5	55.4
4	Akdam	21-22/09/2024	62.1	60.2	57.4
5	Emişbeleni	21-22/09/2024	71.6	69.5	66.7
6	Karakaya	21-22/09/2024	73	72.8	63.8
7	Hacıobası	21-22/09/2024	61.2	60.2	43.9
8	Uzunlar	21-22/09/2024	74.5	62.3	53.5
9	Sülek	21-22/09/2024	68.6	66.8	62.4
10	Sağırın	21-22/09/2024	67.6	67	66
11	Sarıabalı	21-22/09/2024	61.9	55.7	55.6
12	Sarılar	21-22/09/2024	63.1	63	59
13	Bucakşeyhler	21-22/09/2024	65.7	64.3	58.7
14	Kalemler	21-22/09/2024	66	61.7	60.8
15	Köprüçay	21-22/09/2024	64	62.9	62.8
16	Bademliyar	21-22/09/2024	63.3	61.7	61.6
17	Ulukapı	21-22/09/2024	62.7	57.9	54.9
18	Taşağıl	21-22/09/2024	68.8	65.5	65.3
19	Hacıali	21-22/09/2024	68.5	67.2	66
20	Deniz Tepesi	21-22/09/2024	67	61.1	57.8
21	Serik	21-22/09/2024	66.6	62.2	60.3

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023



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Sayfa **8 / 24**

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5.4. HAFTA SONU - IFC GÜNDÜZ GECE ÖLÇÜMLERI

SIRA	NOKTA ADI	Tarih	Gündüz (Leq)	Gece (Leq)
1	Konaklı	21-22/09/2024	64.3	60.2
2	Çakallar	21-22/09/2024	61.9	61.7
3	Avsallar	21-22/09/2024	61.9	54.9
4	Akdam	21-22/09/2024	62	56.9
5	Emişbeleni	21-22/09/2024	71.3	66.6
6	Karakaya	21-22/09/2024	73.2	63.6
7	Hacıobası	21-22/09/2024	61.2	47.6
8	Uzunlar	21-22/09/2024	73.6	54.3
9	Sülek	21-22/09/2024	68.2	63.5
10	Sağırin	21-22/09/2024	67.3	66.5
11	Sarıabalı	21-22/09/2024	61.2	55.5
12	Sarılar	21-22/09/2024	63.2	59.3
13	Bucakşeyhler	21-22/09/2024	65.5	59.3
14	Kalemler	21-22/09/2024	65.5	60.6
15	Köprüçay	21-22/09/2024	64	62.4
16	Bademliyar	21-22/09/2024	63.2	61.2
17	Ulukapı	21-22/09/2024	62.1	55
18	Taşağıl	21-22/09/2024	68.4	65.1
19	Hacıali	21-22/09/2024	68.4	65.9
20	Deniz Tepesi	21-22/09/2024	66.3	57.4
21	Serik	21-22/09/2024	66.1	59.9

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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EKLER

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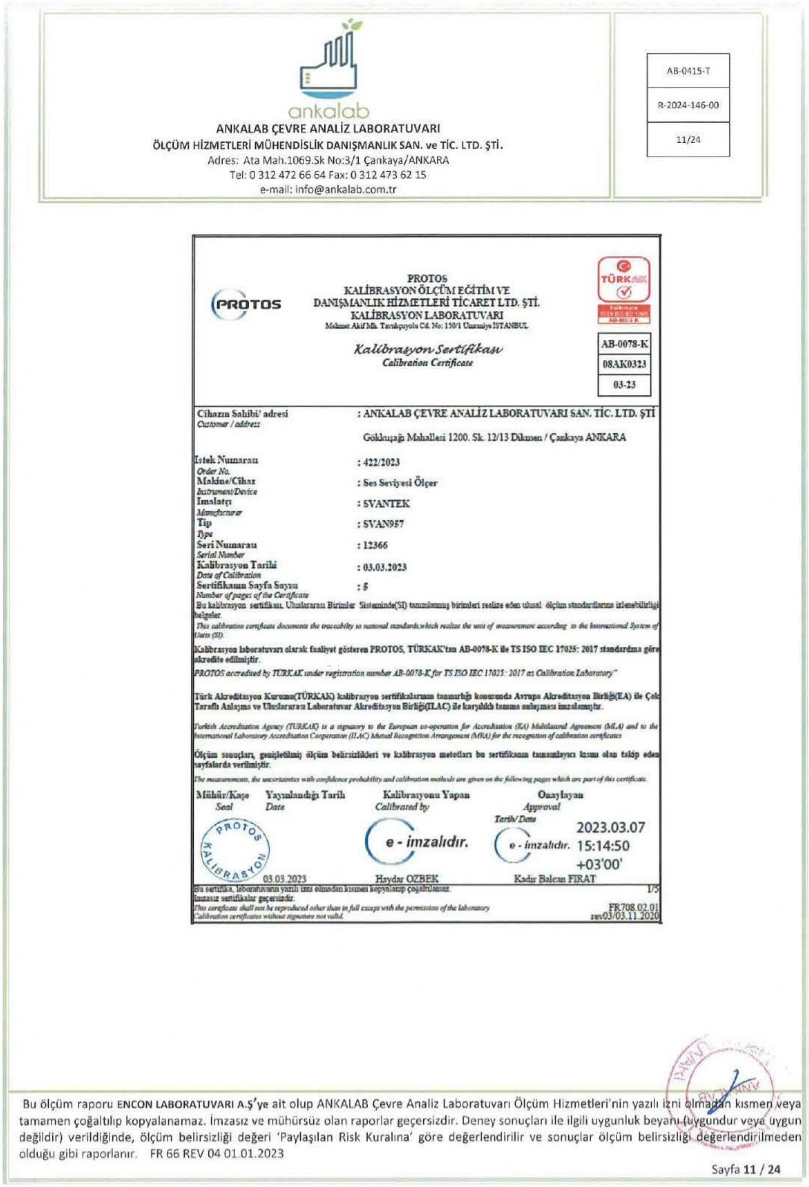

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PROTOS
KALİBRASYON ÖLÇÜM EĞİTİM VE DANIŞMANLIK HİZMETLERİ TİCARET LTD. ŞTİ.
KALİBRASYON LABORATUVARI
Mehmet Akif Mh. Tarakçıyolu Cd. No: 150/1 Üsküdar/İSTANBUL

AB-0078-K
08AK0323
03-23

Kalibrasyon Sertifikası
Calibration Certificate

Cihazın Sahibi' adresi / Customer / address	: ANKALAB ÇEVRE ANALİZ LABORATUVARI SAN. TİC. LTD. ŞTİ Göklüçağlı Mahalleri 1200. Sk. 12/13 Dikmen / Çankaya ANKARA
İstek Numarası / Order No.	: 422/2023
Malzeme/Cihaz / Instrument/Device	: Ses Seviyesi Ölçer
İmalatçı / Manufacturer	: SVANTEK
Tip / Type	: SVAN957
Seri Numarası / Serial Number	: 12366
Kalibrasyon Tarihi / Date of Calibration	: 03.03.2023
Sertifikanın Sayfa Sayısı / Number of pages of the Certificate	: 5

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde(SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.
This calibration certificate documents the traceability to national standards,which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren PROTOS, TÜRKAK'tan AB-0078-K ile TS ISO IEC 17025: 2017 standardına göre akredite edilmiştir.
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Türk Akreditasyon Kurumu(TÜRKAK) kalibrasyon sertifikalarının tanınırlığı konusunda Avrupa Akreditasyon Birliği(EA) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği(ILAC) ile karşılıklı tanıma anlaşması imzalamıştır.
Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of calibration certificates

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.
The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür/Kaşe / Seal	Yayınlandığı Tarih / Date	Kalibrasyonu Yapan / Calibrated by	Onaylayan / Approval
PROTOS KALİBRASYON	03.03.2023	e - imzalıdır. Haydar OZBEK	Tarih/Date e - imzalıdır. 2023.03.07 15:14:50 +03'00' Kadir Bülent FIRAT

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz. 1/5
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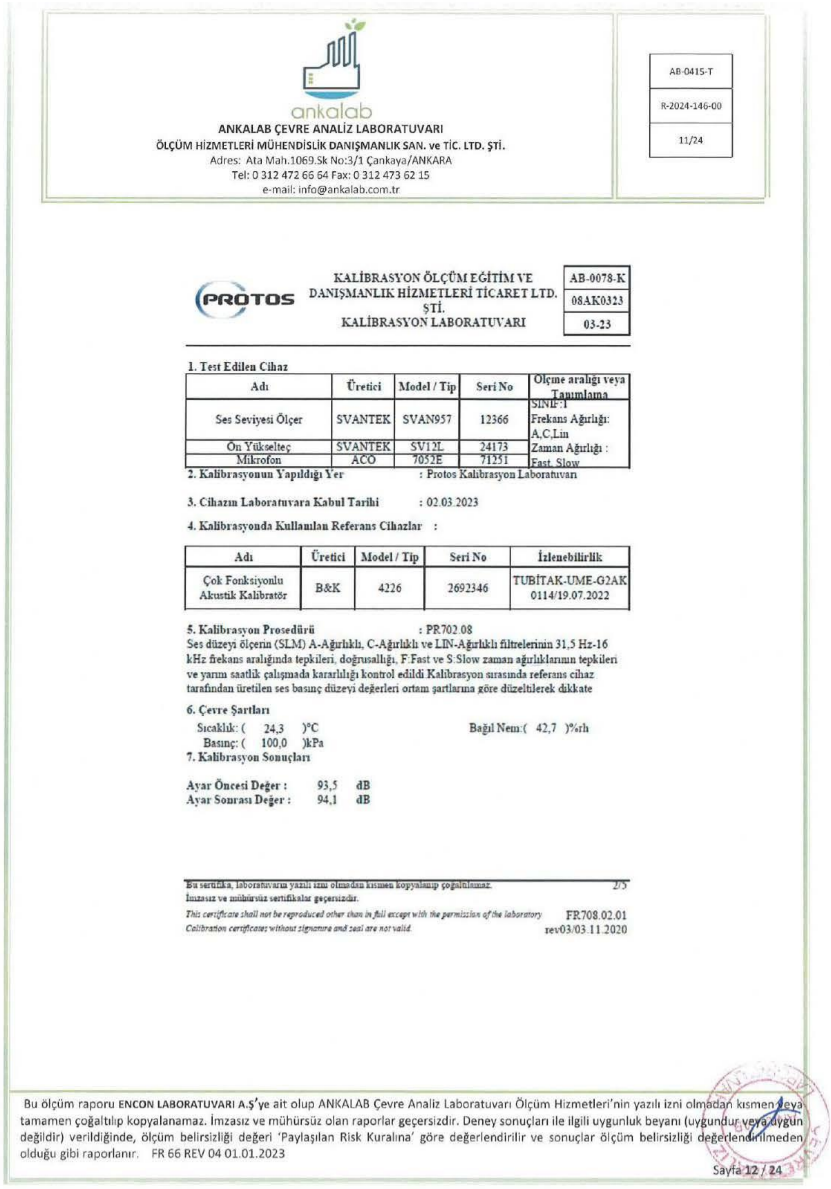

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PROTOS

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1. Test Edilen Cihaz

Adı	Üretici	Model / Tip	Seri No	Ölçme aralığı veya Tanımlama
Ses Seviyesi Ölçer	SVANTEK	SVAN957	12366	SINIF-1 Frekans Ağırlığı: A,C,Lin
Ön Yükselteç	SVANTEK	SV12L	24173	Zaman Ağırlığı :
Mikrofon	ACO	7052E	71251	Fast, Slow

2. Kalibrasyonun Yapıldığı Yer : Protos Kalibrasyon Laboratuvarı

3. Cihazın Laboratuvara Kabul Tarihi : 02.03.2023

4. Kalibrasyonda Kullanılan Referans Cihazlar :

Adı	Üretici	Model / Tip	Seri No	İzlenebilirlik
Çok Fonksiyonlu Akustik Kalibratör	B&K	4226	2692346	TUBİTAK-UME-G2AK 0114/19.07.2022

5. Kalibrasyon Prosedürü : PR.702.08
Ses düzeyi ölçerin (SLM) A-Ağırlıklı, C-Ağırlıklı ve LIN-Ağırlıklı filtrelerinin 31,5 Hz-16 kHz frekans aralığında tepkileri, doğrusallığı, F.Fast ve S.Slow zaman ağırlıklarının tepkileri ve yarım saatlik çalışmada kararlılığı kontrol edildi Kalibrasyon sırasında referans cihaz tarafından üretilen ses basınç düzeyi değerleri ortam şartlarına göre düzeltilerek dikkate

6. Çevre Şartları
Sıcaklık: (24,3)°C Bağıl Nem:(42,7)%rh
Basınç: (100,0)kPa

7. Kalibrasyon Sonuçları

Ayar Öncesi Değer : 93,5 dB
Ayar Sonrası Değer : 94,1 dB

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz. 2/5
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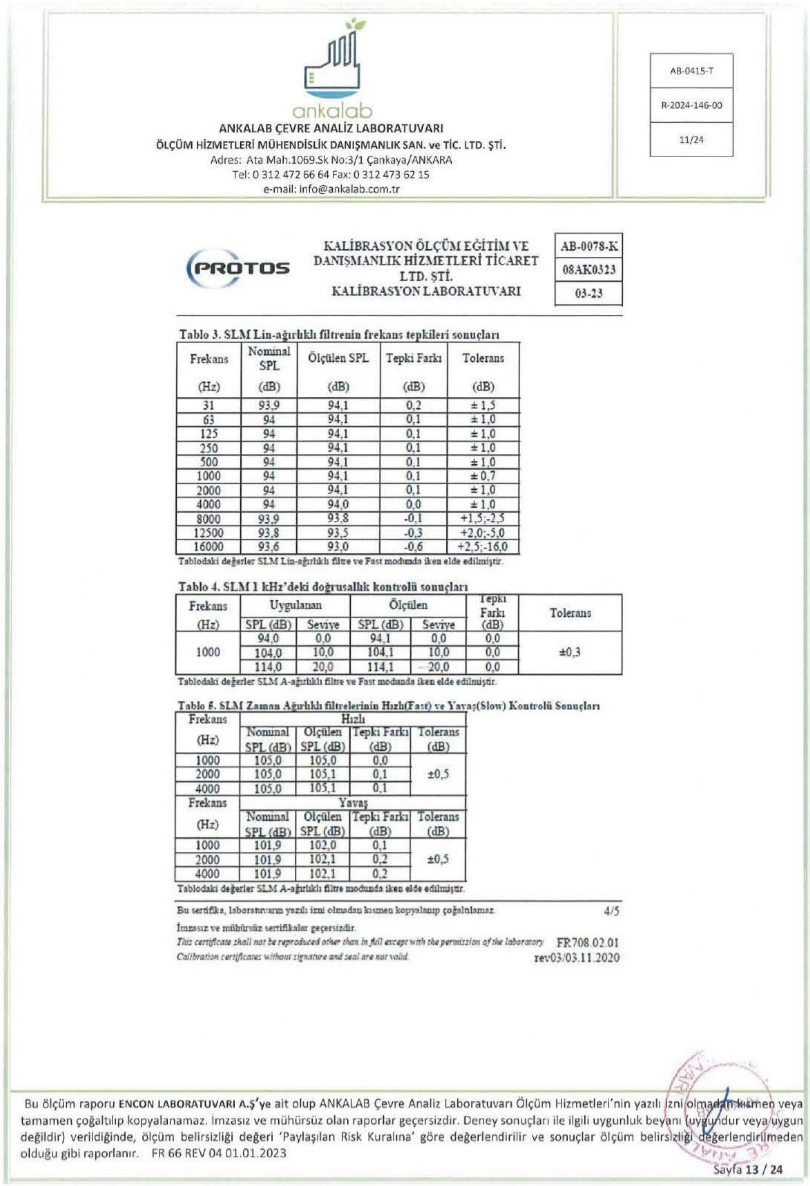

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Tablo 3. SLM Lin-ağırlıklı filtrenin frekans tepkileri sonuçları

Frekans (Hz)	Nominal SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
31	93,9	94,1	0,2	± 1,5
63	94	94,1	0,1	± 1,0
125	94	94,1	0,1	± 1,0
250	94	94,1	0,1	± 1,0
500	94	94,1	0,1	± 1,0
1000	94	94,1	0,1	± 0,7
2000	94	94,1	0,1	± 1,0
4000	94	94,0	0,0	± 1,0
8000	93,9	93,8	-0,1	+1,5;-2,5
12500	93,8	93,5	-0,3	+2,0;-5,0
16000	93,6	93,0	-0,6	+2,5;-16,0

Tablodaki değerler SLM Lin-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Tablo 4. SLM 1 kHz'deki doğrusallık kontrolü sonuçları

Frekans (Hz)	Uygulanan		Ölçülen		Tepki Farkı (dB)	Tolerans
	SPL (dB)	Seviye	SPL (dB)	Seviye		
1000	94,0	0,0	94,1	0,0	0,0	±0,3
	104,0	10,0	104,1	10,0	0,0	
	114,0	20,0	114,1	20,0	0,0	

Tablodaki değerler SLM A-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Tablo 5. SLM Zaman Ağırlıklı filtrelerinin Hızlı(Fast) ve Yavaş(Slow) Kontrolü Sonuçları

Frekans (Hz)	Hızlı			
	Nominal SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
1000	105,0	105,0	0,0	±0,5
2000	105,0	105,1	0,1	
4000	105,0	105,1	0,1	
Frekans (Hz)	Yavaş			
	Nominal SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
1000	101,9	102,0	0,1	±0,5
2000	101,9	102,1	0,2	
4000	101,9	102,1	0,2	

Tablodaki değerler SLM A-ağırlıklı filtre modunda iken elde edilmiştir.

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz. 4/5
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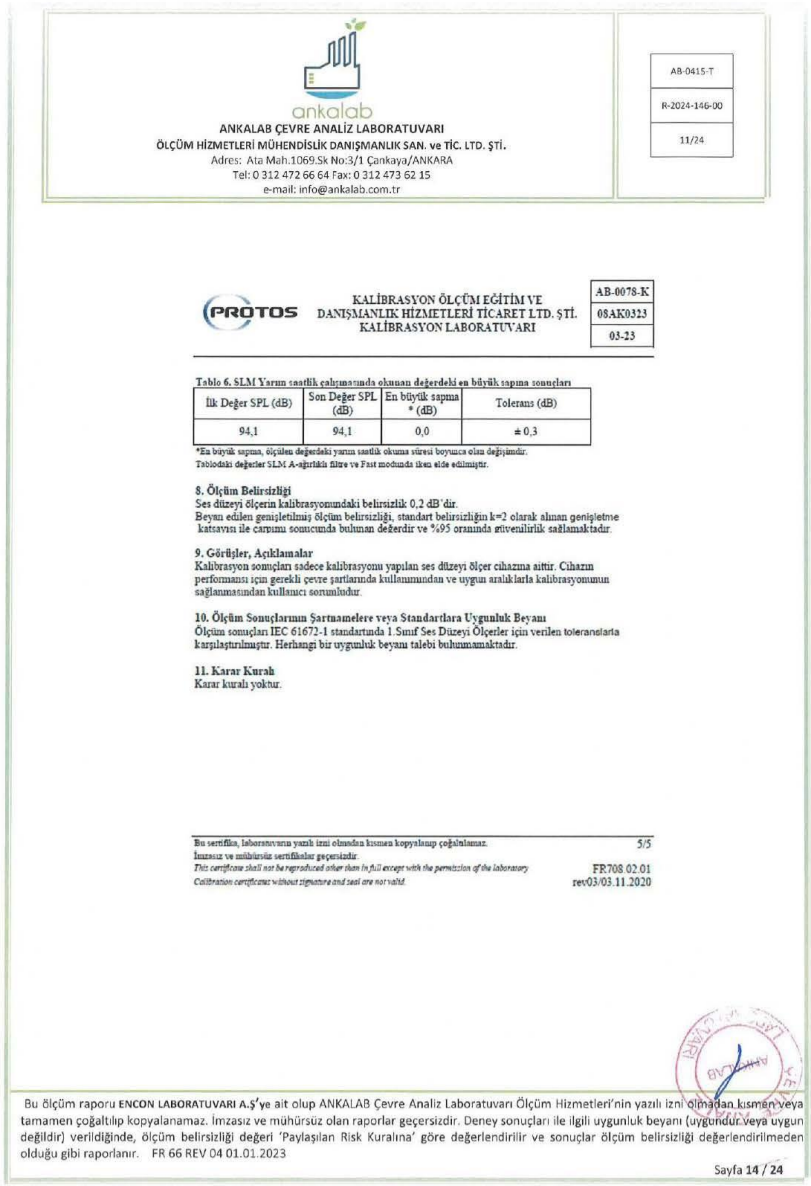

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Tablo 6. SLM Yarım saatlik çalışmasında okunan değerdeki en büyük sapma sonuçları

İlk Değer SPL (dB)	Son Değer SPL (dB)	En büyük sapma * (dB)	Tolerans (dB)
94,1	94,1	0,0	± 0,3

*En büyük sapma, ölçülen değerdeki yarım saatlik okuma süresi boyunca olan değişimdir.
Tablodaki değerler SLM A-ağırlıklı filtre ve Fast modunda tkeu elde edilmiştir.

8. Ölçüm Belirsizliği
Ses düzeyi ölçerin kalibrasyonundaki belirsizlik 0,2 dB'dir.
Beyanı edilen genişletilmiş ölçüm belirsizliği, standart belirsizliğin k=2 olarak alınan genişletme katsayısı ile çarpımı sonucunda bulunan değerdir ve %95 oranında güvenilirlik sağlamaktadır.

9. Görüşler, Açıklamalar
Kalibrasyon sonuçları sadece kalibrasyonu yapılan ses düzeyi ölçer cihazına aittir. Cihazın performansı için gerekli çevre şartlarında kullanımından ve uygun aralıklarla kalibrasyonunun sağlanmasından kullanıcı sorumludur.

10. Ölçüm Sonuçlarının Şartnamelere veya Standartlara Uygunluk Beyanı
Ölçüm sonuçları IEC 61672-1 standartında 1.Sınıf Ses Düzeyi Ölçerler için verilen toleranslarla karşılaştırılmıştır. Herhangi bir uygunluk beyanı talebi bulunmamaktadır.

11. Karar Kuralı
Karar kuralı yoktur.

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz. 5/5
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AB-0089-K
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KALİBRASYON SERTİFİKASI
Calibration Certificate

Cihazın Sahibi Customer Name	:	ANKALAB ÇEVRE ANALİZ LABORATUVARI LTD. ŞTİ. Ata Mah. 1069. Sok. No: 3/1 ÇANKAYA / ANKARA
İstek Numarası Order No.	:	T-1123-001
Makine / Cihaz Instrument / Device	:	Ses Seviyesi Ölçüm Cihazı / Ön Yükseltici / Mikrofon Sound Level Meter
İmalatçı Manufacturer	:	SVANTEK / SVANTEK / ACO
Tip Type	:	SVAN 958 / SV 12L / 7052E
Seri Numarası Serial number	:	23305 / 24173 / 71251
Kalibrasyon Tarihi Date of calibration	:	10.11.2023
Sertifika Sayfa Sayısı Number of pages	:	5

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.
This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).
Kalibrasyon laboratuvarı olarak faaliyet gösteren AVL Kalibrasyon Laboratuvarı, TÜRKAK'tan AB-0089-K dosya numarası ile TS EN ISO/IEC 17025:2017 standardına göre akredite edilmiştir.
AVL Kalibrasyon Laboratuvarı is accredited by TÜRKAK under registration number AB-0089-K for TS EN ISO/IEC 17025:2017 as test laboratory.
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The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe Seal	Yayım Tarihi Publication Date	Kalibrasyonu Yapan Calibrated By	Onaylayan / Tarih Approved / Date
AVL Kalibrasyon	10.11.2023	Fatma SOLGUNTEKİN Kalibrasyon Personeli Calibration Responsible e-imzalıdır	Younes NEVAYESHİRAZİ / 10.11.2023 Laboratuvar Müdürü Laboratory Manager e-imzalıdır

Bu sertifika 5070 sayılı kanuna göre güvenli elektronik imza ile imzalanmıştır. Belge teyidi için sayfalarda yer alan karekodu okutabilirsiniz.
This certificate is signed using secure digital signature according to article of law, number 5070. For confirmation, read the QR Code using QR Code reader.

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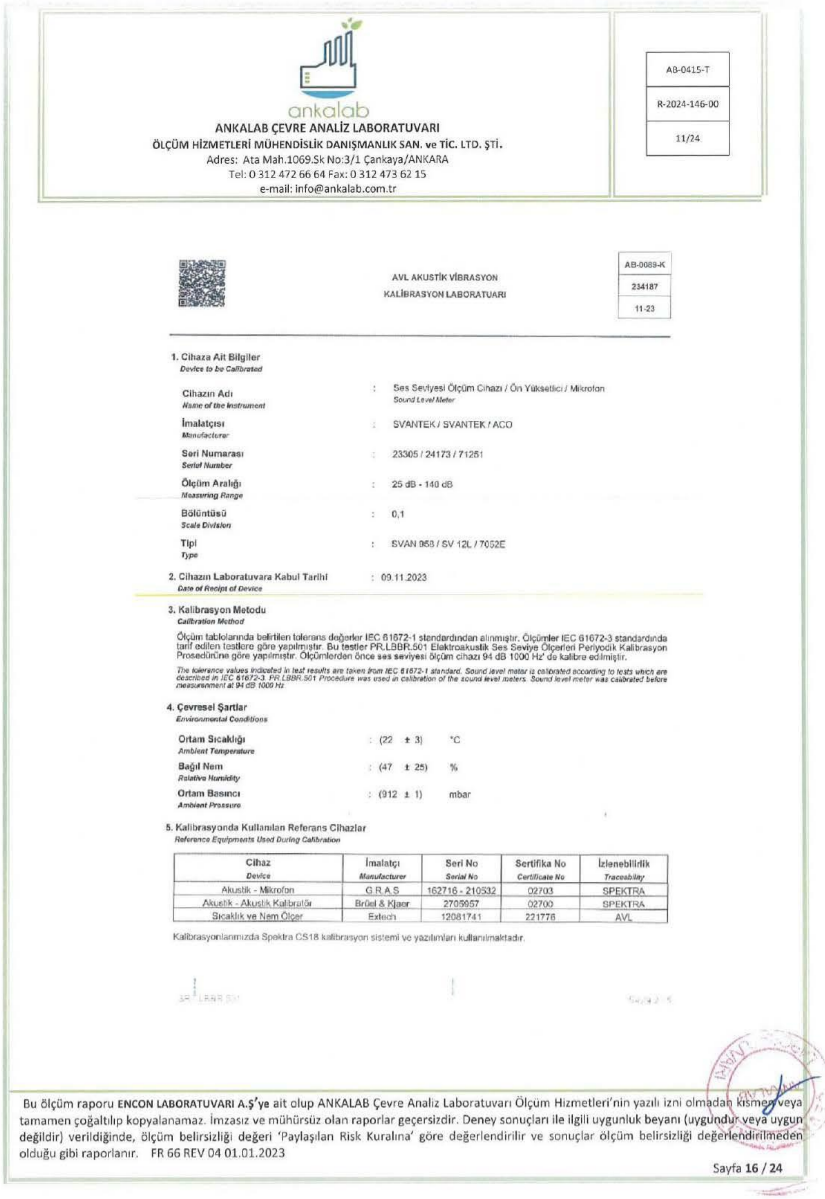

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1. Cihaza Ait Bilgiler
Device to be Calibrated

Cihazın Adı *Name of the Instrument*	:	Ses Seviyesi Ölçüm Cihazı / Ön Yükseltici / Mikrofon *Sound Level Meter*
İmalatçısı *Manufacturer*	:	SVANTEK / SVANTEK / ACO
Seri Numarası *Serial Number*	:	23305 / 24173 / 71251
Ölçüm Aralığı *Measuring Range*	:	25 dB - 140 dB
Bölüntüsü *Scale Division*	:	0,1
Tipi *Type*	:	SVAN 958 / SV 12L / 7052E

2. Cihazın Laboratuvara Kabul Tarihi : 09.11.2023
Date of Receipt of Device

3. Kalibrasyon Metodu
Calibration Method

Ölçüm tablolarında belirtilen tolerans değerler IEC 61672-1 standardından alınmıştır. Ölçümler IEC 61672-3 standardında tarif edilen testlere göre yapılmıştır. Bu testler PR.LBBR.501 Elektroakustik Ses Seviye Ölçerleri Periyodik Kalibrasyon Prosedürüne göre yapılmıştır. Ölçümlerden önce ses seviyesi ölçüm cihazı 94 dB 1000 Hz' de kalibre edilmiştir.

The tolerance values indicated in test results are taken from IEC 61672-1 standard. Sound level meter is calibrated according to tests which are described in IEC 61672-3. PR.LBBR.501 Procedure was used in calibration of the sound level meters. Sound level meter was calibrated before measurement at 94 dB 1000 Hz.

4. Çevresel Şartlar
Environmental Conditions

Ortam Sıcaklığı *Ambient Temperature*	: (22 ± 3)	°C	
Bağıl Nem *Relative Humidity*	: (47 ± 25)	%	
Ortam Basıncı *Ambient Pressure*	: (912 ± 1)	mbar	

5. Kalibrasyonda Kullanılan Referans Cihazlar
Reference Equipments Used During Calibration

Cihaz *Device*	İmalatçı *Manufacturer*	Seri No *Serial No*	Sertifika No *Certificate No*	İzlenebilirlik *Traceability*
Akustik - Mikrofon	G.R.A.S	162716 - 210532	02703	SPEKTRA
Akustik - Akustik Kalibratör	Brüel & Kjaer	2709957	02700	SPEKTRA
Sıcaklık ve Nem Ölçer	Extech	12081741	221776	AVL

Kalibrasyonlarımızda Spektra CS18 kalibrasyon sistemi ve yazılımları kullanılmaktadır.

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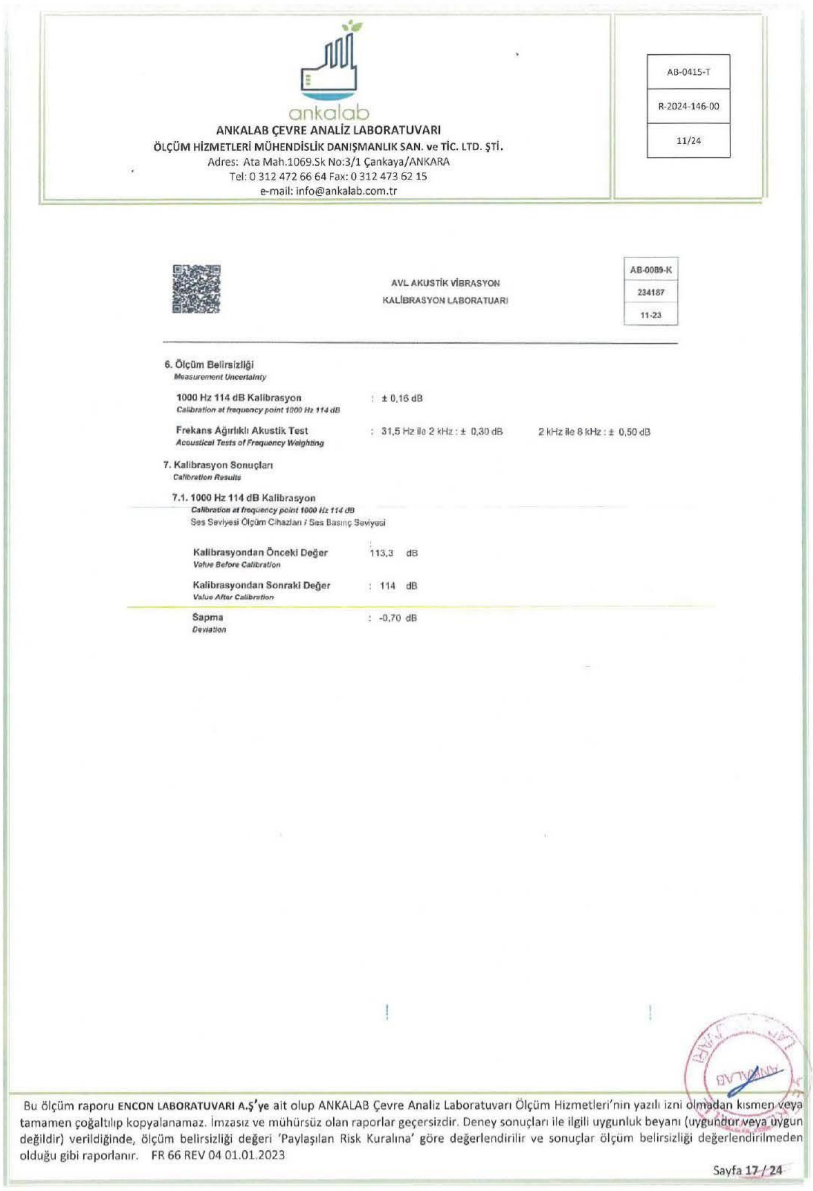

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6. Ölçüm Belirsizliği
Measurement Uncertainty

1000 Hz 114 dB Kalibrasyon : ± 0,16 dB
Calibration at frequency point 1000 Hz 114 dB

Frekans Ağırlıklı Akustik Test : 31,5 Hz ile 2 kHz : ± 0,30 dB 2 kHz ile 8 kHz : ± 0,50 dB
Acoustical Tests of Frequency Weighting

7. Kalibrasyon Sonuçları
Calibration Results

7.1. 1000 Hz 114 dB Kalibrasyon
Calibration at frequency point 1000 Hz 114 dB
Ses Seviyesi Ölçüm Cihazları / Ses Basınç Seviyesi

Kalibrasyondan Önceki Değer *Value Before Calibration*	113,3	dB
Kalibrasyondan Sonraki Değer *Value After Calibration*	: 114	dB
Sapma *Deviation*	: -0,70	dB

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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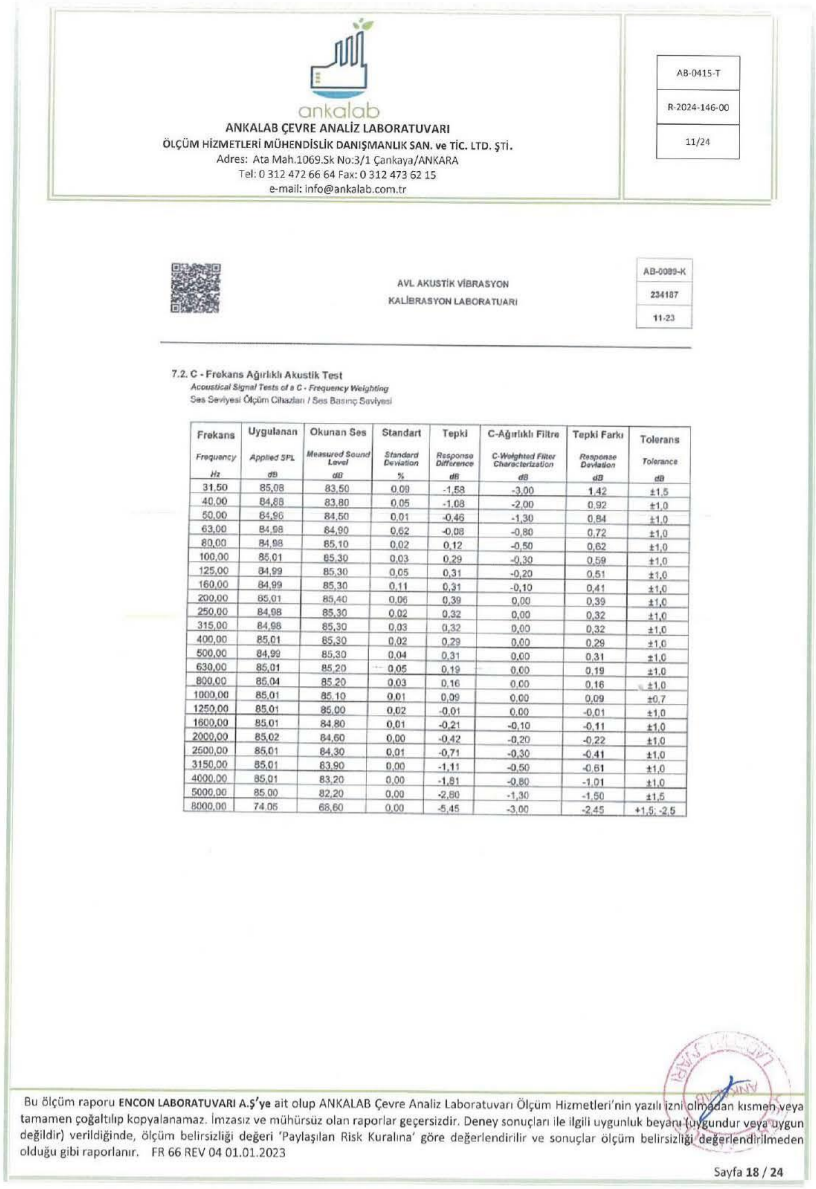

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7.2. C - Frekans Ağırlıklı Akustik Test
Acoustical Signal Tests of a C - Frequency Weighting
Ses Seviyesi Ölçüm Cihazları / Ses Basınç Seviyesi

Frekans *Frequency* Hz	Uygulanan *Applied SPL* dB	Okunan Ses *Measured Sound Level* dB	Standart *Standard Deviation* %	Tepki *Response Difference* dB	C-Ağırlıklı Filtre *C-Weighted Filter Characterization* dB	Tepki Farkı *Response Deviation* dB	Tolerans *Tolerance* dB
31,50	85,08	83,50	0,00	-1,58	-3,00	1,42	±1,5
40,00	84,88	83,80	0,05	-1,08	-2,00	0,92	±1,0
50,00	84,96	84,50	0,01	-0,46	-1,30	0,84	±1,0
63,00	84,98	84,90	0,62	-0,08	-0,80	0,72	±1,0
80,00	84,98	85,10	0,02	0,12	-0,50	0,62	±1,0
100,00	85,01	85,30	0,03	0,29	-0,30	0,59	±1,0
125,00	84,99	85,30	0,05	0,31	-0,20	0,51	±1,0
160,00	84,99	85,30	0,11	0,31	-0,10	0,41	±1,0
200,00	85,01	85,40	0,06	0,39	0,00	0,39	±1,0
250,00	84,98	85,30	0,02	0,32	0,00	0,32	±1,0
315,00	84,98	85,30	0,03	0,32	0,00	0,32	±1,0
400,00	85,01	85,30	0,02	0,29	0,00	0,29	±1,0
500,00	84,99	85,30	0,04	0,31	0,00	0,31	±1,0
630,00	85,01	85,20	0,05	0,19	0,00	0,19	±1,0
800,00	85,04	85,20	0,03	0,16	0,00	0,16	±1,0
1000,00	85,01	85,10	0,01	0,09	0,00	0,09	±0,7
1250,00	85,01	85,00	0,02	-0,01	0,00	-0,01	±1,0
1600,00	85,01	84,80	0,01	-0,21	-0,10	-0,11	±1,0
2000,00	85,02	84,60	0,00	-0,42	-0,20	-0,22	±1,0
2500,00	85,01	84,30	0,01	-0,71	-0,30	-0,41	±1,0
3150,00	85,01	83,90	0,00	-1,11	-0,50	-0,61	±1,0
4000,00	85,01	83,20	0,00	-1,81	-0,80	-1,01	±1,0
5000,00	85,00	82,20	0,00	-2,80	-1,30	-1,50	±1,5
8000,00	74,05	68,60	0,00	-5,45	-3,00	-2,45	+1,5; -2,5

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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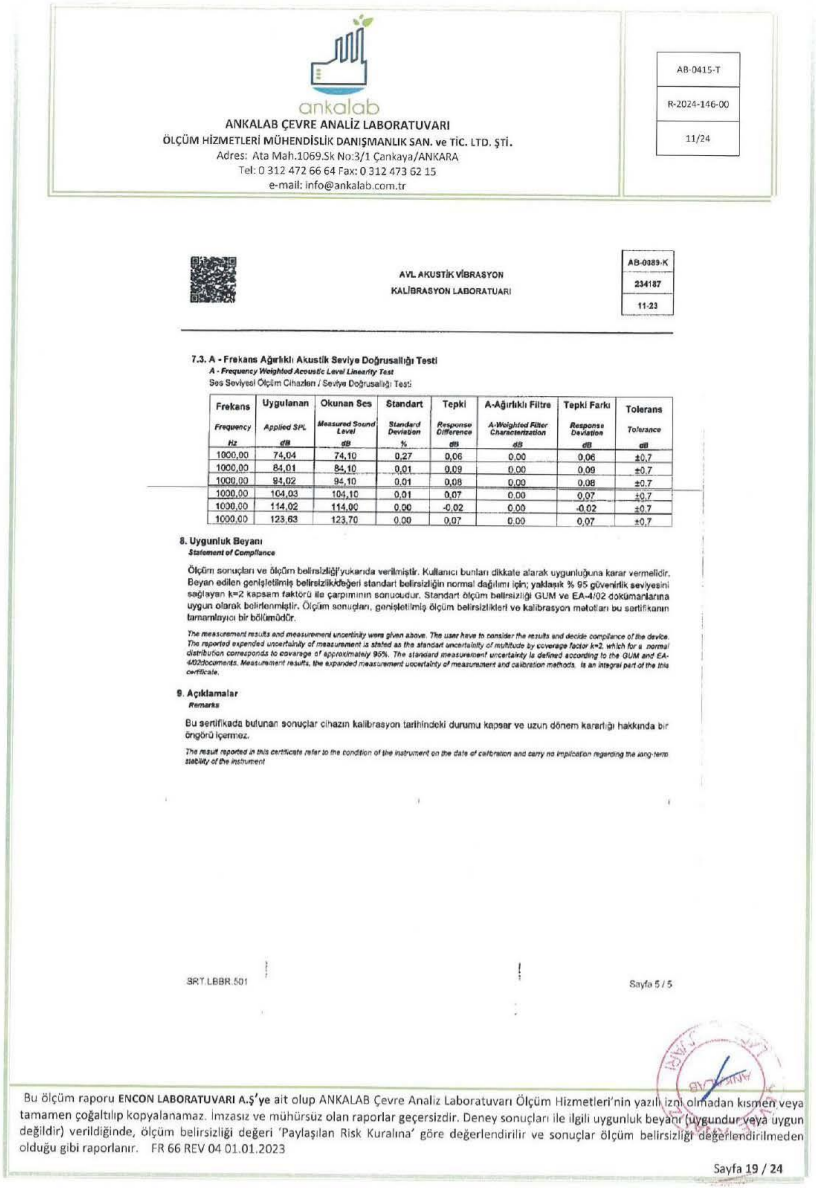

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7.3. A - Frekans Ağırlıklı Akustik Seviye Doğrusallığı Testi
A - Frequency Weighted Acoustic Level Linearity Test
Ses Seviyesi Ölçüm Cihazları / Seviye Doğrusallığı Testi

Frekans *Frequency* Hz	Uygulanan *Applied SPL* dB	Okunan Ses *Measured Sound Level* dB	Standart *Standard Deviation* %	Tepki *Response Difference* dB	A-Ağırlıklı Filtre *A-Weighted Filter Characteristication* dB	Tepki Farkı *Response Deviation* dB	Tolerans *Tolerance* dB
1000,00	74,04	74,10	0,27	0,06	0,00	0,06	±0,7
1000,00	84,01	84,10	0,01	0,09	0,00	0,09	±0,7
1000,00	94,02	94,10	0,01	0,08	0,00	0,08	±0,7
1000,00	104,03	104,10	0,01	0,07	0,00	0,07	±0,7
1000,00	114,02	114,00	0,00	-0,02	0,00	-0,02	±0,7
1000,00	123,63	123,70	0,00	0,07	0,00	0,07	±0,7

8. Uygunluk Beyanı
Statement of Compliance

Ölçüm sonuçları ve ölçüm belirsizliği yukarıda verilmiştir. Kullanıcı bunları dikkate alarak uygunluğuna karar vermelidir. Beyan edilen genişletilmiş belirsizlikteğeri standart belirsizliğin normal dağılımı için; yaklaşık % 95 güvenilik seviyesini sağlayan k=2 kapsam faktörü ile çarpımının sonucudur. Standart ölçüm belirsizliği GUM ve EA-4/02 dokümanlarına uygun olarak belirlenmiştir. Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı bir bölümüdür.

The measurement results and measurement uncertinity were given above. The user have to consider the results and decide compliance of the device. The reported expended uncertainty of measurement is stated as the standart uncertainty of multitude by coverage factor k=2, which for a normal distribution corresponds to coverage of approximately 95%. The standard measurement uncertainty is defined according to the GUM and EA-4/02documents. Measurement results, the expanded measurement uncertainty of measurement and calibration methods. is an integral part of the this certificate.

9. Açıklamalar
Remarks

Bu sertifikada bulunan sonuçlar cihazın kalibrasyon tarihindeki durumu kapsar ve uzun dönem kararlığı hakkında bir öngörü içermez.

The result reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument

SRT.LBBR.501

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Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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TÜRKAK
AB-0089-K

KALİBRASYON SERTİFİKASI
Calibration Certificate

233743
10-23

Cihazın Sahibi / Customer Name	:	ANKALAB ÇEVRE ANALİZ LABORATUVARI LTD. ŞTİ. Ata Mah. 1069. Sok. No: 3/1 ÇANKAYA / ANKARA
İstek Numarası / Order No.	:	T-0923-110
Makine / Cihaz / Instrument / Device	:	Ses Seviyesi Ölçüm Cihazı / Ön Yükseltici / Mikrofon / Sound Level Meter
İmalatçı / Manufacturer	:	SVANTEK / SVANTEK / ACO
Tip / Type	:	958 / SV12L / 7052E
Seri Numarası / Serial number	:	23361 / 24173 / 71251
Kalibrasyon Tarihi / Date of calibration	:	19.10.2023
Sertifika Sayfa Sayısı / Number of pages	:	5

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.
This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren AVL Kalibrasyon Laboratuvarı, TÜRKAK'tan AB-0089-K dosya numarası ile TS EN ISO/IEC 17025:2017 standardına göre akredite edilmiştir.
AVL Kalibrasyon Laboratuvarı is accredited by TÜRKAK under registration number AB-0089-K for TS EN ISO/IEC 17025:2017 as test laboratory.

Türk Akreditasyon Kurumu(TÜRKAK) deney raporlarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanınma anlaşmalarına imzalamıştır.
The Turkish Accreditation Acency (TURKAK) is signatory to the multilateral agreements of the European co-operation for the Accreditation(EA) and of the International Laboratory Accreditation (ILAC) for the Mutual recognition of test reports.

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.
The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe / Seal	Yayım Tarihi / Publication Date	Kalibrasyonu Yapan / Calibrated By	Onaylayan / Tarih / Approval / Date
AVL Kalibrasyon	19.10.2023	Fatma SOLGUNTEKİN Kalibrasyon Personeli Calibration Responsible e-imzalıdır	Younes NEVAYESHİRAZİ / 19.10.2023 Laboratuvar Müdürü Laboratory Manager e-imzalıdır

Bu sertifika 5070 sayılı kanuna göre güvenli elektronik imza ile imzalanmıştır. Belge teyidi için sayfalarda yer alan karekodu okutabilirsiniz.
This certificate is signed using secure Digital signature according to article of law number 5070. For confirmation read the QR Code using QR Code reader.

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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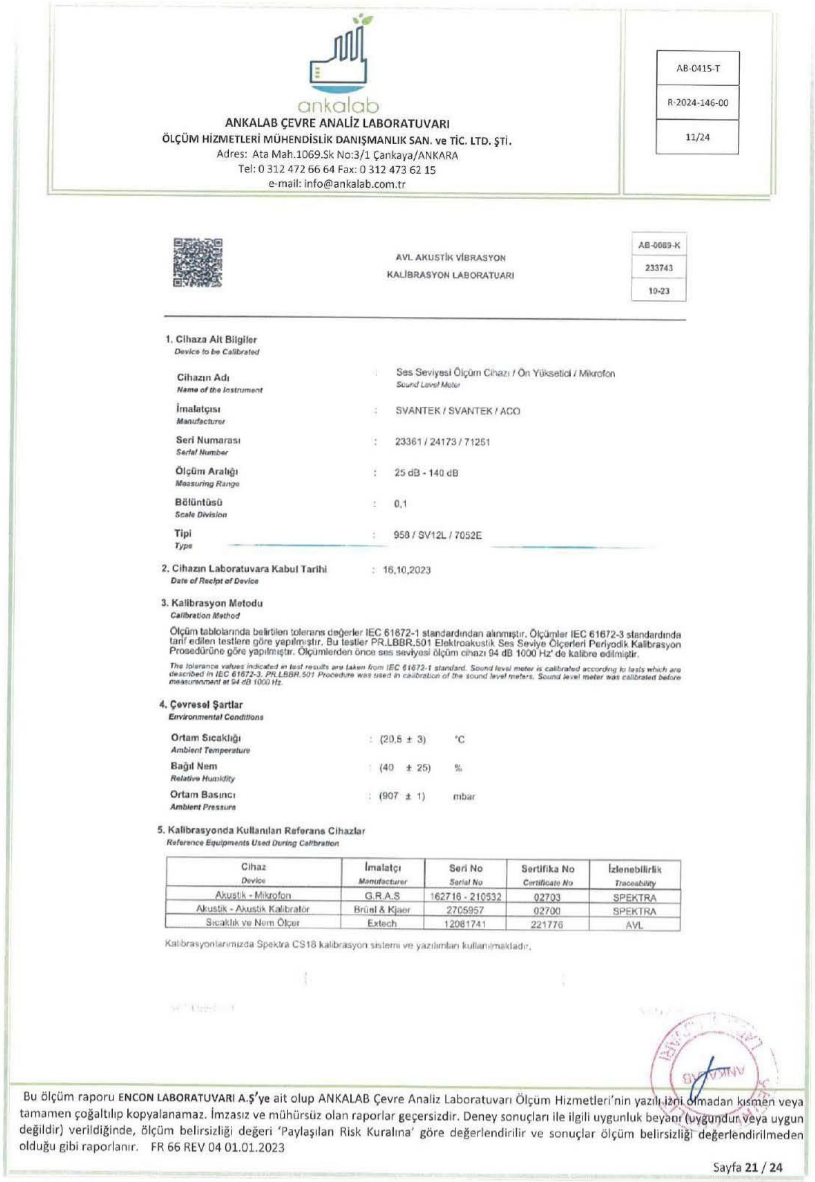

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1. Cihaza Ait Bilgiler
Device to be Calibrated

Cihazın Adı *Name of the Instrument*	:	Ses Seviyesi Ölçüm Cihazı / Ön Yükseltici / Mikrofon *Sound Level Meter*
İmalatçısı *Manufacturer*	:	SVANTEK / SVANTEK / ACO
Seri Numarası *Serial Number*	:	23361 / 24173 / 71251
Ölçüm Aralığı *Measuring Range*	:	25 dB - 140 dB
Bölüntüsü *Scale Division*	:	0,1
Tipi *Type*	:	959 / SV12L / 7052E

2. Cihazın Laboratuvara Kabul Tarihi : 16.10.2023
Date of Receipt of Device

3. Kalibrasyon Metodu
Calibration Method

Ölçüm tablolarında belirtilen tolerans değerler IEC 61672-1 standardından alınmıştır. Ölçümler IEC 61672-3 standardında tarif edilen testlere göre yapılmıştır. Bu testler PR.LBBR.501 Elektroakustik Ses Seviye Ölçerleri Periyodik Kalibrasyon Prosedürüne göre yapılmıştır. Ölçümlerden önce ses seviyesi ölçüm cihazı 94 dB 1000 Hz' de kalibre edilmiştir.

The tolerance values indicated in test results are taken from IEC 61672-1 standard. Sound level meter is calibrated according to tests which are described in IEC 61672-3. PR.LBBR.501 Procedure was used in calibration of the sound level meters. Sound level meter was calibrated before measurement at 94 dB 1000 Hz.

4. Çevresel Şartlar
Environmental Conditions

Ortam Sıcaklığı *Ambient Temperature*	:	(20,5 ± 3)	°C
Bağıl Nem *Relative Humidity*	:	(40 ± 25)	%
Ortam Basıncı *Ambient Pressure*	:	(907 ± 1)	mbar

5. Kalibrasyonda Kullanılan Referans Cihazlar
Reference Equipments Used During Calibration

Cihaz *Device*	İmalatçı *Manufacturer*	Seri No *Serial No*	Sertifika No *Certificate No*	İzlenebilirlik *Traceability*
Akustik - Mikrofon	G.R.A.S	162716 - 210532	02703	SPEKTRA
Akustik - Akustik Kalibratör	Brüel & Kjaer	2705957	02700	SPEKTRA
Sıcaklık ve Nem Ölçer	Extech	12081741	221776	AVL

Kalibrasyonlarımızda Spektra CS18 kalibrasyon sistemi ve yazılımları kullanılmaktadır.

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6. Ölçüm Belirsizliği
Measurement Uncertainty

1000 Hz 94 dB Kalibrasyon : ± 0,16 dB
Calibration at frequency point 1000 Hz 94 dB

Frekans Ağırlıklı Akustik Test : 31,5 Hz ile 2 kHz : ± 0,30 dB 2 kHz ile 8 kHz : ± 0,50 dB
Acoustical Tests of Frequency Weighting

7. Kalibrasyon Sonuçları
Calibration Results

7.1. 1000 Hz 94 dB Kalibrasyon
Calibration at frequency point 1000 Hz 94 dB
Ses Seviyesi Ölçüm Cihazları / Ses Basınç Seviyesi

Kalibrasyondan Önceki Değer : 93,8 dB
Value Before Calibration

Kalibrasyondan Sonraki Değer : 94 dB
Value After Calibration

Sapma : -0,20 dB
Deviation

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

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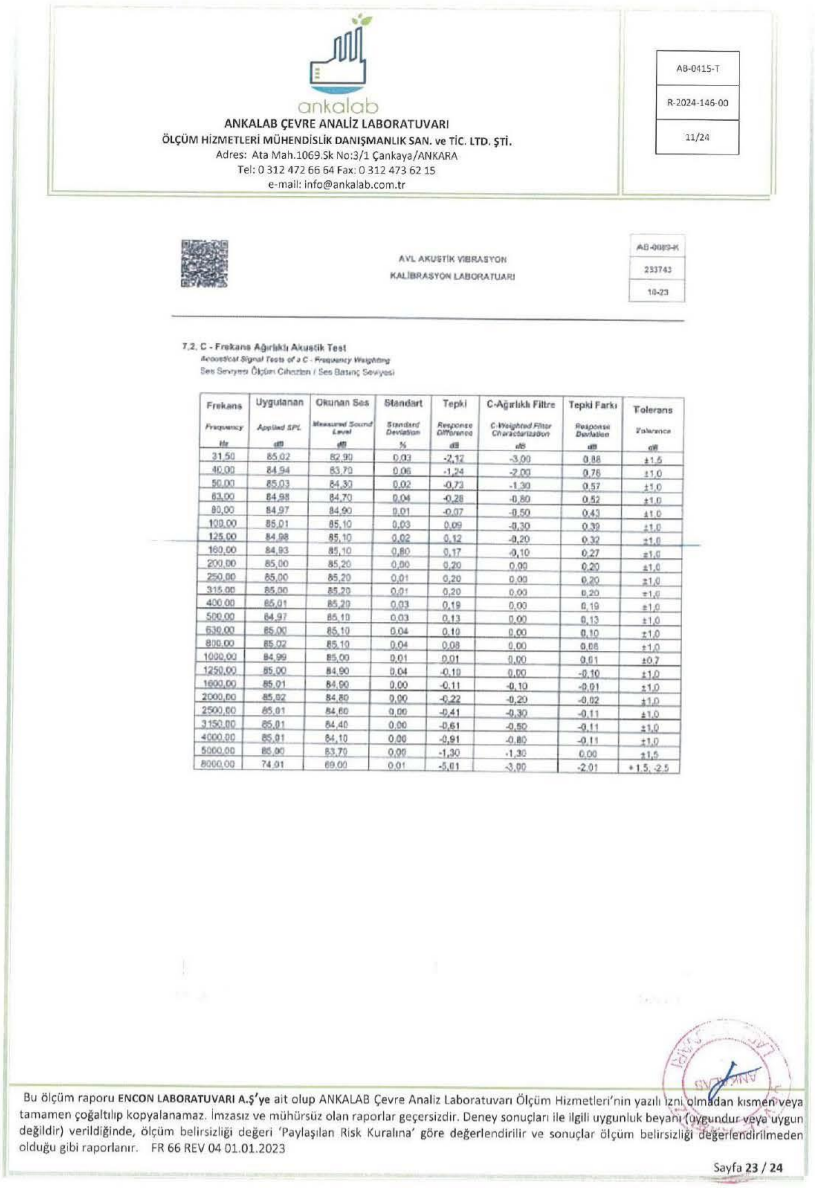

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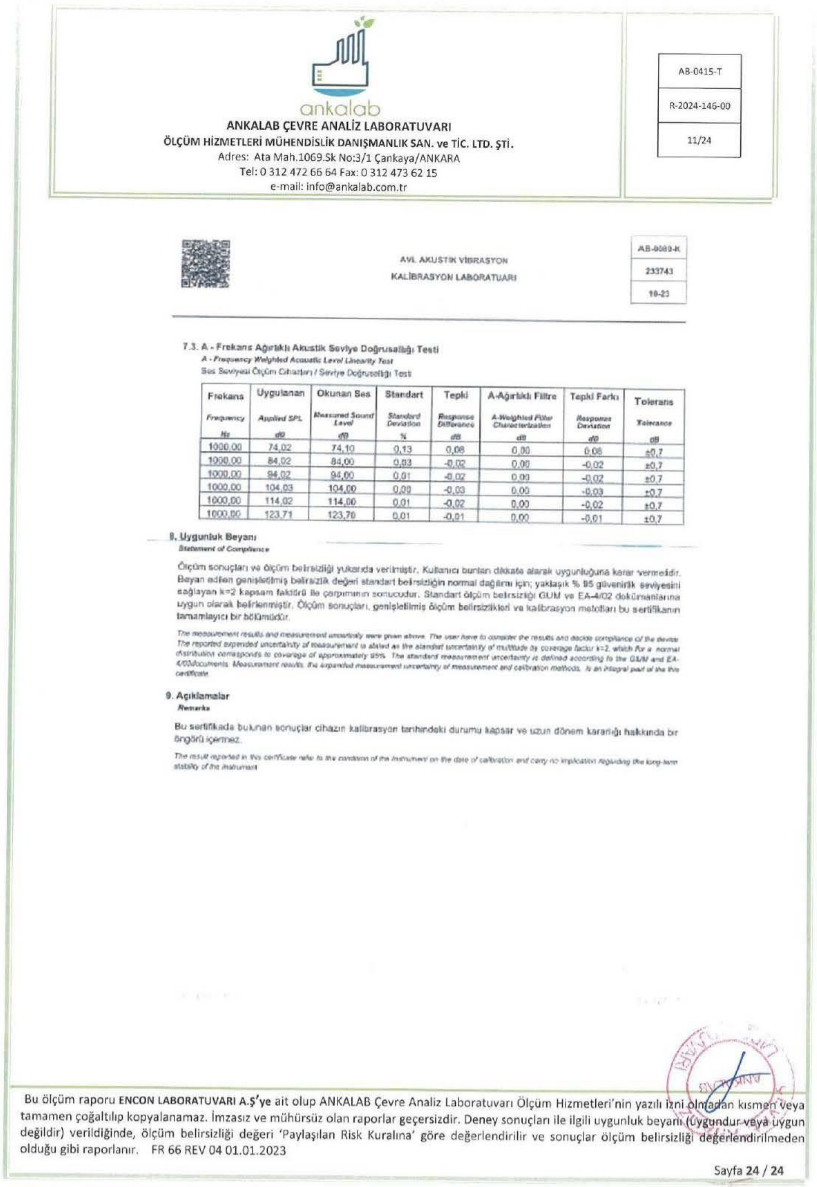
7.2. C - Frekans Ağırlıklı Akustik Test
Acoustical Signal Tests of a C - Frequency Weighting
Ses Seviyesi Ölçüm Cihazları / Ses Basınç Seviyesi

Frekans *Frequency* Hz	Uygulanan *Applied SPL* dB	Okunan Ses *Measured Sound Level* dB	Standart *Standard Deviation* %	Tepki *Response Difference* dB	C-Ağırlıklı Filtre *C-Weighted Filter Characterization* dB	Tepki Farkı *Response Deviation* dB	Tolerans *Tolerance* dB
31,50	85,02	82,90	0,03	-2,12	-3,00	0,88	±1,5
40,00	84,94	83,70	0,06	-1,24	-2,00	0,76	±1,0
50,00	85,03	84,30	0,02	-0,73	-1,30	0,57	±1,0
63,00	84,98	84,70	0,04	-0,28	-0,80	0,52	±1,0
80,00	84,97	84,90	0,01	-0,07	-0,50	0,43	±1,0
100,00	85,01	85,10	0,03	0,09	-0,30	0,39	±1,0
125,00	84,98	85,10	0,02	0,12	-0,20	0,32	±1,0
160,00	84,93	85,10	0,80	0,17	-0,10	0,27	±1,0
200,00	85,00	85,20	0,00	0,20	0,00	0,20	±1,0
250,00	85,00	85,20	0,01	0,20	0,00	0,20	±1,0
315,00	85,00	85,20	0,01	0,20	0,00	0,20	±1,0
400,00	85,01	85,20	0,03	0,19	0,00	0,19	±1,0
500,00	84,97	85,10	0,03	0,13	0,00	0,13	±1,0
630,00	85,00	85,10	0,04	0,10	0,00	0,10	±1,0
800,00	85,02	85,10	0,04	0,08	0,00	0,08	±1,0
1000,00	84,99	85,00	0,01	0,01	0,00	0,01	±0,7
1250,00	85,00	84,90	0,04	-0,10	0,00	-0,10	±1,0
1600,00	85,01	84,90	0,00	-0,11	-0,10	-0,01	±1,0
2000,00	85,02	84,80	0,00	-0,22	-0,20	-0,02	±1,0
2500,00	85,01	84,60	0,00	-0,41	-0,30	-0,11	±1,0
3150,00	85,01	84,40	0,00	-0,61	-0,50	-0,11	±1,0
4000,00	85,01	84,10	0,00	-0,91	-0,80	-0,11	±1,0
5000,00	85,00	83,70	0,00	-1,30	-1,30	0,00	±1,5
8000,00	74,01	69,00	0,01	-5,01	-3,00	-2,01	+1,5, -2,5

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023



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ANKALAB ÇEVRE ANALİZ LABORATUVARI
ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMANLIK SAN. ve TİC. LTD. ŞTİ.
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AB-0415-T
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11/24

AVL AKUSTİK VİBRASYON
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AB-0083-K
233743
19-23

7.3. A - Frekans Ağırlıklı Akustik Seviye Doğrusallığı Testi
A - Frequency Weighted Acoustic Level Linearity Test
Ses Seviyesi Ölçüm Cihazları / Seviye Doğrusallığı Testi

Frekans *Frequency* Hz	Uygulanan *Applied SPL* dB	Okunan Ses *Measured Sound Level* dB	Standart *Standard Deviation* %	Tepki *Response Difference* dB	A-Ağırlıklı Filtre *A-Weighted Filter Characteristics* dB	Tepki Farkı *Response Deviation* dB	Tolerans *Tolerance* dB
1000,00	74,02	74,10	0,13	0,08	0,00	0,08	±0,7
1000,00	84,02	84,00	0,03	-0,02	0,00	-0,02	±0,7
1000,00	94,02	94,00	0,01	-0,02	0,00	-0,02	±0,7
1000,00	104,03	104,00	0,02	-0,03	0,00	-0,03	±0,7
1000,00	114,02	114,00	0,01	-0,02	0,00	-0,02	±0,7
1000,00	123,71	123,70	0,01	-0,01	0,00	-0,01	±0,7

8. Uygunluk Beyanı
Statement of Compliance

Ölçüm sonuçları ve ölçüm belirsizliği yukarıda verilmiştir. Kullanıcı bunları dikkate alarak uygunluğuna karar vermelidir. Beyan edilen genişletilmiş belirsizlik değeri standart belirsizliğin normal dağılımı için; yaklaşık % 95 güvenirlik seviyesini sağlayan k=2 kapsam faktörü ile çarpımının sonucudur. Standart ölçüm belirsizliği GUM ve EA-4/02 dokümanlarına uygun olarak belirlenmiştir. Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı bir bölümüdür.

The measurement results and measurement uncertainty were given above. The user have to consider the results and decide compliance of the device. The reported expended uncertainty of measurement is stated as the standard uncertainty of multiple by coverage factor k=2, which for a normal distribution corresponds to coverage of approximately 95%. The standard measurement uncertainty is defined according to the GUM and EA-4/02documents. Measurement results, the expanded measurement uncertainty of measurement and calibration methods, is an integral part of the this certificate.

9. Açıklamalar
Remarks

Bu sertifikada bulunan sonuçlar cihazın kalibrasyon tarihindeki durumu kapsar ve uzun dönem kararlığı hakkında bir öngörü içermez.

The result reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

Bu ölçüm raporu **ENCON LABORATUVARI A.Ş'ye** ait olup ANKALAB Çevre Analiz Laboratuvarı Ölçüm Hizmetleri'nin yazılı izni olmadan kısmen veya tamamen çoğaltılıp kopyalanamaz. İmzasız ve mühürsüz olan raporlar geçersizdir. Deney sonuçları ile ilgili uygunluk beyanı (uygundur veya uygun değildir) verildiğinde, ölçüm belirsizliği değeri 'Paylaşılan Risk Kuralına' göre değerlendirilir ve sonuçlar ölçüm belirsizliği değerlendirilmeden olduğu gibi raporlanır. FR 66 REV 04 01.01.2023

Sayfa 24 / 24

DEVICE CALIBRATIONS

AVL Kalibrasyon Laboratuarı

AVL AKUSTİK VİBRASYON KALİBRASYON LAB. LTD. ŞTİ.

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TÜRKAK Kalibrasyon TS EN ISO/IEC 17025 AB-0089-K

AB-0089-K
234187
11-23

KALİBRASYON SERTİFİKASI
Calibration Certificate

Cihazın Sahibi *Customer Name*	:	ANKALAB ÇEVRE ANALİZ LABORATUVARI LTD. ŞTİ. Ata Mah. 1069. Sok. No: 3/1 ÇANKAYA / ANKARA
İstek Numarası *Order No.*	:	T-1123-001
Makine / Cihaz *Instrument / Device*	:	Ses Seviyesi Ölçüm Cihazı / Ön Yüksetlici / Mikrofon *Sound Level Meter*
İmalatçı *Manufacturer*	:	SVANTEK / SVANTEK / ACO
Tip *Type*	:	SVAN 958 / SV 12L / 7052E
Seri Numarası *Serial number*	:	23305 / 24173 / 71251
Kalibrasyon Tarihi *Date of calibration*	:	10.11.2023
Sertifika Sayfa Sayısı *Number of pages*	:	5

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.

This calibration certificate documents the traceabilty to national standards, which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren AVL Kalibrasyon Laboratuvarı, TÜRKAK'tan AB-0089-K dosya numarası ile TS EN ISO/IEC 17025-2017 standardına göre akredite edilmiştir.

AVL Kalibrasyon Laboratuvarı is accredited by TÜRKAK under registration number AB-0089-K for TS EN ISO/IEC 17025-2017 as test laboratory.

Türk Akreditasyon Kurumu(TÜRKAK) deney raporlarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanınma antlaşmasını imzalamıştır.

The Turkish Accreditation Acency (TURKAK) is signatory to the multilateral agreements of the European co-operation for the Accreditation(EA) and of the International Laboratory Accreditation (ILAC) for the Mutual recognation of test reports.

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.

The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe *Seal*	Yayım Tarihi *Publication Date*	Kalibrasyonu Yapan *Calibrated By*	Onaylayan / Tarih *Approval / Date*
AVL Kalibrasyon	10.11.2023	Fatma SOLGUNTEKİN Kalibrasyon Personeli *Calibration Responsible* e-imzalıdır	Younes NEVAYESHİRAZİ / 10.11.2023 Laboratuvar Müdürü *Laboratory Manager* e-imzalıdır

Bu sertifika 5070 sayılı kanununa göre güvenli elektronik imza ile imzalanmıştır. Belge teyidi için sayfalarda yer alan karekodu okutabilirsiniz.
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AVL AKUSTİK VİBRASYON
KALİBRASYON LABORATUARI

AB-0089-K
234187
11-23

1. Cihaza Ait Bilgiler
Device to be Calibrated

Cihazın Adı *Name of the Instrument*	:	Ses Seviyesi Ölçüm Cihazı / Ön Yüksetlici / Mikrofon *Sound Level Meter*
İmalatçısı *Manufacturer*	:	SVANTEK / SVANTEK / ACO
Seri Numarası *Serial Number*	:	23305 / 24173 / 71251
Ölçüm Aralığı *Measuring Range*	:	25 dB - 140 dB
Bölüntüsü *Scale Division*	:	0,1
Tipi *Type*	:	SVAN 958 / SV 12L / 7052E

2. Cihazın Laboratuvara Kabul Tarihi : 09.11.2023
Date of Recipt of Device

3. Kalibrasyon Metodu
Calibration Method

Ölçüm tablolarında belirtilen tolerans değerler IEC 61672-1 standardından alınmıştır. Ölçümler IEC 61672-3 standardında tarif edilen testlere göre yapılmıştır. Bu testler PR.LBBR.501 Elektroakustik Ses Seviye Ölçerleri Periyodik Kalibrasyon Prosedürüne göre yapılmıştır. Ölçümlerden önce ses seviyesi ölçüm cihazı 94 dB 1000 Hz' de kalibre edilmiştir.

The tolerance values indicated in test results are taken from IEC 61672-1 standard. Sound level meter is calibrated according to tests which are described in IEC 61672-3. PR.LBBR.501 Procedure was used in calibration of the sound level meters. Sound level meter was calibrated before measurenment at 94 dB 1000 Hz.

4. Çevresel Şartlar
Environmental Conditions

Ortam Sıcaklığı *Ambient Temperature*	: (22	± 3)	°C
Bağıl Nem *Relative Humidity*	: (47	± 25)	%
Ortam Basıncı *Ambient Pressure*	: (912	± 1)	mbar

5. Kalibrasyonda Kullanılan Referans Cihazlar
Reference Equipments Used During Calibration

Cihaz *Device*	İmalatçı *Manufacturer*	Seri No *Serial No*	Sertifika No *Certificate No*	İzlenebilirlik *Traceability*
Akustik - Mikrofon	G.R.A.S	162716 - 210532	02703	SPEKTRA
Akustik - Akustik Kalibratör	Brüel & Kjaer	2705957	02700	SPEKTRA
Sıcaklık ve Nem Ölçer	Extech	12081741	221776	AVL

Kalibrasyonlarımızda Spektra CS18 kalibrasyon sistemi ve yazılımları kullanılmaktadır.

SRT.LBBR.501

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6. Ölçüm Belirsizliği
Measurement Uncertainty

1000 Hz 114 dB Kalibrasyon : ± 0,16 dB
Calibration at frequency point 1000 Hz 114 dB

Frekans Ağırlıklı Akustik Test : 31,5 Hz ile 2 kHz : ± 0,30 dB 2 kHz ile 8 kHz : ± 0,50 dB
Acoustical Tests of Frequency Weighting

7. Kalibrasyon Sonuçları
Calibration Results

7.1. 1000 Hz 114 dB Kalibrasyon
Calibration at frequency point 1000 Hz 114 dB
Ses Seviyesi Ölçüm Cihazları / Ses Basınç Seviyesi

Kalibrasyondan Önceki Değer : 113,3 dB
Value Before Calibration

Kalibrasyondan Sonraki Değer : 114 dB
Value After Calibration

Sapma : -0,70 dB
Deviation

SRT.LBBR.501

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AVL AKUSTİK VİBRASYON
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7.2. C - Frekans Ağırlıklı Akustik Test

Acoustical Signal Tests of a C - Frequency Weighting

Ses Seviyesi Ölçüm Cihazları / Ses Basınç Seviyesi

Frekans *Frequency* *Hz*	Uygulanan *Applied SPL* *dB*	Okunan Ses *Measured Sound Level* *dB*	Standart *Standard Deviation* *%*	Tepki *Response Difference* *dB*	C-Ağırlıklı Filtre *C-Weighted Filter Characterization* *dB*	Tepki Farkı *Response Deviation* *dB*	Tolerans *Tolerance* *dB*
31,50	85,08	83,50	0,09	-1,58	-3,00	1,42	±1,5
40,00	84,88	83,80	0,05	-1,08	-2,00	0,92	±1,0
50,00	84,96	84,50	0,01	-0,46	-1,30	0,84	±1,0
63,00	84,98	84,90	0,62	-0,08	-0,80	0,72	±1,0
80,00	84,98	85,10	0,02	0,12	-0,50	0,62	±1,0
100,00	85,01	85,30	0,03	0,29	-0,30	0,59	±1,0
125,00	84,99	85,30	0,05	0,31	-0,20	0,51	±1,0
160,00	84,99	85,30	0,11	0,31	-0,10	0,41	±1,0
200,00	85,01	85,40	0,06	0,39	0,00	0,39	±1,0
250,00	84,98	85,30	0,02	0,32	0,00	0,32	±1,0
315,00	84,98	85,30	0,03	0,32	0,00	0,32	±1,0
400,00	85,01	85,30	0,02	0,29	0,00	0,29	±1,0
500,00	84,99	85,30	0,04	0,31	0,00	0,31	±1,0
630,00	85,01	85,20	0,05	0,19	0,00	0,19	±1,0
800,00	85,04	85,20	0,03	0,16	0,00	0,16	±1,0
1000,00	85,01	85,10	0,01	0,09	0,00	0,09	±0,7
1250,00	85,01	85,00	0,02	-0,01	0,00	-0,01	±1,0
1600,00	85,01	84,80	0,01	-0,21	-0,10	-0,11	±1,0
2000,00	85,02	84,60	0,00	-0,42	-0,20	-0,22	±1,0
2500,00	85,01	84,30	0,01	-0,71	-0,30	-0,41	±1,0
3150,00	85,01	83,90	0,00	-1,11	-0,50	-0,61	±1,0
4000,00	85,01	83,20	0,00	-1,81	-0,80	-1,01	±1,0
5000,00	85,00	82,20	0,00	-2,80	-1,30	-1,50	±1,5
8000,00	74,05	68,60	0,00	-5,45	-3,00	-2,45	+1,5; -2,5

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7.3. A - Frekans Ağırlıklı Akustik Seviye Doğrusallığı Testi
A - Frequency Weighted Acoustic Level Linearity Test
Ses Seviyesi Ölçüm Cihazları / Seviye Doğrusallığı Testi

Frekans *Frequency* Hz	Uygulanan *Applied SPL* dB	Okunan Ses *Measured Sound Level* dB	Standart *Standard Deviation* %	Tepki *Response Difference* dB	A-Ağırlıklı Filtre *A-Weighted Filter Characterization* dB	Tepki Farkı *Response Deviation* dB	Tolerans *Tolerance* dB
1000,00	74,04	74,10	0,27	0,06	0,00	0,06	±0,7
1000,00	84,01	84,10	0,01	0,09	0,00	0,09	±0,7
1000,00	94,02	94,10	0,01	0,08	0,00	0,08	±0,7
1000,00	104,03	104,10	0,01	0,07	0,00	0,07	±0,7
1000,00	114,02	114,00	0,00	-0,02	0,00	-0,02	±0,7
1000,00	123,63	123,70	0,00	0,07	0,00	0,07	±0,7

8. Uygunluk Beyanı
Statement of Compliance

Ölçüm sonuçları ve ölçüm belirsizliği yukarıda verilmiştir. Kullanıcı bunları dikkate alarak uygunluğuna karar vermelidir. Beyan edilen genişletilmiş belirsizlik değeri standart belirsizliğin normal dağılımı için; yaklaşık % 95 güvenirlik seviyesini sağlayan k=2 kapsam faktörü ile çarpımının sonucudur. Standart ölçüm belirsizliği GUM ve EA-4/02 dokümanlarına uygun olarak belirlenmiştir. Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı bir bölümüdür.

The measurement results and measurement uncertinity were given above. The user have to consider the results and decide compliance of the device. The reported expended uncertainity of measurement is stated as the standart uncertainity of multitude by coverage factor k=2, which for a normal distribution corresponds to covarage of approximately 95%. The standard measurement uncertainty is defined according to the GUM and EA-4/02documents. Measurement results, the expanded measurement uncertainty of measurement and calibration methods, is an integral part of the this certificate.

9. Açıklamalar
Remarks

Bu sertifikada bulunan sonuçlar cihazın kalibrasyon tarihindeki durumu kapsar ve uzun dönem kararlığı hakkında bir öngörü içermez.

The result reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument

AVL Kalibrasyon Laboratuarı

AVL AKUSTİK VİBRASYON KALİBRASYON LAB. LTD. ŞTİ.

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TÜRKAK Kalibrasyon TS EN ISO/IEC 17025 AB-0089-K

AB-0089-K
233743
10-23

KALİBRASYON SERTİFİKASI
Calibration Certificate

Cihazın Sahibi *Customer Name*	:	ANKALAB ÇEVRE ANALİZ LABORATUVARI LTD. ŞTİ. Ata Mah. 1069. Sok. No: 3/1 ÇANKAYA / ANKARA
İstek Numarası *Order No.*	:	T-0923-110
Makine / Cihaz *Instrument / Device*	:	Ses Seviyesi Ölçüm Cihazı / Ön Yüksetici / Mikrofon *Sound Level Meter*
İmalatçı *Manufacturer*	:	SVANTEK / SVANTEK / ACO
Tip *Type*	:	958 / SV12L / 7052E
Seri Numarası *Serial number*	:	23361 / 24173 / 71251
Kalibrasyon Tarihi *Date of calibration*	:	19.10.2023
Sertifika Sayfa Sayısı *Number of pages*	:	5

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde (SI) tanımlanmış birimleri realize eden ulusal ölçüm standartlarına izlenebilirliği belgeler.

This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren AVL Kalibrasyon Laboratuvarı, TÜRKAK'tan AB-0089-K dosya numarası ile TS EN ISO/IEC 17025-2017 standardına göre akredite edilmiştir.

AVL Kalibrasyon Laboratuvarı is accredited by TÜRKAK under registration number AB-0089-K for TS EN ISO/IEC 17025-2017 as test laboratory.

Türk Akreditasyon Kurumu(TÜRKAK) deney raporlarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanınma antlaşmasını imzalamıştır.

The Turkish Accreditation Acency (TURKAK) is signatory to the multilateral agreements of the European co-operation for the Accreditation(EA) and of the International Laboratory Accreditation (ILAC) for the Mutual recognation of test reports.

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.

The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür / Kaşe *Seal*	Yayım Tarihi *Publication Date*	Kalibrasyonu Yapan *Calibrated By*	Onaylayan / Tarih *Approval / Date*
AVL Kalibrasyon	19.10.2023	Fatma SOLGUNTEKİN Kalibrasyon Personeli *Calibration Responsible* e-imzalıdır	Younes NEVAYESHİRAZİ / 19.10.2023 Laboratuvar Müdürü *Laboratory Manager* e-imzalıdır

Bu sertifika 5070 sayılı kanununa göre güvenli elektronik imza ile imzalanmıştır, Belge teyidi için sayfalarda yer alan karekodu okutabilirsiniz.

This certificate is signed using secure digital signature according to article of law, number 5070. For confirmation, read the QR Code using QR Code reader.

AVL AKUSTİK VİBRASYON
KALİBRASYON LABORATUARI

AB-0089-K
233743
10-23

1. Cihaza Ait Bilgiler
Device to be Calibrated

Cihazın Adı *Name of the Instrument*	:	Ses Seviyesi Ölçüm Cihazı / Ön Yüksetici / Mikrofon *Sound Level Meter*
İmalatçısı *Manufacturer*	:	SVANTEK / SVANTEK / ACO
Seri Numarası *Serial Number*	:	23361 / 24173 / 71251
Ölçüm Aralığı *Measuring Range*	:	25 dB - 140 dB
Bölüntüsü *Scale Division*	:	0,1
Tipi *Type*	:	958 / SV12L / 7052E

2. Cihazın Laboratuvara Kabul Tarihi : 16.10.2023
Date of Recipt of Device

3. Kalibrasyon Metodu
Calibration Method

Ölçüm tablolarında belirtilen tolerans değerler IEC 61672-1 standardından alınmıştır. Ölçümler IEC 61672-3 standardında tarif edilen testlere göre yapılmıştır. Bu testler PR.LBBR.501 Elektroakustik Ses Seviye Ölçerleri Periyodik Kalibrasyon Prosedürüne göre yapılmıştır. Ölçümlerden önce ses seviyesi ölçüm cihazı 94 dB 1000 Hz' de kalibre edilmiştir.

The tolerance values indicated in test results are taken from IEC 61672-1 standard. Sound level meter is calibrated according to tests which are described in IEC 61672-3. PR.LBBR.501 Procedure was used in calibration of the sound level meters. Sound level meter was calibrated before measurenment at 94 dB 1000 Hz.

4. Çevresel Şartlar
Environmental Conditions

Ortam Sıcaklığı *Ambient Temperature*	:	(20,5 ± 3)	°C
Bağıl Nem *Relative Humidity*	:	(40 ± 25)	%
Ortam Basıncı *Ambient Pressure*	:	(907 ± 1)	mbar

5. Kalibrasyonda Kullanılan Referans Cihazlar
Reference Equipments Used During Calibration

Cihaz *Device*	İmalatçı *Manufacturer*	Seri No *Serial No*	Sertifika No *Certificate No*	İzlenebilirlik *Traceability*
Akustik - Mikrofon	G.R.A.S	162716 - 210532	02703	SPEKTRA
Akustik - Akustik Kalibratör	Brüel & Kjaer	2705957	02700	SPEKTRA
Sıcaklık ve Nem Ölçer	Extech	12081741	221776	AVL

Kalibrasyonlarımızda Spektra CS18 kalibrasyon sistemi ve yazılımları kullanılmaktadır.

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6. Ölçüm Belirsizliği
Measurement Uncertainty

1000 Hz 94 dB Kalibrasyon : ± 0,16 dB
Calibration at frequency point 1000 Hz 94 dB

Frekans Ağırlıklı Akustik Test : 31,5 Hz ile 2 kHz : ± 0,30 dB 2 kHz ile 8 kHz : ± 0,50 dB
Acoustical Tests of Frequency Weighting

7. Kalibrasyon Sonuçları
Calibration Results

7.1. 1000 Hz 94 dB Kalibrasyon
Calibration at frequency point 1000 Hz 94 dB
Ses Seviyesi Ölçüm Cihazları / Ses Basınç Seviyesi

Kalibrasyondan Önceki Değer : 93,8 dB
Value Before Calibration

Kalibrasyondan Sonraki Değer : 94 dB
Value After Calibration

Sapma : -0,20 dB
Deviation

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7.2. C - Frekans Ağırlıklı Akustik Test

Acoustical Signal Tests of a C - Frequency Weighting

Ses Seviyesi Ölçüm Cihazları / Ses Basınç Seviyesi

Frekans *Frequency* Hz	Uygulanan *Applied SPL* dB	Okunan Ses *Measured Sound Level* dB	Standart *Standard Deviation* %	Tepki *Response Difference* dB	C-Ağırlıklı Filtre *C-Weighted Filter Characterization* dB	Tepki Farkı *Response Deviation* dB	Tolerans *Tolerance* dB
31,50	85,02	82,90	0,03	-2,12	-3,00	0,88	±1,5
40,00	84,94	83,70	0,06	-1,24	-2,00	0,76	±1,0
50,00	85,03	84,30	0,02	-0,73	-1,30	0,57	±1,0
63,00	84,98	84,70	0,04	-0,28	-0,80	0,52	±1,0
80,00	84,97	84,90	0,01	-0,07	-0,50	0,43	±1,0
100,00	85,01	85,10	0,03	0,09	-0,30	0,39	±1,0
125,00	84,98	85,10	0,02	0,12	-0,20	0,32	±1,0
160,00	84,93	85,10	0,80	0,17	-0,10	0,27	±1,0
200,00	85,00	85,20	0,00	0,20	0,00	0,20	±1,0
250,00	85,00	85,20	0,01	0,20	0,00	0,20	±1,0
315,00	85,00	85,20	0,01	0,20	0,00	0,20	±1,0
400,00	85,01	85,20	0,03	0,19	0,00	0,19	±1,0
500,00	84,97	85,10	0,03	0,13	0,00	0,13	±1,0
630,00	85,00	85,10	0,04	0,10	0,00	0,10	±1,0
800,00	85,02	85,10	0,04	0,08	0,00	0,08	±1,0
1000,00	84,99	85,00	0,01	0,01	0,00	0,01	±0,7
1250,00	85,00	84,90	0,04	-0,10	0,00	-0,10	±1,0
1600,00	85,01	84,90	0,00	-0,11	-0,10	-0,01	±1,0
2000,00	85,02	84,80	0,00	-0,22	-0,20	-0,02	±1,0
2500,00	85,01	84,60	0,00	-0,41	-0,30	-0,11	±1,0
3150,00	85,01	84,40	0,00	-0,61	-0,50	-0,11	±1,0
4000,00	85,01	84,10	0,00	-0,91	-0,80	-0,11	±1,0
5000,00	85,00	83,70	0,00	-1,30	-1,30	0,00	±1,5
8000,00	74,01	69,00	0,01	-5,01	-3,00	-2,01	+1,5; -2,5

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7.3. A - Frekans Ağırlıklı Akustik Seviye Doğrusallığı Testi

A - Frequency Weighted Acoustic Level Linearity Test

Ses Seviyesi Ölçüm Cihazları / Seviye Doğrusallığı Testi

Frekans *Frequency* *Hz*	Uygulanan *Applied SPL* *dB*	Okunan Ses *Measured Sound Level* *dB*	Standart *Standard Deviation* *%*	Tepki *Response Difference* *dB*	A-Ağırlıklı Filtre *A-Weighted Filter Characterization* *dB*	Tepki Farkı *Response Deviation* *dB*	Tolerans *Tolerance* *dB*
1000,00	74,02	74,10	0,13	0,08	0,00	0,08	±0,7
1000,00	84,02	84,00	0,03	-0,02	0,00	-0,02	±0,7
1000,00	94,02	94,00	0,01	-0,02	0,00	-0,02	±0,7
1000,00	104,03	104,00	0,00	-0,03	0,00	-0,03	±0,7
1000,00	114,02	114,00	0,01	-0,02	0,00	-0,02	±0,7
1000,00	123,71	123,70	0,01	-0,01	0,00	-0,01	±0,7

8. Uygunluk Beyanı

Statement of Compliance

Ölçüm sonuçları ve ölçüm belirsizliği yukarıda verilmiştir. Kullanıcı bunları dikkate alarak uygunluğuna karar vermelidir. Beyan edilen genişletilmiş belirsizlik değeri standart belirsizliğin normal dağılımı için; yaklaşık % 95 güvenirlik seviyesini sağlayan k=2 kapsam faktörü ile çarpımının sonucudur. Standart ölçüm belirsizliği GUM ve EA-4/02 dokümanlarına uygun olarak belirlenmiştir. Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı bir bölümüdür.

The measurement results and measurement uncertinity were given above. The user have to consider the results and decide compliance of the device. The reported expended uncertainity of measurement is stated as the standart uncertainity of multitude by coverage factor k=2, which for a normal distribution corresponds to covarage of approximately 95%. The standard measurement uncertainty is defined according to the GUM and EA-4/02documents. Measurement results, the expanded measurement uncertainty of measurement and calibration methods, is an integral part of the this certificate.

9. Açıklamalar

Remarks

Bu sertifikada bulunan sonuçlar cihazın kalibrasyon tarihindeki durumu kapsar ve uzun dönem kararlığı hakkında bir öngörü içermez.

The result reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument

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PROTOS
KALİBRASYON ÖLÇÜM EĞİTİM VE DANIŞMANLIK HİZMETLERİ TİCARET LTD. ŞTİ.
KALİBRASYON LABORATUVARI
Mehmet Akif Mh. Tavukçuyolu Cd. No: 150/1 Ümraniye ISTANBUL

TÜRKAK Kalibrasyon TS EN ISO/IEC 17025 AB-0078-K

Kalibrasyon Sertifikası
Calibration Certificate

AB-0078-K
08AK0323
03-23

Cihazın Sahibi/ adresi *Customer / address*	**: ANKALAB ÇEVRE ANALİZ LABORATUVARI SAN. TİC. LTD. ŞTİ** Gökkuşağı Mahallesi 1200. Sk. 12/13 Dikmen / Çankaya ANKARA
İstek Numarası *Order No.*	**: 422/2023**
Makine/Cihaz *Instrument/Device*	**: Ses Seviyesi Ölçer**
İmalatçı *Manufacturer*	**: SVANTEK**
Tip *Type*	**: SVAN957**
Seri Numarası *Serial Number*	**: 12366**
Kalibrasyon Tarihi *Date of Calibration*	**: 03.03.2023**
Sertifikanın Sayfa Sayısı *Number of pages of the Certificate*	**: 5**

Bu kalibrasyon sertifikası, Uluslararası Birimler Sisteminde(SI) tanımlanmış birimleri realize eden ulusal ölçüm standardlarına izlenebilirliği belgeler.
This calibration certificate documents the traceability to national standards,which realize the unit of measurement according to the International System of Units (SI).

Kalibrasyon laboratuvarı olarak faaliyet gösteren PROTOS, TÜRKAK'tan AB-0078-K ile TS ISO IEC 17025: 2017 standardına göre akredite edilmiştir.

PROTOS accredited by TÜRKAK under registration number AB-0078-K for TS ISO IEC 17025: 2017 as Calibration Laboratory"

Türk Akreditasyon Kurumu(TÜRKAK) kalibrasyon sertifikalarının tanınırlığı konusunda Avrupa Akreditasyon Birliği(EA) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği(ILAC) ile karşılıklı tanıma anlaşması imzalamıştır.

Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of calibration certificates

Ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ve kalibrasyon metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.

The measurements, the uncertainties with confidence probability and calibration methods are given on the following pages which are part of this certificate.

Mühür/Kaşe *Seal*	**Yayınlandığı Tarih** *Date*	**Kalibrasyonu Yapan** *Calibrated by*	**Onaylayan** *Approval*
PROTOS KALİBRASYON	03.03.2023	e - imzalıdır. Haydar ÖZBEK	***Tarih/Date*** e - imzalıdır. 2023.03.07 15:14:50 +03'00' Kadir Balcan FIRAT

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
İmzasız sertifikalar geçersizdir.
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	08AK0323
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1. Test Edilen Cihaz

Adı	Üretici	Model / Tip	Seri No	Ölçme aralığı veya Tanımlama
Ses Seviyesi Ölçer	SVANTEK	SVAN957	12366	SINIF:1 Frekans Ağırlığı: A,C,Lin
Ön Yükselteç	SVANTEK	SV12L	24173	Zaman Ağırlığı : Fast, Slow
Mikrofon	ACO	7052E	71251	

2. Kalibrasyonun Yapıldığı Yer : Protos Kalibrasyon Laboratuvarı

3. Cihazın Laboratuvara Kabul Tarihi : 02.03.2023

4. Kalibrasyonda Kullanılan Referans Cihazlar :

Adı	Üretici	Model / Tip	Seri No	İzlenebilirlik
Çok Fonksiyonlu Akustik Kalibratör	B&K	4226	2692346	TUBİTAK-UME-G2AK 0114/19.07.2022

5. Kalibrasyon Prosedürü : PR702.08

Ses düzeyi ölçerin (SLM) A-Ağırlıklı, C-Ağırlıklı ve LIN-Ağırlıklı filtrelerinin 31,5 Hz-16 kHz frekans aralığında tepkileri, doğrusallığı, F:Fast ve S:Slow zaman ağırlıklarının tepkileri ve yarım saatlik çalışmada kararlılığı kontrol edildi.Kalibrasyon sırasında referans cihaz tarafından üretilen ses basınç düzeyi değerleri ortam şartlarına göre düzeltilerek dikkate

6. Çevre Şartları

Sıcaklık: (24,3)°C Bağıl Nem:(42,7)%rh
Basınç: (100,0)kPa

7. Kalibrasyon Sonuçları

Ayar Öncesi Değer : 93,5 **dB**
Ayar Sonrası Değer : 94,1 **dB**

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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1. Kalibrasyon Sonuçları

Tablo 1. SLM A-ağırlıklı filtrenin frekans tepkileri sonuçları

Frekans (Hz)	Nominal SPL (dB)	A-ağırlıklı filtrenin karakteristiği (dB)	Hesaplanan SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
31	93,9	-39,4	54,5	54,6	0,1	± 1,5
63	94,0	-26,2	67,8	68,1	0,3	± 1,0
125	94,0	-16,1	77,9	78,1	0,2	± 1,0
250	94,0	-8,6	85,4	85,5	0,1	± 1,0
500	94,0	-3,2	90,8	90,9	0,1	± 1,0
1000	94,0	0,0	94,0	94,1	0,1	± 0,7
2000	94,0	1,2	95,2	95,4	0,2	± 1,0
4000	94,0	1,0	95,0	95,1	0,1	± 1,0
8000	93,9	-1,1	92,8	92,0	-0,8	+1,5;-2,5
12500	93,8	-4,3	89,5	87,6	-1,9	+2,0;-5,0
16000	93,6	-6,6	87,0	85,3	-1,7	+2,5;-16,0

Tablodaki değerler SLM A-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Tablo 2. SLM C-ağırlıklı filtrenin frekans tepkileri sonuçları

Frekans (Hz)	Nominal SPL (dB)	C-ağırlıklı filtrenin karakteristiği (dB)	Hesaplanan SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
31	93,9	-3,0	90,9	91,1	0,2	± 1,5
63	94	-0,8	93,2	93,5	0,3	± 1,0
125	94	-0,2	93,8	94,0	0,2	± 1,0
250	94	0,0	94,0	94,1	0,1	± 1,0
500	94	0,0	94,0	94,1	0,1	± 1,0
1000	94	0,0	94,0	94,1	0,1	± 0,7
2000	94	-0,2	93,8	93,9	0,1	± 1,0
4000	94	-0,8	93,2	93,3	0,1	± 1,0
8000	93,9	-3,0	90,9	90,1	-0,8	+1,5;-2,5
12500	93,8	-6,2	87,6	86,9	-0,7	+2,0;-5,0
16000	93,6	-8,5	85,1	85,0	-0,1	+2,5;-16,0

Tablodaki değerler SLM C-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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Tablo 3. SLM Lin-ağırlıklı filtrenin frekans tepkileri sonuçları

Frekans (Hz)	Nominal SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
31	93,9	94,1	0,2	± 1,5
63	94	94,1	0,1	± 1,0
125	94	94,1	0,1	± 1,0
250	94	94,1	0,1	± 1,0
500	94	94,1	0,1	± 1,0
1000	94	94,1	0,1	± 0,7
2000	94	94,1	0,1	± 1,0
4000	94	94,0	0,0	± 1,0
8000	93,9	93,8	-0,1	+1,5;-2,5
12500	93,8	93,5	-0,3	+2,0;-5,0
16000	93,6	93,0	-0,6	+2,5;-16,0

Tablodaki değerler SLM Lin-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Tablo 4. SLM 1 kHz'deki doğrusallık kontrolü sonuçları

Frekans (Hz)	Uygulanan		Ölçülen		Tepki Farkı (dB)	Tolerans
	SPL (dB)	Seviye	SPL (dB)	Seviye		
1000	94,0	0,0	94,1	0,0	0,0	±0,3
	104,0	10,0	104,1	10,0	0,0	
	114,0	20,0	114,1	20,0	0,0	

Tablodaki değerler SLM A-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

Tablo 5. SLM Zaman Ağırlıklı filtrelerinin Hızlı(Fast) ve Yavaş(Slow) Kontrolü Sonuçları

Frekans (Hz)	Hızlı			
	Nominal SPL (dB)	Olçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
1000	105,0	105,0	0,0	±0,5
2000	105,0	105,1	0,1	
4000	105,0	105,1	0,1	
Frekans (Hz)	Yavaş			
	Nominal SPL (dB)	Ölçülen SPL (dB)	Tepki Farkı (dB)	Tolerans (dB)
1000	101,9	102,0	0,1	±0,5
2000	101,9	102,1	0,2	
4000	101,9	102,1	0,2	

Tablodaki değerler SLM A-ağırlıklı filtre modunda iken elde edilmiştir.

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Tablo 6. SLM Yarım saatlik çalışmasında okunan değerdeki en büyük sapma sonuçları

İlk Değer SPL (dB)	Son Değer SPL (dB)	En büyük sapma * (dB)	Toleranı (dB)
94,1	94,1	0,0	± 0,3

*En büyük sapma, ölçülen değerdeki yarım saatlik okuma süresi boyunca olan değişimdir.
Tablodaki değerler SLM A-ağırlıklı filtre ve Fast modunda iken elde edilmiştir.

8. Ölçüm Belirsizliği
Ses düzeyi ölçerin kalibrasyonundaki belirsizlik 0,2 dB'dir.
Beyan edilen genişletilmiş ölçüm belirsizliği, standart belirsizliğin k=2 olarak alınan genişletme katsayısı ile çarpımı sonucunda bulunan değerdir ve %95 oranında güvenilirlik sağlamaktadır.

9. Görüşler, Açıklamalar
Kalibrasyon sonuçları sadece kalibrasyonu yapılan ses düzeyi ölçer cihazına aittir. Cihazın performansı için gerekli çevre şartlarında kullanımından ve uygun aralıklarla kalibrasyonunun sağlanmasından kullanıcı sorumludur.

10. Ölçüm Sonuçlarının Şartnamelere veya Standartlara Uygunluk Beyanı
Ölçüm sonuçları IEC 61672-1 standartında 1.Sınıf Ses Düzeyi Ölçerler için verilen toleranslarla karşılaştırılmıştır. Herhangi bir uygunluk beyanı talebi bulunmamaktadır.

11. Karar Kuralı
Karar kuralı yoktur.

Bu sertifika, laboratuvarın yazılı izni olmadan kısmen kopyalanıp çoğaltılamaz.
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ACCREDITATION CERTIFICATE

Türk Akreditasyon Kurumu

AKREDİTASYON SERTİFİKASI

Deney Laboratuvarı olarak faaliyet gösteren,

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

Merkez Adres: ATA MAH. 1069 CAD. No:3/1 ÇANKAYA/ANKARA Ankara / Türkiye

TÜRKAK tarafından yapılan denetim sonucunda TS EN ISO/IEC 17025:2017 standardına göre Ek'te yer alan kapsamlarda akredite edilmiştir.

Akreditasyon No : AB-0415-T

Akreditasyon Tarihi : 07.11.2010

Revizyon Tarihi / No : 25.02.2025 / 15

Bu Sertifika, yukarıda açık adı ve adresi yazılı Kuruluşun TS EN ISO/IEC 17025:2017 Standardına, ilgili Yönetmelik ve Tebliğlere uygunluğunu sürdürmesi halinde **04.07.2027** tarihine kadar geçerlidir.

Gülden Banu Müderrisoğlu
Genel Sekreter

Türk Akreditasyon Kurumu (TÜRKAK) ISO/IEC 17025 alanında Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile çok taraflı anlaşma (MLA/MRA) imzalamıştır.

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

F701-040

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Akreditasyon Sertifikası Eki (Sayfa 1/20)
Akreditasyon Kapsamı

TÜRKAK
Deney
TS EN ISO/IEC 17025
AB-0415-T

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

Akreditasyon No: AB-0415-T
Revizyon No: 15 Tarih: 25.02.2025

Deney Laboratuvarı

Adresi :
ATA MAH. 1069 CAD. No:3/1 ÇANKAYA/ANKARA Ankara / Türkiye

Telefon : +90 312 472 6664
Fax : +90 312 473 6215
EPosta : info@ankalab.com.tr
Web Sitesi : www.ankalab.com.tr

Çevresel Deneyler

Deneyi Yapılan Malzemeler / Ürünler	Deney Adı	Deney Metodu (Ulusal, Uluslararası Standartlar, İşletme-içi Metotlar)
Baca Gazı	Sabit Kaynak Emisyonları-Duman Yoğunluğunun (İsilik) Tayini Bacharach Metodu	TS 9503 *
Baca Gazı	Sabit Kaynak Emisyonları-Karbonmonoksit (CO) Kütle Derişiminin Tayini Ölçüm: Elektrokimyasal Yöntem	TS ISO 12039 *
Baca Gazı	Sabit Kaynak Emisyonları-Bacalarda Gaz Akış Hız ve Debi Tayini Ölçüm: L Tipi Pitot Tüpü Ölçüm: S Tipi Pitot Tüpü	TS ISO 10780 *
Baca Gazı	Sabit Kaynak Emisyonları-Oksijen (O_2) Kütle Derişimlerinin Tayini Ölçüm: Elektrokimyasal Yöntem	TS ISO 12039 *
Baca Gazı	Sabit Kaynak Emisyonları-Azot Monoksit (NO), Azot Dioksit (NO_2) ve Azot Oksit (NO_x) Emisyonlarının Tayini Elektrokimyasal Hücre Metodu	EPA CTM 022 *
Baca Gazı	Sabit Kaynak Emisyonları-Kükürtdioksit (SO_2) Kütle Derişiminin Tayini Ölçüm: Elektrokimyasal Hücre Metodu	TS ISO 7935 *
Su	Nehirlerden ve Akarsulardan Numune Alma	TS EN ISO 5667-6
Su	Bulanıklık Tayini Nefelometrik Metot	SM 2130 B
Su	Çözünmüş Oksijen Tayini Azid Modifikasyonu Metodu	SM 4500-O C
Su	İletkenlik Tayini Laboratuvar Metodu	SM 2510 B
Su	Sıcaklık Tayini Laboratuvar ve Saha Metodu	SM 2550 B
Su	pH Tayini Elektrometrik Metot	SM 4500 H+ B
Su	Askıda Katı Madde (AKM) Tayini Gravimetrik Metot	TS EN 872
Su	Amonyum/Amonyum Azotu Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-NH_3 B SM 4500-NH_3 F
Su	Florür Tayini Ön İşlem: Distilasyon Metodu Ölçüm: SPADNS Metodu	SM 4500-F B SM 4500-F D

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 2/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

Akreditasyon No: AB-0415-T
Revizyon No. 15 Tarih: 25.02.2025

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Su	Klorofil-a Tayini Spektrofotometrik Metot	TS 9092 ISO 10260
Su	Krom (VI) Tayini Spektrofotometrik Metot	SM 3500-Cr B
Su	Renk Tayini Spektrofotometrik Metot	SM 2120 C
Su	Renk Tayini Spektrofotometrik Metot	TS EN ISO 7887 B
Su	Sülfür Tayini Spektrofotometrik Metot	SM 4500-S^{2-} D
Su	Serbest Klor Tayini Spektrofotometrik Metot	SM 4500-Cl G
Su	Serbest Siyanür Tayini Spektrofotometrik Metot	SM 4500-CN E
Su	Sülfat Tayini Gravimetrik Metot	SM 4500 SO_4^{2-} D
Su	Toplam Siyanür Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-CN C SM 4500-CN E
Atıksu	Numune Alma Teknikleri	TS ISO 5667-10
Su	Toplam Kjeldahl Azotu Tayini Makro Kjeldahl Metodu	SM 4500-N_{org} B
Atıksu	Çözünmüş Oksijen Tayini Azid Modifikasyonu Metodu	SM 4500-O C
Atıksu	Çözünmüş Oksijen Tayini Membran Elektrot Metodu	SM 4500-O G
Atıksu	İletkenlik Tayini Laboratuvar Metodu	SM 2510 B
Atıksu	pH Tayini Elektrometrik Metot	SM 4500 H^+ B
Atıksu	Sıcaklık Tayini Laboratuvar ve Saha Metodu	SM 2550 B
Atıksu	Tuzluluk Tayini Elektriksel İletkenlik Metodu	SM 2520 B
Atıksu	Askıda Katı Madde (AKM) Tayini Gravimetrik Metot	TS EN 872

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 3/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Atıksu	Alkalinite Tayini Titrimetrik Metot	SM 2320 B
Atıksu	Biyolojik Oksijen İhtiyacı (BOİ) Tayini 5 Günlük BOİ Testi	SM 5210 B
Atıksu	Amonyum/Amonyum Azotu Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-NH_3 B SM 4500-NH_3 F
Atıksu	Çökebilir Katı Madde(ÇKM) Tayini Hacimsel Metot	SM 2540 F
Atıksu	Florür Tayini Ön İşlem: Distilasyon Metodu Ölçüm: SPADNS Metodu	SM 4500-F B SM 4500-F D
Atıksu	Fenol Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 5530 B SM 5530 D
Atıksu	Fosfat/Fosfat Fosforu Tayini Spektrofotometrik Metot	SM 4500-P C
Atıksu	Fosfat/Fosfat Fosforu Tayini Spektrofotometrik Metot	SM 4500-P E
Atıksu	Kimyasal Oksijen İhtiyacı (KOİ) Tayini Açık Reflaks-Titrimetrik Metot	SM 5220 B
Atıksu	Krom (VI) Tayini Spektrofotometrik Metot	SM 3500-Cr B
Atıksu	Nitrit/Nitrit Azotu Tayini Spektrofotometrik Metot	SM 4500-NO_2^- B
Atıksu	Renk Tayini Spektrofotometrik Metot	SM 2120 C
Atıksu	Sülfür Tayini Spektrofotometrik Metot	SM 4500-S_2^- D
Atıksu	Serbest Siyanür Tayini Spektrofotometrik Metot	SM 4500-CN E
Atıksu	Renk Tayini Spektrofotometrik Metot	TS EN ISO 7887 B
Atıksu	Sülfat Tayini Gravimetrik Metot	SM 4500 SO_4^{2-} D
Atıksu	Toplam Çözünmüş Madde (TÇM) Tayini Gravimetrik Metot	SM 2540 C

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Akreditasyon Sertifikası Eki (Sayfa 4/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Atıksu	Toplam Fosfor Tayini Ön İşlem: Özütleme Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-P B SM 4500-P C
Atıksu	Toplam Kjeldahl Azotu (TKN) Tayini Makro Kjeldahl Metodu	SM 4500-N_{org} B
Atıksu	Toplam Siyanür Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-CN C SM 4500-CN E
Deniz Suyu	Deniz Sularından Numune Alma	TS ISO 5667-9
Deniz Suyu	Çözünmüş Oksijen Tayini Azid Modifikasyonu Metodu	SM 4500-O C
Atıksu	Yağ ve Gres Tayini Ön İşlem: Solvent Ekstraksiyon Metodu Ölçüm: Gravimetrik Metot	SM 5520 B
Deniz Suyu	Çözünmüş Oksijen Tayini Membran Elektrot Metodu	SM 4500-O G
Deniz Suyu	pH Tayini Elektrometrik Metot	SM 4500 H^+ B
Deniz Suyu	Sıcaklık Tayini Laboratuvar ve Saha Metodu	SM 2550 B
Deniz Suyu	Klorofil-a Tayini Spektrofotometrik Metot	TS 9092 ISO 10260
Deniz Suyu	Krom (VI) Tayini Spektrofotometrik Metot	SM 3500-Cr B
Deniz Suyu	Amonyum/Amonyum Azotu Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-NH_3 B SM 4500-NH_3 F
Deniz Suyu	Nitrat/Nitrat Azotu Tayini Spektrofotometrik Metot	SM 4500-NO_3^- E
Deniz Suyu	Renk Tayini Spektrofotometrik Metot	SM 2120 C
Deniz Suyu	Renk Tayini Spektrofotometrik Metot	TS EN ISO 7887 B
Deniz Suyu	Toplam Kjeldahl Azotu (TKN) Tayini Makro Kjeldahl Metodu	SM 4500-N_{org} B
Deniz Suyu	Toplam Siyanür Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-CN C SM 4500-CN E

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Akreditasyon Sertifikası Eki (Sayfa 5/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

Akreditasyon No: AB-0415-T
Revizyon No. 15 Tarih: 25.02.2025

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Deniz Suyu	Yüzey Aktif Madde (MBAS) Tayini Ön İşlem: Sublation Aparatı ile Ayırma Ölçüm: Spektrofotometrik Metot	SM 5540 B SM 5540 C
Atık	Katı Atıklardan Numune Alma	TS 12090
Arıtma Çamuru	Kanalizasyon ve Su Arıtma Tesislerinden Çamur Numunesi Alma	TS EN ISO 5667-13
Arıtma Çamuru	Elektriksel İletkenlik Tayini Elektrometrik Metot	TS ISO 11265
Toprak	Yüzey Topraktan Numune Alma, Numunelerin Taşınma ve Muhafazası	TS 9923
Toprak	Elektriksel İletkenlik Tayini Elektrometrik Metot	TS ISO 11265
Toprak	pH Tayini Elektrometrik Metot	TS ISO 10390
Baca Gazı	Sabit Kaynak Emisyonları-Tozun Düşük Aralıktaki Kütle Derişiminin Tayini (5-50 mg/m³) Gravimetrik Metot	TS EN 13284-1
Baca Gazı	Sabit Kaynak Emisyonları-Baca Dışı Örnekleme ile Toz Emisyon Miktarının Tayini Gravimetrik Metot	EPA Metot 5
Baca Gazı	Sabit Kaynak Emisyonları-Baca Gazlarında Düşük Derişimlerde Bulunan Gaz Halindeki Toplam Organik Karbonun Kütle Derişiminin Tayini FID Analizörü	TS EN 12619 *
Akustik-Gürültü	Akustik-Çevresel Gürültünün Tanımı, Ölçümü ve Değerlendirilmesi - Bölüm 2: Ses Basıncı Seviyelerinin Belirlenmesi	TS ISO 1996-2
Atıksu	Serbest Klor Tayini Spektrofotometrik Metot	SM 4500-Cl G
Atıksu	Metilen Mavisi ile Reaksiyon Veren Yüzey Aktif Maddeler (MBAS) Tayini Spektrofotometrik Metot	SM 5540 C SM 5540 B
Su	Metilen Mavisi ile Reaksiyon Veren Yüzey Aktif Maddeler (MBAS) Tayini Spektrofotometrik Metot	SM 5540 C SM 5540 B
Deniz Suyu	Işık Geçirgenliği/Seki Diski Derinliği Tayini Disk Metodu	TS EN ISO 7027-2
Baca Gazı	Sabit Kaynak Emisyonları-Nem Probu ile Nem Tayini (≤180 °C baca sıcaklığı için)	İşletme İçi Metot "TL31 Rev.01"

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Akreditasyon Sertifikası Eki (Sayfa 6/20)
Akreditasyon Kapsamı

TÜRKAK Deney TS EN ISO/IEC 17025 AB-0415-T	**ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ** **Akreditasyon No: AB-0415-T** **Revizyon No. 15 Tarih: 25.02.2025**
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Akustik-Gürültü	Akustik-Çevre Gürültüsünün Tarifi, Ölçülmesi ve Değerlendirilmesi - Bölüm 1: Temel Büyüklükler ve Değerlendirme İşlemleri	TS ISO 1996-1
Akustik-Gürültü	Sesin Dışarıda Yayılırken Azalması - Bölüm 2: Genel Hesaplama Yöntemi	TS ISO 9613-2
Akustik-Gürültü	Gürültü Kaynaklarının Ses Gücü Seviyelerinin ve Ses Enerji Seviyelerinin Ses Basıncı Kullanılarak Belirlenmesi - Yansıtıcı Bir Düzlem Üzerindeki Temel Olarak Serbest Bir Alanda Uygulanan Mühendislik Yöntemleri	TS EN ISO 3744
Akustik-Gürültü	Gürültü Kaynaklarının Ses Gücü Seviyelerinin ve Ses Enerji Seviyelerinin Ses Basıncı Kullanılarak Belirlenmesi - Yansıtıcı Bir Düzlem Üzerinde Çevreleyici Bir Ölçüm Yüzeyinin Kullanıldığı Gözlem Yöntemi	TS EN ISO 3746

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Akreditasyon Sertifikası Eki (Sayfa 7/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Akustik-Gürültü	Çoklu Gürültü Kaynağına Sahip Sanayi Tesislerinde Yapılan Ses Basıncı Düzeyi Ölçümlerinden Ses Gücü Düzeyinin (ΔL_{oc}, ΔL_F, ΔL_M, ΔL_Q , L_{pA}, L_W) Tespiti	TS ISO 8297
Titreşim	Binalarda Titreşimin Ölçülmesi ve Yapı Hasarının Tespiti (v r, a, V)	TS ISO 4866
Titreşim	Madencilik Faaliyetleri Sonucunda Oluşan Hava Şoku ve Yer Titreşiminin Ölçülmesi (a, v)	TS 10354
Su	Yeraltı Sularından Numune Alma	TS ISO 5667-11
Su	Göl ve Göletlerden Numune Alma	TS ISO 5667-4
Su	Çözünmüş Oksijen Tayini Membran Elektrot Metodu	SM 4500-O G
Atıksu	Bulanıklık Tayini Nefelometrik Metot	SM 2130 B
Atıksu	Fenol Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 5530 B SM 5530 C
Su	Nitrat/Nitrat Azotu Tayini Spektrofotometrik Metot	SM 4500-NO_3^- E
Atıksu	Nitrat/ Nitrat Azotu Tayini Spektrofotometrik Metot	SM 4500-NO_3^- E
Arıtma Çamuru	pH Tayini Elektrometrik Metot	TS ISO 10390
Su	Işık Geçirgenliği/Seki Diski Derinliği Tayini Disk Metodu	TS EN ISO 7027-2
Titreşim	Hidrolik Güç Kaynakları ve Pompa Tesisatlarındaki Makine Setlerinin Dönmeyen Parçalarında Titreşimin Ölçülmesi ve Değerlendirilmesi (V_{rms})	ISO 20816-5

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ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Atıksu	Balık Biyodeneyi (ZSF) Tayini	SKKY Numune Alma ve Analiz Metotları Tebliği Ek-1
Baca Gazı	Sabit Kaynak Emisyonları-Tanecikli Maddenin Kütle Derişiminin Tayini (20-1000 mg/m^3) Gravimetrik Metot	TS ISO 9096
Baca Gazı	Sabit Kaynak Emisyonları-Baca İçi Örnekleme ile Toz Emisyon Miktarının Tayini Gravimetrik Metot	EPA Metot 17
Baca Gazı	Sabit Kaynak Emisyonları-Baca Gazında Nem Tayini Ölçüm: Volumetrik Metot Ölçüm: Gravimetrik Metot	EPA Metot 4
Baca Gazı	Sabit Kaynak Emisyonları-Bacalarda Gaz Akış Hız ve Debi Tayini S Tipi Pitot Tüpü	EPA Metot 2*
Baca Gazı	Sabit Kaynak Emisyonları-Sülfürik Asit (H_2SO_4) Buharı, Sülfür Trioksit (SO_3), Kükürt Dioksit (SO_2) Miktarının Tayini Titrimetrik Metot (Baryum-Thorin)	EPA Metot 8
Baca Gazı	Sabit Kaynak Emisyonları-Gaz Halindeki Her Bir Organik Bileşiğin Kütle Derişiminin Tayini (1,2,4- Trimetilbenzen, 1,2-Diklorobenzen, 1,4-Diklorobenzen, İzopropenilbenzen, 2-Klortoluen, 4-Klortoluen, 1,3,5-Trimetilbezen, n-propilbenzen, Dietileter, Bromoklormetan, Bromodiklorometan, Metil iyodür, Tetrahidrofuran, 1,1-Dikloroeten (viniliden klorür), Kloroform (Triklormetan), Karbontetraklorür, 1,1-Dikloroetan (Etilenklorür), 1,2-Dikloroetan, 1,1,1- Trikloroetan, 1,1,2-Trikloroetan, Klorobenzen, 1,2-Dikloropropan, Asetonitril, İzobutil alkol, Kloropren, 1,4-Dioksan, Benzen, Toluen, Naftalin, Etilbenzen, Bromoform, 1,2-Dikloretilen, Akrilonitril, m,p-Ksilen, o-Ksilen, Stiren) Numune Alma: Örnekleme Tüpü (Aktif Karbon) Ön İşlem: Çözücü Desorpsiyonu Metodu Ölçüm: GC-MS Metodu	TSE CEN/TS 13649
Baca Gazı	Sabit Kaynak Emisyonları-HCl Olarak Tanımlanan Gaz Halindeki Klorürlerin Kütle Konsantrasyonunun Tayini Ölçüm: Spektrofotometrik Metot Ölçüm: İyon Kromotografi Metodu	TS EN 1911
Baca Gazı	Sabit Kaynak Emisyonları-Toplam Flor (F) Miktarının Tayini Spektrofotometrik (SPADNS-Zirkonyum) Metodu	EPA Metot 13 A
Baca Gazı	Sabit Kaynak Emisyonları-Hidrojen Siyanür (HCN) Tayini Spektrofotometrik Metot	CARB 426
Baca Gazı	Sabit Kaynak Emisyonları-Krom VI (Cr^{+6}) Tayini Spektrofotometrik Metot	CARB 425
Baca Gazı	Sabit Kaynak Emisyonları-Doğal Gaz Kullanan Sabit Kaynaklarda Formaldehit Tayini Spektrofotometrik Metot	EPA Metot 323
Su	Tuzluluk Tayini Elektriksel İletkenlik Metodu	SM 2520 B
Su	Askıda Katı Madde (AKM) Tayini Gravimetrik Metot	SM 2540 D

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Su	Amonyum/Amonyum Azotu Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Titrimetrik Metot	SM 4500-NH_3 B SM 4500-NH_3 C
Su	Alkalinite Tayini Titrimetrik Metot	SM 2320 B
Su	Biyokimyasal Oksijen İhtiyacı (BOİ) Tayini 5 Günlük BOİ Testi	SM 5210 B
Su	Çökebilir Katı Madde Tayini Hacimsel Metot	SM 2540 F
Su	Fenol Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 5530 B SM 5530 C
Su	Fenol Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 5530 B SM 5530 D
Su	Fosfat/Fosfat Fosforu Tayini Spektrofotometrik Metot	SM 4500-P E
Su	Hidrokarbonlar Tayini Ön İşlem: Solvent Ekstraksiyon Metodu Ölçüm: Gravimetrik Metot	SM 5520 B ve F
Su	Kimyasal Oksijen İhtiyacı (KOİ) Tayini Açık Reflaks-Titrimetrik Metot	SM 5220 B
Su	Nitrit/Nitrit Azotu Tayini Spektrofotometrik Metot	SM 4500-NO_2^- B
Su	Nitrat/Nitrat Azotu Tayini Spektrofotometrik Metot	EPA 352.1

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 10/20)
Akreditasyon Kapsamı

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Akreditasyon No: AB-0415-T
Revizyon No. 15 Tarih: 25.02.2025

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Su	Bağlı Klor Tayini Spektrofotometrik Metot	SM 4500-Cl G
Su	Toplam Klor Tayini Spektrofotometrik Metot	SM 4500-Cl G
Su	Sülfat Tayini Spektrofotometrik Metot	SM 4500 SO_4^{2-} E
Su	Toplam Çözünmüş Madde (TÇM) Tayini Gravimetrik Metot	SM 2540 C
Su	Toplam Fosfor Tayini Ön İşlem: Özütleme Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-P B SM 4500-P C
Su	Yağ ve Gres Tayini Ön İşlem: Solvent Ekstraksiyon Metodu Ölçüm: Gravimetrik Metot	SM 5520 B
Atıksu	Askıda Katı Madde (AKM) Tayini Gravimetrik Metot	SM 2540 D
Atıksu	Hidrazin Tayini Spektrofotometrik Metot	ASTM D1385-07
Atıksu	Hidrokarbonlar Tayini Ön İşlem: Solvent Ekstraksiyon Metodu Ölçüm: Gravimetrik Metot	SM 5520 B ve F
Atıksu	Nitrat/ Nitrat Azotu Tayini Spektrofotometrik Metot	EPA 352.1
Atıksu	Sülfat Tayini Spektrofotometrik Metot	SM 4500 SO_4^{2-} E

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 11/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

Akreditasyon No: AB-0415-T
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Atıksu	Toplam Fosfor Tayini Ön İşlem: Özütleme Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-P B SM 4500-P E
Deniz Suyu	Bulanıklık Tayini Nefelometrik Metot	SM 2130 B
Deniz Suyu	Tuzluluk Tayini Elektriksel İletkenlik Metodu	SM 2520 B
Deniz Suyu	Askıda Katı Madde (AKM) Tayini Gravimetrik Metot	SM 2540 D
Deniz Suyu	Askıda Katı Madde (AKM) Tayini Gravimetrik Metot	TS EN 872
Deniz Suyu	Zehirlilik/Balık Biyodeneyi (ZSF) Tayini	İşletme İçi Metot "TL157 Rev.01" (SKKY Numune Alma ve Analiz Metotları Tebliği Ek-1 ve TS 5676 modifiye edilmiştir.)
Deniz Suyu	Florür Tayini Ön İşlem: Distilasyon Metodu Ölçüm: SPADNS Metodu	SM 4500-F B SM 4500-F D
Deniz Suyu	Fosfat/Fosfat Fosforu Tayini Spektrofotometrik Metot	SM 4500 P C
Deniz Suyu	Fosfat/Fosfat Fosforu Tayini Spektrofotometrik Metot	SM 4500 P E
Deniz Suyu	Fenol Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 5530 B SM 5530 C
Deniz Suyu	Nitrit/Nitrit Azotu Tayini Spektrofotometrik Metot	SM 4500-NO_2^- B

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 12/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Deniz Suyu	Nitrat/Nitrat Azotu Tayini Spektrofotometrik Metot	EPA 352.1
Deniz Suyu	Parçalanabilir Organik Kirleticilerin Tayini 5-Günlük BOİ Test Metodu	SM 5210 B
Deniz Suyu	Sülfür Tayini Spektrofotometrik Metot	SM 4500-S^{2-} D
Deniz Suyu	Toplam Fosfor Tayini Ön İşlem: Özütleme Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-P B SM 4500-P E
Deniz Suyu	Toplam Fosfor Tayini Ön İşlem: Özütleme Metodu Ölçüm: Spektrofotometrik Metot	SM 4500-P B SM 4500-P C
Deniz Suyu	Serbest Siyanür Tayini Spektrofotometrik Metot	SM 4500-CN E
Deniz Suyu	Yağ ve Gres Tayini Ön İşlem: Solvent Ekstraksiyon Metodu Ölçüm: Gravimetrik Metot	SM 5520 B
Atık	Klorür Tayini Ön İşlem: Katıdan Özütleme Metodu Ölçüm: Titrimetrik Metot	TS EN 12457-4 SM 4500-Cl^- B
Atık	Katı Atıklardan Numune Alma	TS 12090

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 13/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Atık	Florür Tayini Ön İşlem: Katıdan Özütleme Metodu Ön İşlem: Distilasyon Metodu Ölçüm: SPADNS Metodu	TS EN 12457-4 SM 4500-F B SM 4500-F D
Atık	Kuru Madde (%) Muhtevası / Nem (%) Tayini Gravimetrik Metot	TS 9546 EN 12880
Atık	Kuru Kütlenin Kızdırma Kaybının Tayini Gravimetrik Metot	TS EN 15935
Atık	Sülfat Tayini Ön İşlem: Katıdan Özütleme Metodu Ölçüm: Gravimetrik Metot	TS EN 12457-4 SM 4500 SO_4^{2-} D
Atık	Sülfat Tayini Ön İşlem: Katıdan Özütleme Metodu Ölçüm: Türbidimetrik Metot	TS EN 12457-4 SM 4500-SO_4^{2-} E

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 14/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

Akreditasyon No: AB-0415-T
Revizyon No. 15 Tarih: 25.02.2025

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Atık	Toplam Çözünmüş Madde Ön İşlem: Katıdan Özütleme Metodu Ölçüm: Gravimetrik Metot	TS EN 12457-4 SM 2540 C
Toprak	Yüzey Topraktan Numune Alma, Numunelerin Taşınma ve Muhafazası	TS 9923
Toprak	Kuru Madde (%) Muhtevası / Nem (%) Tayini Gravimetrik Metot	TS 9546 EN 12880
Toprak	Yanma Kaybı Tayini (550 ± 25)°C Gravimetrik Metot	TS EN 15935
Arıtma çamuru	Kuru Kütlenin Kızdırma Kaybının Tayini Gravimetrik Metot	TS EN 15935
İmisyon (Çevre Havası)	Askıdaki Tanecikli Maddenin PM10 veya PM 2,5 Kütle Derişimlerinin Tayini Gravimetrik Metot	TS EN 12341
İmisyon (Çevre Havası)	Askıdaki Tanecikli Maddenin PM10 Kesrinin Tayini Gravimetrik Metot	EPA 40 CFR 50 AppJ
İmisyon (Çevre Havası)	Çöken Toz Tayini Gravimetrik Metot	TS 2342 TS 2341
Atıksu	Toplam Klor Tayini Spektrofotometrik Metot	SM 4500-Cl G
Atıksu	Bağlı Klor Tayini Spektrofotometrik Metot	SM 4500-Cl G
Baca Gazı	Sabit Kaynak Emisyonları-Karbonmonoksit (CO) ve Karbondioksit (CO_2) Kütle Derişimlerinin Tayini Ölçüm: Elektrokimyasal Hücre Metodu Ölçüm: Kızılötesi Absorpsiyon Metodu Ölçüm: Hesaplama Metodu	TS ISO 12039 *

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 15/20)
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Toprak	Organik Madde Tayini Titrimetrik Metot	TS 8336
Arıtma Çamuru	Organik Madde Tayini Titrimetrik Metot	TS 8336
Atık	Organik Madde Tayini Titrimetrik Metot	TS 8336
Baca Gazı	Sabit Kaynak Emisyonları Arsenik (As), Kadmiyum (Cd), Krom (Cr), Kobalt (Co), Bakır (Cu), Manganez (Mn), Nikel (Ni), Kurşun (Pb), Antimon (Sb), Talyum (Tl) ve Vanadyum (V) Tayini Ön İşlem: Özütleme Ölçüm: ICP-MS Metodu	TS EN 14385
Su	Mikrobiyolojik Analizler için Numune Alma	TS EN ISO 19458
Su	Asidite Tayini Titrimetrik Metot	SM 2310 B
Su	Silika (SiO_2) Tayini Spektrofotometrik Metot	SM 4500 SiO_2 C
Su	Permanganat İndeksi Tayini Titrimetrik Metot	TS 6288 EN ISO 8467
Su	Sülfür Tayini Titrimetrik Metot	SM 4500-S^{2-} F
Su	Sertlik Tayini EDTA Titrimetrik Metot	SM 2340 C
Su	Sülfit Tayini Titrimetrik Metot	SM 4500 SO_3^{2-} B
Su	Zayıf Asitte Çözünebilen Siyanür Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 4500 CN C SM 4500 CN E SM 4500 CN I
Su	Alüminyum (Al), Antimon (Sb), Arsenik (As), Bakır (Cu), Baryum (Ba), Berilyum (Be), Bor (B), Civa (Hg), Çinko (Zn), Demir (Fe), Gümüş (Ag), Kadmiyum (Cd), Kobalt (Co), Krom (Cr), Kurşun (Pb), Magnezyum (Mg), Manganez (Mn), Molibden (Mo), Nikel (Ni), Potasyum (K), Selenyum (Se), Sodyum (Na), Talyum (Tl), Vanadyum (V) Tayini Ön İşlem: Filtrasyon Ön İşlem: Mikrodalga Asidik Özütleme Ölçüm: ICP-MS Metodu	TS EN ISO 15587-1 TS EN ISO 15587-2 TS EN ISO 17294 1-2

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 16/20)
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Akreditasyon No: AB-0415-T
Revizyon No. 15 Tarih: 25.02.2025

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Su	Koliform Bakteri Sayımı Membran Filtrasyon Tekniği	TS EN ISO 9308-1
Su	*Escherichia coli* Sayımı Membran Filtrasyon Tekniği	TS EN ISO 9308-1
Su	*Escherichia coli* Sayımı EMS Tekniği	SM 9221 F
Su	Koliform Bakteri Sayımı EMS Tekniği	SM 9221 B
Su	Fekal Koliform Sayımı Membran Filtrasyon Tekniği	SM 9222 D
Su	Fekal Koliform Sayımı EMS Tekniği	SM 9221 E
Su	Fekal Streptokokların Sayımı EMS Tekniği	SM 9230 B
Su	Fekal Enterokokların Sayımı Membran Filtrasyon Tekniği	TS EN ISO 7899-2
Atıksu	Mikrobiyolojik Analizler için Numune Alma	TS EN ISO 19458
Atıksu	Asidite Tayini Titrimetrik Metot	SM 2310 B
Atıksu	Silika (SiO_2) Tayini Spektrofotometrik Metot	SM 4500 SiO_2 C
Atıksu	Sülfit Tayini Titrimetrik Metot	SM 4500 SO_3^{2-} B
Atıksu	Zayıf Asitte Çözünebilen Siyanür Tayini Ön İşlem: Distilasyon Metodu Ölçüm: Spektrofotometrik Metot	SM 4500 CN C SM 4500 CN E SM 4500 CN I
Atıksu	Alüminyum (Al), Antimon (Sb), Arsenik (As), Bakır (Cu), Baryum (Ba), Berilyum (Be), Bor (B), Civa (Hg), Çinko (Zn), Demir (Fe), Gümüş (Ag), Kadmiyum (Cd), Kobalt (Co), Krom (Cr), Kurşun (Pb), Magnezyum (Mg), Manganez (Mn), Molibden (Mo), Nikel (Ni), Potasyum (K), Selenyum (Se), Sodyum (Na), Talyum (Tl), Vanadyum (V) Tayini Ön İşlem: Filtrasyon Ön İşlem: Mikrodalga Asidik Özütleme Ölçüm: ICP-MS Metodu	TS EN ISO 15587-1 TS EN ISO 15587-2 TS EN ISO 17294 (1/2)

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

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ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Atıksu	Koliform Bakteri Sayımı EMS Tekniği	SM 9221 B
Atıksu	Fekal Koliform Sayımı EMS Tekniği	SM 9221 E
Atıksu	Fekal Koliform Sayımı Membran Filtrasyon Tekniği	SM 9222 D
Atıksu	*Escherichia coli* Sayımı EMS Tekniği	SM 9221 F
Atıksu	Fekal Streptokokların Sayımı EMS Tekniği	SM 9230 B
Atıksu	Fekal Enterokokların Sayımı Membran Filtrasyon Tekniği	TS EN ISO 7899-2
Deniz Suyu	Mikrobiyolojik Analizler için Numune Alma	TS EN ISO 19458
Deniz Suyu	Sülfür Tayini Titrimetrik Metot	SM 4500-S^{2-} F
Deniz Suyu	Koliform Bakteri Sayımı Membran Filtrasyon Tekniği	TS EN ISO 9308-1
Deniz Suyu	*Escherichia coli* Sayımı Membran Filtrasyon Tekniği	TS EN ISO 9308-1
Deniz Suyu	*Escherichia coli* Sayımı EMS Tekniği	SM 9221 F
Deniz Suyu	Fekal Streptokokların Sayımı EMS Tekniği	SM 9230 B
Deniz Suyu	Fekal Enterokokların Sayımı Membran Filtrasyon Tekniği	TS EN ISO 7899-2
Deniz Suyu	Koliform Bakteri Sayımı EMS Tekniği	SM 9221 B

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 18/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Web Sitesi : www.ankalab.com.tr

Deniz Suyu	Fekal Koliform Sayımı Membran Filtrasyon Tekniği	SM 9222 D
Deniz Suyu	Fekal Koliform Sayımı EMS Tekniği	SM 9221 E
Havuz Suyu	Koliform Bakteri Sayımı Membran Filtrasyon Tekniği	TS EN ISO 9308-1
Havuz Suyu	*Escherichia coli* Sayımı Membran Filtrasyon Tekniği	TS EN ISO 9308-1
Havuz Suyu	Fekal Koliform Sayımı Membran Filtrasyon Tekniği	SM 9222 D
Havuz Suyu	Fekal Enterokokların Sayımı Membran Filtrasyon Tekniği	TS EN ISO 7899-2
Sediment	Elektriksel İletkenlik Tayini Elektrometrik Metot	TS ISO 11265
Sediment	Kuru Madde (%) Muhtevası / Nem (%) Tayini Gravimetrik Metot	TS 9546 EN 12880
Sediment	Yanma Kaybı Tayini (550 ± 25)°C Gravimetrik Metot	TS EN 15935
Sediment	Deniz Çökeltilerinden Numune Alma	TS EN ISO 5667-19
Sediment	*Escherichia coli* Sayımı EMS Tekniği	SM 9221 A, F
Atık	Alüminyum (Al), Antimon (Sb), Arsenik (As), Bakır (Cu), Baryum (Ba), Berilyum (Be), Bor (B), Civa (Hg), Çinko (Zn), Demir (Fe), Gümüş (Ag), Kadmiyum (Cd), Kobalt (Co), Krom (Cr), Kurşun (Pb), Magnezyum (Mg), Manganez (Mn), Molibden (Mo), Nikel (Ni), Potasyum (K), Selenyum (Se), Sodyum (Na), Talyum (Tl), Vanadyum (V) Tayini Ön İşlem: Katıdan Özütleme Metodu Ön İşlem: Filtrasyon Ön İşlem: Mikrodalga Asidik Özütleme Ölçüm: ICP-MS Metodu	TS EN 12457-4 TS EN ISO 17294 1-2

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 19/20)
Akreditasyon Kapsamı

ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ

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Atık	*Escherichia coli* Sayımı EMS Tekniği	SM 9221 A, F
Arıtma Çamuru	*Escherichia coli* Sayımı EMS Tekniği	SM 9221 A, F
Toprak	*Escherichia coli* Sayımı EMS Tekniği	SM 9221 A, F
Toprak	Koliform Bakteri Sayımı EMS Tekniği	SM 9221 A, B
Baca Gazı	Sabit Kaynak Emisyonları Arsenik (As), Kadmiyum (Cd), Krom (Cr), Kobalt (Co), Bakır (Cu), Manganez (Mn), Nikel (Ni), Kurşun (Pb), Antimon (Sb), Talyum (Tl) ve Vanadyum (V) Tayini Ön İşlem: Özütleme Ölçüm: ICP-MS Metodu	TS EN 14385
Atıksu	Sertlik Tayini EDTA Titrimetrik Metot	SM 2340 C
Deniz Suyu	Sülfit Tayini Titrimetrik Metot	SM 4500-SO_3^{2-} B
Atıksu	Permanganat İndeksi Tayini Titrimetrik Metot	TS 6288 EN ISO 8467
Sediment	pH Tayini Elektrometrik Metot	TS ISO 10390
Sediment	Nehirler, Göller ve Nehir Ağzı Alanlarında Dip Çökeltilerinden Numune Alma	TS ISO 5667-12

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR kodunu kullanabilirsiniz.

Akreditasyon Sertifikası Eki (Sayfa 20/20)
Akreditasyon Kapsamı

TÜRKAK Deney TS EN ISO/IEC 17025 AB-0415-T	**ANKALAB ÇEVRE ANALİZ LABORATUVARI ÖLÇÜM HİZMETLERİ MÜHENDİSLİK DANIŞMALIK SANAYİ VE TİCARET LİMİTED ŞİRKETİ** **Akreditasyon No: AB-0415-T** **Revizyon No. 15 Tarih: 25.02.2025**	
Deney Laboratuvarı		
Adresi : ATA MAH. 1069 CAD. No:3/1 ÇANKAYA/ANKARA Ankara / Türkiye	Telefon : +90 312 472 6664 Fax : +90 312 473 6215 E-Posta : info@ankalab.com.tr Web Sitesi : www.ankalab.com.tr	
İmisyon (Çevre Havası)	PM10'da Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, Se, Sb, Tl, V ve Zn Tayini Ölçüm: GF-AAS Metodu Ölçüm: ICP-MS Metodu Ölçüm: ICP-OES Metodu	VDI 2267 Bölüm 1
İmisyon (Çevre Havası)	Çöken Tozda Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Sn, Tl, V ve Zn Tayini Ölçüm: GF-AAS Metodu Ölçüm: ICP-MS Metodu Ölçüm: ICP-OES Metodu	VDI 2267 Bölüm 2

Bu belge 5070 sayılı elektronik imza kanununa göre Gülden Banu Müderrisoğlu tarafından güvenli elektronik imza ile imzalanmıştır. E-imzalı belgeyi doğrulamak için QR koduru kullanabilirsiniz.

SOİL MEASUREMENTS

ENCON LABORATUVARI A.Ş.
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Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2758
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 2
Sample Record Number	NUM.24.2758
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-1 (Coordinate: 36S 335630/4093475)
Sample Type / Sample Sign	Soil / Unsealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	17.09.2024 / 18.09.2024
Delivery Conditions of the Sample	Plastic and Glass
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	18.09.2024 / 07.10.2024

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

Remarks:
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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2758
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Antimony	mg/kg	5.21	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Barium	mg/kg	183.6	EPA 3051 A. EPA 6010 D
Beryllium	mg/kg	0.183	EPA 3051 A. EPA 6010 D
Boron	mg/kg	57.97	EPA 3051 A. EPA 6010 D
BTEX	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Cadmium	mg/kg	1.175	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	98.18	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	15.67	EPA 3051 A. EPA 6010 D
Copper	mg/kg	33.29	EPA 3051 A. EPA 6010 D
Lead	mg/kg	6.71	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	168.2	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Silver	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Tin	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	564.6	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	< 25.0	TS ISO 14507 .TS EN 14039
Total Volatile Organic Compounds	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	92.55	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	77.04	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2762
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 2
Sample Record Number	NUM.24.2762
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-2 (Coordinate: 36S 343827/4087777)
Sample Type / Sample Sign	Soil / Unsealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	18.09.2024 / 19.09.2024
Delivery Conditions of the Sample	Plastic and Glass
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	19.09.2024 / 07.10.2024

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T
LR.24.2762
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Antimony	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Barium	mg/kg	146.9	EPA 3051 A. EPA 6010 D
Beryllium	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Boron	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
BTEX	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Cadmium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	2.57	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.76	EPA 3051 A. EPA 6010 D
Copper	mg/kg	2.98	EPA 3051 A. EPA 6010 D
Lead	mg/kg	1.08	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	68.06	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Silver	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Tin	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	< 2.0	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	< 25.0	TS ISO 14507 .TS EN 14039
Total Volatile Organic Compounds	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	16.02	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	22.25	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2793
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 2
Sample Record Number	NUM.24.2793
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-3 (Coordinate: 36S 353500/4081392)
Sample Type / Sample Sign	Soil / Unsealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	19.09.2024 / 20.09.2024
Delivery Conditions of the Sample	Plastic and Glass
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	20.09.2024 / 07.10.2024

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T
LR.24.2793
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Antimony	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Barium	mg/kg	40.24	EPA 3051 A. EPA 6010 D
Beryllium	mg/kg	0.147	EPA 3051 A. EPA 6010 D
Boron	mg/kg	18.31	EPA 3051 A. EPA 6010 D
BTEX	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Cadmium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	47.67	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.47	EPA 3051 A. EPA 6010 D
Copper	mg/kg	9.10	EPA 3051 A. EPA 6010 D
Lead	mg/kg	4.82	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	95.64	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Silver	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Tin	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	48.52	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	< 25.0	TS ISO 14507 .TS EN 14039
Total Volatile Organic Compounds	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	25.14	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	26.90	EPA 3051 A. EPA 6010 D

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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2794
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 2
Sample Record Number	NUM.24.2794
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-4 (Coordinate: 36S 360677/4076784)
Sample Type / Sample Sign	Soil / Unsealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	19.09.2024 / 20.09.2024
Delivery Conditions of the Sample	Plastic and Glass
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	20.09.2024 / 07.10.2024

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2794
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Antimony	mg/kg	1.71	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	7.61	EPA 3051 A. EPA 6010 D
Barium	mg/kg	41.63	EPA 3051 A. EPA 6010 D
Beryllium	mg/kg	0.348	EPA 3051 A. EPA 6010 D
Boron	mg/kg	42.55	EPA 3051 A. EPA 6010 D
BTEX	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Cadmium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	75.93	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	13.09	EPA 3051 A. EPA 6010 D
Copper	mg/kg	14.01	EPA 3051 A. EPA 6010 D
Lead	mg/kg	8.16	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	126.0	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Silver	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Tin	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	66.40	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	< 25.0	TS ISO 14507 .TS EN 14039
Total Volatile Organic Compounds	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	43.58	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	41.55	EPA 3051 A. EPA 6010 D

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2801
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 2
Sample Record Number	NUM.24.2801
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-5 (Coordinate: 36S 371432/4070051)
Sample Type / Sample Sign	Soil / Unsealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	20.09.2024 / 21.09.2024
Delivery Conditions of the Sample	Plastic and Glass
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	21.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T
LR.24.2801
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Antimony	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	3.44	EPA 3051 A. EPA 6010 D
Barium	mg/kg	25.61	EPA 3051 A. EPA 6010 D
Beryllium	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Boron	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
BTEX	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Cadmium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	10.63	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	12.36	EPA 3051 A. EPA 6010 D
Copper	mg/kg	11.35	EPA 3051 A. EPA 6010 D
Lead	mg/kg	22.82	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	92.41	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Silver	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Tin	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	< 2.0	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	< 25.0	TS ISO 14507 .TS EN 14039
Total Volatile Organic Compounds	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	8.89	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	32.04	EPA 3051 A. EPA 6010 D

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2811
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 2
Sample Record Number	NUM.24.2811
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-6 (Coordinate: 36S 386801/4060407)
Sample Type / Sample Sign	Soil / Unsealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	24.09.2024 / 25.09.2024
Delivery Conditions of the Sample	Plastic and Glass
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	25.09.2024 / 07.10.2024

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T
LR.24.2811
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Antimony	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Barium	mg/kg	337.2	EPA 3051 A. EPA 6010 D
Beryllium	mg/kg	0.555	EPA 3051 A. EPA 6010 D
Boron	mg/kg	2.426	EPA 3051 A. EPA 6010 D
BTEX	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Cadmium	mg/kg	1.563	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	4.74	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	9.28	EPA 3051 A. EPA 6010 D
Copper	mg/kg	23.24	EPA 3051 A. EPA 6010 D
Lead	mg/kg	7.28	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	51.61	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	2.903	EPA 3051 A. EPA 6010 D
Silver	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	2.563	EPA 3051 A. EPA 6010 D
Tin	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	4.261	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	< 25.0	TS ISO 14507 .TS EN 14039
Total Volatile Organic Compounds	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	14.79	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	43.13	EPA 3051 A. EPA 6010 D

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2812
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 2
Sample Record Number	NUM.24.2812
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-7 (Coordinate: 36S 402035/4051679)
Sample Type / Sample Sign	Soil / Unsealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	24.09.2024 / 25.09.2024
Delivery Conditions of the Sample	Plastic and Glass
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	25.09.2024 / 07.10.2024

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T
LR.24.2812
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Antimony	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	29.20	EPA 3051 A. EPA 6010 D
Barium	mg/kg	42.80	EPA 3051 A. EPA 6010 D
Beryllium	mg/kg	0.295	EPA 3051 A. EPA 6010 D
Boron	mg/kg	40.18	EPA 3051 A. EPA 6010 D
BTEX	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Cadmium	mg/kg	1.731	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	32.64	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	12.30	EPA 3051 A. EPA 6010 D
Copper	mg/kg	40.14	EPA 3051 A. EPA 6010 D
Lead	mg/kg	174.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	< 0.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	27.14	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Silver	mg/kg	< 0.5	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	5.457	EPA 3051 A. EPA 6010 D
Tin	mg/kg	< 1.0	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	258.7	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	< 25.0	TS ISO 14507 .TS EN 14039
Total Volatile Organic Compounds	mg/kg	< 0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	35.43	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	317.0	EPA 3051 A. EPA 6010 D

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2603
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2603
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-8 (Bağlantı Yolu) (Coordinate: 36.934532/31.088478)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 20 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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Doküman No / Document No	**İlk Yayın Tarihi / First Release Date**	**Revizyon No / Tarihi Revision No / Date**	**Sayfa No Page No**
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	1/2

ENCON LABORATUVARI A.Ş.
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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2603
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	2.01	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	3.31	EPA 3051 A. EPA 6010 D
Copper	mg/kg	25.2	EPA 3051 A. EPA 6010 D
Barium	mg/kg	68.7	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.453	EPA 3051 A. EPA 6010 D
Boron	mg/kg	39.7	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	60.8	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	16.1	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	116	EPA 3051 A. EPA 6010 D
Lead	mg/kg	44.0	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	138	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	461	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	77.1	EPA 3051 A. EPA 6010 D

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2604
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2604
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-9 (Ariyet Ocağı – Depolama Alanı) (Coordinate: 36.967571/31.160462)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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Doküman No / Document No	**İlk Yayın Tarihi / First Release Date**	**Revizyon No / Tarihi Revision No / Date**	**Sayfa No Page No**
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	1/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2604
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	2.95	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	1.81	EPA 3051 A. EPA 6010 D
Copper	mg/kg	38.1	EPA 3051 A. EPA 6010 D
Barium	mg/kg	151	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Boron	mg/kg	52.1	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	61.6	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	28.2	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	183	EPA 3051 A. EPA 6010 D
Lead	mg/kg	20.4	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	215	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	1752	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	114	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2605
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2605
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-10 (Tesis Alanı) (Coordinate: 36.971612/31.177516)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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AB-0168-T
LR.25.2605
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	2.55	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Copper	mg/kg	77.5	EPA 3051 A. EPA 6010 D
Barium	mg/kg	150	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Boron	mg/kg	58.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	57.6	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	26.4	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	109	EPA 3051 A. EPA 6010 D
Lead	mg/kg	11.5	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	110	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	1672	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	111	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2606
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2606
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-11 (Taş Ocağı) (Coordinate: 36.964076/31.190797)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2606
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	4.09	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Copper	mg/kg	55.7	EPA 3051 A. EPA 6010 D
Barium	mg/kg	127	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Boron	mg/kg	69.1	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	81.2	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	44.2	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	198	EPA 3051 A. EPA 6010 D
Lead	mg/kg	8.50	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	251	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	6229	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	186	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2607
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2607
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-12 (Taş Ocağı) (Coordinate: 36.976366/31.215049)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 22 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2607
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	3.20	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	2.12	EPA 3051 A. EPA 6010 D
Copper	mg/kg	27.5	EPA 3051 A. EPA 6010 D
Barium	mg/kg	193	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.334	EPA 3051 A. EPA 6010 D
Boron	mg/kg	40.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	599	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	16.5	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	132	EPA 3051 A. EPA 6010 D
Lead	mg/kg	11.4	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	198	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	314	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	79.3	EPA 3051 A. EPA 6010 D

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LR.25.2608
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2608
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-13 (Tesis/Geçici Şantiye) (Coordinate: 36.951819/31.212740)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 22 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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Doküman No / Document No	**İlk Yayın Tarihi / First Release Date**	**Revizyon No / Tarihi Revision No / Date**	**Sayfa No Page No**
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	1/2

ENCON LABORATUVARI A.Ş.
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Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2608
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	21.4	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	16.0	EPA 3051 A. EPA 6010 D
Copper	mg/kg	53.0	EPA 3051 A. EPA 6010 D
Barium	mg/kg	58.9	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.289	EPA 3051 A. EPA 6010 D
Boron	mg/kg	46.5	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	5620	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	185	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	13.6	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	121	EPA 3051 A. EPA 6010 D
Lead	mg/kg	37.9	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	1.10	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	149	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	297	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	77.2	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2609
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2609
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-14 (Depolama Alanı) (Coordinate: 36.946803/31.205316)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 22 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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LR.25.2609

06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	2.88	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Copper	mg/kg	28.4	EPA 3051 A. EPA 6010 D
Barium	mg/kg	89.9	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.158	EPA 3051 A. EPA 6010 D
Boron	mg/kg	47.6	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	61.1	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	26.2	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	187	EPA 3051 A. EPA 6010 D
Lead	mg/kg	15.7	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	322	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	601	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	117	EPA 3051 A. EPA 6010 D

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AB-0168-T
LR.25.2610
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2610
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-15 (Depolama Alanı) (Coordinate: 36.939337/31.227535)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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AB-0168-T
LR.25.2610
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	2.37	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Copper	mg/kg	11.9	EPA 3051 A. EPA 6010 D
Barium	mg/kg	46.1	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Boron	mg/kg	36.2	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	33.7	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	18.1	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	177	EPA 3051 A. EPA 6010 D
Lead	mg/kg	12.6	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	267	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	576	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	75.7	EPA 3051 A. EPA 6010 D

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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2611
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2611
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-16 (Depolama Alanı) (Coordinate: 36.940488/31.282315)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 23 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2611
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.98	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	5.25	EPA 3051 A. EPA 6010 D
Copper	mg/kg	23.7	EPA 3051 A. EPA 6010 D
Barium	mg/kg	245	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.558	EPA 3051 A. EPA 6010 D
Boron	mg/kg	38.7	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	45.0	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	12.6	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	100	EPA 3051 A. EPA 6010 D
Lead	mg/kg	13.2	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	121	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	185	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	57.4	EPA 3051 A. EPA 6010 D

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Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2612
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2612
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-17 (Depolama Alanı) (Coordinate: 36.890254/31.330575)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 23 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

Açıklamalar/Remarks:
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2612
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	35.3	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	25.3	EPA 3051 A. EPA 6010 D
Copper	mg/kg	88.4	EPA 3051 A. EPA 6010 D
Barium	mg/kg	63.1	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.495	EPA 3051 A. EPA 6010 D
Boron	mg/kg	50.7	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	10526	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	1.98	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	15.2	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	138	EPA 3051 A. EPA 6010 D
Lead	mg/kg	47.0	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	1.62	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	149	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	331	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	72.4	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2613
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2613
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-18 (Depolama Alanı) (Coordinate: 36.878102/31.337837)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 23 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2613
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.02	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	3.38	EPA 3051 A. EPA 6010 D
Copper	mg/kg	14.0	EPA 3051 A. EPA 6010 D
Barium	mg/kg	166	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.277	EPA 3051 A. EPA 6010 D
Boron	mg/kg	28.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	78.2	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.94	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	62.8	EPA 3051 A. EPA 6010 D
Lead	mg/kg	13.2	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	80.2	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	171	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	35.9	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2614
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2614
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-19 (Depolama Alanı) (Coordinate: 36.864922/31.383516)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 23 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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AB-0168-T
LR.25.2614
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.09	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	5.82	EPA 3051 A. EPA 6010 D
Copper	mg/kg	14.5	EPA 3051 A. EPA 6010 D
Barium	mg/kg	41.1	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.479	EPA 3051 A. EPA 6010 D
Boron	mg/kg	34.1	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	36.3	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	10.3	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	75.2	EPA 3051 A. EPA 6010 D
Lead	mg/kg	15.7	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	111	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	213	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	48.1	EPA 3051 A. EPA 6010 D

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TS EN ISO/IEC 17025
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AB-0168-T
LR.25.2615
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2615
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-20 (Depolama Alanı) (Coordinate: 36.853594/31.469960)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 22 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2615
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.39	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	9.53	EPA 3051 A. EPA 6010 D
Copper	mg/kg	24.8	EPA 3051 A. EPA 6010 D
Barium	mg/kg	37.0	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.284	EPA 3051 A. EPA 6010 D
Boron	mg/kg	28.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	41.2	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.54	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	56.2	EPA 3051 A. EPA 6010 D
Lead	mg/kg	12.2	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	0.586	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	62.9	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	172	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	29.8	EPA 3051 A. EPA 6010 D

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2616
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2616
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-21 (Şantiye Alanı/Tesis) (Coordinate: 36.837169/31.474673)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 22 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

Açıklamalar/Remarks:
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2616
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	4.44	EPA 3051 A. EPA 6010 D
Copper	mg/kg	9.11	EPA 3051 A. EPA 6010 D
Barium	mg/kg	36.6	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.247	EPA 3051 A. EPA 6010 D
Boron	mg/kg	26.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	26.1	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	6.91	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	50.8	EPA 3051 A. EPA 6010 D
Lead	mg/kg	17.9	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	77.4	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	150	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	31.9	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2617
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2617
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-22 (Depolama Alanı) (Coordinate: 36.842788/31.485617)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 22 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2617
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.07	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	5.06	EPA 3051 A. EPA 6010 D
Copper	mg/kg	7.42	EPA 3051 A. EPA 6010 D
Barium	mg/kg	31.7	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.222	EPA 3051 A. EPA 6010 D
Boron	mg/kg	23.4	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	21.4	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.15	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	66.1	EPA 3051 A. EPA 6010 D
Lead	mg/kg	10.6	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	88.0	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	128	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	31.5	EPA 3051 A. EPA 6010 D

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ENCON LABORATUVARI A.Ş.
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2618
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2618
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-23 (Tesis) (Coordinate: 36.840491/31.480745)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 22 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TS EN ISO/IEC 17025
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AB-0168-T

LR.25.2618

06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.03	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	4.67	EPA 3051 A. EPA 6010 D
Copper	mg/kg	7.58	EPA 3051 A. EPA 6010 D
Barium	mg/kg	55.7	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.221	EPA 3051 A. EPA 6010 D
Boron	mg/kg	26.2	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	24.5	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	5.62	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	51.7	EPA 3051 A. EPA 6010 D
Lead	mg/kg	19.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	49.9	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	179	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	29.3	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2619
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2619
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-24 (Tesis) (Coordinate: 36.821774/31.492143)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 22 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2619
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	4.16	EPA 3051 A. EPA 6010 D
Copper	mg/kg	9.82	EPA 3051 A. EPA 6010 D
Barium	mg/kg	46.7	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.305	EPA 3051 A. EPA 6010 D
Boron	mg/kg	23.0	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	31.5	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.62	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	58.3	EPA 3051 A. EPA 6010 D
Lead	mg/kg	9.60	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	89.4	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	120	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	30.4	EPA 3051 A. EPA 6010 D

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2620
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2620
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-25 (Depolama Alanı) (Coordinate: 36.801270/31.538836)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 20 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	1/2

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2620
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.90	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	9.68	EPA 3051 A. EPA 6010 D
Copper	mg/kg	8.87	EPA 3051 A. EPA 6010 D
Barium	mg/kg	31.1	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.197	EPA 3051 A. EPA 6010 D
Boron	mg/kg	38.6	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	66.0	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	9.46	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	71.3	EPA 3051 A. EPA 6010 D
Lead	mg/kg	11.5	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	10.2	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	132	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	245	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	52.7	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2621
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2621
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-26 (Depolama Alanı) (Coordinate: 36.779114/31.562452)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 20 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2621
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	2.95	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	8.32	EPA 3051 A. EPA 6010 D
Copper	mg/kg	17.8	EPA 3051 A. EPA 6010 D
Barium	mg/kg	85.9	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	1.12	EPA 3051 A. EPA 6010 D
Boron	mg/kg	55.1	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	78.7	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	10.1	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	103	EPA 3051 A. EPA 6010 D
Lead	mg/kg	38.6	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	0.987	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	66.7	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	217	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	71.9	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2622
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2622
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-27 (Depolama Alanı) (Coordinate: 36.765323/31.576211)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	29.05.2025 / 30.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 19 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	30.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TS EN ISO/IEC 17025
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AB-0168-T
LR.25.2622
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.91	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	3.91	EPA 3051 A. EPA 6010 D
Copper	mg/kg	12.2	EPA 3051 A. EPA 6010 D
Barium	mg/kg	43.8	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.411	EPA 3051 A. EPA 6010 D
Boron	mg/kg	33.4	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	40.0	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.91	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	88.1	EPA 3051 A. EPA 6010 D
Lead	mg/kg	21.8	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	0.883	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	60.3	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	222	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	39.9	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2623
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2623
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-28 (Taş Ocağı) (Coordinate: 36.736103/31.640902)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Cloudly / 18 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2623
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	1.65	EPA 3051 A. EPA 6010 D
Copper	mg/kg	4.66	EPA 3051 A. EPA 6010 D
Barium	mg/kg	83.1	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.128	EPA 3051 A. EPA 6010 D
Boron	mg/kg	10.7	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	13.9	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	0.566	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	1.10	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	16.0	EPA 3051 A. EPA 6010 D
Lead	mg/kg	7.03	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	7.89	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	40.6	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	21.5	EPA 3051 A. EPA 6010 D

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2624
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2624
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-29 (Dere Malzemesi) (Coordinate: 36.749430/31.640448)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Rainy / 16 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2624
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	2.34	EPA 3051 A. EPA 6010 D
Copper	mg/kg	6.55	EPA 3051 A. EPA 6010 D
Barium	mg/kg	88.4	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Boron	mg/kg	19.3	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	21.0	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	5.75	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	33.3	EPA 3051 A. EPA 6010 D
Lead	mg/kg	8.54	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	14.1	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	360	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	46.7	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2625
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2625
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-30 (Taş Ocağı) (Coordinate: 36.799439/31.756502)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Cloudly / 18 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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ENCON LABORATUVARI A.Ş.
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2625
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.91	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	5.81	EPA 3051 A. EPA 6010 D
Copper	mg/kg	10.9	EPA 3051 A. EPA 6010 D
Barium	mg/kg	107	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	1.17	EPA 3051 A. EPA 6010 D
Boron	mg/kg	34.4	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	56.2	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	0.926	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.54	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	70.5	EPA 3051 A. EPA 6010 D
Lead	mg/kg	15.0	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	0.545	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	33.3	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	196	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	83.2	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2626
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2626
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-31 (Depolama Alanı) (Coordinate: 36.713302/31.646813)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Cloudly / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2626
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	10.1	EPA 3051 A. EPA 6010 D
Copper	mg/kg	7.79	EPA 3051 A. EPA 6010 D
Barium	mg/kg	58.1	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.442	EPA 3051 A. EPA 6010 D
Boron	mg/kg	28.0	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	33.9	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	4.92	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	36.7	EPA 3051 A. EPA 6010 D
Lead	mg/kg	14.0	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	0.661	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	18.5	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	31.3	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	26.1	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2627
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2627
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-32 (Depolama Alanı) (Coordinate: 36.707781/31.668481)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Cloudly / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2627
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	7.12	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	10.1	EPA 3051 A. EPA 6010 D
Copper	mg/kg	11.2	EPA 3051 A. EPA 6010 D
Barium	mg/kg	75.7	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.496	EPA 3051 A. EPA 6010 D
Boron	mg/kg	30.1	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	38.3	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	6.26	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	54.5	EPA 3051 A. EPA 6010 D
Lead	mg/kg	17.6	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	0.895	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	34.6	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	60.5	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	44.0	EPA 3051 A. EPA 6010 D

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2628
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2628
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-33 (Taş Ocağı) (Coordinate: 36.700017/31.704666)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2628
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	2.30	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	4.39	EPA 3051 A. EPA 6010 D
Copper	mg/kg	80.5	EPA 3051 A. EPA 6010 D
Barium	mg/kg	188	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.448	EPA 3051 A. EPA 6010 D
Boron	mg/kg	51.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	3761	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	1.42	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	11.3	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	96.3	EPA 3051 A. EPA 6010 D
Lead	mg/kg	10.7	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	1.85	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	92.4	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	103	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	38.6	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2629
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2629
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-34 (Taş Ocağı) (Coordinate: 36.709552/31.751816)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2629
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	2.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	24.2	EPA 3051 A. EPA 6010 D
Copper	mg/kg	14.0	EPA 3051 A. EPA 6010 D
Barium	mg/kg	46.7	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	1.000	EPA 3051 A. EPA 6010 D
Boron	mg/kg	38.2	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	47.7	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	8.79	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	76.1	EPA 3051 A. EPA 6010 D
Lead	mg/kg	17.0	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	1.58	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	40.9	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	47.2	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	52.7	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2630
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2630
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-35 (Taş Ocağı) (Coordinate: 36.713805/31.786409)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2630
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	4.06	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	24.4	EPA 3051 A. EPA 6010 D
Copper	mg/kg	12.4	EPA 3051 A. EPA 6010 D
Barium	mg/kg	151	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	1.52	EPA 3051 A. EPA 6010 D
Boron	mg/kg	58.2	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	63.9	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	0.756	EPA 3051 A. EPA 6010 D
Tin	mg/kg	1.01	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	11.5	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	121	EPA 3051 A. EPA 6010 D
Lead	mg/kg	26.2	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	3.93	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	40.5	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	174	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	88.0	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2631
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2631
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-36 (Tesis) (Coordinate: 36.645228/31.767080)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2631
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	6.75	EPA 3051 A. EPA 6010 D
Copper	mg/kg	15.6	EPA 3051 A. EPA 6010 D
Barium	mg/kg	71.6	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.331	EPA 3051 A. EPA 6010 D
Boron	mg/kg	23.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	26.6	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.48	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	41.2	EPA 3051 A. EPA 6010 D
Lead	mg/kg	15.3	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	34.1	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	108	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	32.6	EPA 3051 A. EPA 6010 D

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2632
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2632
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-37 (Depolama Alanı) (Coordinate: 36.656379/31.772657)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Cloudly / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2632
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	3.27	EPA 3051 A. EPA 6010 D
Copper	mg/kg	20.4	EPA 3051 A. EPA 6010 D
Barium	mg/kg	63.0	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.441	EPA 3051 A. EPA 6010 D
Boron	mg/kg	30.6	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	36.2	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	9.26	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	55.7	EPA 3051 A. EPA 6010 D
Lead	mg/kg	13.6	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	51.4	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	91.2	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	38.7	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2633
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2633
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-38 (Şantiye/Depolama Alanı) (Coordinate: 36.639909/31.785044)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Rainy / 21 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2633
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.23	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	4.78	EPA 3051 A. EPA 6010 D
Copper	mg/kg	13.3	EPA 3051 A. EPA 6010 D
Barium	mg/kg	138	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.651	EPA 3051 A. EPA 6010 D
Boron	mg/kg	38.0	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	49.4	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	7.81	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	73.3	EPA 3051 A. EPA 6010 D
Lead	mg/kg	12.1	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	52.4	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	82.2	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	46.5	EPA 3051 A. EPA 6010 D

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2634
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2634
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-39 (Depolama Alanı) (Coordinate: 36.653600/31.805469)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Rainy / 19 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2634
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	7.68	EPA 3051 A. EPA 6010 D
Copper	mg/kg	12.6	EPA 3051 A. EPA 6010 D
Barium	mg/kg	31.1	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.691	EPA 3051 A. EPA 6010 D
Boron	mg/kg	30.8	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	38.4	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	4.66	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	47.7	EPA 3051 A. EPA 6010 D
Lead	mg/kg	78.5	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	21.7	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	31.3	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	40.1	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2635
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2635
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-40 (Depolama Alanı) (Coordinate: 36.633068/31.849376)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Cloudly / 20 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	1/2

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2635
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.06	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	3.06	EPA 3051 A. EPA 6010 D
Copper	mg/kg	12.2	EPA 3051 A. EPA 6010 D
Barium	mg/kg	146	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.547	EPA 3051 A. EPA 6010 D
Boron	mg/kg	26.7	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	32.2	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	6.10	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	50.5	EPA 3051 A. EPA 6010 D
Lead	mg/kg	21.2	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	0.519	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	21.1	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	77.7	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	35.3	EPA 3051 A. EPA 6010 D

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2636
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2636
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-41 (Depolama Alanı) (Coordinate: 36.639749/31.863974)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Sunny / 20 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2636
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.13	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	3.72	EPA 3051 A. EPA 6010 D
Copper	mg/kg	12.2	EPA 3051 A. EPA 6010 D
Barium	mg/kg	73.9	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.150	EPA 3051 A. EPA 6010 D
Boron	mg/kg	15.9	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	29.4	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	5.42	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	22.6	EPA 3051 A. EPA 6010 D
Lead	mg/kg	7.85	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	4.99	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	113	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	33.5	EPA 3051 A. EPA 6010 D

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2637
06-25

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	10.06.2025 / 2
Sample Record Number	NUM.25.2637
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – T-42 (Taş Ocağı) (Coordinate: 36.658918/31.901682)
Sample Type / Sample Sign	Soil / Sealed
Way and Aim the Sampling	-- / Monitoring
Person Conducted Sampling	Serhat UÇAR
Sampling Standard	TS 9923
Sampling Date / Date of Samples Received	30.05.2025 / 31.05.2025
Delivery Conditions of the Sample	Plastic (Cold Preservation), Glass (Cold Preservation)
Environmental Conditions During Sampling	Cloudly / 19 °C
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	31.05.2025 / 04.06.2025

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
10.06.2025		**10.06.2025**

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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.25.2637
06-25

TEST REPORT

Parameter	Unit	Test Result	Method of Analysis
Antimony	mg/kg	1.94	EPA 3051 A. EPA 6010 D
Arsenic	mg/kg	10.9	EPA 3051 A. EPA 6010 D
Copper	mg/kg	27.9	EPA 3051 A. EPA 6010 D
Barium	mg/kg	69.1	EPA 3051 A. EPA 6010 D
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Beryllium	mg/kg	0.367	EPA 3051 A. EPA 6010 D
Boron	mg/kg	42.3	EPA 3051 A. EPA 6010 D
Mercury	mg/kg	<0.10	EPA 3051 A. EPA 6010 D
Zinc	mg/kg	60.3	EPA 3051 A. EPA 6010 D
Silver	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Cadmium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Tin	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Cobalt	mg/kg	14.8	EPA 3051 A. EPA 6010 D
Chromium	mg/kg	67.2	EPA 3051 A. EPA 6010 D
Lead	mg/kg	17.0	EPA 3051 A. EPA 6010 D
Molybdenum	mg/kg	0.540	EPA 3051 A. EPA 6010 D
Nickel	mg/kg	24.3	EPA 3051 A. EPA 6010 D
Selenium	mg/kg	<0.50	EPA 3051 A. EPA 6010 D
Thallium	mg/kg	<1.00	EPA 3051 A. EPA 6010 D
Titanium	mg/kg	180	EPA 3051 A. EPA 6010 D
Total Petroleum Hydrocarbons	mg/kg	<25.0	TS ISO 14507. TS EN 14039
Total Volatile Organic Compounds	mg/kg	<0.25	EPA 5021 A. EPA 8260 D
Vanadium	mg/kg	36.4	EPA 3051 A. EPA 6010 D

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WATER MEASUREMENTS

ENCON LABORATUVARI A.Ş.
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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2800
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	255.4	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	101.1	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	19.05	SM 4110 B
Color (436 nm)	m-1	0	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	496	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	6.5	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.224	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	2.867	EPA 6020 B
Magnesium	mg/L	11.57	EPA 200.7
Manganese	µg/L	< 1.0	EPA 6020 B

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2800
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	< 1.0	EPA 6020 B
Nitrate Nitrogen	mg/L	2.831	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	1.200	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	8.68	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	8.596	EPA 200.7
Sulfate	mg/L	25.69	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.072	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	1.000	SM 4500-Norg B
Total Nitrogen	mg/L	3.831	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENCON LABORATUVARI A.Ş.
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2802
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2802
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-8 (Coordinate: 36S 371398/4064674)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	21.09.2024 / 22.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	22.09.2024 / 07.10.2024

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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Doküman No / Document No	**İlk Yayın Tarihi / First Release Date**	**Revizyon No / Tarihi Revision No / Date**	**Sayfa No Page No**
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	1/3

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2802
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	213.2	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	80.24	EPA 200.7
Chemical Oxygen Demand	mg/L	6.304	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	500.48	SM 4110 B
Color (436 nm)	m-1	0.08	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	1403	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	7.1	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.535	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	0.665	EPA 6020 B
Magnesium	mg/L	47.48	EPA 200.7
Manganese	µg/L	28.71	EPA 6020 B

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/3

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AB-0168-T
LR.24.2802
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	0.148	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	< 1.0	EPA 6020 B
Nitrate Nitrogen	mg/L	0.940	SM 4110 B
Nitrite Nitrogen	mg/L	0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	1.000	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.16	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	7.902	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	347.6	EPA 200.7
Sulfate	mg/L	91.45	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.074	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	< 0.5	SM 4500-Norg B
Total Nitrogen	mg/L	1.231	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

For the samples not taken by the ENCON laboratory Inc.. uncertainty values indicated do not cover the uncertainties arising from the sampling.
The Laboratory does not accept technical and legal responsibility for samples that are not sampled by authorized personnel and/or received under inappropriate conditions. The legal responsibility of the information provided by the customer belongs to the customer. our company waives the consequences arising from this information.

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2803
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2803
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-9 (Coordinate: 36S 382314/4059455)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	21.09.2024 / 22.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	22.09.2024 / 07.10.2024

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T
LR.24.2803
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	160.3	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	55.07	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	5.28	SM 4110 B
Color (436 nm)	m-1	0.08	TS EN ISO 7887 B
Color (525 nm)	m-1	0.04	TS EN ISO 7887 B
Color (620 nm)	m-1	0.04	TS EN ISO 7887 B
Conductivity	µs/cm	331	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	8.1	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.130	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	1.024	EPA 6020 B
Magnesium	mg/L	16.35	EPA 200.7
Manganese	µg/L	3.97	EPA 6020 B

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2803
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	< 1.0	EPA 6020 B
Nitrate Nitrogen	mg/L	0.258	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.600	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.26	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	2.573	EPA 200.7
Sulfate	mg/L	18.87	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.078	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	< 0.5	SM 4500-Norg B
Total Nitrogen	mg/L	0.630	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2804
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2804
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – GW-6 (Coordinate: 36S 383471/4061640)
Sample Type / Sample Sign	Ground Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-11
Sampling Date / Date of Samples Received	21.09.2024 / 22.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	22.09.2024 / 07.10.2024

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T

AB-0168-T
LR.24.2804
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	0.465	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	748.7	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	4.2	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	25.5	EPA 200.7
Chemical Oxygen Demand	mg/L	12.924	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	69.58	SM 4110 B
Color (436 nm)	m-1	2.96	TS EN ISO 7887 B
Color (525 nm)	m-1	1.28	TS EN ISO 7887 B
Color (620 nm)	m-1	0.56	TS EN ISO 7887 B
Conductivity	µs/cm	1786	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	5.2	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	3.465	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	1.704	EPA 6020 B
Magnesium	mg/L	7.996	EPA 200.7
Manganese	µg/L	57.27	EPA 6020 B

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TS EN ISO/IEC 17025
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AB-0168-T
LR.24.2804
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	6.423	EPA 6020 B
Nitrate Nitrogen	mg/L	2.060	SM 4110 B
Nitrite Nitrogen	mg/L	0.975	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.800	SM 5520 B
Orthophosphate Phosphorus	mg/L	0.375	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.86	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	3.618	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	520.5	EPA 200.7
Sulfate	mg/L	123.10	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.269	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	2.199	SM 4500-Norg B
Total Nitrogen	mg/L	5.234	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	0.165	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2807
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2807
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-10 (Coordinate: 36S 389801/4056234)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	24.09.2024 / 25.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	25.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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LR.24.2807
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	157.9	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	59.27	EPA 200.7
Chemical Oxygen Demand	mg/L	7.092	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	6.09	SM 4110 B
Color (436 nm)	m-1	0.08	TS EN ISO 7887 B
Color (525 nm)	m-1	0.04	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	304	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	7.1	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.143	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	9.543	EPA 6020 B
Magnesium	mg/L	15.76	EPA 200.7
Manganese	µg/L	44.10	EPA 6020 B

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LR.24.2807
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	1.193	EPA 6020 B
Nitrate Nitrogen	mg/L	0.213	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	1.600	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.26	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	2.313	EPA 200.7
Sulfate	mg/L	18.25	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.108	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	0.628	SM 4500-Norg B
Total Nitrogen	mg/L	0.841	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	0.019	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENCON LABORATUVARI A.Ş.
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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2808
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2808
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-11 (Coordinate: 36S 393942/4053762)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	24.09.2024 / 25.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	25.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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LR.24.2808
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	164.9	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	48.47	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	10.02	SM 4110 B
Color (436 nm)	m-1	0.12	TS EN ISO 7887 B
Color (525 nm)	m-1	0.04	TS EN ISO 7887 B
Color (620 nm)	m-1	0.08	TS EN ISO 7887 B
Conductivity	µs/cm	359	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	9.3	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.114	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	< 0.5	EPA 6020 B
Magnesium	mg/L	25.25	EPA 200.7
Manganese	µg/L	41.60	EPA 6020 B

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LR.24.2808
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	< 1.0	EPA 6020 B
Nitrate Nitrogen	mg/L	0.575	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	2.000	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.22	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	4.841	EPA 200.7
Sulfate	mg/L	22.67	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.091	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	0.685	SM 4500-Norg B
Total Nitrogen	mg/L	1.260	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	0.019	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2809
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2809
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – GW-7 (Coordinate: 36S 393245/4055740)
Sample Type / Sample Sign	Ground Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-11
Sampling Date / Date of Samples Received	24.09.2024 / 25.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	25.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2809
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	170.7	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	58.68	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	6.82	SM 4110 B
Color (436 nm)	m-1	0.04	TS EN ISO 7887 B
Color (525 nm)	m-1	0.04	TS EN ISO 7887 B
Color (620 nm)	m-1	0.04	TS EN ISO 7887 B
Conductivity	µs/cm	338	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	6.2	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.138	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	< 0.5	EPA 6020 B
Magnesium	mg/L	13.93	EPA 200.7
Manganese	µg/L	< 1.0	EPA 6020 B

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/3

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AB-0168-T
LR.24.2809
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	< 1.0	EPA 6020 B
Nitrate Nitrogen	mg/L	0.336	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.800	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	8.87	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	2.657	EPA 200.7
Sulfate	mg/L	18.76	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.081	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	0.571	SM 4500-Norg B
Total Nitrogen	mg/L	0.907	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

For the samples not taken by the ENCON laboratory Inc.. uncertainty values indicated do not cover the uncertainties arising from the sampling.
The Laboratory does not accept technical and legal responsibility for samples that are not sampled by authorized personnel and/or received under inappropriate conditions. The legal responsibility of the information provided by the customer belongs to the customer. our company waives the consequences arising from this information.

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2810
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2810
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – GW-8 (Coordinate: 36S 402068/4053737)
Sample Type / Sample Sign	Ground Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-11
Sampling Date / Date of Samples Received	24.09.2024 / 25.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	25.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T
LR.24.2810
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	220.7	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	72.97	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	14.26	SM 4110 B
Color (436 nm)	m-1	0	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	524	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	8.8	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.239	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	4.995	EPA 6020 B
Magnesium	mg/L	31.07	EPA 200.7
Manganese	µg/L	< 1.0	EPA 6020 B

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	2/3

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2810
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	< 1.0	EPA 6020 B
Nitrate Nitrogen	mg/L	2.423	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.600	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.41	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	9.324	EPA 200.7
Sulfate	mg/L	60.96	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.068	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	1.542	SM 4500-Norg B
Total Nitrogen	mg/L	3.965	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	0.016	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2755
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2755
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-1 (Coordinate: 36S 326069/4088123)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	17.09.2024 / 18.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	18.09.2024 / 07.10.2024

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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LR.24.2755
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	223.6	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	68.87	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	15.81	SM 4110 B
Color (436 nm)	m-1	0.08	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	436	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	8.9	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.336	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	1.035	EPA 6020 B
Magnesium	mg/L	25.98	EPA 200.7
Manganese	µg/L	22.63	EPA 6020 B

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mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2755
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	1.078	EPA 6020 B
Nitrate Nitrogen	mg/L	1.226	SM 4110 B
Nitrite Nitrogen	mg/L	0.009	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.600	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.14	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	1.205	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	8.425	EPA 200.7
Sulfate	mg/L	20.48	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.091	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	1.485	SM 4500-Norg B
Total Nitrogen	mg/L	2.720	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2756
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2756
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – GW-1 (Coordinate: 36S 327651/4087613)
Sample Type / Sample Sign	Ground Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-11
Sampling Date / Date of Samples Received	17.09.2024 / 18.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	18.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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LR.24.2756
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	349.7	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	113.7	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	30.30	SM 4110 B
Color (436 nm)	m-1	0.08	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	801	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	3.7	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.499	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	15.956	EPA 6020 B
Magnesium	mg/L	42.93	EPA 200.7
Manganese	µg/L	1.21	EPA 6020 B

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LR.24.2756
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	0.178	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	17.502	EPA 6020 B
Nitrate Nitrogen	mg/L	9.069	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.400	SM 5520 B
Orthophosphate Phosphorus	mg/L	0.072	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	8.55	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	3.15	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	1.84	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	29.06	EPA 200.7
Sulfate	mg/L	78.56	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.091	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	< 0.5	SM 4500-Norg B
Total Nitrogen	mg/L	9.298	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	0.062	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENCON LABORATUVARI A.Ş.
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AB-0168-T
LR.24.2757
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2757
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – GW-2 (Coordinate: 36S 337029/4091993)
Sample Type / Sample Sign	Ground Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-11
Sampling Date / Date of Samples Received	17.09.2024 / 18.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	18.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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LR.24.2757
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	220.3	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	34.64	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	16.75	SM 4110 B
Color (436 nm)	m-1	0.04	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	462	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	6.5	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.337	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	5.055	EPA 6020 B
Magnesium	mg/L	10.88	EPA 200.7
Manganese	µg/L	< 1.0	EPA 6020 B

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AB-0168-T
LR.24.2757
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	0.141	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	1.635	EPA 6020 B
Nitrate Nitrogen	mg/L	0.485	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.800	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.26	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	79.42	EPA 200.7
Sulfate	mg/L	23.76	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.126	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	< 0.5	SM 4500-Norg B
Total Nitrogen	mg/L	0.485	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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TÜRKAK
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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2759
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2759
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-2 (Coordinate: 36S 338242/4093265)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	18.09.2024 / 19.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	19.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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ENCON LABORATUVARI A.Ş.
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Tel: 0 312 447 71 22 **Faks:** 0 312 447 69 88
mail: encon@enconlab.com.tr **web:** www.enconlaboratory.com

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2759
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	212.8	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	68.79	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	7.20	SM 4110 B
Color (436 nm)	m-1	0.04	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	392	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	11.2	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.292	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	< 0.5	EPA 6020 B
Magnesium	mg/L	23.55	EPA 200.7
Manganese	µg/L	< 1.0	EPA 6020 B

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11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	< 1.0	EPA 6020 B
Nitrate Nitrogen	mg/L	0.782	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.800	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.61	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	1.16	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	5.565	EPA 200.7
Sulfate	mg/L	10.00	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.085	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	0.942	SM 4500-Norg B
Total Nitrogen	mg/L	1.724	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

For the samples not taken by the ENCON laboratory Inc.. uncertainty values indicated do not cover the uncertainties arising from the sampling.
The Laboratory does not accept technical and legal responsibility for samples that are not sampled by authorized personnel and/or received under inappropriate conditions. The legal responsibility of the information provided by the customer belongs to the customer. our company waives the consequences arising from this information.

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2760
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2760
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-3 (Coordinate: 36S 343678/4087016)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	18.09.2024 / 19.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	19.09.2024 / 07.10.2024

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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LR.24.2760
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	317.6	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	93.08	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	20.90	SM 4110 B
Color (436 nm)	m-1	0.12	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	774	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	7.1	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.345	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	3.269	EPA 6020 B
Magnesium	mg/L	42.18	EPA 200.7
Manganese	µg/L	39.05	EPA 6020 B

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LR.24.2760
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	3.782	EPA 6020 B
Nitrate Nitrogen	mg/L	1.414	SM 4110 B
Nitrite Nitrogen	mg/L	0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.600	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.03	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	1.169	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	38.47	EPA 200.7
Sulfate	mg/L	99.65	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.083	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	1.428	SM 4500-Norg B
Total Nitrogen	mg/L	2.847	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

ENCON LABORATUVARI A.Ş.
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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2761
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2761
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – GW-3 (Coordinate: 36S 343273/4087097)
Sample Type / Sample Sign	Ground Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-11
Sampling Date / Date of Samples Received	18.09.2024 / 19.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	19.09.2024 / 07.10.2024

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	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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AB-0168-T
LR.24.2761
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	380.1	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	148.7	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	54.77	SM 4110 B
Color (436 nm)	m-1	0	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	904	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	4.9	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.568	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	< 0.5	EPA 6020 B
Magnesium	mg/L	52.34	EPA 200.7
Manganese	µg/L	< 1.0	EPA 6020 B

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2761
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	2.899	EPA 6020 B
Nitrate Nitrogen	mg/L	2.644	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.600	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	8.12	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	4.182	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	51.23	EPA 200.7
Sulfate	mg/L	224.22	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.077	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	< 0.5	SM 4500-Norg B
Total Nitrogen	mg/L	2.901	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

ENCON LABORATUVARI A.Ş.
Mutlukent Mahallesi Uluırmak Sokak No:23 Çankaya/ANKARA
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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2791
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2791
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-5 (Coordinate: 36S 361921/4075517)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	19.09.2024 / 20.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	20.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2791
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	170.1	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	61.71	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	4.88	SM 4110 B
Color (436 nm)	m-1	0.12	TS EN ISO 7887 B
Color (525 nm)	m-1	0.08	TS EN ISO 7887 B
Color (620 nm)	m-1	0.08	TS EN ISO 7887 B
Conductivity	µs/cm	307	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	9.3	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	< 0.02	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	< 0.5	EPA 6020 B
Magnesium	mg/L	8.967	EPA 200.7
Manganese	µg/L	2.18	EPA 6020 B

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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2791
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	< 1.0	EPA 6020 B
Nitrate Nitrogen	mg/L	0.498	SM 4110 B
Nitrite Nitrogen	mg/L	0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.400	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.28	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	2.803	EPA 200.7
Sulfate	mg/L	6.87	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.08	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	0.657	SM 4500-Norg B
Total Nitrogen	mg/L	1.160	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

ENCON LABORATUVARI A.Ş.
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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2792
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2792
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – GW-4 (Coordinate: 36S 359757/4076456)
Sample Type / Sample Sign	Ground Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-11
Sampling Date / Date of Samples Received	19.09.2024 / 20.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	20.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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TS EN ISO/IEC 17025
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AB-0168-T
LR.24.2792
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	292.1	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	88.12	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	36.23	SM 4110 B
Color (436 nm)	m-1	0	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	588	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	5.8	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.401	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	3.981	EPA 6020 B
Magnesium	mg/L	37.56	EPA 200.7
Manganese	µg/L	4.04	EPA 6020 B

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Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2792
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	< 0.07	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	2.909	EPA 6020 B
Nitrate Nitrogen	mg/L	0.821	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.800	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	8.8	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	0.6989	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	16.96	EPA 200.7
Sulfate	mg/L	30.11	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.073	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	< 0.5	SM 4500-Norg B
Total Nitrogen	mg/L	1.307	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

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ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

ENCON LABORATUVARI A.Ş.
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TÜRKAK
Test
TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2798
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2798
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – SW-6 (Coordinate: 36S 364661/4077537)
Sample Type / Sample Sign	Surface Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-11
Sampling Date / Date of Samples Received	20.09.2024 / 21.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	21.09.2024 / 07.10.2024

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Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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TS EN ISO/IEC 17025
AB-0168-T

AB-0168-T
LR.24.2798
11/24

TEST REPORT

Parameter	Unit	Test Result	Method
1.2-Dichloroethane	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Aclonifen	µg/L	< 0.05	In House Method
Alachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Ammonium Nitrogen	mg/L	< 0.02	SM 4500-NH_3 B. F
Anthracene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Atrazine	µg/L	< 0.05	In House Method
Benzene	µg/L	< 0.2	EPA 5030 C. EPA 8260 D
Benzo(a)pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(b)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(g.h.i)preylene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Benzo(k)fluoranthene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Bicarbonate	mg$CaCO_3$/L	175.6	SM 2320 B
Bifenox*	µg/L	< 0.05	In House Method
Biochemical Oxygen Demand	mg/L	< 3.0	SM 5210 B
Bromic Diphenyl Ether*	µg/L	< 0.14	In House Method
Cadmium and Compounds*	µg/L	< 0.08	EPA 6020 B
Calcium	mg/L	60.81	EPA 200.7
Chemical Oxygen Demand	mg/L	< 5.0	SM 5220 B
Chlorfenvinphos	µg/L	< 0.05	In House Method
Chloride	mg/L	5.20	SM 4110 B
Color (436 nm)	m-1	0	TS EN ISO 7887 B
Color (525 nm)	m-1	0	TS EN ISO 7887 B
Color (620 nm)	m-1	0	TS EN ISO 7887 B
Conductivity	µs/cm	307	SM 2510 B
Dichlorvos*	µg/L	< 0.05	In House Method
Dicholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Dicofol*	µg/L	< 0.05	In House Method
Dissolved Oxygen	mg/L	9.6	SM 4500 O G
Diuron	µg/L	< 0.05	In House Method
Endosulfan	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Floranthene*	µg/L	< 0.006	EPA 3510 C. EPA 8270 E
Fluoride	mg/L	0.125	SM 4110 B
Heptachlor	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexachloro-butadiene	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Hexachloro-cyclohexane	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Hexacholorobenzene*	µg/L	< 0.05	EPA 3610 B. EPA 8081 B
Indeno (1.2.3-cd) pyrene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Isoproturon	µg/L	< 0.05	In House Method
Lead and Compounds	µg/L	15.424	EPA 6020 B
Magnesium	mg/L	9.011	EPA 200.7
Manganese	µg/L	2.46	EPA 6020 B

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11/24

TEST REPORT

Parameter	Unit	Test Result	Method
Mercury and Compounds	µg/L	0.141	EPA 6020 B
Naphthalene	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Nickel and Compounds	µg/L	4.349	EPA 6020 B
Nitrate Nitrogen	mg/L	0.323	SM 4110 B
Nitrite Nitrogen	mg/L	< 0.005	SM 4500-NO_2^- B
Oil and Grease*	mg/L	0.200	SM 5520 B
Orthophosphate Phosphorus	mg/L	< 0.01	SM 4500-P E
Pentachlorobenzene	µg/L	< 0.1	EPA 3610 B. EPA 8081 B
Pentachlorophenol	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
pH	-	9.46	SM 4500-H^+ B
Polycyclic Aromatic Hydrocarbons (PAH)	µg/L	< 0.01	EPA 3510 C. EPA 8270 E
Potassium	mg/L	< 0.5	EPA 200.7
Quinoxyfen	µg/L	< 0.05	In House Method
Selenium	µg/L	< 1.0	EPA 6020 B
Sibutrin*	µg/L	< 0.05	In House Method
Sodium	mg/L	3.056	EPA 200.7
Sulfate	mg/L	6.28	SM 4110 B
Sulphur (S^{-2})*	mg/L	0.081	SM 4500-S^{2-} F
Terbutryn	µg/L	< 0.05	In House Method
Total Kjeldahl Nitrogen (TKN)	mg/L	0.600	SM 4500-Norg B
Total Nitrogen	mg/L	0.923	SM 4500-Norg B. SM 4500-NO_2^- B. SM 4110 B
Total Phosphorus	mg/L	< 0.01	SM 4500-P B. E
Trichlorobenzenes	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Tricholoromethane	µg/L	< 0.2	EPA 5030 C .EPA 8260 D
Trifluarilin*	µg/L	< 0.03	EPA 3610 B. EPA 8081 B

For the samples not taken by the ENCON laboratory Inc.. uncertainty values indicated do not cover the uncertainties arising from the sampling.
The Laboratory does not accept technical and legal responsibility for samples that are not sampled by authorized personnel and/or received under inappropriate conditions. The legal responsibility of the information provided by the customer belongs to the customer. our company waives the consequences arising from this information.

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Doküman No / Document No	İlk Yayın Tarihi / First Release Date	Revizyon No / Tarihi Revision No / Date	Sayfa No Page No
ENC.P.14.F.67.A	04.05.2007	25 / 12.07.2023	3/3

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LR.24.2800
11/24

TEST REPORT

Client Name / Address	ENCON Çevre Danışmanlık LTD. ŞTİ. / Prof. Dr. Ahmet Taner Kışlalı, Bangabandhu Blv. Özçelik İmaj İş Merkezi No:94/39 Çankaya/ ANKARA
Proposal Number	LT24_0155
Report Date / Number of Pages	13.11.2024 / 3
Sample Record Number	NUM.24.2800
Sampler Institution / Company	ENCON Laboratuvarı A.Ş.
Sampling Location	Antalya-Alanya Motorway Project – GW-5 (Coordinate: 36S 370530/4069203)
Sample Type / Sample Sign	Ground Water / Unsealed
Way and Aim the Sampling	Grab Sample / Monitoring
Person Conducted Sampling	Enes AKÇER
Sampling Standard	TS EN ISO 5667-4
Sampling Date / Date of Samples Received	20.09.2024 / 21.09.2024
Delivery Conditions of the Sample	Plastic; Cool, HNO_3 Preservation, Glass; HCl, zinc asetate, H_2SO_4 Preservation
Environmental Conditions During Sampling	Sunny
Remarks	Analyses are done in line with the Client's request. This report cannot be used for official permit purposes in accordance with Turkish Environmental Legislation.
Date of Test	21.09.2024 / 07.10.2024

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The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Date	**Person in charge of report**	***Approval** / Date*
	Dildar SÜSLÜ	Hüseyin TEKİN
	Laboratory Assistant Manager	Laboratory Manager
	signed with E-SIGNATURE	**signed with E-SIGNATURE**
13.11.2024		**13.11.2024**

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EMERGENCY PREPAREDNESS AND RESPONSE MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant.

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DEFINITIONS AND ABBREVIATIONS

Terms, definitions and abbreviations used in this document are listed below:

ERP	Emergency Response Plan
ERT	Emergency Response Team
Project	Antalya Alanya Motorway Project
IFC	International Finance Corporation
PS	Performance Standard
AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (“SPV”)
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EHS	Environment, Health and Safety
HSE	Health & Safety and Environment
ESMP	Environmental and Social Management Plan
EHS-MS	Environmental, Health and Safety – Management Plans
SEP	Stakeholder Engagement Plan
EU	European Union
OHS	Occupational Health and Safety
CLO	Community Liaison Officer

1. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Emergency Preparedness and Response Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

1.1. Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

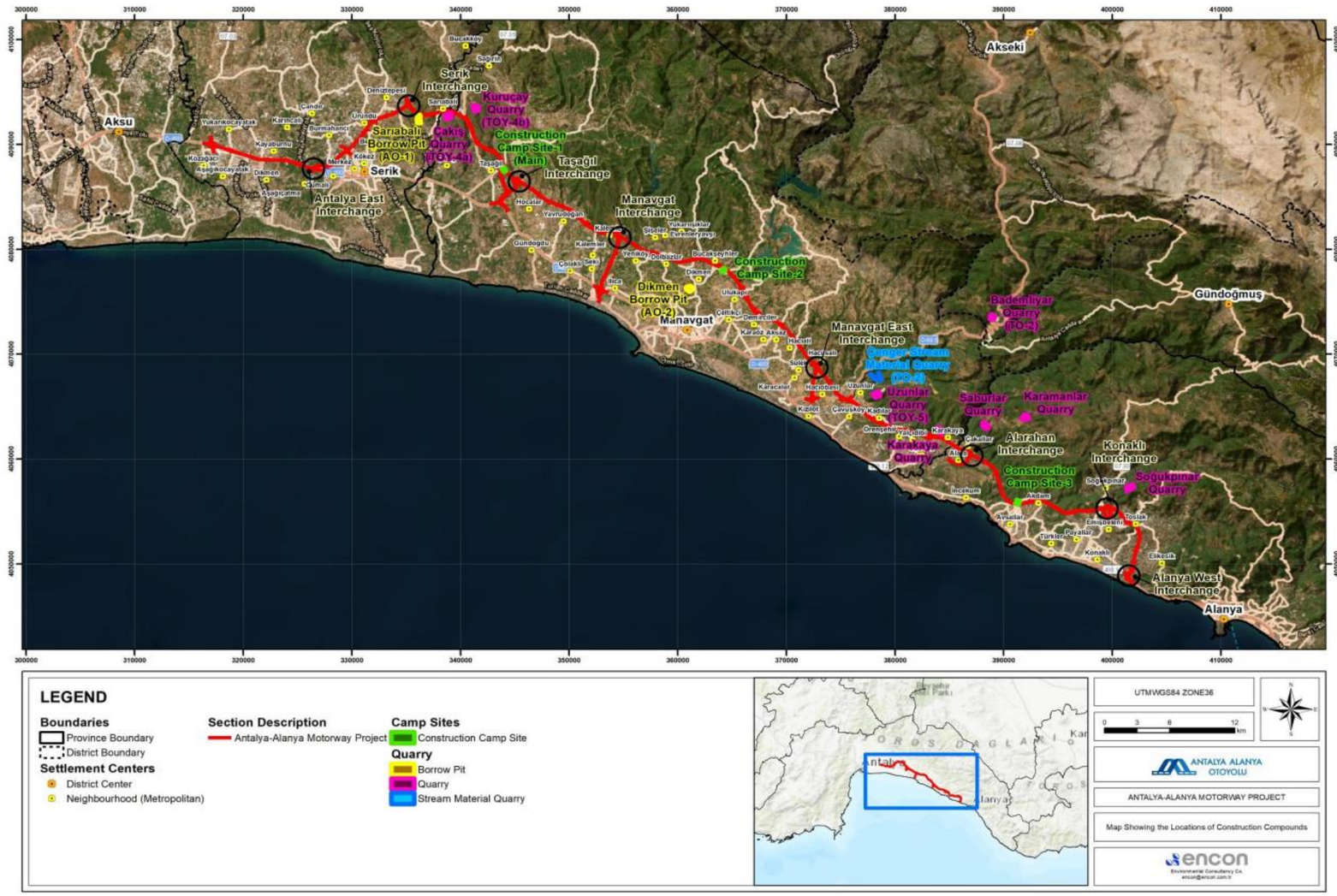


Figure 1.1-1.Map Showing the Locations of Construction Compounds

1.2. Purpose

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project ("The Project"), has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[3] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The Project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

The Project is anticipated to deliver benefits including relieving congestion on the Akdeniz Region's existing road network and building capacity for future traffic, providing better access to employment, markets, education, healthcare and cultural and tourism facilities and improved emergency response times, and creating social and local economic benefits through job creation and local and regional development.

- Motorway (84 km);
- Access roads (33.8 km);
- Viaducts (16);
- Bridges (22);
- Culverts (305);
- Interchanges (25);
- Overpasses (56);
- Underpasses (43); and
- Tunnels (5).

Facilities to be constructed for use during operation include toll collection areas, service areas and a maintenance and operations area. During construction, temporary facilities required including three temporary construction camps with facilities, borrow pits/quarries (11 identified sites according to the draft Environmental and Social Impact Assessment (ESIA), June 2025), and storage sites (22 identified).

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at

[3] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads[4].

The purpose of the Emergency Preparedness and Response Plan (EPRP) is to define the actions and measures necessary for the overall management of and response to emergencies within the Antalya Alanya Motorway Project specific activity area of influence. The Plan aims to:

- Outline the applicable legislation and standards relevant to this Plan;
- Define roles and responsibilities;
- Incorporate the requirements of the Regulatory Environmental Impact Assessment (EIA) findings, the Environmental and Social Impact Assessment (ESIA), international standards, Turkish legislation, Lenders requirements and any Project specific permits: and
- Provide procedures of action for foreseeable emergency scenarios
- Define the lines of communication to be followed during emergencies.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

1.3. Scope and Validity

The present ERP scope covers the construction phase of the Antalya Alanya Motorway Project only and applies to all AAOİAŞ and its subcontractors' activities (including third party subcontracted sites (quarries, borrow pits etc.). The area of influence is therefore limited to all Project activities related to the motorway construction process. The ERP will be further updated one month before slope-earth cut excavation activities), which can be assumed as the beginning of the Motorway Construction. The updated ERP scope will take into account all of the Project Area of influence and all motorway construction activities.

The Plan incorporates the requirements of the Antalya Alanya Motorway Turkish EIA Report findings, the Antalya Alanya Motorway ESIA Report findings, IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts, IFC Performance Standard 4: Community Health, Safety and Security, Turkish Legislation, Project Lenders requirements and any Project specific permits.

This Emergency Preparedness and Response Management Plan ("EPRMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project").

This Plan should be applied by all parties involved in the construction phase, including the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or SPV), the Main Contractor (EPC or Limak), and all subcontractors. The EPRMP will be updated following the start of slope excavation works, which can be considered the beginning of motorway construction. The following Worksites are defined , as below to deliver the Project component described in the previous section:

[4] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

- Motorway
- Access roads
- Viaducts
- Bridges
- Culverts
- Interchanges
- Overpasses
- Underpasses and
- Tunnels

In addition to the main worksites defined above, temporary worksites and all access roads, borrow pits, quarries, stream material quarries, labour camp sites, and social areas are considered within the scope of this Plan.

2. LEGISLATIONS AND STANDARDS

ISO 45001:2081, ISO 14001:2015, Applicable IFC standards include, IFC Performance Standard (PS) 1: Assessment and Management of Environmental and Social Risks and Impacts IFC Performance Standard (PS) 4: Community Health, Safety and Security, IFC General Environmental Health and Safety (EHS) Guidelines and IFC EHS Guidelines for Toll Roads which sets out a range of recommendations with regards to emergency management. EPC will comply with these requirements when implementing the Project. Key requirements of these standards include:

- Establishment of an Emergency Response System so that the EPC, in collaboration with appropriate and relevant third parties, will be prepared to respond to accidental and emergency situations associated with the project in a manner appropriate, to prevent and mitigate any harm to people and/or the environment.
- Where applicable, EPC will also assist and collaborate with the potentially Affected Communities and the local government agencies in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to ensure effective response. If local government agencies have little or no capacity to respond effectively, the EPC will play an active role in preparing for and responding to emergencies associated with the project.

In addition to the above, the following impact assessment reports prepared for the Project will be used as reference documents:

- Antalya Alanya Motorway Project ESIA Report;
- Antalya Alanya Motorway Project EIA Report; and

The requirements of the Turkish laws and regulations with regards to emergencies in accordance with the Project design and construction will be implemented including the following regulations:

- Regulation on Emergencies in Worksites
- Regulation on Structures to be Built in Disaster Areas
- Regulation on Buildings to be Built in Earthquake Areas

The following AAOİAŞ plans, procedures and policies related to engagement with emergencies will also be used as reference documents:

- Solid Waste Management Plan
- Hazardous Material Management Plan
- Environmental Accident and Spill Response Management Plan
- Community Health and Safety Management Plan
- Construction Camp Site Management Plan
- Air Pollution and Emission Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Noise and Vibration Management Plan
- Change Management Plan
- Emergency Response and Management Plan
- Human Resources and Labour Management Plan
- Security Management Plan
- Subcontractor Management Plan
- Training and Communication Management Plan
- Resource Efficiency Management Plan
- Excavated Material Management Plan
- Soil Management and Erosion Control Plan
- Stakeholder Engagement Plan
- Employment Policy
- Project HSE Policy

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework (“ESF”) document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices.

In addition to above following international requirements and standards, and Good International Industrial Practice (GIIP) regarding occupational health and safety.

- ISO 45001:2018 Occupational Health and Safety Management Systems
- IFC Performance Standards (2012), specifically:

o Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

o Performance Standard 2: Labor and Working Conditions

o Performance Standard 4: Community Health, Safety, and Security

- Worker' accommodation: process and standards. A guidance note by IFC and the EBRD, 2009
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- European Union Road Safety Policy Guidelines and Directives=
- European Bank for Reconstruction and Development's (EBRD's) Performance Requirement (PR) 4 – Health, Safety, and Security (2019)
- Addressing Gender-Based Violence and Harassment – Good Practice Note for the Private Sector, December 2019 – Emerging Good Practice for Private Sector
- Addressing Gender-Based Violence and Harassment – Emerging Good Practice for Private Sector
- Asian Infrastructure Investment Bank's (AIIB's) Environmental and Social Framework (2021)
- Worker' accommodation: process and standards. A guidance note by IFC and the EBRD, 2009
- International Finance Corporation's (IFC's) Sustainability Framework (2012) and associated applicable Performance Standard (PS) 2 - Labour and Working Conditions
- Approved Code of Practice and guidance on regulations L8 (Fourth edition)
- The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
- OSHA 1926.651 Specific Excavation Requirements
- OSHA 1910.252 Welding, Cutting and Brazing (Hot Works)
- ILO Safety and Health in Building and Engineering Work
- ILO Safety and Health in Construction, 1992Health and Safety in Construction, HSG150, 2006
- Health and Safety at Work etc. Act 1974

It should be noted here that; where two or more of the identified standards are inconsistent or contradictory, unless otherwise justified, the EPC will adopt the more stringent.

3. ENVIRONMENTAL HEALTH AND SAFETY-MANAMENT SYSTEMS (EHS-MS) INTERACTION

The ERP forms part of the Project EHS-MS and therefore should be read in conjunction with the related EHS-MS elements. These elements include the overarching ESMP and individual EHS Management Plans and Procedures. The ERP will therefore be implemented together with the related plans and procedures in order to manage emergencies. The plans and procedures which are relevant to ERP include:

- Occupational, Health, Safety and Environment Plan
- Stakeholder Engagement Plan – Grievance Mechanism
- Hazardous Materials Management Plan
- Traffic Management Plan
- Biodiversity Action Plan
- Community Health and Safety Management Plan
- Environmental Accident and Spill Response Management Plan
- Environmental and Social Management Plan (ESMP) of the Antalya Alanya Motorway Project together with the Commitments Register (See Annex A for commitments on emergency response together with how the commitments will be implemented)

4. GENERAL ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

- Ensure sufficient resources are allocated on an ongoing basis to meet the requirements of this ERP,
- Describe the resources allocated to and responsible for the execution of each task and requirement contained therein,
- Describe how roles and responsibilities are communicated to relevant personnel,
- Ensure all subcontractors and relevant third parties are bound by this plan and briefed on its content
- Regularly review the implementation and effectiveness of this plan and make adjustments where necessary
- Ensure that all personnel responsible for the execution of the tasks and requirements contained within this plan are competent on the basis of education, training and experience, and
- Undertake the training and awareness requirements necessary for the effective implementation of ERP.

SPV General Manager

- Oversee the financial, legal, and operational compliance of the SPV, including emergency preparedness obligations, in line with local laws, environmental regulations, corporate governance, and international standards/lender requirements.
- Ensure necessary resources (financial, human, and technical) are allocated for the effective implementation of emergency preparedness and response (EPR) measures.
- Promote a culture of safety, environmental, and social responsibility across SPV and stakeholders.
- Support the SPV H&S Manager in the development, dissemination, and execution of the EPRMP.

- Ensure corrective and preventive actions are taken in case of emergency-related non-compliance.
- Monitor the performance of EPC contractors in relation to EPRMP implementation and report to stakeholders.

SPV Health and Safety Manager

- Ensure the preparation, revision, and implementation of emergency-related procedures in compliance with ESIA/EIA, corporate policies, and lender requirements.
- Supervise EPC and subcontractors' emergency preparedness activities, including drills, training, and method statements.
- Ensure proper investigation and root cause analysis of emergency incidents and implement corrective actions.
- Coordinate with authorities and stakeholders regarding emergency notifications, inspections, and compliance.
- Track EPR performance indicators (e.g., incident response times, near misses, TRIR).
- Report emergency preparedness status and non-compliances to the SPV General Manager.

SPV HSE Specialist

- Support the SPV H&S Manager in monitoring EPC's and subcontractors' implementation of EPRMP measures.
- Conduct site inspections focusing on emergency equipment, signage, drills, and hazard identification.
- Maintain emergency-related documentation (drill records, training logs, incident reports).
- Support accident/incident investigations and communicate lessons learned.
- Assist in resolving complaints regarding occupational, site, or community safety linked to emergencies.

EPC Project Director

- Has overall accountability for ensuring EPC's compliance with the EPRMP.
- Allocate adequate resources (competent staff, emergency equipment, PPE, budget) to implement emergency risk mitigation measures.
- Approve emergency and HSE-related management plans.
- Ensure effective corrective actions are taken in response to emergency-related incidents.
- Maintain transparent communication with SPV, subcontractors, regulators, and communities regarding emergency issues.
- Oversee risk management and mitigation strategies, including emergency preparedness for technical, health, safety, environmental, and community safety aspects.

EPC Construction Manager

- Ensure construction works integrate required emergency precautions.

- Verify that emergency access routes are available and properly maintained.
- Ensure work teams have job-specific emergency plans, equipment, and PPE.
- Incorporate lessons learned from drills or incidents into work practices.

EPC Line Managers

- Prepare job-specific method statements that include emergency response measures.
- Ensure emergency risks are assessed and mitigation measures are in place before activities begin.
- Collaborate with ES&H teams to correct nonconformities identified during inspections.
- Support accident/incident investigations and corrective action processes.
- Ensure staff participation in emergency trainings and drills.

EPC Health and Safety Manager

- Lead the preparation, revision, and implementation of EPC's EPR procedures.
- Integrate emergency controls into daily operations, work permits, and toolbox talks.
- Supervise emergency drills, inspections, and audits.
- Maintain the site-specific risk register for hazards and emergencies.
- Coordinate with authorities and SPV on emergency incidents, notifications, and verifications.
- Report on EPC's EPR performance and key risks to the EPC Project Director.
- Foster a proactive safety and emergency culture.

EPC HSE Chief

- Support EPC H&S Manager in implementing site emergency preparedness.
- Ensure compliance of contractors with emergency procedures.
- Conduct emergency training, toolbox talks, and safety briefings.
- Maintain risk registers and track hazards related to emergencies.
- Participate in accident/incident/near-miss investigations and ensure corrective actions are followed.
- Provide reports to EPC H&S Manager on emergency preparedness status.

EPC HSE Engineer

- Support EPC HSE Chief in implementing emergency plans and monitoring compliance.
- Conduct site-level emergency inspections and hazard assessments.
- Ensure proper implementation of behaviour protocols and community safety guidelines.
- Support incident investigations and ensure corrective measures are documented and implemented.
- Address emergency-related complaints in coordination with supervisors.

EPC HSE Technician

- Conduct daily field-level hazard identification and inspections.
- Ensure workers comply with PPE and emergency signage/barrier requirements.
- Support documentation of emergency drills, incidents, and near misses.
- Escalate observed deficiencies to HSE Engineer/Chief.

EPC HSE Worker

- Conduct basic emergency checks on-site (e.g., PPE, housekeeping, fire extinguishers).
- Report unsafe conditions, emergencies, or near misses.
- Support emergency drills and evacuation activities.
- Assist in implementing emergency signage and access controls.

EPC Trainer and Document Controller

- Develop and deliver EPC emergency preparedness training (induction, refresher, drills).
- Maintain training and drill records.
- Ensure EPR-related documentation is archived and traceable.
- Support audits by providing emergency preparedness records.

Site Doctor

- Provide first aid, emergency care, and health monitoring.
- Maintain emergency medical records and health surveillance.
- Identify occupational health risks and integrate into emergency procedures.
- Ensure readiness of emergency medical equipment.
- Coordinate with hospitals and authorities during medical emergencies.

Paramedic

- Provide immediate on-site medical response and stabilization.
- Support emergency evacuation of patients.
- Monitor and restock emergency medical supplies.
- Participate in drills and support incident investigations.

Other Stakeholders

Workers, Subcontractors, and Suppliers

- Follow emergency training and drills.
- Report unsafe conditions, emergencies, and near misses immediately.
- Comply with emergency signage, PPE, and site safety requirements.

Visitors and Consultants

- Receive general emergency induction before site access.
- Always be accompanied by trained site personnel.
- Comply with site-specific emergency instructions

5. EMERGENCY ROLES AND RESPONSIBILITIES

In addition to broad roles and responsibilities in accordance with this Plan, which are outlined in Section 4; roles and responsibilities in the event of any emergency are detailed below. Names and other details of the personnel who are appointed for these roles and responsibilities are presented in Annex B. This contact list will be reviewed monthly by the HSE Manager. Access to internal contact information will be restricted to authorized personnel only. Updated versions will be redistributed after any personnel changes. Contact details of external authorities / agencies are submitted in Annex C.

5.1. Emergency Controllers

Leading responsible employees (2 persons working together or may split according to situation) on the site regarding emergency situations. Take control of the emergency situation and direct the emergency response team, sub-contractors, supervisors, visitors and all other personal. Arrange relevant management and emergency services to be contacted. Direct and liaise with the emergency services. Additionally, are responsible for initiating an evacuation process if needed, and securing a practical perimeter around the incident location. Emergency Controllers have responsibility for reporting relevant developments to the Project Manager.

5.2. Administrative Assistant

Mainly responsible for communicating with and informing the Project Manager and Emergency Services (fire department, police, ambulance, etc.). Also assists the Emergency Controller. The Administrative Assistant has responsibility for reporting relevant developments to the Emergency Controllers.

5.3. Emergency Response Team

They are the first personnel to respond to the emergency before any emergency services arrive at the site. They conduct basic emergency response actions such as fire-fighting, rescue and hazardous material mitigation under the command of the Emergency Controller. Assist in emergency notification and public protective actions, accounting for personnel outside the hazard zone or implementing In-Place Protection (IPP) within the workplace, and assist the emergency services (fire department, police, etc.) on arrival to the site. The Emergency Response Team has responsibility for reporting relevant developments to the Emergency Controllers

5.4. First Aid Personnel

Provide first aid treatment to casualties. Liaise with and assist ambulance service on arrival on site. First Aid Personnel have responsibility to report relevant developments to site doctor.

Paramedics/ambulance staff shall be stationed at designated locations within the Project (near the infirmary), and shall be responsible for the following:

- Providing first aid treatment to workers, local community members, or site visitors in case of an emergency, when needed,

- Conducting routine site patrols within the Project,
- Referring the worker to the nearest hospital or infirmary after administering the necessary first aid treatment, if deemed necessary,
- Performing 24-hour checks to ensure that all medical equipment in the on-site ambulance is complete and reporting any missing items to the H&S team,
- Reaching the incident site in the shortest possible time by using the designated route after the emergency is reported,
- Conducting daily patrols on site and maintaining familiarity with the traffic plan on open road.

Sufficient number of certificated first aid personnel will be employed according to the total personnel number during the construction phase

5.5. Security

In case of an emergency controls the traffic, directs vehicle away from the incident area and escorts emergency vehicles. Security has responsibility to report relevant developments to Emergency Response Team

5.6. Environmental Engineer

Assess extent of environmental threat and/or contamination and liaise with Emergency Controller to minimize effects. Informs Provincial Directorate of Environment and Urbanisation / Fisheries Authorities. Environmental Engineer has responsibility to report relevant developments to Emergency Controllers

5.7. Emergency Wardens

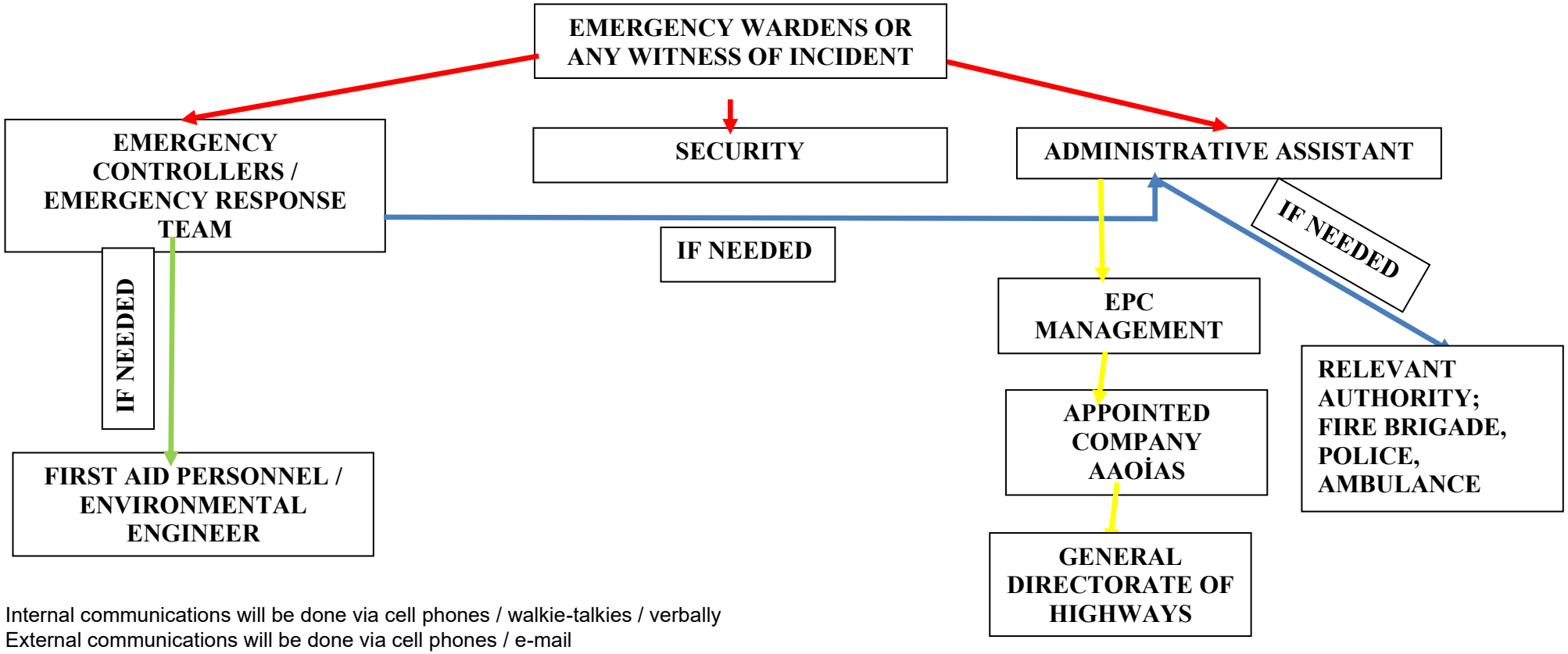
They will be chosen by the Emergency Controller and will be present in every work area. The Emergency Wardens will evaluate the emergency and evacuate the work area if needed. They will conduct a head count at Assembly Points, and account for all personnel, subcontractors and visitors. Reports personnel and visitors who are missing to the Emergency Response Team and H&S Manager. Restricts entry into affected areas to emergency personnel only. Assists the Emergency Controller as needed. Emergency Wardens have responsibility for reporting relevant developments to the Emergency Response Team.

5.8. Site Doctor

Administers relevant treatment to patients and follows the Emergency Controller’s and Emergency Response Team’s instructions on other issues.

6. COMMUNICATION

In any emergency, communication flow presented below will be followed:



- Internal communications will be done via cell phones / walkie-talkies / verbally
- External communications will be done via cell phones / e-mail

7. RISK ASSESSMENT

Relevant Health & Safety risk assessment studies have been conducted already for Motorway construction. Risks assessments have been conducted in accordance with the method submitted in Occupational Health and Safety Plan. Main topics and findings of onshore risk assessment studies are:

Site excavation works risk assessment

Main consequences of hazards of site excavation works are:

- Physical injury
- Environmental pollution – spills
- Overturn of equipment

Lifting risk assessment

Main consequences of hazards of lifting works are:

- Falling – physical injury
- Overturn of equipment

Jet grout risk assessment

Main consequences of jet grout works are:

- Chemical burns – physical injury
- Overturn of equipment
- Environmental pollution – spills

Based on site-specific risk assessments and operational configurations, the following zones within the Project are identified as high-risk areas requiring special control and emergency readiness measures:

- **Tunnel portals and interior segments** – due to limited egress, poor ventilation, and risk of collapse or equipment fire.
- **Fuel and chemical storage areas** – due to flammability, spill potential, and environmental contamination risks.
- **Bridge decks and viaducts under construction** – due to height-related hazards and fall risks.
- **Electrical distribution zones (e.g., transformer areas, substations)** – due to arc flash and electrocution risk.
- **Heavy equipment and crane operation zones** – risk of mechanical failure, struck-by incidents, and collapse.
- **Confined spaces (e.g., stormwater culverts, manholes)** – due to oxygen deficiency, toxic gases, and limited rescue options.
- **Excavation edges and unstable slopes** – due to fall or collapse hazard.

All high risks shall be clearly marked with hazard signage, physically restricted where possible (e.g., barriers, fencing), regularly monitored and reviewed by the H&S team and included in emergency response drills.

8. INCIDENT CLASSIFICATION

8.1. Level 1 Incident (High)

Level 1 incidents are incidents that cannot be managed using normal EPC resources; i.e. the capabilities of the EPC to respond are exceeded by the initial impacts of the event. This type of incident would necessitate a direct call to local emergency authorities by the administrative assistant under the supervision of the Emergency Controller and/or Project manager and initiation of evacuation procedures outlined in Annex E. A Level 1 incident will require significant resources and multiple operational periods until containment/control is achieved.

Examples of a Level 1 incident in the context of this Plan are:

- Terrorism
- Major fire or explosion – Catastrophic fire & explosion events which cannot be managed using normal EPC resources. Incidents which have possibility to spread all construction site quickly.
- Earthquake

8.2. Level 2 (Medium) and Level 3 (Low) Incident

Level 2 and Level 3 incidents require a response from EPC emergency responsible persons. In the event of a Level 2 incident additional resources and services from local emergency authorities will be needed but EPC emergency responsible persons have duties until local emergency authorities arrive.

Examples of a Level 2 & 3 incident in the context of this Plan are:

- Physical injuries
- Minor Fire or Explosion – Fire and/or explosion events which can be managed with EPC resources until local emergency authorities arrive. Incidents which can be confined in a specific area.
- Overturn of equipment

Level 3 incidents can be managed by EPC's emergency responsible persons only. Section 7 below outlines the response procedures for Level 2 and Level 3 incidents.

9. EMERGENCY RESPONSE PROCEDURES FOR LEVEL 2 AND LEVEL 3 INCIDENTS

Response procedures for Level 2 and 3 emergencies are outlined in this section. Material requirements (e.g. PPEs, adsorbents, walkie-talkies etc.) for emergencies are provided in ANNEX D. Evacuation procedures for relevant emergencies which can be distributed to relevant locations of construction site are submitted in ANNEX E.

9.1. Physical Injuries

Emergency Wardens or any witness to the incident can start the response procedure by alerting relevant responsible persons. Minor cuts and/or bruises can be treated by a ***First Aid Personnel*** or be taken along to the site medical clinic for treatment. In the event of a significantly injured individual on site at any time of day or night;

- Contact must be made with the ***Emergency Controller*** by ***Administrative Assistant***.
- ***First Aid Personnel*** will inform the site doctor
- ***Site doctor*** will assess the patient's situation:

  (i) If the patient should not be moved; an ambulance will directly be called by the ***Administrative Assistant*** and relevant treatment will be administered by the ***site doctor*** until an ambulance arrives.

  - ***Security*** will be informed by the ***Administrative Assistant*** on the issue
  - ***Security*** will direct the ambulance to the injured person

  (ii) If moving the patient does not have any risk; the patient will be treated until stable enough to travel and will then be transferred to the site medical clinic

  - ***Site doctor*** will assess the patient's condition and decide if they can be cared for at the site clinic or if they require transfer to the hospital.
  - Ambulance will be called by the ***Administrative Assistant*** or any witness
  - ***Security*** will be informed by the ***Administrative Assistant*** on the issue
  - ***Security*** will direct the ambulance to the injured person

9.2. Minor Fire or Explosion

Anybody who discovers indication of a fire such as smell, smoke, if it is not unsafe to respond, should try to extinguish the fire by using the nearest fire extinguisher – all employees shall be subject to training on the use of fire extinguishers-. In the event of any fire OR explosion;

- ***Emergency Wardens*** or the witness(es) will sound the alarm to alert all personnel
- ***Emergency Wardens*** will evacuate the area if needed and will direct personnel to the assembly point.
- ***Administrative Assistant*** will notify the fire brigade
- ***Emergency Controller*** and ***Emergency Response Team*** will eliminate flammable material (e.g. fuel) sources and will de-energize power supply if necessary
- Without endangering their safety; ***Emergency Controller*** and ***Emergency Response Team*** will try to control the fire until the fire brigade arrives the site.
- ***Security*** will be informed by ***Administrative Assistant*** on the issue
- ***Security*** will direct the fire brigade to the fire scene.
- Fire brigade on arrival will be in charge of fighting the fire.
- The process of response in relation to a physical injury **(see section 6.)** will be implemented for any causalities.

9.3. Collapse of Equipment / Structure / Excavation

In case of any collapse,

- The priority will be for the ***Emergency Controller*** to make the area safe.

- The damaged zone must be barricaded, and non-authorized access shall be prohibited by the ***Emergency Controller***. Response and rescue shall be implemented after evaluating all risks.
- ***Emergency Response Team*** will be directed to the area by ***Emergency Controller***
- ***Emergency Response Team*** and ***Emergency Controller*** will evaluate the situation and while doing that; they direct ***Security*** in order to set up an exclusion zone.
- ***Emergency Response Team*** will develop a rescue plan under the supervision of the ***Emergency Controller.***
- The final plan will be discussed with ***Emergency Controller*** for its approval
- Local Search and Rescue authority will be contacted by ***Administrative Assistant*** if needed. If Search and Rescue authority are called on to attend the scene:
    - ***Security*** will be informed by Administrative Assistant on the issue
    - ***Security*** will direct Search and Rescue authority to the scene.
    - Search and Rescue authority on arrival will be in charge
- If the rescue plan is considered as appropriate; it can be implemented by internal resources
    - All staff in the area of incident should be considered as trapped
    - Rescue plan will be implemented
- During this process; relevant flow of physical injury response (***See Section 7.1***) will be implemented for causalities.

9.4. Overturn of Equipment

It should be noted here that, in the event of equipment overturning outside of the construction site, the incident will be considered as “road traffic accident”. See Section 8.5 please.

- ***Emergency Wardens*** or any witness can inform the ***Emergency Controller*** about the incident
- ***Administrative Assistant*** will inform the ***Project Manager*** about the incident
- The stability of the equipment will be considered by the ***Emergency Controller*** together with experienced riggers and operators before the appropriate response is initiated
- The definite weight of the equipment and centre of the gravity will be checked from operator manual.
- Rescue operation will be supported by experienced riggers and operators
- To rescue any turned over equipment or vehicle, proper capacity crane and hoisting gears will be provided by Project Manager.
- Possible oil and/or fuel leakages will be considered, and necessary precautions will be taken.
- Smoking and the use of any open flames will be prohibited
- Around the equipment, a safety zone will be established, and the surrounding area will be barricaded for non-authorized access by ***Security***.

9.5. Road Traffic Accident

In case of a road traffic accident within the construction site boundaries; the relevant procedure(s) clarified in this Plan must be implemented. For instance; the procedure for physical injuries and/or the procedure for overturn of equipment may need to be followed.

In case of a road traffic accident outside of the construction site, the instruction for drivers is given below:

- Use caution exiting your vehicle. Other vehicles may still be trying to pass or come to a stop.
- Check to see if anyone is injured. If someone is injured, request medical assistance immediately. Perform first aid, if necessary, within the limits of your training and experience.
- Call the police immediately, even if the accident appears to be minor. And then notify your supervisor. During notifying your supervisor; briefly describe what has happened and state if you need assistance.
- Secure the site with warning signs.
- Put out safety cones in relevant locations in order to attract the attention of other drivers
- Do not speak with the media or other parties at the scene.
- Do not argue with the others involved, do not admit liability for the accident or do not make any comments on the causes of the accident with anyone except the police.
- Gather as much information about the accident as possible.
- If possible; write down the names, addresses and phone number of everyone involved.
- Get the automobile insurance company names and policy numbers of all vehicle owners.
- Write down the year, model and plate number of all vehicles
- Note the location and extent of all the damage to all vehicles.
- Write down the names, addresses and phone numbers of any witnesses.
- Note the location of the accident - street names, cross streets, landmarks, route or exit numbers.
- For each vehicle, note the direction of travel, road signs or signals, and the number of lanes.
- Note the time of day, weather conditions, and road conditions.
- If a camera is available, take a photo of the scene from four directions. Also, take a photo of the location of the damage of each vehicle.
- Write a brief description of the accident and sketch the scene if possible.
- Ask the police officer where and when you can get a copy of the report. Note the badge number and name of the officer, as well as the report number.
- Follow instructions given by the police.

9.6. Falling into the Water

- In the event of anybody falling into the water; The Medical Team should be notified immediately about the incident
- Emergency Wardens or any witness can throw the rescue wheel

- The person will be pulled to land or onto a vessel if it is safe to do so. If not you should wait for the Coast Guard to arrive.
- The physical injury response procedure (See Section 6.) will be implemented if necessary.

9.7. Confined Space Rescue

If a person in a confined space gets into trouble, the stand-by employee must inform the ***Emergency Controller*** so the necessary support can be sent. The stand-by employee must never enter the confined space to assist. When ***Emergency Controller*** and ***Emergency Response Team*** arrive;

- ***Emergency Controller*** and ***Emergency Response Team*** will check the atmosphere and ventilate the area as needed in accordance with Occupational Health and Safety Plan
- The possibility for collapsing will be considered
- Safety harnesses, lifeline tripods etc. will be used to access the confined space
- The safety of the ***Emergency Response Team*** must not be endangered
- ***First Aid Personnel*** will be informed by ***Administrative Assistant***
- The physical injury response procedure (***See Section 7.1***) will be implemented if necessary

9.8. Spills

In case of any spill incident; the ***Emergency Controller*** can be informed ***by Emergency Wardens*** or any witness.

- ***Emergency Controller*** and ***Emergency Response Team*** will assess the situation for the possibility of a fire breaking out, the location will be evacuated immediately, and the incident area will be isolated by ***Security.***
- Small spills will be cleaned immediately by the operator using absorbents, which will be disposed of as hazardous waste.
- Large or hazardous spills will be managed by the Emergency Response Team, who will assess severity, contain, and clean up.
- Local Communities will be alerted and informed by appropriate means including telephone, audible alarms and vehicle mounted speakers via supervision of CLOs.

As spill responses need different approaches according to the type of the material; instructions in accordance to the type of the material are submitted below sections:

9.1.1. Diesel Fuel and Gasoline Spills

- Avoid inhalation of any vapours by staying upwind. Use chemical-resistant personal protective equipment (gloves, boots and safety glasses) during clean-up activities,
- Gasoline and gasoline vapours are highly flammable. Remove sources of heat, sparks, flame, and electricity. Gasoline may create an explosive atmosphere,
- Stop the source of the spill/leak and contain (isolate) it as soon as possible; move leaking equipment away from drains and surface waters if needed,

- Apply absorbents (sheets or granular material). Dike the area with absorbent or soil if needed; prevent liquid from spreading and entering drains or surface waters. Allow time for the absorbent material to soak up the spilled material. Restrict access to the area,
- Once the spill is contained and free product is absorbed, put the used absorbent (contaminated absorbent) in a plastic bag, secure the bag with a metal tie, and place the bag in a labelled container with a secure lid,
- Shovel any contaminated soil into drums with secure lids. Pump any free product into a separate and secure drum or appropriate holding tank. Label containers/drums with the date, location of spill, name of product spilled, approximate quantity, and type of material recovered,
- Used absorbents and contaminated soils should be classified and treated as waste.
- Dispose of all free products as either hazardous waste or as material to be recycled,
- Environmental Engineer will supervise the process,
- Implement Environmental Accident and Spill Response Plan.

9.1.2. Hydraulic Fluid, Lubricant and Oil Spills

- Avoid inhalation of any vapours by staying upwind. Use chemical-resistant personal protective equipment (gloves, boots, and safety glasses) during clean-up activities. Restrict to use open flames close to the spill area,
- Stop the source of the spill/leak and contain (isolate) it as soon as possible; move leaking equipment away from drains and surface waters if needed,
- Apply absorbents (sheets or granular material). Dike the area with absorbent or soil if needed; prevent liquid from spreading and entering drains or surface waters. Allow time for the absorbent material to soak up the spilled material. Restrict access to the area,
- Once the spill is contained and free product is absorbed, drain absorbents of any free product and place them in a plastic bag, secure the bag with a metal tie, and place the bag in a labelled container with a secure lid. Shovel any contaminated soil into drums with secure lids. Pump any free product into a separate and secure drum or appropriate holding tank. Label containers/drums with the date, location of spill, name of product spilled, approximate quantity, and type of material recovered,
- Used absorbents and contaminated soils should be classified and treated as waste.
- Dispose of all free product as either hazardous waste or as material to be recycled,
- Environmental Engineer will supervise the process,
- Implement Environmental Accident and Spill Response Plan.

9.1.3. Chemical Spills (e.g. acid caustics)

- Avoid inhalation of any vapours by staying upwind. Use chemical-resistant personal protective equipment (gloves, boots, safety glasses) during clean-up activities. Restrict open flames from the spill area.
- Stop the source of the spill/leak and contain (isolate) it as soon as safely possible.

- Refer to Material Safety Data Sheets (MSDS) for any special hazards and clean up procedures associated with the spilled chemical, especially for reactivity with other substances in the spilled area,
- Apply absorbents. Dike the area with absorbent or soil if needed; prevent liquid from spreading and entering drains or surface waters.
- Once the spill is contained and free product is absorbed, drain absorbents of any free product and place them in a plastic bag, secure the bag with a metal tie, and place the bag in a labelled container with a secure lid. Shovel any contaminated soil into drums with secure lids. Pump any free product into a separate and secure drum or appropriate holding tank. Label containers/drums with the date, location of spill, name of product spilled, approximate quantity, and type of material recovered,
- Used absorbents and contaminated soils should be classified and treated as waste.
- Determine if free product that cannot be used must be classified as hazardous waste. Similarly, determine if used absorbents are hazardous waste. Dispose of hazardous and non-hazardous waste, separately, offsite using a licensed disposal company and to a licensed landfill,
- Environmental Engineer will supervise the process,
- Implement Environmental Accident and Spill Response Plan.

9.9. Flooding

During a flood incident;

- Emergency Wardens or any witness can start evacuation for all personnel who are not involved in flood emergency situations
- If necessary and safe to do so; Emergency Controller and Emergency Response Team will arrange de-energizing any electrical equipment and outlets in the affected areas. Relevant electricians will supervise the process
- Emergency Controller and Emergency Response Team will take measures to stop the flow of water through the buildings by using diver pumps
- If safe to do so; any equipment or supply will be relocated to an unaffected area of the site

9.10. Earthquake

In case of an earthquake, everybody must follow the instructions listed in the “Evacuation Procedure in the Event of Earthquake” which is included as ANNEX E to this Plan. After the shaking stops the Emergency Controller will brief the below mentioned instructions/reminders to personnel at the Assembly point:

- Do not use matches/lighters or other sources of ignition
- Power outages may occur; fire alarms and sprinkler systems may be activated
- If possible, provide assistance to individuals with disabilities who may need it or alert emergency responders to their location
- Do not enter any building that has been deemed or appears to be unsafe
- Leave the area if you smell gas or chemical fumes
- Be prepared for aftershocks

- If you are properly trained and able, provide first aid to victims
- Do not move the seriously injured unless they are in immediate danger of further injury
- Open doors carefully
- Watch for falling objects
- Use radios for internal communications where possible and avoid using telephones except where necessary, e.g. to contact the emergency services.

9.11. Adverse Weather and Storm Preparedness

To ensure preparedness for adverse weather conditions and climate-related events, the following preventive and response measures will be implemented across all construction sites under the Project;

- Meteorological alerts issued by the Turkish State Meteorological Service (MGM) will be continuously monitored and used to trigger site-level emergency notifications.
- Work at height, crane operations, and tunnel activities will be temporarily suspended when wind speeds exceed 70 km/h or lightning is observed within a 5 km radius of the construction site. All personnel will be promptly notified through internal communication channels.
- Drainage systems will be designed and maintained to prevent flooding and erosion.
- Sump pumps and sandbags will be used to prevent water accumulation during rain.
- Hazardous material storage areas will be sealed.
- During storm-prone seasons (e.g., late summer, early winter), high-risk activities such as lifting operations, material transport, or exposed electrical works will be scheduled for early morning or low-risk weather windows.
- Backup power generators will be made available at key operation centres in anticipation of grid outages due to storms.
- All personnel working in exposed outdoor areas will be directed to designated shelter locations in the event of a storm. These shelters will be adequately equipped and maintained to accommodate emergency situations.
- Post-storm clean-up will involve safe collection and separation of debris (metal sheets, cables, etc.) to prevent further hazards or environmental contamination.
- Following any storm event, a detailed inspection of the site will be conducted to assess physical damage, environmental impacts, and structural integrity. Work will only resume after safety conditions are verified and documented.
- A table top exercise and field practice with a storm/emergency weather scenario will be conducted. All personnel will be informed in accordance with these scenarios.

This Emergency Preparedness and Response Management Plan will be updated after each adverse weather incident, as necessary.

In addition to the preventive measures listed above, the Project's emergency planning considers recovery and continuation of operations following climate-related incidents. This includes:

- Controlled shutdown of operations in the event of site-wide safety risks due to extreme weather conditions.
- Safe evacuation of personnel from affected zones using pre-identified muster points and evacuation routes.
- Rapid assessment and reactivation of essential systems and access roads to enable phased return to normal operations.

9.12. Terrorism and Security Threat

- In the event of an armed conflict, or suspected terrorist activity, the following actions shall be taken:
- Emergency Wardens or any witness shall immediately inform the Emergency Controllers of the suspected threat.
- Emergency Controllers will assess the situation and activate the evacuation plan if deemed necessary.
- Evacuation will be carried out under the coordination of Security personnel and in close communication with the Gendarmerie or Police authorities.
- All personnel shall follow the instructions of Emergency Controllers and shall not attempt to intervene under any circumstances.
- The Administrative Assistant will notify relevant external authorities (Police, Gendarmerie) and inform the Project Director.
- Internal communication will be restricted to authorized personnel to avoid misinformation or panic.
- Security personnel will secure the area, restrict access to the threat zone, and support emergency services upon arrival.
- The Emergency Response Team will be on standby to assist with evacuation and first aid if required.
- Assembly Points will be used as temporary gathering areas until the threat is fully cleared by security authorities.
- No personnel shall return to the workplace until official clearance is given by law enforcement and confirmed by the Emergency Controller.

9.13. Site-Type Specific Emergency Consideration

Emergency preparedness and response procedures must consider site-specific characteristics due to the varied nature of construction activities within the Project. The following principles shall guide site-type differentiated response planning:

➢ **Tunnel Areas:**

- Emergency exits, lighting and ventilation systems must be operational at all times.
- Tunnel-specific muster points shall be designated outside tunnel portals.
- Radios or communication lines must be redundant due to poor signal inside tunnels.
- Fire and smoke response must consider limited escape routes and toxic atmosphere risk

➢ **Construction Camps:**

- Evacuation maps must be posted in each sleeping and dining area.
- Emergency drills (especially fire) must be performed during both day and night shifts.
- Utility shut-off points (electricity, gas, water) must be clearly marked and accessible

➢ **Open Construction Sites:**

- Muster points should be identified for each working zone and updated as construction progresses.
- Overhead work, excavation, and equipment operation must have risk-specific emergency triggers (e.g. crane collapse, fall hazards).

➢ **Bridges, Viaducts, Elevated Structures:**

- Fall protection systems must include emergency descent devices.
- In case of structural instability, immediate clearance radius must be observed as per engineering advice.
- Emergency access must be available from both ends of the elevated structure

Annex F illustrates emergency assembly points, the location of the fire extinguishers, employee's rest areas and parking areas.

9.14. Emergency Infrastructure Controls

Emergency utility shut-off points will be provided to ensure timely and effective response to various emergency scenarios such as fire, electrical hazard, fuel spill or flooding.

- *Electrical Panels:* Marked with the symbol "E", all main power panels are labelled and equipped with lock-out capability to isolate circuits during fire, flooding, or electrical hazard scenarios.
- *Fuel Shut-Off Valves:* Located at diesel and fuel storage tanks, marked "F", these valves are accessible without requiring entry into the tank containment area and include visual signage in both Turkish and English.
- *Water Main Valves:* Marked "W", primary water supply shut-off points are located near accommodation blocks, canteens, and equipment washing areas.

To ensure rapid and effective emergency response, Project, site-wide emergency equipment and location information are shown in the tables below.

Detailed Emergency Equipment List

Equipment	Quantity	Maintenance Frequency

Tunnel Ventilation System	2 system per tunnel	Daily test, annual maintenance
Emergency Exit Guidance Lights	1 every 25 meters	Monthly inspection
Fire Cabinets and Hose Reels	1 every 50 meters	Monthly inspection, biannual maintenance
Smoke Detectors (Tunnel)	1 every 50 meters	Monthly functionality test
Emergency Alarm Buttons	1 every 100 meters	Monthly inspection
Vibration and Strain Sensors	1 set per viaduct	Test every 3 months
Wind Speed Measurement Device	1 per viaduct	Monthly inspection, annual calibration
Seismic Activity Sensor	1 per viaduct	Test every 6 months
Smoke Detectors (Accommodation)	1 per room, corridors, common areas	Monthly inspection
Fire Alarm System	1 system / camp	Monthly inspection
Emergency Lighting	1 system per building	Monthly inspection
First Aid Kits	1 per 20 people	Monthly stock check
Portable Fire Extinguishers	1 per 100 m²	Monthly inspection, annual maintenance
Emergency Communication Devices	1 per shift supervisor	Weekly test
Chemical Spill Kit	1 per storage unit	Inspection every 3 months
Eyewash and Emergency Shower Unit	1 per chemical area and tunnels	Weekly functionality test
Fire Detection and Alarm System	1 per facility/corridors	Monthly inspection
Personal Protective Equipment (PPE) Set	1 per worker	Daily user check/ Monthly stock check
Emergency Exit Signs	1 per Exit	Monthly inspection
Automated External Defibrillators (AEDs)	1 per 100 people	Monthly inspection

Location Information of Emergency Equipment

Equipment	Location
Portable Fire Extinguishers	Each accommodation block entrance and dining hall
Smoke Detectors	Each room, corridors, and common areas
First Aid Kits	1 per 20 workers, placed in visible common areas
Emergency Lighting & Exit Signs	Staircases and exits of all buildings
Automated External Defibrillators (AEDs)	Camp infirmary and ambulance
Fire Cabinets and Hoses	Every 50 m inside tunnel
Emergency Exit Guidance Lights	Every 25 m along tunnel base
Portable Gas Detectors (CO, CH4, O2)	Tunnel maintenance points and ventilation control rooms
Thermal Cameras	Tunnel entry points and ERT vehicles
Wind Speed Measurement Device	Midspan or tower locations
Vibration Sensors	Main structural columns
Portable Fire Extinguishers	Maintenance zones and bridge approaches
Chemical Spill Kits	Inside each chemical storage unit, tunnels and maintenance area at each camp sites

Equipment	Location
Eyewash and Emergency Shower Units	Next to hazardous material storage and one per chemical area
Gas Dispersal Equipment	Chemical handling rooms
Portable Lighting Units	Night shift work zones (excavation, paving)
Reflective Warning Signs	Road junctions and worksite boundaries
Mobile Barriers with Impact Absorbers	High-risk road segments

10. EMERGENCY DRILLS AND TRAINING &UPDATE

10.1. Drills

10.1.1. Fire Drill

Two times in a year, a fire drill will be conducted involving all employees. The scenario will be prepared and implemented by *Emergency Response Team*. Every employee including subcontractors' employees must have experience of using a fire extinguisher at least once. Fire Drills will be recorded, and the response time and effectiveness will be evaluated. Faults will be determined, and corrective actions will be planned, and related revisions will be done on this Plan.

10.1.2. Evacuation Drill

Two times in a year, an evacuation drill will be conducted, unannounced, to test the real response of the employees in case of an emergency. The duration times will be observed for the gathering of all employees at muster point and the full evacuation of the workplace. The gathered personnel will be listed, and the muster sheet compared with the normal working daily list. Faults will be determined, and corrective actions will be planned, and related revisions will be done on this Plan.

10.1.3. Environmental Accident Drill

To achieve the target of no harm to environment, including from any possible release of any hazardous material to environment, Emergency Response Team will conduct an environmental accident drill twice in a year to demonstrate how to use a spill kit effectively. The scenario will be prepared and implemented by the *Environmental Engineer*. The environmental accident drill will be recorded, and the response time and effectiveness will be evaluated. Faults will be determined, and corrective actions will be planned, and related revisions will be done on this Plan.

10.2. Training & Update

Necessities of the Training Program including, but not limited to:

- Firefighting, spill response, evacuation, rescue and internal radio usage for Emergency Response Team
- First Aid for First Aiders
- Training will be repeated two times in a year. Training exercises to allow personnel the opportunity to test emergency preparedness will be provided, including:
    - Desktop exercises with emergency responsible persons, where the contact lists are checked, and the facilities and communication assessed

- Drills (See Section 10.1) for testing of equipment and logistics

- Upon completion of a training exercise; Emergency Controller will review the effectiveness of the exercise to assess what worked well and what aspects require improvement
- This Emergency Response Plan will be updated as required after each exercise. Elements of the Plan subject to significant change (such as contact lists) will be replaced
- Training activities and outcomes of the training will be recorded
- Participation in drills is mandatory for all personnel present on-site during the scheduled activity.
- Attendance sheets and drill evaluation forms shall be completed for each event and archived by the HSE Document Controller.
- Drill outcomes shall be reviewed by the HSE Manager, and improvement actions shall be documented and followed up.

11. EMERGENCY REPORTING

Emergency reporting will be according to Accident and Event Reporting Procedure.

12. KEY PERFORMANCE INDICATORS

In order to check efficiency and implementation of emergency response activities and commitments listed in Annex A, determination of key performance indicators and relevant targets are needed. So, key performance indicators according to this procedure in general and targets are given in below table

ID	KPI	Target
KPI-1	Number of reported non-compliances with the requirements of this Procedure. This will be determined during drills for response capability of personnel and by daily site tours for equipment availability	Zero per three months
KPI-2	Number of non-compliances closed due to corrective actions being taken within the defined timeframe (set on a case by case basis).	100% of all non-conformities remedied within the defined timeframe
KPI-3	% of all relevant community who have received relevant community awareness training	100% compliance with training requirements
KPI-4	% of all staff who have received relevant and adequate training	100% compliance with training requirements
KPI-5	% of all staff who have participated emergency drills	100% compliance with drill requirements

ID	KPI	Target
KPI-6	Number of reports of near misses reviewed for root cause and a corrective action identified and shared across the Project construction sites within 48 hours to prevent future occurrence.	100% of near miss reports reviewed and shared
KPI-7	Success of training tests	Expected average 85%

It is not always possible to achieve relevant targets, but continuous improvement will be the major principle in accordance with KPIs.

13. MONITORING, REVIEW AND UPDATE

To ensure the continued relevance and effectiveness of the Emergency Preparedness and Response Plan (EPRP), the following measures shall be implemented:

- The EPRP shall be formally reviewed by the SPV in coordination with the EPC.
- Additional reviews shall be conducted following any major incident, regulatory change, or organizational restructuring that may affect emergency response capacity.
- All changes and updates shall be logged in a revision control table and archived by the HSE Document Controller.
- The updated version of the plan must be submitted for approval by the SPV H&S Manager before dissemination.
- A summary of key findings and improvements shall be documented and communicated during toolbox talks and safety briefings.

Table 1: Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Number of drills conducted	Project office	-Document review	Semi-Annual	SPV EPC

ANNEX A COMMITMENT REGISTER IMPLEMENTATION

Commitment	Where the commitment will be implemented	When the commitment will be implemented	Who will implement the commitment	Monitoring and Assurance
Local emergency services will be alerted in event of emergency that risks collateral damage to the local communities. As part of the community engagement process, details regarding the nature of emergencies and their response plans (e.g. Emergency Prevention and Response Plan) will be shared with the local communities. Channels of communication will be established and agreed upon, and in event of emergency, the communities will be alerted and informed by appropriate means including telephone, audible alarms and vehicle mounted speakers, for example.	The Emergency Action Plan will be accessible through local village mukhtar offices and relevant municipalities – Alanya, Manavgat, Serik.	Start of construction and whenever the Emergency Action Plan is updated	• ***HSE Manager***	• HSE Manager and/or its representatives will control relevant locations monthly to check Emergency Action Plan is present or not.
Provisions of the Turkish 'Regulation on Structures to be Built in Disaster Areas and Turkish 'Regulation on Buildings to be Built in Earthquake Areas will be adhered to during construction.	Any structure to be built	During design and construction of any structure	• ***Project manager*** will enforce • ***HSE Manager*** will supervise	• HSE Manager will monitor design and construction
Provisions of the 'Disaster Regulation on Engineering Structures Along Highways' will be complied with. The Project will undertake consultation with the relevant authority before the design is finalised and request the input of the regulators who are responsible for the Disaster Regulation on Engineering Structures Along Highways.	Any structure to be built	During design and construction of any structure	• ***Project manager*** will enforce • ***HSE Manager*** will supervise	• HSE Manager will monitor design and construction
The Motorway and its structures will need to be designed to meet Turkish and international standards for design and operation to minimise the risks and provide appropriate response in the event of an incident occurring. With adoption of the AAO A.S. EPR Policy, AAO A.S. will commit to set-up and implement: (1) measures to prevent emergencies; (2) measures to respond to emergencies; and (3) measures to assess damages and recover after emergencies.	Any structure to be built	During design and construction of any structure	• ***Project manager*** will enforce • ***HSE Manager*** will supervise	• HSE Manager will monitor design and construction
Coordinate with emergency responders to ensure that appropriate first aid is provided in the event of accidents.	Location of accident	In the event of an accident	• ***Emergency Coordinator***	• Renewal of first aid certificates whenever needed • First aid drills
Project Sponsors will require all contractor and sub-contractor personnel to take necessary measures to avoid forest fires and immediately respond to any fire event that could not be avoided by measures taken, including - o Project personnel will be trained to immediately inform forestry authorities about the location and scale of any fire incident. o Fire fighting equipment will be provided at construction sites (as relevant for different types of fires), inspected regularly and staff trained to use the equipment.. o Proper fire extinguishers will be kept ready at site where hot/welding works will be performed. o Smoking will only be permitted in designated, safe areas. o Staff will be trained on fire protection awareness and response.	Location of the incident	In the event of an incident	• ***Emergency Coordinator***	• Emergency drills • HSE Manager will ensure relevant equipment and training is provided
The key mitigation to be implemented involves the adoption of road traffic management measures, including an effective spill containment and clean-up plan, as per the EPR Plan specified in the ESMP. The EPR Plan will be prepared for the construction stage, and then updated later to apply to Motorway and Bridge operations.	• Nearby schools - Alanya, Manavgat, Serik. • Construction sites	Starting from 2018	• ***CLOs will conduct the work*** • ***HSE Manager will supervise***	• CLOs will monitor communities and HSE manager will monitor workers

Commitment	Where the commitment will be implemented	When the commitment will be implemented	Who will implement the commitment	Monitoring and Assurance
Measures will be in place to prevent members of the local community, especially children, from unauthorised entry to Project-related sites/installations, thus prevent or lower the risks of accidents, as well to the AAO Project employees and contractors in order to prevent the spread of STDs and other cummunicable diseases in local communities. Such measures will include, e.g.: • Awareness training about construction site hazards to children/youths in nearby village schools; •training of health workers in disease treatment and the provision of health services for the workers •performing immunisation programmes for workers • Placement of fencing or other barricades around dangerous construction installations with warning signs of the hazards; • Use of professionally trained security guards at construction sites.	• Construction sites	Construction phase	• ***CLOs*** • ***H&S manager***	• CLOs will monitor communities and HSE manager will monitor workers

ANNEX B INTERNAL EMERGENCY CONTACT NUMBERS

SITE PERSONNEL ROLE	NAME	EXT	MOBILE	LOCATION
Emergency Controller	Selda GÜRSEL		0530 643 72 29	
Administrative Chief	Mehmet KOPAR		0532 711 87 44	
Environmental Engineer	Hüseyin YILDIRIM		0554 128 82 62	
ERT Member	Ekrem GÜMÜŞ		0533 531 56 70	
ERT Member	Emre ISTANBULLU		0534 867 53 65	
ERT Member	Kemal ÖZYİĞİT		0535 032 89 42	
ERT Member	Hasan ÖZKAN		0537 664 43 75	
ERT Member	Hüseyin BALIKÇI		0540 177 63 02	
ERT Member	Mehmet Ali ÖZER		0536 495 40 08	
ERT Member	Mehmet KEKİK		0536 034 71 75	
ERT Member	Reşit ÇELİK		0539 268 75 73	
ERT Member	Yaşar BOZKURT		0536 059 13 10	
ERT Member	M. Seçkin ADAM		0544 791 98 50	
Ambulance	Site Doctor		0505 669 67 68	
First Aid Personnel	Cemil ARSLAN		0538 032 25 03	
First Aid Personnel	Zekeriya YONCA		0546 549 31 39	
First Aid Personnel	M. Faruk AKYOL		0545 251 19 80	
First Aid Personnel	Yüksel BİLGİLİ		0535 956 33 48	
First Aid Personnel	İdris BALABAN		0544 556 23 88	
First Aid Personnel	Ümit Evren SEVİMLİ		0545 839 66 64	
First Aid Personnel	Fatih DERDİYOK		0532 056 95 08	
First Aid Personnel	Furkan İĞİT		0541 519 07 25	
Emergency Warden	Selda GÜRSEL		0530 643 72 29	
Emergency Warden	Murat TÜTÜNCÜ		0533 551 69 88	
Security Manager	Ali Osman AYDIN		0505 776 04 69	

ANNEX C EXTERNAL EMERGENCY CONTACT NUMBERS

CONTACT	TELEPHONE	SPEED DIAL MOBILE	FAX
Ambulance		112	
Fire Service		110	
Health & Safety Authority		112	
Environment Authority	0242 237 00 10		
Gendarme		156	
Police		155	
ASAT (Water)	0242 310 12 00	185	
AEDAŞ (Electricity)	0242 320 36 00		
Antalya Devlet Hastanesi	0242 455 53 53		
Antalya Eğitim ve Araştırma Hastanesi	0242 249 44 00		
Antalya Atatürk Devlet Hastanesi	0242 345 45 50		
Akdeniz Üniversitesi Tıp Fakültesi	0242 249 60 00		
Kepez Devlet Hastanesi	0242 339 11 00		
Serik Devlet Hastanesi	0242 722 13 40		
Manavgat Devlet Hastanesi	0242 746 11 17		
Alanya Eğitim ve Araştırma Hastanesi	0242 513 48 41		
AFAD Afet ve Acil Durum Yönetimi	0242 243 02 55		

ANNEX D EMERGENCY EQUIPMENTS

EQUIPMENT	TYPE	QUANTITY	KEPT IN
AMBULANCE	TRANSFER	1	MAIN CAMP SITE

ANNEX E EVACUATION PROCEDURES

EVACUATION PROCEDURE IN THE EVENT OF EARTHQUAKE

In case of the earthquake, EVERYBODY SHALL;

- **<u>If in the slip platform and on the top of the legs</u>**;
  - ✓ Only wait for the shaking stops!
  - ✓ **<u>DO NOT MAKE PANIC</u>**!!!
  - ✓ Do not jump!
  - ✓ Hold the guardrails!
  - ✓ Do not use elevator!
- **<u>If indoors during an earthquake;</u>**
  - ✓ Drop to the ground!
  - ✓ TAKE COVER by moving under a sturdy table or other piece of furniture. HOLD ON until shaking stops!
  - ✓ If you cannot take cover under a piece of furniture, tuck your head into your knees and cover your head with your arms!
  - ✓ Evacuate only after shaking has stopped and it is safe to do so!
- **<u>If outdoors during an earthquake;</u>**
  - ✓ Remain outdoor; DO NOT enter a container!
  - ✓ Move away from buildings, trees, streetlights and utility wires!
  - ✓ Drop to your knees and into fetal position, close your eyes, and cross your arms over the back of your neck for protection!
  - ✓ Remain in this position until shaking stops!
  - ✓ Stay in an open area!
- **<u>If in a vehicle during an earthquake;</u>**
  - ✓ Stop as quickly as safety permits and stay in the vehicle!
  - ✓ Avoid stopping near or under buildings, trees, overpasses, and utility wires!
  - ✓ Proceed cautiously once shaking has stopped!
  - ✓ Avoid roads, bridges, or ramps that might have been damaged by the earthquake!
- **<u>After shaking stops;</u>**
  - ✓ Go to designated **"Assembly Point"** within the site compound!
  - ✓ Remain at **"Assembly Point"** until all clear is given by the **Emergency Controller** to return to the workplace!

EVACUATION PROCEDURE IN THE EVENT OF FIRE OR EXPLOSION

If you discover an emergency (*e.g. fire*) and you are the first on the scene, carry out the following procedure:

- Shout out a warning and alert people in immediate area!
- **Contact Emergency Controller** by phone on **Ext**. … or **MOBILE** …… or **using internal radio system** to advise them of the situation.
- If you consider that you can without endangering yourself or others, contain / control the emergency you should:
    - ***Take necessary steps to control emergency***

      (e.g. Use appropriate fire extinguisher, contain leak or spillage.)
- **Leave** by nearest exit, close doors behind you.
- **Go** to designated Assembly Point within site compound.
- **Remain** at **"Assembly Point"** until all clear is given by the **Emergency Controller** to return to the workplace.

EVACUATION PROCEDURE IN THE EVENT OF NON–FIRE/EXPLOSION

If you discover an emergency other than fire or explosion (*e.g.* ***Spill or Flood***) and you are the first on the scene, carry out the following procedure:

- Shout out a warning and alert people in immediate area!
- **Contact Site Emergency Controller** by phone on **Ext**. … or **MOBILE** …… or **using internal radio system** to advise them of the situation.
- If you consider that you can without endangering yourself or others, contain / control the emergency you should:
    - ***Take necessary steps to control emergency***

      (e.g. Use appropriate fire extinguisher, contain leak or spillage, use pumps.)
- **Leave** by nearest exit, close doors behind you.
- **Go** to designated Assembly Point within site compound.
- **Remain** at **"Assembly Point"** until all clear is given by the **Emergency Controller** to return to the workplace.

EVACUATION PROCEDURE IN THE EVENT OF TERRORISM

If you discover an emergency (e.g. terrorism) and you are to carry out the following procedure:

- Keep Calm down!
- **Contact Emergency Controller** by phone on **Ext**. …or **MOBILE** ……. or **using internal radio system** to advise them of the situation.

EVACUATION PROCEDURE IN THE EVENT OF FIRE – WORKER CAMP / ACCOMMODATION

If you discover a fire within the camp facility (sleeping quarters, dining hall, etc.):

- Shout out a warning and activate the nearest fire alarm.
- **Contact Emergency Controller** by phone on **Ext**. …or **MOBILE** ……. immediately.
- Attempt to extinguish small fires using a nearby extinguisher only if safe to do so.
- Do not stop to collect personal items.
- Evacuate using marked exit doors and follow escape route signage.
- Proceed to the Camp Muster Point (outside the main dining facility).
- Camp personnel must not return until declared safe by the Emergency Controller and/or Fire Brigade.

EVACUATION PROCEDURE IN THE EVENT OF EMERGENCY – TUNNEL WORK AREA

If an emergency (e.g. fire, gas leak, collapse) occurs in a tunnel area, follow the steps below:

- Shout out a warning and alert all personnel in the tunnel.
- Immediately inform the Emergency Controller via radio or internal communication system.
- Do NOT use any electrical equipment unless instructed.
- Use designated tunnel escape routes (as marked) and proceed on foot to the tunnel portal.
- If available, activate emergency lighting and ventilation systems.
- Assist any injured person only if safe to do so.
- Exit through the nearest safe egress point.
- Once outside the tunnel, proceed to the designated Tunnel Assembly Point located near the portal entrance.
- Remain at the Assembly Point until clearance is given by the Emergency Controller.

EVACUATION PROCEDURE IN THE EVENT OF STRUCTURAL INCIDENT – BRIDGES OR ELEVATED WORK ZONES

In case of suspected collapse, movement, or instability on a bridge, viaduct or similar structure:

- Evacuate immediately using access ladders or ramps if available.
- Do NOT attempt to retrieve tools or materials.
- Alert others verbally and notify the Emergency Controller by radio.
- Emergency personnel will restrict entry until structural stability is confirmed.
- Assemble at the nearest safe open area as defined in bridge-specific signage plans.
- Follow instructions from Emergency Controllers and avoid returning to the structure until professionally inspected.

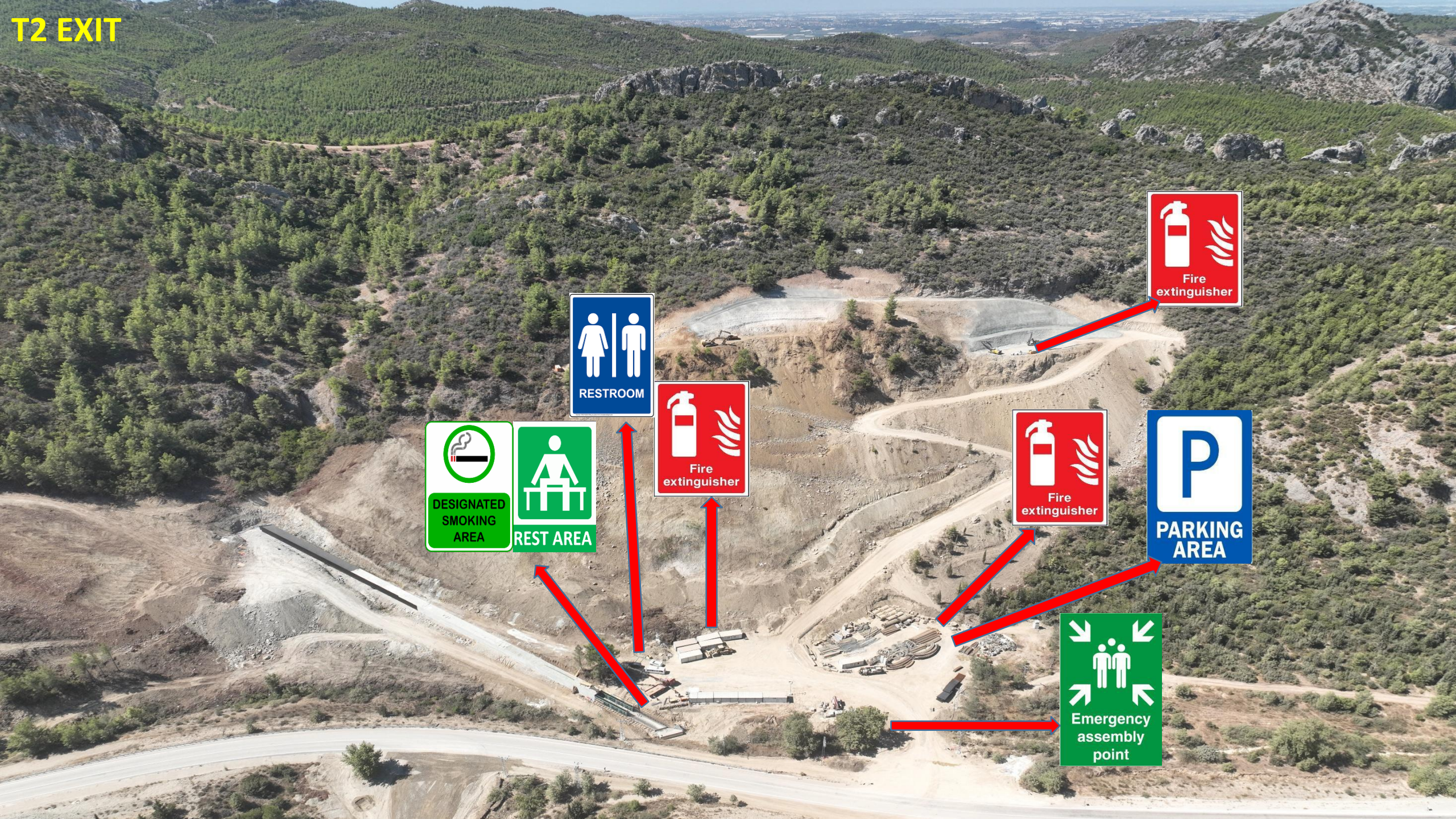
EVACUATION PROCEDURE IN THE EVENT OF GENERAL SITE INCIDENT – OPEN CONSTRUCTION AREA

If a hazardous incident occurs in the general construction site (e.g. heavy equipment failure, fuel spill, explosion):

- Warn surrounding workers loudly and clearly.
- Leave the immediate area using the safest path, avoiding machinery and excavation zones.
- Notify Emergency Controllers or Emergency Wardens.
- Do not block access routes for emergency responders.
- Proceed to the designated General Site Muster Point.
- Wait at the Assembly Point and do not return to the site unless authorized.

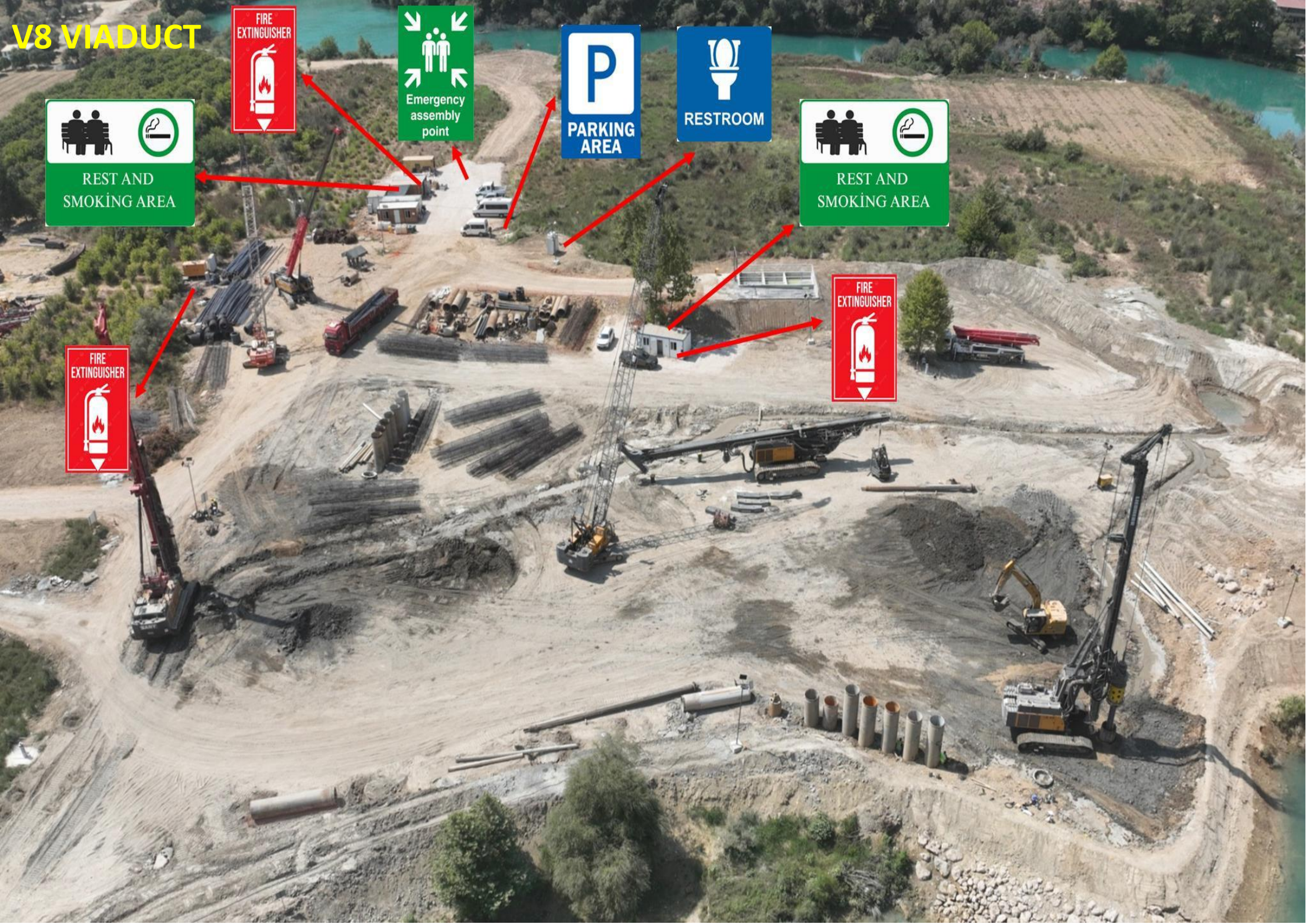
ANNEX F ANNOTATED CONSTRUCTION SITE PHOTOS


TAŞAĞIL
TEMPORARY
CAMP SITE
RESTROOM
Fire extinguisher
RESTROOM
REST AREA
DESIGNATED SMOKING AREA
Emergency assembly point
Fire extinguisher
Emergency assembly point
Fire extinguisher
Fire extinguisher
Fire extinguisher
Fire extinguisher
P
PARKING AREA
Fire extinguisher
P
PARKING AREA


T2 EXIT
RESTROOM
Fire extinguisher
Fire extinguisher
Fire extinguisher
DESIGNATED SMOKING AREA
REST AREA
P
PARKING AREA
Emergency assembly point


T3 ENTRANCE
Fire extinguisher
Fire extinguisher
RESTROOM
DESIGNATED SMOKING AREA
REST AREA
Emergency assembly point
Fire extinguisher


V4 VIADUCT
P
PARKING AREA
Emergency assembly point
DESIGNATED SMOKING AREA
REST AREA
Fire extinguisher
DESIGNATED SMOKING AREA
REST AREA
Fire extinguisher
Fire extinguisher
RESTROOM


V8 VIADUCT
FIRE EXTINGUISHER
Emergency assembly point
P
PARKING AREA
RESTROOM
REST AND SMOKİNG AREA
REST AND SMOKİNG AREA
FIRE EXTINGUISHER
FIRE EXTINGUISHER


V11 VIADUCT
FIRE EXTINGUISHER
REST AND SMOKİNG AREA
Emergency assembly point
P
PARKING AREA
REST AND SMOKİNG AREA
FIRE EXTINGUISHER
RESTROOM


V12 VIADUCT
FIRE EXTINGUISHER
FIRE EXTINGUISHER
REST AND SMOKİNG AREA
REST AND SMOKİNG AREA
P
PARKING AREA
RESTROOM
Emergency assembly point


T5 ENTRY
FIRE EXTINGUISHER
FIRE EXTINGUISHER
FIRE EXTINGUISHER
FIRE EXTINGUISHER
P
PARKING AREA
REST AND SMOKİNG AREA
Emergency assembly point
RESTROOM

MANAGEMENT PLANS

DRAFT

AIR POLLUTION and EMISSIONS MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision as per comments
16.06.2025	02	Revision as per Environmental and Social Due Diligence comments
08 .09 .2025	03	Revision as per Environmental and Social Due Diligence comments

AIR POLLUTION and EMISSIONS MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
AQECP	Air Quality and Emissions Control Plan
CLO	Community Liaison Officer
CO	Carbon Monoxide
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ENCON	ENCON Environmental Consultancy Co.
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
GM	Grievance Mechanism
HC	Hydrocarbons
HSE	Health, Safety and Environment
H&S	Health and Safety
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
NO_x	Nitrogen Oxides (NO_2 and NO)
PM	Particulate Matter
RAMAQ	Regulation on Assessment and Management of Air Quality
RCA	Root Cause Analysis
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
SO_2	Sulfur Dioxide
VOCs	Volatile Organic Compounds
WHO	World Health Organization

AIR POLLUTION and EMISSIONS MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Air Pollution and Emissions Management Plan ("APEMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

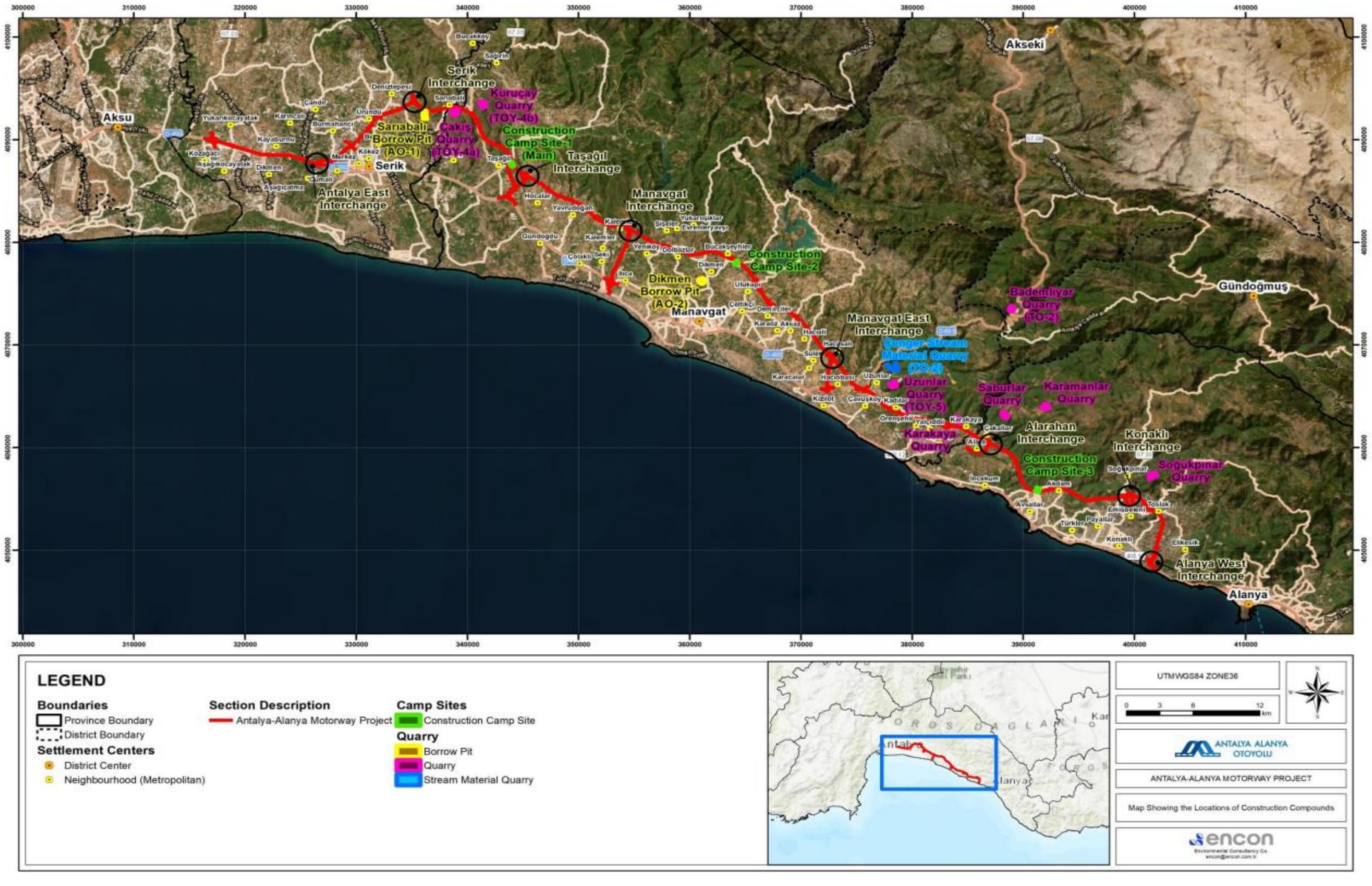

Figure I-1.Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

The activities that should be addressed within this plan and can be considered as emission sources are as follows:

I. Earthworks and Excavation-Filling Operations,
   - Excavation Work
   - Filling Operations
   - Material Storage

II. Material Transportation,
   - Truck Traffic
   - Use of Roads

III. Use of Construction Equipment,
   - Heavy Machinery (excavators, dozers, loaders, and trucks etc.)

IV. Dust Sources at the Construction Site
   - Dusting in Open Areas
   - Temporary Storage Areas

V. Dynamite and Blasting Operations
   - Blasting

VI. Worker and Construction Site Traffic
   - Personnel Vehicles
   - Use of Temporary Roads

I.2 Purpose and Scope

The purpose of this Plan:

- Defining country legislation and Project standards,
- Defining the duties and responsibilities of the personnel, and
- Identify air emission sources and outline mitigation, control, and monitoring measures to minimize adverse environmental and social impacts during the construction phase.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The Plan has been developed in alignment with applicable national legislation and relevant international standards, including the requirements of international financial institutions. It outlines actions that should be done to manage dust and gas emissions effectively across construction-related activities and facilities. This plan will provide mitigation alternatives and an impact monitoring schedule in accordance with Turkish and international regulations and standards.

This Plan should be applied by all parties involved in the construction phase, including the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ), the Main Contractor (EPC or Limak), and all subcontractors. Responsibilities for implementation, monitoring, and reporting of air quality-related issues should be clearly assigned. Necessary updates to the Plan should be considered in case of changes in project design, construction methodology, or regulatory requirements.

Emissions during project construction will contribute to national air pollutant levels and thereby affect the health of nearby communities. The overall objective of this management plan is to identify and minimize air pollutant emissions and potential impacts from construction activities.

The plan refers to potential emission sources during construction and identifies how effective safeguards and appropriate emission controls will be implemented to ensure ambient air quality is maintained and minimize air quality impacts on adjacent receptors.

The primary air pollutants associated with construction of motorway projects include nitrogen oxides (NO_x – NO_2 and NO), particulate matter (PM), carbon monoxide (CO), hydrocarbons (HC), sulfur dioxide (SO_2), and volatile organic compounds (VOCs). Among these, particulate matter emissions are particularly significant and are expected to arise primarily from activities such as material extraction and supply, cut and fill operations, and the storage of excavated materials. This plan will be used to minimize the air quality impacts arising during the construction activities. The details necessary to minimize the impacts are addressed in *Section 5.*

Air pollutant levels derived from construction activities will be assessed against legal requirements and international standards. If the particulate matter level is found to be at risk of exceeding these conditions, preventive actions will be reviewed and enhanced by AAOİAŞ to reduce emissions to a reasonable level. Near sensitive areas such as residential units, schools, public parks, recreational areas and ecologically sensitive areas will be monitored to ensure minimal impact associated with the construction activities.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

The Plan has been structured to align with both national and international requirements, including legislation, guidelines, and sectoral standards that define permissible emission levels and air quality thresholds. Accordingly, the following sources of reference will be used to guide the implementation and compliance procedures.

The regulations and standards to be applied in the project are provided in the following section.

II.1 National Requirements

The following Turkish laws and regulations will be used as the legal basis for managing air emissions during construction:

- Environmental Law No. 2872
- Regulation on the Assessment and Management of Air Quality
- Industrial Air Pollution Control Regulation
- Regulation on the Control of Exhaust Gas Emissions

- Regulation on Decreasing the Ozone Depleting Materials
- Regulation on Monitoring of Greenhouse Gas Emissions
- Regulation on the Control of Air Pollution Caused by Heating
- Regulation on Ozone Depleting Substances
- Regulation on Control of Exhaust Gas Emission and Quality of Petrol and Diesel
- Regulation on the Reduction in the Sulphur Content of Some Fuel Types
- Regulation on the Control of Odorous Emissions.

Ambient air quality limit values for various air pollutants defined in Turkish Regulation on Assessment and Management of Air Quality are presented in *Table.II.1*. . AAOİAŞ and its subcontractors are responsible for reviewing relevant local legislation and requirements to capture all requirements. The standards in *Table.II.1* are the target values for 2024 and further years.

Table.II.1Turkish Regulations: Ambient Air Quality Limit Values

Parameter	Duration	Limit Value*
SO_2	Hourly (cannot be exceeded more than 24 times in a year) **($\mu g/m^3$)**	350
	24 hour (cannot be exceeded more than 3 times in a year) **($\mu g/m^3$)**	125
	Long term limit **($\mu g/m^3$)**	60
	Annual and winter season (from 1 October to 31 March) **($\mu g/m^3$)**	20
NO_2	Hourly (cannot be exceeded more than 18 times a year) **($\mu g/m^3$)**	200
	Annual **($\mu g/m^3$)**	40
PM_{10}	24 hour (cannot be exceeded more than 35 times a year) **($\mu g/m^3$)**	50
	Annual **($\mu g/m^3$)**	40
Settled Dust	Short-Term Limit Value (**mg/m^2day)**	390
	Long-Term Limit Value (**mg/m^2day)**	210
CO	8 hour daily maximum **($\mu g/m^3$)**	10,000
Total VOC**	Hourly **($\mu g/m^3$)**	280
	24-hour **($\mu g/m^3$)**	70
In the Settled Dust	Pb and its compounds (long term limit value) (**mg/m^2day)**	250
	Cd and its compounds (long term limit value) (**mg/m^2day)**	3.75
	Tl and its compounds (long term limit value) (**mg/m^2day)**	5

** Regulation on Assessment and Management of Air Quality (RAMAQ)*
*** Industrial Air Pollution Control Regulation (IAPCR)*

II.2 International Standards and Conventions

In addition to national requirements, the following international guidelines frameworks, standards and agreements should be considered to ensure alignment with best practices and financial institution requirements:

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework ("ESF") document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices.

Moreover, the following standards, guidelines and directives should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- EU Ambient Air Quality Directive (2008/50/EC)
- European Union Road Safety Policy Guidelines and Directives
- World Health Organization (WHO) Ambient Air Quality Guidelines (2005 and 2021)

These references should be used to guide the implementation, monitoring, and performance evaluation of air pollution and emissions control measures on-site throughout the construction phase.

IFC General EHS Guideline for Air Emissions and Air Quality refers to the limit values recommended by the World Health Organization Ambient Air Quality Guidelines which are presented in Table II.2. In addition, the newly adopted Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (see Table II.3) strengthens and updates the existing framework by setting more stringent air quality standards and reinforcing provisions on public information and air quality plans. AAOİAŞ and its subcontractors are responsible for reviewing relevant international standards to capture all requirements.

Table II.2.1 IFC General EHS Guidelines: Environmental Air Emissions a nd Ambient Air Quality Standards (WHO Ambient Air Quality Guidelines)

Parameter	Duration	Guideline Value (µg/m^3)*
SO_2	10 minute	500
	24 hour	20
NO_2	Hourly	200
	Annual	40
PM_{10}	24 hour	50
	Annual	20
$PM_{2.5}$	24 hour	25
	Annual	10

Parameter	Duration	Guideline Value (µg/m³)*
Ozone	8-hour Daily Maximum	100

Table II.3: EU Regulations: Ambient Air Quality Limit Values

Parameter	Duration	Guideline Value (µg/m3)*	Permitted Exceedances / Notes
Particulate Matter (PM_{10})	24-hour average	50 µg/m³	Not to be exceeded more than 35 times/year
	Annual average	40 µg/m³	
Particulate Matter ($PM_{2.5}$)	Annual average	25 µg/m³	
Nitrogen Dioxide (NO_2)	1-hour average	200 µg/m³	Not to be exceeded more than 18 times/year
	Annual average	40 µg/m³	To be reduced to 20 µg/m³ by 2030
Sulfur Dioxide (SO_2)	1-hour average	350 µg/m³	Not to be exceeded more than 24 times/year
	24-hour average	125 µg/m³	Not to be exceeded more than 3 times/year
Carbon Monoxide (CO)	Maximum daily 8-hour mean	10 mg/m³	
Lead (Pb)	Calendar Year	0,5 µg/m³	
Cadmium (Cd)	Calendar Year	5,0 ng/m³	

II.3 Project Standards

To ensure compliance with national and international air quality requirements, the strictest limits among Turkish regulations, international standards should be applied during the construction phase of the Project. Table II.4 outlines the applicable pollutant limits, which should be used for monitoring and mitigation planning. If exceedances occur, corrective actions should be implemented immediately by Limak and its subcontractors.

Table II.4 Reference Limits and Standards for Monitoring and Mitigation

Pollutant	Averaging Period	Turkish Legislation	IFC/WHO (µg/m³)	EU Regulation	Applied Limit
SO_2 (µg/m³)	Hourly (max 24 exceedances/year)	350	-	350	350
	24-hour (max 3 exceedances/year)	125	20	125	20
	Long-term	60	-	-	60
	Annual (winter period)	20	-	-	20
	10-minute	-	500	-	500

NO_2 (µg/m³)	Hourly (max 18 exceedances/year)	200	200	200	200
	Annual average	40	40	40	40
PM_{10} (µg/m³)	24-hour (max 35 exceedances/year)	50	50	50	50
	Annual average	40	40	40	40
$PM_{2.5}$ (µg/m³)	Annual average	-	10		10
	Annual average	-	25	25	25
Settled Dust (mg/m²day)	Short-Term Limit Value	390	-	-	390
	Long-Term Limit Value	210	-	-	210
CO (mg/m³)	8-hour daily maximum	10		10	10
	Maximum daily 8-hour average in one year	120	-	-	120
Ozone (O_3)	Long-term	120	-	-	120
Lead (Pb) in Settled Dust	Long-term	250	-	-	250
Cadmium (Cd) in Settled Dust	Long-term	3,75	-	-	3,75
Total VOC	Hourly	280			
	24-hour	70			

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System ("ESMS") of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Air Pollution and Emissions Management Plan:

- Solid Waste Management Plan,
- Spill Response Management Plan,
- Community Health and Safety Management Plan,
- Traffic Management Plan,
- Hazardous Material Management Plan,
- Blasting Management Plan,
- Demolition Management Plan,
- Environmental and Social Management and Monitoring Plan (ESMMP)

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

IV. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV):

-Define and implement the overall business strategy and direction of the SPV in alignment with shareholder and stakeholder expectations.

-Ensure the provision of necessary resources and organizational support for the implementation of APEMP.

-Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.

-Support the E&S Manager in preparing, disseminating, and implementing this plan.

E&S Manager (SPV):

-Review and ensure the preparation, revision, and implementation of APEMP in accordance with national laws, regulations, company policies, international standards and lender requirements.

-Ensure the development, revision, and execution of project-specific management plans, including the Environmental and Social Management and Monitoring Plan (ESMMP) in accordance with company policies and international standards.

-Monitor the environmental and social performance of EPC and subcontractors to ensure compliance

H&S Manager (SPV):

-Ensure the conditions and obligations specified in the health, safety, community related plans and documents are implemented and adhered to by EPC and subcontractors in accordance with company policies, regulatory obligations, international standards and lender requirements.
-Contribute to project risk assessments and job hazard analyses (JHAs) and ensure these are updated regularly.
-Ensure that all construction site activities are carried out safely by EPC and subcontractors.

Deputy E&S Manager (SPV):
-Lead the development, implementation, and continuous improvement of the Environmental and Social Management.
-Review the ESHS documents of subcontractors and suppliers and ensure that they comply with the Project ESHS requirements.
-Monitor performance through Key Performance Indicators (KPIs), reports, audits, and meetings.
-Oversee incident and non-compliance regarding to air quality , including investigations, corrective/preventive measures, and stakeholder communication.
-Support E&S Manager (SPV) executive decision-making by providing timely reports and insights on E&S performance, risks, and emerging trends.
-Lead community engagement strategies in collaboration with the Environmental Engineer and, and Social Chief to ensure effective grievance management and positive relations with project-affected communities.
-Ensure that EPC and subcontractor provide the necessary training through the review of training records and relevant training documents.

Social Chief (SPV):
-Supervise and mentor CLOs, ensuring their work aligns with project priorities and stakeholder engagement strategy.
-Develop and implement work plans and schedules for the CLO team.
-Ensure that complaints regarding air quality are recorded, processed, and resolved in a timely and transparent manner.
-Ensure accurate, timely, and complete reporting of CLO activities, stakeholder interactions, and grievance outcomes and inform the E&S Deputy Manager about the complaints and coordinate the assessment and solution of grievances with EPC team.
-Coordinate with the E&S Deputy Manager, CLOs and Environmental Engineer, and construction teams to address community-related impacts.

Project Director (EPC):
-Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards.
-Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones.

-In case of non-compliance regarding to air quality, ensure appropriate corrective and preventive actions are taken in coordination with the E&S Manager and H&S Manager

E&S Manager (EPC):

-Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.

-Implement environmental and social measures through site practices and method statements.

-Ensure that all conditions and obligations outlined in the Plan are implemented and adhered to during project activities.

H&S Manager (EPC):

-Ensure the safe execution of construction activities in compliance with APE MP, H&S Plan, legal requirements, international standards, SPV and lender obligations.

-Prepare, review, and improve H&S Plans by integrating air quality control measures into site-specific risk registers, method statements, and monitoring programs.

-Supervise and support Contractors/Subcontractors to implement air quality mitigation measures, and monitor their compliance with H&S and APEMP requirements.

-Coordinate with SPV H&S Manager to address air quality -related incidents, risks, and community safety concerns.

-Ensure that all site personnel receive regular training and toolbox talks covering APEMP MP obligations, air quality risks, and safe working practices.

-Oversee emergency preparedness and response procedures for air quality incidents (e.g., blast vibration exceedances, community complaints).

-Conduct investigations of air quality -related incidents or complaints, ensure corrective/preventive actions are taken, and report findings to Project Director and SPV.

-Promote a safety-first culture by ensuring air quality risks are proactively managed and lessons learned are integrated into continuous improvement.

Line Manager:

-Ensure the implementation of watering and other dust suppression measures on site,

-Ensuring the appropriate selection of vehicles and equipment and monitoring their regular maintenance.

-Ensure the maintenance, watering, and compliance with speed limits on internal roads.

Environmental Engineer (SPV and EPC):

-Implement and monitor the Air Pollution and Emission Management Plan (APEMP) on-site, including subcontractor compliance.

-Conduct routine inspections and measurements of routine inspections and measurements of air quality and dust levels to ensure mitigation measures are effective.

-Maintain accurate records and databases for air quality monitoring, and support reporting for audits or regulatory compliance.

-Support training, toolbox talks, and inductions related to air quality awareness for site personnel.

-Participate in investigations of APEMP-related incidents and coordinate corrective/preventive actions with HSE and E&S teams.

-Implement and monitor the APEMP on-site, including subcontractor compliance.

-Conduct routine inspections and measurements of air quality; maintain records and report performance to E&S Manager and relevant stakeholders.

-Support training, toolbox talks, and inductions for site personnel on air quality awareness.

-Coordinate corrective/preventive actions for APEMP-related incidents in collaboration with HSE, E&S teams, and subcontractors.

-Liaise with external consultants, laboratories, and regulators for air quality monitoring, reporting, and permit compliance.- Assess on a daily basis the level of dust during construction activities at the RoW, access roads, camp site, general facilities and all temporary facilities.

-Integrate APEMP requirements into work plans, method statements, and construction activities.

Community Liaison Officer (CLO)(SPV and EPC):

-Communicate with project-affected communities about construction activities, including potential air quality impacts.

- Log, track, and follow up on community complaints or grievances related to air quality, ensuring timely resolution via the Grievance Mechanism (GM).

- Support monitoring and documentation of APEMP implementation at site level, including subcontractor activities affecting the community.

- Facilitate equitable community engagement and consultations, ensuring vulnerable or sensitive groups are informed about air quality impacts.

- Coordinate with E&S Manager and other project teams to integrate community feedback into APEMP updates and corrective actions.

V. AIR QUALITY AND EMISSIONS MANAGEMENT APPROACH

The primary air pollutants associated with motorway projects include nitrogen oxides (NO_x – NO2 and NO), particulate matter (PM), carbon monoxide (CO), hydrocarbons (HC), sulfur dioxide (SO2), and volatile organic compounds (VOCs). Among these, PM10 emissions are particularly significant and are expected to arise primarily from activities such as material extraction and supply, cut and fill operations, and the storage of excavated materials. Particulate matter can vary in size and composition; however, PM10—defined as particles with an aerodynamic diameter smaller than 10 µm—is commonly used as a standard indicator, as it represents particles likely to be inhaled. Therefore, regulatory limit values are generally defined for PM10 concentrations.

Additional emissions during the construction phase will originate from the operation of construction machinery, transport vehicles, and equipment, as well as from heating systems at camp facilities. Emissions such as PM10, NO_x, CO, SO2, VOCs, benzene, NH_3, and N_2O are expected,

primarily during working hours. The type and quality of fuel used will directly influence the level of pollutant emissions. Furthermore, seasonal heating demand, particularly during winter, will contribute to increased emissions. .

In the scope of the Environmental and Social Impact Assessment study of the Antalya Alanya Motorway Project, air quality baseline measurements were conducted to determine ambient air quality of the region and limitations of the activities during both construction and operation phases. As part of the baseline assessment, in addition to PM_{10}, $PM_{2.5}$, and settled dust, other air pollutants such as SO_2, NO_2, and Volatile Organic Compounds (VOCs) were also measured. Ambient air quality measurements were conducted at 21 locations during September–October 2024. The campaign covered PM_{10}, $PM_{2.5}$, settled dust, and heavy metals in settled dust. PM measurements were taken over 24-hour periods at each location, consistent with IFC's Environmental, Health and Safety (EHS) Guidelines for Air Emissions and Ambient Air Quality, which recommend 24-hour averaging periods for particulate matter to ensure comparability with WHO and national standards. SO_2 and NO_2 were monitored using passive sampling over a one-month period between September 21 and October 21, 2024, at the five selected locations. VOC measurements were conducted on October 17, 2024. The points where baseline measurements were taken are shown in the Figure V-1.

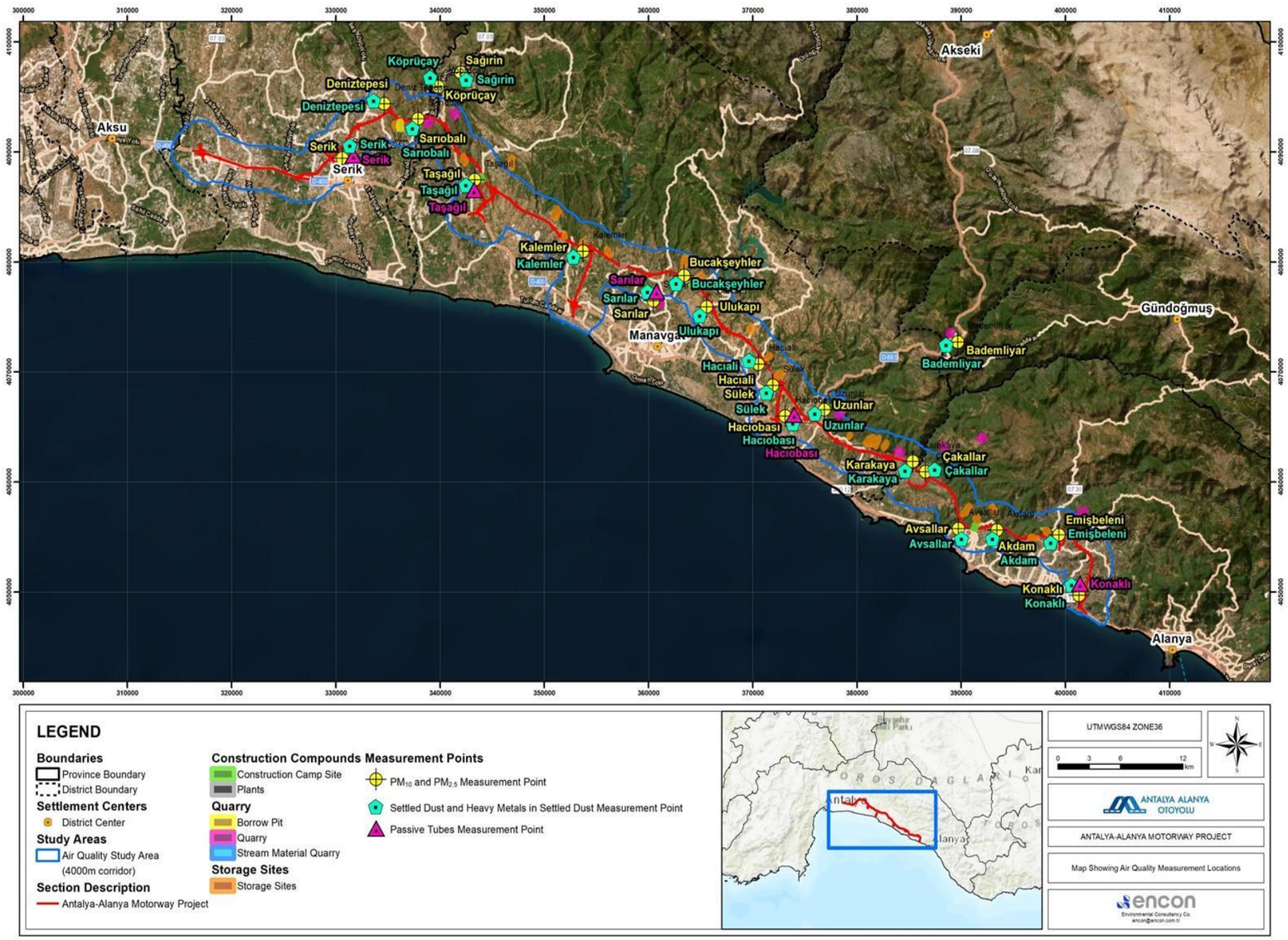

Figure V-1: Sampling Points of Air Quality Baseline Measurement Points

Sensitive receptors are defined as areas that host vulnerable populations, such as residential neighbourhoods, schools, healthcare facilities, and recreational areas, where people may be more susceptible to the adverse effects of air pollution. Within the scope of this Project, residential neighbourhoods located in close proximity to the motorway construction corridor are considered sensitive receptor zones.

A review of the Project alignment has identified several neighbourhoods across three districts—Serik, Manavgat, and Alanya—that are located within the immediate vicinity of the construction area. These are listed in Table V.1. Given their spatial proximity to active construction zones, these neighbourhoods warrant increased attention to ensure that air quality impacts are properly managed.

Table V.1 Settlements Located in The Vicinity of the Motorway Components

Districts	Neighborhoods		
Serik	• Aşağıçatma • Aşağıkocayatak • Burmahancı • Çandır	• Cumalı • Deniztepesi • Dikmen • Kayaburnu	• Kökez • Merkez • Sarıabalı • Üründü • Yukarıkocayatak
Manavgat	• Aksaz • Aşağıışıklar • Bucakşeyhler • Çakış • Çavuşköy • Cevizler • Demirciler • Dikmen • Dolbazlar • Evrenleryavşı • Gültepe • Gündoğdu	• Hacıali • Hacıisalı • Hacıobası • Hatipler • Hocalar • Ilıca • Kadılar • Kalemler • Karacalar • Karakaya • Karaöz • Kızılot • Odaönü	• Örenşehir • Sağırin • Sarılar • Side • Şişeler • Sülek • Taşağıl • Ulukapı • Uzunlar • Yalçıdibi • Yavrudoğan • Yeniköy • Yukarıışıklar
Alanya	• Akdam • Alara • Avsallar	• Çakallar • Elikesik • Emişbeleni • İncekum	• Konaklı • Soğukpınar • Toslak • Türkler

It should be noted that the current designation of sensitive receptors is based solely on geographic proximity to the construction corridor. Air quality dispersion modelling studies have not yet been conducted; as such, the extent and distribution of sensitive receptor areas may be revised once model-based assessments are carried out. These future evaluations will help define more accurately the zones potentially affected by construction-related air emissions and allow for a more refined monitoring and mitigation strategy.

The proximity of some settlements to the Project route—several of which are located directly beneath or adjacent to construction sites—necessitates a proactive air quality monitoring approach. Monitoring efforts should prioritize these sensitive receptors, particularly in areas where baseline data

indicates a potential for pollutant concentrations approaching regulatory thresholds. Measures such as continuous or periodic ambient air measurements, visual inspections, and responsive grievance mechanisms should be implemented to assess the effectiveness of air pollution mitigation strategies.

By aligning targeted air quality monitoring with the spatial distribution of sensitive receptors and integrating feedback from community stakeholders, the Project will be better equipped to maintain compliance with national and international standards, while also safeguarding the health and well-being of local communities. Air quality emissions during construction are closely associated with the locations and operations of site-specific emission sources along the Project corridor. These sources include construction camps; borrow pits, quarries, stream material quarries. The locations and their spatial distribution along the alignment is illustrated in *Figure V.2.*

These components span the entire motorway corridor and are located across Serik, Manavgat, and Alanya districts. Their proximity to settlements requires a targeted emissions monitoring and mitigation strategy. For instance, Construction Camp Sites at Km 64+400, 87+500, and 124+300 will host the workforce, contributing to heating-related emissions, while mechanical plants represent major dust and exhaust emission points. Quarries such as Soğukpınar, Karakaya, and Çenger Stream Quarry are located near residential neighborhoods, increasing the importance of dust suppression measures in those areas. The site layout captured in Figure V.2 allows a clear visualization of how these emission sources align with populated zones. The close proximity of several settlements to the Project route, including areas directly adjacent to construction sites, requires a proactive air quality monitoring approach. Possible problems caused by different types of emissions are listed below (see Table V.2)

Table V.2:Air Emissions and Issues

Emission Types	**Possible Problem**
Dust	Environmental, social, health
Greenhouse Gases (GHG)	Environmental
Exhaust Gases	Environmental, social, health
Vapor	Health, social
Gases	Environmental, social, health

According to the Project components, emission type also changes. The emission sources according to the components and their potential emission types are summarized below (see Table V.3).

Table V.3: Emission Sources in the Project Areas

Project Areas	**Emission Sources**
Road Construction	Excavation and embankment processes, transport vehicles, energy sources (electrical generators), working machinery, blasting activities
Disposal Areas	Excavation and embankment processes, transport vehicles, loading/unloading/disposal processes
Camp Areas	Energy sources (electrical generators), heating systems and transport vehicles inside the camp areas, blasting activities
Quarry and Borrow Areas	Site clearance, spot blasting, earthworks, "open-air" blasting excavation, rock extraction
Washing and Screening Plant, Crushing Plant	Emissions into the atmosphere caused by plant operations and electrical generators

Project Areas	Emission Sources
Concrete Batching Plants	Emissions into the atmosphere from batching plants aoperations and electrical generators
Vehicles	Exhaust emissions

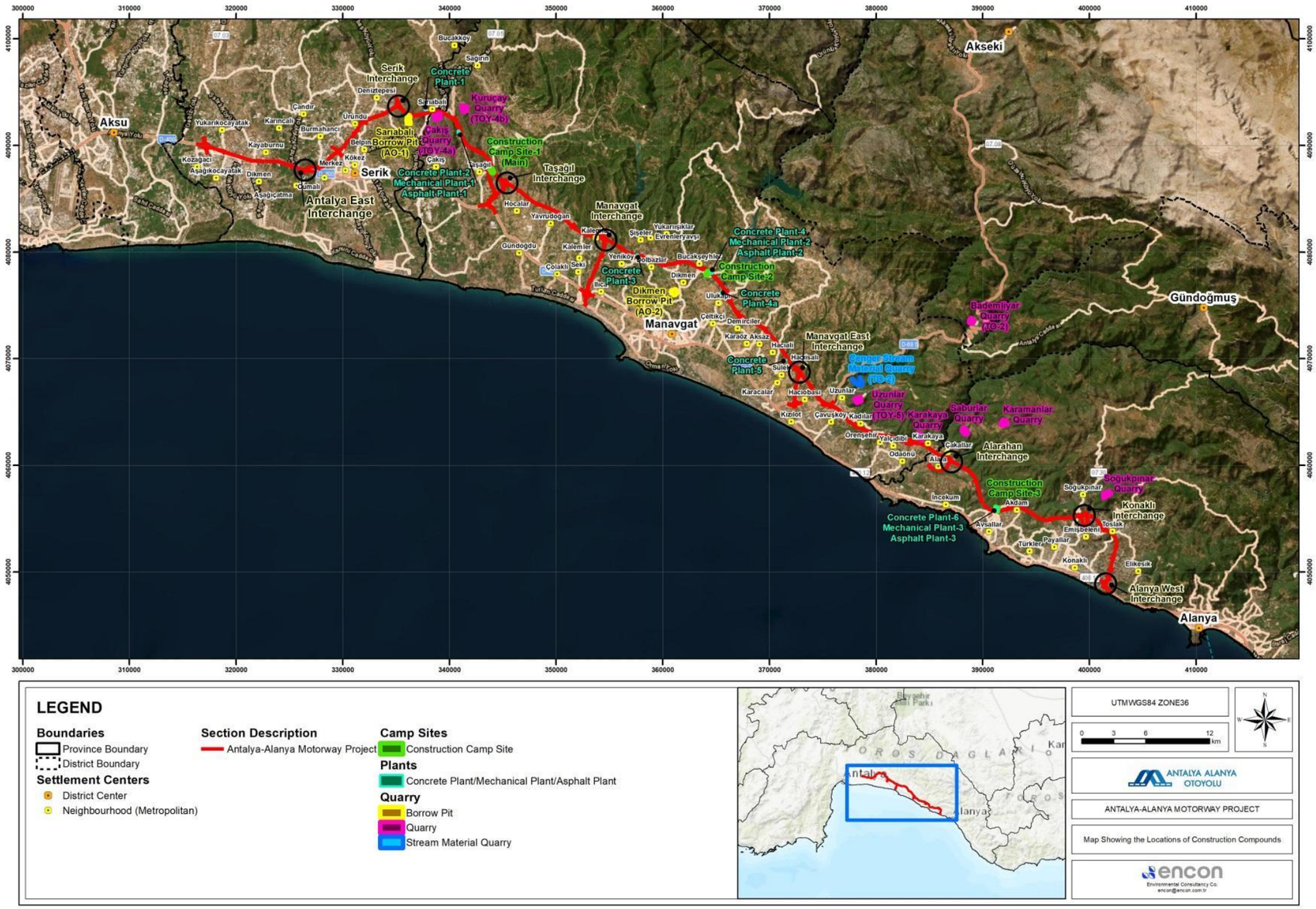

Figure V-2. Spatial Distribution of Construction Camp Sites, Plants, and Material Sources along the Project Route

VI. MITIGATION MEASURES FOR IMPACTS ON AIR QUALITY

The following measures will be implemented throughout the Project sites to prevent or minimize adverse impacts on air quality due to construction activities:

Material Handling and Storage:

- Dust emissions from sources such as conveyors, bins, and crushing-screening plants will be controlled through enclosures, covers, and dedicated dust suppression systems (e.g., water sprays, baghouse filters, or cyclones).
- All dust-emitting units within crushing-screening operations will be placed in enclosed structures equipped with appropriate dust control systems.
- The drop height of fine or dusty materials during loading/unloading will be minimized to reduce airborne dust.
- Loading and unloading operations will be conducted without scattering or throwing materials.

Open Area and Road Dust Controls:

- Open sources such as material stockpiles will be managed using covers, enclosures, or by maintaining adequate moisture content.
- Dust suppression measures including regular watering using water trucks or pressurized spraying systems will be applied on construction sites, service roads, access roads, and at quarry or storage areas. These measures will be enforced as needed, including nights, weekends, and non-working days.
- Speed limits (e.g., 30 km/h general, 20 km/h in residential/village roads) for all construction vehicles will be established and enforced to minimize dust resuspension.
- Project roads, especially those accessing quarries, will be upgraded and widened where necessary to support safe, low-dust vehicle movement.
- If nearby roads are actively used by traffic, continuous dust suppression will be applied to maintain safety and visibility. On unused roads, dust control will focus on residential and commercial areas.

Transport and Vehicle Controls:

- All trucks transporting excavated or raw materials will be covered with nylon tarpaulin.
- Construction vehicles will not be permitted to idle unnecessarily on- or off-site.
- A regular maintenance program will be in place to ensure engine efficiency and minimize emissions.
- Driving through residential settlements will be avoided when alternative routes exist.
- Vehicle exhaust emission measurements will be performed periodically.

Blasting Activities:

- Blasting operations will be conducted in full compliance with applicable regulations and aligned with industry best practices to minimize short-term dust releases.

Dust Barrier and Wind Protection:

- Windbreaks, fences, or vegetative barriers will be installed around material storage areas and other emission-prone zones to reduce dust dispersion.

Monitoring and Compliance:

- Air quality management will comply with legal regulations and applicable international standards.
- During the pre-construction phase, PM10 and PM2.5 will be measured for a period of one week at the locations which will be decided considering the sensitivity of receptors.

Given the current PM concentrations in Hacıali, additional targeted reduction measures are required. These include:

- Dust-generating activities will be limited during stagnant meteorological conditions (e.g., inversions or low wind scenarios).
- Intensive dust-producing operations will be relocated away from Hacıali where technically and logistically feasible.
- Road paving and soil stabilization techniques will be employed to reduce dust lift-off.
- The use of wind barriers or vegetation buffers will be prioritized between emission sources and residential receptors in Hacıali.
- PM_{10} measurements will be conducted in Hacıali (monthly monitoring and, if necessary, more frequent if required in case of any complaints)

GHG specific emissions

Türkiye's NDC commits to a 41% reduction in GHG emissions by 2030 relative to the Business-As-Usual (BAU) scenario, with a peak in emissions by 2038. GHG emissions generated during land preparation and construction phase of the Project can be considered as relatively short-term emissions when compared to the emissions of operation of the Motorway. Within this regard the following measures are suggested to mitigate the potential impacts of the Project on climate change through greenhouse gas emissions:

- High-efficiency and low-emission construction machinery will be prioritized at construction sites to minimize fuel consumption.
- Regular maintenance of equipment will be conducted to improve engine efficiency and reduce the idling time of stop-and-go heavy vehicles.
- Electricity demand during construction activities will be met as much as possible through renewable energy sources.
- The use of recycled and locally sourced materials will be encouraged to reduce indirect emissions from material transportation.
- An effective waste management plan will be implemented to control organic waste that may cause methane emissions.

All these measures will be monitored and reported to align with the Türkiye's 41% reduction target in 2030 ensure that the Antalya–Alanya Motorway serves as a low-carbon transport infrastructure in the long term from existing road network.

- Reduce the requirement for construction materials and excavation. The excavation-fill balance of the project has been optimized to minimize the transport of excavated material, thereby reducing both costs and greenhouse gas emissions.

- Substitute construction elements for lower-carbon alternatives (e.g., specifying concrete with a higher portion of ground-granulated blast furnace slag (GGBS) content which is widely available in Türkiye); and
- Use efficient construction processes, such as design for manufacture and assembly.
- Energy consumption including fuel usage by, for example, reducing the requirement for earth movements to/from and within the construction site will be minimized;
- The local sourcing of materials and local waste management facilities will be maximized.
- The Project with a view to maximizing the potential for reuse and recycling of materials/elements at the end-of-life stage will be specified and constructed. Approximately 90% of the excavated material from the project is planned to be used as fill.
- High efficiency mechanical and electrical equipment will be specified and constructed.
- Transport logistics (locations/routes) will be optimized to ensure efficient carriage of raw materials and promote fuel efficiency
- Vehicle idling times will be reduced through focus on scheduling of construction operations.
- The use of fuel-efficient transportation vehicles will be prioritized, and regular maintenance of vehicles ensured.
- The timing for works implementation (Traffic management) will be optimized to minimize traffic delays due to rehabilitation, widening or maintenance work zones on existing road sections.
- Energy efficiency specifications for new and retrofitted site accommodation (for example, usage of high-efficiency lightning, usage of led lighting, water fixture selection criteria, etc) will be created.
- Sourcing renewable energy will be considered if applicable.
- Energy efficiency usage among workers will be promoted.

AAOİAŞ will ensure that the mitigation measures listed above are implemented by Limak and its subcontractors. In addition, AAOİAŞ commits to review site management and implement suitable additional mitigation measures if monitoring show exceedances of Project standards for dust deposition, PM10 and/or PM2.5, or if complaints regarding dust mobilization / settlement are received.

Ongoing stakeholder engagement will include consultation with authorities, local communities and any other relevant stakeholders with regard to Air Quality Management during construction phase. Any grievances received from stakeholders will be managed in accordance with Grievance Mechanism as detailed in Project SEP.

VII. TRAINING

Upon hiring, all staff will receive structured training addressing sources of air emissions and dust, air quality degradation, and associated health risks, along with the corresponding mitigation strategies applicable to their responsibilities within the project (e.g., appropriate use of protective equipment, maintenance of machinery). In addition, personnel assigned to air quality monitoring will be provided with specialized training to ensure accurate and compliant performance of their duties.

VIII. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of air quality and emissions mitigation measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, air quality trends, stakeholder concerns, or changes in applicable environmental regulations.

Monitoring activities will be coordinated by E&S Manager and his/her team, in close collaboration with the H&S Manager and his/her team. Key responsibilities will include verifying the implementation of dust suppression practices, monitoring equipment and vehicle emissions, evaluating the maintenance status of construction machinery, and ensuring the consistent application of mitigation measures near sensitive receptors such as residential areas, schools, and healthcare facilities.

Regular air quality monitoring will be conducted at designated locations across all worksites to evaluate compliance with national ambient air quality standards and Project-specific emission limits. This will include the measurement of key parameters such as PM_{10}, $PM_{2.5}$, NO_x, and SO_2, as well as visual inspections for dust dispersion, and checks on the use of water spraying systems and covering of materials during transport and storage.

The performance of contractors and subcontractors in implementing air quality management requirements will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and to ensure recurrence is prevented.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, including the Ministry of Environment, Urbanization and Climate Change, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of monitoring data, on-site emission control practices, and documentation of compliance.

- Periodic visual inspections of activities resulting in impact to air quality. Visual inspections will reflect the ethos of ‘see it, own it’, in terms of identifying and addressing significant air quality impacts. Where significant impacts are observed, these will be recorded and closed out.
- Regular inspections during the site preparation phase to review air and dust issues and dust suppression techniques altered as required.

Dust monitoring will primarily be addressed through site inspection to ensure that good site practice with respect to dust control is being effectively implemented on site. Dust sampling is not considered to be an effective means of monitoring dust during construction due to the delay between sampling and the receipt of sampling results. More immediate real time means of identifying unacceptable levels of dust, such as visual observation, is required so that remedial measures can be

implemented immediately. Environmental Engineer will assess on a daily basis the level of dust during construction activities at the RoW, access roads, camp site, general facilities and all temporary facilities. Mitigation measures will be implemented as required immediately. If there is a complaint from the sensitive receptors about the dust generation, then dust measurement will be conducted. Dust monitoring samples will be taken at sensitive receptors' locations according to the ESIA requirements.

Monitoring efforts will be guided by the framework provided in Table VIII.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of measurements, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of air quality and emissions mitigation measures and ensuring full compliance with national regulations and Project standards.

Table VIII.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
PM_{10}, $PM_{2.5}$, Settled Dust, NO_x, SO_x, VOC	Sensitive receptors*	Site measurements	Quarterly and upon grievance	AAOİAŞ, EPC , Accredited Laboratories
PM10	Hacıali and other sensitive locations which will be decided considering result of modelling studies	Site Measurements	Monthly and upon grievance	AAOİAŞ, EPC, Accredited Laboratories
Number of water trucks and frequency of road watering	Camp sites, road construction sites, quarries, stabilized roads	Visual inspection	Daily or more frequently during high risk, dry and windy conditions.	AAOİAŞ, Limak
Grievances related to dust and air emissions	The field subject to the complaint	Review of grievance logs	Weekly	AAOİAŞ, EPC,
Weather conditions and humidity	High-risk area due to flammable material storage and close to the forest area	Weather forecast report checking	Daily during summer period	AAOİAŞ, EPC
record findings	Around the site, particularly near receptors (including roads)	Site inspection Inspection log	Daily	SPV & EPC Environmental Engineer
Roads surface integrity and any damage	Internal haul roads	Site inspection	Weekly	Environmental specialist
Exhaust emission measurement for construction vehicle	Vehicles	Measurement	Annually	EPC Environmental Eng.

** Sensitive receptors have been discussed in detail under Chapter V. Air Quality and Emissions Management Approach.*

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and relevant subcontractors.

All air quality-related findings, including exceedance of limit values, non-compliance incidents, or complaints received from surrounding communities, will be documented in accordance with national environmental regulations and Project procedures. In the event of serious violations—such as significant exceedance of short-term or long-term limit values—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

IX. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table IX.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
On-site air quality training for workers	100% compliance	Monthly	AAOİAŞ, EPC
Complaints related to air quality	Less than five complaints per month	Continuous (upon each complaint)	AAOİAŞ, EPC
Speed limit enforcement for site vehicles	100% compliance with designated limits	Daily	AAOİAŞ, EPC Experts
Vehicle maintenance records	100% compliance with manufacturer's recommendations	Monthly	AAOİAŞ, EPC
PM_{10} and $PM_{2.5}$ particulate matter levels	Should not exceed WHO / IFC and national limit values	Quarterly/Monthly	AAOİAŞ, EPC Accredited Laboratories

X. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities related to air quality management should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established management plans. Records to be reviewed during air quality audits will include, but are not limited to, air emissions monitoring reports, water truck operation logs, maintenance records of construction machinery and equipment, dust suppression activity records, environmental permit files for concrete plants, and air quality-related grievance logs. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with national regulations and applicable international standards regarding air quality management.

XI. REPORTING

Regular reporting will be conducted to ensure the effective implementation and continuous improvement of solid waste management activities throughout the construction phase of the Project. Reporting will be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions will be identified, and the required updates will be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections will be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Quarterly Environmental and Social Monitoring Report will cover at least, but not limited to, the following items. The report will be prepared by the SPV with input data provided by EPC to evaluate the Project performance and compliance of the related plans.

- KPIs and performance trends (*see Table IX.1*)
- Current situation Key Monitoring Activities (*see Table VIII.1*)
- Relevant training activities completed and attendance registers to be maintained;
- Legal Authorities Audit reports;
- Site Inspection logs

In addition, the following external reporting will be done:

- All environmental and social incidents will be appropriately documented, notified and reported in accordance with established procedures the terms and conditions by EPC to SPV,
- Incident notification and reporting to relevant Turkish regulatory bodies will be performed in line with applicable legislation in force and as stipulated in permits and licenses.
- The Lenders will be notified of incidents pursuant to the terms and conditions agreed upon in the Finance Agreements through SPV.

All personnel are encouraged to raise concerns, suggestions, or complaints related to this Plan through the established grievance mechanism by completing the grievance form. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

ANTALYA-ALANYA MOTORWAY PROJECT

Revision No: 3 **Date:** 08.09.2025

HAZARDOUS MATERIAL MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision as per comments
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
ADR	Agreement concerning the International Carriage of Dangerous Goods by Road
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
HSE	Health, Safety and Environment
ICAO TI	Technical Instructions for the Safe Transport of Dangerous Goods by Air
IFC	International Finance Corporation
IMDG	International Maritime Dangerous Goods
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
MSDS	Material Safety Data Sheets
PPE	Personal Protective Equipment
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
WCA	Waste Collection Areas
WHO	World Health Organization
FAO	Food and Agriculture Organization

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HAZARDOUS MATERIAL MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), through the General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has initiated a tender process for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The Project is designed to connect the district Serik and Alanya via the Manavgat district of Antalya province will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Hazardous Material Management Plan ("HMMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards referred to in the relevant legislation section . The Plan covers the construction phase of the Project.

I.1 Project Description

The Project begins at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange.

As of April 2025, the current Project design includes a total of 117.8 kilometers of roadway, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

- 43 underpasses, and
- 5 tunnels.

The map illustrating the construction components and road route within the scope of the Project's construction activities is provided in Figure I-1 .

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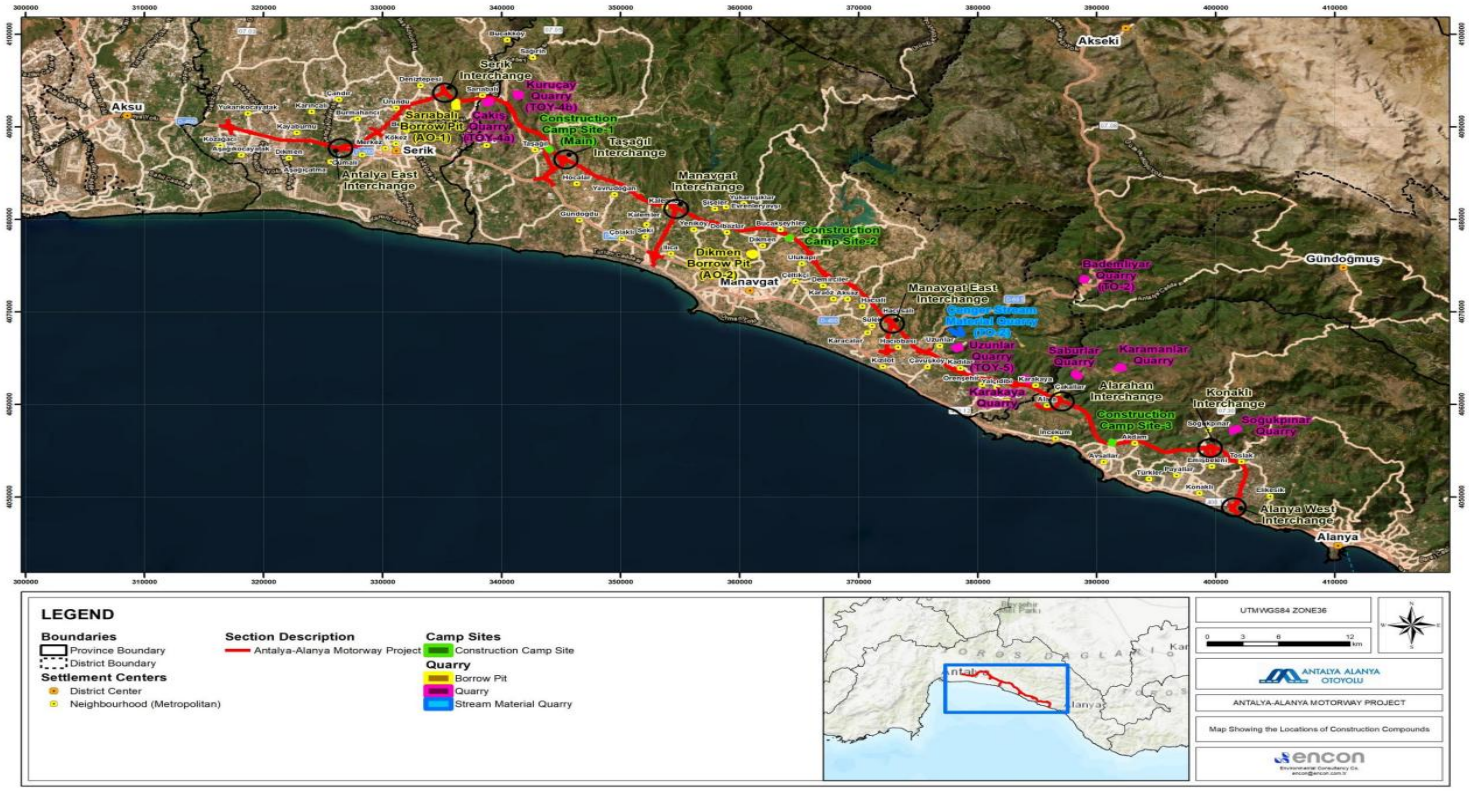

Figure I-1.Map Showing the Locations of Construction Compounds

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HAZARDOUS MATERIAL MANAGEMENT PLAN

II. PURPOSE AND SCOPE

This Plan has been prepared by Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Motorway Project ("the Project").

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The purpose of this Plan is to define the principles and procedures for the management of hazardous materials in accordance with applicable national regulations and international standards. The Plan aims to minimize risks to human health, property, and the environment arising from the use, storage, transportation, and disposal of hazardous materials during the construction phase.

This Plan outlines actions that should be done to ensure that hazardous materials are handled in a safe, compliant, and environmentally responsible manner. It also provides guidance on spill prevention and response, storage and transportation protocol. Moreover, the comprehensive management of h azardous wastes is thoroughly detailed in the solid waste management plan .

The Plan should be implemented by all parties involved in the construction phase, including the Project Sponsor – AAOİAŞ , the Main Contractor (Limak), and all subcontractors. Roles and responsibilities regarding hazardous materials management should be clearly defined. The Plan should be reviewed and updated as necessary to reflect changes in project conditions, design, or legal requirements.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been developed in alignment with both national legislation and internationally recognized environmental and social standards. The legal and institutional framework presented below defines the obligations and guidance applicable to the management of hazardous substances during the construction phase of the Project.

III.1 National Requirements

The following Turkish laws and regulations should be used as the legal basis for the management, storage, transportation, and disposal of hazardous materials during construction:

- Environmental Law (Law No. 2872),
- Occupational Health and Safety Law (Law No. 6331),
- Regulation on Environmental Impact Assessment,
- Regulation on Environmental Permits and Licenses,
- Regulation on Waste Management,
- Regulation on Waste Oil Management,
- Regulation on Waste Batteries and Accumulators,
- Regulation Regarding Transport of Hazardous Materials on Highways
- Regulation on the Control of Medical Wastes,
- Regulation on the Classification, Labeling and Packaging of Substances and Mixtures,
- Regulation on Safety Information Forms on Hazardous Substances and Mixtures
- Regulation on Occupational Health and Safety in Construction Works,
- Regulation on Personal Protective Equipment Use in Workplaces,
- Regulation on Emergency Measures in Workplaces,
- Regulation on Occupational Health and Safety Training,

- Regulation on Health and Safety Signs,
- Regulation on the Use of Work Equipment,
- Regulation on Fire Protection of Buildings,
- Regulation on Workers' Health and Safety in Working with Chemicals,
- Regulation on Preventing and Reducing the Effects of Major Industrial Accidents,
- Regulation on Health and Safety Measures of Working with Asbestos,
- Communiqué on Training Program of Asbestos Demolition,
- Regulation on Biocidal Products.

III.2 International Standards and Guidelines

The following international standards and procedures are applicable to the Project to ensure alignment with national legislation and recognize good industry practices.

AIIB is a multilateral development bank established to promote sustainable economic growth and improve infrastructure connectivity. According to the Articles of Agreement, AIIB aims to invest in infrastructure and productive sectors while fostering regional cooperation through partnerships with other development institutions. To ensure responsible operations, AIIB adheres to policies that address environmental and social impacts, outlined in its Environmental and Social Framework (ESF). The ESF, updated in June 2024, and reflects AIIB's commitment to international standards and sustainable development practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects.

Also, the following international standards and reference frameworks should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- IFC Sector-Specific EHS Guidelines for Hazardous Materials Management
- Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH)
- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)
- International Maritime Dangerous Goods (IMDG) Code
- ICAO Technical Instructions (for air transport)
- Regulations concerning the International Carriage of Dangerous Goods by Rail (RID).

These standards should guide the development of site-specific procedures, monitoring strategies, and corrective actions. In cases where national legislation and international standards diverge, stricter requirements should be adopted.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are

particularly relevant and should be implemented in coordination with the Hazardous Materials Management Plan:

- Solid Waste Management Plan,
- Water Quality, Wastewater and Storm Water Management Plan,
- Community Health and Safety Management Plan,
- Air Pollution and Emission Management Plan,
- Occupational Health and Safety Plan,
- Traffic Management Plan,
- Construction Site Management Plan,
- Environmental, Social, Management and Monitoring Plan (ESMMP),
- Labour and Working Conditions,
- Emergency Response Management Plan,
- Subcontractor Management Plan.
- Training and Communication Management Plan,
- Environmental Accident and Spill Response Management Plan,
- Blasting Management Plan,
- Emergency Preparedness and Response Management Plan.

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards, and to minimize cumulative environmental, health, and safety risks associated with hazardous material use during the construction phase.

V. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV):

- Follow-up the overall responsibility and accountability for the Project including delivery of the construction activities in line with applicable national and international standards.
- Ensure overall compliance with the HMMP and national regulations.
- Ensure that relevant activities are carried out in accordance with this management plan and related procedures and shall ensure the provision of all sources to carry out this Plan.
- Approve storage, handling, and disposal procedures for hazardous materials.
- Allocate resources for hazardous material management and emergency response.
- Ensures the availability of professional resources and materials, undertake to comply with the Regulation, the Contract and the ESMPs, and demands the respect of the same from the organization. He is also committed to apply for the necessary corrective actions, following the findings of the monitoring action.
- Ensure that relevant activities are carried out in accordance with this management plan and related procedures and shall ensure the provision of all sources to carry out this Plan.
- Ensure that all line managers and subcontractors understand and fulfil their responsibilities with hazardous material procedures during construction phases.

E&S Manager (SPV)

- Prepare, review, update, and implement HMMP, ESMP, and project-specific E&S plans per laws, policies, and standards.

- Coordinate with EPC, subcontractors, and internal teams; provide technical support for E&S plan implementation.
- Monitor compliance, site practices, and record-keeping of actions, incidents, and training.
- Ensure delivery and validation of E&S training.
- Investigate incidents, implement corrective actions, and oversee emergency and safety procedures.
- Prepare reports and maintain documentation for audits, compliance, and grievances.
- Support community engagement, grievance resolution, and coordination with authorities and permit processes.

H&S Manager (SPV)

- Prepare, review, and implement health, safety, community, and hazardous materials plans per company policies, regulations, standards, and lender requirements.
- Ensure EPC and subcontractors follow H&S, community safety, and hazardous materials handling procedures, including site boundaries and method statements.
- Provide technical support for safe implementation of hazardous material and safety plans; integrate controls into daily work.
- Monitor compliance, conduct inspections, audits, and hazard walkthroughs, including hazardous materials storage and use.
- Track safety and hazardous material performance, investigate incidents, identify root causes, and implement corrective actions.
- Support H&S and hazardous material training, maintain records, and report performance to management and stakeholders.
- Engage with regulatory authorities and ensure timely resolution of public health, safety, and hazardous material-related complaints.

Deputy E&S Manager (SPV)

- Lead Environmental, Social, and Hazardous Materials management and ensure compliance.
- Review subcontractors' ESHS and hazardous material documents.
- Monitor performance, incidents, and corrective actions.
- Ensure EPC and subcontractors follow E&S and hazardous material procedures.
- Support training, record-keeping, and reporting.
- Oversee community engagement and grievance management.
- Coordinate environmental, social, and hazardous material monitoring.

Social Chief (SPV)

- Ensure EPC and subcontractors follow the HMMP.
- Review reports and ensure compliance with regulations and standards.
- Train staff in engagement, grievance handling, and hazardous materials management.
- Coordinate with E&S Deputy Manager and construction teams on community and hazardous materials issues.

HSE Specialist (SPV)

- Support H&S and HMMP; ensure safe site activities.
- Conduct inspections, hazard assessments, audits, and follow up corrective actions.
- Monitor compliance and integrate H&S and hazardous material measures into work procedures.
- Maintain documentation of permits, incidents, training, and corrective actions.

- Participate in investigations and implement lessons learned.
- Support and review H&S and hazardous material training for site personnel.
- Ensure proper site demarcation, signage, and barriers.
- Assist in resolving safety and hazardous material-related complaints.

Project Director (EPC)

- Define and oversee EPC execution strategy, project management plans (HSE, E&S, QA/QC), and hazardous materials management.
- Lead teams and coordinate EPC functions, ensuring compliance with plans, standards, regulations, and hazardous material procedures.
- Approve and monitor site inspections, safety reviews, and training, including hazardous materials handling.
- Track KPIs, timelines, budgets, and implement corrective actions for non-compliance, including hazardous material issues.
- Serve as EPC representative to SPV, clients, stakeholders, and authorities; address safety, environmental, social, and hazardous material concerns.
- Oversee risk management, quality systems, and mitigation strategies covering technical, HSE, social, and hazardous material aspects.
- Supervise subcontractors and ensure proper execution of construction phases and hazardous materials management.

E&S Manager (EPC)

- Prepare, review, and implement E&S and Hazardous Materials Management Plans per policies, standards, and lender requirements.
- Coordinate with SPV, contractors, and construction teams to ensure compliance and effective site practices.
- Monitor and enforce contractor/subcontractor compliance with E&S and hazardous material requirements.
- Ensure site boundaries, traffic, utility protection, and community safety measures are maintained.
- Oversee E&S training, onboarding, toolbox talks, and awareness programs for all personnel.
- Supervise E&S staff, monitor performance, lead investigations, and implement corrective actions.
- Manage grievance resolution, emergency preparedness, and integration of social inclusion principles.
- Report E&S and hazardous material performance to Project Director and promote continuous improvement.

H&S Manager (EPC)

- Develop, implement, and update the H&S and Hazardous Materials Management Plans.
- Ensure EPC and subcontractors fully comply with safety and hazardous material requirements.
- Manage risk assessments, site safety controls, traffic, utilities, and community protection.
- Lead inspections, incident investigations, and corrective actions, including hazardous material events.

- Oversee training, toolbox talks, and emergency drills on health, safety, and hazardous materials.
- Report performance and risks to the Project Director and foster a proactive safety culture.

Biodiversity Specialist (EPC)

- Ensure integration of biodiversity safeguards into the HMMP, preventing contamination of soil, water, and ecosystems.
- Oversee ecological mitigation measures (e.g., buffer zones, habitat restoration) that also serve as protective barriers against hazardous material impacts.
- Train site teams on biodiversity–hazardous material interactions, raising awareness of risks to sensitive habitats and species.
- Monitor biodiversity indicators and report non-compliances related to hazardous material impacts to the E&S Manager.
- Coordinate with contractors and subcontractors to include biodiversity and hazardous material controls in work plans and method statements.

Warehouse Supervisor (EPC)

- Keep accurate records of all hazardous materials upon receipt and during distribution.
- Ensure safe and secure storage in designated areas with proper labeling and containment.
- Conduct regular inventory checks to monitor stock levels and avoid shortages or excess.
- Prevent risks by identifying and reporting damaged, expired, or leaking hazardous materials, arranging for safe disposal in compliance with regulations.
- Maintain complete documentation of inventory, inspections, and disposal activities for auditing and compliance purposes.
- Coordinate with the E&S Manager and HSE team during inspections, audits, and incident investigations related to hazardous materials.
- Support training and awareness on safe handling, storage, and emergency procedures involving hazardous substances.

Transport Coordinator / Logistics Team (EPC)

- Ensure all hazardous materials are transported via licensed carriers and in compliance with ADR, IMDG, ICAO, and RID regulations
- Maintain proper documentation for transportation.
- Provide spill containment kits and secondary containment during transfers.
- Confirm containers are approved, labeled, and leak-proof before transport.

Maintenance Team / Equipment Operators (EPC)

- Regularly inspect machinery and equipment to prevent leaks or contamination.
- Manage collection and temporary storage of oil and oily residues according to approved procedures.

Ensure used oil is sent to authorized recycling or disposal facilities without mixing with other chemicals.

Emergency Response Team (EPC)

- Conduct drills and respond to chemical spills, fires, or other hazardous incidents.
- Maintain and operate firefighting equipment near hazardous material storage.

- Coordinate with Safety Officer and Project Manager during emergencies.
- Ensure fire exits and evacuation routes are always clear.

Site Doctor (EPC)

- Provide first aid, medical care, and emergency response for incidents, including hazardous material exposure.
- Monitor workers' health, detect occupational illnesses/injuries, and recommend preventive measures.
- Maintain confidential health records, including hazardous material–related cases.
- Ensure medical equipment, first aid kits, and emergency protocols are ready and aligned with HMMP.
- Support training and awareness on health risks, hygiene, sanitation, and hazardous material safety.
- Coordinate with H&S teams, external hospitals, and authorities for emergencies and compliance.

Paramedic (EPC)

- Provide emergency medical care for all site incidents, including hazardous material exposures.
- Assist the Site Doctor with health monitoring, records, and follow-up treatments.
- Maintain and monitor first aid kits, emergency supplies, and decontamination equipment.
- Respond to accidents or hazardous material incidents and report details accurately.
- Participate in drills, health awareness, and hygiene programs related to hazardous materials.
- Report health risks and exposure trends to the Site Doctor and H&S Manager.

Environmental Engineer (SPV and EPC)

- Implement and monitor the Environmental & Social Management Plan (ESMP) and Hazardous Materials Management Plan (HMMP) on-site, including subcontractor activities.
- Conduct routine inspections and audits to ensure safe handling, storage, and disposal of hazardous materials and general environmental compliance.
- Maintain environmental records, support reporting, and assist in incident investigations, including hazardous material incidents.
- Provide training, toolbox talks, and awareness programs on environmental and hazardous material management.
- Coordinate with H&S, Social teams, contractors, and regulators to integrate environmental and hazardous material requirements into site activities.
- Support obtaining, renewing, and complying with all environmental permits.

Community Liaison Officer (CLO) (SPV and EPC)

- Communicate project activities and potential hazardous material risks to local communities.
- Organize community meetings, focus groups, and engagement forums to inform and receive feedback.
- Manage grievances and complaints, including those related to hazardous material incidents, through the Grievance Mechanism (GM).
- Assess impacts on vulnerable or marginalized groups and propose tailored mitigation or engagement approaches.

- Support monitoring, reporting, and documentation of community concerns and contractor compliance with environmental and hazardous material measures.
- Maintain confidentiality and ensure proper handling of sensitive community information.

All Personnel (including Contractor/Subcontractor Personnel)

- Follow the Hazardous Materials Management Plan (HMMP) and related procedures during all site activities.
- Report any non-compliance or hazardous material incidents to the CLO and E&S Manager.
- Participate in relevant HMMP and safety training programs.
- Ensure safe handling, storage, and use of hazardous materials in daily work.
- Take responsibility for implementing HMMP requirements and maintaining a safe working environment.

VI. HAZARDOUS MATERIAL MANAGEMENT APPROACH

The management of hazardous materials is critical to ensuring environmental protection, worker safety, and regulatory compliance throughout the project lifecycle. Structured approach reduces risks to human health and the environment, ensures regulatory compliance, and supports the project's overall environmental and social management objectives. This approach establishes procedures for the identification, handling, storage, transport, and disposal of all hazardous substances used or generated on-site.

- All hazardous materials are cataloged according to type, quantity, and associated risks. Materials are classified in line with local regulations and internationally recognized standards (e.g., GHS – Globally Harmonized System of Classification and Labeling of Chemicals).
- Hazardous substances are stored in designated, secure areas with appropriate containment systems to prevent leaks or spills. Storage facilities are equipped with fire suppression, secondary containment, and clear labeling.
- Staff handling hazardous materials receive specialized training on safe procedures, personal protective equipment (PPE) use, and emergency response.
- Movement of hazardous materials follows strict protocols to prevent accidents and environmental release, including secure packaging, labeling, and transport documentation.
- Spill response kits, fire-fighting equipment, and emergency action plans are maintained and regularly tested. Clear reporting and notification procedures are in place.
- Hazardous waste is segregated, treated, or disposed of according to national regulations and international best practices, minimizing environmental impact. Where feasible, recycling and recovery options are implemented.
- Regular inspections, audits, and monitoring ensure adherence to management procedures, legal requirements, and performance standards. Records are maintained for traceability and reporting purposes.

During the construction works, both temporary and permanent facilities will be established. These include construction campsites, concrete and mechanical plants, quarries, borrow pits, service roads, and other supporting infrastructure. Hazardous materials such as fuel and oil will be stored in designated depots within the three project campsites (Temporary Taşağıl, Manavgat, and Alanya). Temporary construction camps with facilities, borrow pits / quarries

.

During the construction phase of the Project, the main types of hazardous materials are the following:

- Chemical solutions used in construction and maintenance activities;
- Empty or partially full chemical containers;
- Flammable materials;
- Contaminated soil and absorbent materials;
- Contaminated materials such as used personal protective equipment (PPE), workwear, and other construction-related materials.

At the project's camping sites, hazardous materials such as lubricants and chemicals are carefully managed to protect workers, residents, and the surrounding environment. All materials are stored in designated, secure areas with secondary containment to prevent leaks or spills, and access is restricted to trained personnel only. Refueling and transfer operations are conducted in controlled zones equipped with spill response kits and fire-fighting equipment. Staff are provided with personal protective equipment (PPE) and trained in safe handling, emergency response, and proper disposal of hazardous material. Regular inspections, monitoring, and record-keeping ensure compliance with regulatory requirements and minimize the risk of contamination or accidents in the camp areas.

HAZARDOUS MATERIAL MANAGEMENT PLAN

Within the scope of the project, hazardous chemicals and substances will be stored in chemical storage areas in accordance with the storage conditions specified in their Safety Data Sheets (SDSs). There will be at least one hazardous material storage area in every construction site. These storage areas will be properly ventilated in accordance with the SDSs, protected from moisture, humidity, and sunlight, equipped with the necessary fire extinguishing systems, and fitted with spill kits for use in the event of a spill. Chemicals will be stored separately according to their types, and their placement will be determined based on their properties such as flammability, combustibility, corrosiveness, acidity, etc.

The hazardous storage areas will have their own spillage control bund. The areas will be protected against wind and rain, securely fenced and access to this site will be provided only for authorized people. These areas will also be labelled as hazardous storage areas. There should be a secure section to keep personal protection equipment, spill kits (e.g. absorbents), emergency equipment (for firefighting), eyewash and emergency shower and the SDSs for storage hazardous chemicals.

All fuel depots and tank farms will be equipped with secondary containment (e.g., bunds) to prevent soil and water contamination. Storage and handling areas will be clearly marked, fenced, and access controlled. Fuel and oil stockpiling in open areas will not be permitted. Under the EPA SPCC Regulation, flood (secondary) containment capacity of at least 110% of the volume of the facility's largest storage tank must be provided (see Figure VI-1).



Figure VI-1 . Fuel depots and tanks

The transportation of hazardous material will be undertaken using licensed transportation companies, in accordance with national regulations. Hazardous material will be transported in leak-proof, securely closed, and clearly labeled containers to prevent spillage, leakage, or human exposure. All transport activities will ensure the protection of personnel and environmental integrity throughout the process. Final disposal of hazardous waste will be carried out at licensed treatment and disposal facilities, based on the classification and properties of the waste. Moreover, the comprehensive management of hazardous waste is thoroughly detailed in the Solid Waste Management Plan.

Waste oils will be transported to the licensed processing and disposal/recover facilities. Waste Oil Declaration Form in Appendix of Regulation on Management of Waste Oils will be filled and sent to the Provincial Directorate of Environment, Urbanization and Climate Change by the end of February of the following year.

Explosives and blasting materials will not be stored on-site under any circumstances. Moreover, campsites will include facilities such as cafeteria, infirmary, showers and toilets, wastewater treatment plants/septic tanks, water supply facilities. The implementation of this project will be entirely pesticide-free.

Inventory and stock control will be carried out regularly by the Warehouse Supervisor. As part of the HMMP, the Supervisor will ensure that all hazardous materials are properly recorded upon receipt, stored in designated and secure areas, and distributed in line with safety procedures. The Supervisor will also be responsible for monitoring stock levels, preventing overstock or shortages, and ensuring that expired or damaged materials are immediately reported and safely disposed of in accordance with applicable regulations. Regular inspections and documentation will support compliance with environmental, health, and safety standards throughout the construction period

To support proper classification and management of hazardous materials, Table VI.1 outlines the key hazardous characteristics used to define substances and materials under national and international standards. This table should be used as a complementary reference when assessing whether a substance presents a risk to human health or the environment, particularly when it is not immediately clear whether a material meets the criteria of hazardous material. The hazardous characteristics of substances and materials are summarized in Table VI.1 .

Table VI-1 Hazardous Characteristics of Substances and Materials

Characteristic	Definition
Explosive	Substances and preparations that can explode in the presence of a flame or are more sensitive to shock and friction than dinitrobenzene.
Oxidizing	Substances and preparations that, in contact with other materials, especially flammable ones, cause strongly exothermic reactions.
Highly Flammable	Substances and preparations that (i) in liquid phase have a flash point below 21°C or spontaneously ignite in air, (ii) in solid phase ignite easily and continue burning, (iii) in gas phase are flammable under normal pressure, or (iv) produce flammable gases upon contact with water or moist air.
Flammable	Liquid substances and preparations with a flash point equal to or greater than 21°C and equal to or less than 55°C.
Irritant	Non-corrosive substances and preparations that may cause inflammation upon immediate, prolonged, or repeated contact with skin or mucous membranes.
Harmful	Substances and preparations that may pose limited but significant risks when inhaled, ingested, or absorbed through the skin.
Toxic	Substances and preparations that may cause serious, acute or chronic health risks, or death when inhaled, ingested, or absorbed through the skin (including highly toxic substances).
Carcinogenic	Substances and preparations that may cause or increase the risk of cancer when inhaled, ingested, or absorbed through the skin.
Corrosive	Substances and preparations that can destroy living tissue upon contact.
Infectious	Substances containing microorganisms or their toxins known to cause disease in humans or other organisms, or with a reasonable assumption of such risks.
Reproductive Toxic	Substances and preparations that may cause or increase non-hereditary adverse effects in offspring or impair reproductive functions and capabilities.
Mutagenic	Substances and preparations that may cause or increase the frequency of heritable genetic disorders when inhaled, ingested, or absorbed through the skin.
Reactive with Water	Substances and preparations that release toxic or highly toxic gases upon contact with water, air, or acids.
Sensitizing	Substances and preparations that may cause hypersensitivity when inhaled or absorbed through the skin, so that repeated exposure leads to harmful effects.
Eco toxic	Substances and preparations that pose actual or potential immediate or delayed risks to one or more environmental components.
Dangerous to the Environment	Substances and preparations that, upon disposal, may exhibit one or more hazardous characteristics by any pathway (e.g., via leachate or breakdown products).

VII. MITIGATION MEASURES FOR IMPACTS OF HAZARDOUS MATERIALS

The following mitigation measures will be implemented under the H MMP to ensure proper handling, storage, transportation, and disposal of hazardous material during the construction phase of the Project.

General Principles

- All necessary measures will be taken to prevent the release of hazardous materials and minimize environmental impact.
- Hazardous substances will not be disposed of on-site (e.g., incineration, burial) and will not enter surface water, groundwater, or areas where they could cause harm.
- Oil and oily residues will be collected and managed according to approved procedures. Where appropriate, used oil may be sent to authorized facilities for recycling or reuse, ensuring it is not mixed with degreasers, solvents, antifreeze, or brake fluid.
- Construction machinery and equipment will be regularly inspected and maintained to prevent spills or contamination.
- Material Safety Data Sheets (MSDS) for all hazardous substances will be available in storage and working areas.
- Full compliance with national regulations will be ensured.
- Hazardous materials in solid or liquid form will be stored in appropriate containers with clear labeling of type, source, quantity, and storage date.
- Hazardous materials will be transferred only to licensed facilities authorized for handling, recovery, recycling, or disposal.
- Proper labeling of hazardous products will be maintained, including content descriptions, quantity, and storage dates.
- Personnel handling hazardous materials will wear appropriate Personal Protective Equipment (PPE).
- Corrosive liquids will be stored separately from flammable substances.
- Information posters on hazardous materials will be displayed in accessible areas.
- Regular inspections will be conducted to ensure compliance with hazardous material management procedures.
- Medical materials from on-site medical facilities will be temporarily stored in sealed, labeled containers and disposed of according to regulations.
- Materials potentially containing hazardous substances (e.g., detergents, petroleum products, asphalt, concrete compounds) will be handled and stored to prevent environmental release.
- A hazardous materials minimization program will be implemented, including substitution with safer alternatives where feasible.
- Engineering controls and technological improvements will be applied to mitigate chemical risks.
- Site-specific and individual risk assessments will be conducted for each hazardous chemical prior to use.
- Collective protective measures (e.g., ventilation, process modifications) will be prioritized, with personal protection used where necessary.
- All control measures will be regularly monitored for effectiveness.
- Working alone with hazardous chemicals is strictly prohibited.
- Eating, drinking, and smoking are not allowed in hazardous material handling or storage areas.
- All personnel must receive hazardous chemical handling training before starting work.

Classification and Labeling of Hazardous Materials

- Hazardous chemicals will be classified based on their physical, toxicological, and environmental risks. This information will be available in Material Safety Data Sheets (MSDS) and on chemical labels.
- Classification aims to identify the risks of chemicals during handling and usage. Once classified, hazardous substances will be properly labeled to inform workers, the public, and the environment.
- Project suppliers will be required to comply with REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulations for hazardous material supply.
- Labels will include the chemical's common and trade names, potential physical and health hazards, the manufacturer's name, and relevant pictograms and warning signs.
- Labels must be applied to all primary and secondary containers to ensure proper identification.
- MSDS will be obtained before hazardous materials arrive on-site.
- Hazardous material storage risks will be assessed beforehand to prevent irreversible damage.
- MSDS will be provided to relevant personnel, including environmental specialists, safety officers, and emergency response teams.
- All hazardous substances will be labeled as "hazardous" and stored accordingly.
- MSDS will be regularly updated and revised as needed.
- Chemical storage risks will be identified in advance to prevent accidents.

Transportation of Hazardous Chemicals

- Hazardous chemicals transported via road, sea, air, or rail will comply with the ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road), the IMDG Code (International Maritime Dangerous Goods Code), ICAO Technical Instructions (for air transport), and RID (Regulations concerning the International Carriage of Dangerous Goods by Rail).
- Hazardous material transportation will be conducted by licensed transport companies and comply with legal requirements.
- Spill prevention kits and secondary containment systems will be available at all hazardous material transfer points.
- Proper documentation for transportation will be completed by trained personnel.
- Hazardous substances will be transported in approved, labeled containers.
- Drip trays and spill containment kits will be used to prevent leaks during material transfers.

Storage of Hazardous Materials

- Chemicals will be classified and segregated to prevent hazardous reactions.
- The priority order for hazardous material storage will be as follows: infectious materials, radioactive materials, explosive materials, compressed, liquefied and dissolved gases and pressurized small gas containers, self-igniting materials, materials that emit flammable gas upon contact with water, organic peroxides, oxidizing materials, flammable solids, flammable liquids, flammable liquids, flammable toxic materials, non-flammable toxic materials, flammable corrosive (corrosive) materials, non-flammable corrosive (corrosive) materials, flammable liquids that do not fall under Class 3A or 3B, flammable solids, non-flammable liquids, and non-flammable solids.
- Flammable, oxidizing, and toxic materials will be stored separately.
- Storage areas will be fire-resistant, ventilated, and clearly marked.

- Secondary containment systems will be used to prevent spills.
- Regular safety inspections will be conducted on storage areas.
- Chemical inventory records will be maintained.
- Proper fire prevention measures (e.g., fire extinguishers, emergency exits) will be in place.

Fire Safety and Emergency Response

- Fire safety measures will include the identification of hazardous materials storage areas, the designation of safe fuel transfer locations, and the strict control of ignition sources along with smoking restrictions.
- Fire extinguishers will be strategically placed near hazardous material storage areas.
- Emergency response drills will be conducted regularly.
- Fire exits will remain unobstructed at all times.
- All personnel will be trained in hazardous material fire response procedures.
- Only authorized personnel will handle hazardous substances.

VIII. TRAINING

Upon hiring, all staff will receive structured training addressing the risks associated with hazardous material handling, storage, transportation, and disposal, as well as the corresponding mitigation strategies applicable to their responsibilities within the Project. This training will include guidance on appropriate use of personal protective equipment (PPE), spill prevention techniques, labeling and segregation requirements, and proper disposal procedures.

As part of the hazardous materials management requirements, targeted training will also be provided as outlined below:

- All personnel involved in the handling, storage, use, and transportation of chemical substances will be trained by qualified professionals and will be required to understand the potential hazards associated with these activities. Only trained and experienced personnel selected by authorized experts will be permitted to carry out these tasks.
- Individuals will not be authorized to undertake responsibilities involving chemical substances unless they have completed the required chemical handling training program in accordance with this standard.
- Chemical handling training will be provided at least once to all employees throughout the Project duration, with refresher training delivered as necessary. This training will also be mandatory for contractor and all subcontractor personnel employed on the Project.
- The training and awareness sessions will include information obtained from risk assessments; identification and recognition of hazardous chemical substances present or potentially arising in the workplace, associated health and safety risks, occupational illnesses, occupational exposure limit values, and applicable legal requirements; precautionary measures and safe practices to prevent endangering oneself or others; information on Material Safety Data Sheets (MSDS) provided by the supplier in the language understood by workers; and labeling and lockout/tag out requirements for areas, containers, piping systems, and similar installations containing hazardous chemical substances in accordance with relevant regulations.

The overall training framework will be developed by the E&S and/or H&S Manager and disseminated to all relevant Project stakeholders for implementation. Training records will be maintained, and continuous monitoring of staff competency will be ensured to verify effective understanding and application of safe hazardous management practices.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of hazardous materials management and associated mitigation measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, trends, stakeholder concerns, or updates in applicable environmental and health and safety regulations.

Monitoring activities will be coordinated by the E&S Manager, in close collaboration with the H&S Manager and General Manager. Key responsibilities will include verifying the implementation of hazardous materials storage and handling protocols, reviewing documentation on chemical inventories, and ensuring the consistent application of safety measures near sensitive receptors such as work camps, storage yards, and worker accommodation units.

Regular inspections will be conducted by E&S Specialist at designated locations across all worksites to evaluate compliance with national hazardous waste regulations and Project-specific management procedures. This will include review and control of the following:

- The list of hazardous materials and chemicals supplied, stored, and used on-site, including information on their type, quantity, and volume.
- Hazardous material management and disposal agreements with licensed companies to ensure legal compliance and traceability.
- Hazardous compartments within Storage Areas to confirm compliance with storage and containment requirements.
- Site practices related to hazardous management—including general housekeeping rules, source separation practices, container integrity, and containment infrastructure.

In addition, a daily general site overview will be conducted by the E&S Specialist to observe construction progress, site organization, and general environmental conditions. Monthly coordination meetings will also be held with project management teams to report on the key findings from monitoring activities and to provide feedback on overall environmental performance.

The performance of contractors and subcontractors in implementing hazardous materials management requirements will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and ensure recurrence is prevented.

In addition to internal monitoring, inspections may also be carried out by relevant public institutions, including the Ministry of Environment, Urbanization and Climate Change, the Ministry of Health, and the Ministry of Labor and Social Security, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the competent authorities and may include on-site assessments, documentation review, and verification of compliance with hazardous material management standards.

Monitoring efforts will be guided by the framework provided in Table IX.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of inspections, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of hazardous materials management and ensuring full compliance with national regulations and Project-specific requirements.

Table IX-1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
The list of hazardous materials and chemicals supplied, stored, and used on-site, including information on their type, quantity, and volume	Camp sites, road construction sites, quarries	Site audit, document review	Monthly	SPV E&S Engineer EPC E&S Engineer
Soil contamination risk from hazardous substances (e.g., fuel	Project area and sensitive receiving environments (e.g., soil, surface water)	Visual inspection for signs of leakage or spills; inspection of storage and handling practices; SDS and training record review	Daily	AAOİAŞ / Subcontractors
General site practices related to hazardous materials management	Entire construction corridor	Field observations on container integrity, spill kits, PPE use, and storage conformity	Weekly	AAOİAŞ, Independent Environmental Experts
Environmental enforcement actions and non-compliance records	Project area	Review of regulatory audit reports, notifications, and enforcement communications	Monthly	AAOİAŞ, Independent Environmental Experts

In the event that non-compliance is identified through internal oversight or external audits, AAOİAŞ will ensure that all corrective and preventive measures are promptly implemented in coordination with the Main Contractor (Limak) and all relevant subcontractors.

All hazardous materials-related findings, including non-compliance incidents, inspection results, or grievances received, will be documented in accordance with national environmental legislation and Project procedures. In the case of significant violations—such as mismanagement of hazardous material or failure to follow approved storage practices—AAOİAŞ will ensure timely reporting to the competent authorities and initiate all necessary technical, procedural, and contractual measures to ensure legal and environmental compliance.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X-1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Percentage of inspections completed compared to those planned	100%	Monthly	AAOİAŞ Subcontractors
Percentage of hazardous materials management training sessions completed as planned	100%	Monthly	AAOİAŞ / Subcontractors

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Non-conformities related to hazardous materials management	Less than five	Monthly	AAOİAŞ / Subcontractors
Complaints related to hazardous materials management	Less than five	Monthly	AAOİAŞ / Subcontractors
Number of legal penalties issued by authorities in relation to environmental requirement	0	Monthly	AAOİAŞ / Subcontractors
Number of training on hazardous material management for all employees	At least 1 times in a year	Yearly	AAOİAŞ / Subcontractors

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities related to hazardous materials management should be documented and reported as outlined in this Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Supply Chain and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's environmental, health, and safety procedures. Records to be reviewed during hazardous materials audits will include, but are not limited to, chemical inventory logs, MSDS, waste transfer and disposal documentation, training attendance records related to hazardous substances, inspection and maintenance checklists, non-conformity and incident reports, storage area inspection records, and relevant environmental permits. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with national regulations and applicable international standards regarding hazardous materials management.

XII. REPORTING

Regular reporting will be conducted to ensure the effective implementation and continuous improvement of hazardous material management activities throughout the construction phase of the Project. Reporting will be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions will be identified, and the required updates will be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections will be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Quarterly Environmental and Social Monitoring Report will cover at least, but not limited to, the following items. The report will be prepared by the SPV with input data provided by EPC to evaluate the Project performance and compliance of the related plans.

- Incident reporting;
- Emergency response reporting;
- Records of annual emergency response training exercises;
- KPIs and performance trends (see Table XI.1) ;
- Current situation Key Monitoring Activities (see Table XI.2)
- Relevant training activities completed and attendance registers to be maintained;
- Legal Authorities Audit reports;
- Site Inspection logs

In addition, the following external reporting will be done:

- All environmental and social incidents will be appropriately documented, notified and reported in accordance with established procedures the terms and conditions by EPC to SPV,
- Incident notification and reporting to relevant Turkish regulatory bodies will be performed in line with applicable legislation in force and as stipulated in permits and licenses.
- The Lenders will be notified of incidents pursuant to the terms and conditions agreed upon in the Finance Agreements through SPV.

All personnel are encouraged to raise concerns, suggestions, or complaints related to this Plan through the established grievance mechanism by completing the grievance form. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

ANTALYA-ALANYA MOTORWAY PROJECT

Revision No: 3 **Date:** 08.09.2025

SOLID WASTE MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
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SOLID WASTE MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
MoTAT	Mobile Hazardous Waste Tracking System
MSDS	Material Safety Data Sheets
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
WEEE	Electrical and Electronic Equipment
WHO	World Health Organization

I. INTRODUCTION

Ministry of Transport and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), through the General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has initiated a tender process for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The Project is designed to connect the district Serik and Alanya via the Manavgat district of Antalya province will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Solid Waste Management Plan ("SWMP" or "The Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards referred to in the relevant legislation section. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project begins at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange.

As of April 2025, the current Project design includes a total of 117.8 kilometers of roadway, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

The map illustrating the construction components and road route within the scope of the Project's construction activities is provided in Figure I-1.

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design



Figure I-1.Map Showing the Locations of Construction Compounds

SOLID WASTE MANAGEMENT PLAN

II. PURPOSE AND SCOPE

This Plan has been prepared by Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Motorway Project ("the Project").

The purpose of this Plan is to identify the main sources of solid waste generated during the construction phase and to outline the measures that should be implemented to prevent, minimize, reuse, and recycle waste in accordance with applicable national legislation and international standards. This Plan aims to support sustainable waste management practices and promote circular economy principles throughout construction activities.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

Waste types include but are not limited to domestic/residential waste from construction personnel, excavation waste from earthworks and site arrangements (e.g., base layers, shoulders, slope shaping), construction waste from material use and installation processes, and packaging waste generated from the consumption of goods and materials (e.g., construction materials, food, clothing).

This Plan should be implemented by the Project Sponsor, AAOİAŞ, the Main Contractor (Limak or EPC) all subcontractors involved in the construction phase. Roles and responsibilities for waste management, monitoring, and reporting should be clearly defined, and this Plan should be reviewed and updated in line with changes in project activities or legal requirements.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

The Plan has been developed in alignment with applicable national legislation and international standards to ensure that solid waste generation, segregation, collection, storage, transportation, reuse, recycling, and final disposal during the construction phase of the Project are conducted in an environmentally sound manner. The references listed below should be used as the legal and procedural basis for implementing the waste management practices outlined in this Plan.

III.1 National Requirements

The following Turkish laws and regulations should be used as the primary legal framework for solid waste management:

- Environmental Law (Law No. 2872),
- Regulation on Waste Management,
- Regulation on Environmental Impact Assessment,
- Regulation on Environmental Permits and Licenses,
- Regulation on the Control of Excavation, Construction, and Demolition Wastes,
- Regulation on the Control of Packaging Waste,
- Regulation on the General Principles for Waste Pre-Treatment and Recovery Facilities,
- Regulation on the Management of Waste Oils,
- Regulation on the Management of Waste Electrical and Electronic Equipment,
- Regulation on the Control of Waste Batteries and Accumulators,
- Regulation on the Control of End-of-Life Tires,
- Regulation on the Control of End-of-Life Vehicles,
- Regulation on the Control of Vegetable Waste Oils,
- Regulation on the Control of Medical Wastes
- Regulation on Mining Wastes,

- Regulation on Landfilling of Waste
- Regulation on Waste Incineration
- Regulation on Zero Waste Management
- Regulation on Recycling Contribution Fee
- Communiqué on the Transport of Waste by Road
- Circular on the Preparation of Implementation Project for Landfills,
- Circular on Landfill of Mining Wastes and Technical Arrangement of Other Landfills,
- Water Pollution Control Regulation,
- Surface Water Quality Regulation,
- Regulation on the Control of Pollution Caused by Dangerous Substances in and around the Water Bodies,
- Regulation Concerning Protection of Groundwater against Pollution and Deterioration,
- Ordinance on Groundwater Resources,
- Regulation on Safety Data Sheet on Harmful Substances and Mixture
- Regulation on the Preparing and Distributing Safety Data Sheets Regarding Dangerous Materials and Preparations,
- Regulation on the Classification, Labelling and Packaging of Materials and Mixtures,

Regulation on Transportation of Hazardous Goods on Highways,

These regulations should be used as the legal basis for waste segregation, temporary storage, transport, recycling, recovery, and disposal activities at all construction sites and associated facilities.

III.2 International Standards and Guidelines

The following international standards and procedures are applicable to the Project to ensure alignment with national legislation and recognize good industry practices.

AIIB is a multilateral development bank established to promote sustainable economic growth and improve infrastructure connectivity. According to the Articles of Agreement, AIIB aims to invest in infrastructure and productive sectors while fostering regional cooperation through partnerships with other development institutions. To ensure responsible operations, AIIB adheres to policies that address environmental and social impacts, outlined in its Environmental and Social Framework (ESF). The ESF, updated in June 2024, and reflects AIIB's commitment to international standards and sustainable development practices.

Also, the following international standards and reference frameworks should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- European Union Requirements- Waste Frameworks Directives (2008)
- Equator Principles (EPs) IV,

- World Business Council for Sustainable Development (WBCSD), December 2011

These international references provide the broader sustainability framework and technical benchmarks to be integrated into solid waste management procedures, particularly in relation to source reduction, reuse and recycling targets, occupational health and safety, and environmental protection.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Solid Waste Management Plan to ensure consistency in environmental and social performance and regulatory compliance throughout the construction phase:

- Environmental Accident and Spill Response Management Plan,
- Water, Wastewater, and Storm Water Management Plan,
- Soil Management and Erosion Control Plan,
- Hazardous Materials Management Plan,
- Excavated Material Management Plan,
- Construction Camp Site Management Plan,
- Occupational Health and Safety Management Plan,
- Community Health and Safety Management Plan,
- Environmental and Social Management and Monitoring Plan (ESMMP)

The effective integration of these plans should be ensured to maintain alignment with Turkish legislation, IFC Performance Standards, and other international best practices. Cross-plan coordination is essential for minimizing cumulative impacts, supporting resource efficiency, and enhancing overall environmental and social risk management during the construction phase.

V. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV):

- Hold the overall responsibility and accountability for the Project, ensuring construction activities comply with national regulations, international standards, and Project commitments.
- Ensure full compliance with the SWMP and related national legislation.
- Ensure that relevant activities are carried out in accordance with this management plan and related procedures and shall ensure the provision of all sources to carry out this Plan.
- Approve and oversee procedures for segregation, collection, storage, transport, recycling, and disposal of solid waste.
- Allocate sufficient resources (personnel, budget, equipment) for effective solid waste management and emergency response related to waste.
- Ensure monitoring, audits, and inspections are carried out, and corrective actions are implemented where gaps are identified.
- Ensure that all line managers and subcontractors understand and fulfil their responsibilities with hazardous material procedures during construction phases.

E&S Manager (SPV)

- Prepare, review, update, and implement the SWMP and other project-specific E&S plans in line with national regulations, international standards, and client requirements.
- Coordinate with EPC, subcontractors, and authorities on waste management.
- Monitor compliance with the SWMP through inspections, audits, and review of records (e.g., waste transfer notes, disposal certificates).
- Ensure waste facilities and contractors are compliant and licensed.
- Deliver and validate waste management and E&S trainings for staff and subcontractors, including induction sessions and refreshers.
- Coordinate with licensed waste contractors and ensure only approved facilities are used for transport, recycling, or disposal.
- Support community engagement, ensuring concerns related to waste (odors, dust, litter, etc.) are addressed through the grievance mechanism.
- Contribute to emergency response planning for accidental releases, hazardous waste mismanagement, or fires at waste storage areas.
- Maintain documentation for audits, compliance checks, and due diligence processes; provide input for sustainability and environmental performance reporting.
- Liaise with local authorities and ensure compliance with permitting, reporting, and regulatory inspections.
- Maintain waste records, Waste Transfer Notes, and MoTAT documentation for hazardous waste.
- Promote continuous improvement by reviewing SWMP implementation, integrating lessons learned, and recommending new waste minimization or recycling opportunities.

H&S Manager (SPV)

- Prepare and implement H&S, hazardous material and waste management plans per regulations and standards.
- Provide technical support and integrate hazardous material and waste controls into daily work.
- Monitor compliance, conduct inspections, and address non-conformities related to hazardous materials waste.

- Investigate incidents involving hazardous materials or waste, implement corrective actions, and report performance.
- Oversee training and maintain records on hazardous material and waste safety.
- Coordinate with authorities and resolve hazardous material– and waste-related complaints.

Deputy E&S Manager (SPV)

- Lead environmental, social, hazardous materials, and waste management, ensuring compliance.
- Review and approve subcontractors' ESHS and hazardous material/waste documents.
- Monitor performance, incidents, and corrective actions related to hazardous materials and waste.
- Ensure EPC and subcontractors follow E&S, hazardous material, and waste procedures.
- Support training, record-keeping, and reporting on hazardous materials and waste management.
- Oversee community engagement and grievance management concerning hazardous materials and waste.
- Coordinate environmental, social, hazardous material, and waste monitoring programs.

HSE Specialist (SPV)

- Support safe site activities and compliance with the SWMP.
- Conduct inspections, audits, and hazard assessments related to waste handling, storage, and disposal.
- Monitor EPC and subcontractor compliance with waste segregation, collection, and disposal procedures.
- Maintain records of waste management activities, incidents, and corrective actions.
- Participate in investigations of waste-related incidents and implement lessons learned.
- Support and review training on proper waste handling and site-level environmental practices.
- Ensure waste storage areas are properly demarcated, labeled, and secure.
- Assist in resolving complaints or issues related to solid waste management.

Project Director (EPC)

- Define and oversee EPC execution strategy and project management plans, ensuring integration of the SWMP.
- Lead teams and coordinate EPC functions, ensuring compliance with SWMP, HSE, E&S, and QA/QC standards.
- Approve and monitor site inspections, audits, and training related to solid waste handling, storage, and disposal.
- Track KPIs, timelines, and budgets; implement corrective actions for non-compliance with waste management procedures.
- Represent EPC to SPV, clients, and authorities; address solid waste, environmental, safety, and social concerns.
- Oversee risk management, quality systems, and mitigation strategies, including waste minimization and recycling.
- Supervise subcontractors to ensure proper execution of construction activities and compliance with SWMP requirements.

E&S Manager (EPC)

- Prepare, review, and implement E&S and Solid Waste Management Plans in line with policies, standards, and lender requirements.
- Coordinate with SPV, contractors, and construction teams to ensure compliance with SWMP and effective waste management practices on-site.
- Monitor and enforce contractor/subcontractor compliance with waste segregation, storage, transport, and disposal procedures.
- Ensure proper site boundaries, traffic, utility protection, and community safety measures related to waste management.
- Oversee SWMP-related training, onboarding, toolbox talks, and awareness programs for all personnel.
- Supervise E&S staff, monitor waste management performance, lead investigations, and implement corrective actions.
- Manage waste-related grievances, emergency preparedness, and integrate social inclusion principles into site-level practices.
- Report SWMP performance to Project Director and promote continuous improvement in waste management.

H&S Manager (EPC)

- Develop, implement, and update the H&S and Solid Waste Management Plans.
- Ensure EPC and subcontractors comply with safety and solid waste handling, storage, and disposal procedures.
- Manage risk assessments, site safety controls, traffic, utilities, and community protection related to waste management.
- Lead inspections, audits, incident investigations, and corrective actions for waste management issues.
- Oversee training, toolbox talks, and emergency drills on health, safety, and solid waste practices.
- Report on SWMP performance and risks to the Project Director and foster a proactive safety and waste management culture.

H&S Specialist (EPC)

- Support the implementation of the H&S and Solid Waste Management Plans.
- Monitor EPC and subcontractor compliance with waste handling, storage, and disposal procedures.
- Conduct inspections, audits, and hazard assessments related to waste management.
- Maintain accurate records of waste activities, incidents, and corrective actions.
- Support training, toolbox talks, and awareness programs on solid waste management
- Ensure secure, properly labeled waste storage and assist in resolving related issues.

Biodiversity Specialist (EPC)

- Ensure biodiversity safeguards are applied to prevent impacts from improper waste handling on soil, water, and ecosystems.
- Oversee ecological measures (e.g., buffer zones, habitat restoration) to mitigate effects of solid waste.
- Train site teams on biodiversity risks related to waste management.
- Monitor biodiversity indicators and report non-compliance linked to waste management to the

Environmental Engineer (SPV and EPC)

- Implement and monitor the ESMP and SWMP across EPC and subcontractor activities.
- Conduct site inspections and audits to ensure compliance with solid waste handling, storage, transport, and disposal procedures.
- Maintain environmental records, support reporting, and assist in waste-related incident investigations.
- Deliver training, toolbox talks, and awareness programs on environmental and waste management practices.
- Coordinate with H&S, Social teams, contractors, and regulators to embed waste management requirements into site activities.
- Support permitting processes and ensure compliance with environmental and waste-related regulations.

Waste Management Supervisor / Officer (EPC)

- Supervise daily implementation of waste segregation at source (e.g., food waste, packaging, office waste, hazardous waste).
- Manage labeling, color-coding, and proper containerization of all waste streams.
- Ensure temporary storage areas comply with safety and security standards (fencing, gates, signage, spill kits, fire extinguishers).
- Keep inventory logs of incoming and outgoing waste and update records.
- Verify that excavated materials are reused on-site whenever possible and that excess is transferred only to designated areas.
- Oversee secure handling of WEEE, batteries, oils, and end-of-life tires

Warehouse Supervisor (EPC)

- Monitor safe storage of hazardous and non-hazardous waste containers.
- Ensure corrosion-resistant and sealed containers are available and properly labeled.
- Remove or cover old/conflicting labels to avoid confusion.
- Coordinate with licensed transporters for collection of hazardous and medical waste.

Community Liaison Officer (CLO) (SPV and EPC)

- Communicate project activities and solid waste management practices to local communities.
- Organize meetings and engagement forums to share information and gather feedback.
- Manage grievances related to solid waste through the Grievance Mechanism (GM).
- Assess impacts on vulnerable groups and ensure inclusive engagement.
- Monitor and report community feedback on SWMP implementation and contractor compliance.
- Safeguard confidentiality and handle sensitive community information responsibly.

All Personnel (including Contractor/Subcontractor Personnel)

- Comply with the SWMP and related site procedures.
- Handle, store, and dispose of waste safely during daily activities.
- Report non-compliance or waste-related incidents to supervisors or the E&S Manager.
- Participate in SWMP and safety trainings as required.
- Immediately notify supervisors in case of accidental spills or improper disposal.
- Take personal responsibility for maintaining a safe and clean working environment.

VI. SOLID WASTE MANAGEMENT AND RECYCLING APPROACH

VI.1 Waste Management Strategy

Although the primary principle of solid waste management is to prevent waste generation at the source, mitigation measures should be implemented to minimize the adverse environmental and social impacts of the solid waste generated during the construction phase. These measures are designed in accordance with the waste management hierarchy prevention, minimization, reuse, recycling, recovery, and safe disposal and are essential to ensure full compliance with Turkish legislation and international standards.

Waste management should follow the principles of the waste hierarchy, as outlined below:

- **Avoidance/Prevention:** Measures should be taken to reduce the quantity of materials used and waste generated from the outset.
- **Reuse:** Materials such as surplus construction materials, excavation soil, timber, and metal should be reused on-site or externally, where technically feasible.
- **Recycling and Recovery:** Separate collection and recycling should be done for paper, cardboard, glass, metal, plastics, tires, electronic waste, batteries, and similar materials. These should be temporarily stored in labeled containers and sent to licensed recycling/recovery facilities.
- **Safe Disposal:** Disposal should only be applied where other management options are not viable. Disposal should be conducted in line with regulatory requirements and the best environmental practices.

The fundamental principle of solid waste management is to prevent waste generation at the source and, where prevention is not possible, to minimize, reuse, or recycle waste to the greatest extent practicable. All waste management activities will be carried out in compliance with relevant Turkish legislation and applicable international standards.

VI.2 Waste Categorization

Solid waste generated during the construction phase of the Project will originate from various activities, including construction operations, excavation works, material usage, accommodation facilities, and routine consumption of goods and supplies such as paper, plastic, metal, and glass containers. All solid waste streams will be classified and managed in accordance with their physical and chemical characteristics to enable effective separation, reuse, recycling, and disposal.

Further detail on the expected waste types, their regulatory codes, and associated management considerations is provided in Table VI-1. This table presents an indicative list of potentially generated waste during land preparation and construction activities, based on the classifications in the Waste Management Regulation (Annex-4). The list includes excavation waste, construction and demolition debris, packaging materials, vehicle and equipment maintenance waste (e.g., waste oil, filters), and municipal-type waste from camp areas. Each waste stream is categorized with its six-digit waste code and marked according to whether it is classified as hazardous (A) or potentially hazardous (M). These classifications are critical for determining appropriate handling, temporary storage, transportation, and final treatment or disposal methods, in alignment with the mitigation and monitoring strategies outlined in this Plan.

Table VI-1. Indicative List of the Potentially Generated Wastes Types During the Land Preparation and Construction Activities

Waste Code	Waste Code Definition	Remarks
01	Wastes Generated During the Exploration, Extraction, Operation and Physical or Chemical Processing of Ores	
01 01	Wastes generated due to mining excavations	

Waste Code	Waste Code Definition	Remarks
01 01 02	Wastes due to non-metallic ores	
01 04	Wastes from physical and chemical processing of non-metallic minerals	
01 04 07*	Wastes containing dangerous substances from the physical and chemical processing of non-metallic minerals	M
01 04 09	Waste sand and clays	
01 04 13	Wastes from stone chipping and cutting operations other than those mentioned in 01 04 07	
01 04 99	Wastes that not otherwise specified	
13	Oil Wastes and Liquid Fuel Wastes (Excluding Renewable Oils)	
13 01	Waste hydraulic oils	A
13 02	Waste engine, transmission and lubrication oils	A
13 03	Waste insulation and heat conduction oils	A
13 04	Bilge oils	A
13 05	Oil/water separator contents	A
13 07	Wastes of liquid fuels (fuel oil, diesel, gasoline, other fuels including mixtures)	A
15	Waste Packaging and Absorbents, Wiping Clothes, Filter Materials and Protective Clothing Not-Classified Under Other Waste Types	
15 01	Packaging (including packaging material collected by the municipality separately)	
15 01 01	Paper and cardboard packaging	
15 01 02	Plastic packaging	
15 01 03	Wood packaging	
15 01 04	Metallic packaging	
15 01 05	Composite packaging	
15 01 06	Mixed packaging	
15 01 07	Glass packaging	
15 01 09	Textile packaging	
15 01 10*	Packaging containing traces of hazardous materials or contaminated with hazardous materials	A
15 01 11*	Metallic packaging material containing hazardous porous solid structures (asbestos, for example), including empty pressurized containers	A
15 02	Absorbents, filter materials, wiping clothes and protective clothing	
15 02 02*	Absorbents, filter materials (oil filters if not classified in any other way), wiping clothes, protective clothing contaminated with hazardous materials	M
15 02 03	Absorbents, filter materials, wiping clothes and protective clothing excluding 15 02 02	
16	Wastes not Classified under any other Type of Waste in the List	
16 01	Wastes generated due to vehicle maintenance (excluding 13, 14, 16 06 and 16 08), end-of-life vehicles and the dismantling of end-of-life vehicles (including construction machinery) in various transportation categories	
16 01 03	End-of-life tires	
16 01 04*	End-of-life vehicles	A
16 01 06	End-of-life vehicles that do not contain liquids or hazardous substances	

Waste Code	Waste Code Definition	Remarks
16 01 07*	Oil filters	A
16 02	Electrical and electronic equipment wastes	A
16 04	Explosive wastes	A
16 06	Batteries and accumulators	A
16 10	Aqueous liquid wastes to be sent to off-site treatment	
16 10 01*	Aqueous liquid wastes containing dangerous substances	M
16 10 02	Aqueous liquid wastes other than those mentioned in 16 10 01	
16 10 03*	Aqueous concentrated substances containing hazardous substances	M
16 10 04	Aqueous concentrates other than 16 10 03	
17	Construction and Demolition Wastes (Including Excavations Conducted at Contaminated Sites)	
17 01	Concrete, brick, tile and ceramic	
17 01 01	Concrete	
17 01 02	Bricks	
17 01 03	Tiles and ceramic	
17 01 06*	Mixtures or separated groups of concrete, brick, tile and ceramic containing hazardous substances.	M
17 01 07	Mixtures or separated groups of concrete, brick, tile and ceramic, excluding 17 01 06	
17 02	Wood, glass and plastic	
17 02 01	Wood	
17 02 02	Glass	
17 02 03	Plastic	
17 02 04*	Wood, glass and plastic containing or contaminated with hazardous substances.	A
17 03	Mixtures containing bitumen, coal tar and products containing tar	
17 03 01*	Mixtures with bitumen, containing coal tar	M
17 03 02	Mixtures containing bitumen, excluding 17 03 01	
17 03 03*	Coal tar and products containing tar	A
17 04	Metals (including their alloys)	
17 04 01	Copper, bronze and brass	
17 04 02	Aluminium	
17 04 03	Lead	
17 04 04	Zinc	
17 04 05	Iron and steel	
17 04 06	Tin	
17 05	Soil (including excavations conducted in contaminated sites), stones and dredging mud	
17 05 03*	Soil and stones containing hazardous substances	M

Waste Code	Waste Code Definition	Remarks
17 05 04	Soil and stones excluding 17 05 03	
17 06 01*	Insulation materials containing asbestos	A
17 06 05*	Construction materials containing asbestos	A
17 09	Other construction and demolition waste	
17 09 01*	Construction and demolition waste containing mercury	M
17 09 02*	Construction and demolition waste containing PCB (example: filling paste containing PCB, resin-based base coating material containing PCB, coated enamelling units containing PCB, capacitors containing PCB)	M
17 09 03*	Other construction and demolition waste containing hazardous substances (including mixed waste)	M
17 09 04	Mixed construction and demolition waste, excluding 17 09 01, 17 09 02 and 17 09 03	
18	Healthcare Waste	
18 01 03*	Wastes whose collection and disposal is subject to special requirements in order to prevent infection*	A
19	Materials from waste and water treatment	
19 08 05	Sludges from treatment of urban waste water	
19 13 08	Concentrated liquids and aqueous liquid wastes due to groundwater rehabilitation, excluding 19 13 07	
20	Municipal Waste including Separately Collected Fractions (Household Waste and Similar Commercial, Industrial and Institutional Waste)	
20 01	Separately collected fractions (excluding 15 01)	
20 01 01	Paper and cardboard	
20 01 02	Glass	
20 01 08	Biodegradable kitchen and canteen wastes	
20 01 10	Clothing	
20 01 11	Textile products	
20 01 13*	Solvents	A
20 01 14*	Acids	A
20 01 15*	Alkalines	A
20 01 17*	Photo chemicals	A
20 01 19*	Pesticides	A
20 01 21*	Fluorescent lamps and other mercury-containing wastes	A
20 01 37*	Wood containing hazardous substances	M
20 01 38	Wood excluding 20 01 37	
20 01 39	Plastics	
20 01 40	Metals	
20 02	Garden and park wastes (including cemetery wastes)	
20 02 01	Biodegradable wastes	
20 02 02	Soil and stones	

Waste Code	Waste Code Definition	Remarks
20 02 03	Other non-biodegradable wastes	
20 03	Other municipal wastes	
20 03 01	Mixed municipal waste	
20 03 04	Septic tank sludge	

Source: Waste Management Regulation, Appendix-4

(*): Indicates that the waste is either potentially hazardous or hazardous waste.

(A): Indicates that the waste is a hazardous waste, there is no need for any further analysis.

(M): Indicates that the waste is potentially hazardous waste. In order to determine whether the waste is hazardous or not, an analysis is carried as stipulated in Article 11 of this Regulation.

Wastes ending with 99: Wastes ending with the six-digit waste code 99 define wastes that are not classified as hazardous or non-hazardous waste and are not otherwise defined in the list. "Waste Code Determination Hierarchy" and the provisions of Article 12 of this Regulation shall be applied in the use of this waste code.

Municipal Solid Wastes

According to the TurkStat data (2022), the average daily amount of municipal solid waste per capita in Türkiye is 1.03 kg, while this amount is 1.37 kg in Antalya. Most of the municipal solid waste generation due to the Project will be in the campsites. The amount of domestic solid waste to be produced in the campsites is estimated by multiplying the average daily municipal solid waste production per capita of Antalya province by the number of personnel employed due to the Project. The information on maximum number of personnel to be employed and estimated amount of municipal waste to be generated is summarized in Table VI-2. Assuming 20% (Ministry of Environment, Urbanization and Climate Change, 2020) of the municipal solid wastes (by weight) is formed of packaging wastes, estimated amount of packaging wastes within the total municipal wastes to be produced is also provided in the last column of the table. For the handling of the municipal solid wastes, municipalities' landfills and disposal sites, and licensed waste transportation trucks will be utilized. The facilities that are suitable and close to the campsites will be prioritized, if possible, for fuel and time efficiency.

Table VI-2. Estimated Solid Municipal Waste Generation of the Campsites

Number of Personnel* (cap)	Daily Municipal Waste Generation (kg/day/cap)	Daily Packaging Waste Generation (kg/day/cap)
3,300	1.37	0.27

** Maximum Project related employee number including subcontractors; provided by the Project Sponsor.*

The amount of municipal solid waste to be produced per day at the campsites is:

1.37 kg/day/cap * 3,300 cap = 4.52 ton/day

When compared to the total municipal solid waste generation of the Antalya province, which is 1,340,770 tons per year (Turkstat, 2022), the Project's contribution to solid waste generation of the province is less than one per two thousand. Additionally, it should be noted that the campsites will be present for a maximum of 3 years during the construction period of the Project. Since the waste load contribution of the Project on the existing waste management infrastructure capacity is limited in both time and impact, the overall impact of the Project is determined as negligible.

Treatment Sludge:

The total wastewater flow from all camp sites (Camp Site-1, Camp Site-2 and Camp Site-3) are approximately 0.725 m³/day. As a result of the treatment process, a small amount of sludge is generated.

The sludge production rate corresponds to approximately 0.7 kg of dry solids generated per cubic meter of influent wastewater treated.

Based on this sludge yield, the daily dry sludge production is estimated as follows:

0.725 m_3/day x 0.7 kg/m_3 = 0.5075 kg/day

Therefore, approximately 0.51 kg of dry sludge is expected to be produced daily from all camp sites combined.

The generated sludge will be collected and removed regularly by licensed waste transport vehicles, ensuring proper handling and disposal in accordance with applicable environmental regulations and standards.

Construction and Demolition Wastes

Fences, barriers, buildings, walls, former engineering structures, etc. corresponding to the Motorway route will be dismantled and removed prior to construction resulting in generation of construction and demolition wastes. Those wastes will be handled with the use of appropriate construction and demolition waste areas. The generated demolition waste, mainly consisting of rubble and other construction debris, will be transported by trucks with a capacity of approximately 40 tons each. Based on the estimated waste volume per household, it is expected that about 2 truckloads will be required to remove the demolition waste generated from one residential unit.

Preliminary estimates indicate that a total of 304 houses, 37 business structures, and 831 greenhouses will be affected by the Project. Considering an average building height of 3 m for houses and business structures, with wall thickness yielding a structural volume of 300 m^3 each, and a debris density of 2 ton/m^3, the total waste generated from houses is estimated to be approximately 182,400 ton. The business structures are expected to produce an additional 22,200 ton of waste under the same assumptions. The greenhouses, constructed with lighter materials and typically 2 m in height, are expected to generate approximately 83,100 ton of waste, with a rubble density of 0.5 ton/m^3. Overall, a total of approximately 287,700 ton of construction and demolition waste is expected to be generated by the Project. All waste will be efficiently managed, temporarily stored at designated sites, and subsequently disposed of or recycled in compliance with applicable legislation and best practices. Additionally, affected households and business owners will be permitted to salvage any materials or components of value from the demolition site following the completion of demolition activities, prior to the removal and disposal of debris.

Topsoil from sensitive areas (wetlands, slopes, agricultural lands) will be carefully removed, stored separately, and later used for site rehabilitation. Storage areas will be on gentle slopes (<5%) with protective measures against erosion, contamination, or quality loss. If stored long-term, the soil surface will be covered with fast-growing plants. Excavated waste will not be disposed into streams, in line with the 2006/27 Stream Beds and Floods Circular. The contractor will secure adequate storage capacity to avoid pressure on local disposal sites.

Construction of the Project and related structures such as the cuttings, earthworks, etc. will generate significant volumes of material from earthmoving and site clearance. The cut and fill balances along the Project route indicate that total amount of surplus material to be disposed will be around 10,8 million m3. 22 surplus material dumpsites are planned to be used for the Project which are listed below (see Table VI-3).

Table VI-3. The List of Dumpsites and Capacities

Location		Description of the Site	Capacity Information (m^3)	Planned Capacity Usage (m^3)
Km 52+544	Antalya, Serik	D-2	736,660.28	470,850.34
Km 59+580	Antalya, Serik	D-3	2,111,705.36	56,553.44
Km 61+500	Antalya, Manavgat	D-6	4,378,853.62	156,734.25
Km 64+160	Antalya, Manavgat	D-7	3,327,945.41	615,670.09
Km 71+800	Antalya, Manavgat	D-10	7,516,026.00	184.77
Km 74+360	Antalya, Manavgat	D-11	1,037,880.08	149,039.49
Km 76+240	Antalya, Manavgat	D-14	371,940.90	160,175.41
Km 78+790	Antalya, Manavgat	D-15	1,261,077.59	223,457.91
Km 86+340	Antalya, Manavgat	D-16	4,869,058.60	1,050,435.77
Km 87+800	Antalya, Manavgat	D-17	2,504,385.12	262,361.54
Km 95+410	Antalya, Manavgat	D-18	1,124,258.46	73,868.29
Km 95+410	Antalya, Manavgat	D-19	1,522,633.16	162,563.18
Km 98+290	Antalya, Manavgat	D-20	711,115.13	41,87.43
Km 100+000	Antalya, Manavgat	D-21	1,648,102.37	2,174.86
Km 107+850	Antalya, Manavgat	D-22	1,222,720.44	301,963.83
Km 110+820	Antalya, Manavgat	D-23	20,093,692.94	584,686.39
Km 113+050	Antalya, Manavgat	D-24	2,552,495.14	205,287.40
Km 123+000	Antalya, Alanya	D-26	5,638,396.17	871,743.65
Km 124+250	Antalya, Alanya	D-27	1,926,864.50	1,297,126.46
Km 127+000	Antalya, Alanya	D-28	3,763,723.90	383,579.61
Km 130+400	Antalya, Alanya	D-29	1,991,642.98	1,625,062.08
Km 132+720	Antalya, Alanya	D-30	3,307,202.05	2,132,211.56

During the demolition phase, various types of hazardous waste, including asbestos-containing materials, may be generated. These wastes pose significant risks to human health and the environment if not properly managed. To address these risks, detailed procedures for the safe handling, transportation, temporary storage, and final disposal of hazardous materials are outlined in the Demolition Management Plan. The plan ensures that all activities comply with applicable safety standards, environmental regulations, and best practice guidelines, thereby minimizing potential hazards and environmental impacts associated with demolition activities.

Hazardous and Special Wastes

Hazardous waste shares the properties of hazardous material (e.g. ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed. Wastes may also be defined as “hazardous” by local regulations or international conventions, based on the origin of the waste and its inclusion on hazardous waste lists, or based on its characteristics (IFC, April 2007). Waste Management Regulation specifies the hazardousness properties (explosive, oxidizing, flammable, irritating, toxic, and carcinogenic, etc.)

of wastes and lists the types of wastes that are to be handled directly as hazardous or after tests to be done if their hazardousness properties and concentrations are confirmed. Additionally, specific regulations are in force for the management of special wastes such as waste tires, medical wastes, waste vegetable oils, waste batteries and accumulators.

During the land preparation and construction phases of the Project, the following hazardous and special wastes are anticipated to be generated due to the associated activities:

- Chemical solutions used in construction and maintenance activities;
- Empty or partially full chemical containers;
- Flammable materials;
- Contaminated soil and absorbent materials;
- Contaminated materials such as used personal protective equipment (PPE), workwear, and other construction-related materials.

The hazardous storage areas will have their own spillage control bund. The areas will be protected against wind and rain, securely fenced and access to this site will be provided only for authorized people. These areas will also be labelled as hazardous storage areas. There should be a secure section to keep personal protection equipment, spill kits (e.g. absorbents), emergency equipment (for firefighting), eyewash and emergency shower and the SDSs for storage hazardous chemicals.

The total quantity of hazardous waste generated on-site though the project is estimated to be approximately 750 tons. These wastes will be carefully managed and stored in designated areas to ensure safe handling, prevent environmental contamination, and comply with all applicable regulations and safety standards throughout the construction of the Project.

Assuming that the average oil capacity of the construction machinery is 20 liters and motor oils of these machineries will be changed 4 times a year, total amount of waste oil to be produced can be estimated as given in Table VI-4.

Table VI-4: Estimated Engine Oil Waste Amounts

Machinery	Piece	Total Engine Oil Capacity (L)	Annual Engine Oil Waste (L)
Excavator	51	1,020	4,080
Grader	5	100	400
Bulldozer	14	280	1,120
Loader	20	400	1,600
Roller	10	200	800
Rock Driller	24	480	1,920
Transmixer	50	1,000	4,000
Compactor	24	480	1,920
Paver	12	240	960
Truck	147	2,940	11,760
Other (Mobile crane, injector, shotcretor, asphalt distributor, pump etc.)	115	2,300	9,200
Total	Total	Total	Total

VI.3 Waste Segregation at Source and Collection within Campsites

Project waste is collected separately at the point of generation. The EPC Contractor and its subcontractors will arrange appropriate containers and bins throughout the Camp, inside the Project construction facilities, and in the working area. Project wastes will be collected according to the types listed in Table VI-6. Suitable waste containers will be provided for each type of waste and clearly labelled according to the content of the containers. EPC will ensure that waste is effectively contained and is protected against wind, rain and vermin. There will be separate storage containers for recyclables (plastics, glass, ferrous metals, metals, and papers/cupboards etc.).

A label will appear on bins and containers stating the type of waste: inert, hazardous waste and non-hazardous waste. Wastes will be collected and transported to the Temporary Storage Area on a daily or more frequent basis, depending on the rate of production and capacity of the waste containers and bins. EPC will define the designated location of the Temporary Waste Storage Area on each Campsite.

There are some situations that are prohibited in the Temporary Storage Area. These are;

- Burning all kinds of waste at construction sites, unless otherwise specified in the contract or instructed by EPC.
- Mixing hazardous waste with non-hazardous waste;
- Throwing hazardous waste out of waste collection containers;
- Discharging hazardous wastes into sewer systems or underground and/or surface waters,
- To treat hazardous materials outside of licensed waste treatment facilities.

VI.4 Temporary Waste Storage Area

During the construction phase, if the waste generating amount reaches 1,000 kilograms or more of hazardous waste per month, a temporary storage permit from the provincial directorate for the areas/containers will be obtained. If any changes are made to the Temporary Waste Storage Areas (TWSAs), the temporary storage permit will be renewed. Excluding medical waste, hazardous waste may be temporarily stored in the temporary storage area for a maximum of 6 months, while non-hazardous waste may be stored for a maximum of 1 year.

TWSAs will have sufficient areas for handling waste containers. The areas will be concrete lined, equipped with separate drainage with spillage control channels and sumps. These areas will also be labelled as hazardous waste storage areas. There should be a security section to keep personal protection equipment, spill kits (e.g. absorbents), emergency equipment (for firefighting), eyewash and emergency shower. Waste segregation will be maintained at all times, separate storage areas/containers will be provided to ensure continued segregation of wastes. For the storage of waste at campsites, the Contractor will construct TWSA of which sketches are given in Figure VI-1 and Figure VI-2 .

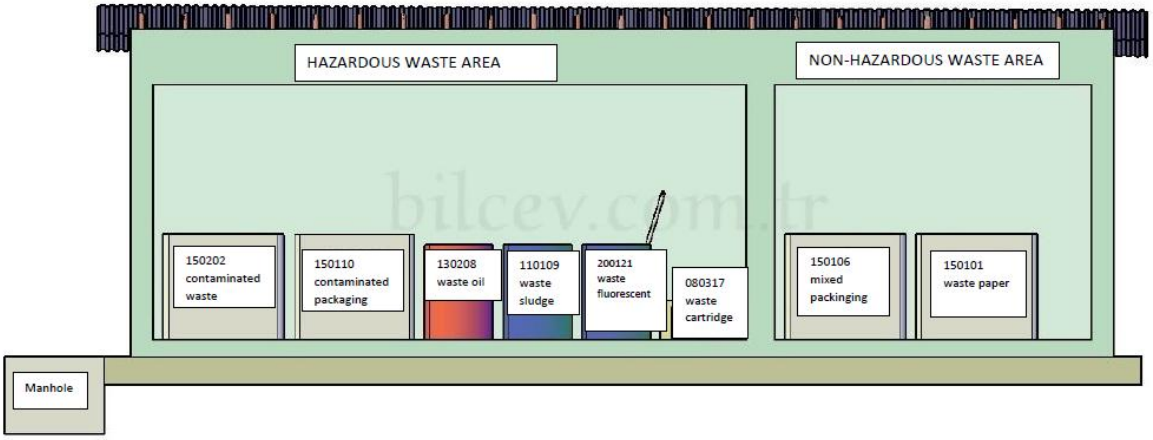

Figure VI-1: Sketch of Temporary Waste Storage Area



Figure VI-2: Sketch of Temporary Waste Storage Area for Hazardous Wastes

AAOİAŞ will ensure that, EPC will create Temporary Waste Storage Areas (TWSA) where the wastes are generated (e.g. close to construction activities). The designated areas for the temporary storage and management of both hazardous and non-hazardous wastes, including all necessary measures to ensure safe handling, segregation, and prevention of environmental contamination, are detailed and provided in the following tables (see Table VI-5**Error! Reference source not found.**).

Table VI-5. Waste Management Areas

Location	Province	District	Nearest Neighbourhood	Description of the Site / Plant
Km 64+400	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3

VI.5 Technical Specifications for Storage

Containers, bins and storage areas will be labelled to show the type of waste as per the defined waste category. Appropriate containers and bins will be provided within the facilities and at the construction site to collect waste according to the types listed in Table VI-6.

Table VI-6. Storage by Type of Waste

Waste	Dangerous	Storage
Contaminated wastes, like chemical containers, oil or chemical cleaning fabrics, used spill kits, paint containers, lamps, batteries, oily cut metal parts	Yes	Container
Domestic wastes from camps and offices	No	Bin, Container
Empty Gas Cylinders	Yes	Container
Used Batteries	Yes	Container
Food Waste	No	Bin, Container
Glass (not polluted vessels, no lamps)	No	Container
Lamps	Yes	Bin, Container
Medical Wastes	Yes	Bin, Locked
Packages, plastic, paper or wood	No	Container, Store Separately
Scrap concrete, sludge sedimentation, runoff water from batching plant	No	Process in the batching plant facilities before collecting
Scrap concrete, sludge sedimentation, untreated runoff water from batching plant	Yes	Tank
Scrap Metal	No	Container, Laid on paved ground, protect from rain
Scrap Paper	No	Container
Scrap Wood	No	Container, Laid on paved ground, protect from rain
Scrap Wood	Yes	Container
Printer Cartridges	No	Bin, Container
Vegetable Waste Oil	No	Tank
Waste oil and grease	Yes	Tank
Worn out equipment (e.g. not contaminated, damaged or no longer used in machineries or equipment)	No	Container, Laid on paved ground
Worn out equipment (e.g. contaminated, damaged or no longer used in machineries or equipment)	Yes	Container, machineries and equipment
Used Tyres	No	Container, Laid on paved ground
Contaminated Soil	Yes	Container, Laid on paved ground in the

Waste	Dangerous	Storage
		Waste Storage Area, protect from rain
Sludge of Wastewater Treatment Plant	Will be analysed and decided accordingly	Will be taken from the wastewater treatment plan with vacuum truck and directly sent to relevant waste disposal area.

VI.6 Examples of containers

Description	Picture
Bins	
Containers	
Tanks for used oil	
Container for used batteries	
Bins for medical wastes including needles and sharp medical waste	

Description	Picture
Container for used gas cylinders	 Requirements: Store separately depending on the gas type. Protect water from spillage. Protect from water. Protect from unwanted access. Protect from ignition sources (heat, sparks, earthing, ATEX electrical equipment for flammable)
Equipment for dangerous liquids	 Vessels containing dangerous liquids should always be stored on containment basins, to avoid spills and leakages.

VI.7 Waste Transportation

The transportation of waste will be carried out according to its type, characteristics and composition, without preventing its further recovery. Environmental pollution and harmful effects on human health caused by the transportation of waste will be tried to be prevented as much as possible. In the case of environmental pollution resulting from the transportation of waste, the waste transporter will ensure the implementation of cleaning activities. Also, waste transportation from construction sites to recycling, treatment and waste management facilities will be according to the frequency of removal. Frequency of removal guarantees; there will be no overflow from the containers; that there will be no unpleasant odors and emissions harmful to human health; that insects, rodents, dogs or other animals that are harmful or dangerous to human health will not reproduce and that the containers and surfaces on which they are located will be cleaned regularly. Waste hauling trucks will be covered / closed properly.

Non-recyclable domestic waste that cannot be reused or recovered will be collected separately and transported to licensed landfill sites in accordance with project standards. There are four landfills in Antalya province which are given in the Table VI-7**Error! Reference source not found.**. Generated solid wastes are collected by the waste trucks of district municipalities, transferred to one of the six solid waste transfer stations, and disposed of at these landfills, which are designed in accordance with the requirements of the Regulation on the Landfill of Wastes. In this context, landfills have proper impermeability layers and the leachate collected at the landfills is treated by means of physical, chemical, and anaerobic processes.

Table VI-7. Landfills and Transfer Stations in Antalya Province for non hazardous wastes

Landfills
Patara Solid Waste Landfill
Manavgat Solid Waste Energy Recovery and Landfill Facility
Alanya Integrated Solid Waste Recycle and Disposal Facility
Kızıllı Integrated Solid Waste Recycle and Landfill Facility
Transfer Stations
Elmalı Transfer Station
Kumluca Transfer Station
Serik Transfer Station
Kemer Transfer Station
Korkuteli Transfer Station
Manavgat Transfer Station

The closest and appropriate landfills, Manavgat Solid Waste Recovery and Landfill Facility and Alanya Integrated Solid Waste Recycle and Disposal Facility, will be used for the management of Project-sourced wastes. Required agreements will be made with the municipalities and the facilities for the transfer, recovery, disposal and landfill services.

On-site and off-site transportation of waste will be conducted so as to prevent or minimize spills, releases, and exposures to employees and the public. All waste containers designated for off-site shipment will be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site.

Agreements will be signed with licensed firms for transport of segregated recyclable and packaging wastes, and licensed disposal facilities will be used for transfer and disposal of hazardous wastes. Where waste is transferred for recovery or disposal, the responsibility of the original waste producer and/or waste holder will remain in force until recovery or disposal of waste is completed. Hazardous wastes will be transported off site when the storage on site reaches maximum storage capacity levels.

VI.8 Third Party Waste Management Services

EPC Contractor will evaluate the availability of local services for recycling and re-use and successfully execute available local recycling and re-use solutions for waste created on the project site. For the treatment of hazardous and non-hazardous waste streams, EPC Contractor will choose a waste management service provider with appropriate licenses and relevant authorizations.

The EPC Contractor will conduct a recorded prior audit of the treatment, storage, and recycling facilities before using third-party waste management services to ensure compliance with the current environmental and social requirements. SPV will receive a copy of the audit report.

EPC Contractor will locate and engage the services of a registered waste management firm to collect and recycle recyclable materials. Recyclable wastes will be collected on a regular basis, at least every two months, from their temporary storage places. Municipal wastes at camps will be collected daily and disposed to licensed disposal facilities.

VI.9 Waste Disposal Management

If waste materials are still generated after the implementation of feasible waste prevention, reduction, reuse, recovery and recycling measures, waste materials will be treated and disposed of and all measures will be taken to avoid potential impacts to human health and the environment.

VI.9.1 Management of Non-Hazardous Waste

Required agreements will be made with the municipalities and the facilities for the transfer, recovery, disposal and landfill services for non-hazardous waste. Municipal landfill that is to be used by EPC will be subject to a documented audit which demonstrates that the quantity and type of wastes brought by the EPC Contractor does not raise an incremental risk for the environment and community which cannot be handled by the present management of the municipal landfill. If the project develops its own landfill, then the following specifications apply. Steps to be followed for the management of non-hazardous wastes:

- Non contaminated inert waste will be removed and can be disposed of in landfill with unused backfill material. Inert waste will be disposed to the dumpsites listed in Table VI-3 with the approval of the relevant institutions.

- Non-hazardous wastes will be sent to municipality landfill, according to the following criteria: (Wastes at camps will be collected daily and disposed to lice the garbage trucks. The protocol related to the garbage trucks should be made with the municipality.)

VI.9.2 Hazardous Waste Management

All the hazardous waste generated from the site will be handled and stored as per *Hazardous Material Management Plan, and the Spill Response Management Plan* and managed through a specialized hazardous waste subcontractor.

Hazardous waste will be securely packed and labelled prior to removal from site to ensure the waste can be transported safely to the approved disposal site without risk to those handling the waste or to the environment. Before leaving the site, all waste containers intended for off-site shipment will be locked. Before transporting the hazardous waste, the waste carrier will obtain a transport certificate for the vehicle that will transport the waste, and the driver of the vehicle will keep this certificate with his/her while transporting the hazardous waste. Spills, releases, and exposures to employees and the general public will be avoided or minimized during on-site and off-site waste transportation. The waste transport will comply with IFC Environmental, Health, and Safety Guidelines. The potential licensed companies have been listed Annex- A.

Contaminated soil generated during construction activities will be managed in accordance with Turkish legislation. In line with the Regulation on Control of Soil Pollution and Sites Contaminated by Point Sources (. 27605, dated 08.06.2010), soils contaminated with hazardous substances are classified as hazardous waste. Such waste must be temporarily stored in suitable conditions to prevent further contamination and subsequently delivered to licensed hazardous waste treatment or disposal facilities authorized by the Ministry of Environment, Urbanization and Climate Change. Documentation, transportation, and final disposal of contaminated soils will be carried out through the MoTAT system (National Waste Transport Form) to ensure traceability and compliance with Turkish regulations.

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VII. MITIGATION MEASURES FOR SOLID WASTE-RELATED RISKS AND IMPACTS

Construction and associated camp operations will generate both hazardous and non-hazardous waste streams, primarily resulting from material used during construction works, earthworks, packaging materials, and the daily activities of on-site personnel. Effective implementation of the Solid Waste Management Plan and associated procedures should be done to minimize the quantity of waste requiring off-site disposal and to ensure environmentally sound management of all waste streams.

Mitigation measures for solid waste management include the following:

- Cooperation should be ensured with licensed local service providers (private licensed waste transportation/recycling/recovery firms), and written agreements or protocols should be established regarding the regular and sound management/disposal of Project-generated wastes.
- The amount of waste to be sent to off-site management should be minimized through the implementation of the Solid Waste Management Plan based on the waste management hierarchy.
- Sites should not be located in dense forest areas with primary ecological functions.
- Proper temporary waste storage areas should be constructed.
- No waste will be burned, illegally dumped or buried on site
- Training should be provided to Project personnel regarding the proper implementation of waste management procedures in line with the requirements of national legislation and good site practices.
- All waste containers should be labeled with waste type, source, volume, and date. Containers should be corrosion-resistant, sealed, and suitable for waste characteristics. Old or conflicting labels must be removed or covered to avoid confusion.
- All waste (hazardous and non-hazardous) should be transported using licensed vehicles and delivered to authorized facilities. Transfer should be documented using Waste Transfer Notes (for non-hazardous waste) and the Mobile Hazardous Waste Tracking System (MoTAT) System (for hazardous waste).
- Annual waste declarations should be submitted by the end of March each year using the Ministry's Environmental Information System. Records of all waste movements and quantities should be retained and submitted in accordance with legal requirements.
- Temporary waste storage areas (for hazardous and non-hazardous areas) should be designed with secure fencing, lockable gates, and appropriate signage, lighting, and pest deterrents. Fire safety equipment and spill containment kits should be provided, and segregated storage zones should be established for incompatible waste types. Inventory logs and emergency response plans should be clearly documented and implemented.
- Agreements will be established with the municipalities and relevant facilities for the transfer, recovery, and disposal of non-hazardous wastes.
- Regular inspections will be conducted to ensure waste segregation, containment integrity, and overall compliance with safety and environmental requirements.
- Transportation frequency will be planned to prevent container overflow, unpleasant odors, vermin/insect attraction, and emissions harmful to human health. Containers and their surrounding areas will be regularly cleaned.
- The closest and most suitable facilities will be primarily used for the Project.
- Inert waste (e.g., uncontaminated soil or excavation material) should be disposed of in dumpsites with institutional approval.

The following are specific measures to be applied for different types of waste:

- The measures taken for solid waste management should ensure the reduction of environmental pollution and the efficient use of natural resources such as energy and raw materials by minimizing the negative effects of solid waste on the environment. Solid waste generated at

construction sites and camps (e.g., packaging, food waste, office waste) should be separated at source and sent to licensed disposal or recycling facilities. Waste types must be matched with suitable treatment and disposal options as per local legislation and site-specific waste categorization.

- Excavated materials should primarily be reused on-site. Remaining excess materials should be managed in accordance with project-specific reuse or disposal plans. Excess material, will be around 10,8 million m^3, should be repurposed where possible, including for landscape restoration or structural fill. Excavated materials should be disposed of at designated storage sites only. The amount of excavated materials to be sent to disposal should be minimized by reusing them as fill material in the construction of road bases, shoulders, side slope arrangements, etc., to the extent the quality and quantity of materials allow.
- Hazardous waste generated from construction and maintenance activities—including chemical containers, contaminated soil, solvents, oils, filters, and fluorescent tubes—should be identified, labeled, stored in compliant containers and temporary storage area, and transferred to licensed facilities in accordance with applicable regulations, such as the Waste Management Regulation (Official Gazette: 02.04.2015 – No. 29314). Management measures should include clear labeling and the use of color-coded containers for each hazardous waste type, provision of spill containment kits and fire prevention systems, establishment of secure fenced storage areas with impermeable flooring, availability of Material Safety Data Sheets (MSDS) on site, regular training of workers on hazardous waste handling, and maintaining hazardous waste liability insurance to ensure safe and compliant management practices.
- Medical waste from clinics and first aid units should be stored in red biohazard bags or color-coded rigid containers labeled with “Biohazard – Medical Waste” symbols. Bags should be double-layered if necessary and stored at ≤+4°C until transfer to authorized medical waste disposal facilities. Collection must occur within 48 hours (or one week if proper storage conditions are ensured). Waste collection and transfer must follow the Regulation on Medical Waste Control.
- Waste Electrical and Electronic Equipment (WEEE) should be stored separately and transferred to authorized recovery facilities. Waste should not be handed over to informal or unlicensed collectors. Compliance with the Regulation on the Management of Waste Electrical and Electronic Equipment (Official Gazette: 22.05.2012 – No. 28296) is mandatory.
- Waste oils generated from equipment maintenance should be collected in leak-proof containers and sent to licensed waste oil recovery/refining facilities in accordance with the Regulation on the Management of Waste Oils (Official Gazette: 21.12.2019 – No. 30985). MSDS must be available on site.
- Waste batteries should be collected in designated boxes and delivered to collection points established by municipalities or licensed distributors in line with the Regulation on the Control of Waste Batteries and Accumulators (Official Gazette: 31.08.2004 – No. 25569).
- End-of-life tires should be collected separately and delivered to authorized recycling facilities in accordance with the Regulation on the Control of End-of-Life Tires (Official Gazette: 25.11.2006 – No. 26357).
- Waste oils from catering activities should be collected in sealed, impermeable containers and stored in closed temporary storage areas before being transferred to licensed recovery or interim storage facilities.
- Sludge from wastewater treatment and concrete batching plants should be analyzed for hazardous characteristics and managed accordingly. Inert wastes (e.g., stone, processed aggregates) should be reused wherever possible and stored to prevent contamination.

The AAOİAŞ will be deemed to be the “owner” of the solid waste that will be created and will be responsible for its management in accordance with the provisions of the Environment Law and its relevant regulations.

The solid waste management measures will be implemented throughout the construction phase. The on-site specification, implementation, and supervision of these measures will follow by the responsible parties, as indicated the related part of this Play. The Project will also be required to comply with national legal requirements relating to solid waste management.

VIII. TRAINING

Upon hiring, all staff will receive structured training addressing sources of waste management hierarchy, measures of waste generation reduction,, environmental and health risks associated with improper waste handling and storage, and the corresponding mitigation strategies applicable to their responsibilities within the Project (e.g., waste segregation at source, proper use of labeled containers, safe storage practices). In addition, personnel assigned to waste management activities will be provided with specialized training to ensure the accurate, safe, and compliant execution of their duties in accordance with the Solid Waste Management Plan and relevant legal requirements.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of solid waste management mitigation measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, waste generation trends, stakeholder concerns, or changes in applicable environmental regulations.

Monitoring activities will be coordinated by the E&S Manager, in close collaboration with the Management teams. Key responsibilities will include reviewing the type and quantity of waste generated and disposed (e.g., municipal, packaging, waste oil), verifying the implementation of waste segregation at source, inspecting the condition and use of temporary waste storage areas, and ensuring the consistent application of solid waste management measures, including compliance with general housekeeping and containment practices.

Regular inspections will be conducted across all campsites to evaluate compliance with national solid waste regulations and Project-specific waste management requirements. This will include the review of waste records, control of agreements with licensed waste contractors, inspections of labeled containers and containment structures, and verification of source separation and waste handling practices.

The performance of contractors and subcontractors in implementing solid waste management requirements will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and to ensure recurrence is prevented.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, including the Ministry of Environment, Urbanization and Climate Change, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of monitoring data, on-site waste handling practices, and documentation of compliance.

Monitoring efforts will be guided by the framework provided in Table IX-1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of inspections, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of solid waste mitigation measures and ensuring full compliance with national regulations and Project standards.

Table IX-1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Type and amount of wastes produced/disposed of (e.g., municipal, packaging, waste oil)	Camp sites, road construction sites, quarries	Site audit, document review	Monthly	AAOİAŞ, EPC EnvironmentalExperts
Validity and completeness of waste management/disposal agreements with licensed companies	Camp sites, road construction sites, quarries	document review	Before every waste transfer	AAOİAŞ, EPC EnvironmentalExperts
Review and implementation consistency of Waste Management Plans	Camp sites, road construction sites, quarries	Site audit, document review	Yearly	AAOİAŞ, EPCEnvironmental Experts
Inspection and condition of Temporary Waste Storage Areas	Camp sites, road construction sites, quarries	Site audit, document review	Monthly	AAOİAŞ, EPC Environmental Experts
Site practices on waste management (e.g., source separation, labeling, containers, containment, housekeeping)	All active construction and camp areas	Visual inspection	Daily	AAOİAŞ, EPCEnvironmental Experts

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and relevant subcontractors.

All solid waste-related findings, including violations of handling protocols, non-compliance, incidents, or complaints received from surrounding communities, will be documented in accordance with national environmental regulations and Project plans. In the event of serious violations—such as illegal disposal or mismanagement of hazardous waste—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X-1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Number of trainings conducted under the Waste Management Plan	All relevant personnel trained regularly	first acceptance of the Site and at least yearly	AAOİAŞ E&S Engineer EPC E&S Engineer
Number of non-conformities and spill/accident records	Less than five	Monthly	AAOİAŞ,
Number of complaints received related to waste management	Less than five	Quarterly	AAOİAŞ,
Compliance with Solid Waste Management Plan (recording waste types, quantities, classification, storage area management, license verification)	Full compliance with waste classification and licensed firm engagement	Quarterly	AAOİAŞ,

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Percentage of key environmental monitoring activities completed under the program	100%	Quarterly	AAOİAŞ,
Trend of hazardous and non-hazardous waste generation	Reduce hazardous waste per working hour by 2%	Semi-year	AAOİAŞ,
Percentage of reused, recycled, or recovered waste	70%	Monthly	AAOİAŞ,
Percentage of environmental audits completed and corrective actions closed	100%	Monthly	AAOİAŞ,
Obtaining a waste storage permit	100%	Quarterly	AAOİAŞ, EPC
Obtaining waste management plan approval	100%	Yearly	AAOİAŞ, EPC

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established plans and procedures. Relevant records that will be reviewed during solid waste management audits may include the external grievance and suggestion tracking database related to waste management issues, the internal grievance and suggestion tracking database concerning solid waste handling and site practices, solid waste management training records, waste inventory logs, contractor waste transfer documentation, and non-conformity records related to solid waste segregation, storage, or disposal. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary.

XII. REPORTING

Regular reporting will be conducted to ensure the effective implementation and continuous improvement of solid waste management activities throughout the construction phase of the Project. Reporting will be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions will be identified, and the required updates will be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections will be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Quarterly Environmental and Social Monitoring Report will cover at least, but not limited to, the following items. The report will be prepared by the SPV with input data provided by EPC to evaluate the Project performance and compliance of the related plans.

- Incident reporting;
- Emergency response reporting;
- Records of annual emergency response training exercises;
- KPIs and performance trends (see Table XII-1) ;
- Current situation Key Monitoring Activities (see Table XII-2)
- Relevant training activities completed and attendance registers to be maintained;

- Legal Authorities Audit reports;
- Site Inspection logs

In addition, the following external reporting will be done:

- All environmental and social incidents will be appropriately documented, notified and reported in accordance with established procedures the terms and conditions by EPC to SPV,
- Incident notification and reporting to relevant Turkish regulatory bodies will be performed in line with applicable legislation in force and as stipulated in permits and licenses.
- The Lenders will be notified of incidents pursuant to the terms and conditions agreed upon in the Finance Agreements through SPV.

All personnel are encouraged to raise concerns, suggestions, or complaints related to this Plan through the established grievance mechanism by completing the grievance form. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

ANNEX-A: Licensed Waste Management Facilities Located in Antalya

No	ID No	Name	Adres
1	289358100	ITC-KA ENERJİ ÜRETİM SAN. VE TİC. A.Ş. - ALANYA ŞUBESİ	TÜRKLER Mahallesi, KÖLEHASANLI CADDE, No: 45 -, ALANYA, ANTALYA, Türkiye
2	257927338	SIR PLASTİK SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Yeşilkaraman Mahallesi, 16003 Sokak, No: 40, Aksu / ANTALYA
3	284796758	DURO PLASTİK SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Yeşilkaraman Mahallesi, 16003 Sokak, No: 40 B, Aksu / ANTALYA
4	232445796	ADAM PLAST TARIM LİMİTED ŞİRKETİ	AOSB 1. Kısım Mahallesi, 10. Cadde, No:3 Döşemealtı/ANTALYA
5	1701881232	TEMİZ ÇEVRE ATIK VE ENERJİ SİSTEMLERİ SANAYİ VE TİCARET ANONİM ŞİRKETİ ANTALYA ŞUBESİ	EMİNCELER MAHALLESİ, EMİNCELER SOKAK, ASAT SİTESİ ASAT BLOK NO:176, SERİK, ANTALYA
6	252444034	TUNA GERİ DÖNÜŞÜM PLASTİK AMBALAJ ATIK NAKLİYE SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Kömürcüler Mahallesi, 2900 Sokak, No:5-7 ve 2901 Sokak No:8-, Döşemealtı/ANTALYA
7	231586612	SER-MA SERA MALZEMELERİ TİCARET VE SANAYİ LTD.ŞTİ.	Şafak Mahallesi, 5005 Sokak, No: 49-, Kepez/ANTALYA
8	232752876	ORCAN GERİ DÖNÜŞÜM PLASTİK KAUÇUK ELEKTRİK SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Kömürcüler Mah. 2861 Sokak No:4/1, Döşemealtı/ANTALYA
9	280853152	KALIRLAR PLASTİK NAK İNŞ.İML.GE.DÖ.SAN. VE TİC.LTD.ŞTİ.	Kömürcüler Mahallesi, 2876 Sok. No:1 ve 2878 Sok. No:8, Döşemealtı/ANTALYA
10	261393576	ERİNCİ PLASTİK SERA TARIM YAŞ MEYVE SEBZE GIDA İNŞAAT VE YAPI MALZEMELERİ TAŞIMACILIK TURİZM SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Antalya Organize Sanayi Bölgesi 2.Kısım Mahallesi 24.Cadde No:17 Döşemealtı/ANTALYA

No	ID No	Name	Adres
11	226627500	ANTALYA AKYILDIZ HURDA PLASTİK İMALAT NAKLİYE TURİZM SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Yeşil Antalya Sanayi Sitesi 3189 Sokak No:13-66 Kepez/ANTALYA
12	231388982	EKER TARIM ÜRÜNLERİ TURİZM İNŞAAT PAZARLAMA TİCARET VE SANAYİ LİMİTED ŞİRKETİ	Turunçova Mahallesi, Hal Cadde, No: 22 A-, Finike/ANTALYA
13	292658114	GÜLŞEN ZOR	Kürüş Mahallesi, Kürüş 6 Sokak, No: 11 -, Serik, ANTALYA
14	225372146	KIZILCA PLASTİK SANAYİ İNŞAAT TARIM TURİZM VE TİCARET ANONİM ŞİRKETİ FİNİKE ŞUBESİ	İskele Mahallesi, Ova Mevkii, 430 Sokak, No:17 A-1 Finike/ANTALYA
15	1005501686	ŞAKİ GERİ DÖNÜŞÜM TİCARET VE SANAYİ LİMİTED ŞİRKETİ	Gaziler Mahallesi 247 Sokak No: 3 A Kepez / ANTALYA
16	950651628	SENGIL SANAYİ TİCARET İNŞAAT VE TURİZM LTD. ŞTİ. ORGANİZE SANAYİ FABRİKA ŞUBESİ	Antalya Organize Sanayi Bölgesi, 3. Kısım Mahallesi, 29. Cadde, No:5 Döşemealtı/ANTALYA
17	231741648	SBC GERİ DÖNÜŞÜM SANAYİ VE TİCARET ANONİM ŞİRKETİ	Kömürcüler Mahallesi, 2878 Sokak, No:6. Döşemealtı/ANTALYA
18	810401682	OKTAYLAR MÜHENDİSLİK ALÜMİNYUM DÖKÜM SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Kömürcüler Mahallesi, 2868 Sokak, No: 12 -, Döşemealtı/ANTALYA
19	1140461670	MÜDÜROĞLU GERİ DÖNÜŞÜM TAŞIMACILIK TURİZM TİCARET VE SANAYİ LİMİTED ŞİRKETİ	Altınova Orta Mah. Altınova Blv. 88 Kepez/ ANTALYA
20	226463452	HAMBURGER RECYCLING TURKEY ATIK YÖNETİMİ A.Ş.- ANTALYA ŞUBESİ	Altıayak Mahallesi 8408 Sokak No:22. Kepez/ANTALYA
21	232479018	NN METALÜRJİ ANONİM ŞİRKETİ	AOSB1.Kısım Mahallesi. Antalya Bulvarı. No:23. Döşemealtı/ANTALYA

No	ID No	Name	Adres
22	231926384	07 GERİ DÖNÜŞÜM NAKLİYAT İNŞAAT SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Şafak Mahallesi, 5015 Sokak, No: 19-, Kepez/ANTALYA
23	230801576	YAMAN CAM SANAYİ VE TARIM ÜRÜNLERİ TİC. LTD. ŞTİ. ORGANİZE SANAYİ ŞUBESİ	AOSB 1.Kısım Mahallesi, 2. Cadde, No: 34 Döşemealtı / ANTALYA
24	228715522	KÖRÜCÜMEHMET CEMAL	Karşıyaka Mahallesi, Barbaros Cad., No: 10 B-1, Kumluca/ ANTALYA
25	233234232	ALTUNDAŞ PLASTİK GERİ DÖNÜŞÜM SİSTEMLERİ NAKLİYAT İNŞAAT VE İNŞAAT MALZEMELERİ TARIM EMLAK TURİZM SANAYİ İTHALAT İHRACAT VE TİCARET LİMİTED ŞİRKETİ	Antalya Organize Sanayi Bölgesi 3.Kısım Mahallesi 37.Cadde No:11 Döşemealtı/ANTALYA
26	280146090	PİRSAN ENERJİ SANAYİ VE TİCARET LİMİTED ŞİRKETİ	UZUNOLUK MAHALLESİ, MEHMET AKİF ERSOY BULVAR, NO: 137 -, KORKUTELİ / ANTALYA
27	305446990	TEMPO KLİPS PLASTİK SANAYİ VE TİCARET LİMİTED ŞİRKETİ	AOSB 3.Kısım Mahallesi, 25 CADDE, No: 32 Döşemealtı/ ANTALYA
28	304542716	FİKRET ÖZCAN	Altınova Sinan Mahallesi Hanımeli Sokak No: 240 Kepez/ANTALYA
29	304207152	BETAR PLASTİK SANAYİ TİCARET LİMİTED ŞİRKETİ	Kömürcüler Mahallesi, 2862 Sokak, No: 6-1, Döşemealtı/ANTALYA
30	232031382	ÇIĞLI-MER ME.HU.PL.T.G.D.S.İ.VE İ.M.T.T.S.İ.İ.VE TİC.LTD.ŞTİ	Kepez Mahallesi 5066 Sokak No:8 Kepez/ANTALYA
31	304010840	TOROS ATIK YÖNETİMİ GERİ DÖNÜŞÜM PLASTİK TİCARET ANONİM ŞİRKETİ	Kömürcüler Mah. 2901 Sokak SS Yeni Hurdacılar Koop. Sitesi No:6 Döşemealtı / ANTALYA
32	274926336	TORUNOĞLU PLASTİK SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Gaziler Mahallesi, 252 SOKAK, No: 2 F Kepez/ANTALYA

No	ID No	Name	Adres
33	232481954	U2 OTELCİLİK TURİZM VE TİCARET LİMİTED ŞİRKETİ	Yeşilova Mahallesi, 1679 Sokak, No: 20 B-Muratpaşa/ANTALYA
34	299524854	ARİA ÇEVRE GERİ DÖNÜŞÜM OTELCİLİK TİCARET ANONİM ŞİRKETİ	Altıayak Mahallesi, Recep Gürbüz Caddesi, No:5 Kepez/ANTALYA
35	305628262	KAPET GERİ DÖNÜŞÜM TURİZM İNŞAAT SANAYİ TİCARET LİMİTED ŞİRKETİ	Zeytinlik Mahallesi, 7641 Sokak, No: 22 Kepez/ANTALYA
36	250072286	ERGÜL ÇIĞLI	Kepez Mahallesi, 5070 SOKAK, No: 9 Kepez/ANTALYA
37	294003716	YILDIZ GERİ DÖNÜŞÜM PLASTİK TİCARET SANAYİ LİMİTED ŞİRKETİ	Sanayi Mahallesi, 2060 Sokak, No: 12 -, Manavgat / ANTALYA
38	229750432	ECİRLİLER METAL HURDACILIK VE PLASTİK İNŞ. NAK. TUR. İTH. İHR. SAN. TİC. LTD. ŞTİ. KEPEZ ŞUBESİ	Kepez Mahallesi, 5062 Sokak, No:17, Kepez/ANTALYA
39	230262926	ALFYHAA PLASTİK AMBALAJ SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Antalya Organize Sanayi Bölgesi, 2. Kısım, 25. Cadde, No:9 Döşemealtı/ANTALYA
40	228742218	KEMALETTİN ÇİTGEZ	ANTALYA,SANAYİ Mahallesi, 2071 SOKAK, No: 7-Z01, MANAVGAT,Türkiye
41	260936758	F2 GERİ DÖNÜŞÜM SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Altınova Sinan Mahallesi, Hanımeli Sokak, No: 90/1 Kepez/ANTALYA
42	284790550	İSMAİL SARI	Menderes Mahallesi, Uzun Sokak, No: 5, Kepez / ANTALYA
43	224256270	ÇAĞLAYAN SERA PLASTİK YATIRIM MALZEMELERİ.SANAYİ VE TİCARET VE TİCARET LİMİTED ŞİRKETİ ORGANİZE SANAYİ ŞUBESİ	Antalya Organize Sanayi Bölgesi 1. Kısım Mahallesi, 1. Cadde No: 5 Döşemealtı/ANTALYA
44	285942392	MEHMET AĞYURT MM GERİ KAZANIM TİCARETİ	Ayanoğlu Mahallesi 1900 Sokak No:24 Kepez/ANTALYA

No	ID No	Name	Adres
45	223699506	SERTKAYA İNŞAAT TURİZM MAD.YAY.MAT.SAN.TİC.LTD.ŞTİ.	Bereket Mahallesi, Merkez Sokak, No:206 /1 Manavgat/ANTALYA
46	223342646	ANTALYA AKYILDIZ HURDA PLASTİK İML.SAN.TİC.LTD.ŞTİ. ORGANİZE SANAYİ ŞUBESİ	Antalya Organize Sanayi Bölgesi 3. Kısım Mah. 37. Cadde No:15 Döşemealtı/ANTALYA
47	227471946	EKODEN ENERJİ SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Kömürcüler Mah. 2869 Sok. SSKuzeyAkdeniz Sit No:17 Döşemealtı-ANTALYA
48	260793568	ANTALYA ERDOĞANLAR GERİ DÖNÜŞÜM HURDACILIK OTOMOTİV İTHALAT VE İHRACAT LİMİTED ŞİRKETİ	Kömürcüler Mahallesi, 2872 Sokak, NO: 5-, Döşemealtı / ANTALYA
49	226522032	TURKUAZ ATIK YÖNETİMİ YAKIT VE ENERJİ ANONİM ŞİRKETİ MANAVGAT SALUR ŞUBESİ	Salur Mahallesi, Güğükısalar Sokak, No:5-, Yalamuklu, Manavgat / ANTALYA
50	231598828	SERAPSU PLASTİK İMALAT İNŞAAT EMLAK SANAYİ VE TİCARET LİMİTED ŞİRKETİ	Emişbeleni Mahallesi, Kesmekoyak Çıkmaz Sokak, No: 32 Alanya/ANTALYA
51	229235722	KEMALETTİN ÇİTGEZ BİRİNCİ ŞUBESİ	Sanayi Mahallesi, 2060 Sokak, No:4-Z01 Manavgat/ANTALYA
52	227005646	BÜLBÜL PLASTİK GERİDÖN.TEK.SAN.İNŞ.G.N.T.LTD.ŞTİ.	Organize Sanayi Bölgesi 1.Kısım Mah. 8.Cad. No:5. Döşemealtı/ANTALYA
53	267940110	MİSTALYA ARITMA TESİSLERİ MATBACILIK YAYINCILIK ENERJİ ÜRETİM REKLAM İNŞAAT TAŞIMACILIK OTO KİRALAMA SANAYİ VE TİCARET LİMİTED ŞİRKETİ - KORKUTELİ ŞUBESİ	İmecik Mahallesi, 30000 Sokak No:259, Korkuteli / ANTALYA
54	281565984	KÖPÜKCÜM GERİ DÖNÜŞÜM NAKLİYAT OTOMOTİV TİCARET LİMİTED ŞİRKETİ	Zeytinlik Mahallesi, Atatürk Cadde, NO:138 Kepez/ANTALYA
55	226383464	ÖZEN CAM GERİ DÖNÜŞÜM KAZANIM VE İNŞ.SAN. LTD. ŞTİ. MANAVGAT ŞUBESİ	Sanayi Mahallesi, 2063 Sokak, No: 20-, Manavgat / ANTALYA

No	ID No	Name	Adres
56	222924540	SÜREKO ATIK YÖNETİMİ NAKLİYE LOJİSTİK ELEKTRİK ÜRETİM ANONİM ŞİRKETİ KULA ŞUBESİ	SANDAL Mahallesi, Atatürk Cadde, No: 283 -, Kula, MANİSA

ENVIRONMENTAL ACCIDENT and SPILL RESPONSE MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision as per comments
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

ENVIRONMENTAL ACCIDENT and SPILL RESPONSE MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ER	Employee Relations
ERT	Emergency Response Team
ESHS	Environmental, Social, Health And Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
IFC	International Finance Corporation
ISO	International Organization for Standardization
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
MSDS	Material Safety Data Sheet
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
RCA	Root Cause Analysis
SEP	Stakeholder Engagement Plan
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
SRP	Spill Response Personnel
WHO	World Health Organization

I. INTRODUCTION

Ministry of Transport and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), through the General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has initiated a tender process for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The Project is designed to connect the district Serik and Alanya via the Manavgat district of Antalya province will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Environmental Accident And Spill Response Management Plan ("SRMP" or "The Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards referred to in the relevant legislation section. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project begins at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange.

As of April 2025, the current Project design includes a total of 117.8 kilometers of roadway, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor
[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

The map illustrating the construction components and road route within the scope of the Project's construction activities is provided in Figure I-1.

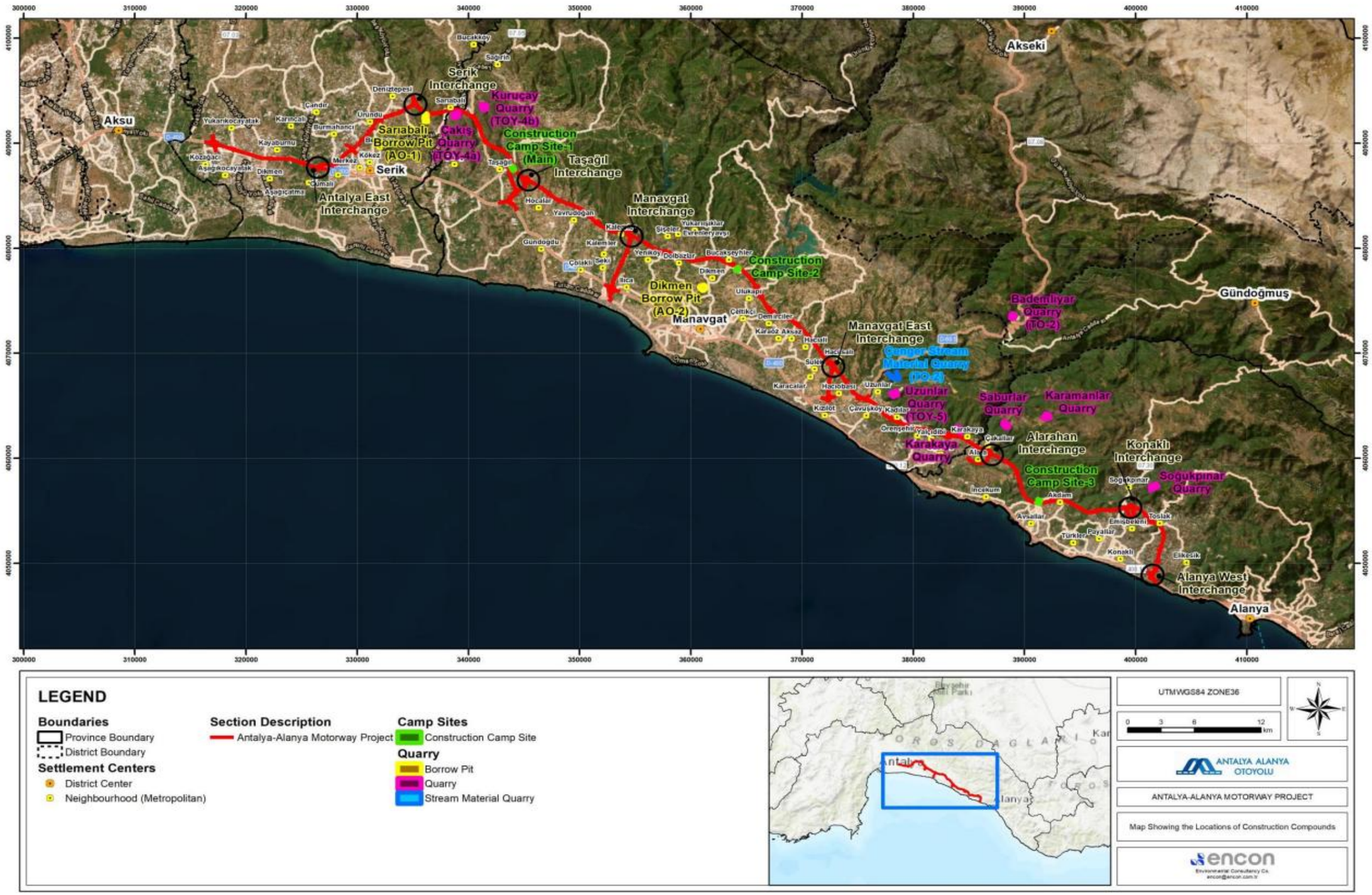

Figure I-1. Map Showing the Locations of Construction Compounds

II. PURPOSE AND SCOPE

This Environmental Accident and Spill Response Management Plan ("the Plan") has been prepared for the Antalya–Alanya Motorway Project ("the Project").

The purpose of this Plan is to define response strategies and mitigation measures for managing environmental accidents, spillages of hazardous and non-hazardous substances, and unexpected pollution events that may occur during the construction phase. This includes fuel, oil, chemicals, or process-related spills that could adversely impact human health or the environment.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The Plan has been developed in alignment with applicable national environmental legislation and international standards, including those of international financial institutions. It provides a framework that should be followed to ensure spill preparedness, timely intervention, and proper containment and cleanup procedures.

This Plan should be implemented by all construction-phase parties, including the Project Sponsor (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. – AAOİAŞ), the Main Contractor (Limak), and all subcontractors. Responsibilities related to implementation, training, monitoring, and reporting should be clearly defined and communicated across all relevant levels. In case of changes in project design, materials used, or construction methodology, this Plan should be reviewed and updated accordingly.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been structured to align with applicable national legislation and relevant international standards and frameworks that govern environmental accident preparedness, hazardous material handling, and spill response during construction activities. Accordingly, the following legislative and institutional references should guide the implementation, compliance, and performance monitoring procedures throughout the construction phase of the Project.

III.1 National Requirements

The following Turkish laws and regulations provide the legal foundation for managing environmental accidents, hazardous material spills, and associated risks during the construction phase of the Project:

- Environmental Law (Law No. 2872),
- Regulation on Environmental Impact Assessment,
- Regulation on Environmental Permits and Licenses,
- Regulation on the Control of Soil Pollution and Sites Contaminated by Point Sources,
- Regulation on the Control of Pollution Caused by Hazardous Substances in Water and its Environment,
- Regulation on the Control of Water Pollution,
- Regulation on Test Methods for Determining the Physicochemical, Toxicological and Eco toxicological Properties of Substances and Mixtures,
- Regulation on Classification, Labelling and Packaging of Substances and Mixtures,
- Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals,
- Regulation on Persistent Organic Pollutants,

- Regulation on Prevention and Mitigation of Major Industrial Accidents,
- Waste Management Regulation,
- Regulation on Control of Packaging Waste,
- Regulation on the Control of Waste Electrical and Electronic Equipment,
- Regulation on General Principles of Waste Pre-Treatment and Recovery Facilities,
- Regulation on the Control of Waste Batteries and Accumulators,
- Waste Oil Management Regulation,
- Regulation on the Landfilling of Waste,
- Regulation on Incineration of Waste,
- Regulation on the Control of Waste Vegetable Oils,
- Regulation on the Control of Excavation Soil, Construction and Demolition Waste,
- Regulation on the Control of End-of-Life Vehicles,
- Regulation on the Control of End-of-Life Tires,
- Regulation on the Control of Polychlorinated Biphenyls and Polychlorinated Terphenyls,
- Regulation on the Control of Medical Waste,
- Zero Waste Regulation.

III.2 International Standards and Conventions

The following international standards and procedures are applicable to the Project to ensure alignment with national legislation and recognize good industry practices.

AIIB is a multilateral development bank established to promote sustainable economic growth and improve infrastructure connectivity. According to the Articles of Agreement, AIIB aims to invest in infrastructure and productive sectors while fostering regional cooperation through partnerships with other development institutions. To ensure responsible operations, AIIB adheres to policies that address environmental and social impacts, outlined in its Environmental and Social Framework (ESF). The ESF, updated in June 2024, and reflects AIIB's commitment to international standards and sustainable development practices.

Also, the following international standards and reference frameworks should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- ISO 14001: Environmental Management Systems – Requirements with Guidance for Use
- ISO 45001: Occupational Health and Safety Management Systems
- EU Seveso III Directive (2012/18/EU) on the Control of Major Accident Hazards
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
- Stockholm Convention on Persistent Organic Pollutants
- European Agreement Concerning the International Carriage of Dangerous Goods by Road

These references should be utilized to ensure that environmental accident and spill response procedures are implemented in a manner consistent with international expectations and that the Project remains aligned with both domestic regulatory obligations and global environmental performance standards.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Environmental Accident and Spill Response Management Plan:

- Solid Waste Management Plan,
- Water, Wastewater, and Storm Water Management Plan,
- Hazardous Materials Management Plan,
- Occupational Health and Safety Management Plan,
- Construction Camp Site Management Plan,
- Community Health, Safety, and Security Management Plan,
- Traffic Management Plan,
- Environmental and Social Management and Monitoring Plan (ESMMP),
- Emergency Preparedness and Response Plan (EPRP),
- Excavated Material Management,
- Soil Management and Erosion Control Plan,
- Stakeholder Engagement Plan,
- Blasting Management Plan,
- Demolition Management Plan,
- Quarry Management Plan.

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

V. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV):

- Hold overall responsibility and accountability for the project, ensuring construction activities comply with national and international spill management standards.
- Ensure full compliance with the SRMP and related regulations.
- Approve procedures for spill prevention, handling, containment, and cleanup.
- Allocate necessary resources, including trained personnel and equipment, for effective spill response.
- Ensure professional oversight, corrective actions, and monitoring are implemented following spill incidents.

- Ensure all line managers, contractors, and subcontractors understand and fulfil their responsibilities regarding spill management throughout construction activities.

E&S Manager (SPV)

- Prepare, review, update, and implement the SRMP and related E&S plans in accordance with laws, company policies, and international standards.
- Coordinate with EPC, subcontractors, and internal teams; provide technical guidance for spill prevention, containment, and response.
- Monitor compliance, site practices, and record-keeping related to spills, incidents, and corrective actions.
- Ensure delivery and validation of spill management training for all relevant personnel.
- Investigate spill incidents, implement corrective and preventive measures, and oversee emergency response procedures.
- Prepare reports and maintain documentation for audits, regulatory compliance, and incident follow-up.
- Support community engagement and grievance resolution related to spill events, and coordinate with authorities and permit processes.

H&S Manager (SPV)

- Prepare, review, and implement Health, Safety, Community, and Spill Management Plans in line with company policies, regulations, standards, and lender requirements.
- Ensure EPC and subcontractors comply with spill prevention, containment, and response procedures, including site boundaries and method statements.
- Provide technical guidance for safe spill handling and integrate spill controls into daily operations.
- Monitor compliance through inspections, audits, and hazard walkthroughs, focusing on spill risks and storage areas.
- Track spill and safety performance, investigate incidents, determine root causes, and implement corrective actions.
- Support spill management and H&S training, maintain records, and report performance to management and stakeholders.
- Engage with regulatory authorities and ensure timely resolution of spill-related public health and environmental concerns.

Deputy E&S Manager (SPV)

- Lead spill/hazardous material management, ensuring compliance with project requirements, standards, and regulations.
- Review and monitor subcontractors' ESHS and spill/hazardous material procedures.
- Oversee implementation of spill prevention, containment, and response measures by EPC and subcontractors.
- Track incidents, corrective actions, and reporting; ensure proper record-keeping and training.
- Support community engagement, grievance management, and monitoring programs related to spills and hazardous materials.

Social Chief (SPV)

- Ensure EPC and subcontractor adherence to spill response protocols and community protection measures.
- Review and validate reports to ensure compliance with regulatory requirements and spill management standards.
- Deliver training and guidance on community engagement, grievance resolution, and spill incident awareness.
- Liaise with the E&S Deputy Manager and construction teams to address community concerns arising from spill events and ensure effective mitigation.

HSE Specialist (SPV)

- Support implementation of health, safety, environmental, and spill response procedures to ensure safe site operations.
- Conduct routine site inspections, hazard assessments, and audits, with emphasis on spill risks and containment measures.
- Monitor contractor compliance and integrate spill response protocols into daily work procedures.
- Maintain accurate records of spill incidents, permits, inspections, and training activities.
- Participate in spill investigations and ensure lessons learned are applied to prevent recurrence.
- Support and review spill response training for all site personnel.
- Ensure proper placement and maintenance of spill control equipment, barriers, and containment areas.
- Assist in addressing and resolving spill-related complaints and environmental concerns.

Project Director (EPC)

- Define and oversee EPC execution strategy and project management plans (HSE, E&S, QA/QC) with integrated spill response measures.
- Lead teams and coordinate EPC functions, ensuring compliance with site procedures, standards, and regulations for spill prevention and response.
- Approve and monitor site inspections, safety reviews, and training programs, including spill response readiness.
- Track KPIs, timelines, budgets, and implement corrective actions for non-compliance, including spill incidents.
- Serve as EPC representative to SPV, clients, stakeholders, and authorities; address safety, environmental, social, and spill-related concerns.
- Oversee risk management, quality systems, and mitigation strategies covering technical, HSE, social, and spill response aspects.
- Supervise subcontractors and ensure proper execution of construction phases with adherence to spill prevention, control, and response measures.

E&S Manager (EPC)

- Prepare, review, and implement Environmental, Social, and Spill Response Management Plans in accordance with policies, standards, and lender requirements.
- Coordinate with SPV, contractors, and construction teams to ensure compliance with spill prevention, control, and response procedures.

- Monitor and enforce contractor/subcontractor adherence to environmental, safety, and spill management requirements.
- Maintain site boundaries, traffic management, utility protection, and community safety measures related to spill risks.
- Oversee E&S and spill response training, onboarding, toolbox talks, and awareness programs for all personnel.
- Supervise E&S staff, monitor performance, lead investigations, and implement corrective actions for spill incidents.
- Manage grievances, emergency preparedness, and ensure integration of social inclusion principles in spill response planning.
- Report environmental, social, and spill response performance to the Project Director and promote continuous improvement.

H&S Manager (EPC)

- Develop, implement, and update Health & Safety and Spill Response Management Plans.
- Ensure EPC and subcontractors comply with safety and spill prevention, control, and response procedures.
- Manage risk assessments, site safety controls, traffic, utilities, and community protection related to spill hazards.
- Lead inspections, audits, incident investigations, and corrective actions for spill events and safety issues.
- Oversee training, toolbox talks, and emergency drills focused on health, safety, and spill response.
- Report performance, risks, and lessons learned to the Project Director and promote a proactive safety and spill management culture.

Warehouse Supervisor (EPC)

- Maintain accurate records of all hazardous materials and track their location to prevent accidental releases.
- Ensure safe storage with proper labelling, containment, and secondary protection to minimize spill risks.
- Conduct regular inspections of tanks, drums, and containers for leaks, damage, or corrosion.
- Immediately report and manage damaged, expired, or leaking materials, coordinating safe containment and disposal.
- Keep spill response equipment (spill kits, absorbents, fire extinguishers) accessible in storage areas.
- Coordinate with the E&S Manager and HSE team during spill-related inspections, audits, and incident investigations.
- Support training and awareness programs for staff on spill prevention, response, and safe handling of hazardous substances.

Maintenance Team / Equipment Operators (EPC)

- Conduct regular inspections of machinery and equipment to identify and prevent leaks or accidental releases.
- Collect and temporarily store oil, lubricants, and other hazardous residues following approved containment procedures.

- Ensure used oil and residues are transported to authorized recycling or disposal facilities, avoiding contamination or mixing with other substances.
- Keep spill kits and containment materials accessible during maintenance activities.
- Immediately report any spills or leak incidents to the E&S Manager and HSE team for rapid response.
- Participate in spill prevention and response training to ensure safe handling of hazardous substances.

Emergency Response Coordinator (EPC)

- Respond to major spills beyond the capacity of on-site personnel.
- Contain, control, and clean up spills according to emergency response procedures.
- Follow pre-defined safety protocols to protect personnel, community, and environment.

Emergency Response Team (EPC)

- Confirm the use of appropriate PPE.
- Identify the source of the spill.
- Assess if the spill is ongoing.
- Contain the spill using materials from spill kits (booms, bunds, absorbents).
- Recover spilled substances, contaminated soil, and absorbents into suitable containers.
- Clean up the spill while preventing environmental spread.

Environmental Engineer (SPV and EPC)

- Oversee the implementation and monitoring of spill response procedures across all site operations, including subcontractor activities.
- Conduct regular inspections, audits, and risk assessments to ensure proper containment, handling, and environmentally compliant disposal of spilled materials.
- Maintain comprehensive records and support the investigation, reporting, and corrective action of spill incidents.
- Develop and deliver training, toolbox talks, and awareness programs on spill prevention, response protocols, and environmental protection measures.
- Coordinate with H&S, E&S, contractors, and regulatory authorities to integrate spill management into operational plans and emergency preparedness.
- Ensure compliance with all relevant environmental permits, standards, and regulatory requirements related to spill prevention and response.

Community Liaison Officer (CLO) (SPV and EPC)

- Communicate potential spill risks and mitigation measures to local communities.
- Organize meetings and engagement forums to inform and receive feedback on spill incidents.
- Manage grievances related to spills through the Grievance Mechanism (GM).
- Assess spill impacts on vulnerable groups and propose tailored mitigation measures.
- Support monitoring, reporting, and documentation of spill incidents and contractor compliance.
- Maintain confidentiality and ensure proper handling of sensitive spill-related information.

All Personnel/ Spill Observer (including Contractor/Subcontractor Personnel)

- Follow the Spill Response Management Plan and related procedures during all site activities.
- Report any spills or potential spill risks immediately to the CLO and E&S Manager.

- Participate in spill response and safety training programs.
- Ensure safe handling, storage, and use of materials to prevent spills.
- Take responsibility for implementing spill prevention and response measures to maintain a safe working environment.

VI. ENVIRONMENTAL ACCIDENT AND SPILL MANAGEMENT APPROACH

VI.1 Work Sites, Location and Hazardous Materials On-Site

Environmental accidents and unintentional spills during motorway construction projects may result in the release of hazardous and non-hazardous substances such as fuel, oil, lubricants, hydraulic fluids, bitumen, chemicals, and wastewater. If not properly managed, these substances may cause contamination of soil, surface water, and groundwater, posing serious risks to both environmental and human health.

Spills may occur during storage, equipment refueling, vehicle maintenance, chemical handling, or the transportation of hazardous materials. Risk factors include improper handling practices, equipment failure, inadequate storage infrastructure, and insufficient containment systems. Adverse weather events such as heavy rainfall or flooding may further increase the likelihood of containment failure, particularly at temporary waste storage sites and fuel storage areas.

Agricultural areas, pastures, and forests are particularly sensitive to such impacts, with a high overall risk due to the potential for pollutants to degrade soil quality, harm vegetation, and disrupt agricultural productivity. In contrast, scrublands and recreational areas are considered to present a moderate risk, while artificial surfaces—such as urban fabric, industrial zones, or active construction sites—where natural soil functions are already compromised, are associated with lower risk levels. Across all land types, potential contamination is expected to remain spatially limited and short-term reversible, provided that effective spill prevention and response measures are rigorously implemented.

The Project corridor traverses a diverse landscape composed of agricultural lands (63.33%), forests and semi-natural areas (29.05%), meadow-pasture areas (4.94%), settlement areas (1.79%), water bodies (0.77%), and natural and semi-natural areas (0.12%). Given the ecological and economic value of these land use types, accidental spills, leakages, or the improper handling of hazardous materials during construction pose significant risks of soil contamination.

Spill risks during the construction phase are particularly associated with the use of heavy construction equipment, mobile fuel tanks, chemical and waste storage areas, wastewater treatment plants and processing units such as asphalt and concrete batching plants. The improper handling of waste oils, chemical solvents, and other construction-related liquid wastes can lead to contamination incidents if preventive measures are not adequately implemented. Substances such as petroleum hydrocarbons, detergents, and acids may have persistent impacts on environmental media if not promptly contained and remediated.

Through the project, there will be three construction camp sites (Main Camp Site (Manavgat), Camp Site-2 (Manavgat) and Camp Site-3 (Alanya), temporary construction camp site in Taşağıl is in use. In addition to these areas, there will be usage land for mechanic and asphalt plant and concrete plant areas which are listed below (see Table VI-1**Error! Reference source not found.**). In these areas, activities such as refueling and oil changes will be intensive, so the spill risk is highest. Additionally, construction activities along the route, in quarries, and during transportation are also at risk of environmental accidents and spills. In these areas, in addition to spill kits located in risky areas, extra kits will be kept for delivery to nearby construction sites in case of an emergency.

Table VI-1. Information on Mechanic, Asphalt and Concrete Plant Areas

Location	Province	District	Nearest Neighbourhood	Description of the Site / Plant	Area (m²)
Km 55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1	13,946
Km 59+400	Antalya	Manavgat	Taşağıl	Temporary Construction Camp Site	66,450
				Concrete Plant-2	
				Mechanical Plant-1	
				Asphalt Plant-1	
Km 64+400	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)	-
Km 80+400	Antalya	Manavgat	Yeniköy	Concrete Plant-3	15,000
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2	42,371
Km 87+700	Antalya	Manavgat	Bucakşeyhler	Concrete Plant-4	
				Mechanical Plant-2	
				Asphalt Plant-2	
Km 89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a	11,665
Km 99+200	Antalya	Manavgat	Sülek	Concrete Plant-5	11,977
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3	85,000
				Concrete Plant-6	
				Mechanical Plant-3	
				Asphalt Plant-3	

To prevent or minimize the environmental consequences of spills, proactive strategies should be implemented. These include proper handling, storage, and transportation of hazardous substances, the provision of appropriate containment infrastructure, and the development of robust emergency response and remediation procedures that are systematically applied throughout construction activities.

In case of a spill in any area, contaminated soil, water and used spill kits will be treated as hazardous waste. These wastes will be disposed of in hazardous waste containers in the area where the work is carried out and from there they will be transferred to the Temporary Hazardous Waste Storage Areas in Temporary Construction Camp Site, Main Camp Site, Camp Site-2 or Camp Site-3 which one is the closest, considering the spill products either hazardous or non-hazardous.

VI.2 Spill Classification

Spill incidents can be classified into three categories based on the estimated volume of the released substance and the spatial extent of the impact:

- **Minor Spills:** Minor spills are localized and can be addressed solely by worksite personnel using available on-site resources such as spill kits. These may include small leaks, drips, or splashes from malfunctioning hoses, fittings, or leaking vehicles and equipment. Environmental impacts are expected to be minimal, confined within the work area, and remediable within a few days or weeks. No lasting effects on terrestrial or aquatic ecosystems are anticipated. Minor spills are generally considered to involve volumes of less than 200 liters.

- **Medium Spills:** Medium spills involve larger volumes and require additional local manpower and resources. Such incidents are typically caused by failures in safety systems, structural breaches, or significant fuel losses. These spills may cause moderate, yet reversible, impacts on the environment and typically require 1–2 months for effective clean-up and remediation. The relevant authorities should be immediately notified. Indicatively, medium spills range from 200 to 5,000 liters. Remediation and monitoring will be overseen by the Environmental Engineer of the EPC under the supervision of the E&S Manager of EPC and E&S manager of the SPV, and in coordination with regulatory agencies.

- **Major Spills:** Major spills represent large-scale or crisis-level events that exceed the response capacity of local teams and require the involvement of specialized contractors and additional equipment. These events must be immediately reported to the relevant authorities. Clean-up and rehabilitation efforts may span up to one year, and significant, potentially long-term impacts on the environment may occur. Spills involving more than 5,000 liters fall within this category. Remediation and monitoring activities will be led by the environmental engineer of the EPC with supervision of E&S Manager of the EPC and carried out to the satisfaction of E&S Manager of SPV and the competent regulatory authorities.

VI.3 Preparedness, Prevention and On-site Resources

Storage area will be designed and equipped based on the chemical and physical properties of the products, and based on the types of containers stored, the number of people requiring access, and the quantities of the substance used. The size of areas allocated for storage will be calculated based on the volume of the hazardous material that will be on site during peak construction for the relevant activity. MSDSs must be available for all stored hazardous substances and the substances must be clearly labelled. Entrances, exits and access to emergency equipment are kept clear at all times. All storage areas for hazardous substances are equipped with secondary retentions to retain any spill or leakage from one of the containers stored. The secondary retention volume is defined as a minimum of 110% of the volume of the largest container stored on the site taking into consideration the volume occupied by the stored containers. Secondary containment bunds are to be maintained empty of rainwater. Tanks are to be equipped with level detectors and safety systems to prevent overfilling. Suitable absorbents (neutralising and non-combustible) are available in the storage area to clean up any spills and leaks.

Refuelling of project vehicles and plants are to be made on dedicated refuelling stations equipped with impervious platforms. Refuelling on worksite outside the dedicated refuelling stations is not authorized unless authorized otherwise by Project Management when no other options are feasible. If authorized, refuelling of machinery on worksite will be performed using a dedicated equipment to minimize risks of leakage and soil contamination.

Hazardous substances and waste must be clearly labelled on each container and the proper container for each substance must be used. Secondary containment will be provided together with collection and treatment of runoff from areas where hazardous materials are stored. For more details, refer to Hazardous Material and Solid Waste Management Plan.

Hydrocarbon/Oil spill kits will be present at each worksite during the implementation of the Project: Spill kits will be located at each worksite and in particular appropriate spill kits will be located at:

- Storage areas for hazardous substances,
- Nearby areas where hazardous substances are used,
- Mechanical workshops where the construction equipment is repaired and maintained,
- On trucks and tank trucks (in particular, as bridges can be present, on each transportation vehicle, the spill kit should include spill pads that can be used to avoid leakages into the water stream).

VI.4 Site Inspections and Monitoring

ESHS will conduct daily visual inspections of all hazardous material storage areas and containers to look for signs of deterioration, leaks, unsecured container lids, or excess accumulation of materials in the containment areas. All visible leaks and releases will be promptly cleaned up and disposed in accordance with this Plan. Additionally, equipment operators (crane operators-high up operators, fuel tanker drivers) will conduct routine inspections on equipment to check for leaks daily to minimize the potential for spills or leaks and ensure spill kits are complete and available.

VI.5 Spill Response Action Steps

All site personnel act as spill observers. They must first ensure safety, notify the Emergency Response Team, and provide key details such as the location, type of substance, and source of the spill. If necessary, they evacuate nearby personnel, use PPE, and remove ignition sources, stop the spill, and contain it. If the substance is unknown or there is a fire/explosion risk, evacuation is required. The Emergency Response Team or Coordinator confirms the use of correct PPE, identifies the spill source, and checks if the release is ongoing.

All personnel may assist in stopping or minimizing the spill if safe to do so, for example by closing valves or moving equipment. The spill observer must notify the Emergency Response Coordinator, who then informs the E&S Manager and ESHS Manager. The Emergency Response Coordinator evacuates the area if needed and diverts traffic and people away from the hazard. The Emergency Response Team contains the spill using spill kit materials such as bunds, booms, or absorbents.

The team collects spilled products, contaminated soil, and used absorbents in appropriate containers included in the spill kits. The Emergency Response Team cleans the area carefully, avoiding spread to soil, water, or air. The ESHS Team ensures that all contaminated products, materials, and soils are disposed of following hazardous waste procedures. The ESHS Team reports the spill to the ESHS Manager and Construction Manager. Any spill response equipment used must be replaced immediately by the ESHS Team. The ESHS Team monitors environmental and social impacts and checks the effectiveness of the clean-up.

If the spill affects areas outside the worksite, the ESHS Manager and Project Manager must report it to the local authorities..

VI.6 Reporting and Recordkeeping

In an event of spill, the following general notification procedures are to be followed:

- The person who observed a spill must notify the event to the Emergency Response Coordinator and/or ESHS Supervisor.
- The ESHS Manager should also be notified immediately orally, together with the E&S Manager.
- A Spill Report Form must be filled up by the Emergency Response Coordinator and notified to the ESHS Manager and Construction Manager within 12 hrs from the event.
- The ESHS Manager is responsible for the evaluation of the extent of the spill and of immediately contacting the local and National Authorities, if deemed necessary.
- Also, a notification to the Employer ESHS Manager should be issued within 24 hrs.

VI.7 Spill Containment, Clean-up and Rehabilitation

When a spill occurs, polluted soils must be removed and managed as hazardous waste. Runoff from areas where hazardous materials are stored or handled will be collected and treated through an oil-water separator before any discharge to the environment.

After every clean-up, the area will be assessed to check if further remediation is needed. This includes identifying affected environmental components, the extent of contamination, and possible migration paths. If required, a Monitoring Plan will be developed and implemented. All used spill kits must be replaced before construction resumes, and all equipment used must be decontaminated before storage. Wastes generated from spill response will be disposed of according to national regulations and the Hazardous Material and Solid Waste Management Plan.

Spills must be restricted immediately for hydrocarbon spills. Absorbents, pads, booms, and barriers should be used to minimize contamination of soil, water, and vegetation. Contaminated soil, water, and materials must be containerized, double-bagged, and stored in a designated hazardous waste area. If spills occur near drains or streams, drains must be closed and floating product pumped into drums. Contaminated vegetation may be cut or flushed with water. Effectiveness of the clean-up must be monitored. Water must not be used to disperse chemicals. Personnel must use PPE and compatible containers. Activities must be reported to the ESHS Manager.

For all spill types, contaminated soils must be removed, spills restricted with barriers, and watercourses protected with booms and absorbents. Snow and ice are to be treated as soil. Vegetation can be protected with pads and booms; if contaminated, it may be cut or flushed.

VII. MITIGATION MEASURES FOR SPILL AND ENVIRONMENTAL ACCIDENT RISKS

The following measures will be implemented throughout the Project sites to prevent or minimize the risks and impacts associated with spills and environmental accidents during the construction phase:

Hazardous Material Evaluation & Storage

- All hazardous materials will be evaluated by the E&S Manager of the EPC prior to being brought to site, including their type, quantity, transfer location, and hazardous characteristics, in order to implement appropriate preventive and control measures.
- Any spill or leakage event will be responded in accordance with the procedures described in the Emergency Preparedness and Response Plan
- Storage areas will be designed with impermeable flooring, secondary containment (e.g., bunds, drip trays), and secure enclosures. And it will be located at least 10 m. away from drainage lines and environmentally sensitive zones to prevent the spread of contamination during accidental releases.
- All tanks, containers, and drums will be regularly inspected for damage or leakage. Any corroded, worn, or damaged equipment will be promptly repaired or replaced.
- Incompatible hazardous substances will be stored separately, and material safety data sheet (SDS) requirements will be considered in designing storage arrangements.
- Storage facilities will be covered to protect materials from rain and snow and secured with fencing and locks to restrict unauthorized access.
- Storage structures will include sufficient open space to allow for visual inspection and monitoring of stored materials.
- Fire extinguishers will be available in also all hazardous and non-hazardous material storage areas.
- All chemicals and hazardous materials will be stored in designated hazardous materials storage areas that have lean to roof, concrete floor, secondary containment of at least 110% of the stored volume and proper drainage for spills/leak.
- For the storage of liquid wastes greater than 220 liters, secondary containment will be provided with an available volume of at least 110% of the largest storage container or 25% of the total storage capacity, whichever is greater.

Refueling & Maintenance Activities

- Refueling will be carried out only by trained operators using hoses with automatic shut-off nozzles. Fueling tankers will be equipped with spill kits and/or drip trays for use during refueling. Drip trays or absorbent materials will be placed under refueling points.
- All refueling, maintenance, or chemical handling activities will be carried out with spill prevention in mind and with contingency equipment immediately accessible.
- Spill kits, absorbents (pads, socks, booms), and fire extinguishers will be located at all spill-prone locations, including fuel tanks, maintenance areas, and material storage areas.
- A trained fuel operator will maintain hose contact with the equipment during refueling. Fueling will not begin without placing drip trays under the vehicle or machinery.

Spill Prevention & Response

- Maintenance activities that may result in spills will be conducted in designated areas which will be constructed in construction site areas equipped with containment systems and spill kits.
- During any maintenance activity with spill risk, spill kits will be positioned near the work zone and equipment will be placed within containment barriers or over drip trays.
- Spill response responsibilities will be assigned to designated personnel, including environmental engineers, and the Emergency Response Team (ERT) which is specified in Emergency Response Plan.
- The ERT contact information and emergency numbers will be clearly posted at work sites and storage areas.
- In case of any emergency (e.g., spill, fire), any staff member must immediately notify the ERT and provide the following: name, location, type of incident (e.g., chemical or fuel spill), and its severity.
- If a worker detects a spill, they must alert nearby personnel, inform environmental staff, and provide a brief description of the situation to facilitate a timely response.
- In case of spills:
    - Small spills will be cleaned immediately by the operator using absorbents, which will be disposed of as hazardous waste.
    - Large or hazardous spills will be managed by the Emergency Response Team (ERT), who will assess severity, contain, and clean up.
- The severity of a spill will be assessed based on chemical type, physical state, potential for spread, weather conditions, and area affected—not solely by surface area.
- For spills on soil, the source will be shut or isolated, and the substance contained using earthen bunds, booms, or absorbent materials. Contaminated soil will be excavated and disposed of at licensed hazardous waste facilities.
- For spills into surface water, floating barriers (booms) will be used to contain the release. Free product will be collected using pumps and absorbents. Any grease, solvent, or oil spills in maintenance areas will be cleaned using sorbents and placed in appropriate hazardous waste containers. No spills will be hosed into the environment.
- Spills of dangerous substances will be reported by E&S Manager of the EPC to the E&S Manager of the SPV and documented on site.
- Contaminated materials (e.g., soil, cloth, barrels) will be transported to licensed disposal facilities using authorized vehicles.
- Used absorbents will be placed in black-colored hazardous waste containers marked appropriately.
- Absorbent pads will be placed on spills and left for 5–10 minutes. If residues remain, a second pad will be applied. Each pad can absorb up to 17 times its weight.
- Absorbent socks (“sausages”) will be used as perimeter controls to contain spreading spills. These will also be disposed of as hazardous waste.
- All spill control materials (kits, extinguishers) will be kept near high-risk locations and clearly marked.
- Fire extinguishers will be placed strategically and regularly inspected.

Training, Inspection & Documentation

- All employees will be trained on spill prevention, response procedures, and their respective responsibilities.
- Regular inspections will be carried out on tanks, bunds, supports, and connections by environmental staff. All findings will be recorded.
- Internal haul roads will be inspected for structural integrity, and repairs will be conducted promptly to minimize vehicle-related spill risks.
- All spill events will be recorded, investigated, and followed up with corrective actions. Lessons learned will be incorporated into updated response plans.
- EPC's Environmental Engineer will coordinate all major spill responses in accordance with Turkish legislation and notify the EPC's E&S Manager and SPV's E&S Manager accordingly. The SPV E&S Manager will coordinate the documentation of corrective actions for these incidents and their submission to the Antalya Provincial Directorate of Environment, Urban Planning, and Climate Change, as required.

VIII. TRAINING

All personnel will receive structured training upon hiring as part of the Project's onboarding and orientation program. This training will cover the prevention and management of environmental accidents and hazardous material spills, including identification of potential spill sources, associated risks to human health and the environment, and appropriate response actions.

The training program will include the following core elements:

- General environmental awareness and potential impacts of spills;
- Applicable national legislation and international standards related to hazardous material handling and spill response;
- Where can this Plan and other relevant procedures (e.g., Hazardous Materials Management Plan, Solid Waste Management Plan) be accessed;
- Typical sources of spills on construction sites, such as equipment failure, leaks during fuel transfer, and improper storage of chemicals or lubricants;
- Precautionary measures for spill prevention;
- Use, location, and application of spill kits and absorbent materials in various work areas;
- Spill containment and control procedures;
- Proper use of personal protective equipment (PPE) during spill response;
- Procedures for clean-up, recovery, and appropriate disposal of contaminated materials;
- Replenishment of spill kits following use or routine inspection.

Training will be primarily delivered through practical demonstrations to ensure staff understands how to respond effectively in the event of a spill. Specialized training will be provided to designated personnel, including members of the ERT, with additional focus on spill response leadership, containment strategies, clean-up coordination, and documentation.

Subcontractors will be responsible for ensuring that their employees receive equivalent training, consistent with Project requirements and aligned with the overall ESMS.

All personnel will receive refresher training at regular intervals, and additional training will be provided to newly hired staff. The E&S Manager will prepare a detailed training schedule, which will be reviewed and approved by the Project Manager.

Spill response drills will be conducted at least once annually to test readiness and build confidence among construction teams and the ERT. Before the drills, ERT team will be trained in waste disposal intervention and management in accordance with national and international standards. Drill performance will be documented in accordance with the ESMS protocols. Drill records will be submitted to the Project Manager for approval and archived as per ESMS protocols.

Attendance and completion of all training sessions will be documented through the Training Participation Form. These records will be managed and retained by the ESHS team, and subject to periodic audits to verify compliance with training and preparedness requirements.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of environmental accident and spill response measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific risks, incident trends, stakeholder concerns, or changes in applicable environmental regulations.

Monitoring activities will be coordinated by the E&S Manager, in close collaboration with the H&S Manager. Key responsibilities will include verifying the proper storage and handling of hazardous materials, monitoring implementation of spill prevention measures, checking the availability and condition of spill response kits, and ensuring that spill containment practices are consistently applied across critical work areas such as fuel storage sites, maintenance zones, and material handling areas.

Regular inspections will be conducted at designated locations across all worksites to evaluate compliance with national environmental regulations and Project-specific spill prevention requirements. This will include visual inspections for potential leaks or spill risks, control of secondary containment systems, checks on the use of drip trays and absorbent materials, and review of maintenance and inspection logs for storage tanks and hazardous material containers.

The performance of contractors and subcontractors in implementing spill management and emergency response measures will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and to prevent recurrence.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, including the Ministry of Environment, Urbanization and Climate Change, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of monitoring data, inspection of hazardous material storage practices, and verification of response protocols and documentation.

Monitoring efforts will be guided by the framework provided in Table IX-1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of inspections, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of spill prevention and response measures and ensuring full compliance with national regulations and Project standards.

Table IX-1. Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Number of trainings conducted	Project site offices	Tracking the number of trained personnel	Quarterly	AAOİAŞ, EPC,
Reported spill/leak incidents or non-compliance records	Site-wide	Review of non-compliance, accident, and spill records	Daily	AAOİAŞ, EPC
Number of complaints related to environmental accidents	Project site offices	Logging and reviewing records as per the Stakeholder Engagement Procedure	Quarterly	AAOİAŞ, EPC,
Hazardous materials storage conditions	Storage and handling areas of hazardous substances	Maintaining records in accordance with the Spill Response Management Plan	Monthly	AAOİAŞ, EPC,
Spill kits number and conditions	All construction and maintenance areas and vehicles, chemical storage areas	Visual check and control list	Weekly	AAOİAŞ, EPC, Subcontractors
Number of spill/leakage	All construction site	Visual check and incident reports	Daily	AAOİAŞ,EPC,
Fire extinguisher check	Storage and handling areas of hazardous substances	Visual check and control list	Monthly	AAOİAŞ,EPC,
Spill response drills	Storage and handling areas of hazardous substances	Audit – Drill reports review	At least semi-annually	AAOİAŞ,EPC,
Spill prevention and response training	All employees	Audit – training records review	Monthly	AAOİAŞ,EPC,

In cases of non-compliance identified through internal oversight AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and relevant subcontractors.

All spill-related findings, including incident reports, non-compliance records, or complaints received from workers or community members, will be documented in accordance with national environmental regulations and Project plans. In the event of serious violations—such as significant releases of hazardous substances or repeated failure to implement mitigation measures—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

In cases of any medium and major spills will be reported immediately. All reporting will be conducted in accordance with the requirements of local and national authorities.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X-1. Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Number of spill response trainings conducted	All personnel to receive training, 100%	Monthly	AAOİAŞ,EPC,
Number of non-compliances with applicable standards	Less than five	Monthly	AAOİAŞ, EPC,
Number of complaints related to spills	Less than five	Monthly	AAOİAŞ, EPC,
Compliance with Spill Response Management Plan procedures	Less than five deviations	Monthly	AAOİAŞ, EPC,
Contamination on soil and/or water	0 (zero)		AAOİAŞ, EPC
Number of spill drills	All personell to attendance drill,100%	Semi-annualy	AAOİAŞ, EPC

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All environmental accident and spill-related incidents and non-conformities should be documented and reported as outlined in this Plan. Contractors and subcontractors should be subject to audits conducted by the SPV within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's environmental management system and applicable regulatory requirements. Records to be reviewed during environmental audits will include, but are not limited to, incident and non-compliance records related to spills, spill response and investigation reports, training attendance logs for spill prevention and response, inspection and maintenance records of hazardous material storage areas, spill kit inventory checklists, and corrective action logs. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under corrective actions defined in Section VI. Project management will review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with national legislation, international standards, and Project-specific environmental requirements.

XII. REPORTING

Regular reporting will be conducted to ensure the effective implementation and continuous improvement of solid waste management activities throughout the construction phase of the Project. Reporting will be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions will be identified, and the required updates will be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections will be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Quarterly Environmental and Social Monitoring Report will cover at least, but not limited to, the following items. The report will be prepared by the SPV with input data provided by EPC to evaluate the Project performance and compliance of the related plans.

- Incident reporting;
- Emergency response reporting;
- Records of annual emergency response training exercises;
- KPIs and performance trends (see Table XII-1) ;
- Current situation Key Monitoring Activities (see Table XII-2)
- Relevant training activities completed and attendance registers to be maintained;
- Legal Authorities Audit reports;
- Site Inspection logs

In addition, the following external reporting will be done:

- All environmental and social incidents will be appropriately documented, notified and reported in accordance with established procedures the terms and conditions by EPC to SPV,
- Incident notification and reporting to relevant Turkish regulatory bodies will be performed in line with applicable legislation in force and as stipulated in permits and licenses.
- The Lenders will be notified of incidents pursuant to the terms and conditions agreed upon in the Finance Agreements through SPV.

All personnel are encouraged to raise concerns, suggestions, or complaints related to this Plan through the established grievance mechanism by completing the grievance form. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

WATER QUALITY, WASTEWATER AND STORM WATER MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision as per comments
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

WATER QUALITY, WASTEWATER AND STORM WATER MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
BOD_5	Biological Oxygen Demand
CLO	Community Liaison Officer
COD	Chemical Oxygen Demand
DO	Dissolved Oxygen
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
HSE	Health, Safety and Environment
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
NH_4^+	Ammonium
NO_3^-	Nitrate
OHS	Occupational Health and Safety
o-PO_4^{3-}	Orthophosphate
SEP	Stakeholder Engagement Plan
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TP	Total Phosphorus

WATER QUALITY, WASTEWATER AND STORM WATER MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Water Quality, Watewater and Storm Water Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1.Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

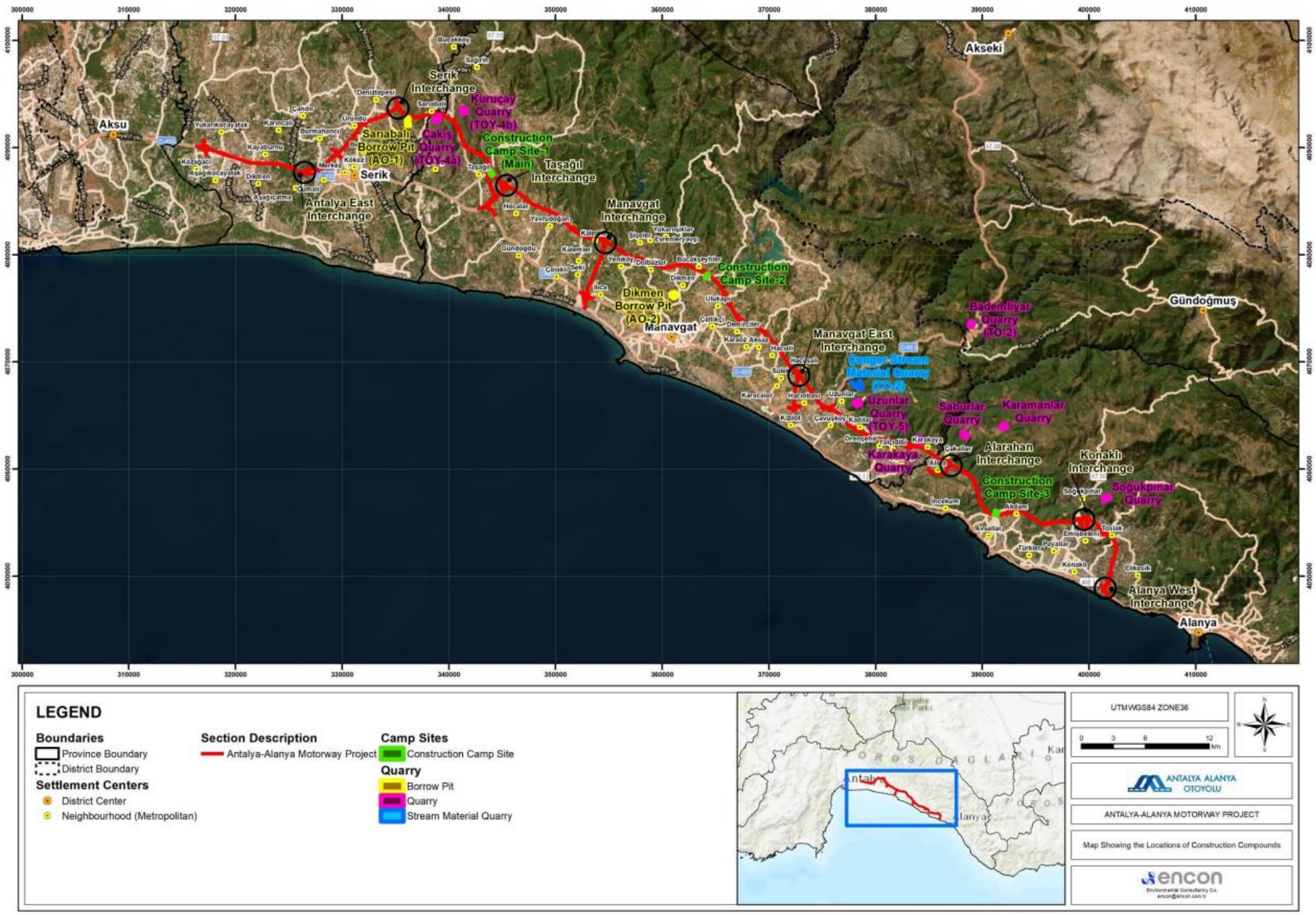


Figure I-1. Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

The activities to be carried out within the scope of the Project that are likely to have an impact on water resources are as follows:

- Excavation
- Soil stockpiling
- Quarry activities
- Plant and wheel washing
- Road construction
- Washing of finished road surfaces to remove accumulated soil

I.2. PURPOSE AND SCOPE

This Water Quality, Wastewater and Storm Water Management Plan ("the Plan") has been prepared for the Antalya-Alanya Motorway Project ("the Project").

The aim of this Plan is to establish effective procedures and control mechanisms for managing and monitoring water use, wastewater and storm water generated throughout the construction phase, including those arising from construction zones, maintenance areas, rest facilities, and toll booth operations. The Plan has been developed in line with relevant national legislation and international standards, including requirements set by international financial institutions.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The ultimate responsibility for its implementation resides with AAOİAŞ, Limak and AAOAİŞ's sub-contractors & suppliers will be required to demonstrate compliance of their activities against this plan.

The Special Purpose Vehicle (SPV) (AAOİAŞ) will have the main role in monitoring of E&S performance of all project participants during implementation of works and services.

This Plan outlines procedures, responsibilities, and control measures that should be done to minimize adverse impacts on water resources, water consumption, safeguard water quality, and ensure environmentally sound wastewater and storm water handling. It serves as a guiding framework for identifying potential risks, implementing mitigation measures, and establishing monitoring protocols throughout construction activities.

The Plan should be adopted by all construction-phase stakeholders, including the Project Sponsor (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. – AAOİAŞ), the Main Contractor (Limak), and all subcontractors. Each party should ensure compliance with the procedures defined in this Plan. Adequate training, infrastructure, source, equipment, and capacity should be provided to

ensure effective implementation. Regular reviews and updates should be conducted to reflect changes in design, construction approach, or applicable legislation.

During the construction phase of the Project, the following types of wastewater are expected to be generated:

- Black water (sewage) from flushable toilets and portable/chemical toilets;
- Grey water from sinks, showers, canteens and laundry facilities (at the worker camp);
- Other wastewater from equipment/vehicle washing, concrete washout, wastewater from concrete batch plants, Quarry and Material Extraction Activities deep excavation, blasting, blockage of permeable layers etc.; and
- 'Dirty' run-off water from impermeable surfaces (e.g. concrete paved areas).

This Plan covers the various aspects pertaining to the water consumption (uses, quantities, source and quality etc.) of water, the safe and environmentally acceptable handling, treatment and discharge of wastewater and management of ambient water quality during the Site construction and related humanitarian activities ("the Project Activities"). The following key objectives apply:

- Identify potential water sources
- Identify potential water users with the required quality and amount
- Identify potential sources of wastewater and any key risks to the environment;
- Identify and control key potential pollution risks;
- Cover both accidental and intended impacts on the aquatic environment;
- Identify and ensure that the relevant requirements of national and international standards are complied with during the project (i.e. IFC Performance Standards);
- Outline actions and measures necessary for the effective management of wastewater;
- Define measures to address potential pollution or contamination of the aquatic environment should this arise from the Project Activities or accidental incidents;
- Define the duties and responsibilities of the key personnel involved; and
- Ensure that the necessary equipment, training, capacity needs are known and provided to ensure efficient implementation of the plan.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

The Plan has been structured to align with both national and international requirements, including legislation, guidelines, and sectoral standards that define permissible emission levels and water quality thresholds. Accordingly, the following sources of reference should be used to guide the implementation and compliance procedures:

II.1 National Requirements

The following Turkish laws and regulations should be used as the legal basis for managing water quality during construction:

- Environmental Law (Law No. 2872)
- Regulation on Control of Water Pollution,
- Regulation on Protection of Groundwater Against Pollution and Deterioration,
- Regulation on Surface Water Quality,
- Regulation on the Protection of Drinking Water Basins,
- Regulation on the Collection, Storage, and Discharge of Storm water Systems,
- Regulation on Urban Wastewater Treatment,

- Regulation on Wetland Conservation,
- Regulation on Drinking Water Intended for Human Consumption,
- Regulation on the Control of Pollution Caused by Hazardous Substances in Water and the Environment,
- Regulation on Waste Management,

- Regulation on Environmental Permit and License,
- Groundwater Law (Law No.167)
- Waste Water Treatment Plant Registration Certificate (Numbered 2015/06) and

II.2 International Standards and Conventions

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework ("ESF") document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects, supported by Environmental and Social Standards ("ESSs"):

Moreover, the following standards, guidelines and directives should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC EHS Guidelines for Cement and Lime Manufacturing: Occupational Health and Safety (2007)
- IFC General EHS Guidelines: Wastewater and Ambient Water Quality
- IFC General EHS Guidelines: for Construction Materials Extraction Construction and Decommissioning
- Equator Principles IV (2020)
- EU Urban Wastewater Treatment Directive (2024/3019/EC)
- World Health Organization (WHO) Guidelines for Drinking-Water Quality (2022 and 2024)

These references should be used to guide the implementation, monitoring, and performance evaluation of water pollution and mitigation on-site throughout the construction phase.

II.3 Project Domestic Waste Water Standards

To determine the discharge limits for domestic wastewater, the limit values specified in national and applicable international standards are provided below (see Table II.1). It is stated in the IFC EHS General Guidelines, Wastewater and Ambient Water Quality document, "Compliance with national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater discharges shown in Table 1.3.1". Accordingly, domestic wastewater discharge standards are determined as follows.

Table II.1 Project Discharge Standards for Domestic Wastewater

Parameter	Turkish Legal Requirement ([a])	IFC ([b])	Project Standards
Biochemical Oxygen Demand (BOD_5) (mg/L)	50	30	50
Chemical Oxygen Demand (COD) (mg/L)	160	125	160
Total Suspended Solids (TSS) (mg/L)	60	50	60
pH	6-9	6-9	6-9
Total Nitrogen (mg/L)	-	10	10
Total Phosphorus (mg/L)	-	2	2
Oil and Grease (mg/L)	-	10	10
Total Coliform Bacteria MPN([c])/100 ml	-	400	400

([a]) Water Pollution Control Regulation, Table 21.1 Domestic Wastewater Discharges (Class 1: BOD load 5-120 kg/day, Population: 84-2000)
([b]) Table 1.3.1-Indicative Values for Treated Sanitary Sewage Discharges, IFC Environmental, Health, and Safety General Guidelines, April 30, 2007.

III. Water Usage

III.1 Potential Water Sources

- The Project will supply water from groundwater and surface water resources. The water use of project activities would be planned to be limited and would be done only after getting relevant permissions from the authorities. Periodical potable water analysis will be conducted by independent parties according to relevant standards for human usage. In any case of noncompliance with parameters for potable water, appropriate water treatment facilities will be furnished to comply with relevant standards. Drinking water will be supplied as bottled water for all site areas. If water is to be procured through suppliers for usage purposes, the suppliers' water availability and capacity should be confirmed via official letters.

III.2 Potential water users with the required quality

- Considering that groundwater could be used as domestic water needs at campsite facilities the nearest groundwater resources were studied within the Project ESIA.

Table III.1 General Water Usage

Water User	Water consumption amount
Humanitarian	806.2 tons/day
Dust Suppression	26.4 m^3 /day

Table III.2 Water Consumption in Concrete Plants and Mechanical Plant Manufacturing

Motorway Km	Facilities Name	Area (m^2)	Maximum Hourly Capacity (m^3/h)	Water Consumption in Concrete Plants and Mechanical Plant Manufacturing (m^3)
55+450	Concrete Plant-1	13,946	140	66,667.05
59+400	Concrete Plant-2	66,450	140	81,020.94
	Mechanical Plant		550	73,601.07
	Asphalt Plant-1		240	-
80+400	Concrete Plant-3	15,000	140	56,391.94
87+700	Concrete Plant-4	42,371	140	42,943.78
	Mechanical Plant-2		550	64,216.74
	Asphalt Plant-2		240	-
89+700	Concrete Plant-4a	11,665	140	28,701.11
99+200	Concrete Plant-5	11,977	140	73,368.82
124+300	Concrete Plant-6	85,000	140	83,610.62
	Mechanical Plant-3		550	86,669.95
	Asphalt Plant-3		240	-
				-

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Water Quality, Wastewater and Storm water Management Plan:

- Solid Waste Management Plan
- Community Health and Safety Management Plan
- Hazardous Material Management Plan
- Construction Campsite Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Environmental Accident and Spill Response Management Plan

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

V. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV):

-Define and implement the overall business strategy and direction of the SPV in alignment with stakeholder expectations.

- Ensure the provision of necessary resources and organizational support for the implementation of Water Quality, Wastewater and Stormwater Management Plan.

-Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction phase.

-Support the E&S Manager in preparing, disseminating, and implementing this plan

E&S Manager (SPV):

-Review and ensure the preparation, revision, and implementation of the Plan in accordance with national laws, regulations, company policies, applicable international standards, and lender requirements.

-Ensure the development, revision, and execution of project-specific plan, including the Environmental and Social Management and Monitoring Plan (ESMMP), with a focus on water quality, wastewater, and stormwater.

-Monitor the environmental and social performance of EPC and subcontractors to ensure compliance with water-related requirements

H&S Manager (SPV):

- Ensure the conditions and obligations specified in health, safety, community, and water-related management plans are implemented and adhered to by EPC and subcontractors in accordance with company policies, regulatory obligations, international standards, and lender requirements.

-Ensure that all construction site activities impacting water resources are carried out safely by EPC and subcontractors.

Deputy E&S Manager (SPV):

-Lead the development, implementation, and continuous improvement of the Water Quality, Wastewater, and Stormwater Management Plan (WQWSMP).

-Review the ESHS documents of subcontractors and suppliers and ensure that they comply with the Project's water management requirements.

-Monitor performance through Key Performance Indicators (KPIs), reports, audits, and meetings related to water use, wastewater treatment, and stormwater management.

-Oversee incidents and non-compliances regarding water quality, wastewater, and stormwater, including investigations, corrective/preventive measures, and stakeholder communication.

-Support E&S Manager (SPV) in executive decision-making by providing timely reports and insights on water-related E&S performance, risks, and emerging trends.

-Lead community engagement strategies in collaboration with the Environmental Engineer and Social Chief to address concerns related to water supply, wastewater discharges, or stormwater impacts, and ensure effective grievance management and positive relations with project-affected communities.

-Ensure that EPC and subcontractors provide the necessary water-related training through the review of training records and relevant training documents.

Social Chief (SPV):

- Supervise and mentor CLOs, ensuring their work aligns with project priorities and the stakeholder engagement strategy, particularly regarding water use, wastewater management, and stormwater issues.

-Develop and implement work plans and schedules for the CLO team to ensure proactive communication with communities about water-related project impacts.

-Ensure that complaints regarding water quality, wastewater discharges, or stormwater management are recorded, processed, and resolved in a timely and transparent manner.

-Ensure accurate, timely, and complete reporting of CLO activities, stakeholder interactions, and grievance outcomes related to water issues, and inform the Deputy E&S Manager about the complaints. Coordinate the assessment and resolution of grievances with the EPC team.

-Coordinate with the Deputy E&S Manager, CLOs, Environmental Engineer, and construction teams to address community-related impacts on water resources and stormwater systems.

Project Director (EPC):

-Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards.

-Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones.

-In case of non-compliance regarding to air quality, ensure appropriate corrective and preventive actions are taken in coordination with the E&S Manager and H&S Manager

E&S Manager (EPC):

- Coordinate with the SPV's E&S Manager to ensure alignment on water quality, wastewater, and stormwater management requirements, including compliance audits, reporting, and corrective action follow-ups.

-Implement water protection measures through site practices, method statements, and construction activity planning.

-Monitor compliance of EPC and subcontractors with The Plan requirements, including proper handling, treatment, and discharge of wastewater.

-Ensure all water consumption on-site (drinking, sanitation, dust suppression, concrete production) follows the approved permits, quality standards, and project-specific limitations.

-Supervise the operation and maintenance of temporary and permanent WWTP, ensuring treated effluent meets regulatory and project standards.

-Support water quality monitoring programs, including routine inspections, sampling, and measurement of key water parameters.

-Identify, report, and manage water-related incidents, spills, or non-compliances, and coordinate corrective and preventive actions with site teams and SPV.

-Provide guidance and training to site personnel on The Plan implementation, including safe wastewater handling, stormwater management, and pollution prevention measures.

-Ensure that documentation, records, and reporting for water quality, wastewater, and stormwater management are accurate, complete, and readily available for audits or inspections.

-Incorporate lessons learned, site observations, and regulatory updates into ongoing The Plan updates and improvements.

H&S Manager (EPC):

-Integrate water, wastewater, and stormwater management measures into site risk registers and method statements.

-Supervise Contractors/Subcontractors to implement water management measures and monitor compliance.

-Coordinate with SPV H&S Manager on water-related incidents and risks.

Line Manager:

- Oversee daily watering, dust suppression, and other measures to control runoff and sediment.

-Monitor the condition and maintenance of site equipment and vehicles to prevent leaks or spills.

-Ensure proper operation and maintenance of temporary treatment facilities, drains, and sediment controls.

Environmental Engineer (SPV and EPC):

- Conduct routine inspections of water handling systems, drainage networks, and temporary treatment facilities.
- Maintain accurate records of water use, wastewater discharge, stormwater management, and monitoring results.
- Support training, toolbox talks, and awareness sessions for site personnel on proper water management practices.
- Coordinate with EPC and SPV E&S Managers to report non-compliances, incidents, or environmental risks.
- Liaise with external laboratories, regulators, and consultants for water quality monitoring and reporting.
- Assist in the preparation of environmental performance reports, including corrective and preventive actions.
- Ensure that subcontractors implement water management measures and comply with The Plan obligations.
- Support continuous improvement of The Plan based on field observations, monitoring results, and lessons learned.

Community Liaison Officer (CLO)(SPV and EPC):

- Inform project-affected communities about construction activities, including potential impacts on water quality, wastewater, and stormwater management.

-Log, track, and follow up on community complaints or grievances related to water pollution, wastewater discharge, or stormwater issues, ensuring timely resolution via the Grievance Mechanism (GM).

-Support monitoring and documentation of WQWSMP implementation at site level, including subcontractor activities that may affect water resources or wastewater handling.

-Facilitate equitable community engagement and consultations, ensuring vulnerable or sensitive groups are informed about water-related impacts.

-Coordinate with E&S Manager and other project teams to integrate community feedback into WQWSMP updates and corrective actions.

VI. WATER QUALITY, WASTEWATER AND STORM WATER MANAGEMENT APPROACH

The Antalya Basin, within which the Project is located, is one of Türkiye's richest regions in terms of water resources, with a usable water potential of 12,283.44 hm³. A total of 155 surface water bodies have been identified in the Antalya Basin, including 109 rivers, 32 lakes, 11 transitional water bodies, and 3 coastal water bodies.[3] Accordingly, water quality risks related to Project activities will be managed with particular sensitivity, given the ecological importance and diversity of these resources.

Among the major rivers and streams in proximity to the Project corridor are Köprüçay Stream, Manavgat River, Alara (Ulugüney) Stream, and Karpuz Stream. These water bodies are already under pressure from point and diffuse sources such as domestic wastewater, tourism facilities, agriculture, fish farming, and sand and gravel extraction. Table V.1 below summarizes these pressure factors and their types based on regional water protection studies.

Table VI.1 Pressures and Impacts on Rivers/Streams on the Route

River name	Pressure Factor	Pressure Type
Köprüçay Stream	Domestic Wastewater Discharges Tourism Facilities Fish Farms	Point, Diffused
Manavgat River	Domestic Wastewater Discharges Agriculture Activities	Point, Diffused
Alara (Ulugüney) Stream	Pollutants from agricultural activities Water use for agricultural purposes	Diffused
Karpuz Stream	Sand and gravel purchase	Diffused

Given these existing pressures, it is critical that all project-related activities are planned and executed in a way that prevents further deterioration of these already sensitive and impacted water bodies. In this context, the following sections outline the overall approach of the Project to the management of water, wastewater and storm water during the construction phase, in line with applicable environmental standards and best practices.

Water-related impacts associated with motorway projects primarily involve the generation and management of wastewater, storm water runoff, and potential risks to both surface and groundwater quality. During the land preparation and construction activities, wastewater will be generated from construction sites and accommodation facilities for workers (campsite, kitchen, cafeteria, etc.).

Throughout the project construction phase, package WWTPs will be used for domestic wastewater management during construction phase of the Project. In addition, impermeable septic tanks also will be utilized at the campsites, if/when necessary. Although it is accepted that 1,100 people are planned to work in a campsite during the construction period of the project, each package WWTP will have a capacity equivalent to the maximum number of people, 1,250 people (including personnel of contractor and sub-contractors).

[3] *MoEUCC, April 2024, River Basin Management Plan Strategic Environmental Assessment Scoping Report*

The basic approach will be to reuse the wastewater generated by project activities in the activity cycle during construction. This approach will not require any water discharge to environmental media. Especially for the reuse of wastewater generated in concrete batching plants, three-compartment settling ponds will be constructed. In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary settlement pools and installations will be constructed for the reuse of water at these stations.

Treated wastewater will be analyzed to ensure compliance with relevant quality limit as defined in regulatory frameworks. The Project's approach to water management focuses on minimizing adverse environmental impacts and ensuring that all discharges meet established regulatory thresholds.

To prevent or minimize the environmental consequences of spills, proactive strategies should be implemented. These include proper handling, storage, and transportation of hazardous substances, the provision of appropriate containment infrastructure, and a roof for large-scale chemical storage areas and waste storage areas to prevent stormwater contamination. The robust emergency response and remediation procedures are systematically applied throughout construction activities.

Additionally, the completed motorway structure will increase impermeable surface area, leading to elevated surface runoff rates. This may result in erosion, localized flooding, and increased water flow in receiving bodies, especially during periods of heavy rainfall. Infrastructure components such as bridges, culverts, and diversion channels may alter natural water flows and cause localized increases in upstream water levels during flood events.

The construction of viaducts, bridges, and culverts may temporarily alter the hydrological regime, leading to effects such as scour, erosion, and sediment deposition in riverbeds and banks. Improper design and installation of temporary structures (e.g., culverts or roadways) may further exacerbate such impacts by disrupting natural stream flows. Measures will be taken to ensure that surface water management complies with national and international standards, mitigating both temporary and permanent risks.

Groundwater resources may also be at risk, particularly in areas with shallow overburden, where accidental discharges of hazardous substances could contaminate aquifers. Construction activities such as site clearance, earthworks, vehicle refueling, and wastewater discharge (both sanitary and industrial) pose potential threats to groundwater quality if not properly managed. Some excavation works may require groundwater dewatering, which could have implications for local aquifer levels. Additionally, earthworks in bedrock or shallow overburden areas may lead to blockage of fissure permeability by infiltrating fines or sediments.

The increase in impermeable surface area will raise runoff rates, and high storm water flows may cause erosion and flooding. During flood events, infrastructure elements like bridges and culverts may impede water flow, resulting in increased upstream water levels. Accordingly, mitigation measures will be developed and implemented to manage drainage and flooding risks throughout the construction phase.

VII. MITIGATION MEASURES FOR IMPACTS ON WATER QUALITY and CONSUMPTION

This Plan focuses exclusively on measures applicable to the construction phase. The following measures should be implemented to manage wastewater, control storm water, minimize sedimentation and pollution, and protect both surface and groundwater resources during construction activities.

General Implementations

- No direct discharge of wastewater or water containing waste to the environment is permitted unless legally allowed and allowed by Project Standards (See Section I) and in this case all wastewater discharges (all domestic) from all construction components must comply with all relevant legal requirements;
- During site planning and arrangement, the potential wastewater sources from camp/site and facilities, and quarries will be defined;
- All wastewater discharges must comply with relevant Turkish legal requirements (Water Pollution Control Regulation 2004, No. 25687) and Project Standards before disposal, and relevant permits and monitoring shall be in place
- The AAOİAŞ will have responsibility for the full chain of custody and will retain original invoices for any and all wastewater collection and disposal by third-party service providers;
- All appropriate permits need to be sought by AAOİAŞ from the local authorities; notifications filed, and discharges need to be made within the conditions of the permit; conditions;
- Precautionary measures must be taken to minimize possible impacts to surface water infrastructure. Any damage caused to surface water infrastructure such as supply systems, irrigation systems, flood defenses and drainage ditches must be rectified by the AAOİAŞ;
- All construction equipment, vehicles and plant will be cleaned away from surface waters and wash water captured for reuse or treatment off site (only authorized discharge to permitted standards of treated wastewater to be allowed as per local permit/license conditions);
- All facilities and structures will be regularly inspected and maintained to ensure proper and efficient operation at all times.

Domestic Wastewater

- Depending on the availability of wastewater treatment facilities, these sources can be connected to the local sewerage system where possible;
- Wastewater from all construction compounds and the associated buildings will either be discharged into the local/municipal sewage network or treated on site before discharge to a suitable receiving environment (as allowed for under permit conditions) or collected on site and transported by tanker for disposal at the local sewage treatment works;
- Where wastewater is to be produced and treated at camp sites, this will be treated via a suitable wastewater treatment plant system, to comply with the limit values for wastewater quality given in IFC General Environmental, Health and Safety Guidelines and/or the "Average Discharge Standards to Receiving Environment for Domestic Waste Water" given in "Regulation on Water Pollution Control (RWPC)" numbered 25687 and dated 31.12.2004, whichever standard is strictest will be followed;
- For onsite wastewater treatment plants/units, an approval will be obtained as per Wastewater Treatment/Deep Sea Discharge Project Approval Circular dated 04.03.2014 and numbered 2014/07;
- Additionally, a wastewater discharge permit according to the provisions of the "Environmental Permit and License Regulation" (Official Gazette: 10.09.2014-29115) will be secured before operation of the plant;
- Permit Register was established and permits will be tracking.
- Wastewater accumulated in the septic tank on site will be transported to packaged wastewater treatment plants using vacuum trucks.
- AAOAİŞ will retain a licensed and approved management service for the collection and transportation of wastewater generated and temporarily stored onsite in conservancy tanks, to be transported to a licensed treatment/disposal facility;

- All wastewater produced during construction activities will be temporarily stored on site in suitable, leakage-proof and spill-proof above-ground storage tanks or similar containers based on available technology (non-corrosive and suitable for storing wastewater) and periodically collected by licensed companies appointed by AAOAİŞ and trucked to appropriate and licensed wastewater treatment/disposal facility authorized according to national regulations;
- Portable chemical toilets will be provided during construction as necessary and will be maintained and serviced by an external contracted service provider on a regular basis;
- The AAOİAŞ will appoint local authorized transport companies to collect and transport all sewage and grey water to offsite facilities as well as any other wastewater under its responsibility.
- Rain water harvesting/recovery off of rooftops for example, for domestic use (e.g. for toilet flushing/washing, soil wetting, etc.) is permitted;
- AAOİAŞ will implement technically and financially feasible and cost-effective measures for improving efficiency in its consumption of water, with a focus on areas that are considered core business activities (where benchmarking data are available, a comparison to establish the relative level of efficiency will be made).

Waste Water Treatment Plant (WWTP) Maintenance

Maintenance intervals may be shortened based on the results of the previous maintenance and the characteristics and quantity of the wastewater.

General cleaning and maintenance

- Regarding general cleaning and maintenance: the environmental engineer on site will check daily for leaks, and the maintenance staff will check the pump, motor, etc. monthly. In addition, the company that installed the treatment system will check it annually.
- This interval may be shortened depending on the pollution and density of the incoming water.
- No chemicals that may damage the system equipment should be used during cleaning.
- If the pumps remain unused for a long time, the suction and discharge lines should be checked before operation, and the pump should be dismantled, cleaned, and then operated.
- The accumulation of dirt or residue inside the pump must be prevented; no residue or debris should be left inside the pump.
- For cleaning the manometer, Solvents and chemicals that could damage the acrylic material should not be used. It should be cleaned using only water and soap.

Routine Inspection and Maintenance

Whenever routine inspections are performed, the following steps should be followed:

- Electrical cable connections should be checked.
- Check for any abnormal noise or vibration.
- Check for any leakage in the pump and pipeline.
- Check for any corrosion on the pump or its components.

The following checks should be performed every three months in accordance with the instructions below:

- Connections should be inspected.
- O-rings and gaskets should be checked to ensure that there are no leaks.

Yearly Inspection and Maintenance

- Pump capacity is checked (as specified on the equipment nameplate).
- Pump pressure is checked (as specified on the equipment nameplate).
- Pump power is checked (as specified on the equipment nameplate).

If the system requirements have not changed and the discharge or wastewater pump performance does not meet the process needs, follow the instructions below. Same control and steps will be followed up for the aeration and disinfection pump etc.

1. Remove the pump from its installation location.
2. Inspect the pump.
3. Replace any worn-out parts.

In addition to general risks during operation, there are specific risks associated with the characteristics of this system.
The system may create conditions that adversely affect human health, particularly due to chemical (such as chlorine) and electrical hazards. To minimize these risks, attention should be paid to the following points:

- Considering the possibility of exposure to chemicals, appropriate protective clothing and equipment must be used during chemical refilling, equipment inspection, or any work involving the container.
- Individuals other than authorized personnel must not interfere with the facility, especially the dosing system, and must not be allowed to climb onto the tank under any circumstances.
- No intervention should be made inside the electrical panel without the knowledge and approval of the manufacturer.

Industrial Wastewater (Sourced from Concrete Batch Plants)

- To reuse of wastewater generated in concrete batching plants, three-compartment settling ponds that each compartment will be 1 m depth, 2 m width and 3 m length should be constructed The sedimentation amount in the sedimentation tanks will be monitored through daily inspections and cleaned according to the fill level... In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary pools and installations should be constructed for the reuse of water at these stations.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site unless this wash-water is directed to a dirty water collection and treatment system or stored for approved reuse on site;
- No discharge of cement contaminated waters to the construction phase drainage system or directly to any natural watercourse will be allowed;
- Any water containing cement-based products that cannot be reused or recycled on site must be collected within a suitable wastewater collection system and then transported by tanker offsite for treatment and disposal at a reputable and licensed facility;

- Following completion of the concrete works, water contained within the washout sump of the concrete batch plant will need to be pumped to a tanker and removed from site to a licensed waste facility and the washout area will then be cleared and fully reinstated.

Mitigation Measures for Surface and Groundwater Quality

- In the selection of temporary storage sites for oil, fuel and chemicals, the location of the water resources will be taken into consideration. Handling of all hazardous materials will be supervised. Impervious bunds and other containment techniques will be used where hazardous materials are handled.
- Waste oils will be stored in tanks/containers located on impervious surfaces.
- Secondary containment will be provided (on concrete surfaces) for all the storage tanks/barrels containing chemicals including diesel fuels or hazardous liquid wastes. Absorbents will be kept available at storage sites, if necessary. The volume of containment structures allocated for the storage of fuel, oil or other chemicals will be sufficiently greater than the volume of contained liquid.
- Fueling of equipment and vehicles will not be conducted within excavated areas. Equipment and vehicles will get their fuels at designated areas.
- Hazardous materials will not be stored within excavated areas. Supervision will be used during the handling of all hazardous materials. Impervious bunds and other containment techniques will be used where hazardous materials are handled.
- All wastewater discharges from all components of the construction must comply with relevant legal requirements. Treated water will be reused for planting purposes where possible and feasible. When water quality criteria allow, storm water will be managed as a resource for meeting the Project's water needs whenever feasible.
- For facilities with a small number of workers where a treatment plant is not feasible, septic tanks will be used, and these tanks will be frequently emptied by vacuum trucks.
- The disposal of the wastewater collected by the vacuum trucks will be carried out at appropriate district municipal treatment facilities under a contractual agreement. The frequency of vacuum truck wastewater removal will be recorded.
- Quarry pond dredging activities will be designed and implemented in material quarries to minimize drawdown with consideration of potential impacts to surface and groundwater resource flow and availability.
- When water quality criteria allow, storm water also will be managed as a resource for meeting water needs of the Project whenever feasible.
- Before discharging according to relevant legal requirements, drainage from excavations will be collected and treated to remove contaminants. Perimeter drains will be constructed around all working areas to collect potentially contaminated run-off and direct it to a system of settlement tanks before discharge in accordance with required permits. Layout of the drainage networks designed in the project components are provided in *Appendix A. (*For illustration purposes, the water and sewerline layout of the Manavgat 2nd Camp Site has been included.)
- Direct discharge of contaminated run-off from work sites will not be allowed.
- In order to provide direct run-off to the collection system; channels, bunds and sandbag barriers will be used.
- In order to keep roads and other surfaces clear of dust, sweeping will be used rather than washing.
- In order to ensure a proper and efficient construction process, maintenance and inspection of all facilities and structures will be done regularly; especially heavy rainfall. Sediment deposits will be regularly removed and disposed of either by spreading on site (if uncontaminated) or at a suitably licensed facility.
- High sediment generating activities such as road paving will be avoided and exposed surfaces and stored materials covered if necessary to reduce erosion of sediments into surface waters.

- During construction, an Emergency Preparedness and Response Plan will be implemented for any spills and leakages.
- Exposure to areas of open ground will be kept minimum in size and duration.
- The regular cleaning, maintenance, and inspection of package wastewater treatment plants will be ensured.
- The pipeline from the wastewater source to the package wastewater treatment plant will be robust enough to withstand heavy vehicle loads. This will prevent blockages and/or leaks.

Mitigation Measures for Surface Water Bodies and Channels

- Whenever and wherever possible; construction of bridges, viaducts, retaining walls and other structures will be carried out during lean water season months.
- Fencing will be used at sensitive areas of rivers and drains for protection.
- Isolation techniques such as beaming or diversion during construction to limit the exposure of disturbed sediments to moving water will be used during in-stream works.
- In order to protect small drains within the construction areas, they will be covered with metal plates which can be passed over by construction machines.
- For Stream crossings the work will be carried out from the banks above the channel and avoiding direct intervention in the watercourse unless the existing bank reinforcement needs to be replaced. The works will be undertaken during periods of low flow. Duration of in-stream activities will also be restricted.
- Use of grass turf from adjacent areas to cover the soil surface, use of erosion control blankets or mats and other relevant soil erosion prevention measures will be implemented after the finalization of earthwork.

Mitigation Measures for Water Ingress into the Tunnels

- The expected volume of water ingress into the tunnels will be calculated prior to the layout of construction sites being defined.
- Tunnel water settlement ponds will be conservatively sized taking that calculation and best practice guidance on settlement pond sizing into account.
- Mitigation to avoid cement contamination of tunnel waters will be defined and detailed. The waters coming out of tunnels will be diverted to sedimentation ponds adequately sized for receiving the whole flow.
- After sedimentation ponds, in accordance with the measured parameters, the effluent will be discharged if the limits are met.

Mitigation on water usage amount

- During the land preparation and construction activities, wastewater will be generated from construction sites and accommodation facilities for workers (campsite, kitchen, cafeteria, etc.). The basic approach will be to reuse the wastewater generated by project activities in the activity cycle during construction. This approach will not require any water discharge to environmental media. Especially for the reuse of wastewater generated in concrete batching plants, three-compartment settling ponds will be constructed. In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary pools and installations will be constructed for the reuse of water at these stations. It is planned to reuse treated water to prevent dusting. Water used in concrete plants will be filtered in watertight sedimentation ponds and reused. These ponds will be frequently cleaned by the responsible person(s) according to the plan, thus preventing overflow.

- A separate vehicle washing station will be established, and the used water will be reused after passing through a sedimentation pond. The cleaning of the sediment that accumulates at the bottom of this pond will be scheduled.

The Project Sponsor (AAOİAŞ) is responsible for overseeing wastewater and storm water management in line with national regulations. The Environmental Department of the Contractor is responsible for on-site implementation, supervision, and inspection of mitigation measures. Compliance with all legal requirements related to water management should be ensured throughout the construction phase.

VIII. TRAINING

Upon hiring, all staff will receive structured training on potential environmental and social impacts relevant to their roles, including the sources, consequences, and associated risks (e.g., emissions, pollution, noise, vibration, waste, or safety hazards), as well as the corresponding mitigation measures applicable to their responsibilities (e.g., proper use of protective equipment, safe operation of machinery, implementation of control measures). In addition, personnel assigned to monitoring activities will be provided with specialized training to ensure accurate, effective, and compliant performance of their duties.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of water quality mitigation measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, water quality trends, stakeholder concerns, or changes in applicable environmental regulations.

Monitoring activities will be coordinated by the E&S Manager, in close collaboration with the E&S team and Construction Management teams. Key responsibilities will include verifying the implementation of water pollution prevention practices, monitoring wastewater discharge points, evaluating the maintenance status of wastewater treatment systems, and ensuring the consistent application of mitigation measures near sensitive water bodies such as streams, wetlands, and groundwater recharge zones.

Regular water quality monitoring will be conducted at designated locations across all worksites to evaluate compliance with national surface and groundwater quality standards and Project-specific discharge limits. This will include the measurement of key parameters such as pH, COD, BOD, TSS, oil and grease, and heavy metals, as well as visual inspections of discharge outlets and checks on containment systems for fuel and chemical storage.

The performance of contractors and subcontractors in implementing water quality management requirements will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and to ensure recurrence is prevented.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, including the Ministry of Environment, Urbanization and Climate Change, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may

include review of monitoring data, on-site water pollution control practices, and documentation of compliance.

Monitoring efforts will be guided by the framework provided in Table VIII.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of measurements, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of water quality mitigation measures and ensuring full compliance with national regulations and Project standards.

Table IX.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
suppliers' water availability and capacity	Project office	Document review	Monthly	AAOİAŞ,EPC
Discharge water analysis (BOD, COD, TSS, pH, Total Nitrogen, Total Phosphorus, Oil and Grease, Total Coliform Bacteria	Camp Sites(Km 64+500, Km 87+800, Km 124+300)	Water quality sampling, laboratory analyses	*In the period to be specified in the environmental permit	AAOİAŞ,EPC, Accredited Laboratories
Sources and amount of water supply;	Project Office; Camp Sites	Document review	Monthly	AAOİAŞ,EPC,
Water supply permit from surface and groundwater	Project Office	Document review	Monthly	AAOİAŞ,EPC
Environmental permits, wastewater disposal agreements, channel connection permits, treatment plant capacity, discharge volumes	Package domestic wastewater treatment plants	Document review	Quarterly	AAOİAŞ,EPC,
Water quality	Water supply point for humanitarian usage	Water quality sampling, laboratory analyses	Quarterly	AAOİAŞ,EPC, Community Health Laboratory
Wastewater management practices at concrete plants	Camp Sites; Concrete Plant locations	Site audit; document review	Quarterly	AAOİAŞ,EPC,
Waste water treatment plant maintenance and inspection records	Project Office	Document review	Quarterly	AAOİAŞ,EPC
Baseline monitoring surface and ground water quality measurement (Table 5, the Annex.5 of Regulation on Surface Water Quality, and IFC EHS Guideline Environmental Waste water and Ambient Water Quality)	ESIA baseline sampling points	Laboratory analyses	Annualy	AAOİAŞ, EPC
Kaymazboğazı Stream	Receiving water bodies for treated wastewater discharges	Laboratory analyses	Quarterly	AAOİAŞ, EPC
(WWTP) Maintenance	WWTPs (Camp Sites(Km 64+500, Km 87+800, Km 124+300))	as per the Plan relevant part	Daily, weekly, annually	AAOİAŞ, EPC

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and relevant subcontractors.

All water quality-related findings, including exceedance of limit values, non-compliance incidents, or complaints received from surrounding communities, will be documented in accordance with national environmental regulations and Project procedures. In the event of serious violations—such as significant exceedance of discharge limits or pollution of natural water bodies—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Implementation of Wastewater Management Plan and performance monitoring	Proper management of wastewater in accordance with the plan	Monthly	AAOİAŞ EPC Environmental Engineer
Obtained of all obtained and valid permits for waste water discharge and water supply	Obtaining necessary permits for all treated discharges	Annually	AAOİAŞ, EPC Environmental Engineer
Fulfillment of wastewater discharge standards	Compliance with discharge standards	Monthly	AAOİAŞ, EPC Environmental EngineerAccredited Laboratories
Zero illegal discharges to receiving environment	Zero illegal wastewater discharge to receiving environment	Monthly	AAOİAŞ,EPC Environmental Engineer
Zero - medium spill/pollution incidents	Zero spill/pollution incidents	Monthly	AAOİAŞ,EPC Environmental Engineer
No water pollution detected in surface or groundwater through sampling and testing	Proper management of any identified water pollution	Monthly	AAOİAŞ,EPC Environmental EngineerAccredited Laboratories
Full compliance with relevant procedural and plan requirements	Prevention of pollution from plants and operations	Monthly	AAOİAŞ, EPC Environmental Engineer
All records maintained and kept up to date	Recordkeeping of off-site wastewater transfers	Quarterly	AAOİAŞ,EPC Environmental Engineer
Provision of general (and where necessary, specialized) training to relevant staff	Provision of relevant training to employees	Monthly	AAOİAŞ,EPC Environmental Engineer
Complaints related to water quality	Less than five	Monthly	AAOİAŞ, EPC Environmental Engineer

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. Incidents and non-conformities related to water supply, wastewater discharge, and rainwater will be documented and reported as specified in the plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established plans and procedures. Relevant records that should be reviewed during audits may include the external grievance and suggestion tracking database, internal grievance and suggestion tracking database, training records, non-conformity records, water sampling and analysis reports, wastewater discharge logs, storm water management inspection checklists, and environmental permit documentation related to water use and discharge. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should

review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary.

XII. REPORTING

Regular reporting will be conducted to ensure the effective implementation and continuous improvement of solid waste management activities throughout the construction phase of the Project. Reporting will be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions will be identified, and the required updates will be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections will be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Quarterly Environmental and Social Monitoring Report will cover at least, but not limited to, the following items. The report will be prepared by the SPV with input data provided by EPC to evaluate the Project performance and compliance of the related plans.

- Incident reporting;
- Emergency response reporting;
- Records of annual emergency response training exercises;
- KPIs and performance trends (see Table XII.1) ;
- Current situation Key Monitoring Activities (see Table XII.2)
- Relevant training activities completed and attendance registers to be maintained;
- Legal Authorities Audit reports;
- Site Inspection logs

In addition, the following external reporting will be done:

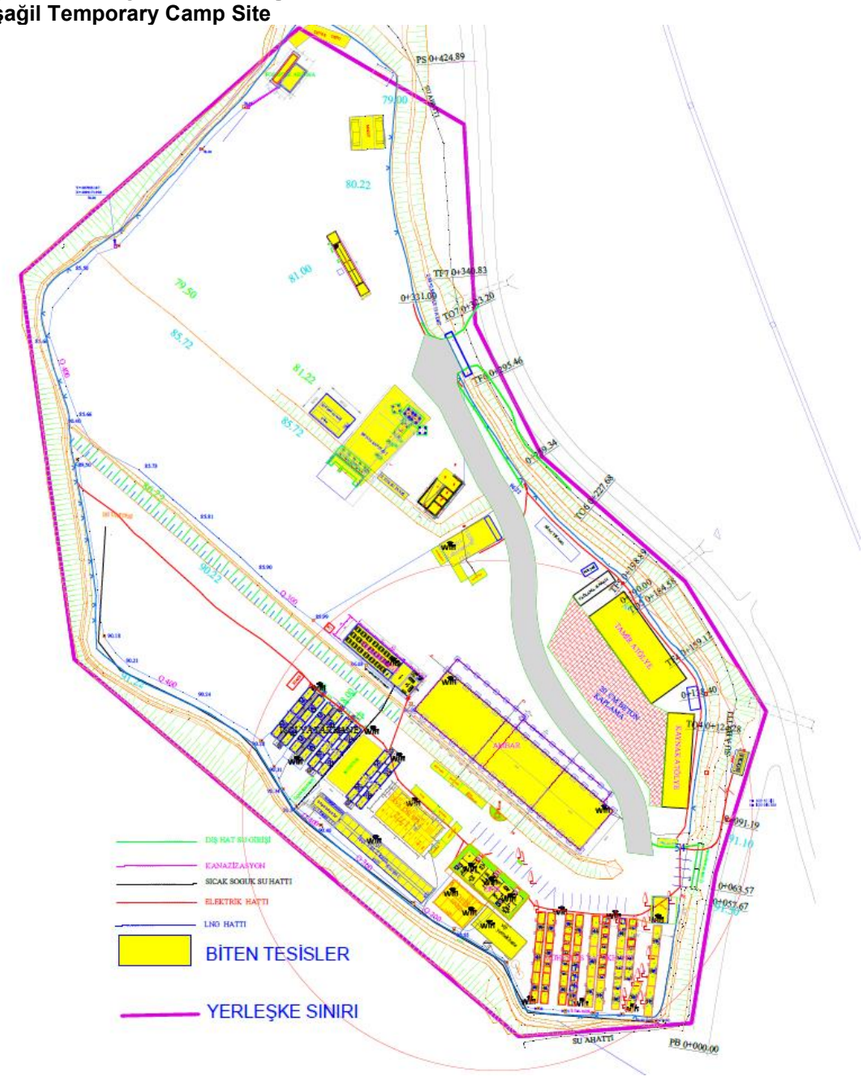
- All environmental and social incidents will be appropriately documented, notified and reported in accordance with established procedures the terms and conditions by EPC to SPV,
- Incident notification and reporting to relevant Turkish regulatory bodies will be performed in line with applicable legislation in force and as stipulated in permits and licenses.
- The Lenders will be notified of incidents pursuant to the terms and conditions agreed upon in the Finance Agreements through SPV.

All personnel are encouraged to raise concerns, suggestions, or complaints related to this Plan through the established grievance mechanism by completing the grievance form. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

XIII. APPENDICES

Appendix A: Layout of Drainage Network of Camp Sites (which are under usage)

Appendix-A: Layout of Drainage Network
Taşağil Temporary Camp Site



Manavgat Camp Site



ANTALYA-ALANYA MOTORWAY PROJECT

Revision No:3
.

Date: 08.09.2025

NOISE and VIBRATION MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision as per comments
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

NOISE and VIBRATION MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health and Safety
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
OHS	Occupational Health and Safety
RCA	Root Cause Analysis
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
WHO	World Health Organization

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province.The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Noise and Vibration Management Plan ("NVMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and Global International Industry Practices ("GIIP"), as well as the expectations of international financial institutions. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

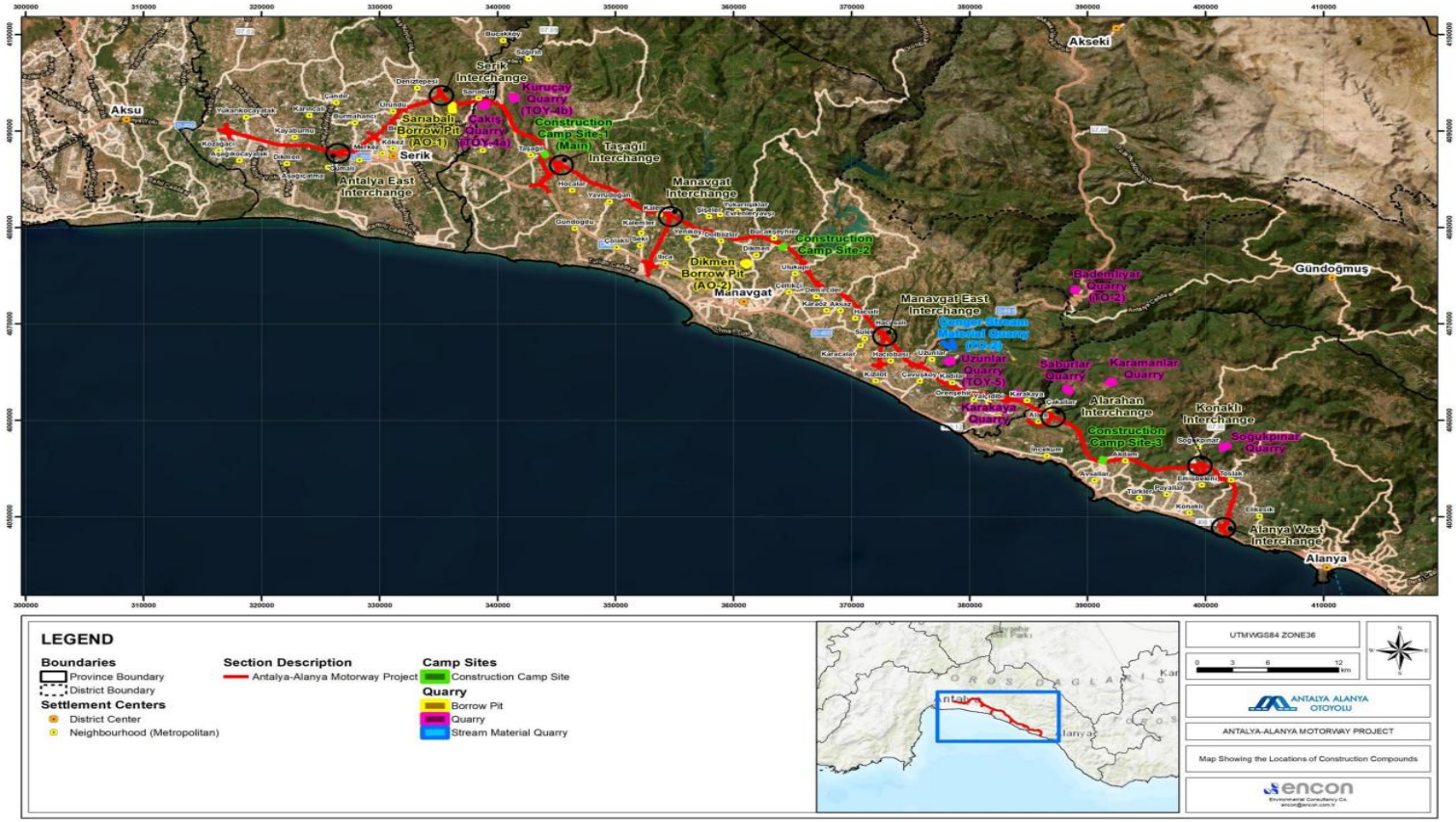

Figure I-1.Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

Excessive noise levels within the scope of the Project's construction activities may primarily arise from the following activities:

- Construction of the motorway itself,
- Construction of the other engineering structures such as the bridges, viaducts, etc,
- Excavation and preparation of construction materials in quarries or stockyards,
- Transportation of excavated and construction materials and workforce,
- Earthworks & Crusher,
- Roadworks.

Increased vibration levels may arise from the following project construction phase activities:

- Piling,
- Operation of vibratory equipment (e.g. compaction),
- Blasting.

I.2 Purpose and Scope

The purpose of this Plan:

- Outline applicable national legislation and standards as relevant to this Plan,
- Identify the sections of applicable international standards to which the Project must comply that are relevant to this Plan,
- Define roles and responsibilities of the personnel, and
- Define mitigation measures.

Moreover, this Plan is to identify significant noise and vibration sources associated with construction activities and to define the necessary mitigation, control, and monitoring measures to minimize potential impacts on the surrounding environment, including both human receptors and wildlife.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The Plan has been developed in line with applicable Turkish regulations and relevant international standards, including the requirements of international financial institutions. The measures described in this Plan should be implemented to ensure that noise levels remain within acceptable limits throughout the construction phase.

This Plan should be implemented by all relevant parties, including the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ), the Main Contractor (Limak), and all subcontractors. Responsibilities for implementation, monitoring, and reporting should be clearly defined. Revisions to the Plan should be made if there are changes in site operations, regulatory updates, or project modifications.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been structured to comply with national legislative requirements and relevant international standards that regulate permissible noise and vibration levels for infrastructure projects. Accordingly, the following references should guide the implementation, monitoring, and performance evaluation of noise and vibration control measures during construction phase.

II.1 National Requirements

The following Turkish laws and regulations form the legal basis for the management of noise and vibration impacts arising from project activities:

- Environmental Law (Law No. 2872)
- Regulation on Environmental Noise Control (Official Gazette: 30.11.2022 – No. 32029)
- Regulation on Noise Emissions to the Environment by Equipment Used in Open Areas (Official Gazette: 30.12.2006 – No. 26392)

Noise limits applicable to project activities are defined under the Regulation on Environmental Noise Control. These limits are summarized in *Table II.1.*

Table II-1 Reference Limits and Standards for Monitoring and Mitigation

Noise Source	Measured Parameter	Environmental Noise Level		
		Daytime	Evening	Night
Industrial facilities, transport sources	LAeq,5min.	65 dB(A)	60 dB(A)	55 dB(A)
Establishments with music broadcasting (1)	LAeq 63-250 Hz	60 dB(A)	55 dB(A)	50 dB(A)
Workplaces (including those with music) (2)	LAeq,5min.	Background + 5 dBA		Background + 3 dBA
Multiple workplaces (3)	LAeq,5min.	Background + 7 dBA		Background + 5 dBA
All sources	LCmax	100 dBC		

(1): These limit values are valid as of 31.12.2023. These limit values are provided in each 1/3 octave band of the specified frequency range. In the acoustic reports prepared until this date; environmental noise measurement results and measures determined as a result of the measurement results taken are included.
(2): Workplaces broadcasting music and marine vessels are included.
(3): Each workplace that contributes to the background noise level is equally responsible for ensuring this limit value. Each workplace takes the necessary measures according to their contribution to noise.

In addition, operating hours for construction activities have been defined to limit noise disturbances, as shown in *Table II.2.*

Table II-2 Time period permitted for outdoor activities in residential areas

Activity	Working Hours
Construction site activities	10:00 – 22:00
Blasting activities in quarries/mines	10:00 – 20:00
Use of fireworks	20.00-22.00
Blasting activities in mines, quarries, and other areas	10.00-20.00

Note: For public interest projects such as dams, bridges, tunnels, highways, and urban roads, working hours may be revised by the Provincial Environmental Board.

Regulations on vibration impacts are also included in the Environmental Noise Control Regulation. The limits are defined for various types of structures and activities as presented in *Table II.3, Table II.4, and Table II.5.*

Table II-3 The maximum permissible values of the ground vibrations caused by the vibrations caused by blasting in mines, quarries and similar areas on the nearest structure

Structure Type	Max Vibration Velocity at Foundation (mm/s)			Max at Top Floor (mm/s)(2)
	f= 1-10	f=10-50	f=50-100(1)	
Industrial buildings	20	40	50	40
Residential buildings	5	15	20	15
Sensitive, historical/natural structures(3)	2	8	10	8

(1) For frequencies greater than 100 cycles/sec, a large vibration level is permissible.
(2) For buildings with more than one story, measurements should be taken both at the foundation of the building and at the slab of the top floor.
(3) These limit values for historical and natural structures may be limited by precise, comprehensive vibration measurements and scientific studies to be carried out on-site.

Table II-4 The maximum permissible values of ground vibrations generated by rail and road transportation vehicles, workplaces and industrial facilities in the nearest building and ground vibrations generated by machinery and equipment inside the building

Structure Type	Frequency Range (Hz)	Permissible Vibration Velocity (rms, mm/s)
Residential buildings	1(1)	1.5
	8-100	0.3
Office buildings	1(2)	3.5
	8-100	0.6
Historical/natural buildings (4)	1(3)	0.8
	8-100	0.1

(1) The maximum permissible vibration speed is determined according to the vibration frequency in the graph drawn logarithmically with the specified values.
For example, between 1 Hz-8 Hz, it decreases linearly from 1.5 mm/sec to 0.3 mm/sec in a logarithmic graph.
(2) The highest permissible vibration speed is determined according to the vibration frequency in the graph drawn logarithmically with the specified values.
For example, between 1 Hz-8 Hz, it decreases linearly from 3.5 mm/sec to 0.6 mm/sec in a logarithmic graph.
(3) The highest permissible vibration speed is determined according to the vibration frequency in the graph drawn logarithmically with the specified values.
For example, between 1 Hz-8 Hz, it decreases linearly in the graph drawn logarithmically from 0.8 mm/sec to 0.1 mm/sec.
(4) These limit values determined for historical and natural structures may be limited by precise, comprehensive vibration measurements and related scientific studies to be carried out on site.

Table II-5 The maximum permissible values of ground vibrations caused by pile driving and similar vibration-generating operations in construction and construction machinery outside the nearest structure (in frequency bands between 1 Hz and 80 Hz)

Area Type	Max Vibration Velocity (Peak Value – mm/s)	
	Continuous Vibration	Intermittent Vibration
Residential Areas	5	10
Commercial Areas	15	30
Historical/Natural Structures (1)	2	5

(1) These limit values determined for historical and natural structures may be limited by sensitive, comprehensive vibration measurements and scientific studies to be carried out on-site.

II.2 International Standards and Conventions

In addition to national requirements, the following international guidelines frameworks, standards and agreements should be considered to ensure alignment with best practices and financial institution requirements:

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework ("ESF") document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects, supported by Environmental and Social Standards ("ESSs"):

Moreover, the following standards, guidelines and directives should be used to align Project practices with international lender requirements and good practice environmental and social management.

- IFC Performance Standards and Sectoral Guidelines (2012)
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- World Health Organization (WHO) Guidelines for Community Noise

The IFC EHS Guidelines recommend noise limits for sensitive receptors, as presented below.

Table II-6 The Noise Level Guidelines (IFC General EHS Guidelines – Noise Management

Receptor	One-Hour LAeq (dBA)	
	Daytime (07:00–22:00)	Night (22:00–07:00)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

As per IFC requirements, noise impacts should not exceed these thresholds or result in an increase of more than 3 dB over baseline levels at the nearest off-site receptor.

II.3 Project Standards

The Project will adopt the most stringent limits between national regulations and international standards to ensure effective management of noise and vibration impacts throughout the construction phase. The reference levels presented in the tables above will be used for monitoring and mitigation planning. In case of exceedances, corrective measures should be implemented immediately. Noise and vibration limits for road construction activities are summarized in *Table II.7*. Similarly, limits for vibration levels generated by construction machinery are given in *Table II.8.*

Table II-7 Project Construction Noise Standards

Receptor	One-Hour LAeq (dBA)	
	Daytime (07:00–22:00)	Night (22:00–07:00)

Residential, institutional, educational	55	45
Industrial, commercial	70	70

Table II-8 Project Construction Vibration Standards

Land Use Type	Max Vibration Velocity (Peak Value – mm/s)	
	Continuous	Intermittent
Residential Areas	5	10
Commercial Areas	15	30
Historical/Natural Structures	2	5

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (“ESMS”) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Noise and Vibration Management Plan:

- Community Health and Safety Management Plan
- Occupational Health and Safety Plan
- Traffic Management Plan,Blasting Management Plan,
- Demolition Management Plan,
- Environmental and Social Management and Monitoring Plan (“ESMMP”)

Each of these plans is linked to the Noise and Vibration Management Plan by addressing sources or impacts of construction-related noise and vibration. The Community Health and Safety Plan manages risks to nearby residents. The Occupational Health and Safety Plan protects workers from noise exposure. The Traffic Management Plan regulates vehicle-related noise. . The ESMMP monitors compliance with noise and vibration controls across all activities.

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

IV. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV):

-Define and implement the overall business strategy and direction of the SPV in alignment with shareholder and stakeholder expectations.

-Ensure the provision of necessary resources and organizational support for the implementation of NVMP.

-Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.

-Support the E&S Manager (SPV) in preparing, disseminating, and implementing this plan.

E&S Manager (SPV):

-Review and ensure the preparation, revision, and implementation of NVMP in accordance with national laws, regulations, company policies, international standards and lender requirements.

-Ensure the development, revision, and execution of project-specific management plans, including the Environmental and Social Management and Monitoring Plan (ESMMP) in accordance with company policies and international standards.

-Monitor the environmental and social performance of EPC and subcontractors to ensure compliance

H&S Manager (SPV):

-Ensure the conditions and obligations specified in the health, safety, community related plans and documents are implemented and adhered to by EPC and subcontractors in accordance with company policies, regulatory obligations, international standards and lender requirements.

-Contribute to project risk assessments and job hazard analyses (JHAs) and ensure these are updated regularly.

-Ensure that all construction site activities are carried out safely by EPC and subcontractors.

Deputy E&S Manager (SPV):

-Lead the development, implementation, and continuous improvement of the Environmental and Social Management.

-Review the ESHS documents of subcontractors and suppliers and ensure that they comply with the Project ESHS requirements.

-Monitor performance through Key Performance Indicators (KPIs), reports, audits, and meetings.

-Oversee incident and non-compliance regarding to noise and vibration, including investigations, corrective/preventive measures, and stakeholder communication.

-Support E&S Manager (SPV) executive decision-making by providing timely reports and insights on E&S performance, risks, and emerging trends.

-Lead community engagement strategies in collaboration with the Environmental Engineer and , and Social Chief to ensure effective grievance management and positive relations with project-affected communities.

-Ensure that EPC and subcontractor provide the necessary training through the review of training records and relevant training documents.

Social Chief (SPV):

-Supervise and mentor CLOs, ensuring their work aligns with project priorities and stakeholder engagement strategy.

-Develop and implement work plans and schedules for the CLO team.

-Ensure that complaints regarding air quality are recorded, processed, and resolved in a timely and transparent manner.

-Ensure accurate, timely, and complete reporting of CLO activities, stakeholder interactions, and grievance outcomes and inform the E&S Deputy Manager about the complaints and coordinate the assessment and solution of grievances with EPC team.

-Coordinate with the E&S Deputy Manager, CLOs and Environmental Engineer and construction teams to address community-related impacts.

Project Director (EPC):

-Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards.

-Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones.

-In case of non-compliance regarding to noise and vibration, ensure appropriate corrective and preventive actions are taken in coordination with the E&S Manager and H&S Manager

E&S Manager (EPC):

-Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.

-Implement environmental and social measures through site practices and method statements.

-Ensure that all conditions and obligations outlined in the The Plan are implemented and adhered to during project activities.

H&S Manager (EPC):

-Ensure the safe execution of construction activities in compliance with NVMP, H&S Plan, legal requirements, international standards, SPV and lender obligations.

-Prepare, review, and improve H&S Plans by integrating noise and vibration control measures into site-specific risk registers, method statements, and monitoring programs.

-Supervise and support Contractors/Subcontractors to implement noise and vibration mitigation measures, and monitor their compliance with H&S and NVMP requirements.

-Coordinate with SPV H&S Manager to address noise/vibration-related incidents, risks, and community safety concerns.

-Ensure that all site personnel receive regular training and toolbox talks covering NVMP obligations,air quality noise/vibration risks, and safe working practices.

-Oversee emergency preparedness and response procedures for noise and vibration incidents (e.g., blast vibration exceedances, community complaints).

-Conduct investigations of noise/vibration-related incidents or complaints, ensure corrective/preventive actions are taken, and report findings to Project Director and SPV.

-Promote a safety-first culture by ensuring noise and vibration risks are proactively managed and lessons learned are integrated into continuous improvement.

Line Manager:

-Ensure the implementation of noise and vibration mitigation measures on site (e.g., use of silencers, mufflers, acoustic barriers).

-Ensure the appropriate selection of vehicles and equipment with low-noise specifications and monitor their regular maintenance to minimize noise and vibration.

-Ensure the proper maintenance of access and internal roads, and enforce speed limits to reduce vibration impacts on nearby sensitive receptors

Environmental Engineer (SPV and EPC):

-Implement and monitor the Noise and Vibration Management Plan (NVMP) on-site, ensuring subcontractor compliance.

-Conduct routine inspections and measurements of noise and vibration levels to verify the effectiveness of mitigation measures.

-Maintain accurate monitoring records and databases, and prepare reports for audits, stakeholders, and regulatory compliance.

-Support training, toolbox talks, and inductions to raise noise and vibration awareness among site personnel.

-Coordinate and follow up corrective and preventive actions for NVMP-related incidents in collaboration with HSE, E&S teams, and subcontractors.

-Liaise with external consultants, laboratories, and regulators for monitoring, reporting, and permit compliance.

-Integrate NVMP requirements into work plans, method statements, and construction activities.

Community Liaison Officer (CLO)(SPV and EPC):

-Communicate with project-affected communities about construction activities, including potential noise-vibration impacts.

-Log, track, and follow up on community complaints or grievances related to noise, ensuring timely resolution via the Grievance Mechanism (GM).

-Support monitoring and documentation of NVMP implementation at site level, including subcontractor activities affecting the community.

-Facilitate equitable community engagement and consultations, ensuring vulnerable or sensitive groups are informed about noise and vibration impacts.

-Coordinate with E&S Manager and other project teams to integrate community feedback into NVMP updates and corrective actions.

V. NOISE AND VIBRATION MANAGEMENT APPROACH

Noise and vibration impacts associated with motorway projects primarily arise during the construction phase from activities such as excavation works, use of heavy machinery and equipment, piling, blasting operations, material transportation, and the operation of batch plants. These sources generate intermittent and continuous noise and ground-borne vibrations, particularly affecting nearby sensitive receptors such as residential areas, schools, hospitals, and ecological habitats.

Vibration impacts during construction are typically associated with activities such as blasting, piling, and the use of vibratory machinery. These operations may result in ground vibrations that can potentially affect structural integrity and human comfort in nearby buildings and facilities. Sensitive receptors, including historical or cultural structures, require particular attention due to their susceptibility to even low levels of vibration.

These impacts should be assessed in the context of current baseline conditions, which show that ambient noise levels in certain areas are already near or above guideline thresholds. As shown in *Table V-1.*

Table V-1.Geographical and Environmental Information of Noise Measurement

Neighborhood	*Coordinates*	*Corresponding Motorway (KM)*	*Environmental Activities*	*Distance to Project Alignment (m)*
Akdam	*393414/4055623*	*127+000*	*Greenhouses, residential areas, a school, and a mosque near a road with vehicle traffic*	*380*
Avsallar	*389720/4055765*	*123+400*	*Greenhouses, residential areas, and hotels near a road with vehicle traffic.*	*640*
Bademliyar	*389655/4072729*	*115+000*	*The Bademliyar quarry is located near the receptor along the Konya-Manavgat D695 highway*	*11,980*
Bucakşeyhler	*363395/4078780*	*86+500*	*Residential areas, tourism facilities, and greenhouses near a road with vehicle traffic.*	*190*
Çakallar	*386572/4060940*	*117+100*	*Residential areas and roads*	*230*
Deniz Tepesi	*334640/4094389*	*52+000*	*Greenhouses and residential areas near a road with vehicle traffic.*	*350*
Emişbeleni	*399364/4055198*	*133+000*	*Greenhouses and residential areas near a road with vehicle traffic.*	*75*
Hacıali	*370544/4070725*	*97+750*	*Greenhouses, residential areas, and a school near a road with vehicle traffic.*	*560*
Hacıobası	*373104/4065985*	*Manavgat East Access Road 1+000*	*Greenhouses and residential areas near a road with vehicle traffic.*	*100*
Kalemler	*353691/4080989*	*76+300*	*Greenhouses and residential areas near a road with vehicle traffic.*	*490*
Karakaya	*385356/4061872*	*115+500*	*Greenhouses and residential areas near a road with vehicle traffic.*	*410*
Konaklı	*401287/404971*	*140+600*	*Greenhouses and residential areas near a road with vehicle traffic.*	*550*

Neighborhood	Coordinates	Corresponding Motorway (KM)	Environmental Activities	Distance to Project Alignment (m)
	7			
Köprüçay	339819/4095932	56+700	Greenhouses, Köprüçay stream, and residential areas near a road with vehicle traffic.	2,860
Sağırin	341974/4097230	57+250	Residential areas, tourism facilities, a school, and a river near a road with vehicle traffic.	4,890
Sarılar	360448/4076493	83+500	Greenhouses, Borrow Pit, and residential areas near a road with vehicle traffic.	2,335
Sarıabalı	337884/4093014	55+400	Greenhouses, Köprüçay stream, and residential areas near a road with vehicle traffic.	0
Serik	330608/4089427	Serik Access Road 7+000	Greenhouses and residential areas near a road with vehicle traffic.	690
Sülek	371900/4068786	100+000	Residential areas near a road with vehicle traffic.	620
Taşağıl	343326/4087476	Taşağıl Access Road 2+500	Antalya-Konya D687 highway and residential areas	310
Ulukapı	365551/4075913	90+300	Greenhouses and residential areas near a road with vehicle traffic.	425
Uzunlar	376876/4066570	105+400	Greenhouses, Çenger stream, and residential areas near a road with vehicle traffic.	1,330

Baseline measurements indicated that sound levels at several locations were close to or exceeded the threshold values set by the Regulation on Environmental Noise Control and IFC EHS Guidelines. This is primarily due to the proximity of 21 main and state roads, 20 settlements, 15 agricultural businesses, 3 tourism spots, 3 schools, 1 mosque, and 4 rivers. No significant existing sources of vibration were identified during baseline assessments. The points where baseline measurements were taken are shown in the Figure V-1. Moreover, measurement results are given in Table V-1.

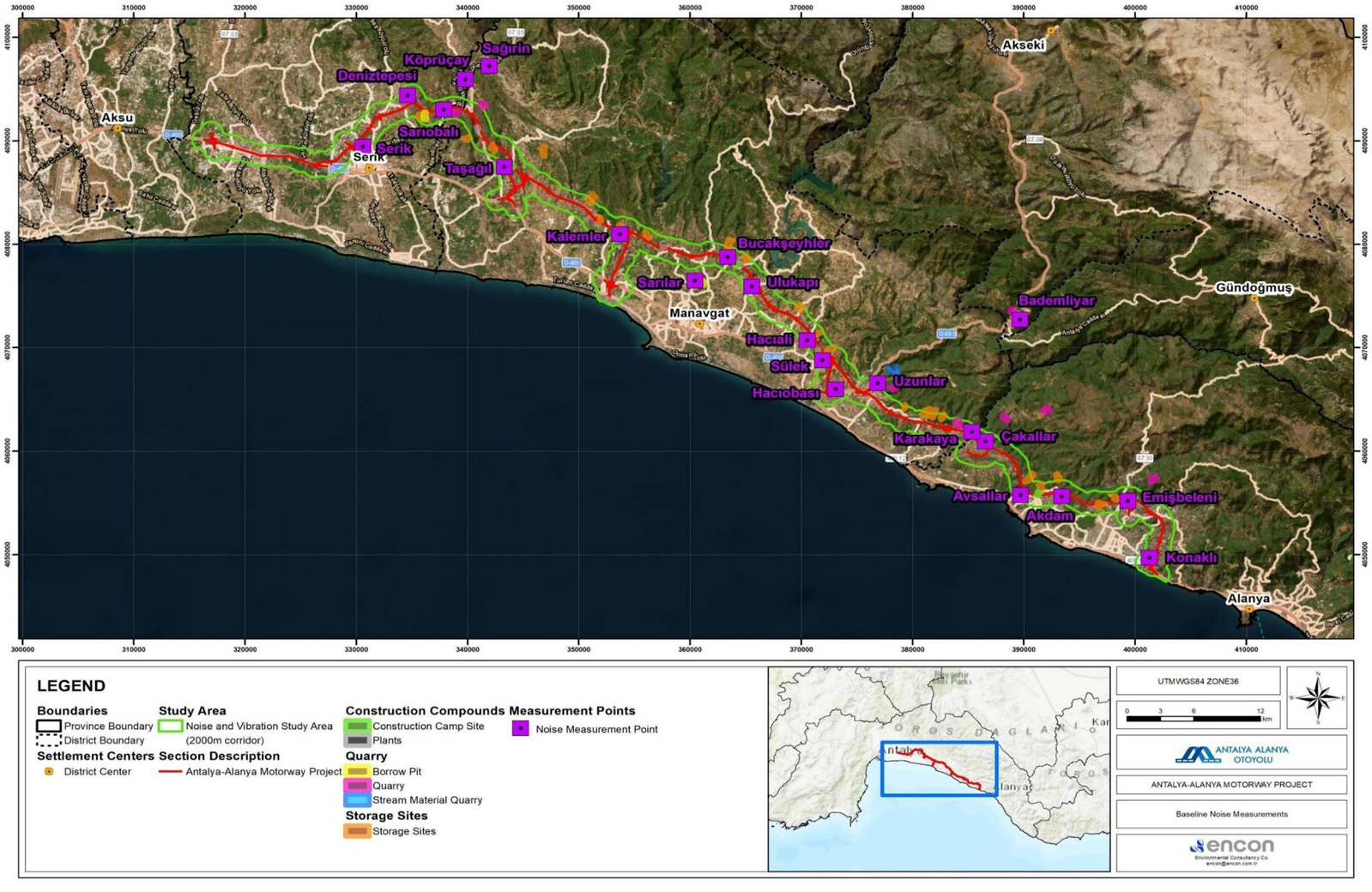

Figure V-1. Baseline Noise Measurements

Table V-1.Noise Measurement Results

Districts	Measurement Date	Environmental Conditions During Sampling	Coordinates (UTM WGS84-Zone 35)		RENC Noise Levels			IFC EHS Guidelines Noise Levels	
			X (North)	Y (East)	L_{eq} Day (7:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)
Sarıabalı	16-17.09.2024	Sunny	337884	4093014	62.4	56.2	53.6	61.5	53.2
	21-22.09.2024	Sunny			61.9	55.7	55.6	61.2	55.5
Sarılar	16-17.09.2024	Sunny	360448	4076493	65.5	63.7	62.0	65.1	62.5
	21-22.09.2024	Sunny			63.1	63.0	59.0	63.2	59.3
Bucakşeyhler	16-17.09.2024	Sunny	363395	4078780	70.3	56.3	55.0	69.3	55.6
	21-22.09.2024	Sunny			65.7	64.3	58.7	65.5	59.3
Kalemler	16-17.09.2024	Sunny	353691	4080989	57.6	52.7	45.7	57.1	45.6
	21-22.09.2024	Sunny			66.0	61.7	60.8	65.5	60.6
Köprüçay	16-17.09.2024	Sunny	339819	409532	63.9	58.6	58.5	63.2	58.8
	21-22.09.2024	Sunny			64.0	62.9	62.8	64.0	62.4
Bademliyar	16-17.09.2024	Sunny	389655	4072729	71.8	56.9	55.5	70.9	55.3
	21-22.09.2024	Sunny			63.3	61.7	61.6	63.2	61.2
Ulukapı	16-17.09.2024	Sunny	365551	4075913	60.2	59.8	59.4	60.4	59.0
	21-22.09.2024	Sunny			62.7	57.9	54.9	62.1	55.0

Districts	Measurement Date	Environmental Conditions During Sampling	Coordinates (UTM WGS84-Zone 35)		RENC Noise Levels			IFC EHS Guidelines Noise Levels	
			X (North)	Y (East)	L_{eq} Day (7:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)
Taşağıl	16-17.09.2024	Sunny	343526	4087476	79.1	68.5	56.4	78.3	56.5
	21-22.09.2024	Sunny			68.8	65.5	65.3	68.4	65.1
Hacıali	16-17.09.2024	Sunny	370544	4070725	73.1	45.6	43.9	72.2	43.5
	21-22.09.2024	Sunny			68.5	67.2	66.0	68.4	65.9
Deniz Tepesi	16-17.09.2024	Sunny	334640	4094389	63.9	55.2	54.8	63.1	54.8
	21-22.09.2024	Sunny			67.0	61.1	57.8	66.3	57.4
Serik	16-17.09.2024	Sunny	330608	4089427	64.4	63.0	60.4	64.3	60.2
	21-22.09.2024	Sunny			66.6	62.2	60.3	66.1	59.9
Konaklı	17-18.09.2024	Sunny	401287	4049717	56.3	52.4	51.6	55.6	51.4
	21-22.09.2024	Sunny			64.4	63.0	60.4	64.3	60.2
Çakallar	17-18.09.2024	Sunny	386572	4060940	58.3	56.5	41.9	57.9	48.7
	21-22.09.2024	Sunny			62.2	62.7	60.7	61.9	61.7
Avsallar	17-18.09.2024	Sunny	389720	4055765	57.2	54.2	53.9	56.8	53.6
	21-22.09.2024	Sunny			61.6	61.5	55.4	61.9	54.9
Akdam	17-18.09.2024	Sunny	393414	4055623	64.4	62.3	61.5	63.8	62.1
	21-22.09.2024	Sunny			62.1	60.2	57.4	62.0	56.9
Emişbeleni	17-18.09.2024	Sunny	399364	4055198	59.8	59.0	52.2	59.8	52.2

Districts	Measurement Date	Environmental Conditions During Sampling	Coordinates (UTM WGS84-Zone 35)		RENC Noise Levels			IFC EHS Guidelines Noise Levels	
			X (North)	Y (East)	L_{eq} Day (7:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)
	21-22.09.2024	Sunny			71.6	69.5	66.7	71.3	66.6
Karakaya	17-18.09.2024	Sunny	385356	4061872	68.7	66.2	62.7	68.5	62.4
	21-22.09.2024	Sunny			73	72.8	63.8	73.2	63.6
Hacıobası	17-18.09.2024	Sunny	373104	4065985	55.9	50.3	50.2	55.3	50.2
	21-22.09.2024	Sunny			61.2	60.2	43.9	61.2	47.6
Uzunlar	17-18.09.2024	Sunny	376876	4066570	62.9	60.6	60.1	62.6	59.8
	21-22.09.2024	Sunny			74.5	62.3	53.5	73.6	54.3
Sülek	17-18.09.2024	Sunny	371900	4068786	57.9	50.5	50.0	57.2	49.8
	21-22.09.2024	Sunny			68.6	66.8	62.4	68.2	63.5
Sağırin	17-18.09.2024	Sunny	341974	4097230	70.7	64.6	64.3	70.1	64.0
	21-22.09.2024	Sunny			67.6	67.0	66.0	67.3	66.5

To ensure compliance with applicable international standards and to minimize adverse impacts on the surrounding environment and communities, appropriate noise and vibration prevention and mitigation measures will be implemented throughout the Project area.

Sensitive receptors, including residential neighborhoods, schools, healthcare facilities, and recreational areas, are locations where vulnerable populations may be more susceptible to the adverse effects of noise and vibration. Within the scope of this Project, several residential areas across the Serik, Manavgat, and Alanya districts have been identified in close proximity to the motorway construction corridor and are listed in *Table V-5* . Due to their location near heavy equipment operations, material transport routes, and potential blasting or piling activities, these areas require careful monitoring and targeted mitigation. All measures will be implemented to ensure that noise and vibration levels at the nearest sensitive receptors remain below threshold values established by national regulations and international guidelines. These measures will be further detailed in this Plan and will be regularly reviewed in response to site conditions and stakeholder feedback.

Table V-5 Settlements Located in The Vicinity of the Motorway Components

Districts	Neighborhoods		
Serik	• Aşağıçatma • Aşağıkocayatak • Burmahancı • Çandır	• Cumalı • Deniztepesi* • Dikmen • Kayaburnu	• Kökez • Merkez • Sarıabalı • Üründü • Yukarıkocayatak
Manavgat	• Aksaz • Aşağıışıklar • Bucakşeyhler* • Çakış • Çavuşköy • Cevizler • Demirciler • Dikmen • Dolbazlar • Evrenleryavşı • Gültepe • Gündoğdu	• Hacıali* • Hacıisalı • Hacıobası • Hatipler • Hocalar • Ilıca • Kadılar • Kalemler* • Karacalar • Karakaya* • Karaöz • Kızılot • Odaönü	• Örenşehir • Sağırin* • Sarılar* • Side • Şişeler • Sülek* • Taşağıl* • Ulukapı • Uzunlar • Yalçıdibi • Yavrudoğan • Yeniköy • Yukarıışıklar
Alanya	• Akdam • Alara • Avsallar	• Çakallar • Elikesik • Emişbeleni* • İncekum	• Konaklı • Soğukpınar • Toslak • Türkler

**Settlements located in areas with significant baseline noise.*

Noise and vibration impacts during construction are closely associated with the location and operation of key project components along the motorway corridor. These include construction camp sites, borrow pits, quarries, stream material quarries, , concrete batching plants, and mechanical plants. The locations, operational capacities, and durations of these facilities are provided in Table V.4, and their spatial distribution is illustrated in Figure V-2. Spread across the Serik, Manavgat, and Alanya districts, many of these facilities are located near settlements identified as sensitive receptors.

Construction camp sites at Km 64+400, 87+500, and 124+300 will generate continuous background noise due to generators, vehicle activity, and workshops. Concrete and asphalt plants will contribute high operational noise from mixers, conveyors, and loaders. Mechanical plants are expected to produce intense machinery noise, especially during peak use. Quarries and borrow pits such as Soğukpınar, Karakaya, and Dikmen may involve blasting and rock breaking, which generate both peak noise and ground-borne vibration. The Çenger Stream Material Quarry poses additional sensitivity due to its proximity to open terrain and watercourses. Given the closeness of these components to residential areas, a targeted monitoring and mitigation strategy will be essential. Measures such as activity scheduling, equipment maintenance, and temporary barriers will be applied as needed. The layout shown in will support the planning of site-specific controls to minimize community exposure.

By aligning targeted noise monitoring with the spatial distribution of sensitive receptors and integrating feedback from community stakeholders, the Project will be better equipped to maintain compliance with national and international standards, while also safeguarding the health and well-being of local communities.

Table V-6 Locations of Borrow Pits / Quarries and Plants

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)	Capacity Information / Operation Period
Km 53+800	Antalya	Serik	Sarıabalı	Sarıabalı (AO-1) Borrow Pit	249,000	375 m^3/hour
						36 months
Km 55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1	13,946	140 m^3/hour
						36 months
Km 56+500	Antalya	Manavgat	Çakış	Çakış (TOY4a) Quarry	247,300	375 m^3/hour
						36 months
Km 58+500	Antalya	Manavgat	Taşağıl	Kuruçay (TOY4b) Quarry	243,000	375 m^3/hour
						36 months
Km 59+400	Antalya	Manavgat	Taşağıl	Concrete Plant-2	66,450	140 m^3/hour
						36 months
				Mechanical Plant-1		550 tonnes/hour
						16 months
				Asphalt Plant-1		240 tonnes/hour
						16 months
Km 64+400	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)	-	
Km 80+400	Antalya	Manavgat	Yeniköy	Concrete Plant-3	15,000	140 m^3/hour
						36 months
Km 83+000	Antalya	Manavgat	Sarılar	Dikmen Borrow Pit	244,000	375 m^3/hour
						36 months
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2	-	
Km 87+700	Antalya	Manavgat	Bucakşeyhler	Concrete Plant-4	42,371	140 m^3/hour
						36 months
				Mechanical Plant-2		550 tonnes/hour
						16 months
				Asphalt Plant-2		240 tonnes/hour
						16 months
Km 89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a	11,665	140 m^3/hour
						36 months
Km 99+200	Antalya	Manavgat	Sülek	Concrete Plant-5	11,977	140 m^3/hour
						36 months
Km 104+750	Antalya	Manavgat	Gençler	Bademliyar (TO2) Quarry	178,000	375 m^3/hour
						36 months
Km 105+000	Antalya	Manavgat	Uzunlar	Çenger Stream Material Quarry	190,000	375 m^3/hour
						36 months
Km 106+000	Antalya	Manavgat	Uzunlar	Uzunlar (TOY5) Quarry	246,000	375 m^3/hour
						36 months
Km 114+200	Antalya	Manavgat	Karakaya	Karakaya Quarry	249,100	375 m^3/hour

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)	Capacity Information / Operation Period
						36 months
Km 117+000	Antalya	Alanya	Saburlar	Saburlar Quarry	249,400	375 m^3/hour
						36 months
Km 119+500	Antalya	Alanya	Karamanlar	Karamanlar Quarry	311,900	375 m^3/hour
						36 months
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3	-	
				Concrete Plant-6	85,000	140 m^3/hour
						36 months
				Mechanical Plant-3		550 tonnes/hour
						16 months
				Asphalt Plant-3		550 tonnes/hour
						16 months
Km 134+000	Antalya	Alanya	Soğukpınar	Soğukpınar Quarry	251,000	375 m^3/hour
						36 months

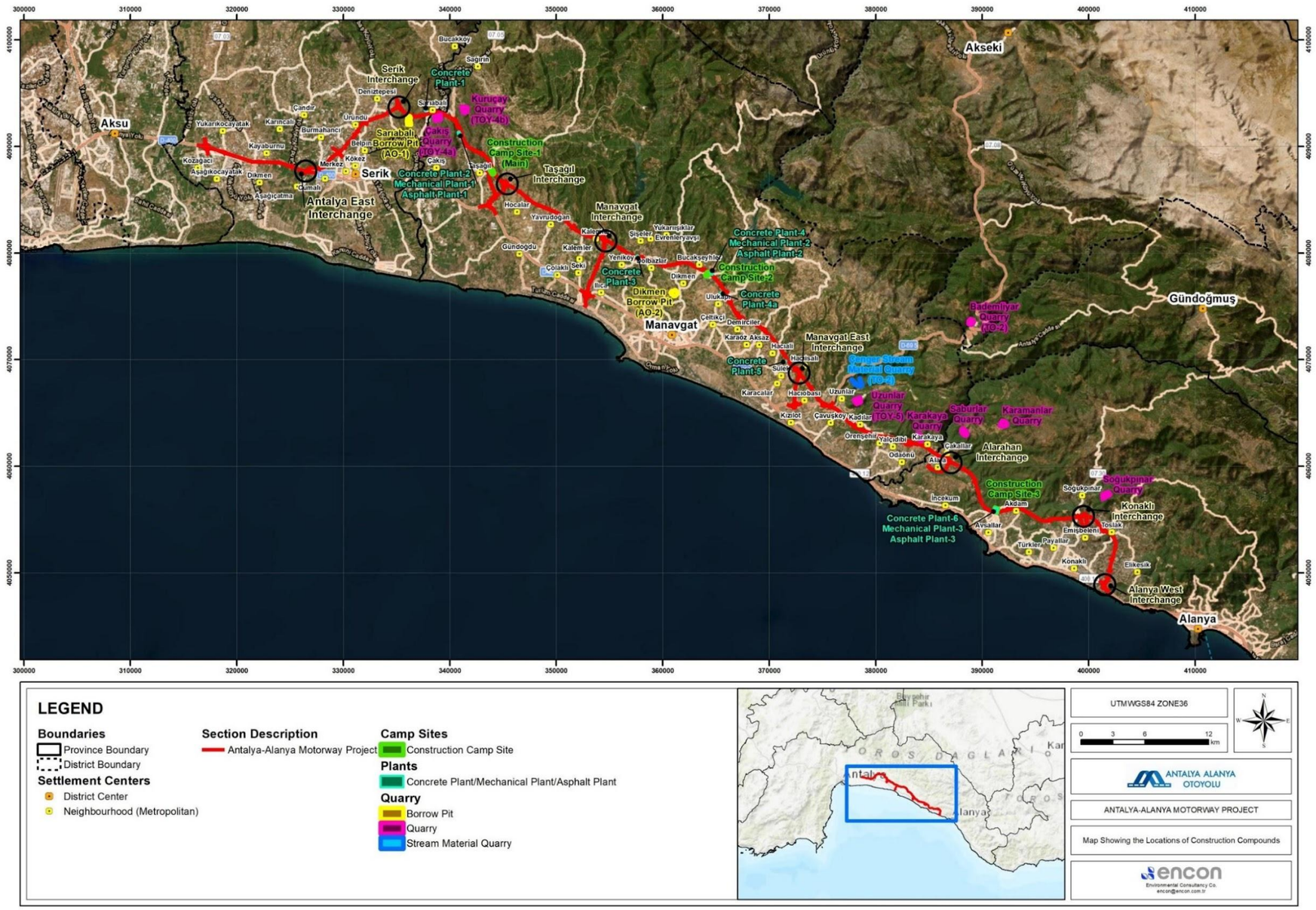

Figure V-2.Spatial Distribution of Construction Camp Sites, Plants, and Material Sources along the Project Route

To assess the potential vibration impacts caused by blasting activities, sensitivity analyses were conducted individually for the settlements that may be affected by the planned tunnel and cut blasting operations. The results of these analyses are presented below.

To support these findings, blast vibration assessments were carried out to identify areas that may be subject to potential impacts based on their proximity to vibration-sensitive structures. For tunnels (Table V-2**Error! Reference source not found.**), and cuts and foundations (Table V-3), the vibration limits are set at 10 mm/s for durable structures and 5 mm/s for vibration-sensitive structures such as mosques, cultural heritage sites, and schools. In contrast, for quarries and borrow pits (Table V-4), the allowable limits increase to 15 mm/s for durable structures and 8 mm/s for vibration-sensitive structures. These assessments help determine which environments could pose risks to sensitive sites and guide the implementation of appropriate safety standards.

Table V-2.Blast Vibration assessment for tunnels with vibration of 10mm/s for durable structures and 5 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact
Tunnel 1	Start Km: 54+311	Sarıabalı	158	10.82	3.77	**-6.23**	**-1.23**	**No Impact**
	End Km: 55+378		40	10.82	34.19	**24.19**		**Potential Impact**
	End Km: 55+378	HRM 8*	177	10.82	3.14		**-1.86**	**No Impact**
	Start Km: 54+311	Student Hostel	700	10.82	0.35		**-4.65**	**No Impact**
Tunnel 2	Start Km: 57+366	Çakış	215	10.82	2.30	**-7.70**		**No Impact**
	End Km: 57+985		750	10.82	0.31	**-9.69**		**No Impact**
	Start Km: 57+366	HRM 8*	53	10.82	21.77		**16.77**	**Potential Impact****
Tunnel 3	Start Km: 60+935	Taşağıl	195	10.82	2.69	**-7.31**		**No Impact**
	End Km: 62+477		80	10.82	11.24	**1.24**		**Potential Impact**
	End Km: 62+477	HRM 11*	196	10.82	2.67		**-2.33**	**No Impact**
	End Km: 62+477	Mosque	845	10.82	0.26		**-4.74**	**No Impact**
Tunnel 4	Start Km: 70+131	HRM 16*	163	10.82	3.59		**-1.41**	**No Impact**
	End Km: 70+475		60	10.82	17.84		**12.84**	**Potential Impact****
	End Km: 70+475		60	10.82	17.84		**12.84**	**Potential Impact****
Tunnel 5	Start Km: 88+671	Ulukapı	150	10.82	4.10	**-5.90**		**No Impact**
	End Km: 89+544		110	10.82	6.74	**-3.26**		**No Impact**
	End Km: 89+544	HRM 36*	248	10.82	1.83		**-3.17**	**No Impact**
	End Km: 89+544	Mosque	854	10.82	0.25		**-4.75**	**No Impact**

**See Chapter 13 of ESIA for the details of the locations of Cultural Heritage sites*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table XI.35 of ESIA to address these potential impacts*

Table V-3.Blast vibration assessment for Quarries and Borrow Pits with vibration of 15mm/s for durable structures and 8 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 15 mm/s for Durable Structures	Exceedence of the limit of 8 mm/s for Vibration Sensitive Structures	Vibration Impact
Sarıabalı (AO-1) Borrow Pit	Km 53+800	Sarıabalı	63	10.82	16.49	**1.49**		**Potential Impact**
		Student Hostel	720	10.82	0.33		**-7.67**	**No Impact**
Çakış (TOY4a) Quarry	Km 56+500	Çakış	180	10.82	3.06	**-11.94**		**No Impact**
		Mosque	570	10.82	0.48		**-7.52**	**No Impact**
Kuruçay (TOY4b) Quarry	Km 58+500	Sağırin	800	10.82	0.28	**-14.72**		**No Impact**
		HRM 8*	720	10.82	0.33		**-7.67**	**No Impact**
Dikmen Borrow Pit	Km 83+000	Sarılar	100	10.82	7.86	**-7.14**		**No Impact**
		HRM 20*	100**	10.82	7.82	**-**	**-0.18**	**No Impact**
		Mosque	770	10.82	0.30		**-7.70**	**No Impact**
Bademliyar (TO2) Quarry	Km 104+750	Güçlüköy	1060	10.82	0.18	**-14.82**		**No Impact**
		School	1060	10.82	0.18		**-7.82**	**No Impact**
Uzunlar (TOY5) Quarry	Km 106+000	Uzunlar	910	10.82	0.23	**-14.77**		**No Impact**
Karakaya Quarry	Km 114+200	Karakaya	460	10.82	0.68	**-14.32**		**No Impact**
		School	620	10.82	0.42		**-7.58**	**No Impact**
Saburlar Quarry	Km 117+000	Saburlar	71	10.82	13.61	**-1.39**		**No Impact**
		Mosque	400	10.82	0.85		**-7.15**	**No Impact**
Karamanlar Quarry	Km 119+500	Karamanlar	366	10.82	0.98	**-14.02**		**No Impact**
Soğukpınar Quarry	Km 134+000	Toslak	326	10.82	1.18	**-13.82**		**No Impact**

** See Chapter 13 of ESIA for the details of the locations of Cultural Heritage sites*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table XI.35 to address these potential impacts*

Table V-4.Blast Vibration Assessment for Cut, and Foundation with vibration of 10mm/s for durable structures and 5 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact
Cut and Foundation	Serik Access Road Km 2+000	Sarıabalı	30	10.82	54.26	**44.26**		**Potential Impact**
		Mosque	820	10.82	0.27		**-4.73**	**No Impact**
	Serik Access Road Km 1+700	HRM 58	10**	10.82	316.41	**-**	**311.41**	**Potential Impact**
	Km 52+500	Deniztepesi	125	10.82	5.49	**-4.51**		**No Impact**
		HRM 5*	5**	10.82	962.52	**-**	**957.52**	**Potential Impact**
	Km 53+500	Sarıabalı	60	10.82	17.84	**7.84**		**Potential Impact**
		Student Hostel	990	10.82	0.20		**-4.80**	**No Impact**
	Km 58+800	HRM 9*	-**	10.82	-	**-**	**-**	**No Impact**
	Km 66+200	Hocalar	91	10.82	9.14	**-0.86**		**No Impact**
	Km 66+500	HRM 12*	332	10.82	1.15		**-3.85**	**No Impact**
	Km 73+500	Yavrudoğan	32	10.82	48.92	**38.92**		**Potential Impact**
	Km 76+500	Kalemler	26	10.82	68.27	**58.27**		**Potential Impact**
		Mosque	235	10.82	1.99		**-3.01**	**No Impact**
	Km 79+000	Yeniköy	110	10.82	6.74	**-3.26**		**No Impact**
	Km 84+000	Yukarıışıklar	62	10.82	16.92	**6.92**		**Potential Impact**
		Mosque	640	10.82	0.40		**-4.60**	**No Impact**
	Km 85+000	Dikmen	65	10.82	15.69	**5.69**		**Potential Impact**
		HRM 27*	166	10.82	3.48		**-1.52**	**No Impact**
		Mosque	290	10.82	1.42		**-3.58**	**No Impact**
	Km 94+500	Karaöz	57	10.82	19.37	**9.37**		**Potential Impact**
	Km 95+500	Aksaz	44	10.82	29.34	**19.34**		**Potential Impact**
		HRM 38*	15**	10.82	165.06	**-**	**160.06**	**Potential Impact**
	Km 97+500	Hacıali	51	10.82	23.15	**13.15**		**Potential Impact**
		School	510	10.82	0.57		**-4.43**	**No Impact**
	Km 100+500	Hacıaisalı	56	10.82	19.93	**9.93**		**Potential Impact**
	Km 104+500	Uzunlar	121	10.82	5.79	**-4.21**		**No Impact**
		HRM 41*	20	10.82	104.02		**99.02**	**Potential Impact**
		Mosque	260	10.82	1.70		**-3.30**	**No Impact**
	Km 105+500	Uzunlar	144	10.82	4.38	**-5.62**		**No Impact**
		School	800	10.82	0.28		**-4.72**	**No Impact**
	Km 112+000	Yalçıdibi	35	10.82	42.37	**32.37**		**Potential Impact**
		HRM 45*	30	10.82	54.26		**49.26**	**Potential Impact**

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact
		Mosque	660	10.82	0.38		**-4.62**	**No Impact**
	Km 116+000	HRM 47*	258	10.82	1.72		**-3.28**	**No Impact**
	Km 116+500	Çakallar	53	10.82	21.77	**11.77**		**Potential Impact**
		School	330	10.82	1.16		**-3.84**	**No Impact**
	Km 118+500	Çakallar	55	10.82	20.51	**10.51**		**Potential Impact**
	Km 120+800	HRM 57*	10**	10.82	316.41	**-**	**311.41**	**Potential Impact**
	Km 121+500	Hacılar	587	10.82	0.46	**-9.54**		**No Impact**
		Mosque	876	10.82	0.24		**-4.76**	**No Impact**
	Km 124+000	Avsallar	211	10.82	2.37	**-7.63**		**No Impact**
	Km 126+500	Akdam	30	10.82	54.26	**44.26**		**Potential Impact**
		Mosque	250	10.82	1.81		**-3.19**	**No Impact**
	Km 130+000	Türkler	130	10.82	5.16	**-4.84**		**No Impact**
		Mosque	350	10.82	1.05		**-3.95**	**No Impact**
	Km 133+000	Soğukpınar	39	10.82	35.61	**25.61**		**Potential Impact**
	Km 133+800	HRM 50*	74	10.82	12.74		**7.74**	**Potential Impact****
	Km 136+000	Toslak	65	10.82	15.69	**5.69**		**Potential Impact**
		HRM 51*	100	10.82	7.86		**2.86**	**Potential Impact****
		HRM 52*	106	10.82	7.16		**2.16**	**Potential Impact****
	Km 140+000	Konaklı	27	10.82	64.26	**54.26**		**Potential Impact**
		HRM 53*	26	10.82	68.27		**63.27**	**Potential Impact****
		Mosque	630	10.82	0.41	**-9.59**		**No Impact**
	Km 141+500	Mosque	250	10.82	1.81	**-8.19**		**No Impact**

** See Chapter 13 of ESIA for the details of the locations of Cultural Heritage sites*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table XI.35 of ESIA to address these potential impacts.*

VI. MITIGATION MEASURES FOR IMPACTS OF NOISE AND VIBRATION

AAOİAŞ will be responsible for managing noise and vibration in accordance with the provisions of the Environmental Law (Law No. 2872), the relevant implementing regulations, and applicable international standards. . Mitigation measures will be implemented during the construction phase of the Project. On-site specification, implementation, and supervision of these measures will be under the responsibility of the Environmental Department.

To minimize noise a impacts on nearby sensitive receptors and to ensure compliance with applicable legal limits, the following mitigation measures should be implemented throughout the construction phase:

- Equipment and machinery with lower sound power levels and noise-reduced models will be prioritized when possible and feasible.
- Newer and/or well-maintained vehicles, machinery and equipment will be preferred for procurement.
- Maintenance of construction machinery and equipment will be carried out regularly.
- Silencers will be installed on appropriate machinery and equipment, including mechanical plants machinery and construction vehicle exhausts.
- Portable barriers and acoustic enclosures will be installed around noise-generating stationary machinery, such as power generators, if necessary.
- Speed limits for construction vehicles will be enforced, particularly near sensitive areas.
- Traffic through residential areas will be minimized wherever possible. Dedicated site access roads will be constructed to reach Project components (campsites, the Motorway, quarries etc.) to avoid disturbances in residential areas when necessary.
- Noise monitoring will be conducted during the construction phase according to the Environmental Monitoring Plan Noise levels in nearby settlements will be regularly monitored, and corrective measures will be taken immediately if any exceedance of national regulation and/or international standard limits is detected.
- Any noise related complaints received through the Project's Grievance Mechanism will be assessed, and corrective actions will be implemented as necessary.
- Construction vehicles will not be permitted to keep engines running while waiting to enter the site or waiting on-site.
- Ancillary components in campsites, such as power generators, will be placed with consideration of potential noise disturbances.
- The Motorway alignment will be used for transportation whenever feasible.
- Roads used during the construction of the Motorway will be well maintained.
- Site personnel will be trained to carry out construction activities using noise-reduction methods.
- Vegetated buffer zones should be established between service areas and the road corridor to provide natural noise barriers.
- During the construction phase of the motorway in the Sarıabalı region, it is therefore recommended that machinery and equipment to be used in this area be selected based on low noise emission criteria, and that quarterly (monitoring will be conducted more frequently depending on the intensity of construction work) regular noise monitoring be conducted to ensure compliance with applicable noise limits.

To minimize vibration impacts and ensure compliance with regulatory thresholds, the following measures should be implemented:

- Modern blasting techniques will be employed to minimize vibration, including the use of millisecond delays with low charge weights, which will be determined based on geological formation and rock density.
- Vibration monitoring should be conducted during activities such as piling and blasting, particularly in sensitive areas. Where exceedances are observed, equipment and

methodologies generating lower vibration levels should be adopted.

- To prevent excessive vibration, alternative piling methods (e.g., bored piles instead of driven piles) should be used where feasible.
- The number of blasted holes per shot and total charge amounts per shot will be optimized to comply with the regulatory limit values and minimize fly rock incidents. All blast vibrations will be monitored by using vibrometers to be placed at appropriate locations, with records kept on charge amounts, delays, distance to blast sites, and resulting vibration levels. Blasting activities will adhere to the limit values specified in the Regulation on Environmental Noise Control for ground vibrations.
- Blasting activities will adhere to the limit values specified in the Regulation on Environmental Noise Control for ground vibrations. Records of air shock and vibration measurements will be maintained, and compliance with regulatory limit values will be monitored to minimize impacts on local residents.
- The Construction Noise and Vibration Guide (NSW Government, Transport, Roads and Maritime Services, 2016) recommend minimum working distances from sensitive receptors for vibrating construction equipment. Recommended working distances will be taken into account.
- Prior to the blasting operations, the sensitivity of nearby settlements/buildings against noise and vibration will be assessed. Buildings located within 100 meters of major vibration sources will be identified and assessed for vibration sensitivity prior to construction. Structural conditions of buildings located within 100 meters of the motorway alignment will be recorded before and after construction works to assess any possible vibration-induced damage.
- Detailed records of blasting operations will be kept and blasting related impacts will be closely monitored.
- The number of blasted holes per shot and total charge amounts per shot will be optimized to comply with the regulatory limit values and minimize fly rock incidents. During blasting activities will be kept on charge amounts, delays, distance to blast sites, and resulting vibration levels. During blasting activities, compliance with the limit will be monitored in potential sensitive receptors.
- The Project's grievance mechanism will be active for any complaints related to vibration impacts. Complaints will be thoroughly evaluated, and corrective actions will be implemented as necessary.

The significance of identified impacts before and after the implementation of mitigation measures is presented in the table. During the land preparation and construction phase, noise levels in certain areas—such as Sarıabalı—were found to exceed national daytime limits by up to 3 dB(A), also surpassing IFC's 55 dB(A) threshold. With the implementation of noise control measures, such as proper scheduling, equipment maintenance, and where necessary, temporary barriers, these impacts are expected to be reduced to acceptable levels. Vibration impacts during construction are expected to cause short-term disturbances, particularly near sensitive receptors, but are anticipated to remain within medium to low levels after mitigation. It should be noted that high baseline noise levels in some locations contribute significantly to the overall impact, underscoring the need for continued mitigation and monitoring throughout the Project lifecycle.

VII. TRAINING

Upon hiring, all staff will receive structured training addressing sources of noise and vibration, associated health and environmental risks, and potential impacts on nearby sensitive receptors, along with the corresponding mitigation strategies applicable to their responsibilities within the Project (e.g., appropriate use of protective equipment, operation of low-noise equipment, and adherence to designated work hours). In addition, personnel assigned to noise and vibration monitoring will be provided with specialized training to ensure accurate, effective, and compliant performance of their duties.

VIII. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of the noise and vibration mitigation measures outlined in this Plan during the construction and operation phases of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, noise and vibration trends, stakeholder concerns, or changes in applicable environmental regulations.

Monitoring activities will be coordinated by the Environmental and Social (E&S) Manager (SPV) in close collaboration with the Health and Safety (H&S) Manager (SPV) and the Engineering, Procurement and Construction (EPC) Contractor Director. Key responsibilities will include verifying the implementation of noise and vibration mitigation measures, evaluating the proper functioning and maintenance of construction machinery, and ensuring the consistent application of noise control strategies near sensitive receptors such as residential areas, schools, and healthcare facilities.

Environmental noise level (dBA) will be measured at selected settlements during construction (quarterly or upon complaint) and operation (annually) and compared with legal limit values and Project-specific standards. These measurements will be used to evaluate compliance and identify any needs for corrective actions.

Monitoring activities will include site inspections, review of non-conformance records, and collection of feedback through the Project's Grievance Mechanism. In addition, personnel will be trained to carry out monitoring responsibilities and respond to identified issues.

Performance of contractors and subcontractors in implementing noise and vibration management requirements will be reviewed through environmental audits, site supervision reports, and field observations. Any non-conformities will trigger corrective and preventive action plans. Follow-up assessments will be carried out to confirm the effectiveness of the implemented measures and to prevent recurrence.

In addition to internal monitoring, inspections may be conducted by public institutions, including the Ministry of Environment, Urbanization and Climate Change, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of monitoring records, implementation practices, and compliance documentation.

Monitoring efforts will be guided by the framework provided in Table VIII.1, which outlines the parameters to be monitored, the corresponding monitoring locations, monitoring methods, frequency, and responsible parties. These monitoring activities are essential for evaluating the effectiveness of

noise and vibration control measures and ensuring full compliance with national regulations and Project standards.

Table VIII-1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Environmental noise level (dBA)	Sensitive Receptors considering all Project components including: Construction camp sites, borrow pits, quarries, stream material quarries, asphalt plants, concrete plants, mechanical plants, and nearby residential areas	Site measurements (24-hour average)	Quarterly/ Monthly and upon grievance (depending on the intensity of construction work and the sensitivity of location)	-SPV -EPC -Sub-Contractor -Accredited laboratories
Environmental noise level (dBA)	Sarıabalı District (Sensitive Receptor)	Site measurements (24-hour average)	Quarterly/ Monthly and upon grievance (depending on the intensity of construction work)	-SPV -EPC -Sub-Contractor -Accredited laboratories
Number of non-conformance records related to noise emission management	Project construction areas	Review and control of non-conformance logs	Quarterly	Environmental Eng. (SPV) and Environmental Eng. (EPC)
Number of complaints related to noise emission management	Communities and stakeholders in project vicinity	Documentation under the GM Procedure	Weekly	CLO - SPV and EPC
Ground vibration value	Sensitive Receptors considering all Project components including: Construction camp sites, borrow pits, quarries, stream material quarries, asphalt plants, concrete plants, mechanical plants, and nearby residential areas	Measurement with vibrometer	Quarterly and upon grievance	-SPV -EPC -Sub-Contractor -Accredited laboratories
Number of non-conformance records related to vibration management	Project construction areas	Review and control of non-conformance logs	Quarterly	Environmental Eng. (SPV) and Environmental Eng. (EPC)
Number of complaints related to vibration management	Communities and stakeholders in project vicinity	Documentation under the GM Procedure	Weekly	CLO - SPV and EPC
Number of training sessions conducted	Project personnel and contractor workers	Tracking and recording training delivery	Quarterly	E&S Manager / Deputy E&S Manager (SPV)

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and relevant subcontractors.

All noise and vibration-related findings, including exceedances, non-compliance incidents, or complaints received from surrounding communities, will be documented in accordance with national

environmental regulations and Project procedures. In the event of serious violations—such as significant exceedance of regulatory limits—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

IX. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table IX-1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Percentage of noise monitoring results in compliance with standards referenced in Chapter II.	100%	Quarterly	Environmental Specialist (EPC)
Percentage of vibration monitoring results in compliance with standards referenced in Chapter II.	100%	Quarterly	Environmental Specialist (EPC)
Inspection report coverage for buildings within 100meters of major vibration sources	100%	Monthly	Environmental Specialist (EPC) and Environmental Engineer (EPC)
Number of penalties issued by authorities related to noise exceedances	< 20	Monthly	Environmental and Social (E&S) Manager (SPV)
Complaints related to noise	90% of complaints resolved within two weeks	Continuous (upon each complaint)	Community Liaison Officer (CLO, SPV), and Social Chief (EPC)
Complaints related to vibration	90% of complaints resolved within two weeks	Continuous (upon each complaint)	Community Liaison Officer (CLO, SPV), and Social Chief (EPC)

X. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All noise- and vibration-related non-conformities, incidents, and complaints should be documented and reported as outlined in this Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor, in line with the scope and schedule defined in the Supply Chain and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's environmental and social management procedures. Records to be reviewed during noise and vibration audits will include, but are not limited to, the external and internal grievance and suggestion tracking databases, records of training sessions related to noise and vibration management, non-conformity and incident records, noise and vibration monitoring results, and any documentation of mitigation measures applied near sensitive receptors. Observations and deficiencies identified during audits should be documented in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to maintain compliance with national regulations and applicable international performance standards on noise and vibration management.

XI. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of noise and vibration management activities throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions should be identified, and any required updates should be incorporated into this Plan. The training program will also be revised accordingly to address observed gaps. Regular audits and site inspections should be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Reports should be prepared using data gathered through noise and vibration monitoring activities defined under this Plan. The results and supporting evidence of these monitoring activities (e.g., noise level measurements, vibration monitoring logs, and photographs) should be documented in detail using standardized reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

Reporting activities under this Plan will include noise monitoring data (e.g., dBA levels), the number and nature of vibration-related inspections, training records, mitigation measures implemented at noise-sensitive receptors, and any non-compliance findings. In the event of significant environmental incidents related to noise or vibration (e.g., complaints from sensitive receptors, exceedance of permissible noise or vibration limits), an incident report including root cause analysis (RCA), mitigation, and corrective actions will be prepared.

All monitoring data, together with the outcomes of inspections and audits, will be summarized in the noise and vibration section of the Environmental and Social Monitoring Report prepared on a quarterly basis. This report will include any non-compliances identified, corrective actions taken, and recommendations for time-bound corrective measures. All findings should be supported with documentary evidence, such as site photos, field logs, and measurement results.

All personnel are encouraged to raise concerns, suggestions, or complaints related to noise and vibration management through the established grievance mechanism by completing the designated grievance form. Public grievances regarding construction or traffic noise, ground-borne vibration, or any other related disturbances should also be addressed promptly and followed up accordingly. The available channels for submitting grievances are outlined in the Stakeholder Engagement Plan.

Throughout the construction phase of the Project, this Plan will be reviewed by the Environmental and Social (E&S) Manager (SPV), based on the results of audits, incident reports, and any significant changes in site activities or conditions. Updates to the Plan will be agreed upon between the Environmental and Social (E&S) Manager (SPV), ensuring that it remains responsive to evolving project risks and compliance requirements.

CHANGE MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.04.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

CHANGE MANAGEMENT PLAN

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- **LIST OF ABBREVIATIONS**

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
IFC	International Finance Corporation
KGM	General Directorate of Highways
LACRP	Land Acquisition and Compensation/Resettlement Plan
SEP	Stakeholder Engagement Plan

CHANGE MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Change Management Plan ("CMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

II. PURPOSE AND SCOPE

This Change Management Plan ("the Plan") has been prepared for the Antalya-Alanya Motorway Project ("the Project").

The purpose of this Plan is to define the procedure that should be followed for identifying, documenting, evaluating, approving, and implementing changes that may arise during the construction phase of the Project. The Plan aims to ensure that any proposed changes to the Project—especially those that deviate from the scope and commitments defined in the ESIA—are managed systematically and transparently.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

This Plan should be implemented by all relevant parties, including the Project Sponsor (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. - AAOİAŞ), the Main Contractor (Limak), and all subcontractors involved in the construction phase. Responsibilities for change identification, assessment, mitigation planning, and documentation should be clearly defined.

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

To ensure that the potential environmental and social risks associated with changes are adequately managed, the procedure described in this Plan incorporates applicable Turkish legislation as well as relevant international standards and requirements of international financial institutions. Necessary updates to the Plan should be made when there are modifications to the project design, construction methodology, or legal framework.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

The Plan has been structured to align with both national and international requirements, including legislation, guidelines, and sectoral standards that govern project change processes and environmental compliance obligations. Accordingly, the following sources of reference should be used to guide the implementation and compliance procedures.

III.1 National Requirements

The following Turkish laws and regulations should be used as the legal basis for managing project changes during construction:

- Environmental Law
- Electricity Market Law
- Energy Efficiency Law
- Expropriation Law
- Forestry Law
- Groundwater Law
- Labor Law
- Law on the Conservation of Cultural and Natural Assets
- Law on Improvement of Olive Cultivation and Budding of Wild Species
- Law on Soil Protection and Land Use
- Municipality Law
- National Parks Law
- Occupational Health and Safety Law
- Pasture Law
- Public Hygiene Law
- Resettlement Law
- Highway Traffic Law

III.2 International Standards and Conventions

In addition to national requirements, the following international guidelines and agreements should be considered to ensure alignment with best practices and financial institution requirements:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)

These references should be used to guide the implementation, monitoring, and performance evaluation of change management procedures throughout the construction phase.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with this Plan:

- Environmental Accident and Spill Response Management Plan
- Cultural Heritage Management Plan
- Air Pollution and Emissions Management Plan
- Noise and Vibration Management Plan
- Traffic Management Plan
- Community Health and Safety Management Plan
- Occupational Health and Safety Management Plan
- Hazardous Material Management Plan
- Water, Wastewater, and Storm Water Management Plan
- Solid Waste Management Plan
- Training and Communication Management Plan
- Subcontractor Management Plan
- Construction Camp Site Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

V. ROLES AND RESPONSIBILITIES

SPV E&S Manager:

- Responsible for reviewing and approving the change proposals, ensuring compliance with national regulations and international standards. Provides these oversight to EPC and monitors the correct application of changes.

Project Manager (EPC):

- Provides resources and supports EPC E&S and H&S managers for implementation.

EPC E&S Manager:

- Responsible for implementing the approved changes on site, ensuring all E&S requirements are integrated into construction activities, and reporting progress/challenges to SPV. Coordinates with site supervisors and subcontractors for effective implementation.

H&S Manager (EPC):

- Ensures that proposed and implemented changes are evaluated for occupational health and safety risks, communicates change requirements to workers, and verifies them.

Supervisors (EPC):

- Apply the changes at field level, ensure workers are briefed, and provide feedback to managers about practicality and challenges.

VI. CHANGE MANAGEMENT APPROACH

Changes in such infrastructure projects are considered typical, within this regard there might be changes required for the design and construction methods of the Project. While the most of the changes will be technical with little to no ESIA relevance, the others are expected to be issues that are already covered by the ESIA studies and the Resettlement Action Plan (RAP). An overview of the Change Management Procedure is provided in Figure V.1.

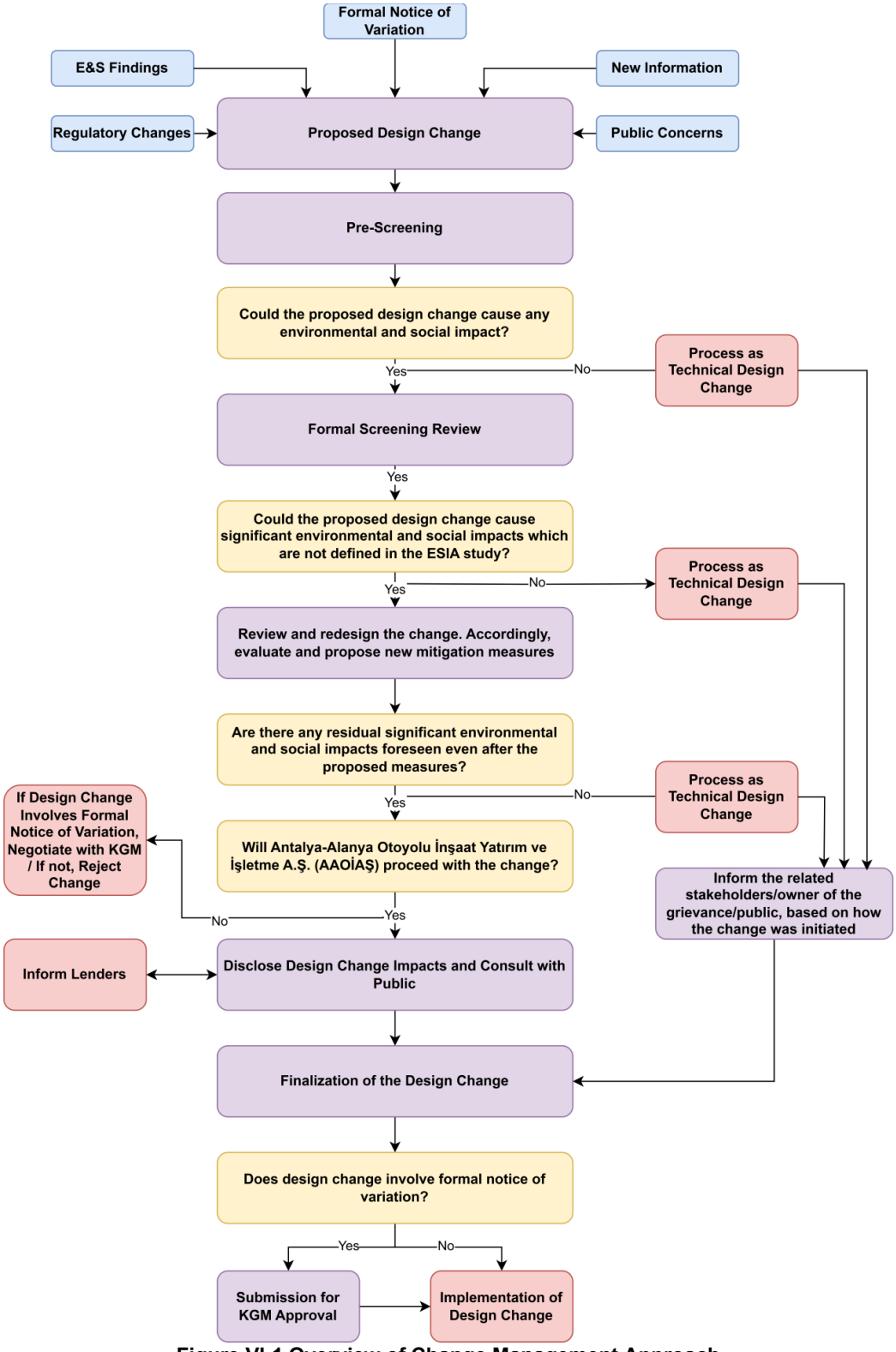

Figure VI-1.Overview of Change Management Approach

VI.1 Sources for Consideration of Change

Possible design changes might occur due to various reasons given below:

- Requests from KGM;
- Detailed design development;
- Changes in construction methodologies;
- Changes in regulations;
- The accepted considerations of the stakeholders raised through the grievance mechanism,
- Concerns expressed by public/stakeholders/lenders; and
- Results of field surveys and monitoring activities.

In addition to the above given cases, change management procedure must be processed formally regardless of the case.

VI.2 Pre-Screening

Pre-screening will ensure that proposed design changes that are not related with the environmental and social issues or that are low in significance in terms of project implementation, will not be evaluated for further screening. If the proposed design changes will not be subjected to further screening, the change will be processed as technical design change. Pre-screening will be performed by Environmental and Social Department of the AAOİAŞ with the support from independent experts, if needed.

VI.3 Screening

For any proposed design changes that could result in new or additional significant impacts which are not defined in the ESIA study, the screening will cover the following process:

- Compliance with Turkish and international regulations and standards;
- Compliance with ESIA-related legal standards and permitting requirements;
- Any new impacts on current stakeholders and impact to new/additional stakeholders which are not considered in ESIA study;
- Any expansion of Project's footprint that requires additional land acquisition and expropriation;
- Impacts on cultural heritage/archaeology; and
- Any additional/different ESIA-related topics that are not evaluated in the ESIA studies.

The screening will be performed by Environmental and Social Department of the AAOİAŞ with the support from independent experts, if needed. Screening results will be logged and recorded in a suitable format (to be determined by AAOİAŞ and Lenders). The screening results will be available for review by the Lenders.

The potential outcomes of the screening of design changes can be grouped as given below:

- **No Significant Environmental and/or Social Impacts:** No significant implications or additional negative impacts are identified compared to the evaluations performed in the ESIA study and change does not require any additional or new mitigation measures. Within this case, the change will be processed as technical design change.
- **Significant Environmental and/or Social Impacts:** Significant or potentially significant implications with respect to ESIA-related topics that could not be mitigated without any additional mitigation and were not evaluated in the ESIA studies. Within this case, screening results will be logged and Change ESIA Review process will be undertaken.

VI.4 Review and Redesign of Change

For the proposed changes that could have significant/potentially significant ESIA-related impacts, Environmental and Social Department of the AAOİAŞ will undertake consultation internally and with independent experts regarding any further mitigation or other measures such as design review, to comply with the relevant ESIA commitments. The significance of a potential impact will be determined based on the corresponding definitions in the ESIA studies for the relevant environmental and social topics. If no further residual significant environmental and social impact is foreseen, the change will be processed as technical design change.

VI.5 Stakeholder Engagement

AAOİAŞ will directly inform relevant stakeholders in writing when a proposed design change is initiated based on their suggestions, complaints, or feedback collected through the Project's grievance mechanism or engagement processes.

If a proposed change is anticipated to result in significant environmental and/or social impacts that cannot be addressed through existing mitigation measures, or if it introduces impacts on stakeholders not previously considered in the ESIA, additional public disclosure and stakeholder engagement should be undertaken. These efforts should be tailored based on the significance, scale, and geographic extent of the anticipated impacts.

While the Project involves a wide range of stakeholders, community-related engagement should particularly focus on the settlements located in the vicinity of the motorway components, as outlined in Table V.1.

Table VI-1.Settlements Located in The Vicinity of the Motorway Components

Districts	Neighborhoods		
Serik	• Aşağıçatma • Aşağıkocayatak • Burmahancı • Çandır	• Cumalı • Deniztepesi • Dikmen • Kayaburnu	• Kökez • Merkez • Sarıabalı • Üründü • Yukarıkocayatak
Manavgat	• Aksaz • Aşağıışıklar • Bucakşeyhler • Çakış • Çavuşköy • Cevizler • Demirciler • Dikmen	• Hacıali • Hacıisalı • Hacıobası • Hatipler • Hocalar • Ilıca • Kadılar • Kalemler	• Örenşehir • Sağırin • Sarılar • Side • Şişeler • Sülek • Taşağıl • Ulukapı

Districts	Neighborhoods		
	• Dolbazlar • Evrenleryavşı • Gültepe • Gündoğdu	• Karacalar • Karakaya • Karaöz • Kızılot • Odaönü	• Uzunlar • Yalçıdibi • Yavrudoğan • Yeniköy • Yukarıışıklar
Alanya	• Akdam • Alara • Avsallar	• Çakallar • Elikesik • Emişbeleni • İncekum	• Konaklı • Soğukpınar • Toslak • Türkler

The type and extent of stakeholder consultation should correspond to the nature of the change and may include public meetings, direct engagement with affected communities, and updates via the Project website. A feedback period of no more than 30 calendar days should be provided to enable meaningful stakeholder input. All regulatory requirements and formal procedures related to stakeholder engagement will be fulfilled during this stage.

AAOİAŞ will also notify the Lenders of any design changes associated with significant environmental and social impacts and will share the relevant supporting documentation, including stakeholder consultation materials and updated mitigation measures.

Following agreement with the Lenders on the reporting and notification procedures, this Plan will be revised by the Environmental and Social Interaction Department of AAOİAŞ, with the support of independent experts, to reflect the final approach to change-related stakeholder communication.

A summary of the proposed change, the stakeholder feedback received, and the planned mitigation measures will be included in public disclosure materials and made available on the official Project website to ensure transparency and accountability.

VI.6 Finalization of the Design Change

Environmental and Social Department of the AAOİAŞ, with the support from independent experts, will review and compile any feedback received from Lenders, public and other affected parties, and will prepare a final design change version that incorporates consideration of the feedback and comments received. Further evaluations of the measures may be needed based on the stakeholder engagement findings.

VI.7 Submission for KGM Approval

If the change is related to a KGM-approved change, then formal notice of variation will be prepared that includes relevant mitigation measures and considerations, and will be submitted to KGM for their approval. After the approval, AAOİAŞ will implement the agreed changes.

If the change is not related to a KGM-approved change, then AAOİAŞ will implement the changes defined in finalized version of the design change.

VII. MONITORING

Monitoring activities under this Plan should be implemented on a case-by-case basis, triggered by the initiation or implementation of changes during the construction phase of the Project. A structured approach should be followed to evaluate whether each proposed or executed change has been properly screened, documented, and managed in accordance with the Change Management Procedure and in line with the commitments outlined in the ESIA, as well as relevant national and international standards.

Monitoring should be coordinated by the E&S Team of AAOİAŞ, in collaboration with the Contractor (Limak) and relevant subcontractors. Key responsibilities include verifying whether proposed changes have undergone formal screening, ensuring the appropriate implementation of additional mitigation measures, and confirming the completeness of all supporting documentation, such as screening records, stakeholder engagement logs, and revised mitigation plans.

Since monitoring is event-based rather than periodic, its scope should reflect the nature, scale, and complexity of the change in question. Special attention should be given to changes that may result in environmental or social risks not previously evaluated in the ESIA, or that affect previously unassessed stakeholders.

In cases of non-compliance—such as the execution of unapproved changes, inadequate documentation, or failure to notify stakeholders—corrective and preventive actions should be initiated without delay. Follow-up assessments should be conducted to evaluate the effectiveness of these measures and to prevent recurrence.

Monitoring outcomes and related documentation should be made available to regulatory authorities or international financial institutions upon request, particularly in the context of audits, inspections, or project-level reviews.

VIII. AUDIT AND REVIEW

The implementation of the Change Management Plan should be subject to periodic audits and internal reviews in accordance with the ESMMP. These audits should evaluate the effectiveness of the change screening, review, and documentation processes, and confirm alignment with ESIA commitments, stakeholder engagement requirements, and applicable legislation.

Audits should be conducted by the E&S teamt of AAOİAŞ, with support from independent experts when necessary. Contractors and subcontractors should also be evaluated for their compliance with change-related responsibilities, including notification, mitigation implementation, and recordkeeping.

Audit findings should be formally documented and shared with Project management and, where appropriate, Lenders and regulatory authorities. Any deficiencies or non-conformities should be recorded, followed by corrective actions with defined timelines and responsibilities. Where recurring issues are observed, the Plan should be revised accordingly to close procedural gaps and improve effectiveness.

The Change Management Plan should be reviewed or in response to major incidents, design updates, or regulatory amendments. Outcomes of the audit process should inform necessary updates to the Plan, training programs, or related management systems.

IX. REPORTING

Effective reporting is essential to ensure transparency, accountability, and traceability in the management of changes during the construction phase of the Project. Reporting under this Plan should address internal monitoring and auditing outcomes, stakeholder engagement related to changes, and compliance with external requirements.

Change-related reports should include:

- A register of all proposed changes screened during the reporting period, including outcomes and categorization (technical vs. ESIA-relevant);
- Documentation of stakeholder engagement related to design changes, including grievances or feedback received;
- Details of any approved changes that resulted in updates to environmental or social mitigation measures;
- Records of corrective actions taken in cases of procedural non-compliance; and
- Notifications submitted to KGM, regulatory authorities, or Lenders, where applicable.

These reports should be incorporated into the quarterly Environmental and Social Monitoring Report, under a dedicated section for Change Management. Supporting documentation—including screening checklists, audit forms, stakeholder communication records, and photographic evidence—should be annexed to the report.

Where significant changes with potential ESIA implications are proposed or implemented, incident reports should be submitted to the Ministry of Environment, Urbanization and Climate Change, in accordance with national regulations.

All personnel should be encouraged to report any unapproved changes, risks, or improvement suggestions through the Project's grievance mechanism. The grievance channels for change-related concerns are outlined in the Stakeholder Engagement Plan (SEP), and all feedback received should be evaluated and integrated into the Plan's continuous improvement process.

COMMUNITY HEALTH AND SAFETY MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

COMMUNITY HEALTH AND SAFETY MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
CSOs	Civil Society Organizations
CHS	Community Health and Safety
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
GBVH	Gender-Based Violence and Harassment
HR	Human Resources
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Sanayi ve Ticaret A.Ş.
OHS	Occupational Health and Safety
RCA	Root Cause Analysis
SEP	Stakeholder Engagement Plan
WHO	World Health Organization

COMMUNITY HEALTH AND SAFETY MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Community Health and Safety Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

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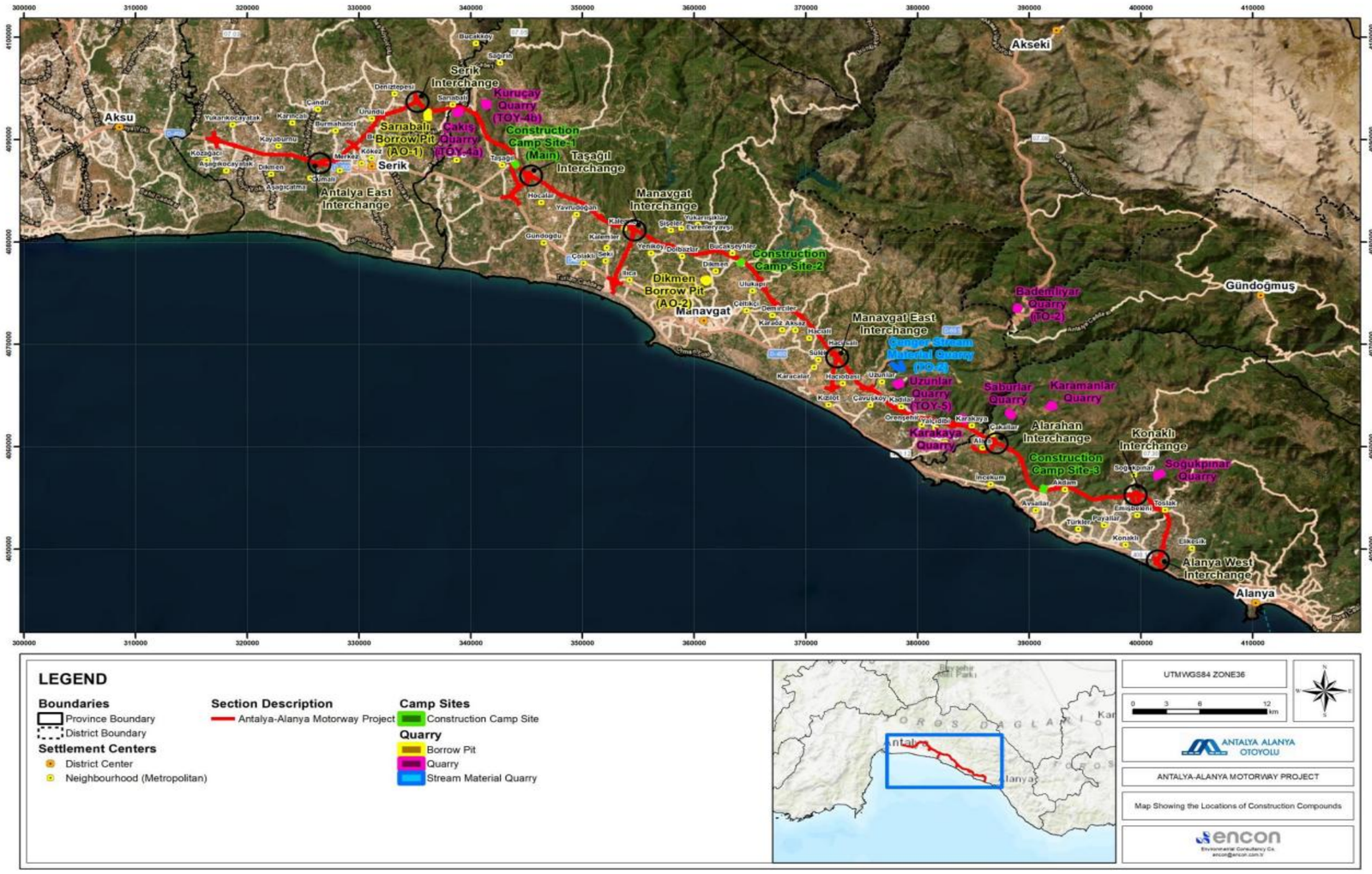

Figure I-1.Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

The activities to be carried out within the scope of the Project that are likely to have an impact on water resources are as follows:

- Excavation
- Soil stockpiling
- Quarry activities
- Plant and wheel washing
- Road construction
- Washing of finished road surfaces to remove accumulated soil

I.2 PURPOSE AND SCOPE

This Community Health and Safety Management Plan (“the Plan”) has been prepared for the Antalya–Alanya Motorway Project (“the Project”).

The purpose of this Plan is to assess the potential impacts of construction activities on the health, safety, and security of communities and to outline the measures that should be done to prevent, reduce, or manage these risks. It aims to ensure that the Project’s construction phase is implemented in a manner that safeguards the well-being of the public in the surrounding area.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

This Plan has been developed in accordance with applicable national legislation and the requirements of relevant international standards, including those of international financial institutions. It sets forth the responsibilities of the Project Sponsor, the Main Contractor, and subcontractors; outlines the procedures for risk mitigation, monitoring, emergency response, and community engagement; and provides guidance on grievance mechanisms relevant to community health and safety.

The Plan should be implemented by all parties involved in the construction phase, including Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ) as the Project Sponsor, the Main Contractor (Limak), and all subcontractors. Revisions to the Plan should be done when significant changes occur in project design, construction activities, or regulatory requirements.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been structured in accordance with both national legal requirements and internationally recognized standards concerning community health, safety, and security. These references form the foundation for defining the necessary measures that should be done during the construction phase to ensure effective risk management, impact mitigation, and compliance with best practices.

II.1 National Requirements

The following Turkish legislation and regulations should be considered in the implementation of community health and safety measures during construction:

- Environmental Law (Law No. 2872)
- Public Hygiene Law (Law No. 1593)
- Occupational Health and Safety Law (Law No. 6331)
- Regulation on Occupational Health and Safety Services
- Regulation on Health and Safety Measures in Construction Works
- Regulation on the Control of Environmental Noise
- Regulation on the Transport of Dangerous Goods by Road
- Road Traffic Law
- Regulation on Fire Protection of Buildings

II.2 International Standards and Conventions

In addition to national requirements, the following international standards and guidelines should be followed to ensure that community health and safety measures are consistent with international good practices:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- IFC Good Practice Note: Addressing Gender-Based Violence and Harassment (GBVH)
- European Landscape Convention (entered into force in 2000, ratified by Türkiye in 2003)

These references should be used to guide the implementation, monitoring, and periodic updating of community health and safety measures throughout the construction phase of the Project.

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other thematic management plans and procedures prepared under the Environmental and Social Management System (ESMS) of the Project. These complementary documents collectively guide the implementation of mitigation and monitoring measures during the construction phase. The following plans and procedures are particularly relevant and should be implemented in coordination with the Community Health and Safety Management Plan:

- Traffic Management Plan
- Occupational Health and Safety Plan
- Environmental Accident and Spill Response Management Plan
- Noise and Vibration Management Plan
- Hazardous Materials Management Plan
- Solid Waste Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Environmental Accident and Spill Response Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Demolition Management Plan
- Emergency Response and Management Plan
- Resettlement Action Plan (RAP)
- Stakeholder Management Plan (SEP)

Effective coordination among these plans should be ensured to prevent duplication, close any procedural gaps, and minimize cumulative health and safety risks to the community throughout the construction phase.

IV. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

EPC Project Director

The EPC Project Director has the overall responsibility and accountability for the Project including delivery of the construction activities in line with applicable national and international standards. He/She ensures relevant activities are carried out in accordance with this OHSMP.

The EPC Project Director has the ultimate responsibility for ensuring the health, safety and wellbeing of all project personnel, sub-contractors, suppliers, visitors and members of the public that may be affected by the works that are being performed. He/She will also ensure the implementation of required corrective actions in response to identified nonconformities or incidents regarding to this Plan. He/she ensures periodical review of the OHSMP effectiveness.

The Project Director will ensure that necessary resources are allocated for the management of the Plan including competent personnel and financial resources for implementing of risk mitigation measures such as trainings and external sources.

- Ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements.
- Promote a culture of environmental and social responsibility across the EPC and its stakeholders.
- Define and implement the overall business strategy and direction of the EPC in alignment with SPV and stakeholder expectations.
- Ensure the provision of necessary resources and organizational support for the implementation of all plans.
- Supervise and coordinate subcontractors to ensure proper execution of construction and commissioning phase.
- Support the E&S Manager in preparing, disseminating, and implementing this plan.In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the SPV and other responsible parties.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, E&S compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including EPC, stakeholders and other related parties.
- Approval of project management plans (HSE, E&S, QA/QC, etc.) in line with company policies, legal frameworks, international standards, SPV and lender requirements.

- Ensure that all employees comply with the obligations specified in the project's management plans during activities.
- Serve as the primary EPC representative to the SPV, client, and key stakeholders.
- Maintain communication channels with SPV, subcontractors, and vendors to ensure alignment and compliance.
- Coordinate with regulatory authorities, community representatives, and auditors as required.
- Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters.
- Oversee risk management and mitigation strategies related to technical, health, safety, community safety, environmental, and social aspects.
- Supervise the preparation and approval of documentation related to claims, variations, and commercial issues.

EPC H&S Manager

The H&S Manager is responsible for health and safety management during the construction phase of the Project. Reporting to the EPC Project Director, he/she develops the necessary procedures, plans and training requirements for on-the-ground implementation of the related national and international requirements, standards, SPV's health and safety commitments made in Environmental and Social Impact Assessment (ESIA), and this Plan.

Duties of the EPC H&S Manager are as follows

- Coordinate the preparation, revision, and implementation of the Plan with E&S Manager in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
- Ensure timely and appropriate resolution of complaints related to community health and safety issues.
- Ensure and conduct the completion of the specific training and safety briefings to reinforce awareness on site.
- Ensure relevant measures are communicated to all stakeholders and updated in a timely manner on human health and safety issues.

- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Conduct and lead a comprehensive accident and incident investigation process. Analyse trends from incidents and near-misses to identify systemic issues and develop long-term preventive strategies.
- Provide technical support to EPC and subcontractors for the proper implementation of the Project's plans.
- Ensure the accurate records of inspections, incidents, safety meetings, and training records.
- Ensure the corrective actions process is followed up on by all parties strictly.
- Report on H&S performance, non-compliance, and corrective actions to the EPC Project Director.
- Engage with regulatory authorities on inspections, audits, and compliance verification.
- Coordinate emergency preparedness and response procedures, including drills and communication protocols, in collaboration with relevant departments.

EPC E&S Manager

- Coordinate the preparation, revision, and implementation of the Plan with H&S Manager in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.
- Implement environmental and social measures through site practices and method statements.
- Ensure that all conditions and obligations outlined in the environmental and social management plans are implemented and adhered to during project activities.
- Ensure relevant measures are communicated to all stakeholders and updated in a timely manner on human health and safety issues.
- Ensure employees and contractors fulfil the requirements and relevant training of the environmental and social management plans.

- Ensure the environmental and social management plans are communicated and implemented by Contractors/Subcontractors.
- Monitor compliance of Contractors/Subcontractors with environmental and social management plans requirements.
- Supervise the Environmental Engineers, Biodiversity Specialist, Archaeologist, CLOs and oversee monitoring site practices and management plans.
- Ensure the development and follow-up of corrective/improvement actions.
- Conduct comprehensive investigations of accidents and incidents and promote continuous improvement via lessons learned.
- Enforce behaviour protocols related to community safety.
- Establish emergency preparedness and response procedures.
- Ensure inclusive practices by integrating gender, vulnerability, and social inclusion principles into site-level practices.

EPC HSE Chief

The EPC HSE Chief who will be reporting to SPV H&S Manager. The number of the H&S Chief will be defined considering the existing workload, work locations and the work plan of the EPC Contractor.

The EPC HSE Specialist will be responsible for supporting H&S Manager and monitoring the compliance of all activities associated with the Project against the requirements of the ESMP and any other relevant health and safety legislation defined in this Plan.

- Monitor the compliance of Contractors/Subcontractors with the requirements of the Plan and report non-conformities.
- Monitor health, safety and community safety measures through site practices and method statements.
- Review and validate training records and related documentation from Contractor/Subcontractor.
- Participate a comprehensive investigation in the event of accidents, incidents, or near misses.
- Implement and monitor the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks.
- Prepare regular reports to H&S manager summarizing H&S performance, compliance status, and key risks.

EPC HSE Engineer

The EPC HSE Engineer will be responsible for supporting HSE Chief and monitoring the compliance of all activities associated with the Project against the requirements of the ESMP and any other relevant health and safety legislation defined in this Plan.

- Support all employees in fulfilling the conditions and obligations of this Plan during project activities.
- Provide technical support to Contractors/Subcontractors for the implementation of health and safety plans.
- Monitor the health, safety and community safety measures through site practices and method statements.
- Monitor the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site.
- Review and validate training records and related documentation from Contractor/Subcontractor
- Support comprehensive investigations in the event of accidents, incidents, or near misses, ensuring findings are documented and corrective actions are implemented.
- Ensure the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks.
- Follow prompt and structured resolution of complaints related to public health, safety, and security.

EPC HSE Technician

The EPC HSE Technician will be responsible for supporting HSE Engineer and monitoring the compliance of all activities associated with the Project against the requirements of the ESMP and any other relevant health and safety legislation defined in this Plan.

- Monitor the implementation of the Health, Safety, Social and Environmental Management Plans on-site.
- Assist in the inspection of site conditions, equipment, and practices to ensure compliance with HSE protocols.
- Monitor proper use of PPE by workers and subcontractors and ensure daily compliance.
- Assist in the documentation of incidents, near-misses, and unsafe acts/conditions.
- Support the organization of safety toolbox talks and drills, and participate in site safety briefings.
- Assist in maintaining updated HSE records.
- Escalate social and environmental issues and observations for timely corrective actions.
- Promote a proactive safety culture through daily site presence and informal engagement with workers.

EPC HSE Worker

Duties of the EPC HSE Worker are as follows

- Perform routine safety checks and observations on construction activities to support accident prevention.
- Support field-level enforcement of basic HSE requirements such as PPE usage, housekeeping, and emergency access.
- Report unsafe behaviours, near-misses, or incidents to the HSE Technician or Engineer.
- Assist with basic safety logistics such as placement of safety signs, first aid kits, and fire extinguishers.
- Provide assistance during emergency drills and real-time evacuations if needed.
- Assist in controlling site entry for compliance with safety rules.
- Support spill response and clean up efforts as guided by supervisors.

SPV E&S Manager

- Review and ensure the preparation, revision, and implementation of the Plan in accordance with national laws, regulations, company policies, international standards and lender requirements.
- Ensure and monitor that EPC and subcontractors correctly implement site practices and management plans.
- Ensure relevant measures are communicated to all stakeholders and updated in a timely manner on human health and safety issues.
- Provide technical support to EPC and subcontractors for the implementation of E&S plans.
- Collaborate with internal teams (e.g., H&S, Legal, Procurement) to integrate E&S criteria into project operations and contracts. Monitor the environmental and social performance of EPC and subcontractors to ensure compliance.
- Prepare and submit E&S compliance and performance reports to internal and external stakeholders, including lenders and regulators.
- Support stakeholder engagement activities and consultations with local communities.
- Oversee the Grievance Mechanism (GM) and ensure timely resolution of community and worker complaints
- Engage with regulatory authorities, auditors, and NGOs on E&S compliance and performance matters.

- Lead the implementation of corrective actions and incident prevention measures.

SPV H&S Manager

Duties of the SPV H&S Manager are as follows:

- Ensure the preparation, revision, and implementation of the health and safety-related plans and documents in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
- Ensure timely and appropriate resolution of complaints related to occupational health and safety.
- Ensure safety inductions and community health and safety training are conducted and recorded.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Conduct a comprehensive accident and incident investigation process.
- Engage with regulatory authorities on inspections, audits, and compliance verification.
- Ensure relevant measures are communicated to all stakeholders and updated in a timely manner on human health and safety issues.

Site Doctor

Adequately experienced and certified Occupational Doctors will be employed as required according to national regulation requirements.

Duties of the Site Doctor are as follows

- Ensure and support the preparation, revision, and implementation of the health and safety-related plans and documents in accordance with the Project ESIA and EIA,

SPV's corporate policies, regulatory obligations, international standards, disease control guidelines, industrial good practices, and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.

- Conduct collective assessment with related parties, such as H&S and E&S Manager on occupational injury and illness and disease control.
- Provide on-site medical care, first aid, and emergency response to site personnel.
- Ensure relevant measures are communicated to all stakeholders and updated in a timely manner on human health and safety issues.
- Monitor the health status of workers through routine check-ups, Pre-employment or pre-placement examinations and undertake health assessments for fitness to work.
- Maintain accurate and confidential health records and incident logs.
- Identify and manage occupational health risks, hygiene, sanitation, and disease control measures and recommend preventive measures.
- Conduct health awareness sessions and support mental health and wellness programs.
- Ensure compliance with local occupational health laws and project-specific health standards.
- Collaborate with external hospitals, disease control centres or clinics for referrals and medical emergencies.
- Participate in site inspections and contribute to health-related sections of HSE audits.
- Provide medical input to risk assessments, method statements, and H&S Plans.
- Support pandemic response procedures as needed.
- Detect occupational injuries and illnesses and prepare relevant prevention plans.
- Track of all health records of all employees including occupational injuries and illnesses.

V. COMMUNITY HEALTH AND SAFETY MANAGEMENT APPROACH

Community health and safety risks associated with motorway construction projects primarily arise from increased construction traffic, the operation of heavy machinery, exposure to hazardous substances, elevated levels of noise and dust, and the potential occurrence of accidental events such as vehicle collisions, fuel or chemical spills, and fires. These risks are particularly pronounced in areas where construction activities are carried out in close proximity to residential settlements or areas with public access, including schools, clinics, or marketplaces.

During the construction phase, significant concerns include the increased likelihood of traffic accidents due to the movement of heavy vehicles along access roads and within settlements; the exposure of sensitive receptors to construction-related dust, noise, and vibration; and the risk of disease transmission associated with the influx of non-local workers and the establishment of temporary campsites. Moreover, the close interface between construction areas and local communities can result

in physical safety hazards, particularly in cases where access to hazardous zones is not adequately restricted or where fencing and warning signage are insufficient. The improper handling, storage, or disposal of fuels, chemicals, and construction materials may also pose direct and indirect health risks to surrounding populations.

The Antalya–Alanya Motorway Project passes through multiple districts—Serik, Manavgat, and Alanya—where several residential settlements are located within the Project's area of influence. These neighborhoods are listed in Table V.1. The presence of residences, schools, health centers, agricultural lands, and public access areas in or near these neighborhoods requires heightened attention to community health and safety. Specific risks related to dust, noise, vibration, blasting, construction traffic, and restricted access to hazardous areas must be carefully managed in coordination with the affected communities such as Serik (Üründü, Burmahanci, Cumali), Manavgat (Taşağıl, Hocalar, Kalemler,Yukarıışıklar, Hacıobası, Yalcıdibi, Karakaya) and Alanya (Alara, Çakallar, Akdam, Emişbeleni,Toslak).

Table V.1 Settlements Located in The Vicinity of the Motorway Components

Districts	Neighborhoods		
Serik	• Aşağıçatma • Aşağıkocayatak • Burmahancı • Çandır	• Cumalı • Deniztepesi • Belpınarı Abdulrahmanlar • Kayaburnu	• • • Sarıabalı • Üründü • Yukarıkocayatak
Manavgat	• Aksaz • Aşağıışıklar • Bucakşeyhler • Çakış Çolaklı • • Cevizler • Demirciler • Dikmen • Dolbazlar Evren• Evrenleryahşı • • Gündoğdu	• Hacıali • Hacıisalı • Hacıobası • Hocalar • Ilıca • Kadılar • Kalemler • Karakaya • Karaöz • • Odaönü	• Örenşehir • Seki• • Şişeler • Sülek • Taşağıl • Ulukapı • Uzunlar • Yalçıdibi • Yavrudoğan • Yeniköy • Yukarıışıklar
Alanya	• Akdam • Alara • Avsallar Payalar	• Çakallar • Elikesik • Emişbeleni • İncekum	• • Toslak Telatiye • Türkler

To minimize these impacts, construction activities should be planned and executed in a manner that prioritizes the protection of public health and community well-being. Preventive measures such as physical access control to construction sites, the implementation of dust and noise suppression strategies, and the safe design of traffic routes should be undertaken. Public information campaigns and worker-community interaction protocols should be developed to raise awareness among both construction personnel and community members regarding potential risks and acceptable behavior standards.

In cases where risks escalate or complaints are received, mitigation strategies should be reviewed and strengthened. Coordination with local authorities, emergency response units, and public health institutions should be done to ensure timely and effective responses to any incident that may impact community health and safety. Community Liaison Officers will ensure communication with project-affected communities and support grievance management processes.

The overall goal should be to ensure that construction activities do not generate health and safety risks that exceed acceptable thresholds, in line with Turkish legislation and relevant international good practices, and to maintain open communication and responsiveness to the concerns of affected communities.

VI. MITIGATION MEASURES FOR COMMUNITY HEALTH AND SAFETY RISKS

The construction phase of the Antalya Alanya Motorway Project presents several health and safety risks to the community. These include increased noise, vibration, and dust levels, as well as disturbance to the public and grazing animals due to blasting activities. Construction traffic, including heavy machinery, is expected to elevate road safety risks. The risk of communicable disease (e.g., STI/HIV/AIDS etc.) transmission may increase due to worker-community interactions, while the potential for gender-based violence and harassment (GBVH) may also rise. To address these risks, the following mitigation measures will be implemented during the construction phase.

Vegetation Clearance and Excavation Activities

- Due to the sensitive receptor designation of Hacıali neighborhood, an air quality monitoring point has been determined, monitoring will be carried out every three months and in case of complaints.
- The Health & Safety (H&S) team member or CLO assigned within the Project will visit households and carry out community information activities and free mask distribution (including spares) before construction works approach within 1,000 meters of any residential area.
- If dust levels reduce visibility, safety personnel will be stationed at pedestrian crossings to ensure safe passage for individuals.
- Dust emissions will be controlled by water spraying. In cases where excavation trucks must pass close to residential areas, the loads will be covered to minimize dust spread during transport.

Community Severance

- In areas where the project route intersects with existing village roads, farm tracks, or rural connection routes, temporary access solutions such as gravel service roads, temporary bridges, and directional signage should be provided. Before any temporary closure is implemented, local residents will be informed at least 7 days in advance through verbal channels (e.g., public announcements, village offices), and maps showing alternative routes should be posted on-site.
- In locations where the project intersects with main roads, secondary roads, or internal access routes within settlements, construction activities will be phased to reduce disruption. Night-time construction should be limited, and temporary traffic signals or trained traffic marshals should be deployed where necessary. Especially near sensitive areas such as schools, health clinics, mosques, and marketplaces, safe pedestrian access must be maintained at all times. Where necessary, temporary pedestrian overpasses, protective barriers, and metal crossing structures should be installed, along with adequate lighting and traffic-calming measures.

Close coordination with tourism facility managers is essential to minimize disruptions to visitor movement and local economic activity. Additionally, in situations where children, patients, or other residents are unable to access schools, healthcare services, or public transport due to temporary construction closures, the Project Sponsor may provide shuttle services or temporary transport support as needed.

Public Health and Safety & Worker Well-Being Measures

- Collaboration with local law enforcement, healthcare providers, and NGOs, especially on water supply issues, is the responsibility of all parties to ensure victim support services and enforcement of legal and social protections.
- Civilian access to the construction site will be restricted to the greatest extent possible.
- Leakage or spills of fuels, oils, and solvents may lead to soil and groundwater pollution, potentially affecting agricultural lands, local water resources, and thereby public health. The Project's related plans will be followed during construction activities.
- Improper storage and handling of fuels and explosives can create fire and explosion risks, which may endanger both workers and nearby communities.
- Direct or indirect exposure to hazardous chemicals (vapors, dust, or accidental contact) may result in respiratory issues, skin irritation, or other health problems for workers and local populations.
- Improper handling of chemicals, such as paints and solvents, may create strong odors that disturb nearby settlements and affect quality of life.
- Pre-employment health screenings will be conducted in accordance with Turkish regulations, and workers will undergo regular medical check-ups throughout their employment on the Project.
- Public health campaigns within local communities will be supported as part of the Project's community engagement and health risk mitigation efforts.
- Access to healthcare services will be facilitated for individuals from local communities who may be adversely affected by construction activities. Measures will be taken to ensure that emergency medical care is available and reachable when needed.
- Primary healthcare services and basic first aid will be made available to all workers at construction sites. Medical care will be provided by qualified personnel to ensure timely response to injuries and health issues.
- All Project workers will be provided with routine medical check-ups and centralized access to medical treatment as needed. These services will help monitor workforce health and ensure early response to health concerns.
- An occupational physician will be responsible for maintaining health records for all workers. These records will be reviewed regularly using a sickness monitoring chart to identify recurring or serious health conditions, and findings will be addressed through training sessions and health-focused toolbox meetings.
- Health awareness training will be provided to all workers, including contractors and subcontractors. The training will include briefings on hygiene practices such as handwashing, prevention of communicable and infectious diseases, and key facts on transmission routes and symptoms of high-risk illnesses.
- Infectious disease screening protocols will be implemented for all workers, including those of subcontractors, particularly at the time of initial recruitment. All protocols will comply with the most up-to-date national health guidelines issued by the relevant authorities.
- An effective waste management system will be implemented to prevent the creation of new vector breeding grounds and to deter rodents from being attracted to worker accommodations or construction sites. Waste will be regularly removed and disposed of in accordance with environmental and health standards.
- Measures will be taken to reduce the presence of stagnant water at construction sites through environmental controls and source reduction strategies. These actions will prevent the formation of breeding areas for bacteria and disease-carrying insects.
- Worker camps will be maintained in a clean and sanitary condition, free of waste accumulation. Access to safe and clean drinking water will also be ensured at all accommodation and work areas.
- Safe food preparation practices will be followed, and food storage and handling will be monitored to ensure compliance with relevant food safety standards. Regular inspections will be carried out to verify adherence to hygiene protocols in food services.

- The basic approach will be to reuse the wastewater generated by project activities in the activity cycle during construction. This approach will not require any water discharge to environmental media. Especially for the reuse of wastewater generated in concrete batching plants, three-compartment settling ponds will be constructed. In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary pools and installations will be constructed for the reuse of water at these stations.
- Storm water collected on construction sites may become contaminated with pollutants such as chemicals, sediments, and construction debris due to runoff. To prevent or minimize the discharge of such polluted storm water into receiving water bodies, appropriate control measures will be implemented.
- Groundwater resources may also be at risk, particularly in areas with shallow overburden, where accidental discharges of hazardous substances could contaminate aquifers. Construction activities such as site clearance, earthworks, vehicle refueling, and wastewater discharge (both sanitary and industrial) pose potential threats to groundwater quality if not properly managed. Some excavation works may require groundwater dewatering, which could have implications for local aquifer levels. Additionally, earthworks in bedrock or shallow overburden areas may lead to blockage of fissure permeability by infiltrating fines or sediments.
- The Project Sponsor (AAOİAŞ) is responsible for overseeing wastewater and storm water management in line with national regulations. The Environmental Department of the Contractor is responsible for on-site implementation, supervision, and inspection of mitigation measures. Compliance with all legal requirements related to water management should be ensured throughout the construction phase.
- The camp perimeter should be fenced, and entry/exit points should be controlled (without restricting individuals' freedom of movement). In order to deter potential criminal activities and facilitate the detection of any incidents, both the interior and perimeter of the camp area should be monitored through security cameras. To support these objectives, the perimeter of the camp should be illuminated to a level equivalent to that of the interior will be utilized. These measures will contribute to ensuring the safety of local communities and temporary settlers (workers), while also ensuring compliance with the IFC Performance Standards.
- Throughout the road construction process, specialized engineers will be engaged to ensure the structural safety of the works.
- Compliance of drivers and operators with professional competency requirements will be ensured.
- Complaint boxes will be placed in all mukhtar offices within the area of influence, and the grievance mechanism will be introduced during the site visits conducted by the CLOs.

Noise, Vibration, and Blasting Risk Management

- Blasting warning signs will be placed prominently along the perimeter of the blasting area and in zones where the effects of blasting, such as flying debris, may pose a risk. The signs will be clear, highly visible, and positioned to alert both workers and nearby community members.
- Access to blasting areas will be strictly controlled to prevent the entrapment of animals or unauthorized entry by individuals during blasting operations. The area will remain restricted until a designated representative of the Contractor confirms that no unusual hazards—such as slope instability or unexploded materials—are present and that access and movement within the area can safely resume.
- Residents of nearby communities will be informed in advance of any scheduled blasting activities. Notifications will include the blasting schedule, identification of areas where blasting will take place, the expected date and time range for detonations, the access control methods to be used, and descriptions of the audible warning and all-clear signals that will be employed before and after the event.
- Truck movements will be routed to avoid residential settlements and noise-sensitive areas to the greatest extent possible as a key avoidance and mitigation measure for protecting

community safety. Haulage routes will be scheduled to prevent passage through villages or populated areas, and additional measures such as speed restrictions, regular vehicle maintenance, and safe driving practices will be implemented.

- Noise monitoring should be conducted at pre-determined locations in accordance with the Environmental and Social Monitoring Plan. If exceedances occur, corrective actions should be implemented immediately.
- Potentially affected structures such as hospitals should be identified in advance, and nighttime works near these locations should be minimized or avoided.
- A community engagement program should be implemented to inform residents, businesses, and stakeholders in areas where construction activities may cause elevated noise levels.
- Prior to the blasting operations, the sensitivity of nearby settlements/buildings against noise and vibration will be assessed. Buildings located within 100 meters of major vibration sources will be identified and assessed for vibration sensitivity prior to construction. Structural conditions of buildings located within 100 meters of the motorway alignment will be recorded before and after construction works to assess any possible vibration-induced damage.
- During the entire construction phase, regular surveys will be carried out throughout blasting and drilling activities by the contractor, capturing photographic records of all structures adjacent to blasting areas to detect and evaluate any damage that may arise post-blasting. Explosive charges will be optimized accordingly.
- Detailed records of blasting operations will be kept and blasting related impacts will be closely monitored.
- Modern blasting techniques will be employed to minimize vibration, including the use of millisecond delays with low charge weights, which will be determined based on geological formation and rock density.
- The number of blasted holes per shot and total charge amounts per shot will be optimized to comply with the regulatory limit values and minimize fly rock incidents. During blasting activities will be kept on charge amounts, delays, distance to blast sites, and resulting vibration levels. During blasting activities, compliance with the limit will be monitored in potential sensitive receptors.
- Blasting activities will adhere to the limit values specified in the Regulation on Environmental Noise Control for ground vibrations. Records of air shock and vibration measurements will be maintained, and compliance with regulatory limit values will be monitored to minimize impacts on local residents.
- The Project's grievance mechanism will be active for any complaints related to vibration impacts. Complaints will be thoroughly evaluated, and corrective actions will be implemented as necessary.
- Construction works will be designed and scheduled to minimize vibration and its adverse effects.
- Blasting will be carried out at designated times in order to prevent disturbance.
- Construction machinery and equipment will be operated by taking into account the recommended minimum working distances.
- A specialized blasting team will be engaged to ensure safe and efficient operations.
- In locations where Potential Impact Zones are identified and cannot be mitigated through design or excavation changes, the contractor will implement tailored risk mitigation strategies.
- Modifying blast patterns and using low-risk techniques, such as reducing charge per delay, to minimize hazards.
- A blast attenuation survey will be conducted by the consultant to determine the distance at which vibration levels reduce to acceptable thresholds.

Displacement

- All Parties shall follow the RAP, SEP and additionally below requirements;
- Advance notification and scheduling of construction activities
- Compensation for verified income losses
- Maintaining alternative access to affected businesses
- Support programs for re-establishing livelihoods
- Provision of fair and timely compensation
- Psychological and logistical support for affected households
- Prioritization of vulnerable groups

Traffic Safety and Management Measures

All Parties shall follow the Traffic Management Plan and additionally below requirements;

- Construction works on existing roads will not be started until relevant traffic safety measures (including traffic signing and placement of equipment) are taken on roads serving pedestrian and vehicle traffic. These measures will be designed to ensure the safety of life and property of the local people and the users of the roads.
- In the scope of better working organization, construction traffic routes will be strictly defined and road construction machinery will use only these routes.
- Passage of the routes through the settlements (i.e. neighborhoods) will be avoided where alternative routes are available. Dangerous routes that are to be avoided, if there is any, will be specified and informed. In this scope, construction contractors will construct service roads in order not the affect (such as increasing the heavy traffic load) the natural flow on the existing roads and for avoiding the passage of heavy vehicles through residential areas to the extent possible. In addition service roads will be constructed where the traffic will be temporarily diverted. Furthermore, service roads will be used for transportation of the construction machinery, equipment and materials used for Project.
- Pedestrian interaction with construction vehicles will be minimized by taking appropriate measures in and around the construction corridor.
- Valid licenses will be required for the drivers and operators.
- Working hours of the day for the drivers/operators will be specified and informed to relevant personnel.
- Limits will be defined for the working/trip duration for the drivers and operators to avoid overtiredness.
- Speed control devices will be used on trucks.
- All the construction machinery and equipment will be operated in alignment with the direction of the traffic flow.
- Rigid objects will not be used for the purpose of traffic diversion.
- Unused construction materials, equipment or machinery will not be left on the road in an uncontrolled way. They will be put in designated places.
- Construction-related traffic delays will be minimized. Flow of traffic will be allowed periodically.
- Road signing for night traffic will be provided with reflectors and flashing signals of sufficient number.
- Relevant dust control measures will be taken at the road construction sites so that safe sight distances could be maintained on the existing roads under service.
- Upon the completion of works, signing equipment will be immediately removed and standard signing will be provided.

- To reduce transportation distances, services and materials required for construction works will be aimed to be primarily supplied from the local sources, wherever possible
- A Traffic Management Plan will be implemented to manage traffic-related risks throughout the construction phase. This plan will include the enforcement of appropriate speed limits, driver safety training, advance warnings of detours and closures, and other measures to reduce the risk of accidents involving drivers, passengers, and other road users.
- Drivers and operators of Project vehicles will be trained and informed on safe driving practices, with a specific focus on minimizing risks to other drivers, pedestrians, and livestock. Awareness will be promoted to reduce the likelihood of road-related incidents in and around construction areas. Detailed information can be seen in Traffic Management Plan.
- All Project vehicles, including those operated by subcontractors, will be clearly identifiable. This will be ensured through the display of visible markings or symbols that indicate their association with the Project and facilitate accountability.
- Construction equipment and machinery will be secured when not in use to prevent unauthorized access. Access to construction sites will be controlled to prevent unauthorized or accidental entry by members of the public. Entry points will be monitored and physical barriers such as fences and gates will be installed where necessary.
- As one of the key avoidance and mitigation measures to protect community safety, truck movements should be determined based on the routes in a way that avoids residential areas and noise-sensitive zones as much as possible. Drivers will be informed about the haulage routes, and they will be regularly reminded of the rules to be followed within residential areas, and additional measures such as speed restrictions, regular vehicle maintenance, and safe driving practices will be implemented.
- The professional competency certificates of operators and drivers will be checked during the recruitment process, and the validity of these certificates will be ensured by the relevant department in cooperation with the OHS Committee, OHS Department, and HR Department. The relevant documents will be archived in the personnel files.
- Vehicles and machinery shall not deviate from the designated route.

Security

- A Security Management Plan will be implemented to ensure that all security-related risks during the construction phase are systematically identified, mitigated, and monitored. The Plan will be developed in accordance with national legislation and international good practice.
- Certified security personnel will receive comprehensive training on security protocols, with a focus on the Voluntary Principles on Security and Human Rights. Training will emphasize respect for the rights of workers and community members, and the prohibition of excessive use of force under all circumstances.
- All instructions to security personnel will be based on applicable Turkish legal requirements and will be formally incorporated into their employment terms. In light of their regular interaction with local communities, security staff will also be trained on the Project's Grievance Mechanism, including procedures for addressing complaints in a respectful, timely, and effective manner.
- In cases of non-compliance with defined standards and codes of conduct, corrective actions will be taken. These may include termination of subcontracts with private security providers. All security personnel will receive clear instructions regarding acceptable conduct and authorized actions, with such training reinforced through ongoing professional development initiatives.

Social Conduct, Community Engagement, and GBVH Prevention

- All employees and contractors will be required to acknowledge and adhere to the Project's environmental and social work practices, including all community health and safety (CHS) procedures, the Code of Conduct for Workers, and the Zero Tolerance Policy and Policy on Gender-Based Violence and Harassment (GBVH). They will also be expected to report any safety hazards, unsafe practices, unacceptable conditions, or environmental and social concerns observed on-site.
- All contractor agreements will include clear references to compliance with applicable Turkish health and safety laws, as well as relevant national and international standards and policies. Contracts will also require explicit commitment to the Project Sponsor's Zero Tolerance Policy and Policy on GBVH, and will outline identified GBVH risks along with agreed prevention and response measures.
- Employment contracts will include a requirement for all workers to be informed of, and to sign, the Code of Conduct for Workers at the time of recruitment.
- Training and orientation programs will be provided with a specific focus on gender sensitivity, human rights, and GBVH risk awareness. These sessions will include clear guidance on respecting local communities and vulnerable groups, and will emphasize the importance of maintaining a safe environment for women and children. Actions such as catcalling or inappropriate behavior toward community members or other workers will not be tolerated.
- A functioning and accessible grievance mechanism will be maintained throughout the Project. All relevant personnel will be made fully aware of their roles in the grievance resolution process to ensure timely and effective responses to concerns raised by local stakeholders. A dedicated and confidential grievance mechanism will be established to address GBVH complaints. This system will include anonymous reporting options, access to referral pathways, and a support structure for workers. All GBVH-related complaints will be managed by a trained gender focal point with expertise in GBVH investigations and appropriate response protocols.
- Awareness campaigns will be carried out to inform local communities about the risks of blasting activities and entering construction zones. These campaigns will include educational sessions on the meaning of warning signs, the dangers of playing near equipment, and the importance of using designated pedestrian paths.

Chemicals And Fuels

- All fuels and chemicals will be stored in sealed, properly labeled, and licensed storage facilities. Separate storage arrangements will be ensured for flammable and explosive materials.
- Spill containment systems, secondary containment structures, and absorbent materials will be available at storage and use areas. Emergency spill kits will always be kept accessible.
- Vehicles, equipment, and storage tanks will undergo regular maintenance and inspections, and any equipment with leakage risks will be repaired immediately.
- All personnel handling chemicals will receive regular training on safe storage, transportation, usage, and emergency response. Participation will be mandatory, and trainings will be documented.
- Storage areas will be fire-resistant, and firefighting equipment will be available at all times. Explosives will only be handled by competent and authorized personnel.
- During the transportation of chemicals and fuels, vehicles compliant with national regulations will be used, and transport routes will be planned to avoid residential areas as much as possible
- Local communities will be informed about potential risks and the preventive measures taken, and they will be able to communicate their concerns through the grievance mechanism.
- An Emergency Preparedness and Response Plan (EPRP) will be implemented for potential spill, fire, or explosion scenarios, and its effectiveness will be tested through regular drills

- Air, soil, and water quality will be regularly monitored, and rapid response will be ensured in case of detected contamination.
- An inventory of all chemicals and fuels used during the Project will be established and continuously updated to ensure proper tracking, management, and compliance with applicable regulations.

VII. TRAINING

As part of the Communication and Training Plan, all personnel will receive structured training upon hiring, which will cover topics related to community health and safety risks and their potential consequences. The training will include an overview of legal obligations, roles, and responsibilities under applicable legislation, as well as specific mitigation measures relevant to each worker's duties (e.g., use of personal protective equipment, appropriate behavior near local communities, and adherence to site access protocols). Topics will also include recognizing and responding to situations that may endanger public health and safety, such as unsafe equipment operations, community exposure to dust or noise, or improper handling of hazardous materials. Training records will be maintained by the Human Resources Department in coordination with the Environmental and Social Team. This training will be reinforced through regular refresher sessions throughout the construction phase.

VIII. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of community health and safety mitigation measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, observed risks or incidents, stakeholder concerns, or changes in applicable national regulations and international standards.

Monitoring activities will be coordinated by the Corporate Communication, in close collaboration with the Environmental, Occupational Health and Safety (OHS), and Construction Management teams. Key responsibilities will include verifying the implementation of community access control measures, ensuring the visibility and condition of safety signage, reviewing traffic safety measures around construction zones, and assessing adherence to blasting protocols and emergency response readiness near sensitive receptors such as residential areas, schools, and healthcare facilities.

Regular site-level monitoring will be conducted to evaluate compliance with national legislation and Project-specific community health and safety requirements. This will include visual inspections, review of site access logs, observation of construction traffic behavior near populated areas, tracking of safety-related grievances, and assessment of community outreach and awareness activities conducted under the Stakeholder Engagement Plan (SEP).

The performance of contractors and subcontractors in implementing community health and safety measures will be reviewed through internal audits, site supervision reports, and direct observations in the field. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to verify the effectiveness of implemented measures and ensure that risks are mitigated without recurrence.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, such as the Ministry of Health or local municipal authorities, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of community complaints, inspection of construction site boundaries, and evaluation of compliance with emergency preparedness procedures.

Monitoring efforts will be guided by the framework provided in Table VIII.1, which outlines key parameters to be monitored, relevant locations, monitoring methods, frequency, and responsible parties. These monitoring activities are essential for evaluating the effectiveness of community health and safety mitigation efforts and ensuring full compliance with applicable regulations and Project standards.

Table VIII.1 Key Monitoring Activities

Parameter	Monitoring Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Certificates of operators and drivers	Relevant department	Certificates will be ensured by the relevant department	During the recruitment process	SPV EPC
Number of Trainings, participants, Conducted	Project personnel and contractor workers receiving training	Review of training records	Monthly	SPV EPC
Compliance with Plan Implementation	Availability of relevant records in the system	Review of documented compliance with Plan procedures	Monthly	SPV EPC
Number of Complaints Related to the Plan	Records kept under the Grievance Mechanism Procedure	Review of grievance registration and resolution logs	Weekly	SPV EPC
-Employment data on the security personnel -Trainings provided to security personnel -Grievances received and replied to regarding the acts of security personnel	-Project office -Camp Sites	-Document review	Weekly	SPV EPC
Number of complaints received on traffic	Public relations records and grievance system	Logging and monitoring of grievances as per the Grievance Mechanism Procedure	Weekly	SPV EPC

In cases of non-compliance identified through internal oversight audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and relevant subcontractors.

All community health and safety-related findings, including non-compliance incidents, or complaints received from surrounding communities, will be documented in accordance with national environmental regulations and Project procedures. In the event of serious violations—such as significant exceedance of short-term or long-term limit values—AAOİAŞ will ensure that the issue is reported and that appropriate actions are taken.

IX. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table IX.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Number of trainings conducted	All personnel to receive training	Quarterly	AAOİAŞ,
Non-conformities with standards	Less than five	Monthly	AAOİAŞ,
Complaints related to community health and safety	Less than five	Monthly	AAOİAŞ,

X. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the Environmental and Social Management and Monitoring Plan (ESMMP). All incidents and non-conformities related to community health and safety should be documented and reported as outlined in this Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Supply Chain and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established plans and procedures. Records to be reviewed during community health and safety audits will include, but are not limited to, the External and Internal Grievance and Suggestion Tracking Databases, records of community health and safety training sessions, non-conformity and incident records, emergency drill evaluations, and site-specific environmental and social monitoring data such as dust, noise, or vibration measurement reports. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary.

XI. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of community health and safety management activities throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions should be identified and the required updates should be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections should be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Reports should be prepared using data gathered through community health and safety monitoring activities defined under this Plan. The results and supporting evidence of these monitoring activities (e.g., observations, grievance logs, community engagement records, and photos) should be documented in detail within appropriate reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

Reporting activities under this Plan mainly relate to community grievances, implementation of awareness and training programs, performance of emergency response drills, monitoring of blasting activities and road safety measures near populated areas, and access control around high-risk construction zones. In the event of significant community health and safety incidents (e.g., injuries, unauthorized site access, unannounced blasting), an incident report including root cause analysis (RCA), mitigation and compensation measures should be submitted to the relevant authorities in accordance with Turkish legislation and Project procedures.

All data, together with the results of inspections and audits, should be summarized in the dedicated community health and safety chapter of the Environmental and Social Monitoring Report prepared on a quarterly basis. This report will include any non-compliances identified, corrective actions taken, and any recommended time-bound corrective measures. These should be supported with documentary evidence such as photographs, checklists, and field logs.

All personnel are encouraged to raise concerns, suggestions, or complaints related to community health and safety through the established grievance mechanism by completing the grievance form or using designated communication channels. Public grievances regarding safety, access, noise, blasting, or other community-related risks should also be addressed and followed up accordingly. The available communication channels for submitting grievances are outlined in the Stakeholder Engagement Plan.

Throughout the construction phase of the Project, this Plan will be reviewed quarterly by the E&S Manager, based on the results of audits and any community health and safety incidents or changes in site activities. Updates to the Plan will be agreed upon between the E&S Manager and the Site Manager.

CONSTRUCTION CAMP SITE MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

CONSTRUCTION CAMP SITE MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
CO	Carbon Monoxide
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
IFC	International Finance Corporation
ITS	Intelligent Transportation Systems
KPIs	Key Performance Indicators
Limak	Limak İnşaat Sanayi ve Ticaret A.Ş.
NO_x	Nitrogen Oxides
OHS	Occupational Health and Safety
PM_{10}	Particulate Matter with a diameter of 10 micrometers or less
SEP	Stakeholder Engagement Plan
SEP	Stakeholder Engagement Plan
VOC	Volatile Organic Compounds
WHO	World Health Organization

CONSTRUCTION CAMP SITE MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Construction Camp Site Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange.

As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels

The map showing the construction components and road route within the scope of the Project's construction activities is provided in Figure I.1.

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design.

CONSTRUCTION CAMP SITE MANAGEMENT PLAN

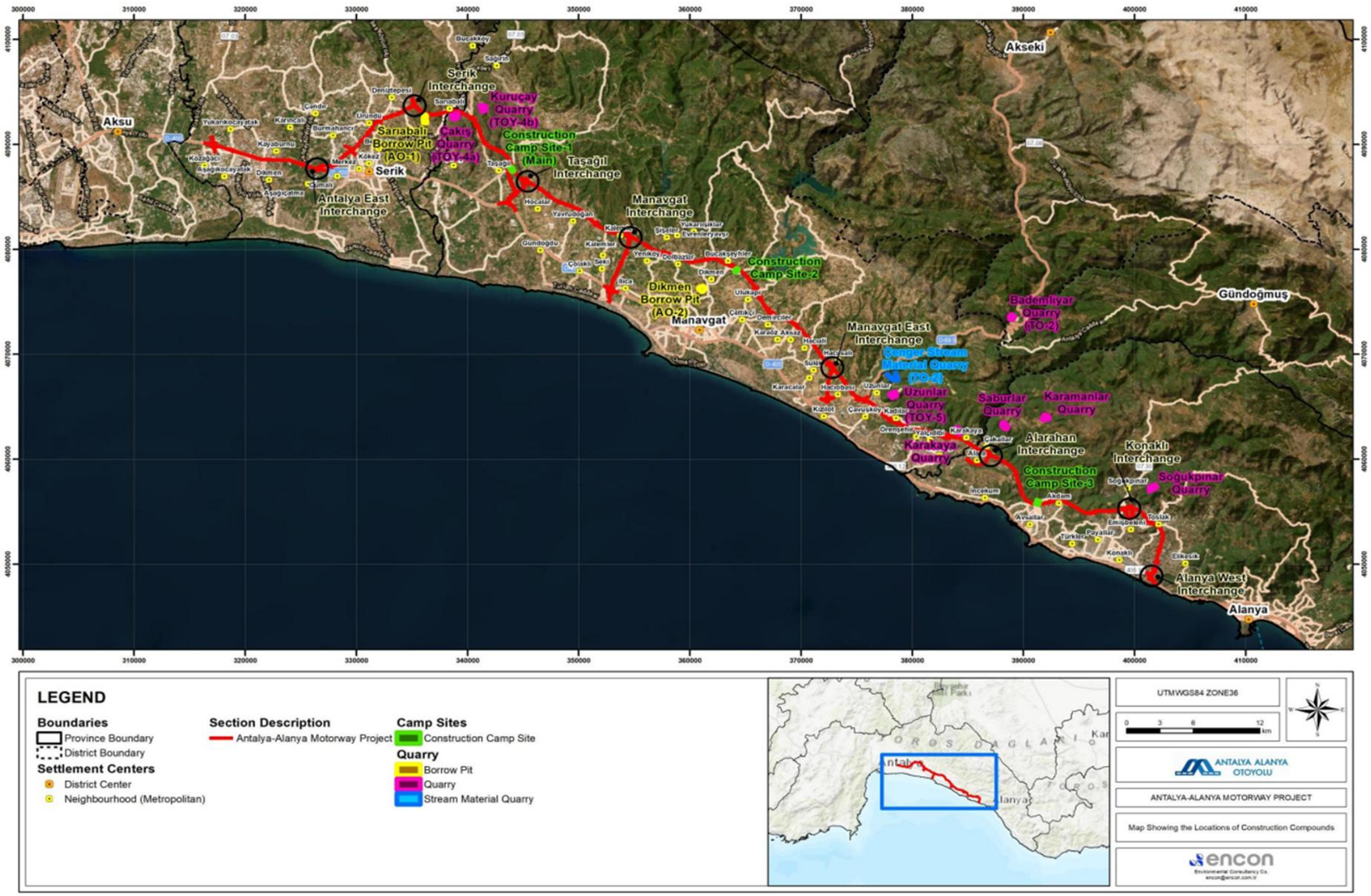


Figure I.1 Map Showing the Locations of Construction Compounds

CONSTRUCTION CAMP SITE MANAGEMENT PLAN

II. PURPOSE AND SCOPE

This Plan has been prepared by Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Motorway Project ("the Project").

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The purpose of this Plan is to define the principles and procedures for the management of camp sites in accordance with applicable national regulations and international standards. In addition, the Plan sets out the standards for campsite facilities, including accommodation conditions, spatial arrangements, room requirements, water quality, and other essential aspects to ensure compliance and safeguard the health, safety, and well-being of workers accordance with applicable national regulations and international standards. The Construction Campsite Management Plan aims to minimize risks to human health, property, and the environment associated with the establishment, operation, and maintenance of campsite facilities during the construction phase, and sets a standard for worker accommodation conditions.

The Plan should be implemented by all parties involved in the construction phase, including the Project Sponsor – AAOİAŞ, the Main Contractor (Limak), and all subcontractors. Roles and responsibilities regarding campsite management should be clearly defined. The Plan should be reviewed and updated as necessary to reflect changes in project conditions, design, or legal requirements.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been prepared in alignment with relevant national legislation and international reference standards that regulate environmental protection, occupational health and safety, and social management during construction activities. The Plan aims to ensure compliance with applicable legal requirements and best practice standards set by international financial institutions.

III.1 National Requirements

The following national laws and regulations provide the legal basis for the establishment, operation, and management of temporary construction camps during the construction phase:

- Occupational Health and Safety Law (Law No. 6331)
- Labor Law (Law No. 4857)
- Environmental Law (Law No. 2872)

III.2 International Standards and Conventions

The following international standards and conventions should be considered to ensure that construction camp site activities are implemented in accordance with international good practice and the requirements of international financial institutions.

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework ("ESF") document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices.

- IFC Performance Standards (2012), specifically:
  - Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
  - Performance Standard 2: Labor and Working Conditions
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- European Landscape Convention (entered into force in 2000; ratified by Türkiye in 2003)
- Workers' accommodation: processes and standards A guidance note by IFC and the EBRD

These references should guide the development, implementation, and monitoring of all environmental and social measures associated with construction camp facilities. Compliance with these standards should be ensured throughout the construction phase, especially in areas such as worker accommodation, sanitation, resource use, safety, and community health.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Construction Camp Site Management Plan:

- Human Resources and Labor Management Plan
- Subcontractor Management Plan
- Solid Waste Management Plan
- Water, Wastewater, Storm Water Management Plan
- Hazardous Materials Management Plan
- Air Quality and Emissions Management Plan
- Noise and Vibration Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction camp operations during the construction phase.

V. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

Project Manager (EPC)

- The project manager is responsible for construction of the mobilization area according to the lender's requirements

- Ensure implementation of the requirements and for making the resources available that may be required during implementation of this plan.

Administrative Affairs Supervisor and Camp Supervisor (EPC)

- Ensures compliance with health, safety, and worker accommodation standards.
- Coordinates daily administrative and welfare operations in the camp.
- Manages room allocation, occupancy records, and resident registration.
- Oversees catering, laundry, cleaning, and transport services.
- Ensures compliance with IFC & EBRD workers accommodation standards, labor law, and project policies.
- Ensure that the grievances received about campsite from CLO's is managed and resolved in a timely and transparent matter.
- Supervises daily camp operations, and maintenance.
- Monitors hygiene, sanitation, waste management, and utilities.
- Oversees security, emergency procedures, and fire safety measures.
- Conducts inspections of dining, accommodation, and recreational facilities.
- Takes action with the OHS team in emergency situations.
- Coordinates with the E&S and OHS teams to ensure compliance with legal and international requirements.
- Reports non-compliances to the Project Manager and ensures that they are resolved in a timely manner.

E&S Department and OHS Department (EPC)

- Inform, train and guide the camp supervisor about lender's requirements and regulations.
- Conduct joint labor audits together with the SPV including E&S team, OHS department, camp doctor, food engineer and camp supervisor from the EPC - regarding with legal/international requirements and the camp checklist presented in ANNEX IV: CAMP SITE CHECKLIST prepared according to the IFC/EBRD Guidance Note. Document the condition of accommodation sites, dining halls, and workers' facilities through records and photographs. Share audit findings.
- Conduct routine inspection about condition of accommodation sites, dining halls, and workers' facilities.
- Share the non-compliances of the audits and inspections with Project Manager of EPC, and make sure that the necessary steps are taken.
- Train relevant personnel particularly about the plan and campsite rules

E&S Department and Occupational Safety Department (SPV)

- Conducts quarterly labor audits with the EPC's E&S team, OHS department, camp doctor, food engineer and camp supervisor regarding with legal/international requirements and regarding the camp checklist presented in ANNEX IV: CAMP SITE CHECKLIST prepared according to the IFC/EBRD Guidance Note. Share the findings of the audit findings (report, photographs) with the EPC team.
- Revise campsite management plan depending on changing conditions.
- Ensure that the relevant personnel are trained particularly about the plan and campsite rules.
- Share the findings of the audits with Project Manager of EPC, and make sure that the necessary steps are taken in any case of non-compliance.

Food Engineer (EPC)

- Ensure that all meals are prepared, stored, and served in compliance with hygiene and food safety standards.
- Monitor kitchen staff for proper food handling, storage temperatures, and cleanliness.
- Conduct routine inspections of dining halls, kitchens, and food storage areas.
- Oversee food quality and nutritional value to ensure workers receive balanced meals.
- Provide training to food handlers on hygiene, sanitation, and safe practices.
- Record and report non-compliances (e.g., spoiled food, poor hygiene) and follow up on corrective actions.
- Take samples from all meals served and store them in a +4 °C cold storage for 72 hours.
- Monitor and control the expiration dates of goods delivered to the warehouses and those maintained in the cold chain.
- Join the audits/inspections conducted by the SPV and EPC Team.

Camp Site Doctor (EPC)

- Provide primary healthcare services to workers and maintain medical records.
- Conduct routine health checks and manage treatment of illnesses and injuries at the campsite.
- Ensure first aid kits, medicines, and medical equipment are available and up to standard.
- Coordinate health awareness campaigns (e.g., hygiene, communicable diseases, occupational health).
- Oversee sanitation and hygiene conditions in accommodation and communal facilities from a health perspective.
- Support emergency preparedness by assisting with emergency response plans and conducting medical drills.
- Refer workers to external hospitals/clinics when necessary and liaise with local health authorities.
- Join the audits/inspections conducted by the SPV and EPC Team.

Subcontractors

- Train and inform the workers staying in Limak's campsite about this plan and make sure that the workers are obliging to the Plan and campsite rules,
- Ensure that the workers are participating the awareness trainings given by the EPC's E&S and OHS departments.

Employees

- Participate in trainings given by EPC and follow the camp site's rules accordingly.
- Share his/her grievances or any non-compliance through grievance channels; if urgent share it with the camp supervisor.
- Accommodate in the premises in such way that does not harm himself and his colleagues.

ANTALYA ALANYA MOTORWAY	**ANTALYA-ALANYA MOTORWAY PROJECT**
Revision No: 3	**Date:** 08.09.2025
CONSTRUCTION CAMP SITE MANAGEMENT PLAN	

VI. CONSTRUCTION CAMP SITE MANAGEMENT APPROACH

Construction camps are critical support facilities during the construction phase of large-scale infrastructure projects. If not properly managed, these sites can result in a range of environmental, health, and social impacts. Key issues associated with construction camps include improper solid and liquid waste management, inadequate sanitation, occupational health and safety risks, pressure on local resources (e.g., water, land), and poor accommodation and hygiene conditions for workers.

Social impacts may arise from worker-community interactions, insufficient grievance mechanisms, and non-compliance with labor standards. In addition, increased demand for water, energy, and waste treatment capacity can place stress on local infrastructure.

Construction camps are also expected to contribute to emissions through the use of fossil fuel-based generators and heating systems. These systems can emit pollutants such as particulate matter (PM_{10}), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs), particularly in the absence of proper maintenance or emission controls. Noise and vibration disturbances may also occur due to the operation of heavy equipment, vehicle traffic, and power generation units.

To mitigate these risks, construction camps will be sited, designed, and operated in accordance with applicable national regulations and international best practice standards. Camp layouts should incorporate designated areas for accommodation, dining, hygiene facilities, waste storage, and emergency response. Adequate infrastructure should be provided to ensure the provision of potable water, safe sanitation, reliable electricity, and effective drainage.

As of the current planning phase, three primary construction camp sites have been identified along the Antalya–Alanya Motorway Project corridor. These camps will be established to support key segments of the construction works, provide accommodation and welfare services to workers, and house essential facilities and equipment. Table VI.1 presents the locations of the proposed construction camps.

Table VI.1 Proposed Construction Camp Site Locations

Location (Km)	Province	District	Nearest Neighborhood	Description
Km 59+400	Antalya	Manavgat	Taşağıl	Temporary Construction Camp Site
Km 64+500	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)
Km 87+800	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3

Temporary Construction Camp Site is located near Km 59+400 in the Taşağıl neighborhood of Manavgat district. The site is approximately 1 km from the center of the Taşağıl neighborhood. This site is planned to be used until the Main Construction Camp Site No.1 is constructed. Once the main camp site is established, one asphalt plant, one mechanical plant, and one concrete plant will be installed in this area. A general view of the site is shown in Figure VI.1 and its layout is presented in ANNEX I: Temporary Construction Camp Site.



Construction Camp Site-1



General View

Figure VI.1 Satellite Image and Photograph of the Temporary Construction Camp Site (Km 59+400)

Main Construction Camp Site No. 1 is located near Km 64+500 in the Taşağıl neighborhood of Manavgat district. The site is approximately 1 km from the center of the Taşağıl neighborhood. This site is planned to remain in use as a maintenance and operation area following the construction phase. A general view of the site is shown in Figure VI.2 and its layout is presented ANNEX II: Main Construction Camp Site.



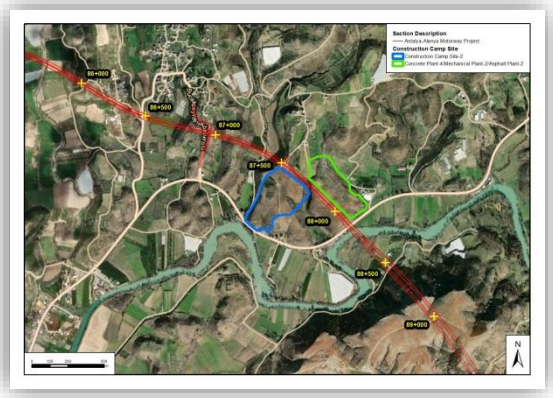
Construction Camp Site-1



General View

Figure VI.2 Satellite Image and Photograph of the Construction Camp Site-1 (Km 64+500)

Construction Camp Site No. 2 is located near Km 87+800 in the Bucakşeyhler neighborhood of Manavgat district. The site is approximately 1.1 km from the center of the Bucakşeyhler neighborhood. A general view of the camp site is shown in Figure VI.3 and its layout is presented inANNEX III: Manavgat Construction Camp Site .



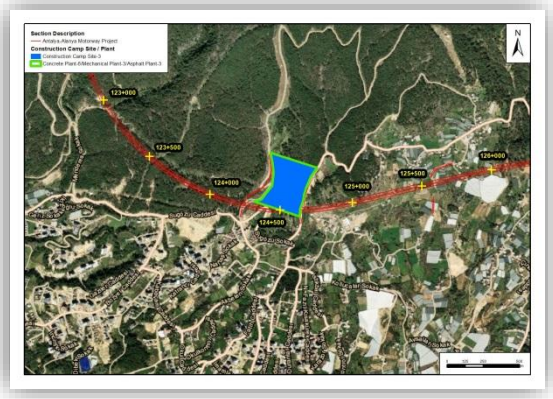
Construction Camp Site-2



General View

Figure VI.3 Satellite Image and Photograph of the Construction Camp Site-2 (Km 87+700)

Construction Camp Site No. 3 is located near Km 124+300 in the forest area between Avsallar and İncekum neighborhoods of Alanya district. The site is approximately 500 m from the center of the İncekum neighborhood. A general view of the camp site is shown in Figure VI.4.



Construction Camp Site-3



General View

Figure VI.4 Satellite Image and Photograph of the Construction Camp Site-3 (Km 124+300)

Each campsite will include facilities such as cafeteria, infirmary, showers and toilets, wastewater treatment plants/septic tanks, and water supply facilities.

The total equivalent population for these plants is 3,750 people. Package WWTPs will be constructed in each campsite to treat the domestic wastewater that will be generated during the construction phase of the Project.. A total of 3,300 people will be accommodated across three campsites as part of the Project. It is assumed that approximately 1,100 people will stay at each campsite.

Considering potential visitors and occasional overcapacity, a package WWTP with a capacity for 1,250 people is calculated to be sufficient for the domestic wastewater treatment needs of each campsite.

Wastes anticipated to be generated at the campsites during the construction phase of the Project would mainly include cleared vegetation, municipal (domestic) solid wastes, domestic wastewater, treatment sludge, packaging wastes, excavation wastes, construction wastes, debris from settling ponds at concrete plants, hazardous wastes (including packaging wastes that contacted with hazardous substances), waste oils, waste tires, waste vegetable oils and other types of special wastes. Further information on the main types of wastes are detailed in Solid Waste and Hazardous Waste Management Plans.

All activities associated with camp construction, operation, and decommissioning would be conducted under strict health, safety, and environmental management procedures. Implementation of this Plan would be closely coordinated with relevant management plans, including those on waste, wastewater, health and safety, and subcontractor .

Monitoring of camp conditions should be carried out regularly to ensure compliance with the ESMS, and corrective actions should be taken promptly where non-conformities are identified. Worker welfare standards and community relations should be continuously monitored and improved throughout the construction phase.

VII. MITIGATION MEASURES FOR IMPACTS OF CONSTRUCTION CAMPS

The following measures will be implemented to prevent or minimize environmental, occupational health and safety, and social risks associated with the construction and operation of camp facilities during the construction phase:

- Camp-related waste will be managed in accordance with relevant Waste Management Plans (e.g., solid waste, wastewater, hazardous waste).
- Emergency response equipment will be available on-site in compliance with legal requirements to respond to fire, medical, and environmental emergencies.
- Access to and from the camp site will be controlled in accordance with the provisions outlined in the Security Management Plan.
- A fire detection and firefighting system will be installed and maintained in all accommodation units, kitchens, storage areas, and social facilities, with regular inspections and drills conducted to ensure readiness.
- Hygienic and legally compliant meal service areas will be established within the camp to meet workers' nutritional and health needs.
- Adequate quantities of safe and hygienic drinking water will be supplied and maintained at all times in compliance with national health regulations.
- Toilet, shower, laundry, changing, and dressing areas will be provided in sufficient quantity, in hygienic conditions, and in accordance with international (lenders') requirements.
- Comfort conditions (ventilation, lighting, heating, etc.) in on-site office buildings and worker housing will be ensured in line with applicable occupational health and safety regulations, seasonal needs and legal requirements.
- A drainage system will be installed across the camp site to prevent water accumulation and runoff, prevent contamination risks within worker living areas in accordance with relevant legislation.
- Campsites will host on-site infirmaries staffed by trained health professionals to provide initial

response in case of injuries or health incidents. In the event of an emergency, coordination with local authorities-including village heads, municipalities, healthcare units, and law enforcement-will enable swift and organized action.

- Legally compliant medical units and first-aid equipment will be established within the camp site and made readily accessible to all personnel.
- Workshop areas (such as those used for equipment maintenance and repair) within the camp will be managed to prevent adverse impacts on the environment, community, and worker health.
- Waste and hazardous materials generated in these areas will be stored separately in sealed, leak-proof containers and in designated enclosed areas, in line with related management plans.
- Measures will be taken to prevent the release of contaminants into soil and water, including the implementation of spill containment protocols and secondary containment systems.
- Building materials used in worker accommodation will comply with applicable fire safety and hygiene regulations.
- Accommodation units will be positioned at a reasonable distance from active construction zones to ensure worker safety and comfort.
- Systems for the organized collection and disposal of domestic and operational waste will be established, including clearly designated bins and regular collection services.
- Routine pest control will be implemented to maintain sanitary conditions in worker accommodation facilities.
- Each worker will be assigned a personal bed, and all rooms will be equipped with operable windows, secure door locks, and fly screen, air conditioner, and wardrobe.
- Separate storage areas for personal protective equipment, including boots and other gear, will be provided to avoid cross-contamination and ensure organization.
- Regular cleaning of accommodation dormitory, baths and toilets will be carried out to maintain hygiene and prevent health issues.
- Toilets and sleeping quarters will be located within the same building to enhance accessibility, safety, and convenience for workers.
- Cleaning schedules will be posted in all areas where cleaning is performed, and cleaning activities will be regularly recorded.
- There will be a recreation room for workers to rest and spend their free time.
- Lounge areas will be built in the camp areas for workers relax.
- There will be a Wi-Fi network in the recreation room and rooms for workers to access the internet.
- Meals will be provided in the camp areas to ensure that workers eat regularly and healthily.
- Shuttle services with appropriate air conditioning will be provided to the nearby town center at certain times of the day.
- All camp areas will be inspected at regular intervals by companies authorized by the OHS, E&S Team, campsite supervisor, food engineers, camp site doctor.
- Mechanical maintenance workshops, warehouses, and other such facilities will be separated from accommodation and rest areas in the camp areas.
- Waste management in camp areas will be carried out in accordance with the guidelines provided in the Hazardous Waste and Material Management Plan and the Solid Waste Management Plan, with separate areas for hazardous and non-hazardous waste collection.
- Sufficiently sized and numbered prayer room will be established for workers.
- In order to implement the internal complaint mechanism, grievance boxes will be placed in areas without camera surveillance, and the requests, suggestions, and complaints collected will be logged into CLO's archive and resolved by management.
- Workers will have access to hot water 24 hours a day.
- Camp rules will be clearly communicated to workers, and necessary measures and incentives will be implemented to ensure compliance with camp rules.

- Access to camp areas from outside will be restricted, and security will be ensured.
- Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers. Security staff have received adequate training in dealing with domestic violence and the use of force.
- The campsite shall implement adequate security measures and awareness programs to prevent GBVH, ensuring that all facilities are safe, inclusive, and respectful for both men and women, with clear reporting channels for any incidents. Particular attention will be paid to the safety and security of women workers.
- Workers' rights must be respected in both living and working areas, and all house rules should be fair, non-discriminatory, and give equal opportunities to everyone
- All camp areas, accommodation facilities, toilets, bathrooms, prayer rooms, lounge areas will be assessed at internal labor audits conducted by the SPV and EPC's OHS, E&S Team, campsite supervisor, food engineers, camp site doctor according to the legal / international requirements and by the checklist prepared in ANNEX IV: CAMP SITE CHECKLIST regarding the IFC/EBRD's guidance note. The findings of these audits will be analyzed actions will be taken according to that.

VIII. TRAINING

When evaluating training needs for the implementation of this procedure, several key considerations will be addressed. All Project personnel, including contractor staff, will be informed of basic hygiene practices, safety rules, emergency response procedures, pollution prevention, waste management procedures, general camp site and accommodation rules and other requirements outlined under the Project. Personnel responsible for the management, security, cleanliness, and maintenance of the camp site and accommodation areas, including those employed by contractors, will be required to hold professional training certifications in accordance with applicable legislation. It will also be ensured that a sufficient number of staff trained in first aid is present at all times. Training records will be maintained by the Human Resources and/or the Environment and Social team.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of campsite management measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, health and safety observations, worker feedback, or changes in applicable legislation and Project requirements.

Monitoring activities will be coordinated by the E&S and OHS Department of EPC and SPV in close collaboration with the and Camp Management teams. Key responsibilities will include verifying the adequacy of accommodation standards, monitoring sanitation and hygiene conditions, ensuring the proper functioning of wastewater and solid waste management systems, and confirming that food preparation and storage practices meet health and safety requirements.

Regular audits will be carried out by the EPC and SPV Team at all worker accommodation and support facility areas to ensure compliance with national standards, IFC/EBRD requirements, and Project-specific campsite management criteria. The conditions to be checked are presented in ANNEX IV: CAMP SITE CHECKLIST. This will include checks on room occupancy, cleanliness of common areas

(e.g., kitchens, dining halls, toilets, and showers), availability of drinking water, adequacy of waste segregation and disposal practices, and implementation pest control measures.

The performance of contractors and subcontractors in meeting campsite management standards will be assessed through internal labor audits, supervisor inspections, worker interviews, and grievance records. Any identified non-conformities will trigger the preparation and implementation of corrective and preventive actions. Follow-up inspections will be conducted to confirm the resolution of issues and ensure ongoing compliance.

In addition to internal monitoring, inspections may be conducted by relevant public institutions, such as the Ministry of Health, Provincial Directorates, or the Ministry of Environment, Urbanization and Climate Change. The frequency and scope of these inspections will be determined by the competent authorities and will cover environmental health, hygiene, and worker welfare aspects of the campsites.

Monitoring efforts will be guided by the framework provided in Table IX.1, which outlines the specific parameters to be monitored, their corresponding locations within the campsite, monitoring frequency, and responsible parties. These activities will be essential for ensuring that campsite facilities remain safe, hygienic, and compliant with national regulations and international best practices.

Table IX.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Borders of the camp sites	Camp Sites	Site audit	Daily	SPV EPC -Sub-Contractor
Area of exposed lands at each camp sites (m^2)	Locations of exposed lands within the expropriation corridor	Site audit	Daily	-SPV -EPC -Sub-Contractor
List of hazardous materials/chemicals supplied, stored and used (inc. information on type and amount/volume) Type (i.e. municipal, packaging, waste oil, etc.) and amount of wastes produced/disposed of Waste management/disposal agreements done with licensed companies Temporary Waste Storage Areas	Camp Sites	-Site audit -Document review	Monthly	-SPV -EPC -Sub-Contractor
Site practices on waste management (e.g. general housekeeping rules, source separation practice, containers, containment structures, etc.)	Camp Sites	Visual inspection	Daily	-SPV -EPC -Sub-Contractor
Sources and amount of water supply Water supply permits	Camp sites	-Document review	Monthly	-SPV -Acridities Laboratory

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Employment agreements -Number of personnel who are infected with an infectious disease -Source and quality of drinking water	Camp sites	-Document review	Weekly	-SPV -EPC
-Use of PPEs -Health and safety signs -Fire safety equipment/systems -Accommodation conditions	Camp sites	Site audit Visual observation	Daily	-SPV -EPC
Number of health and safety trainings provided	Camp sites	Document review	Monthly	SPV
-Employment data on the security personnel -Trainings provided to security personnel -Grievances received and replied to regarding the acts of security personnel	Camp sites	Document review	Weekly	SPV
Visual barriers	Camp sites	Site audit Review of grievance logs	Monthly	SPV
Number of trainings conducted	Camp sites	Tracking the number of Project personnel and contractor workers who have received training	Quarterly	EPC (E&S Department – OHS Department)
Number of audits conducted	Construction camp sites	Audit reports, checklists, records of findings and corrective actions	Quarterly	EPC (E&S Department – OHS Department) SPV
Complaints related to camp site management	Public relations records and grievance system	Logging and monitoring of grievances as per the Grievance Mechanism Procedure	Regularly	EPC (E&S Department – OHS Department) SPV
Compliance with Plan implementation	Worker Rooms, cafeterias, social areas, bathrooms, toilets, etc.	Visual inspection, check-lists	Regularly	EPC (E&S Department – OHS Department)

In cases of non-compliance identified through internal audits SPV will ensure that corrective and preventive measures are promptly implemented in coordination with the EPC and relevant subcontractors.

All campsite-related findings—including hygiene deficiencies, overcrowding, inadequate waste or wastewater management, food safety violations, or grievances rose by workers—will be documented in accordance with national legislation and Project procedures. In the event of serious violations, such as confirmed breaches of minimum accommodation standards, health and sanitation failures, or conditions posing risks to worker welfare, SPV will ensure that the issue is reported to the relevant authorities and that appropriate technical, procedural, and contractual actions are undertaken without delay.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Monitoring Frequency	Target	Responsible Party
Number of trainings conducted	Continuous	All personnel to receive training	EPC (E&S Department – OHS Department) SPV
Non-compliance with standards	Monthly	Less than five	EPC (E&S Department – OHS Department) SPV
Number of complaints received about camp site accommodation and welfare facilities	Monthly	Less than five	EPC (E&S Department) SPV
Number of inspections conducted	Continuous	Fewer than five non-compliances per month	EPC (E&S Department – OHS Department)
Number of audits conducted	Quarterly	Fewer than 15 non-compliances per quarter	EPC (E&S Department – OHS Department) SPV

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities should be documented and reported as outlined in the plan. Contractors and subcontractors should be subject to audits conducted by the EPC and SPV within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established plans and procedures. Observations and deficiencies identified during audits will be included in formal audit reports, and any required improvements will be registered under Corrective Actions. The audits will be conducted in accordance with the Camp Site Checklist, prepared in line with the IFC/EBRD Workers' Accommodation Guidance Note as shown in ANNEX IV: CAMP SITE CHECKLIST. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary and update this document.

XII. REPORTING

Regular reporting will be carried out to ensure the effective implementation and continuous improvement of environmental and social (E&S) site management practices throughout the construction phase of the Project. Reporting will address both internal monitoring and auditing results, as well as stakeholder communication obligations related to site operations.

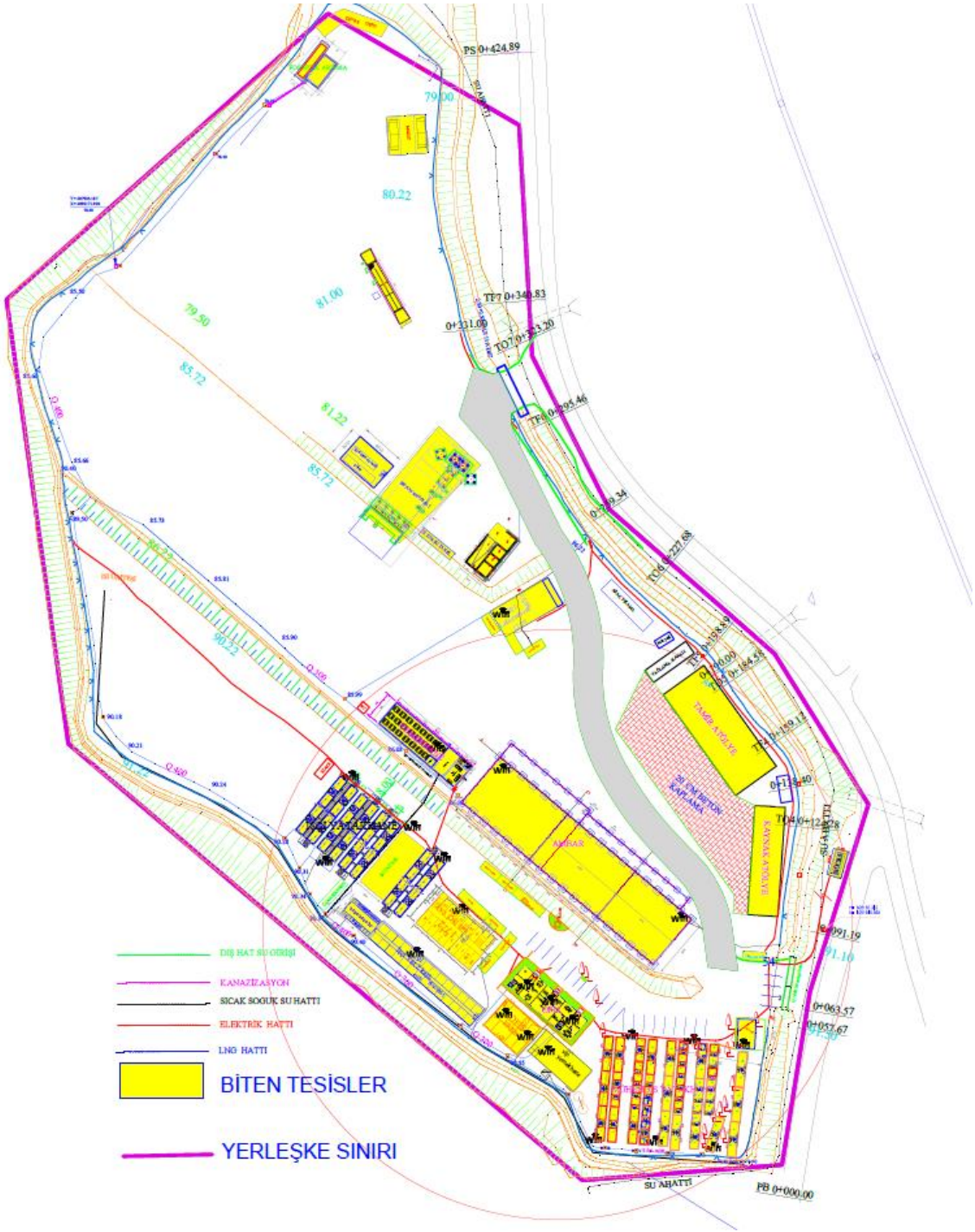
Based on the monitoring results, necessary corrective and preventive actions will be identified and required changes will be reflected to this Plan. Training program will also be updated accordingly. Regular audits and visual inspections will be conducted in order to ensure all activities are being undertaken according to this Plan.

These monitoring results, along with data obtained through inspection and audit activities, will be consolidated under a dedicated section related to site management in the Environmental and Social Monitoring Reports, which are prepared on a quarterly basis. All observed non-compliances, corrective actions taken, and recommended time-bound corrective measures will be documented and supported with relevant records, including photographs or other verifiable materials.

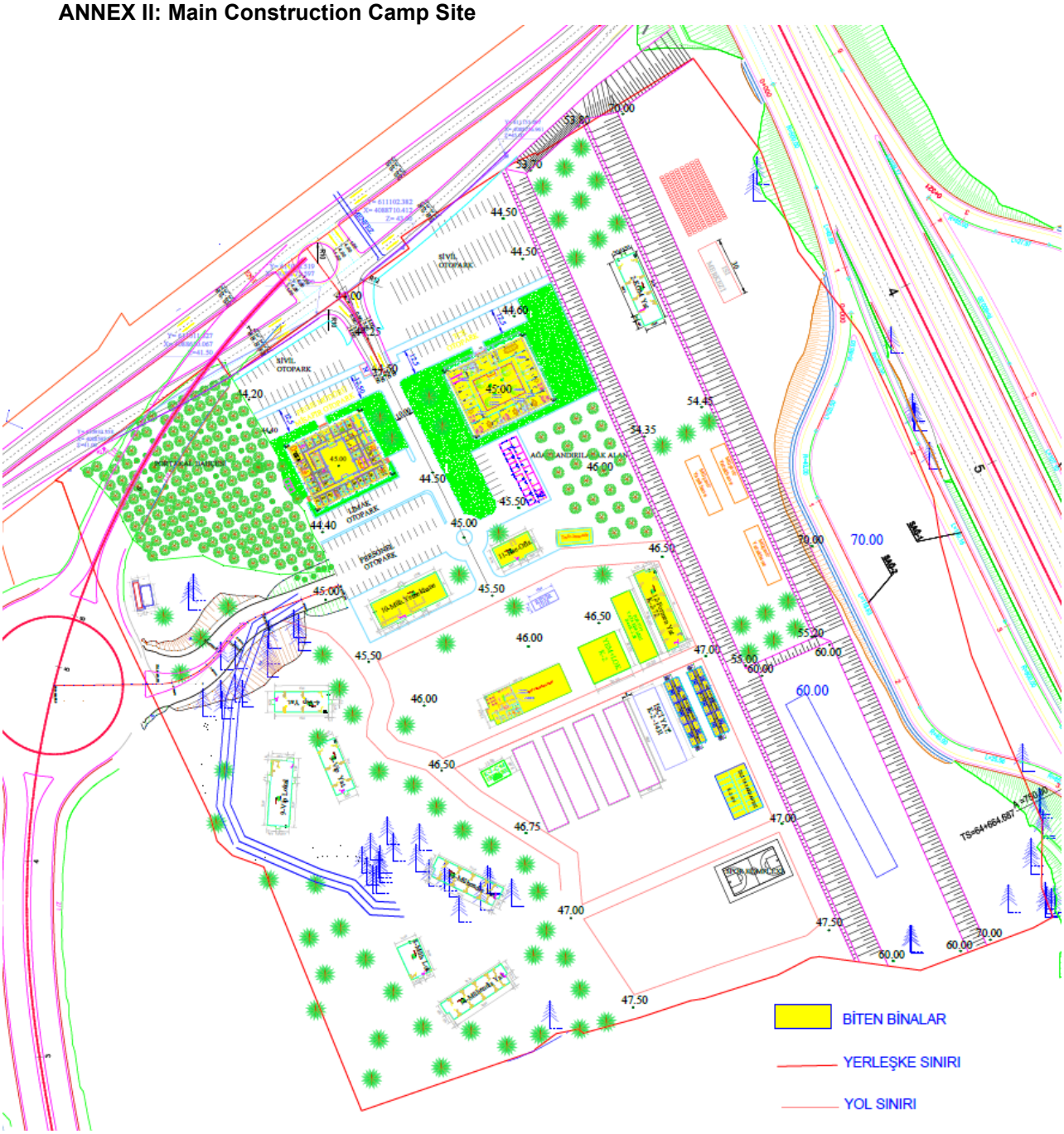
All personnel may submit concerns, suggestions, or complaints in accordance with the Project's Grievance Mechanism, by completing a grievance form. Communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan (SEP).

This Plan will be reviewed on a quarterly basis by the Environmental and Social Expert, following site audits or after any incident or significant change in site activities. Any updates to the Plan will be developed in coordination with the Site Manager and agreed upon accordingly.

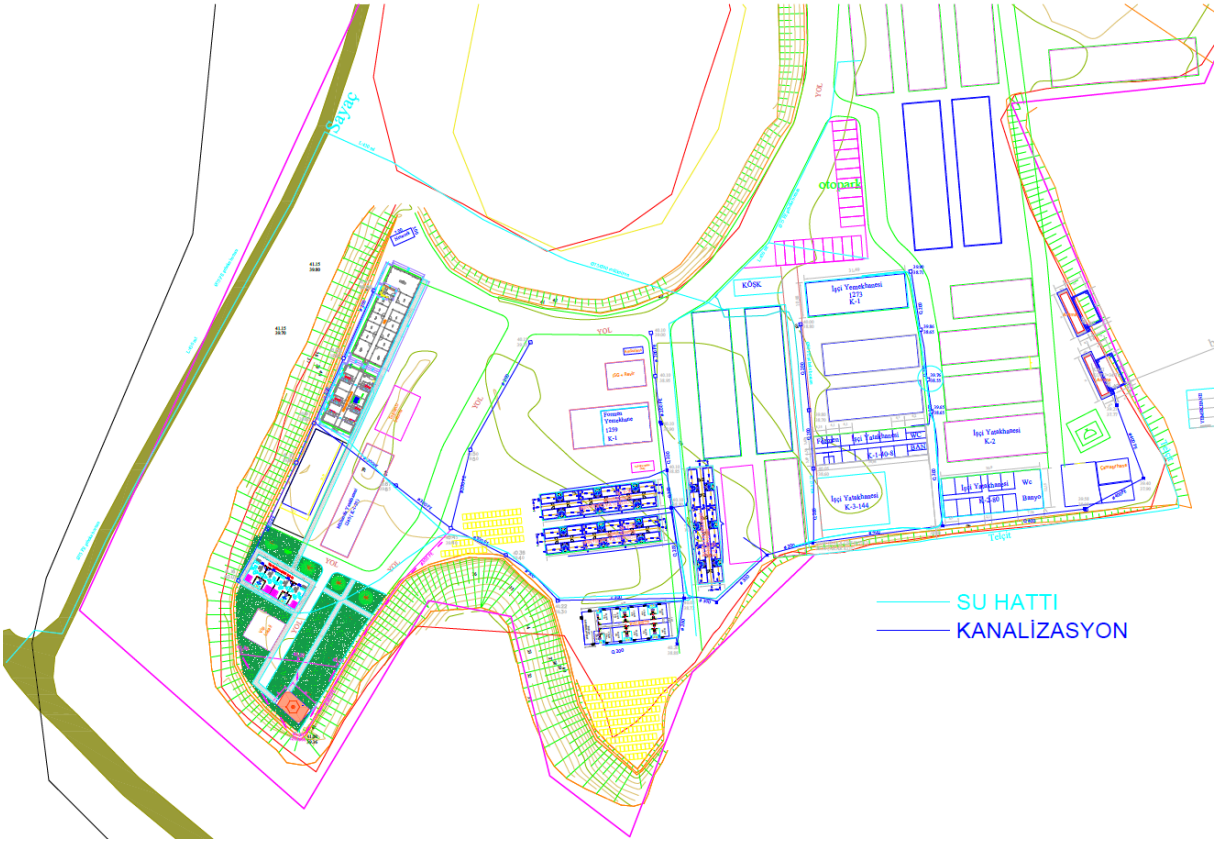
ANNEX I: Temporary Construction Camp Site



ANNEX II: Main Construction Camp Site



ANNEX III: Manavgat Construction Camp Site



ANNEX IV: CAMP SITE CHECKLIST

ANTALYA ALANYA MOTORWAY	**CAMP CONTROL FORM**	**Doc No**: **Rev:** **Publication Date:**

No.	Control Parameters	Compliance			Comments
		Yes	No	Not Relevant	
ASSESSMENT OF THE NEED FOR WORKERS' ACCOMMODATION					
1	Have mandatory provisions regarding worker accommodation been established?	☐	☐	☐	
2	Has an assessment been made regarding the suitability of workers living near the work site?	☐	☐	☐	
3	Has an assessment been made of the skills and competencies of the workforce in the work area and how these skills and competencies align with the project's needs?	☐	☐	☐	
4	Before constructing the mobilization facility, was a comprehensive assessment conducted of the different types of housing available in the surrounding communities?	☐	☐	☐	
5	Have measures been identified to mitigate negative impacts on the local housing market, and have they been included in the Environmental and Social Action Plan (ESAP) or other relevant action plans?	☐	☐	☐	
ASSESSMENT OF THE IMPACT OF WORKER ACCOMMODATION ON COMMUNITIES					
6	To reduce the negative impacts of workers' accommodation facilities on surrounding communities and enhance their positive impacts, was a community impact assessment conducted as part of the Environmental and Social Assessment of the overall project?	☐	☐	☐	
7	Were the positive and negative impacts of workers' accommodation facilities on infrastructure, services, and facilities included in the assessment?	☐	☐	☐	
8	Were the impacts on local businesses and local employment included in the assessment?	☐	☐	☐	
9	Have the overall effects of workers' accommodation facilities on community health (particularly the risks of increased traffic accidents and infectious diseases) and community social cohesion been included in the assessment?	☐	☐	☐	
10	Does the current assessment include appropriate mitigation measures to address the identified adverse impacts?	☐	☐	☐	
WORKERS' ACCOMMODATION STANDARDS					
11	National/local standards Have the relevant national/local regulations been established and implemented?	☐	☐	☐	
GENERAL LIVING FACILITIES					

No.	Control Parameters	Compliance			Comments
		Yes	No	Not Relevant	
12	Are the facilities designed to avoid flooding and other natural hazards?	☐	☐	☐	
13	Are the living facilities located at a reasonable distance from the work site?	☐	☐	☐	
14	Is transportation to/from the work site safe and free?	☐	☐	☐	
15	Are the living facilities constructed using appropriate materials, in good condition, and kept clean and free of trash and other waste?	☐	☐	☐	
16	Is proper drainage provided on site?	☐	☐	☐	
HEATING, AIR CONDITIONING, VENTILATION, AND LIGHTING					
17	Depending on the climate, are adequate heating, ventilation, air conditioning, and lighting systems, including emergency lighting, provided for the accommodation facilities?	☐	☐	☐	
WATER					
18	Do workers have easy access to sufficient quantities of clean/potable water?	☐	☐	☐	
19	Is the quality of the water in compliance with national/local requirements or WHO standards?	☐	☐	☐	
20	Are the tanks used for storing drinking water constructed and sealed in a way that prevents contamination or cross-contamination of the stored water?	☐	☐	☐	
21	Is the quality of drinking water monitored regularly?	☐	☐	☐	
WASTEWATER AND SOLID WASTE					
22	Is wastewater, sewage, food waste, and other waste materials being disposed of appropriately in accordance with local or World Bank standards and without causing significant impact on camp residents, the environment, or surrounding communities?	☐	☐	☐	
23	Are special containers provided for waste collection, and are these containers emptied regularly?	☐	☐	☐	
24	Are pest control and disinfection practices carried out throughout the living facilities?	☐	☐	☐	
ROOM/DORMITORY FACILITIES					
25	Are the rooms in good physical condition? Is there any damage?	☐	☐	☐	
26	Is sufficient space provided for residents?				
27	Is there adequate natural lighting in the rooms? (Window area should not be less than 5%-10% of the room's size)	☐	☐	☐	
28	Are the rooms/dormitories ventilated and cleaned at regular intervals? (Air volume per person: 10 m^3)	☐	☐	☐	
29	Are the rooms constructed with floor materials that are easy to clean?	☐	☐	☐	

No.	Control Parameters	Compliance			Comments
		Yes	No	Not Relevant	
30	Are the rooms and washbasins/showers located within the same buildings?	☐	☐	☐	
31	Is sufficient space provided for room occupants? (4 m² per person)	☐	☐	☐	
32	Is the ceiling height sufficient? (2.4 m)	☐	☐	☐	
33	Has the number of workers sharing the room/dormitory been reduced to a minimum? (There must be a minimum of 1 m between beds)	☐	☐	☐	
34	Can the doors and windows be locked?	☐	☐	☐	
35	Are there curtains or doors in the shower and other private areas?	☐	☐	☐	
BED ARRANGEMENTS AND STORAGE FACILITIES					
36	Is a separate bed provided for each worker?	☐	☐	☐	
37	Is the practice of "shared beds" prohibited?	☐	☐	☐	
38	Is there a minimum 1-meter gap between beds?	☐	☐	☐	
39	Has the use of bunk beds been minimized?	☐	☐	☐	
40	When using bunk beds, is there sufficient space between the lower and upper bunks? (They should be avoided as much as possible in case of potential emergencies. When their use is unavoidable, the distance between beds (the height between two beds should be 0.7-1.1 m)	☐	☐	☐	
41	Is the use of triple-decker bunk beds prohibited? (Their use should be prohibited.)	☐	☐	☐	
42	Are workers provided with comfortable beds, pillows, and clean bedding?	☐	☐	☐	
43	Are bed sheets washed frequently?	☐	☐	☐	
44	Are adequate facilities provided for storing personal belongings? (475-liter lockers suitable for personal use are recommended.)	☐	☐	☐	
45	Are there separate storage areas for work clothes and PPE, and drying/ventilation areas as needed?	☐	☐	☐	
SANITARY FACILITIES					
46	Are the toilets constructed from materials that are easy to clean?	☐	☐	☐	
47	Are the toilets cleaned frequently and kept in constant working order?	☐	☐	☐	
48	Are the restrooms designed to provide workers with adequate privacy, including partitions from ceiling to floor and lockable doors?	☐	☐	☐	
TOILET FACILITIES					
49	Are there enough toilets and urinals? (Minimum 1 facility for every 6 to 15 workers)	☐	☐	☐	
50	Are the toilet facilities appropriately located and easily accessible? (The distance between rooms and facilities should be within accessible limits, such as 30-60 m.)	☐	☐	☐	

No.	Control Parameters	Compliance			Comments
		Yes	No	Not Relevant	
SHOWERS/BATHROOMS AND OTHER SANITARY FACILITIES					
51	Is the shower floor made of non-slip, hard, washable materials?	☐	☐	☐	
52	Are there enough handwashing sinks and shower/bath facilities? (1 toilet, 1 sink, 1 urinal, and 1 row of baths for every 6 to 15 workers).	☐	☐	☐	
53	Are the bathrooms easily accessible? (The distance between rooms and facilities should be within accessible limits, such as 30-60 meters.)	☐	☐	☐	
54	Is there an adequate supply of cold and hot water in the shower facilities?	☐	☐	☐	
55	Are separate sanitary and toilet facilities provided for men and women?	☐	☐	☐	
CAFETERIA, KITCHEN, AND LAUNDRY FACILITIES					
56	Are the canteen, cooking, and laundry facilities constructed using appropriate and easy-to-clean materials ( )?	☐	☐	☐	
57	Are the cafeteria, cooking, and laundry facilities clean and hygienic?	☐	☐	☐	
LAUNDRY FACILITIES					
58	Are adequate facilities provided for washing and drying clothes?	☐	☐	☐	
CAFETERIA AND FOOD PREPARATION FACILITIES					
59	Is there sufficient space provided for employees in the cafeteria/dining hall? (1-1.5 m² per person)	☐	☐	☐	
60	Are facilities provided to ensure adequate personal hygiene in kitchens?	☐	☐	☐	
61	Are kitchens adequately ventilated and properly equipped?	☐	☐	☐	
62	Are kitchen floors, ceilings, and wall surfaces adjacent to or above food preparation and cooking areas made of non-absorbent, durable, non-toxic, non-flammable, and easy-to-clean materials?	☐	☐	☐	
63	Are the wall surfaces adjacent to cooking areas made of fire-resistant materials, and are food preparation tables covered with a smooth, durable, non-abrasive, non-toxic, washable surface?	☐	☐	☐	
64	Are adequate facilities provided for cleaning, disinfecting, and storing kitchen utensils and equipment?	☐	☐	☐	
65	Are there sufficient leak-proof containers available for collecting food waste and other garbage? Is garbage removed from the kitchen frequently to prevent accumulation?	☐	☐	☐	
NUTRITION AND FOOD SAFETY STANDARDS					

No.	Control Parameters	Compliance			Comments
		Yes	No	Not Relevant	
66	Is a special process similar to the WHO's "5 steps to food safety" applied in relation to food safety? (WHO 5 Points: Pay attention to cleanliness, keep cooked and raw foods separate, cook thoroughly, store food at the correct temperature, use clean water and clean equipment)	☐	☐	☐	
67	Do the served foods contain appropriate nutritional value?	☐	☐	☐	
68	Does the food served take into account the religious/cultural backgrounds of the employees?	☐	☐	☐	
MEDICAL FACILITIES					
69	Are there enough first aid kits available?	☐	☐	☐	
70	Are first aid kits adequately stocked?	☐	☐	☐	
71	Is there a sufficient number of personnel/workers trained to provide first aid?	☐	☐	☐	
72	Are other medical facilities/services available at the construction site? (Infirmary services)	☐	☐	☐	
RECREATION, SOCIAL, AND TELECOMMUNICATIONS FACILITIES					
73	Are basic communal social areas and adequate recreational areas provided for workers?	☐	☐	☐	
74	Are separate areas provided for workers to perform their religious worship?	☐	☐	☐	
75	Are workers provided with access to internet facilities?	☐	☐	☐	
MANAGEMENT OF WORKERS' ACCOMMODATION					
76	Is there staff responsible for managing social areas? (Administrative staff)	☐	☐	☐	
77	Are there carefully designed worker camp management plans and policies in place, particularly regarding health and safety (including emergency response), security, worker rights, and community relations?	☐	☐	☐	
78	Is the person appointed to manage the accommodation facility qualified for the role in terms of background, competence, and experience, and have they been given sufficient responsibility and authority for this management?	☐	☐	☐	
79	Is there sufficient staff to ensure that accommodation standards (particularly cleanliness, food preparation, and safety) are adequately implemented?	☐	☐	☐	
80	Were the facility personnel hired from the settlements surrounding the project?	☐	☐	☐	
81	Did the facility personnel receive basic health and safety training?	☐	☐	☐	
82	Are the persons responsible for the kitchen trained in nutrition and food processing and adequately supervised? Do kitchen workers have hygiene certificates?	☐	☐	☐	
CHARGING FOR ACCOMMODATION AND SERVICES					
83	Is the accommodation arrangement for subcontractor personnel managed by competent personnel assigned by the subcontractor?	☐	☐	☐	
84	Is sufficient information provided about payments made to workers? Are camp conditions communicated?	☐	☐	☐	

No.	Control Parameters	Compliance			Comments
		Yes	No	Not Relevant	
85	Is it prohibited to charge workers for accommodation and services? (Are workers charged?)	☐	☐	☐	
HEALTH AND SAFETY ON THE CONSTRUCTION SITE					
86	Have health and safety management plans covering electrical, mechanical, structural, and food safety been designed and implemented?	☐	☐	☐	
87	Is the person responsible for managing social facilities knowledgeable about organizing for situations such as potential infectious diseases or food poisoning?	☐	☐	☐	
88	Is there an adequate number of staff/workers trained in providing first aid?	☐	☐	☐	
89	Has a specific and adequate fire safety management plan been designed and implemented?	☐	☐	☐	
90	Are workers provided with guidance on activities related to alcohol, drugs, HIV/AIDS, and other health risks?	☐	☐	☐	
91	Do workers have easy access to medical facilities?	☐	☐	☐	
92	Have emergency plans been prepared for health and fire safety?	☐	☐	☐	
93	Have special emergency plans (earthquake, flood, tornado) been prepared depending on the conditions?	☐	☐	☐	
WORKER ACCOMMODATION FACILITY SAFETY					
94	Is a security plan containing clear measures to protect employees against theft and assault prepared and implemented?	☐	☐	☐	
95	Has a security plan containing provisions related to violence been designed and implemented?	☐	☐	☐	
96	Have the backgrounds of security personnel been checked for previous crimes or misconduct?	☐	☐	☐	
97	Has the hiring of security personnel from both genders been considered?	☐	☐	☐	
98	Has the security personnel received clear instructions regarding their duties and responsibilities?	☐	☐	☐	
99	Has security personnel been properly trained in combating domestic violence and the use of force?	☐	☐	☐	
100	Are body searches only conducted in exceptional circumstances by specially trained security personnel of both genders?	☐	☐	☐	
101	Do security personnel have a good understanding of the importance of respecting workers' rights and the rights of surrounding communities, and do they adopt appropriate behavior?	☐	☐	☐	
102	Do workers and communities have specific methods to voice their concerns about security regulations and personnel?	☐	☐	☐	
WORKERS' RIGHTS, RULES, AND REGULATIONS REGARDING WORKER ACCOMMODATION FACILITIES					

No.	Control Parameters	Compliance			Comments
		Yes	No	Not Relevant	
103	Are restrictions on workers' freedom of movement limited and justified?	☐	☐	☐	
104	Is an appropriate and adequate transportation system provided for nearby residential areas?	☐	☐	☐	
105	Is it illegal to withhold workers' identity documents?	☐	☐	☐	
106	Is freedom of association clearly respected?	☐	☐	☐	
107	Is respect shown for workers' religious, cultural, and social backgrounds?	☐	☐	☐	
108	Are employees informed about their rights and obligations, and are copies of company rules, procedures, and enforcement mechanisms regarding workers' accommodation provided?	☐	☐	☐	
109	Is discrimination prevented?	☐	☐	☐	
110	Are regulations regarding alcohol, tobacco, and third-party access to the camp clear and communicated to workers?	☐	☐	☐	
111	Has a fair and non-discriminatory procedure been established to implement disciplinary procedures, including the right of workers to defend themselves?	☐	☐	☐	
CONSULTATION AND COMPLAINT MECHANISMS					
112	Are mechanisms designed and implemented for workers to consult or file complaints?	☐	☐	☐	
113	Are processes and mechanisms provided for employees to voice their complaints in accordance with the PS2/PR2 document?	☐	☐	☐	
114	Are workers subject to disciplinary proceedings due to their behavior in the accommodation facility able to appeal the decision and have access to a fair and transparent hearing?	☐	☐	☐	
115	Are fair dispute resolution mechanisms in place?	☐	☐	☐	
116	Are there mechanisms in place to ensure full cooperation with police authorities in cases of serious crimes?	☐	☐	☐	
MANAGEMENT OF COMMUNITY RELATIONS					
117	Have community relations management plans addressing social development, community needs, community health and safety, and the social and cultural cohesion of the community been designed and implemented?	☐	☐	☐	
118	Do public health and safety management plans include the establishment of communication mechanisms to ensure continuous information exchange and consultation with surrounding communities?	☐	☐	☐	
119	Is there a manager responsible for implementing the Community Health and Safety management plan?	☐	☐	☐	
120	Is there a manager responsible for liaising with local communities? (Chief Legal Officer - CLO)	☐	☐	☐	
121	Are the impacts of worker housing periodically reviewed, mitigated, or improved?	☐	☐	☐	
122	Are easy methods provided for community representatives to express their views and file complaints?	☐	☐	☐	

CONSTRUCTION CAMP SITE MANAGEMENT PLAN

No.	Control Parameters	Compliance			Comments
		Yes	No	Not Relevant	
123	Is there a transparent and effective process in place to address community complaints in accordance with creditor standards?	☐	☐	☐	

Auditor:	Date:	Location:	Signature:

CONSTRUCTION CAMP SITE MANAGEMENT PLAN

EMERGENCY PREPAREDNESS AND RESPONSE MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.03.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant.

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DEFINITIONS AND ABBREVIATIONS

Terms, definitions and abbreviations used in this document are listed below:

ERP	Emergency Response Plan
ERT	Emergency Response Team
Project	Antalya Alanya Motorway Project
IFC	International Finance Corporation
PS	Performance Standard
AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (“SPV”)
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EHS	Environment, Health and Safety
HSE	Health & Safety and Environment
ESMP	Environmental and Social Management Plan
EHS-MS	Environmental, Health and Safety – Management Plans
SEP	Stakeholder Engagement Plan
EU	European Union
OHS	Occupational Health and Safety
CLO	Community Liaison Officer

1. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Emergency Preparedness and Response Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

1.1. Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

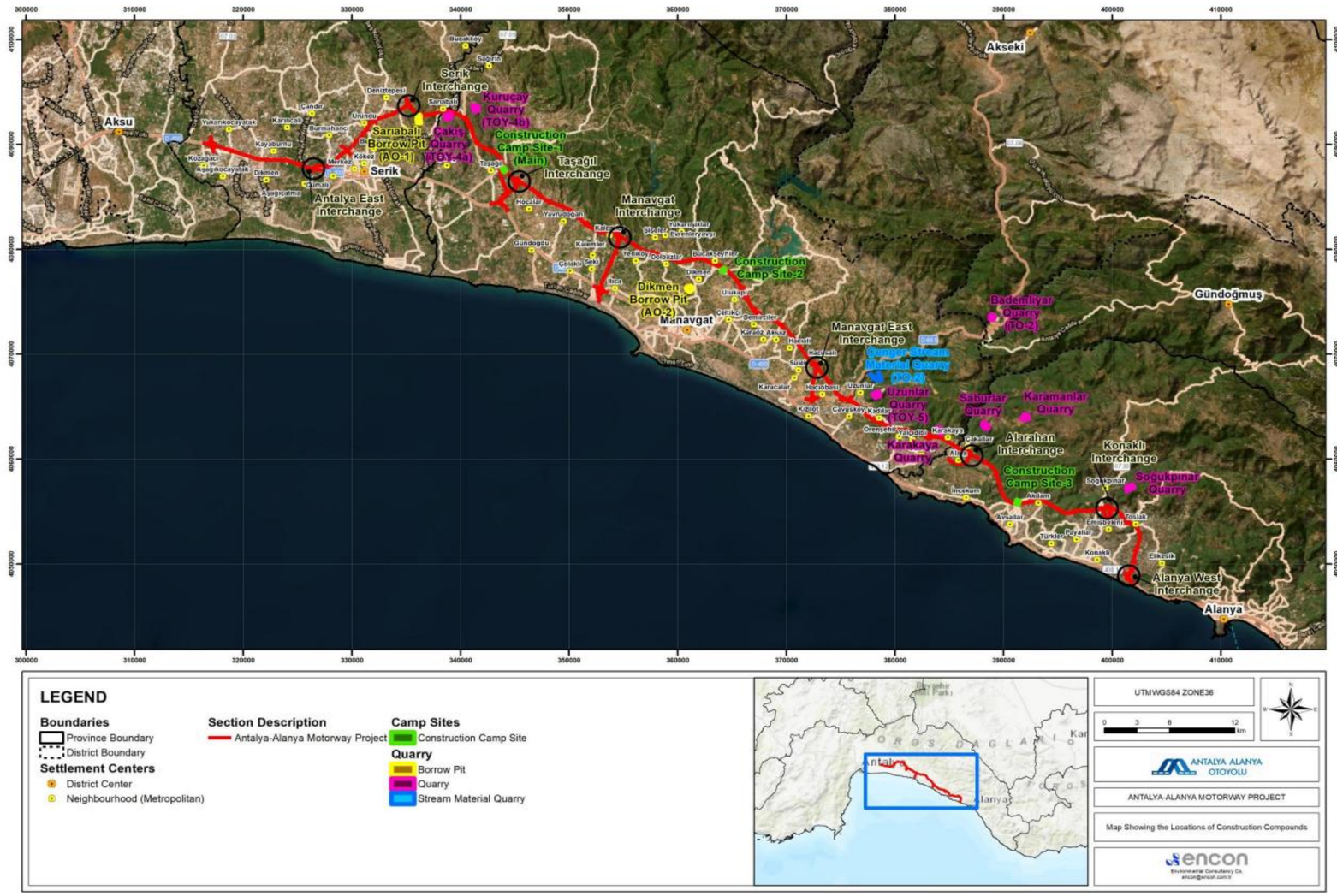


Figure 1.1-1.Map Showing the Locations of Construction Compounds

1.2. Purpose

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project ("The Project"), has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[3] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The Project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

The Project is anticipated to deliver benefits including relieving congestion on the Akdeniz Region's existing road network and building capacity for future traffic, providing better access to employment, markets, education, healthcare and cultural and tourism facilities and improved emergency response times, and creating social and local economic benefits through job creation and local and regional development.

- Motorway (84 km);
- Access roads (33.8 km);
- Viaducts (16);
- Bridges (22);
- Culverts (305);
- Interchanges (25);
- Overpasses (56);
- Underpasses (43); and
- Tunnels (5).

Facilities to be constructed for use during operation include toll collection areas, service areas and a maintenance and operations area. During construction, temporary facilities required including three temporary construction camps with facilities, borrow pits/quarries (11 identified sites according to the draft Environmental and Social Impact Assessment (ESIA), June 2025), and storage sites (22 identified).

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at

[3] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads[4].

The purpose of the Emergency Preparedness and Response Plan (EPRP) is to define the actions and measures necessary for the overall management of and response to emergencies within the Antalya Alanya Motorway Project specific activity area of influence. The Plan aims to:

- Outline the applicable legislation and standards relevant to this Plan;
- Define roles and responsibilities;
- Incorporate the requirements of the Regulatory Environmental Impact Assessment (EIA) findings, the Environmental and Social Impact Assessment (ESIA), international standards, Turkish legislation, Lenders requirements and any Project specific permits: and
- Provide procedures of action for foreseeable emergency scenarios
- Define the lines of communication to be followed during emergencies.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

1.3. Scope and Validity

The present ERP scope covers the construction phase of the Antalya Alanya Motorway Project only and applies to all AAOİAŞ and its subcontractors' activities (including third party subcontracted sites (quarries, borrow pits etc.). The area of influence is therefore limited to all Project activities related to the motorway construction process. The ERP will be further updated one month before slope-earth cut excavation activities), which can be assumed as the beginning of the Motorway Construction. The updated ERP scope will take into account all of the Project Area of influence and all motorway construction activities.

The Plan incorporates the requirements of the Antalya Alanya Motorway Turkish EIA Report findings, the Antalya Alanya Motorway ESIA Report findings, IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts, IFC Performance Standard 4: Community Health, Safety and Security, Turkish Legislation, Project Lenders requirements and any Project specific permits.

This Emergency Preparedness and Response Management Plan ("EPRMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project").

This Plan should be applied by all parties involved in the construction phase, including the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or SPV), the Main Contractor (EPC or Limak), and all subcontractors. The EPRMP will be updated following the start of slope excavation works, which can be considered the beginning of motorway construction. The following Worksites are defined , as below to deliver the Project component described in the previous section:

[4] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

- Motorway
- Access roads
- Viaducts
- Bridges
- Culverts
- Interchanges
- Overpasses
- Underpasses and
- Tunnels

In addition to the main worksites defined above, temporary worksites and all access roads, borrow pits, quarries, stream material quarries, labour camp sites, and social areas are considered within the scope of this Plan.

2. LEGISLATIONS AND STANDARDS

ISO 45001:2081, ISO 14001:2015, Applicable IFC standards include, IFC Performance Standard (PS) 1: Assessment and Management of Environmental and Social Risks and Impacts IFC Performance Standard (PS) 4: Community Health, Safety and Security, IFC General Environmental Health and Safety (EHS) Guidelines and IFC EHS Guidelines for Toll Roads which sets out a range of recommendations with regards to emergency management. EPC will comply with these requirements when implementing the Project. Key requirements of these standards include:

- Establishment of an Emergency Response System so that the EPC, in collaboration with appropriate and relevant third parties, will be prepared to respond to accidental and emergency situations associated with the project in a manner appropriate, to prevent and mitigate any harm to people and/or the environment.
- Where applicable, EPC will also assist and collaborate with the potentially Affected Communities and the local government agencies in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to ensure effective response. If local government agencies have little or no capacity to respond effectively, the EPC will play an active role in preparing for and responding to emergencies associated with the project.

In addition to the above, the following impact assessment reports prepared for the Project will be used as reference documents:

- Antalya Alanya Motorway Project ESIA Report;
- Antalya Alanya Motorway Project EIA Report; and

The requirements of the Turkish laws and regulations with regards to emergencies in accordance with the Project design and construction will be implemented including the following regulations:

- Regulation on Emergencies in Worksites
- Regulation on Structures to be Built in Disaster Areas
- Regulation on Buildings to be Built in Earthquake Areas

The following AAOİAŞ plans, procedures and policies related to engagement with emergencies will also be used as reference documents:

- Solid Waste Management Plan
- Hazardous Material Management Plan
- Environmental Accident and Spill Response Management Plan
- Community Health and Safety Management Plan
- Construction Camp Site Management Plan
- Air Pollution and Emission Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Noise and Vibration Management Plan
- Change Management Plan
- Emergency Response and Management Plan
- Human Resources and Labour Management Plan
- Security Management Plan
- Subcontractor Management Plan
- Training and Communication Management Plan
- Resource Efficiency Management Plan
- Excavated Material Management Plan
- Soil Management and Erosion Control Plan
- Stakeholder Engagement Plan
- Employment Policy
- Project HSE Policy

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework (“ESF”) document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices.

In addition to above following international requirements and standards, and Good International Industrial Practice (GIIP) regarding occupational health and safety.

- ISO 45001:2018 Occupational Health and Safety Management Systems
- IFC Performance Standards (2012), specifically:

o Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

o Performance Standard 2: Labor and Working Conditions

o Performance Standard 4: Community Health, Safety, and Security

- Worker' accommodation: process and standards. A guidance note by IFC and the EBRD, 2009
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- European Union Road Safety Policy Guidelines and Directives=
- European Bank for Reconstruction and Development's (EBRD's) Performance Requirement (PR) 4 – Health, Safety, and Security (2019)
- Addressing Gender-Based Violence and Harassment – Good Practice Note for the Private Sector, December 2019 – Emerging Good Practice for Private Sector
- Addressing Gender-Based Violence and Harassment – Emerging Good Practice for Private Sector
- Asian Infrastructure Investment Bank's (AIIB's) Environmental and Social Framework (2021)
- Worker' accommodation: process and standards. A guidance note by IFC and the EBRD, 2009
- International Finance Corporation's (IFC's) Sustainability Framework (2012) and associated applicable Performance Standard (PS) 2 - Labour and Working Conditions
- Approved Code of Practice and guidance on regulations L8 (Fourth edition)
- The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
- OSHA 1926.651 Specific Excavation Requirements
- OSHA 1910.252 Welding, Cutting and Brazing (Hot Works)
- ILO Safety and Health in Building and Engineering Work
- ILO Safety and Health in Construction, 1992Health and Safety in Construction, HSG150, 2006
- Health and Safety at Work etc. Act 1974

It should be noted here that; where two or more of the identified standards are inconsistent or contradictory, unless otherwise justified, the EPC will adopt the more stringent.

3. ENVIRONMENTAL HEALTH AND SAFETY-MANAMENT SYSTEMS (EHS-MS) INTERACTION

The ERP forms part of the Project EHS-MS and therefore should be read in conjunction with the related EHS-MS elements. These elements include the overarching ESMP and individual EHS Management Plans and Procedures. The ERP will therefore be implemented together with the related plans and procedures in order to manage emergencies. The plans and procedures which are relevant to ERP include:

- Occupational, Health, Safety and Environment Plan
- Stakeholder Engagement Plan – Grievance Mechanism
- Hazardous Materials Management Plan
- Traffic Management Plan
- Biodiversity Action Plan
- Community Health and Safety Management Plan
- Environmental Accident and Spill Response Management Plan
- Environmental and Social Management Plan (ESMP) of the Antalya Alanya Motorway Project together with the Commitments Register (See Annex A for commitments on emergency response together with how the commitments will be implemented)

4. GENERAL ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

- Ensure sufficient resources are allocated on an ongoing basis to meet the requirements of this ERP,
- Describe the resources allocated to and responsible for the execution of each task and requirement contained therein,
- Describe how roles and responsibilities are communicated to relevant personnel,
- Ensure all subcontractors and relevant third parties are bound by this plan and briefed on its content
- Regularly review the implementation and effectiveness of this plan and make adjustments where necessary
- Ensure that all personnel responsible for the execution of the tasks and requirements contained within this plan are competent on the basis of education, training and experience, and
- Undertake the training and awareness requirements necessary for the effective implementation of ERP.

SPV General Manager

- Oversee the financial, legal, and operational compliance of the SPV, including emergency preparedness obligations, in line with local laws, environmental regulations, corporate governance, and international standards/lender requirements.
- Ensure necessary resources (financial, human, and technical) are allocated for the effective implementation of emergency preparedness and response (EPR) measures.
- Promote a culture of safety, environmental, and social responsibility across SPV and stakeholders.
- Support the SPV H&S Manager in the development, dissemination, and execution of the EPRMP.

- Ensure corrective and preventive actions are taken in case of emergency-related non-compliance.
- Monitor the performance of EPC contractors in relation to EPRMP implementation and report to stakeholders.

SPV Health and Safety Manager

- Ensure the preparation, revision, and implementation of emergency-related procedures in compliance with ESIA/EIA, corporate policies, and lender requirements.
- Supervise EPC and subcontractors' emergency preparedness activities, including drills, training, and method statements.
- Ensure proper investigation and root cause analysis of emergency incidents and implement corrective actions.
- Coordinate with authorities and stakeholders regarding emergency notifications, inspections, and compliance.
- Track EPR performance indicators (e.g., incident response times, near misses, TRIR).
- Report emergency preparedness status and non-compliances to the SPV General Manager.

SPV HSE Specialist

- Support the SPV H&S Manager in monitoring EPC's and subcontractors' implementation of EPRMP measures.
- Conduct site inspections focusing on emergency equipment, signage, drills, and hazard identification.
- Maintain emergency-related documentation (drill records, training logs, incident reports).
- Support accident/incident investigations and communicate lessons learned.
- Assist in resolving complaints regarding occupational, site, or community safety linked to emergencies.

EPC Project Director

- Has overall accountability for ensuring EPC's compliance with the EPRMP.
- Allocate adequate resources (competent staff, emergency equipment, PPE, budget) to implement emergency risk mitigation measures.
- Approve emergency and HSE-related management plans.
- Ensure effective corrective actions are taken in response to emergency-related incidents.
- Maintain transparent communication with SPV, subcontractors, regulators, and communities regarding emergency issues.
- Oversee risk management and mitigation strategies, including emergency preparedness for technical, health, safety, environmental, and community safety aspects.

EPC Construction Manager

- Ensure construction works integrate required emergency precautions.

- Verify that emergency access routes are available and properly maintained.
- Ensure work teams have job-specific emergency plans, equipment, and PPE.
- Incorporate lessons learned from drills or incidents into work practices.

EPC Line Managers

- Prepare job-specific method statements that include emergency response measures.
- Ensure emergency risks are assessed and mitigation measures are in place before activities begin.
- Collaborate with ES&H teams to correct nonconformities identified during inspections.
- Support accident/incident investigations and corrective action processes.
- Ensure staff participation in emergency trainings and drills.

EPC Health and Safety Manager

- Lead the preparation, revision, and implementation of EPC's EPR procedures.
- Integrate emergency controls into daily operations, work permits, and toolbox talks.
- Supervise emergency drills, inspections, and audits.
- Maintain the site-specific risk register for hazards and emergencies.
- Coordinate with authorities and SPV on emergency incidents, notifications, and verifications.
- Report on EPC's EPR performance and key risks to the EPC Project Director.
- Foster a proactive safety and emergency culture.

EPC HSE Chief

- Support EPC H&S Manager in implementing site emergency preparedness.
- Ensure compliance of contractors with emergency procedures.
- Conduct emergency training, toolbox talks, and safety briefings.
- Maintain risk registers and track hazards related to emergencies.
- Participate in accident/incident/near-miss investigations and ensure corrective actions are followed.
- Provide reports to EPC H&S Manager on emergency preparedness status.

EPC HSE Engineer

- Support EPC HSE Chief in implementing emergency plans and monitoring compliance.
- Conduct site-level emergency inspections and hazard assessments.
- Ensure proper implementation of behaviour protocols and community safety guidelines.
- Support incident investigations and ensure corrective measures are documented and implemented.
- Address emergency-related complaints in coordination with supervisors.

EPC HSE Technician

- Conduct daily field-level hazard identification and inspections.
- Ensure workers comply with PPE and emergency signage/barrier requirements.
- Support documentation of emergency drills, incidents, and near misses.
- Escalate observed deficiencies to HSE Engineer/Chief.

EPC HSE Worker

- Conduct basic emergency checks on-site (e.g., PPE, housekeeping, fire extinguishers).
- Report unsafe conditions, emergencies, or near misses.
- Support emergency drills and evacuation activities.
- Assist in implementing emergency signage and access controls.

EPC Trainer and Document Controller

- Develop and deliver EPC emergency preparedness training (induction, refresher, drills).
- Maintain training and drill records.
- Ensure EPR-related documentation is archived and traceable.
- Support audits by providing emergency preparedness records.

Site Doctor

- Provide first aid, emergency care, and health monitoring.
- Maintain emergency medical records and health surveillance.
- Identify occupational health risks and integrate into emergency procedures.
- Ensure readiness of emergency medical equipment.
- Coordinate with hospitals and authorities during medical emergencies.

Paramedic

- Provide immediate on-site medical response and stabilization.
- Support emergency evacuation of patients.
- Monitor and restock emergency medical supplies.
- Participate in drills and support incident investigations.

Other Stakeholders

Workers, Subcontractors, and Suppliers

- Follow emergency training and drills.
- Report unsafe conditions, emergencies, and near misses immediately.
- Comply with emergency signage, PPE, and site safety requirements.

Visitors and Consultants

- Receive general emergency induction before site access.
- Always be accompanied by trained site personnel.
- Comply with site-specific emergency instructions

5. EMERGENCY ROLES AND RESPONSIBILITIES

In addition to broad roles and responsibilities in accordance with this Plan, which are outlined in Section 4; roles and responsibilities in the event of any emergency are detailed below. Names and other details of the personnel who are appointed for these roles and responsibilities are presented in Annex B. This contact list will be reviewed monthly by the HSE Manager. Access to internal contact information will be restricted to authorized personnel only. Updated versions will be redistributed after any personnel changes. Contact details of external authorities / agencies are submitted in Annex C.

5.1. Emergency Controllers

Leading responsible employees (2 persons working together or may split according to situation) on the site regarding emergency situations. Take control of the emergency situation and direct the emergency response team, sub-contractors, supervisors, visitors and all other personal. Arrange relevant management and emergency services to be contacted. Direct and liaise with the emergency services. Additionally, are responsible for initiating an evacuation process if needed, and securing a practical perimeter around the incident location. Emergency Controllers have responsibility for reporting relevant developments to the Project Manager.

5.2. Administrative Assistant

Mainly responsible for communicating with and informing the Project Manager and Emergency Services (fire department, police, ambulance, etc.). Also assists the Emergency Controller. The Administrative Assistant has responsibility for reporting relevant developments to the Emergency Controllers.

5.3. Emergency Response Team

They are the first personnel to respond to the emergency before any emergency services arrive at the site. They conduct basic emergency response actions such as fire-fighting, rescue and hazardous material mitigation under the command of the Emergency Controller. Assist in emergency notification and public protective actions, accounting for personnel outside the hazard zone or implementing In-Place Protection (IPP) within the workplace, and assist the emergency services (fire department, police, etc.) on arrival to the site. The Emergency Response Team has responsibility for reporting relevant developments to the Emergency Controllers

5.4. First Aid Personnel

Provide first aid treatment to casualties. Liaise with and assist ambulance service on arrival on site. First Aid Personnel have responsibility to report relevant developments to site doctor.

Paramedics/ambulance staff shall be stationed at designated locations within the Project (near the infirmary), and shall be responsible for the following:

- Providing first aid treatment to workers, local community members, or site visitors in case of an emergency, when needed,

- Conducting routine site patrols within the Project,
- Referring the worker to the nearest hospital or infirmary after administering the necessary first aid treatment, if deemed necessary,
- Performing 24-hour checks to ensure that all medical equipment in the on-site ambulance is complete and reporting any missing items to the H&S team,
- Reaching the incident site in the shortest possible time by using the designated route after the emergency is reported,
- Conducting daily patrols on site and maintaining familiarity with the traffic plan on open road.

Sufficient number of certificated first aid personnel will be employed according to the total personnel number during the construction phase

5.5. Security

In case of an emergency controls the traffic, directs vehicle away from the incident area and escorts emergency vehicles. Security has responsibility to report relevant developments to Emergency Response Team

5.6. Environmental Engineer

Assess extent of environmental threat and/or contamination and liaise with Emergency Controller to minimize effects. Informs Provincial Directorate of Environment and Urbanisation / Fisheries Authorities. Environmental Engineer has responsibility to report relevant developments to Emergency Controllers

5.7. Emergency Wardens

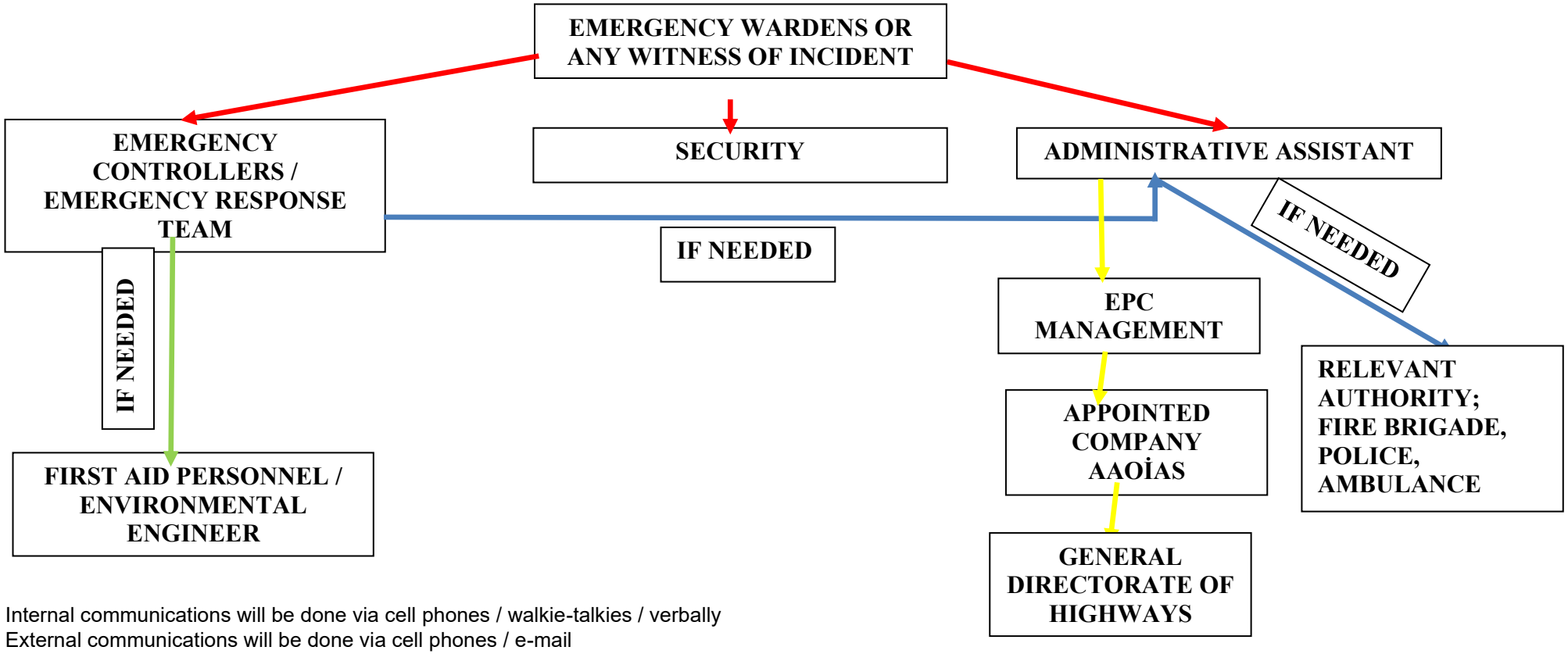
They will be chosen by the Emergency Controller and will be present in every work area. The Emergency Wardens will evaluate the emergency and evacuate the work area if needed. They will conduct a head count at Assembly Points, and account for all personnel, subcontractors and visitors. Reports personnel and visitors who are missing to the Emergency Response Team and H&S Manager. Restricts entry into affected areas to emergency personnel only. Assists the Emergency Controller as needed. Emergency Wardens have responsibility for reporting relevant developments to the Emergency Response Team.

5.8. Site Doctor

Administers relevant treatment to patients and follows the Emergency Controller’s and Emergency Response Team’s instructions on other issues.

6. COMMUNICATION

In any emergency, communication flow presented below will be followed:



- Internal communications will be done via cell phones / walkie-talkies / verbally
- External communications will be done via cell phones / e-mail

7. RISK ASSESSMENT

Relevant Health & Safety risk assessment studies have been conducted already for Motorway construction. Risks assessments have been conducted in accordance with the method submitted in Occupational Health and Safety Plan. Main topics and findings of onshore risk assessment studies are:

Site excavation works risk assessment

Main consequences of hazards of site excavation works are:

- Physical injury
- Environmental pollution – spills
- Overturn of equipment

Lifting risk assessment

Main consequences of hazards of lifting works are:

- Falling – physical injury
- Overturn of equipment

Jet grout risk assessment

Main consequences of jet grout works are:

- Chemical burns – physical injury
- Overturn of equipment
- Environmental pollution – spills

Based on site-specific risk assessments and operational configurations, the following zones within the Project are identified as high-risk areas requiring special control and emergency readiness measures:

- **Tunnel portals and interior segments** – due to limited egress, poor ventilation, and risk of collapse or equipment fire.
- **Fuel and chemical storage areas** – due to flammability, spill potential, and environmental contamination risks.
- **Bridge decks and viaducts under construction** – due to height-related hazards and fall risks.
- **Electrical distribution zones (e.g., transformer areas, substations)** – due to arc flash and electrocution risk.
- **Heavy equipment and crane operation zones** – risk of mechanical failure, struck-by incidents, and collapse.
- **Confined spaces (e.g., stormwater culverts, manholes)** – due to oxygen deficiency, toxic gases, and limited rescue options.
- **Excavation edges and unstable slopes** – due to fall or collapse hazard.

All high risks shall be clearly marked with hazard signage, physically restricted where possible (e.g., barriers, fencing), regularly monitored and reviewed by the H&S team and included in emergency response drills.

8. INCIDENT CLASSIFICATION

8.1. Level 1 Incident (High)

Level 1 incidents are incidents that cannot be managed using normal EPC resources; i.e. the capabilities of the EPC to respond are exceeded by the initial impacts of the event. This type of incident would necessitate a direct call to local emergency authorities by the administrative assistant under the supervision of the Emergency Controller and/or Project manager and initiation of evacuation procedures outlined in Annex E. A Level 1 incident will require significant resources and multiple operational periods until containment/control is achieved.

Examples of a Level 1 incident in the context of this Plan are:

- Terrorism
- Major fire or explosion – Catastrophic fire & explosion events which cannot be managed using normal EPC resources. Incidents which have possibility to spread all construction site quickly.
- Earthquake

8.2. Level 2 (Medium) and Level 3 (Low) Incident

Level 2 and Level 3 incidents require a response from EPC emergency responsible persons. In the event of a Level 2 incident additional resources and services from local emergency authorities will be needed but EPC emergency responsible persons have duties until local emergency authorities arrive.

Examples of a Level 2 & 3 incident in the context of this Plan are:

- Physical injuries
- Minor Fire or Explosion – Fire and/or explosion events which can be managed with EPC resources until local emergency authorities arrive. Incidents which can be confined in a specific area.
- Overturn of equipment

Level 3 incidents can be managed by EPC's emergency responsible persons only. Section 7 below outlines the response procedures for Level 2 and Level 3 incidents.

9. EMERGENCY RESPONSE PROCEDURES FOR LEVEL 2 AND LEVEL 3 INCIDENTS

Response procedures for Level 2 and 3 emergencies are outlined in this section. Material requirements (e.g. PPEs, adsorbents, walkie-talkies etc.) for emergencies are provided in ANNEX D. Evacuation procedures for relevant emergencies which can be distributed to relevant locations of construction site are submitted in ANNEX E.

9.1. Physical Injuries

Emergency Wardens or any witness to the incident can start the response procedure by alerting relevant responsible persons. Minor cuts and/or bruises can be treated by a ***First Aid Personnel*** or be taken along to the site medical clinic for treatment. In the event of a significantly injured individual on site at any time of day or night;

- Contact must be made with the ***Emergency Controller*** by ***Administrative Assistant***.
- ***First Aid Personnel*** will inform the site doctor
- ***Site doctor*** will assess the patient's situation:

  (i) If the patient should not be moved; an ambulance will directly be called by the ***Administrative Assistant*** and relevant treatment will be administered by the ***site doctor*** until an ambulance arrives.

  - ***Security*** will be informed by the ***Administrative Assistant*** on the issue
  - ***Security*** will direct the ambulance to the injured person

  (ii) If moving the patient does not have any risk; the patient will be treated until stable enough to travel and will then be transferred to the site medical clinic

  - ***Site doctor*** will assess the patient's condition and decide if they can be cared for at the site clinic or if they require transfer to the hospital.
  - Ambulance will be called by the ***Administrative Assistant*** or any witness
  - ***Security*** will be informed by the ***Administrative Assistant*** on the issue
  - ***Security*** will direct the ambulance to the injured person

9.2. Minor Fire or Explosion

Anybody who discovers indication of a fire such as smell, smoke, if it is not unsafe to respond, should try to extinguish the fire by using the nearest fire extinguisher – all employees shall be subject to training on the use of fire extinguishers-. In the event of any fire OR explosion;

- ***Emergency Wardens*** or the witness(es) will sound the alarm to alert all personnel
- ***Emergency Wardens*** will evacuate the area if needed and will direct personnel to the assembly point.
- ***Administrative Assistant*** will notify the fire brigade
- ***Emergency Controller*** and ***Emergency Response Team*** will eliminate flammable material (e.g. fuel) sources and will de-energize power supply if necessary
- Without endangering their safety; ***Emergency Controller*** and ***Emergency Response Team*** will try to control the fire until the fire brigade arrives the site.
- ***Security*** will be informed by ***Administrative Assistant*** on the issue
- ***Security*** will direct the fire brigade to the fire scene.
- Fire brigade on arrival will be in charge of fighting the fire.
- The process of response in relation to a physical injury **(see section 6.)** will be implemented for any causalities.

9.3. Collapse of Equipment / Structure / Excavation

In case of any collapse,

- The priority will be for the ***Emergency Controller*** to make the area safe.

- The damaged zone must be barricaded, and non-authorized access shall be prohibited by the ***Emergency Controller***. Response and rescue shall be implemented after evaluating all risks.
- ***Emergency Response Team*** will be directed to the area by ***Emergency Controller***
- ***Emergency Response Team*** and ***Emergency Controller*** will evaluate the situation and while doing that; they direct ***Security*** in order to set up an exclusion zone.
- ***Emergency Response Team*** will develop a rescue plan under the supervision of the ***Emergency Controller.***
- The final plan will be discussed with ***Emergency Controller*** for its approval
- Local Search and Rescue authority will be contacted by ***Administrative Assistant*** if needed. If Search and Rescue authority are called on to attend the scene:
    - ***Security*** will be informed by Administrative Assistant on the issue
    - ***Security*** will direct Search and Rescue authority to the scene.
    - Search and Rescue authority on arrival will be in charge
- If the rescue plan is considered as appropriate; it can be implemented by internal resources
    - All staff in the area of incident should be considered as trapped
    - Rescue plan will be implemented
- During this process; relevant flow of physical injury response (***See Section 7.1***) will be implemented for causalities.

9.4. Overturn of Equipment

It should be noted here that, in the event of equipment overturning outside of the construction site, the incident will be considered as “road traffic accident”. See Section 8.5 please.

- ***Emergency Wardens*** or any witness can inform the ***Emergency Controller*** about the incident
- ***Administrative Assistant*** will inform the ***Project Manager*** about the incident
- The stability of the equipment will be considered by the ***Emergency Controller*** together with experienced riggers and operators before the appropriate response is initiated
- The definite weight of the equipment and centre of the gravity will be checked from operator manual.
- Rescue operation will be supported by experienced riggers and operators
- To rescue any turned over equipment or vehicle, proper capacity crane and hoisting gears will be provided by Project Manager.
- Possible oil and/or fuel leakages will be considered, and necessary precautions will be taken.
- Smoking and the use of any open flames will be prohibited
- Around the equipment, a safety zone will be established, and the surrounding area will be barricaded for non-authorized access by ***Security***.

9.5. Road Traffic Accident

In case of a road traffic accident within the construction site boundaries; the relevant procedure(s) clarified in this Plan must be implemented. For instance; the procedure for physical injuries and/or the procedure for overturn of equipment may need to be followed.

In case of a road traffic accident outside of the construction site, the instruction for drivers is given below:

- Use caution exiting your vehicle. Other vehicles may still be trying to pass or come to a stop.
- Check to see if anyone is injured. If someone is injured, request medical assistance immediately. Perform first aid, if necessary, within the limits of your training and experience.
- Call the police immediately, even if the accident appears to be minor. And then notify your supervisor. During notifying your supervisor; briefly describe what has happened and state if you need assistance.
- Secure the site with warning signs.
- Put out safety cones in relevant locations in order to attract the attention of other drivers
- Do not speak with the media or other parties at the scene.
- Do not argue with the others involved, do not admit liability for the accident or do not make any comments on the causes of the accident with anyone except the police.
- Gather as much information about the accident as possible.
- If possible; write down the names, addresses and phone number of everyone involved.
- Get the automobile insurance company names and policy numbers of all vehicle owners.
- Write down the year, model and plate number of all vehicles
- Note the location and extent of all the damage to all vehicles.
- Write down the names, addresses and phone numbers of any witnesses.
- Note the location of the accident - street names, cross streets, landmarks, route or exit numbers.
- For each vehicle, note the direction of travel, road signs or signals, and the number of lanes.
- Note the time of day, weather conditions, and road conditions.
- If a camera is available, take a photo of the scene from four directions. Also, take a photo of the location of the damage of each vehicle.
- Write a brief description of the accident and sketch the scene if possible.
- Ask the police officer where and when you can get a copy of the report. Note the badge number and name of the officer, as well as the report number.
- Follow instructions given by the police.

9.6. Falling into the Water

- In the event of anybody falling into the water; The Medical Team should be notified immediately about the incident
- Emergency Wardens or any witness can throw the rescue wheel

- The person will be pulled to land or onto a vessel if it is safe to do so. If not you should wait for the Coast Guard to arrive.
- The physical injury response procedure (See Section 6.) will be implemented if necessary.

9.7. Confined Space Rescue

If a person in a confined space gets into trouble, the stand-by employee must inform the ***Emergency Controller*** so the necessary support can be sent. The stand-by employee must never enter the confined space to assist. When ***Emergency Controller*** and ***Emergency Response Team*** arrive;

- ***Emergency Controller*** and ***Emergency Response Team*** will check the atmosphere and ventilate the area as needed in accordance with Occupational Health and Safety Plan
- The possibility for collapsing will be considered
- Safety harnesses, lifeline tripods etc. will be used to access the confined space
- The safety of the ***Emergency Response Team*** must not be endangered
- ***First Aid Personnel*** will be informed by ***Administrative Assistant***
- The physical injury response procedure (***See Section 7.1***) will be implemented if necessary

9.8. Spills

In case of any spill incident; the ***Emergency Controller*** can be informed ***by Emergency Wardens*** or any witness.

- ***Emergency Controller*** and ***Emergency Response Team*** will assess the situation for the possibility of a fire breaking out, the location will be evacuated immediately, and the incident area will be isolated by ***Security.***
- Small spills will be cleaned immediately by the operator using absorbents, which will be disposed of as hazardous waste.
- Large or hazardous spills will be managed by the Emergency Response Team, who will assess severity, contain, and clean up.
- Local Communities will be alerted and informed by appropriate means including telephone, audible alarms and vehicle mounted speakers via supervision of CLOs.

As spill responses need different approaches according to the type of the material; instructions in accordance to the type of the material are submitted below sections:

9.1.1. Diesel Fuel and Gasoline Spills

- Avoid inhalation of any vapours by staying upwind. Use chemical-resistant personal protective equipment (gloves, boots and safety glasses) during clean-up activities,
- Gasoline and gasoline vapours are highly flammable. Remove sources of heat, sparks, flame, and electricity. Gasoline may create an explosive atmosphere,
- Stop the source of the spill/leak and contain (isolate) it as soon as possible; move leaking equipment away from drains and surface waters if needed,

- Apply absorbents (sheets or granular material). Dike the area with absorbent or soil if needed; prevent liquid from spreading and entering drains or surface waters. Allow time for the absorbent material to soak up the spilled material. Restrict access to the area,
- Once the spill is contained and free product is absorbed, put the used absorbent (contaminated absorbent) in a plastic bag, secure the bag with a metal tie, and place the bag in a labelled container with a secure lid,
- Shovel any contaminated soil into drums with secure lids. Pump any free product into a separate and secure drum or appropriate holding tank. Label containers/drums with the date, location of spill, name of product spilled, approximate quantity, and type of material recovered,
- Used absorbents and contaminated soils should be classified and treated as waste.
- Dispose of all free products as either hazardous waste or as material to be recycled,
- Environmental Engineer will supervise the process,
- Implement Environmental Accident and Spill Response Plan.

9.1.2. Hydraulic Fluid, Lubricant and Oil Spills

- Avoid inhalation of any vapours by staying upwind. Use chemical-resistant personal protective equipment (gloves, boots, and safety glasses) during clean-up activities. Restrict to use open flames close to the spill area,
- Stop the source of the spill/leak and contain (isolate) it as soon as possible; move leaking equipment away from drains and surface waters if needed,
- Apply absorbents (sheets or granular material). Dike the area with absorbent or soil if needed; prevent liquid from spreading and entering drains or surface waters. Allow time for the absorbent material to soak up the spilled material. Restrict access to the area,
- Once the spill is contained and free product is absorbed, drain absorbents of any free product and place them in a plastic bag, secure the bag with a metal tie, and place the bag in a labelled container with a secure lid. Shovel any contaminated soil into drums with secure lids. Pump any free product into a separate and secure drum or appropriate holding tank. Label containers/drums with the date, location of spill, name of product spilled, approximate quantity, and type of material recovered,
- Used absorbents and contaminated soils should be classified and treated as waste.
- Dispose of all free product as either hazardous waste or as material to be recycled,
- Environmental Engineer will supervise the process,
- Implement Environmental Accident and Spill Response Plan.

9.1.3. Chemical Spills (e.g. acid caustics)

- Avoid inhalation of any vapours by staying upwind. Use chemical-resistant personal protective equipment (gloves, boots, safety glasses) during clean-up activities. Restrict open flames from the spill area.
- Stop the source of the spill/leak and contain (isolate) it as soon as safely possible.

- Refer to Material Safety Data Sheets (MSDS) for any special hazards and clean up procedures associated with the spilled chemical, especially for reactivity with other substances in the spilled area,
- Apply absorbents. Dike the area with absorbent or soil if needed; prevent liquid from spreading and entering drains or surface waters.
- Once the spill is contained and free product is absorbed, drain absorbents of any free product and place them in a plastic bag, secure the bag with a metal tie, and place the bag in a labelled container with a secure lid. Shovel any contaminated soil into drums with secure lids. Pump any free product into a separate and secure drum or appropriate holding tank. Label containers/drums with the date, location of spill, name of product spilled, approximate quantity, and type of material recovered,
- Used absorbents and contaminated soils should be classified and treated as waste.
- Determine if free product that cannot be used must be classified as hazardous waste. Similarly, determine if used absorbents are hazardous waste. Dispose of hazardous and non-hazardous waste, separately, offsite using a licensed disposal company and to a licensed landfill,
- Environmental Engineer will supervise the process,
- Implement Environmental Accident and Spill Response Plan.

9.9. Flooding

During a flood incident;

- Emergency Wardens or any witness can start evacuation for all personnel who are not involved in flood emergency situations
- If necessary and safe to do so; Emergency Controller and Emergency Response Team will arrange de-energizing any electrical equipment and outlets in the affected areas. Relevant electricians will supervise the process
- Emergency Controller and Emergency Response Team will take measures to stop the flow of water through the buildings by using diver pumps
- If safe to do so; any equipment or supply will be relocated to an unaffected area of the site

9.10. Earthquake

In case of an earthquake, everybody must follow the instructions listed in the “Evacuation Procedure in the Event of Earthquake” which is included as ANNEX E to this Plan. After the shaking stops the Emergency Controller will brief the below mentioned instructions/reminders to personnel at the Assembly point:

- Do not use matches/lighters or other sources of ignition
- Power outages may occur; fire alarms and sprinkler systems may be activated
- If possible, provide assistance to individuals with disabilities who may need it or alert emergency responders to their location
- Do not enter any building that has been deemed or appears to be unsafe
- Leave the area if you smell gas or chemical fumes
- Be prepared for aftershocks

- If you are properly trained and able, provide first aid to victims
- Do not move the seriously injured unless they are in immediate danger of further injury
- Open doors carefully
- Watch for falling objects
- Use radios for internal communications where possible and avoid using telephones except where necessary, e.g. to contact the emergency services.

9.11. Adverse Weather and Storm Preparedness

To ensure preparedness for adverse weather conditions and climate-related events, the following preventive and response measures will be implemented across all construction sites under the Project;

- Meteorological alerts issued by the Turkish State Meteorological Service (MGM) will be continuously monitored and used to trigger site-level emergency notifications.
- Work at height, crane operations, and tunnel activities will be temporarily suspended when wind speeds exceed 70 km/h or lightning is observed within a 5 km radius of the construction site. All personnel will be promptly notified through internal communication channels.
- Drainage systems will be designed and maintained to prevent flooding and erosion.
- Sump pumps and sandbags will be used to prevent water accumulation during rain.
- Hazardous material storage areas will be sealed.
- During storm-prone seasons (e.g., late summer, early winter), high-risk activities such as lifting operations, material transport, or exposed electrical works will be scheduled for early morning or low-risk weather windows.
- Backup power generators will be made available at key operation centres in anticipation of grid outages due to storms.
- All personnel working in exposed outdoor areas will be directed to designated shelter locations in the event of a storm. These shelters will be adequately equipped and maintained to accommodate emergency situations.
- Post-storm clean-up will involve safe collection and separation of debris (metal sheets, cables, etc.) to prevent further hazards or environmental contamination.
- Following any storm event, a detailed inspection of the site will be conducted to assess physical damage, environmental impacts, and structural integrity. Work will only resume after safety conditions are verified and documented.
- A table top exercise and field practice with a storm/emergency weather scenario will be conducted. All personnel will be informed in accordance with these scenarios.

This Emergency Preparedness and Response Management Plan will be updated after each adverse weather incident, as necessary.

In addition to the preventive measures listed above, the Project's emergency planning considers recovery and continuation of operations following climate-related incidents. This includes:

- Controlled shutdown of operations in the event of site-wide safety risks due to extreme weather conditions.
- Safe evacuation of personnel from affected zones using pre-identified muster points and evacuation routes.
- Rapid assessment and reactivation of essential systems and access roads to enable phased return to normal operations.

9.12. Terrorism and Security Threat

- In the event of an armed conflict, or suspected terrorist activity, the following actions shall be taken:
- Emergency Wardens or any witness shall immediately inform the Emergency Controllers of the suspected threat.
- Emergency Controllers will assess the situation and activate the evacuation plan if deemed necessary.
- Evacuation will be carried out under the coordination of Security personnel and in close communication with the Gendarmerie or Police authorities.
- All personnel shall follow the instructions of Emergency Controllers and shall not attempt to intervene under any circumstances.
- The Administrative Assistant will notify relevant external authorities (Police, Gendarmerie) and inform the Project Director.
- Internal communication will be restricted to authorized personnel to avoid misinformation or panic.
- Security personnel will secure the area, restrict access to the threat zone, and support emergency services upon arrival.
- The Emergency Response Team will be on standby to assist with evacuation and first aid if required.
- Assembly Points will be used as temporary gathering areas until the threat is fully cleared by security authorities.
- No personnel shall return to the workplace until official clearance is given by law enforcement and confirmed by the Emergency Controller.

9.13. Site-Type Specific Emergency Consideration

Emergency preparedness and response procedures must consider site-specific characteristics due to the varied nature of construction activities within the Project. The following principles shall guide site-type differentiated response planning:

➢ **Tunnel Areas:**

- Emergency exits, lighting and ventilation systems must be operational at all times.
- Tunnel-specific muster points shall be designated outside tunnel portals.
- Radios or communication lines must be redundant due to poor signal inside tunnels.
- Fire and smoke response must consider limited escape routes and toxic atmosphere risk

➢ **Construction Camps:**

- Evacuation maps must be posted in each sleeping and dining area.
- Emergency drills (especially fire) must be performed during both day and night shifts.
- Utility shut-off points (electricity, gas, water) must be clearly marked and accessible

➢ **Open Construction Sites:**

- Muster points should be identified for each working zone and updated as construction progresses.
- Overhead work, excavation, and equipment operation must have risk-specific emergency triggers (e.g. crane collapse, fall hazards).

➢ **Bridges, Viaducts, Elevated Structures:**

- Fall protection systems must include emergency descent devices.
- In case of structural instability, immediate clearance radius must be observed as per engineering advice.
- Emergency access must be available from both ends of the elevated structure

Annex F illustrates emergency assembly points, the location of the fire extinguishers, employee's rest areas and parking areas.

9.14. Emergency Infrastructure Controls

Emergency utility shut-off points will be provided to ensure timely and effective response to various emergency scenarios such as fire, electrical hazard, fuel spill or flooding.

- *Electrical Panels:* Marked with the symbol "E", all main power panels are labelled and equipped with lock-out capability to isolate circuits during fire, flooding, or electrical hazard scenarios.
- *Fuel Shut-Off Valves:* Located at diesel and fuel storage tanks, marked "F", these valves are accessible without requiring entry into the tank containment area and include visual signage in both Turkish and English.
- *Water Main Valves:* Marked "W", primary water supply shut-off points are located near accommodation blocks, canteens, and equipment washing areas.

To ensure rapid and effective emergency response, Project, site-wide emergency equipment and location information are shown in the tables below.

Detailed Emergency Equipment List

Equipment	Quantity	Maintenance Frequency

Tunnel Ventilation System	2 system per tunnel	Daily test, annual maintenance
Emergency Exit Guidance Lights	1 every 25 meters	Monthly inspection
Fire Cabinets and Hose Reels	1 every 50 meters	Monthly inspection, biannual maintenance
Smoke Detectors (Tunnel)	1 every 50 meters	Monthly functionality test
Emergency Alarm Buttons	1 every 100 meters	Monthly inspection
Vibration and Strain Sensors	1 set per viaduct	Test every 3 months
Wind Speed Measurement Device	1 per viaduct	Monthly inspection, annual calibration
Seismic Activity Sensor	1 per viaduct	Test every 6 months
Smoke Detectors (Accommodation)	1 per room, corridors, common areas	Monthly inspection
Fire Alarm System	1 system / camp	Monthly inspection
Emergency Lighting	1 system per building	Monthly inspection
First Aid Kits	1 per 20 people	Monthly stock check
Portable Fire Extinguishers	1 per 100 m²	Monthly inspection, annual maintenance
Emergency Communication Devices	1 per shift supervisor	Weekly test
Chemical Spill Kit	1 per storage unit	Inspection every 3 months
Eyewash and Emergency Shower Unit	1 per chemical area and tunnels	Weekly functionality test
Fire Detection and Alarm System	1 per facility/corridors	Monthly inspection
Personal Protective Equipment (PPE) Set	1 per worker	Daily user check/ Monthly stock check
Emergency Exit Signs	1 per Exit	Monthly inspection
Automated External Defibrillators (AEDs)	1 per 100 people	Monthly inspection

Location Information of Emergency Equipment

Equipment	Location
Portable Fire Extinguishers	Each accommodation block entrance and dining hall
Smoke Detectors	Each room, corridors, and common areas
First Aid Kits	1 per 20 workers, placed in visible common areas
Emergency Lighting & Exit Signs	Staircases and exits of all buildings
Automated External Defibrillators (AEDs)	Camp infirmary and ambulance
Fire Cabinets and Hoses	Every 50 m inside tunnel
Emergency Exit Guidance Lights	Every 25 m along tunnel base
Portable Gas Detectors (CO, CH4, O2)	Tunnel maintenance points and ventilation control rooms
Thermal Cameras	Tunnel entry points and ERT vehicles
Wind Speed Measurement Device	Midspan or tower locations
Vibration Sensors	Main structural columns
Portable Fire Extinguishers	Maintenance zones and bridge approaches
Chemical Spill Kits	Inside each chemical storage unit, tunnels and maintenance area at each camp sites

Equipment	Location
Eyewash and Emergency Shower Units	Next to hazardous material storage and one per chemical area
Gas Dispersal Equipment	Chemical handling rooms
Portable Lighting Units	Night shift work zones (excavation, paving)
Reflective Warning Signs	Road junctions and worksite boundaries
Mobile Barriers with Impact Absorbers	High-risk road segments

10. EMERGENCY DRILLS AND TRAINING &UPDATE

10.1. Drills

10.1.1. Fire Drill

Two times in a year, a fire drill will be conducted involving all employees. The scenario will be prepared and implemented by *Emergency Response Team*. Every employee including subcontractors' employees must have experience of using a fire extinguisher at least once. Fire Drills will be recorded, and the response time and effectiveness will be evaluated. Faults will be determined, and corrective actions will be planned, and related revisions will be done on this Plan.

10.1.2. Evacuation Drill

Two times in a year, an evacuation drill will be conducted, unannounced, to test the real response of the employees in case of an emergency. The duration times will be observed for the gathering of all employees at muster point and the full evacuation of the workplace. The gathered personnel will be listed, and the muster sheet compared with the normal working daily list. Faults will be determined, and corrective actions will be planned, and related revisions will be done on this Plan.

10.1.3. Environmental Accident Drill

To achieve the target of no harm to environment, including from any possible release of any hazardous material to environment, Emergency Response Team will conduct an environmental accident drill twice in a year to demonstrate how to use a spill kit effectively. The scenario will be prepared and implemented by the *Environmental Engineer*. The environmental accident drill will be recorded, and the response time and effectiveness will be evaluated. Faults will be determined, and corrective actions will be planned, and related revisions will be done on this Plan.

10.2. Training & Update

Necessities of the Training Program including, but not limited to:

- Firefighting, spill response, evacuation, rescue and internal radio usage for Emergency Response Team
- First Aid for First Aiders
- Training will be repeated two times in a year. Training exercises to allow personnel the opportunity to test emergency preparedness will be provided, including:
    - Desktop exercises with emergency responsible persons, where the contact lists are checked, and the facilities and communication assessed

- Drills (See Section 10.1) for testing of equipment and logistics

- Upon completion of a training exercise; Emergency Controller will review the effectiveness of the exercise to assess what worked well and what aspects require improvement
- This Emergency Response Plan will be updated as required after each exercise. Elements of the Plan subject to significant change (such as contact lists) will be replaced
- Training activities and outcomes of the training will be recorded
- Participation in drills is mandatory for all personnel present on-site during the scheduled activity.
- Attendance sheets and drill evaluation forms shall be completed for each event and archived by the HSE Document Controller.
- Drill outcomes shall be reviewed by the HSE Manager, and improvement actions shall be documented and followed up.

11. EMERGENCY REPORTING

Emergency reporting will be according to Accident and Event Reporting Procedure.

12. KEY PERFORMANCE INDICATORS

In order to check efficiency and implementation of emergency response activities and commitments listed in Annex A, determination of key performance indicators and relevant targets are needed. So, key performance indicators according to this procedure in general and targets are given in below table

ID	KPI	Target
KPI-1	Number of reported non-compliances with the requirements of this Procedure. This will be determined during drills for response capability of personnel and by daily site tours for equipment availability	Zero per three months
KPI-2	Number of non-compliances closed due to corrective actions being taken within the defined timeframe (set on a case by case basis).	100% of all non-conformities remedied within the defined timeframe
KPI-3	% of all relevant community who have received relevant community awareness training	100% compliance with training requirements
KPI-4	% of all staff who have received relevant and adequate training	100% compliance with training requirements
KPI-5	% of all staff who have participated emergency drills	100% compliance with drill requirements

ID	KPI	Target
KPI-6	Number of reports of near misses reviewed for root cause and a corrective action identified and shared across the Project construction sites within 48 hours to prevent future occurrence.	100% of near miss reports reviewed and shared
KPI-7	Success of training tests	Expected average 85%

It is not always possible to achieve relevant targets, but continuous improvement will be the major principle in accordance with KPIs.

13. MONITORING, REVIEW AND UPDATE

To ensure the continued relevance and effectiveness of the Emergency Preparedness and Response Plan (EPRP), the following measures shall be implemented:

- The EPRP shall be formally reviewed by the SPV in coordination with the EPC.
- Additional reviews shall be conducted following any major incident, regulatory change, or organizational restructuring that may affect emergency response capacity.
- All changes and updates shall be logged in a revision control table and archived by the HSE Document Controller.
- The updated version of the plan must be submitted for approval by the SPV H&S Manager before dissemination.
- A summary of key findings and improvements shall be documented and communicated during toolbox talks and safety briefings.

Table 1: Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Number of drills conducted	Project office	-Document review	Semi-Annual	SPV EPC

ANNEX A COMMITMENT REGISTER IMPLEMENTATION

Commitment	Where the commitment will be implemented	When the commitment will be implemented	Who will implement the commitment	Monitoring and Assurance
Local emergency services will be alerted in event of emergency that risks collateral damage to the local communities. As part of the community engagement process, details regarding the nature of emergencies and their response plans (e.g. Emergency Prevention and Response Plan) will be shared with the local communities. Channels of communication will be established and agreed upon, and in event of emergency, the communities will be alerted and informed by appropriate means including telephone, audible alarms and vehicle mounted speakers, for example.	The Emergency Action Plan will be accessible through local village mukhtar offices and relevant municipalities – Alanya, Manavgat, Serik.	Start of construction and whenever the Emergency Action Plan is updated	• ***HSE Manager***	• HSE Manager and/or its representatives will control relevant locations monthly to check Emergency Action Plan is present or not.
Provisions of the Turkish 'Regulation on Structures to be Built in Disaster Areas and Turkish 'Regulation on Buildings to be Built in Earthquake Areas will be adhered to during construction.	Any structure to be built	During design and construction of any structure	• ***Project manager*** will enforce • ***HSE Manager*** will supervise	• HSE Manager will monitor design and construction
Provisions of the 'Disaster Regulation on Engineering Structures Along Highways' will be complied with. The Project will undertake consultation with the relevant authority before the design is finalised and request the input of the regulators who are responsible for the Disaster Regulation on Engineering Structures Along Highways.	Any structure to be built	During design and construction of any structure	• ***Project manager*** will enforce • ***HSE Manager*** will supervise	• HSE Manager will monitor design and construction
The Motorway and its structures will need to be designed to meet Turkish and international standards for design and operation to minimise the risks and provide appropriate response in the event of an incident occurring. With adoption of the AAO A.S. EPR Policy, AAO A.S. will commit to set-up and implement: (1) measures to prevent emergencies; (2) measures to respond to emergencies; and (3) measures to assess damages and recover after emergencies.	Any structure to be built	During design and construction of any structure	• ***Project manager*** will enforce • ***HSE Manager*** will supervise	• HSE Manager will monitor design and construction
Coordinate with emergency responders to ensure that appropriate first aid is provided in the event of accidents.	Location of accident	In the event of an accident	• ***Emergency Coordinator***	• Renewal of first aid certificates whenever needed • First aid drills
Project Sponsors will require all contractor and sub-contractor personnel to take necessary measures to avoid forest fires and immediately respond to any fire event that could not be avoided by measures taken, including - o Project personnel will be trained to immediately inform forestry authorities about the location and scale of any fire incident. o Fire fighting equipment will be provided at construction sites (as relevant for different types of fires), inspected regularly and staff trained to use the equipment.. o Proper fire extinguishers will be kept ready at site where hot/welding works will be performed. o Smoking will only be permitted in designated, safe areas. o Staff will be trained on fire protection awareness and response.	Location of the incident	In the event of an incident	• ***Emergency Coordinator***	• Emergency drills • HSE Manager will ensure relevant equipment and training is provided
The key mitigation to be implemented involves the adoption of road traffic management measures, including an effective spill containment and clean-up plan, as per the EPR Plan specified in the ESMP. The EPR Plan will be prepared for the construction stage, and then updated later to apply to Motorway and Bridge operations.	• Nearby schools - Alanya, Manavgat, Serik. • Construction sites	Starting from 2018	• ***CLOs will conduct the work*** • ***HSE Manager will supervise***	• CLOs will monitor communities and HSE manager will monitor workers

Commitment	Where the commitment will be implemented	When the commitment will be implemented	Who will implement the commitment	Monitoring and Assurance
Measures will be in place to prevent members of the local community, especially children, from unauthorised entry to Project-related sites/installations, thus prevent or lower the risks of accidents, as well to the AAO Project employees and contractors in order to prevent the spread of STDs and other cummunicable diseases in local communities. Such measures will include, e.g.: • Awareness training about construction site hazards to children/youths in nearby village schools; •training of health workers in disease treatment and the provision of health services for the workers •performing immunisation programmes for workers • Placement of fencing or other barricades around dangerous construction installations with warning signs of the hazards; • Use of professionally trained security guards at construction sites.	• Construction sites	Construction phase	• ***CLOs*** • ***H&S manager***	• CLOs will monitor communities and HSE manager will monitor workers

ANNEX B INTERNAL EMERGENCY CONTACT NUMBERS

SITE PERSONNEL ROLE	NAME	EXT	MOBILE	LOCATION
Emergency Controller	Selda GÜRSEL		0530 643 72 29	
Administrative Chief	Mehmet KOPAR		0532 711 87 44	
Environmental Engineer	Hüseyin YILDIRIM		0554 128 82 62	
ERT Member	Ekrem GÜMÜŞ		0533 531 56 70	
ERT Member	Emre ISTANBULLU		0534 867 53 65	
ERT Member	Kemal ÖZYİĞİT		0535 032 89 42	
ERT Member	Hasan ÖZKAN		0537 664 43 75	
ERT Member	Hüseyin BALIKÇI		0540 177 63 02	
ERT Member	Mehmet Ali ÖZER		0536 495 40 08	
ERT Member	Mehmet KEKİK		0536 034 71 75	
ERT Member	Reşit ÇELİK		0539 268 75 73	
ERT Member	Yaşar BOZKURT		0536 059 13 10	
ERT Member	M. Seçkin ADAM		0544 791 98 50	
Ambulance	Site Doctor		0505 669 67 68	
First Aid Personnel	Cemil ARSLAN		0538 032 25 03	
First Aid Personnel	Zekeriya YONCA		0546 549 31 39	
First Aid Personnel	M. Faruk AKYOL		0545 251 19 80	
First Aid Personnel	Yüksel BİLGİLİ		0535 956 33 48	
First Aid Personnel	İdris BALABAN		0544 556 23 88	
First Aid Personnel	Ümit Evren SEVİMLİ		0545 839 66 64	
First Aid Personnel	Fatih DERDİYOK		0532 056 95 08	
First Aid Personnel	Furkan İĞİT		0541 519 07 25	
Emergency Warden	Selda GÜRSEL		0530 643 72 29	
Emergency Warden	Murat TÜTÜNCÜ		0533 551 69 88	
Security Manager	Ali Osman AYDIN		0505 776 04 69	

ANNEX C EXTERNAL EMERGENCY CONTACT NUMBERS

CONTACT	TELEPHONE	SPEED DIAL MOBILE	FAX
Ambulance		112	
Fire Service		110	
Health & Safety Authority		112	
Environment Authority	0242 237 00 10		
Gendarme		156	
Police		155	
ASAT (Water)	0242 310 12 00	185	
AEDAŞ (Electricity)	0242 320 36 00		
Antalya Devlet Hastanesi	0242 455 53 53		
Antalya Eğitim ve Araştırma Hastanesi	0242 249 44 00		
Antalya Atatürk Devlet Hastanesi	0242 345 45 50		
Akdeniz Üniversitesi Tıp Fakültesi	0242 249 60 00		
Kepez Devlet Hastanesi	0242 339 11 00		
Serik Devlet Hastanesi	0242 722 13 40		
Manavgat Devlet Hastanesi	0242 746 11 17		
Alanya Eğitim ve Araştırma Hastanesi	0242 513 48 41		
AFAD Afet ve Acil Durum Yönetimi	0242 243 02 55		

ANNEX D EMERGENCY EQUIPMENTS

EQUIPMENT	TYPE	QUANTITY	KEPT IN
AMBULANCE	TRANSFER	1	MAIN CAMP SITE

ANNEX E EVACUATION PROCEDURES

EVACUATION PROCEDURE IN THE EVENT OF EARTHQUAKE

In case of the earthquake, EVERYBODY SHALL;

- **<u>If in the slip platform and on the top of the legs</u>**;
  - ✓ Only wait for the shaking stops!
  - ✓ **<u>DO NOT MAKE PANIC</u>**!!!
  - ✓ Do not jump!
  - ✓ Hold the guardrails!
  - ✓ Do not use elevator!
- **<u>If indoors during an earthquake;</u>**
  - ✓ Drop to the ground!
  - ✓ TAKE COVER by moving under a sturdy table or other piece of furniture. HOLD ON until shaking stops!
  - ✓ If you cannot take cover under a piece of furniture, tuck your head into your knees and cover your head with your arms!
  - ✓ Evacuate only after shaking has stopped and it is safe to do so!
- **<u>If outdoors during an earthquake;</u>**
  - ✓ Remain outdoor; DO NOT enter a container!
  - ✓ Move away from buildings, trees, streetlights and utility wires!
  - ✓ Drop to your knees and into fetal position, close your eyes, and cross your arms over the back of your neck for protection!
  - ✓ Remain in this position until shaking stops!
  - ✓ Stay in an open area!
- **<u>If in a vehicle during an earthquake;</u>**
  - ✓ Stop as quickly as safety permits and stay in the vehicle!
  - ✓ Avoid stopping near or under buildings, trees, overpasses, and utility wires!
  - ✓ Proceed cautiously once shaking has stopped!
  - ✓ Avoid roads, bridges, or ramps that might have been damaged by the earthquake!
- **<u>After shaking stops;</u>**
  - ✓ Go to designated **"Assembly Point"** within the site compound!
  - ✓ Remain at **"Assembly Point"** until all clear is given by the **Emergency Controller** to return to the workplace!

EVACUATION PROCEDURE IN THE EVENT OF FIRE OR EXPLOSION

If you discover an emergency (*e.g. fire*) and you are the first on the scene, carry out the following procedure:

- Shout out a warning and alert people in immediate area!
- **Contact Emergency Controller** by phone on **Ext**. … or **MOBILE** …… or **using internal radio system** to advise them of the situation.
- If you consider that you can without endangering yourself or others, contain / control the emergency you should:
    - ***Take necessary steps to control emergency***

      (e.g. Use appropriate fire extinguisher, contain leak or spillage.)
- **Leave** by nearest exit, close doors behind you.
- **Go** to designated Assembly Point within site compound.
- **Remain** at **"Assembly Point"** until all clear is given by the **Emergency Controller** to return to the workplace.

EVACUATION PROCEDURE IN THE EVENT OF NON–FIRE/EXPLOSION

If you discover an emergency other than fire or explosion (*e.g.* ***Spill or Flood***) and you are the first on the scene, carry out the following procedure:

- Shout out a warning and alert people in immediate area!
- **Contact Site Emergency Controller** by phone on **Ext**. … or **MOBILE** …… or **using internal radio system** to advise them of the situation.
- If you consider that you can without endangering yourself or others, contain / control the emergency you should:
    - ***Take necessary steps to control emergency***

      (e.g. Use appropriate fire extinguisher, contain leak or spillage, use pumps.)
- **Leave** by nearest exit, close doors behind you.
- **Go** to designated Assembly Point within site compound.
- **Remain** at **"Assembly Point"** until all clear is given by the **Emergency Controller** to return to the workplace.

EVACUATION PROCEDURE IN THE EVENT OF TERRORISM

If you discover an emergency (e.g. terrorism) and you are to carry out the following procedure:

- Keep Calm down!
- **Contact Emergency Controller** by phone on **Ext**. …or **MOBILE** ……. or **using internal radio system** to advise them of the situation.

EVACUATION PROCEDURE IN THE EVENT OF FIRE – WORKER CAMP / ACCOMMODATION

If you discover a fire within the camp facility (sleeping quarters, dining hall, etc.):

- Shout out a warning and activate the nearest fire alarm.
- **Contact Emergency Controller** by phone on **Ext**. …or **MOBILE** ……. immediately.
- Attempt to extinguish small fires using a nearby extinguisher only if safe to do so.
- Do not stop to collect personal items.
- Evacuate using marked exit doors and follow escape route signage.
- Proceed to the Camp Muster Point (outside the main dining facility).
- Camp personnel must not return until declared safe by the Emergency Controller and/or Fire Brigade.

EVACUATION PROCEDURE IN THE EVENT OF EMERGENCY – TUNNEL WORK AREA

If an emergency (e.g. fire, gas leak, collapse) occurs in a tunnel area, follow the steps below:

- Shout out a warning and alert all personnel in the tunnel.
- Immediately inform the Emergency Controller via radio or internal communication system.
- Do NOT use any electrical equipment unless instructed.
- Use designated tunnel escape routes (as marked) and proceed on foot to the tunnel portal.
- If available, activate emergency lighting and ventilation systems.
- Assist any injured person only if safe to do so.
- Exit through the nearest safe egress point.
- Once outside the tunnel, proceed to the designated Tunnel Assembly Point located near the portal entrance.
- Remain at the Assembly Point until clearance is given by the Emergency Controller.

EVACUATION PROCEDURE IN THE EVENT OF STRUCTURAL INCIDENT – BRIDGES OR ELEVATED WORK ZONES

In case of suspected collapse, movement, or instability on a bridge, viaduct or similar structure:

- Evacuate immediately using access ladders or ramps if available.
- Do NOT attempt to retrieve tools or materials.
- Alert others verbally and notify the Emergency Controller by radio.
- Emergency personnel will restrict entry until structural stability is confirmed.
- Assemble at the nearest safe open area as defined in bridge-specific signage plans.
- Follow instructions from Emergency Controllers and avoid returning to the structure until professionally inspected.

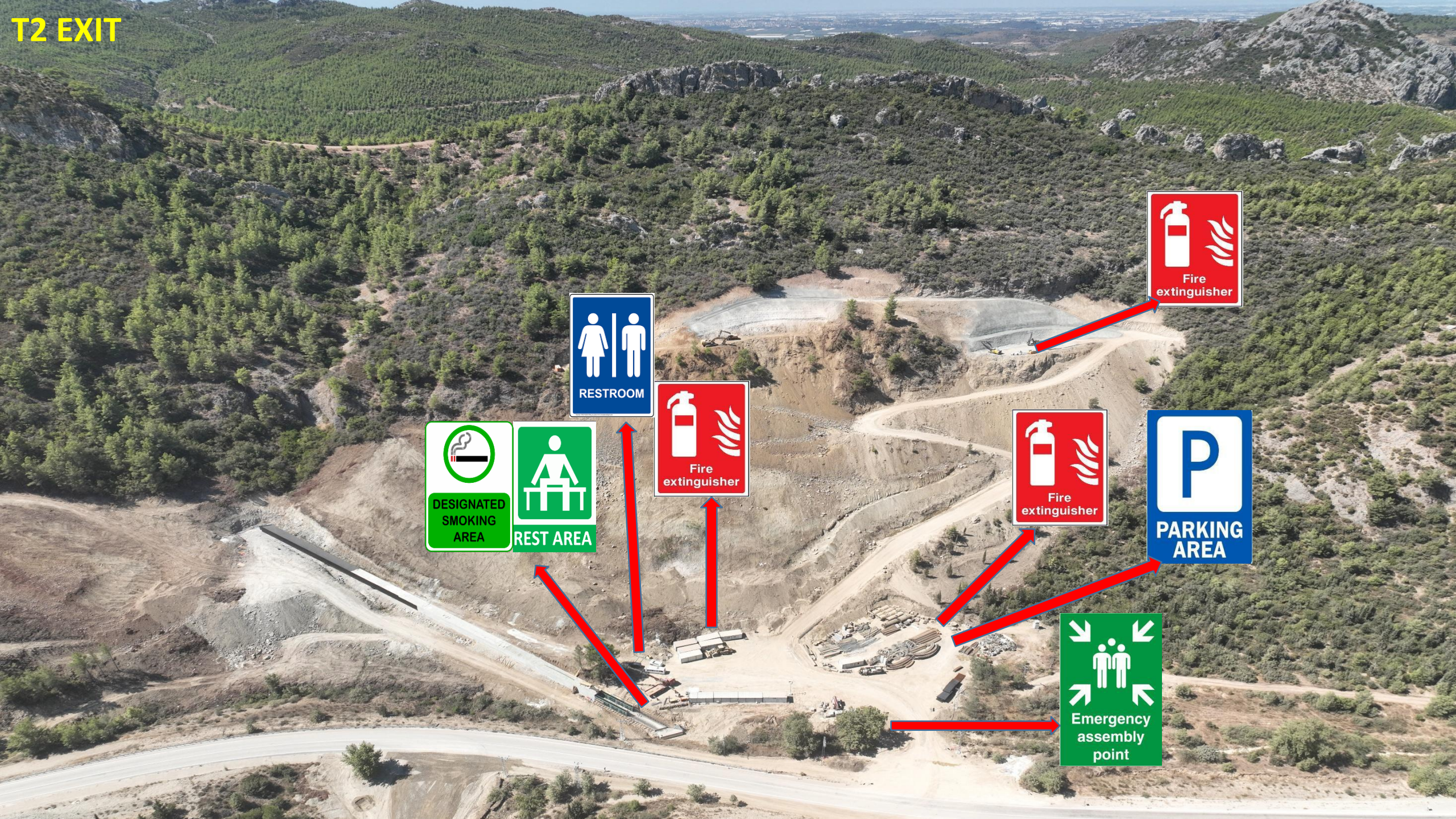
EVACUATION PROCEDURE IN THE EVENT OF GENERAL SITE INCIDENT – OPEN CONSTRUCTION AREA

If a hazardous incident occurs in the general construction site (e.g. heavy equipment failure, fuel spill, explosion):

- Warn surrounding workers loudly and clearly.
- Leave the immediate area using the safest path, avoiding machinery and excavation zones.
- Notify Emergency Controllers or Emergency Wardens.
- Do not block access routes for emergency responders.
- Proceed to the designated General Site Muster Point.
- Wait at the Assembly Point and do not return to the site unless authorized.

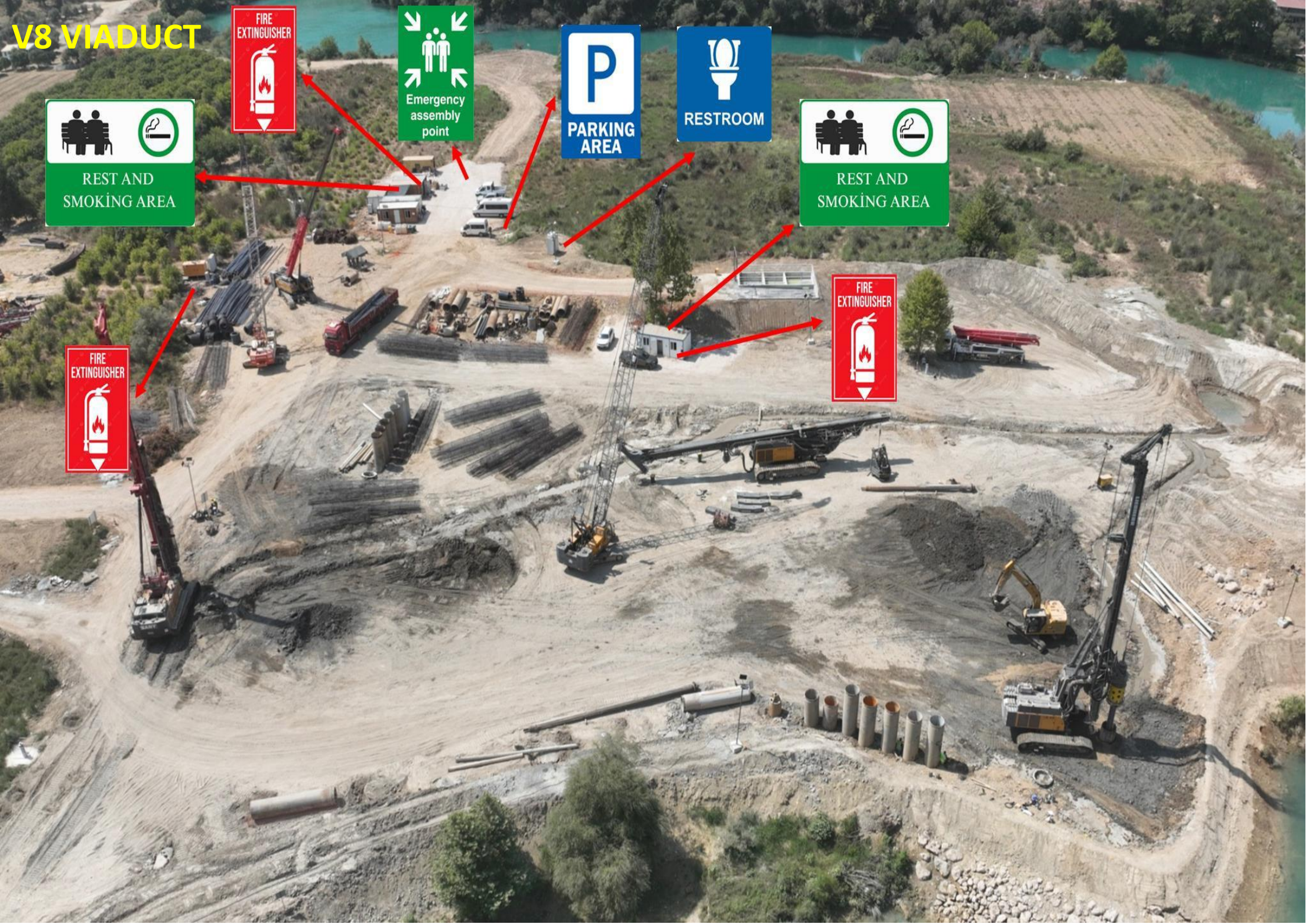
ANNEX F ANNOTATED CONSTRUCTION SITE PHOTOS


TAŞAĞIL
TEMPORARY
CAMP SITE
RESTROOM
Fire extinguisher
RESTROOM
REST AREA
DESIGNATED SMOKING AREA
Emergency assembly point
Fire extinguisher
Emergency assembly point
Fire extinguisher
Fire extinguisher
Fire extinguisher
Fire extinguisher
P
PARKING AREA
Fire extinguisher
P
PARKING AREA


T2 EXIT
RESTROOM
Fire extinguisher
Fire extinguisher
Fire extinguisher
DESIGNATED SMOKING AREA
REST AREA
P
PARKING AREA
Emergency assembly point


T3 ENTRANCE
Fire extinguisher
Fire extinguisher
RESTROOM
DESIGNATED SMOKING AREA
REST AREA
Emergency assembly point
Fire extinguisher


V4 VIADUCT
P
PARKING AREA
Emergency assembly point
DESIGNATED SMOKING AREA
REST AREA
Fire extinguisher
DESIGNATED SMOKING AREA
REST AREA
Fire extinguisher
Fire extinguisher
RESTROOM


V8 VIADUCT
FIRE EXTINGUISHER
Emergency assembly point
P
PARKING AREA
RESTROOM
REST AND SMOKİNG AREA
REST AND SMOKİNG AREA
FIRE EXTINGUISHER
FIRE EXTINGUISHER


V11 VIADUCT
FIRE EXTINGUISHER
REST AND SMOKİNG AREA
Emergency assembly point
P
PARKING AREA
REST AND SMOKİNG AREA
FIRE EXTINGUISHER
RESTROOM


V12 VIADUCT
FIRE EXTINGUISHER
FIRE EXTINGUISHER
REST AND SMOKİNG AREA
REST AND SMOKİNG AREA
P
PARKING AREA
RESTROOM
Emergency assembly point


T5 ENTRY
FIRE EXTINGUISHER
FIRE EXTINGUISHER
FIRE EXTINGUISHER
FIRE EXTINGUISHER
P
PARKING AREA
REST AND SMOKİNG AREA
Emergency assembly point
RESTROOM

HUMAN RESOURCES AND LABOR MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.04.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

HUMAN RESOURCES AND LABOR MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
CSOs	Civil Society Organizations
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
GBVH	Gender-Based Violence and Harassment
HR	Human Resources
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
OHS	Occupational Health and Safety
RCA	Root Cause Analysis
SEP	Stakeholder Engagement Plan
WHO	World Health Organization

HUMAN RESOURCES AND LABOR MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

This Human Resources and Labor Management Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in Figure I-1.

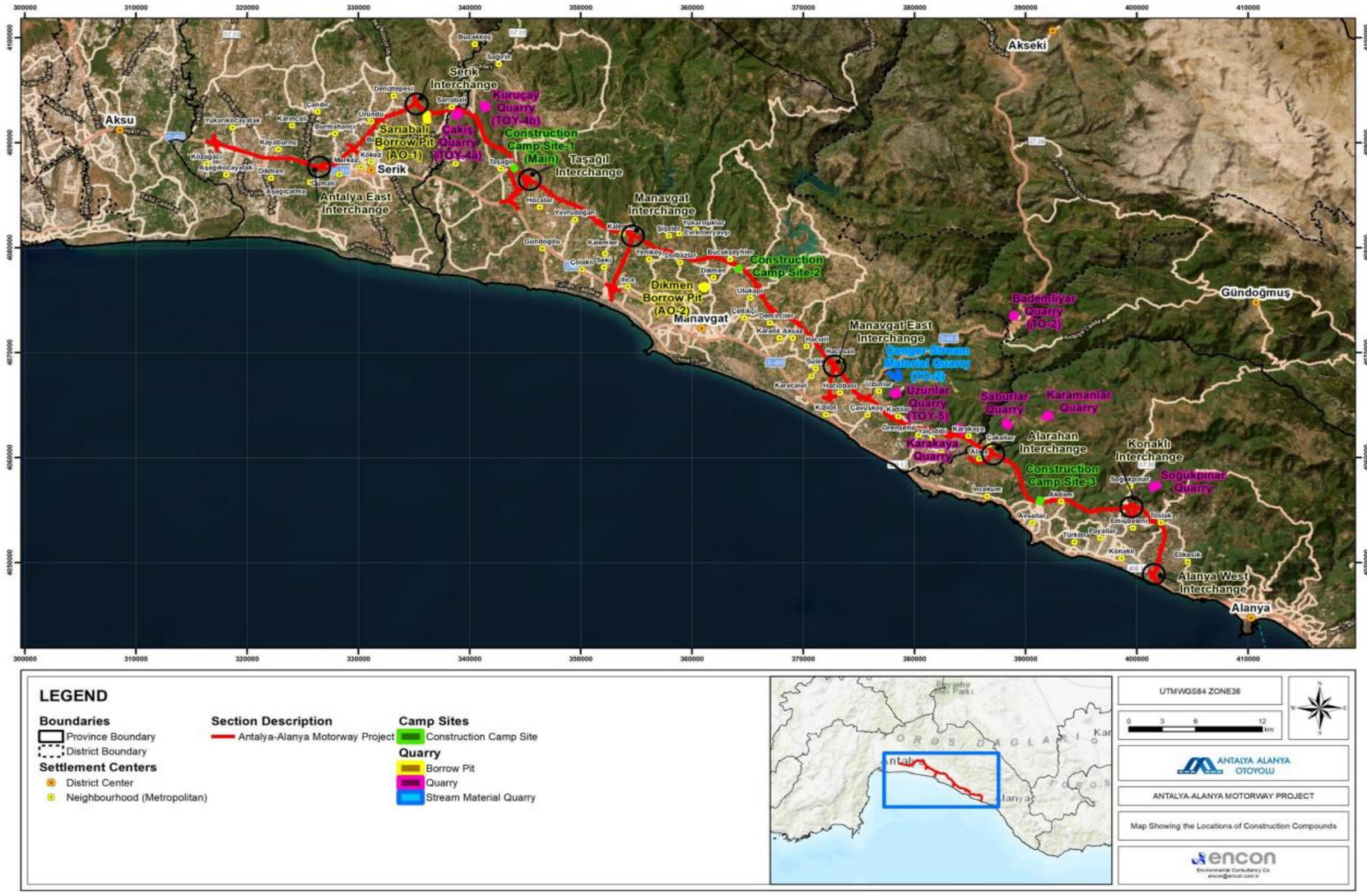

Figure I-1. Map Showing the Locations of Construction Compounds

II. PURPOSE AND SCOPE

This Human Resources and Labor Management Plan ("the Plan" or "HR-LMP") has been prepared for the Antalya-Alanya Motorway Project ("the Project").

The purpose of this Plan is to identify labor-related risks and outline mitigation, control, and monitoring measures to minimize adverse social impacts and ensure fair and compliant workforce management during the construction phase.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The Plan has been developed in alignment with applicable national labor legislation and relevant international standards, including the requirements of international financial institutions. It outlines actions that should be done to manage recruitment, employment conditions, worker welfare, and labor rights effectively across construction-related activities and facilities. This Plan will provide mitigation alternatives and a monitoring schedule in accordance with Turkish labor law and international labor standards.

This Plan should be applied by all parties involved in the construction phase, including the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ), the Main Contractor (Limak), and all subcontractors. Responsibilities for the implementation, monitoring, and reporting of labor-related practices should be clearly assigned. Necessary updates to the Plan should be considered in case of changes in workforce structure, construction methodology, or regulatory requirements.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been developed to align with both Turkish legislation and international standards that govern labor rights, occupational health and safety, and overall workforce management. The references below should be used to guide the implementation and ensure that the Plan meets all required obligations during the construction phase.

III.1 National Requirements

The following primary regulations form the legal basis for labor management in Türkiye:

- Labor Law (No. 4857)
- Social Insurance and General Health Insurance Law
- Occupational Health and Safety Law
- International Labor Force Law
- Regulation on Annual Paid Leave
- Regulation on Working Hours under the Labor Law
- Regulation on Minimum Wage
- Communiqué on National Occupational Standards
- Regulation on the Procedures for Determining Loss of Working Ability and Occupational Earning Capacity
- Communiqué on Short-Time Working and Short-Time Working Allowance Pursuant to Article 65 of Labor Law No. 4857
- Regulation on the Implementation of the Law on Identity Notification

- Regulation on Workplace Physician Work Approval by the Turkish Medical Association

Compliance with these regulations is mandatory, and ongoing monitoring and reporting should be conducted to verify adherence throughout the construction phase.

III.2 International Standards and Conventions

In addition to national regulations, the Plan relies on internationally recognized standards to ensure comprehensive labor management and protection of workers' rights.

AIIB is a multilateral development bank established to promote sustainable economic growth and improve infrastructure connectivity. According to the Articles of Agreement, AIIB aims to invest in infrastructure and productive sectors while fostering regional cooperation through partnerships with other development institutions. To ensure responsible operations, AIIB adheres to policies that address environmental and social impacts, outlined in its Environmental and Social Framework (ESF).

Also, the following international standards and reference frameworks should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 2: Labor and Working Conditions
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- Equator Principles IV (2020)
- Promotional Framework for Occupational Safety and Health Convention (2006)
- Worst Forms of Child Labor Convention (1999)
- Safety and Health in Mines Convention (1995)
- Safety and Health in Construction Convention (1988)
- Health Services Convention (1985)
- Termination of Employment Convention (1982)
- Occupational Safety and Health and the Working Environment Convention (1981)
- Tripartite Consultation (International Labor Standards) Convention (1976)
- Human Resources Development Convention (1975)
- Minimum Age Convention (1973)
- Workers' Representatives Convention (1971)
- Equality of Treatment (Social Security) Convention (1962)
- Discrimination (Employment and Occupation) Convention (1958)
- Abolition of Forced Labor Convention (1957)
- Social Security (Minimum Standards) Convention (1952)
- Equal Remuneration Convention (1951)
- Right to Organize and Collective Bargaining Convention (1949)
- Labor Clauses (Public Contracts) Convention (1949)
- Protection of Wages Convention (1949)
- Minimum Age (Industry) Convention (Revised) (1937)
- Forced Labor Convention (1930)

These references will be used to guide the implementation, monitoring, and performance evaluation of labor practices across the construction phase of the Project, ensuring compliance with international labor rights, occupational standards, and ethical employment principles.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Human Resources and Labor Management Plan:

- Occupational Health and Safety Management Plan
- Community Health and Safety Management Plan
- Subcontractor Management Plan
- Traffic Management Plan
- Construction Campsite Management Plan
- Environmental Accident and Spill Response Management Plan
- Security Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Stakeholder Engagement Plan (SEP)

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

V. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

EPC Project Director :

The EPC Project Director has the overall responsibility and accountability for the Project including delivery of the construction activities in line with applicable national and international standards. He/She ensures relevant activities are carried out in accordance with this Plan.

The EPC Project Manager has the ultimate responsibility for ensuring the health, safety and wellbeing of all project personnel, sub-contractors, suppliers, visitors and members of the public that may be affected by the works that are being performed. He/She will also ensure the implementation of required corrective actions in response to identified nonconformities regarding to this Plan. He/she ensures periodical review of the HR-LMP effectiveness.

- Ensure that all project activities comply with local laws, human rights and labor regulations, corporate governance policies, and international best practices and lender requirements.
- Promote a culture of social responsibility across the EPC and its stakeholders.
- Define and implement the overall business strategy and direction of the EPC in alignment with SPV and stakeholder expectations.

- Ensure the provision of necessary resources and organizational support for the implementation of all plans.
- Supervise and coordinate subcontractors to ensure proper execution of construction and commissioning phase.
- Support the HR Chief and Line Managers in preparing, disseminating, and implementing this plan.In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the SPV and other responsible parties.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and H&S compliance.
- Ensure the monitoring social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including EPC, stakeholders and other related parties.
- Approval of project management plans (HSE,HR, E&S, QA/QC, etc.) in line with company policies, legal frameworks, international standards, SPV and lender requirements.
- Ensure that all employees comply with the obligations specified in the project's management plans during activities.
- Serve as the primary EPC representative to the SPV, client, and key stakeholders.
- Maintain communication channels with SPV, subcontractors, and vendors to ensure alignment and compliance.
- Coordinate with regulatory authorities, community representatives, and auditors as required.
- Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters.
- Oversee risk management and mitigation strategies related to technical, health, safety, community safety, environmental, and social aspects.
- Supervise the preparation and approval of documentation related to claims, variations, and commercial issues.

HR Chief:

- Ensure the preparation, revision, and implementation of this Plan and documents, policies in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC.
- Conduct periodic audits, inspections, and spot checks for subcontractor to ensure alignment with Project requirements.
- Ensure and monitor that all project activities comply with local laws, human rights and labor regulations, corporate governance policies, and international best practices and lender requirements.
- Support a culture of social responsibility across the EPC and its stakeholders.
- Coordinate E&S and H&S departments and all other department managers to prepare site and job-specific annual training plan according to the Project and regulation requirements and implement through activities.
- Support and implement the overall business strategy and direction of the EPC in alignment with SPV and stakeholder expectations.
- Monitor the provision of necessary resources and organizational support for the implementation of all plans.
- Supervise and coordinate subcontractors to ensure proper execution of construction and commissioning phase.

- Coordinate the Line Managers in implementing this plan.In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the SPV and other responsible parties.
- Monitor resource allocation, including employee and financial, to support project execution and human resource and labour management compliance.
- Ensure that all employees comply with the obligations specified in the project's management plans during activities.
- Maintain communication channels with subcontractors to ensure alignment and compliance.
- Coordinate with regulatory authorities as required.
- Address stakeholder concerns proactively and transparently, particularly those related to safety and social matters.

VI. HUMAN RESOURCES AND LABOR MANAGEMENT APPROACH

The effective management of human resources during the construction phase of the Project is critical to ensuring fair labor practices, the protection of workers' rights, and the promotion of safe, equitable, and respectful working conditions in alignment with both national labor legislation and IFC Performance Standard 2 requirements. The construction workforce will include both directly employed personnel and subcontracted workers, who will be engaged in diverse activities such as earthworks, material handling, structural installation, and operations at supporting facilities including camps, administrative units, and batching plants.

Key labor-related risks anticipated during the construction phase include non-transparent or unfair recruitment practices, as through unauthorized agencies or lack of proper contracts, insufficient clarity regarding terms of employment, limited occupational health and safety protections, discriminatory practices, and the potential for forced or child labor, particularly in contexts where subcontractors are engaged. Additionally, restricted access to effective grievance mechanisms and the absence of collective bargaining provisions may further exacerbate vulnerabilities among the workforce particularly in subcontractor-led employment contexts

Additionally, since the construction activities will be completed in 3 years, retrenchment will be an issue at the end of the construction phase that needs proper management and will require compliance with Turkish Labor Law regarding notification, severance, and fair dismissal practices. To minimize the adverse socioeconomic impacts of workforce downsizing following the completion of the construction phase, a Retrenchment Plan will be prepared in line with IFC Performance Standard 2.

To address these risks, the human resources and labor management approach for the Project will be grounded in full compliance with applicable Turkish labor legislation and aligned with international standards, particularly the International Finance Corporation (IFC) Performance Standards—most notably, Performance Standard 2 on Labor and Working Conditions. This approach aims to ensure transparent hiring processes through job announcements, documented eligibility, and objective interviews, equal treatment and non-discrimination in recruitment, wages, and promotion decisions, the prohibition of forced and child labor including strict monitoring of subcontractor practices and zero tolerance for ID retention, the provision of fair wages, regulated working hours and leave entitlements with overtime hours and payment monitored to remain within national legal limits and reported monthly, and the maintenance of safe and healthy working conditions in line with OHS planning, PPE provision, and risk-based training. It also includes the protection of workers' rights to freedom of association and collective bargaining recognized for both directly hired and subcontracted personnel and access to functional and confidential grievance mechanisms supported by worker training and anonymous reporting channels.

All parties involved in construction activities—including the Project Sponsor (AAOİAŞ), the Main Contractor (Limak), and all subcontractors—are expected to incorporate these principles into their labor management systems and ensure their practical implementation in the field through site-specific procedures, performance monitoring, and regular internal audits. Labor-related risks and impacts will be prevented or minimized through proactive planning, regular monitoring, and timely corrective actions where necessary including contractor non-compliance escalation procedures.

It is important to note that this Plan has been specifically developed for the construction phase of the Project. Labor-related issues associated with the operational phase fall outside the scope of this Plan.

The AAOİAS has published its human resources policy on its website and will implement the Human Resources Policy as outlined below. Within the scope of the project, the EPC contractor Limak and its subcontractors will work in accordance with this policy ensuring full horizontal and vertical alignment across all entities responsible for labor and workforce management.

“The Human Resources Policy” of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş adopts a participatory and value-creating Human Resources Management approach based on the principles of change and transformation within the scope of the vision, mission, competencies and ethical values of Limak Group of Companies.

In the light of the Corporate Equality Policy, it is aimed to raise awareness in every employee through providing a fair, transparent, efficient, healthy and development-oriented work environment supporting gender equality this includes gender-sensitive hiring, inclusive communication, and promotion of women into leadership roles. Within the framework of the principles of equality and inclusion, we are completely against to discriminatory factors based on all individual characteristics such as gender, age, marital status, religion, language, ethnicity, pregnancy status or pregnancy possibility and disciplinary practices which all attitudes and behaviors that may harm human dignity such as corporal punishment, physical/psychological pressure, insults and ill-treatment in our entire practices starting from the recruitment process to training, promotion, performance management, career management and remuneration all aligned with IFC PS2 expectations regarding fair treatment and non-discrimination. An egalitarian and inclusive communication language which the skills and competencies are supported is used for all written and verbal communication within and outside of the company.

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş acts with the awareness of social responsibility in preventing the employment of persons under the age of 18 and/or child labor in accordance with laws, legislations and regulations this includes age verification practices, ID checks, and zero tolerance for informal recruitment pathways. Due to its working principles, it pays attention not to exceed the working hours stipulated in the legal legislation, excluding short term extraordinary business conditions with overtime monitoring integrated into monthly subcontractor reports. In recruitment processes, we prioritize female candidates among female and male candidates with equal qualifications. Positive approaches and practices such as providing positions to female employees with a decision-making authority in middle and senior management, encouraging female employees to return to work after childbirth and preventing potential losses in their career development, representation of women in jobs, professions and sectors traditionally dominated by men and involving more men in jobs, professions and sectors traditionally dominated by women, ensuring a balance between the professional and private life and encouraging the sharing of the unpaid workload in the house equally between women and men, including childcare and involved fatherhood (fathers as parents take an active role/responsibility in childcare and development) are fully supported in alignment with international gender equality standards

Based on the positions at the organizational level and the competencies of the employees, we pay regard to a fair remuneration system which is compatible with competition and market conditions, fair and sensitive to the principles of equality including the principle of equal pay for work of equal value

as defined under Turkish labor law and IFC PS2. The entire rights of the employees are protected in accordance with the principle of equal pay for the work of equal value. By applying a fair, transparent, inclusive and egalitarian performance evaluation system that measures the knowledge, experience, effort and behavior, system outputs are ensured to form the basis of development and promotion processes. The career paths of all employees are managed with the development-oriented principle and the employees are encouraged to participate in personal, technical and vocational training programs in accordance with their development requirements supported by structured and documented training programs outlined in this Plan. Internship programs are provided to students in order to motivate them to gain experience in their professional development processes.

"Zero Tolerance Policy" is adopted against violence, domestic violence and/or violation of sexual inviolability among employees, between employees and stakeholders and/or among stakeholders at the work environment and in possible cases, all the sanctions related to the Zero Tolerance Policy are put into practice this includes cases of sexual harassment, GBVH, and workplace retaliation and ensures clear disciplinary enforcement mechanisms. Incentives are provided to increase the motivation of the employees and to strengthen the organizational commitment in accordance with the findings obtained from the practices aimed at increasing employee satisfaction throughout the group companies. It is important to establish the balance between the private and professional lives of the employees through the effective implementation of policies and procedures within the scope of work life balance which includes psychosocial risk mitigation and staff retention."

VII. MITIGATION MEASURES FOR LABOR-RELATED RISKS AND IMPACTS

The following measures will be implemented across all Project sites to prevent or minimize labor-related risks and ensure fair, safe, and compliant workforce management throughout the construction phase:

Recruitment and Hiring Procedures

- Workforce requirements for unskilled, semi-skilled, and skilled positions will be forecasted systematically and in a timely manner during the planning stage of each project unit. Sufficient time and internal resources will be allocated to identify suitable local and regional candidates.
- A standardized recruitment process will be followed, including the identification of staffing needs, development and approval of job descriptions, and definition of qualifications and competencies required for each position. These steps will ensure consistency, transparency, and fairness across all hiring practices.
- Job descriptions will be developed based on a standard template and finalized by the relevant unit managers, reflecting competency-based criteria. This process will help define roles clearly and align them with project requirements.
- Recruitment advertisements will be posted after obtaining the necessary internal approvals from the Project Sponsor (AAOİAŞ) and will be announced by the Contractor (Limak) and all subcontractors. Advertisements will include application procedures and employment conditions.
- Job vacancies will be announced through accessible channels, including local newspapers, online job portals, municipal and community boards, and in coordination with local leaders (e.g., village heads or muhtars) to reach residents in nearby settlements. For specialized roles, professional recruitment firms will be engaged as needed.
- All applicants will be required to submit a completed application form and/or a résumé summarizing their relevant experience and qualifications. As a minimum eligibility requirement, all candidates must be at least 18 years old at the time of employment and pass a health examination in accordance with applicable occupational health standards.
- The recruitment process will be open, fair, and non-discriminatory, and will be free from bias based on ethnicity, gender, age, disability, sexual orientation, or religious and political beliefs.

All Project participants—including the Project Sponsor, the Contractor, and subcontractors—will be required to comply with these principles.

- If labor intermediaries or recruitment agencies are used, they will be required to ensure fair and transparent practices, including the prohibition of recruitment fees and adherence to this Plan's standards. Reasonable efforts will be made to verify their compliance with these requirements.
- Information about workers' rights will be provided to all new hires at the time of onboarding. All employment will be conducted in accordance with Turkish Labor Law and relevant international labor standards.
- Where accommodation or worker camps are provided, these facilities will be managed in line with national legislation and international standards for worker welfare and living conditions. The management of such facilities will be overseen by the Contractor in coordination with the Project Sponsor.
- The Project will ensure equal employment opportunities for women and men. If qualifications are met, female candidates will be given preference in hiring, and wage structures will be based on the principle of equal pay for work of equal value.
- Specific measures will be implemented by subcontractors to enhance employment access for vulnerable groups, including women and youth. These measures may include gender quotas in candidate pools, use of inclusive language in job postings, and collaboration with local employment agencies.
- Priority will be given to applicants residing in directly affected settlements or the nearby project area, in line with the local employment commitment of the Project. Employment opportunities will be accessible to all eligible persons regardless of their background.
- A phased recruitment approach will be adopted to prioritize candidates from directly affected settlements during the initial hiring process. If the required qualifications or experience cannot be met locally, the search will be extended to the regional and national labor markets.
- During the hiring process, the Project Sponsor (AAOİAŞ), the Contractor (Limak), and subcontractors will ensure that local communities are informed about job opportunities and application procedures in a timely and transparent manner. Public announcements will be made using accessible communication channels such as village heads (muhtars), bulletin boards in common gathering places, and other appropriate methods.
- A functioning grievance mechanism will be made available to all workers to raise concerns related to recruitment, employment conditions, or discrimination. The system will allow anonymous submissions and will be responsive, confidential, and free from retaliation.
- A Stakeholder Engagement Plan (SEP) will be implemented to ensure open and transparent communication with all project stakeholders, including local communities. Stakeholders will be encouraged to share their feedback, concerns, and expectations regarding employment through the Project's Grievance Mechanism.
- To maximize local capacity building, knowledge transfer, and workforce development, formal training programs will be designed. On-the-job training will be institutionalized wherever possible, with defined learning objectives and performance monitoring criteria.
- No child labor will be used in any phase or assignment of the project, and the minimum working age will be 18.
- Within the scope of the project, sectoral and regional labor force planning will be carried out according to labor demand.
- Labor recruitment from the region will be kept at the highest possible level.
- The demographic structure of the region for workers coming from outside Antalya to work within the scope of the project will not disrupt the socio-economic structure.

Employment Conditions

- All employees will be hired under written employment contracts, whether for a fixed or indefinite duration. These contracts will clearly state all terms of employment, including working hours, leave entitlements, and other relevant conditions, in accordance with national labor legislation and the Project's human resources policies.
- If the Project Sponsor, the Contractor, or any subcontractor becomes party to a collective bargaining agreement with a recognized labor organization, the provisions of that agreement will be honored. In the absence of such an agreement, or where working conditions are not specified, the Project will ensure reasonable and fair working conditions are established and maintained.
- All applicable leave entitlements—including annual leave, sick leave, and other statutory or contractual leave types—will be explicitly included in individual employment agreements. Leave policies will comply with the Turkish Labor Law and will be communicated to all personnel at the time of hiring.
- In cases where accommodation is provided for workers, the Project will implement specific worker camp management plans to ensure safe, adequate, and hygienic living conditions. These plans will be aligned with national requirements and international standards on worker welfare.
- Accommodation services will be managed in accordance with the principles of non-discrimination and equal opportunity. The provision of housing will not restrict the freedom of movement, privacy, or freedom of association of employees.
- Transportation between accommodation sites and work locations will be arranged and provided by the Project Sponsor to ensure safe and reliable commuting for all workers. These services will be provided at no cost to employees.
- Salaries and wages paid to direct employees and subcontractor personnel will be consistent with the Company's human resources policies and compliant with national labor laws. Wages will be aligned with prevailing market rates and designed to ensure a living wage that meets the cost of living in the region.
- All personnel will be covered under the national social security system, including health insurance, workers' compensation, disability, and unemployment insurance schemes. These entitlements will be reflected in the written employment contracts and administered in compliance with the requirements of the Turkish Social Security Institution.

In line with Turkish Labor Law and IFC Performance Standard 2, the Project will ensure that overtime is performed on a voluntary basis and compensated in accordance with legal provisions. A system will be implemented to monitor overtime hours and payment on a monthly and annual basis to ensure that national legal limits are not exceeded. Overtime will be carried out on a voluntary basis, and the annual legal limit of 270 hours will be strictly observed. All contractors and subcontractors will be required to submit disaggregated overtime records as part of monthly labor performance reports. Workers shall not be coerced into working overtime, and overtime arrangements will be reviewed regularly to assess potential risks to worker health, safety, and well-being.

Procedures for Termination and Workforce Reduction

- All dismissals and contract terminations will be carried out in full compliance with Turkish Labor Law and the internal human resources policies of the Project Sponsor (AAOİAŞ), the Main Contractor (Limak), and all subcontractors. The rights and entitlements of affected employees will be respected throughout the termination process.

- Employment terms, including duration of employment, dismissal procedures, and demobilization conditions, will be clearly communicated to all employees at the time of hiring. These conditions will be explicitly stated in individual employment contracts.
- In the event of demobilization at the completion of the construction phase or workforce downsizing due to unforeseen circumstances, termination procedures will be implemented with transparency and fairness. The Human Resources Unit will be responsible for overseeing and further developing these procedures where necessary.
- Project scheduling and potential demobilizations, especially for temporary construction roles, will be regularly discussed with worker representatives during meetings organized by the Human Resources Unit. This will ensure workers are adequately informed in advance and prepared for planned employment transitions.
- The Project will make all reasonable efforts to avoid mass dismissals. Where unavoidable, such as in cases of workforce demobilization or restructuring, a formal downsizing and dismissal plan will be prepared and implemented to mitigate negative social and economic impacts.
- Prior to any collective dismissal, the Project will explore alternative options to reduce the need for job losses. If no viable alternatives are identified, a termination plan will be developed in line with national legislation and international good practice.
- The collective dismissal plan will include provisions to ensure compliance with non-discrimination principles, reflect consultations held with labor unions or worker representatives, and adhere to any existing collective bargaining agreements.
- If collective dismissal becomes necessary, a 30-day prior notice will be submitted to İŞKUR. Consultations will be held with unions or, if absent, elected worker representatives to review dismissal reasons, scheduling, compensation, and mitigation of social impacts.
- Legal obligations regarding notifications to authorities, consultations with stakeholders, and provision of accurate information to workers will be fulfilled. This includes advance notice to unions or representatives and timely reporting to formal government institutions such as İŞKUR.
- Severance pay will be provided in accordance with the requirements of Turkish Labor Law or as agreed with labor unions or representatives. As a minimum, employees will receive severance equivalent to one month’s base wage per year of service.
- All unpaid dues, including delayed salary payments, social security contributions, and retirement entitlements, will be settled on or before the termination date. Payments will be made directly to the employees or to relevant institutions in line with legal requirements or collective agreements.
- Transparent and objective criteria will be used in determining employees subject to dismissal. These criteria will include length of service, technical skills, performance evaluations, disciplinary records, and attendance history.
- A formal dismissal plan will be prepared and communicated to affected employees, including key information such as reasons for dismissal, the timeline of implementation, selection criteria, severance calculation methods, and possible support for re-employment or retraining.
- The termination process will be designed to avoid gender bias and ensure equal treatment for all employees. Fair consultation and grievance mechanisms will be made available throughout the process to address worker concerns promptly and effectively.
- The implementation of all dismissal-related actions will be closely monitored to ensure compliance with legal requirements, Project standards, and resolution of any grievances submitted by affected employees.

Freedom of Association and Collective Bargaining Rights

- All workers will be treated fairly and respectfully, regardless of their union membership status. The Project Sponsor (AAOİAŞ), the Main Contractor (Limak), and all subcontractors will act in accordance with Turkish labor law and international standards to ensure non-discriminatory and equitable behavior toward all personnel.
- Workers will be granted the right to freely associate and to form or join labor unions of their choice without interference, intimidation, or retaliation. The freedom to organize will be protected, and no punitive actions will be taken against workers who exercise this right.
- Collective bargaining rights will be respected, whether exercised through registered unions or elected worker representatives where unions are not present. Representatives will be selected through transparent, democratic processes, and their roles will be formally acknowledged across project worksites.
- In cases where a collective bargaining agreement exists or is negotiated during the Project, its terms will be implemented without exception. Renegotiation processes will be conducted in accordance with the Turkish Labor Law, with sufficient notice provided to representatives before initiating formal discussions.
- The Project will establish cooperation with local municipalities, civil society organizations (CSOs), labor associations, and local employment offices to promote and support workers' rights, including the right to organize and bargain collectively.
- Under no circumstances will the Project obstruct, discourage, or restrict the rights to freedom of association or collective bargaining. A culture of open dialogue and constructive engagement between management and workers will be promoted across all Project sites.

Internal Worker Grievance and Suggestion System

- A dedicated Grievance and Suggestion Mechanism will be established and made available to all workers to express their concerns, requests, suggestions, or complaints related to workplace conditions. The system will be formally introduced to employees and its accessibility will be ensured throughout the construction phase.
- Contractors and subcontractors will also be required to implement similar internal communication mechanisms for their workforce. Alignment with the Project's overarching grievance procedures will be monitored to ensure consistency and fairness across all levels of the workforce.
- During onboarding, all employees will be informed about the Grievance and Suggestion Mechanism, including how to access it and submit feedback. Continuous awareness-raising will be conducted to ensure that all workers understand the purpose and functionality of the mechanism.
- The mechanism will follow a transparent, fair, and accessible process for all employees. Every submission will be reviewed in detail, and necessary actions will be taken to ensure that comprehensive investigations and appropriate resolutions are provided in a timely manner.
- Relevant departments and designated management representatives will be involved in the resolution process, depending on the nature and scope of the issue. All grievances will be addressed promptly, and feedback will be shared with the submitters without fear of retaliation.
- Confidentiality will be strictly maintained where required, especially in cases involving sensitive or personal issues. Anonymous submissions will also be accepted and treated with equal seriousness and commitment to resolution.
- The Grievance and Suggestion Mechanism will not replace or restrict access to legal remedies under applicable national legislation, nor will it override any provisions established under

collective bargaining agreements. Instead, it will function as a complementary internal tool to address workplace concerns effectively and proactively.

Safeguarding Labor Rights

- Forced Labor and Modern Slavery will not be tolerated in any form throughout the Project. All labor will be freely chosen, and workers will not be subject to coercion, bonded labor, trafficking, or the withholding of personal documents. Employment terms will be clearly communicated in writing, recruitment fees will not be charged to workers, and subcontractors will be monitored and contractually obligated to comply with national laws and international labor standards.
- The prohibition of forced labor, modern slavery, and coercive employment practices, the Project is developed a Code of Conduct (CoC) document applicable to all EPC and subcontractor personnel. This document will outline behavior expectations, reporting responsibilities, and a zero-tolerance stance on retaliation, harassment, and discrimination. A specific training module on the CoC will be incorporated into the onboarding process for all new hires and reinforced through annual refresher sessions. Signed acknowledgments from workers will be collected and retained on site to ensure traceability and compliance.

- Child Labor will be strictly prohibited across all Project activities, in full compliance with Turkish legislation and international standards. No individual under the age of 18 will be employed by the Project Sponsor (AAOİAŞ), the Main Contractor (Limak), or any subcontractor. Age verification through official documentation (e.g., national ID, passport, birth certificate) will be mandatory, and if underage employment is identified, immediate and responsible termination of the employment will be done in the best interest of the child.
- Occupational Health and Safety (OHS) measures will be implemented to ensure a safe and healthy working environment for all Project personnel, with specific attention to industry-specific and gender-related risks. All foreseeable hazards will be assessed and mitigated, and an Emergency Preparedness and Response Plan will be enforced in line with national regulations and international best practices. The Project will take all reasonable steps to prevent work-related accidents, injuries, and illnesses during construction activities.

Oversight of Subcontractor and Supplier Labor Practices

- All subcontractors working within Project sites will be required to comply with the labor, health, safety, environmental, and social standards defined in this Plan and relevant contractual documents. Where necessary, subcontractors will be required to develop their own labor management procedures or systems in line with the Project's standards.
- Subcontractors will prioritize the hiring of local labor wherever possible. In cases where external labor is used, accommodations will be provided near the Project area to help support the local economy. All working and living conditions will comply with applicable Turkish legislation and international standards adopted by the Project.
- The working conditions of subcontractors and their employees will be monitored monthly by Human Resources, Procurement–Technical Office, and Environmental and Social Units. Monitoring will focus on compliance with labor laws, occupational health and safety (OHS), and human rights standards.
- All subcontractor and supplier contracts will explicitly reference compliance with Turkish labor law, ILO conventions, and IFC Performance Standards, and this Plan R-LMP commitments are included also provisions on freedom of association, non-discrimination, and the prohibition of child labor and forced labor. Contracts will also state the consequences of non-compliance and the Project's right to audit and enforce corrective measures.

- The Project Sponsor (AAOİAŞ), Main Contractor (Limak), and subcontractors will be required to commit to responsible sourcing and anti-corruption principles. Subcontractors will be asked to sign declarations affirming adherence to these standards.
- Prior to onboarding any new subcontractor, the Human Resources Department will assess the subcontractor's past performance in labor and OHS management. The subcontractor will be required to provide labor policies, procedures, and evidence of internal systems that comply with this Labor Management Plan.
- A formalized screening procedure shall be implemented specifically for labor intermediary agencies (e.g., recruitment firms, manpower suppliers) engaged by EPC contractors or subcontractors.
- Pre-engagement verification of licenses, registrations, and certifications in accordance with Turkish labor legislation will be conducted.
- Public record and media screening to identify any past human rights violations or reputational risks will be performed.
- Mandatory commitment from intermediaries not to retain workers' identification documents, in alignment with the prohibition of forced labor will be obtained.
- Standardized compliance checklist covering requirements under Turkish Labor Law and IFC Performance Standard 2, prior to contract finalization will be completed.
- Subcontractors will be required to submit records, including employment contracts, grievance resolution logs, and OHS audit reports, records of training and certifications, and documentation of social security payments. These records will be reviewed by the Human Resources (HR) and OHS departments and will serve as the basis for compliance verification.
- Subcontractors will be subject to periodic audits, inspections, and spot checks by the Project's HR Chief to ensure alignment with Project requirements. Labor audits will also be conducted quarterly and documented for transparency and continuous improvement.
- The Procurement and Technical Office will verify subcontractors' previous contracts and licenses and ensure that IFC PS2-compliant clauses are included in agreements. Suppliers' qualifications, registrations, and relevant permits will also be reviewed prior to contract approval.
- If forced labor or child labor risks are identified in the primary supply chain or reported in lower-tier suppliers, appropriate corrective actions will be taken in line with IFC Performance Standard 2. Where resolution is not feasible, suppliers may be replaced to ensure compliance with international labor standards.
- Subcontractors will be expected to provide evidence that their workforce management systems include policies on non-discrimination, human rights, OHS, and freedom of association. They will also be responsible for ensuring their workers have valid certifications or permits for performing technical tasks.
- Subcontractors must ensure their workers have full access to grievance mechanisms, and all complaints—including those related to GBVH (gender-based violence and harassment)—must be recorded and addressed appropriately. Compliance with grievance protocols will be reviewed as part of the monthly labor performance evaluation.
- To ensure consistent ethical standards across the workforce, the CoC will be made binding for all EPC and subcontractor employees. Signed acknowledgments will be collected and stored at site level and included in subcontractor audit reviews.

Capacity Building and Employee Development

- The training needs of Project employees will be accurately assessed to support the development of both personal and technical competencies. Suitable training programs and qualified trainers will be identified, and the effectiveness of training will be objectively measured to support continuous performance improvement.

- Training plans will be developed by individual departments in accordance with the Project's Communication and Training Plan. These plans will be reviewed and implemented on an annual basis to ensure their alignment with the evolving needs of the construction phase.
- The Project will aim to ensure that employees are equipped to perform their tasks with maximum efficiency and satisfaction. Through structured training opportunities, workers will be supported in developing the skills and motivation necessary for high performance.
- All training records will be securely maintained by the Human Resources Department and/or the Environmental and Social Interaction Department. Proper documentation will support monitoring, internal tracking, and compliance with external reporting requirements.
- Training programs will be designed to enhance the personal and technical competencies of Project personnel, with a focus on continuous performance improvement. The accurate assessment of training needs, selection of appropriate trainers, and measurement of outcomes will be prioritized to ensure meaningful capacity development.
- Training planning will be developed by individual departments and implemented annually, in accordance with the Communication and Training Plan. This approach will ensure that training activities are tailored to evolving site-specific requirements and performance feedback.
- The Project aims to ensure that employees not only perform their duties effectively but also remain motivated and engaged through relevant and high-quality training. Training will contribute to a culture of professional growth and job satisfaction.
- All training records will be maintained by the Human Resources Department and/or the Environmental and Social Interaction Department. Proper documentation of training will support internal monitoring and external reporting obligations.
- In collaboration with local authorities and organizations, training opportunities targeting local communities and potential workers will be identified and promoted. These efforts will help improve local capacity and expand the pool of qualified candidates for Project-related employment.
- Prior to the commencement of construction, and following the selection of main contractors, targeted training sessions will be delivered to contractors and subcontractors. These trainings will cover the Project's environmental and social (E&S) requirements, including occupational health and safety (OHS), gender equality, GBVH (gender-based violence and harassment), socioeconomic policy awareness, and worker welfare standards.
- Recruitment and orientation programs will include essential information about the Project's health and safety systems, gender-specific occupational risks, and expected conduct on and off duty. This will support the internalization of E&S culture and ensure a consistent understanding of safety and behavior protocols.
- To promote the participation of women in the workforce, targeted training will be provided where necessary, along with measures such as flexible work arrangements or job-sharing options for women with childcare responsibilities. The Project Sponsor (AAOİAŞ) and the Main Contractor (Limak) will require subcontractors to adopt measures such as gender quotas, collaboration with local employment institutions, and the use of inclusive language in job advertisements to enhance access to employment for women and vulnerable groups.
- A dedicated gender training program will be implemented for team leaders and gender focal points to support the operationalization of the Gender Strategy. These sessions will ensure gender-sensitive leadership and inclusive team management across the Project.
- A GBVH policy will be enforced, and all Project workers will be informed of the expected standards of behavior, both during and outside working hours, through onboarding and awareness sessions. Disciplinary procedures, including termination in cases of unacceptable behavior, will also be clearly communicated.
- Occupational health and safety (OHS) training programs will include not only standard safety protocols but also behavior expectations and discipline procedures. The training content will

align with the requirements of the Project's OHS plans and procedures, covering all personnel involved in construction works.

- All personnel involved in grievance management will receive specialized training, which will include key concepts related to gender (such as gender sensitivity, GBVH, and inclusive terminology), procedures for managing worker complaints, referral pathways, defined roles and responsibilities, and monitoring and reporting obligations. This will ensure that grievance cases—especially those involving sensitive issues—are handled effectively and respectfully.

VIII. TRAINING

Upon hiring, all personnel will be provided with structured training to ensure they are fully informed about the Project's labor standards, expectations, and procedures. Trainings will include key topics such as labor rights, workplace responsibilities, grievance mechanisms, acceptable conduct, and occupational health and safety. These sessions will help ensure that all employees understand their rights and obligations under Turkish labor law and international labor standards.

In accordance with the Communication and Training Plan, training programs will be implemented to support the effective application of the Human Resources and Labor Management Plan. At a minimum, these will cover the purpose, scope, and content of the Plan, implementation procedures, responsible parties, worker rights, and fundamental human rights. Additional training will also address gender equality, non-discrimination, freedom of association, prevention of child and forced labor, and codes of conduct related to workplace behavior, including off-duty expectations.

Refresher trainings will be conducted periodically to reinforce key messages and address updates in legislation or internal procedures. All training activities will be designed to support continuous improvement, raise awareness, and strengthen the overall performance of workforce management systems. Training records will be maintained systematically by the Human Resources Department and/or the Environmental and Social Interaction Departments for verification, monitoring, and reporting purposes.

Level 1 Training

Level 1 Training, which will last at least 2 hours, is also called "OHS Initial Training" and is given by the EPC's H&S Manager/Chief/Expert to cover all Antalya-Alanya Motorway Project, subcontractor and supplier employees. Those who have not received this training are not allowed to enter the construction site or work in the field. The content of the training and revisions are subject to the approval of the H&S Manager/Chief.

The topics covered in this training are as follows:

- Integrated Management System Policy
- OHS and Environmental Principles
- OHS and Environmental standards, rules and practices
- Risk assessment
- Emergency preparedness and response
- Any special hazards associated with activities
- Incident/accident management, near-misses
- Traffic safety
- Environmental awareness
- Pollution prevention
- Waste management

- Proper use and maintenance of personal protective equipment (PPE)
- Proper use of machinery and electrical equipment
- Brief description of the project and Project subject works
- Basic legal requirements related to OHS
- Legal rights and responsibilities of employees
- OHS rules of the Antalya-Alanya Motorway Project
- Project OHS Plan
- Project OHS rules and responsibilities of employees
- Project emergency management practices

For short-term visitors who will not be working on the construction site, OHS This training program is subject to the short version (initial briefing) given by the Manager/Chief/Expert. Visitors who do not attend this briefing session cannot enter the construction site.

Level 2 Training

Level 2 Training programs are also called “job specific OSH training” and are provided due to the risks associated with the work to be performed. Subcontractors and suppliers are responsible for providing these training programs for their own employees and training records will be submitted to the H&S Manager of EPC.

Level 3 Training

Level 3 Training includes “advanced OSH training programmes” that are required for advanced qualifications or are specific to the task to be performed (first aid personnel or emergency management team member training, and similar training).

Annual Training Program covers all the above mentioned trainings under the Annual OHS Training Plan. . Similarly, the same Annual OHS Training and Annual TrainingProgram will be requested from all subcontractors. The OHS Annual Training Program is identified under the Occupational Health and Safety Management Plan.

In order to receive feedback from the participants, a training evaluation form will be used for half-day or longer programs. Subsequent activities will be followed up by the OHS Manager/Chief after analyzing this feedback. Following the training programs, relevant tests will be applied to measure the understanding level of the participants.

Competency Assessment

To ensure that relevant training programs are effective and that workers have the skills, experience, abilities and knowledge required to perform their jobs safely, their competence should be assessed. Methods for this assessment include:

- Training Tests: Following all training, tests will be distributed to assess participants’ understanding and knowledge. The main topics of the tests will be:
  - o What the hazards are
  - o The range of hazards and how they can affect people
  - o How to assess risks and decide on appropriate controls
  - o Key elements of this plan
  - o How occupational health and safety legislation applies to the workplace

● Daily Field Observations: The H&S Manager and representatives will conduct daily field observations. While conducting these observations, they will check whether the employees are performing their duties in accordance with the occupational health and safety rules and measures. If a non-conformity is detected, they will warn the employee and may also instruct the relevant training to be given again. In addition, they will randomly ask questions to the employees about the occupational health and safety rules and measures and conduct interviews with them.

● Identified Hazards: Employees will be encouraged to report the hazards they detect during work. These hazards will be evaluated by the H&S Manager/ E&S Manager and representatives, and the quantitative and qualitative identification of the hazards will be an indicator of competence.

Toolbox Trainings

When a new job starts on site or when site conditions or hazards/risks change significantly; Site managers and supervisors or OHS and Environmental Manager/Engineer will conduct toolbox training to announce job-related information and instructions, job-specific hazards/risks and necessary control measures to eliminate/reduce these risks. Training is conducted among small groups of employees assigned to perform specific jobs and the content of the training covers the following:

● Hazards/risks associated with the jobs in question and necessary control measures to eliminate/reduce these risks
● Deficiencies or negligence detected in site OHS and environmental inspections
● Use of PPE
● Any past accidents/incidents and lessons learned
● General order and organization
● Acting in accordance with warning signs and cautionary signs/labels.

It is always preferred and encouraged for employees to share their past experiences related to the job.

Basic OHS and Environmental Training

It is mandatory to receive Basic OHS and Environmental Training before being assigned to any work site. Employees who do not attend these trainings, including subcontractor employees, will not be allowed to work on site. Basic OHS and Environmental Trainings will be renewed periodically in order to refresh the information.

Visitor Training will also be provided to visitors before they enter the site, which includes basic topics such as general field OHS and Environmental rules, emergency preparation, use of PPE on site, etc.

All OHS and Environmental trainings to be given to employees are planned and recorded in the Annual Training Plan. Each training conducted will be recorded and evaluated. All records will be kept by the OHS and Environment unit.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of labor management and workforce-related mitigation measures outlined in this Plan during the

construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, labor performance trends, stakeholder concerns, or changes in applicable labor legislation.

Monitoring activities will be coordinated by the Human Resources Department, in close collaboration with the Occupational Health and Safety (OHS), Environmental, and Construction Management teams. Key responsibilities will include verifying the implementation of recruitment procedures, monitoring working conditions and accommodations, evaluating compliance with labor rights and protections, and ensuring the consistent application of measures aimed at promoting fair employment practices and protecting vulnerable workers.

Regular labor monitoring will be conducted across all Project sites to evaluate compliance with national labor laws, IFC Performance Standards, and Project-specific employment requirements. This will include the review of key records such as employment contracts, social security registrations, wage and working hour records, training documentation, and grievance resolution logs.

The performance of contractors and subcontractors in implementing labor management requirements will be reviewed through human resources audits, site supervision reports, and field inspections. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and to ensure recurrence is prevented.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, including the Ministry of Labor and Social Security, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of employment records, on-site labor practices, and documentation of compliance with labor and social protection regulations.

Monitoring efforts will be guided by the framework provided in Table IX-1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of monitoring, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of human resources and labor mitigation measures and ensuring full compliance with national regulations and Project standards.

Table IX-1 Key Monitoring Activities

Monitoring Parameter	Method	Frequency / Timing	Responsible Parties
Gender-disaggregated workforce records (female/male employment ratio)	Record review	Monthly Quarterly	EPC AAOİAŞ,
Local/regional workforce participation tracking	Record review	Quarterly	AAOİAŞ,
Employment Agreements	Record review	During the recruitment process	EPC AAOİAŞ,
Number and scope of trainings, number of participants, training hours per employee, training materials, and trainings provided to subcontractors	Project office	Monthly Quarterly	EPC AAOİAŞ,
Review of non-conformity records	Document review	Quarterly	AAOİAŞ,
Documentation of grievances under the Grievance Mechanism	Grievance log	EPC Quarterly	Weekly AAOİAŞ,

Number of work-related incidents, accidents, and near misses	Incident reporting	Weekly Monthly	EPC AAOİAŞ,
Number of personnel affected by infectious diseases	Health records	Weekly Monthly	EPC AAOİAŞ,
Source and quality of tap water in worker camps and offices	Lab Analysis Site inspections	Quarterly Quarterly	EPC AAOİAŞ,
All relevant licences and registrations required by national labour law are in place	Document review	Monthly	AAOİAŞ
Use of PPE	Site inspections	Daily Quarterly	EPC AAOİAŞ,
Health and Safety Signs	Site inspections	Daily Quarterly	EPC AAOİAŞ,

In cases of non-compliance identified through internal oversight or external audits, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ) will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and relevant subcontractors.

All labor-related findings, including non-compliance incidents, grievances, or issues related to employment terms and working conditions, will be documented in accordance with national labor legislation and Project procedures. In the event of serious violations—such as confirmed cases of child labor, forced labor, or discrimination—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate legal, contractual, and procedural actions are taken.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X-1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Number of Trainings Conducted	All personnel to receive training	Quarterly	AAOİAŞ
Non-Conformities with Standards	Less than five	Monthly	AAOİAŞ,
Number of complaints received	Less than five	Monthly	AAOİAŞ

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All labor-related incidents and non-conformities should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established human resources and labor-related procedures. Records to be reviewed during labor and workforce audits will include, but are not limited to, the external and internal grievance and suggestion tracking databases, records of labor-related training sessions, non-conformity and incident records, employment contracts, payroll and attendance records, and social security registration documents. Observations and deficiencies identified during audits should be recorded in formal audit

reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with labor legislation and international standards.

XII. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of human resources and labor management activities throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions should be identified and the required updates should be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and inspections should be conducted to verify that all labor management practices are being implemented in accordance with the provisions of this Plan.

Reports should be prepared using data gathered through labor-related monitoring activities defined under this Plan. The results and supporting evidence of these monitoring activities (e.g., documentation, logs, training records, and photos) should be documented in detail within appropriate reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

Reporting activities under this Plan mainly relate to labor data such as employment ratios (e.g., female and local employment), training participation records, grievance submissions and resolution rates, working hours, contract compliance, and occupational health and safety performance. In the event of serious labor-related incidents (e.g., child labor, forced labor, discrimination, major grievances), an incident report including root cause analysis (RCA), mitigation and compensation measures should be submitted to the relevant authorities in accordance with Turkish labor legislation.

All data, together with the results of inspections and audits, should be summarized in the dedicated human resources and labor management chapter of the Environmental and Social Monitoring Report prepared on a quarterly basis. This report will include any non-compliances identified, corrective actions taken, and any recommended time-bound corrective measures. These should be supported with documentary evidence such as photographs and official records.

All personnel are encouraged to raise concerns, suggestions, or complaints related to labor and employment practices through the established grievance mechanism by completing the grievance form. Grievances received from workers, subcontractor employees, or community members regarding labor issues should be addressed and followed up in a timely and transparent manner. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

SECURITY MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.04.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

SECURITY MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CCTV	Closed-Circuit Television
CLO	Community Liaison Officer
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
IFC	International Finance Corporation
KGM	General Directorate of Highways
KPIs	Key Performance Indicators
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
SEP	Stakeholder Engagement Plan
UNGA	United Nations General Assembly
WHO	World Health Organization

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

This Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange.

As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels

The map showing the construction components and road route within the scope of the Project's construction activities is provided in Figure I.1.

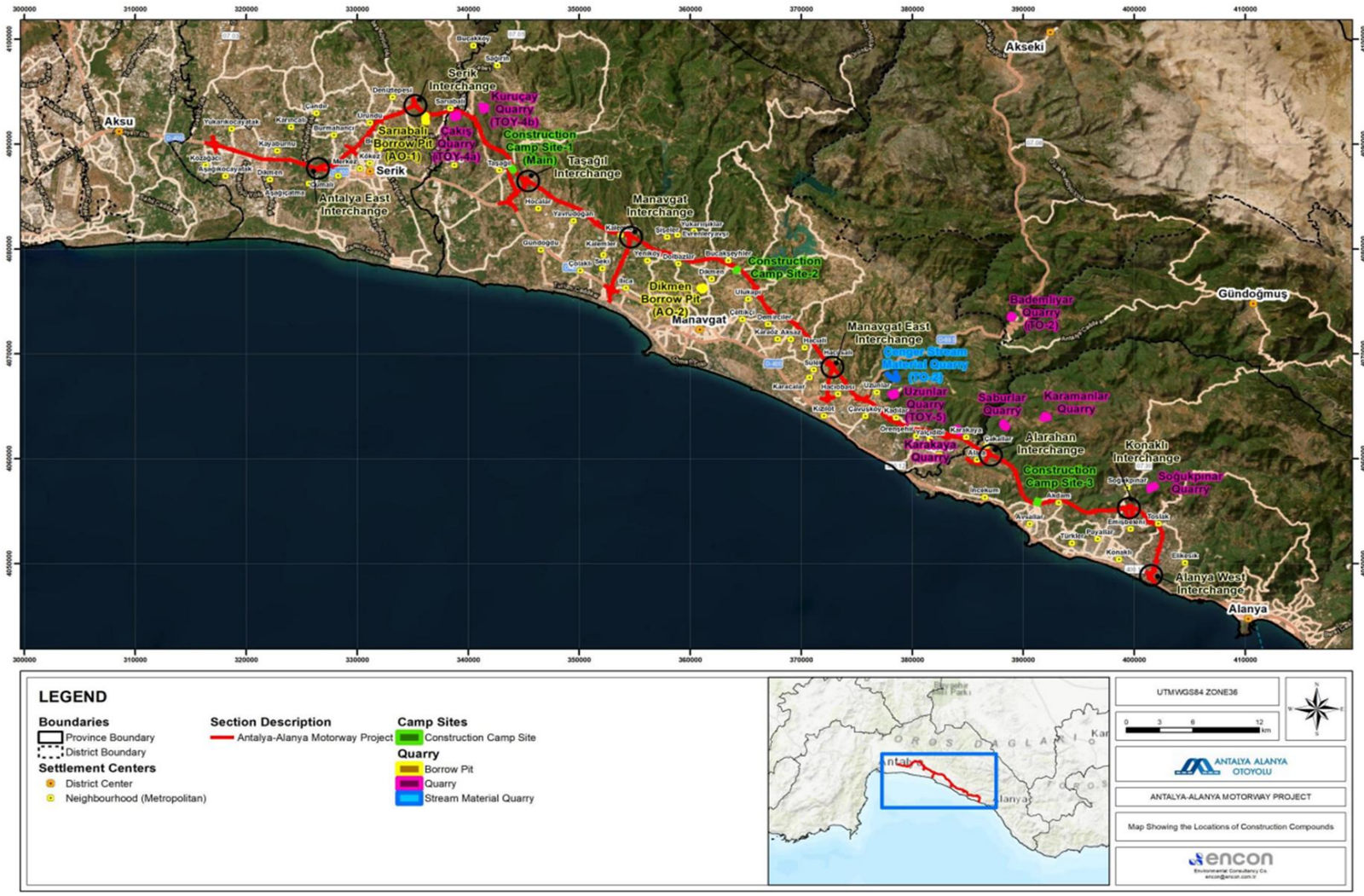

Figure I-1: Map Showing the Locations of Construction Compounds

II. PURPOSE AND SCOPE

This Security Management Plan ("the Plan") has been prepared for the Antalya–Alanya Motorway Project ("the Project").

The purpose of this Plan is to define the necessary measures, roles, and responsibilities for managing security risks and incidents during the construction phase of the Project. The Plan has been developed in accordance with applicable national legislation and the requirements of international financial institutions, including the Equator Principles, IFC Performance Standards and the Voluntary Principles on Security and Human Rights.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The Plan outlines procedures that should be done to prevent, monitor, and respond to potential security risks associated with construction activities and facilities. It provides a framework for identifying and mitigating security-related threats that may impact project workers, subcontractors, local communities, and assets.

This Plan should be applied by all parties involved in the Project, including the Project Sponsor (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. – AAOİAŞ), the Main Contractor (Limak), and all subcontractors. Responsibilities related to implementation, monitoring, incident reporting, and staff training should be clearly defined. Updates to this Plan should be undertaken in response to changes in site conditions, project design, regulatory requirements, or evolving security risks.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been developed in line with national legislative requirements and international standards that establish protocols for managing security risks and ensuring the safety of workers, communities, and assets during the construction phase. The following regulations and frameworks should be used to guide implementation, monitoring, and compliance.

III.1 National Requirements

The national legislative framework for security management applicable to the Project includes the following laws and regulations:

- Law on Private Security Services (Law No. 5188; Official Gazette No. 25504, 26.06.2004)
- Labor Law (Law No. 4857; Official Gazette No. 25134, 10.06.2003)
- Regulation on the Implementation of the Law on Private Security Services (Official Gazette No. 25606, 07.10.2004)
- Tariff and Instruction on Private Security Liability Insurance (Official Gazette No. 26123, 29.03.2006)

These legal documents should be considered in the selection, employment, and oversight of security personnel during the construction phase.

III.2 International Standards and Conventions

In addition to national legislation, the following international frameworks and guidance documents should be considered to ensure consistency with best practices and compliance with international financing institutions:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- IFC Good Practice Handbook on the Use of Security Forces
- Equator Principles IV (2020)
- UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials (1990)
- UN Code of Conduct for Law Enforcement Officials (UNGA Resolution 34/169, 17 December 1979)
- IFC and EBRD Guidance on Worker Accommodation (August 2009)

These references should be used to ensure that security risks are identified, assessed, and managed in a manner that protects the workforce and local communities, particularly vulnerable groups.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Security Management Plan:

- Supply Chain Subcontractor Management Plan
- Environmental Accident and Spill Response Management Plan
- Community Health and Safety Management Plan
- Occupational Health and Safety Management Plan
- Traffic Management Plan
- Hazardous Material Management Plan
- Construction Camp Site Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Human Resources and Labor Management Plan

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

V. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

Security Chief

EPC Contractor to appoint Security Chief and security personnel (per each work areas) to the intensity of the construction activities.

Security Chief will be responsible to control all site installation areas with regard to security issues and ensure that entry to site is under control. He/She will ensure that adequate security guards are provided to effectively manage security system. Security Manager will be in coordination with local

police and will ensure the Employer's requirements on all matters relating to security of the works are complied with.

Security Manager will be responsible for:

- Preparation and implementation of site-specific security management plan
- Carrying out to conduct spontaneous checks of security patrols, surveillance and reports on site,
- Deploying the guards effectively to maintain and evaluate the effectiveness of the security operations and the performance of security guards,
- Submission of the monthly Security Report, weekly meeting minutes and training records to the EPC Project Director,
- Being responsible for the day-to-day supervision of all security personnel, to ensure that plans, procedures, work practices, etc. are implemented effectively and satisfactorily at all levels with respect to the entire project site and the workers accommodation camps,
- Conducts spontaneous checks of security patrols, surveillance and reports on site,
- Investigating any security irregularities, or breaches, or incident and provide a written report without delay to the EPC Project Director within 24 hours and advise any necessary measures to be taken to prevent the recurrence of such events,
- Ensuring that all security personnel are competent, and provide additional training as necessary,
- Being first point of contact in the event of a security emergency situation, and
- Liaises with local Police Department when required.
- Obey the code of conduct outlined in this Plan

Security Supervisors

Responsibilities of Security Supervisors are:

- Reporting directly to the Security Chief,
- Being responsible for maintaining keys and locks to all buildings, ingress and egresses,
- Review daily logs submitted by Security Chief,
- Maintaining a calm and courteous manner in enforcing the security rules,
- Obey the code of conduct outlined in this Plan,
- Commanding with respect, thereby contributing to the public image of both the guards and also the organization, and
- Presenting themselves in clean and neat appearance and being competent to perform the duties described in this Plan.

VI. SECURITY MANAGEMENT APPROACH

Security risks associated with motorway construction projects primarily stem from the presence of large workforces, valuable equipment, materials, and machinery, as well as the geographical dispersion of construction sites. During the construction phase of the Project, potential security threats may include unauthorized site access, theft of assets or equipment, vandalism, conflict among workers or with local communities, and risks arising from interactions between private security personnel and the public. In high-risk areas or periods of heightened local tensions, there may also be elevated risks of civil unrest or deliberate sabotage.

A comprehensive security risk assessment will be conducted prior to mobilization, considering site-specific threats, socio-political dynamics, and risks to workers, communities, and assets.

Security-related incidents can have significant implications on worker safety, construction progress, community relations, and the Project's social license to operate. Therefore, a proactive and structured approach to security management should be adopted across all construction sites and associated facilities. Security measures should be preventive in nature, with an emphasis on de-escalation, respect for human rights, and the use of force only as a last resort and in accordance with national laws and international best practices.

The Project's security management approach should include clearly defined roles and responsibilities for security service providers, contractors, subcontractors, and Project personnel. Security staff should be appropriately vetted, licensed, and trained in line with national regulations and international frameworks such as the Voluntary Principles on Security and Human Rights, and the IFC Good Practice Handbook on the Use of Security Forces. If public security forces are engaged, roles and interaction protocols will be documented to ensure accountability and compliance with the Voluntary Principles on Security and Human Rights. All security arrangements should ensure that the dignity, safety, and rights of all individuals—particularly vulnerable groups—are respected. Security risks to vulnerable groups (e.g. women, children, elderly, minorities) shall be identified through targeted assessments and community consultations. These groups will be protected through the implementation of mitigation actions, including but not limited to the following measures:

- Gender-sensitive conflict de-escalation and response training will be mandatory for all security personnel.
- Confidential reporting mechanisms tailored to women and minors will be established with female grievance officers where feasible.
- Security patrols will be planned to avoid sensitive areas occupied by vulnerable populations, particularly during evening hours.
- Any incident involving vulnerable individuals will trigger an immediate independent review and corrective actions.

Key components of the security management approach should include access control systems, perimeter fencing and lighting, incident reporting mechanisms, and procedures for managing public protests, threats, or escalations. Coordination between private security personnel and local law enforcement should also be established, with clear protocols to guide engagement and response. In addition, grievance mechanisms should be made available to affected communities and workers to report security-related concerns.

Security risks will be continuously assessed and monitored throughout the construction phase to ensure the adequacy and effectiveness of measures. Site-specific security plans should be prepared where needed, based on evolving risk contexts and stakeholder dynamics.

While certain security risks may also arise during the operation phase, the scope of this Plan covers only the construction phase of the Project. Accordingly, all recommendations and mitigation measures presented herein are tailored exclusively to construction-phase activities and facilities.

Security for the project will be provided by EPC (Limak) using its own personnel. Certified personnel who have received special security training will be employed for this security, and the necessary permits will be obtained from the Antalya Governor's Office. Security personnel will be unarmed and will receive training in public relations, communication methods, emergency procedures, and communication effectiveness in addition to special security training.

All permits required under the Law on Private Security Services will be obtained by EPC, and a detailed security plan will be prepared and submitted to the Antalya Governor's Office.

However there will be three construction camp sites (Main Camp Site (Manavgat), Camp Site-2 (Manavgat) and Camp Site-3 (Alanya), temporary construction camp site in Taşağıl is in use. In addition to these areas, there will be usage land for mechanic and asphalt plant and concrete plant areas and quarries which are listed below (see Table VI.1). At least two security personnel will be present 24 hours a day in all of these areas.

Table VI.1 Locations of Borrow Pits / Quarries and Plants

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant
Km 53+800	Antalya	Serik	Sarıabalı	Sarıabalı (AO-1) Borrow Pit
Km 55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1
Km 56+500	Antalya	Manavgat	Çakış	Çakış (TOY4a) Quarry
Km 58+500	Antalya	Manavgat	Taşağıl	Kuruçay (TOY4b) Quarry
Km 59+400	Antalya	Manavgat	Taşağıl	Concrete Plant-2
				Mechanical Plant-1
				Asphalt Plant-1
Km 64+400	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)
Km 80+400	Antalya	Manavgat	Yeniköy	Concrete Plant-3
Km 83+000	Antalya	Manavgat	Sarılar	Dikmen Borrow Pit
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2
Km 87+700	Antalya	Manavgat	Bucakşeyhler	Concrete Plant-4
				Mechanical Plant-2
				Asphalt Plant-2
Km 89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a
Km 99+200	Antalya	Manavgat	Sülek	Concrete Plant-5
Km 104+750	Antalya	Manavgat	Gençler	Bademliyar (TO2) Quarry
Km 105+000	Antalya	Manavgat	Uzunlar	Çenger Stream Material Quarry
Km 106+000	Antalya	Manavgat	Uzunlar	Uzunlar (TOY5) Quarry
Km 114+200	Antalya	Manavgat	Karakaya	Karakaya Quarry
Km 117+000	Antalya	Alanya	Saburlar	Saburlar Quarry
Km 119+500	Antalya	Alanya	Karamanlar	Karamanlar Quarry

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3
				Concrete Plant-6
				Mechanical Plant-3
				Asphalt Plant-3
Km 134+000	Antalya	Alanya	Soğukpınar	Soğukpınar Quarry

VII. MITIGATION MEASURES FOR SECURITY-RELATED RISKS AND IMPACTS

The following mitigation measures will be implemented across all construction-phase work sites and associated facilities of the Project to prevent or reduce security-related risks and adverse impacts on workers, communities, assets, and operations.

Project Specific Security Management Plan

Project Specific Security Management Plan will be prepared after the assignment of the Security Chief. During the preparation of Project Specific Security Management Plan, EPC Contractor will follow the requirements of Voluntary Principles on Security and Human Rights.

The Project Specific Security Plan will be structured by considering the following content:

- Project organization
- Project description
- Roles and responsibilities for security management
- Voluntary principles on Human Rights
- Gender-Based Violence and Harassment
- Security Screening and Assessment
  - The following items shall be, but not limited to, considered during Security Assessment:
    - Violation of Human Rights
    - Gender-Based Violence and Harassment
    - Asset theft from construction sites and accommodations
    - Damage to Project assets
    - Vehicle/traffic security
    - Social unrest (local community)
    - Civil unrest (external activists/militants)
    - Unauthorized access to Site
    - Criminal conspiracy
    - Terrorism
    - Cyber-attack
    - Political unrest
    - Illegal gathering of fauna and flora
    - Kidnapping
    - Natural Hazards
    - Structures failures

- Security Management
  - Stakeholders' minimum responsibilities
  - Security Register and Response/Action Plans
  - Security Notification Levels (Alert States) and action triggers
  - Security Action Plans
  - Security Operative Centre (SOC)
  - Monitoring and reporting
  - Public relations (PR) and external communications
  - Training and awareness
  - Social unrest
- Standard Operation Procedures
  - Safe Driving Policy
  - Security Notification Levels
  - Security Operative Centre
  - Responsibilities of the Head of Project Security (HPS)
  - Security Emergency Equipment
- Emergency Response Plans
  - Road Traffic Accident
  - Response to injuries and/or casualties resulting from any working incident/accident on Site
  - Management of Illegal Actions
  - Direct response of employee(s) witness of social unrest Event
  - Response to injuries and/or casualties resulting from any security emergency Event
  - Partial or full Site evacuation
- Illegal Actions Management Plan
  - Purpose
  - Legal framework
  - Illegal Actions Management Plan framework
  - Cases for illegal actions on site
  - Illegal Action Management Plan Procedures
  - Roles and responsibilities of the Site Management Team
  - Flowchart for Illegal Actions Management Plan
- Geopolitical status in the region
  - Introduction
  - Intelligence and information
  - Travel Security arrangement
  - Evacuation Procedure
  - Security at Site
  - Community Relations
  - Training and Awareness
- General requirements for public and private security forces
- Security of Site and installations areas
-

Security Guard Operations and Duties

The security guard operations will consist of the following:

- Preventing unauthorized access / trespassing to project site by persons or vehicles,
- Preventing unauthorized removal of material(s) and/or equipment,
- Preventing entry of any contraband or prohibited items,
- Inspect vehicles entering and leaving the site for attached soil/mud/ weed propagules,
- Checking validity of project entry/exit passes,
- Preventing harassment or extortion on co-workers,
- Undertaking mobile patrols,
- Providing security monitoring, inspections and drills,
- Preventing any illegal activity on the Project site,
- Responding to emergency incidents,
- Reporting security incidents and infringements to the Security Chief,
- Receive training and be well versed in fire safety and fire extinguisher recognition,
- Being alert to fire risks and initiating actions, and being able to monitor and report during patrols, and
- Maintaining security log books.

The security guards will provide protection through patrols within the project area and along the project perimeter. Similar patrols will also be conducted 24/7 at the camp site and technical installation areas. The patrols will:

- Check the integrity of the fence line or the perimeter delimitation signs,
- Check all security lights around the fence line and core area perimeter,
- Check positioning, integrity and working function of any security systems on a regular basis,
- Ensure that all vehicles on site are parked in designated areas indicated for that purpose,
- Report any incidents immediately to the Security Main Guard House (SGMH),
- Maintain radio or other communication link with SGMH, and
- Other duties as directed.

Patrol routes will be continuously changed at the instruction of the Security Chief, to avoid them becoming known/routine. To prevent unauthorized access / trespassing to the project areas, the security guards will undertake the following duties:

- Check all visitor details,
- Check all materials leaving the site,
- Complete searches of individuals/vehicles as directed,
- Complete all logs, including visitors entry pass and materials,
- Check all authorized entry to site,
- Record authorized entry to site by use of photo ID Card,
- Complete handover reports to each shift on commencement of the new shift coming on duty,
- Sign off issued equipment, including torches and telephone/radio equipment,
- Perform regular checks in the vicinity of the access gate to the core area and campsites,
- Record any complaints or enquiries from individuals requiring site access,

- Prevent all parking near or within the vicinity of the gates,
- Assist with emergency response incidents as directed, and

Undertake other duties as directed.

Security Risk Assessment and Organization

A security risk assessment will be conducted prior to mobilization to identify potential threats, vulnerabilities, and risks to personnel (employees, subcontractors, suppliers, and visitors), equipment, and infrastructure. This assessment will consider national regulations, international standards, site-specific conditions, socio-political context, existing security arrangements, and past experiences in similar projects. Based on the findings, a security organization will be established, and the following measures will be implemented:

- A dedicated Security Chief will be assigned to oversee all security-related arrangements, identify emerging threats, verify compliance with legal and procedural requirements, and ensure the adequacy of implemented control measures.
- Security services will be provided on a 24/7 basis throughout the construction phase.
- All security personnel will be free of criminal records and will be subject to psychological evaluation prior to employment.
- Personnel will receive role-specific security training and refresher training, with records maintained and regularly reviewed by the Security Chief.
- Security personnel will be hired in accordance with national legislation and must fulfill all legal qualifications.
- The use of security personnel will be governed by relevant national laws and international good practices. Proportionality, legality, and accountability principles will be followed during all engagements.

Recruitment and Vetting of Security Personnel

As part of the recruitment process, all security personnel shall be subject to a structured due diligence procedure, which includes:

- Verification of national identification and legal work eligibility documents
- Submission of up-to-date criminal background clearance issued by relevant authorities
- Completion of a psychological evaluation conducted by a licensed mental health professional
- Employment history and reference checks with previous employers
- Screening for any prior involvement in human rights abuses, misconduct, or excessive use of force

Personnel records must include documentation of all vetting steps. These records will be available for audit by the Project's Environmental and Social (E&S) team. The employment of individuals with unresolved allegations or records of abuse is strictly prohibited and will be considered a non-conformance under this Plan.

EPC Contractor will use competent fully trained security guards, with the required qualifications and experience to fulfil their responsibilities. The security guards will have appropriate uniforms and all necessary equipment. EPC Contractor will ensure that appropriate number of female security guard will be recruited specifically for the management of GBVH issues.

The CV's and training records of all security guards will be supplied to the Security Chief who will monitor the guarding standards of staff under their control.

All security guards will be capable of carrying out their assigned duties. Training records will be available for consultation and maintained at the project office for the entire construction period. Training records will be revised during audits in order to confirm security guard's capabilities.

Zero-Tolerance Policy on Retaliation and Abuse

A strict zero-tolerance policy shall be enforced against any form of retaliation, intimidation, harassment, or abuse committed by security personnel towards community members, workers, or other stakeholders. This policy applies to both verbal and physical actions and includes acts such as threats, coercion, discriminatory behavior, and misuse of authority.

All security providers and their personnel must be informed of this policy during onboarding and training. A signed declaration of understanding and commitment to uphold this policy shall be included in the personnel file of each security employee.

Reports or complaints alleging misconduct, including retaliation by security personnel, shall be treated as serious incidents. Independent investigations will be initiated promptly by the E&S team in coordination with independent social experts. Proven violations will result in disciplinary measures including termination of employment, reporting to competent authorities, and, where applicable, contract termination with the security provider.

This zero-tolerance approach will be actively communicated to project workers and community members through trainings and the grievance mechanism.

Legal Compliance and Security Personnel Conduct

- Enforcement of access control measures such as screening individuals and inspecting personal belongings using metal detectors and X-ray scanners.
- Apprehension of individuals in accordance with the provisions of the Code of Criminal Procedure (e.g., Articles 90 and 168) and applicable civil and criminal law.
- Entry into workplaces and residences within the Project Area in emergency situations (e.g., fires, earthquakes) or when assistance is requested.
- Safekeeping of confiscated or abandoned items and the immediate reporting of criminal acts or suspicious activities to law enforcement authorities.
- Prohibition of unauthorized use of force, except where necessary and proportionate to neutralize a threat. Use of firearms will only be permitted under strictly defined legal circumstances.
- All security personnel will be required to review and sign a comprehensive Code of Conduct that reflects the Project's commitment to human rights, as outlined in the IFC Performance Standards and the Voluntary Principles on Security and Human Rights. This Code will define acceptable and prohibited behaviours, including respect for local communities, non-discrimination, proportional use of force, and engagement with grievance mechanisms. A signed copy will be maintained in each personnel file, and compliance will be monitored by the E&S team and independent social experts.

Roles and Responsibilities of the Project Sponsor (AAOİAŞ)

- Security personnel will be informed of AAOİAŞ policies and principles and trained in stakeholder engagement and the Project's grievance mechanism.
- Incidents involving the security team will be addressed promptly, and measures will be taken to resolve complaints in a timely and fair manner.

- A system will be established for the regular evaluation of security personnel performance, with emphasis on behavior, professionalism, and adherence to rules.
- Recruitment, training, equipment, and supervision of security staff will be conducted in compliance with national legislation, international standards, and best practices.
- Security personnel will receive training on appropriate conduct, proportional use of force, and interaction with workers and community members in line with human rights principles.
- No individual under the influence of alcohol or drugs, or in possession of firearms or explosives, will be permitted to enter the Project Area. Security personnel will have the authority to conduct drug and alcohol testing if required.

Resource and Equipment

The EPC Contractor will be responsible for providing the following security related equipment:

- Uniforms,
- Personal Protective Equipment (PPE),
- Sufficient communication equipment, including radios/walkie talkies,
- Transportation to enable mobile security patrols and react to incidents or accidents, if necessary,
- Sufficient lighting (Lux) at the gates,
- Sufficient personnel to provide 24 hours a day, 7 days a week, and 365 days a year security cover which includes relief,
- Full working schedules that will comply with the national legislation,
- Security cabins of a suitable size that will provide electricity, ablution facilities, etc.,
- Security identification passes (including personnel and visitor badges, and vehicle passes).

Access Control and Site Security Measures

- Security checkpoints will be established at all major access points, including camps, quarry ites, borrow areas, and material storage zones. A contracted EPC will manage access under the supervision of the Security Chief.
- Camp perimeters will be enclosed with fencing to prevent unauthorized entry, and security cameras will be installed to monitor sensitive areas.
- All personnel entering the site will be issued ID badges, and supplier/visitor identity verification will be required prior to entry.
- Vehicle access will be subject to a formal registration process. Entry and exit of equipment and materials will be permitted only after clearance from designated project personnel.
- Security personnel will collaborate with Procurement and EHS teams to verify hazardous material shipments and ensure proper offloading procedures. They will also direct transporters to final delivery points and coordinate with EHS during unloading operations.

Visitor Management

- All visitors will be recorded in a visitor logbook at checkpoints.
- Short-term visitors will receive orientation forms outlining workplace hazards, while long-term visitors will undergo full OHS training. Relevant training records will be maintained.
- After orientation and PPE distribution, visitors will be accompanied at all times by trained employees or security staff.

- Photography or video recording will require written permission from the H&S Manager or HR Chief.

Communication, Monitoring, and Incident Management

- Regular security patrols will be carried out, and any breaches or suspicious behavior will be reported to the Security Chief.
- Closed-circuit television (CCTV) systems will be operational 24/7, with periodic reviews of footage. Any threat or irregularity will be documented and escalated to relevant authorities as necessary.
- Community grievance mechanisms will be used to address complaints or concerns regarding security personnel. Awareness of this mechanism will be promoted among local communities.
- The Main Contractor (Limak) will be responsible for recording and investigating all security-related incidents and allegations of misconduct by security personnel.
- Any allegations of abuse or unlawful acts will be documented and reported to the competent authorities for further action, in accordance with legal and procedural standards.

Security Main Guard House (SMGH)

The EPC Contractor will manage the SMGH 24 hours a day, 7 days a week, and 365 days a year. The SMGH will be the designated area for all security requirements, and it will be located at the entrance of the construction site.

The roles and responsibilities of the SMGH staff will comprise of the following:

- Monitoring all security operations,
- Logging visitors' ingress and egress,
- Controlling mobile roving patrols for the Constructions Sites,
- Providing first instance response,
- Calling out emergency services,
- Completing daily records and archiving of data,
- Providing security to specific requests as directed, and
- Recording all calls and radio communications for emergency incidents.

Security Search

Any person or vehicle entering or leaving the construction sites shall be subject to a security search for prohibited items. The security guards will be responsible for carrying out the security searches.

The security team will have the authority to inspect lunch containers, packages, bundles, toolboxes and equipment at any time within the construction sites.

Contraband materials include, but are not limited to the following:

- Unauthorized alcohol,
- Illegal substances,
- Weapons,
- Explosives or pyrotechnics,
- Explicit materials, and
- Stolen tools or equipment.

If contraband materials are found, the security guards will inform immediately the Project Director. In addition, any vehicle entering the construction site shall be subject to a full internal and/or external search. A proper register will be kept of all contraband materials confiscated. Depending on the level of contraband, some may be reclaimed prior to leaving the construction site.

Use of Force

Use of force by the security team is only sanctioned when it is for preventive and defensive purposes in proportion to the nature and extent of the security threat and reiterates the need for proper training. Force shall be used only as a matter of last resort and in a manner that respects human rights.

Restraint and caution will be exercised consistent with international guidelines on the use of force; in particular, the Basic Principles on Use of Force include the following key elements:

- When force must be used to protect human life, it should be proportionate to the threat and should seek to minimize injury.
- Medical assistance should be provided as soon as safely possible.
- During employment checks it should be ensured by EPC Contractor Human Resources Chief to include police records and criminal litigation checks, as well as checks with former employers.

Whenever the lawful use of force is unavoidable, security team shall:

- Exercise restraint in such use and act in proportion to the seriousness of the offence and the legitimate objective to be achieved,
- Minimize damage and injury, and respect and preserve human life,
- Ensure that assistance and medical aid are rendered to any injured or affected persons at the earliest possible moment, and
- Ensure that relatives or close friends of the injured or affected person are notified at the earliest possible moment.

The use of force may need to be justified in any later hearing. EPC Contractor will have the responsibility in presenting this justification following any reportable incident.

EPC Contractor will not sanction any use of force except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.

Local communities can raise grievances related to the conduct of the security team to any Project employee, including subcontractors. All grievances must be immediately managed in light with the Grievance Mechanism.

Code of Conduct

The following code of conduct will apply to the Security Chief and all security guards, who will:

- Not accept any gratuities at any time,
- Remain alert and observe all activity in areas under their control,
- Receive appropriate training to report all incidents or violations to the Security Manager,
- Have no conflict of interests or hold a criminal record of any kind,
- Not threaten, assault or coerce any other individuals in any way,
- Be motivated and willing to work in any weather conditions,
- Be physically fit and able to perform all duties, roles, functions of security activities, and
- Have excellent dress and deportment.

All security employee shall confirm to obey the Code of Conduct with signing documents upon hiring, and Code of Conduct trainings will be given annually. All documents will be documented and maintained by the Human Resources, E&S Departments.

VIII. TRAINING

All security personnel assigned to the construction phase of the Project will receive structured training upon hiring and annually. This training will cover Project-specific procedures, relevant legal and regulatory requirements, and mitigation measures outlined in this Plan.

The EPC Contractor will provide security employee training which will include, but will not be limited to the following:

- Knowledge of Project organization and structures,
- Knowledge of Project labor regulations,
- Fire prevention and fire extinguisher recognition,
- Communication skills,
- Emergency response procedures,
- Report writing,
- Use of security and safety equipment,
- Basic reaction skills,
- Radio skills,
- Conflict management,
- Human rights legislations, and
- Security Code of Conduct.

EPC Contractor will also ensure that GBVH training programs will be included alongside Human Rights training for all security personnel.

The training will be undertaken by an individual with the appropriate qualifications and will be to a level suitable and sufficient to permit the security guards to perform their role.

The training will also ensure alignment with international standards and best practices in security management. In addition to mandatory security training from certified private security agencies, training on protocol rules, stress management and effective communication, private security law, approaches to

suspicious individuals and vehicles, and security systems and devices will be provided to all security personnel.

Personnel will be trained on appropriate conduct in interactions with workers, subcontractors, visitors, and community members, with particular emphasis on conflict prevention, de-escalation techniques, and human rights. Specific topics will include communication with local communities, stakeholder engagement, cultural sensitivity, gender-sensitive approaches, and the cautious and proportionate use of force and voluntary principles on security and human rights. Training will also cover the contents and procedures of the Project's grievance mechanism, stakeholder engagement plan, and internal and external communication protocols.

Security staff will be informed of the importance of professional behavior, legal boundaries of their authority, and proper handling of potentially threatening or unlawful situations. Where applicable, training will include procedures for collaboration with law enforcement and emergency services.

Refresher trainings will be conducted at least twice per year, and immediately following any changes in project scope, security risks, or relevant legal frameworks. The effectiveness of the training program will be evaluated through performance monitoring, interviews, and feedback from community liaison personnel.

These trainings will also address emerging risks and reinforce the implementation of mitigation measures defined in this Plan.

All training activities and attendance records will be documented and maintained by the Human Resources, E&S Departments.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of security management measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on evolving site-specific risks, incident trends, stakeholder concerns, and changes in national security-related regulations or international standards.

Monitoring activities will be coordinated by the Security Chief in close collaboration with the Human Resources (HR), E&S departments. Core responsibilities will include verifying the implementation of access control procedures, reviewing security incident records, assessing the adequacy of on-site security infrastructure, and evaluating personnel compliance with recruitment and training requirements.

Monitoring measures will also include the continuous supervision of entry and exit points through established security checkpoints and Closed-Circuit Television (CCTV) systems. CCTV footage will be reviewed periodically to detect any unauthorized access or suspicious activity. Security incidents involving personnel, subcontractors, suppliers, visitors, or local community members will be logged, investigated, and analyzed to identify root causes and define corrective and preventive actions. Grievances related to the behavior or conduct of security personnel will be recorded through the Project's grievance mechanism and will be addressed in coordination with the Community Relations team.

Personnel files will be reviewed to verify that all employed security staff have undergone required background checks, psychological evaluations, and training in accordance with national regulations and Project requirements. Regular inspections will be conducted across Project sites to

ensure that all security measures—including perimeter fencing, lighting, ID badge protocols, and patrolling—are adequately implemented and maintained. Identified non-conformities or lapses will trigger the development and application of corrective actions.

In addition to internal oversight, inspections may also be carried out by relevant public authorities, including the Ministry of Labor and Social Security and law enforcement agencies, in accordance with Turkish legislation. The frequency and scope of these inspections will be defined by the respective institutions and may involve the review of security records, site conditions, and compliance documentation.

Monitoring activities will be carried out by AAOİAŞ and EPC.

E&S and H&S Managers will monitor security personnel shall possess demonstrable qualifications in social performance, human rights due diligence, and community engagement. To ensure credibility and impartiality, the expert(s) may be appointed under a transparent process, hold a formal mandate authorized by the Project Company, and retain access to grievance records, training attendance logs, and incident investigation files. The expert must also hold a written authorization or assignment letter granting access to project sites and security personnel for interview and compliance verification purposes.

Their responsibilities include verifying that all security personnel comply with human rights commitments, evaluating the effectiveness of grievance response mechanisms, monitoring community perceptions and concerns related to security behavior, and contributing to corrective actions in coordination with the E&S team.

The findings and observations of the social expert shall be documented in quarterly social monitoring reports, which will be reviewed jointly by the Project Sponsor and external stakeholders as needed.

Monitoring efforts will be guided by the framework presented in Table VIII.1, which outlines the key monitoring parameters, performance indicators, responsible parties, and documentation requirements. These activities are essential for evaluating the effectiveness of security management strategies and ensuring full alignment with both national legislation and international good practice.

Table IX.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Employment status and background checks of security personnel	Project Office / Camp Sites	Document review	Quarterly	AAOİAŞ,
Completion of required trainings by security personnel	Project Office / Camp Sites	Document review	Quarterly	AAOİAŞ,
Grievances related to security personnel acts and number of responses	Project Office / Camp Sites	Document review	Weekly	EPC AAOİAŞ,

In cases where non-compliance is identified—either through internal monitoring or external audits—Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ) will ensure that corrective and preventive measures are promptly implemented in coordination with the Main Contractor (Limak) and all relevant subcontractors.

All security-related findings, including breaches, grievances, or complaints received from workers or surrounding communities, will be documented and managed in accordance with Project

procedures. In the event of serious incidents—such as misconduct or unlawful acts involving security personnel—AAOİAŞ will ensure that the matter is reported to the competent authorities and that appropriate procedural, disciplinary, and contractual responses are taken.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Verification of criminal background for all security personnel	No personnel with criminal records employed	At recruitment / Annually	AAOİAŞ, EPC
Number of planned security trainings and completed trainings	100% completion of planned trainings	At recruitment / Annually	AAOİAŞ, EPC
Number of recorded security incidents involving Project personnel, subcontractors, or others	Less than five	Monthly	AAOİAŞ, EPC
Number of complaints related to security personnel and security practices	Less than five	Monthly	AAOİAŞ, EPC

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established plans and procedures. Relevant records that should be reviewed during audits may include the external grievance and suggestion tracking database, internal grievance and suggestion tracking database, training records, and non-conformity records. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary.

XII. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of security management activities throughout the construction phase of the Project. Reporting should be structured to address internal monitoring and audit outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Serious incidents and the associated response actions will be summarized in a manner suitable for external disclosure, to promote transparency and accountability towards affected communities and stakeholders.

Based on monitoring results, necessary corrective and preventive actions should be identified, and required updates should be incorporated into this Plan. The security training program will also be revised as needed to address any identified gaps or emerging risks. Regular audits and site inspections should be conducted to verify that all security-related activities are being implemented in accordance with the provisions of this Plan.

Lessons learned from security incidents and grievance analysis will be used to improve the Security Management Plan and training content on a rolling basis.

Reports will be prepared using data collected through the security monitoring activities defined under this Plan. The results and supporting documentation (e.g., incident records, grievance logs, inspection checklists, and photographs) should be compiled in the appropriate reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

All reported security incidents will be classified by severity (e.g., minor, major, critical) and reviewed by an internal committee that includes the E&S Manager and, where feasible, an independent social expert to ensure impartiality and adherence to human rights obligations.

Grievances specifically related to the behaviour of security personnel shall be disaggregated from general complaints and analysed for recurring patterns, to inform corrective measures and potential retraining needs.

Reporting activities under this Plan mainly relate to the number and nature of security incidents involving Project personnel, subcontractors, suppliers, visitors, and local communities; compliance with security staffing requirements; the training status of security personnel; and the handling and resolution of grievances related to security services. In the event of a serious security incident—such as unlawful behavior, excessive use of force, or threats to personnel or communities—an incident report including root cause analysis (RCA), mitigation measures, and follow-up actions should be prepared by the Contractor and submitted to the Project Sponsor (AAOİAŞ) and, where applicable, to the relevant public authorities within the timeframe required by law.

All data, together with the results of security-related inspections and audits, should be summarized in the dedicated security chapter of the Environmental and Social Monitoring Report, prepared on a quarterly basis. This report will document any non-compliance observed, the corrective actions taken, and any recommended time-bound improvement measures, supported by relevant evidence such as site photos or formal correspondence.

All Project personnel are encouraged to raise concerns, suggestions, or complaints related to security management through the established grievance mechanism by completing a grievance form. Grievances from community members regarding the conduct or actions of security personnel will also be addressed and followed up in line with the procedures defined in the Stakeholder Engagement Plan. Accessible, inclusive, and confidential grievance mechanisms shall be maintained throughout the construction phase to enable both community members and Project workers to report security-related concerns without fear of retaliation. Multiple channels will be available, and community awareness will be promoted actively by the CLOs, with special outreach to vulnerable groups. The grievance mechanism will ensure confidentiality and protection against retaliation, especially for complaints submitted by vulnerable groups such as women or children. Reporting channels will include both verbal and written options, and community liaisons will support accessibility. Clear communication channels for submitting grievances will remain open and accessible throughout the construction period.

Throughout the construction phase of the Project, this Plan will be reviewed quarterly by the E&S manager, based on the findings of internal audits, incident reviews, or any significant changes in site security needs. Updates to the Plan will be coordinated and approved jointly by the E&S Manager and H&S Manager.

SUPPLY CHAIN and SUBCONTRACTOR MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.04.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

SUPPLY CHAIN and SUBCONTRACTOR MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
BOT	Build-Operate-Transfer
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
ESHS	Environmental, Social, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental, Social, Management and Monitoring Plan
ESMS	Environmental and Social Management System
HR	Human Resources
IFC	International Finance Corporation
KGM	General Directorate of Highways
KPIs	Key Performance Indicators
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
RfP	Request for Proposal
CLO	Community Liaison Officer

SUPPLY CHAIN and SUBCONTRACTOR MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The Project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Supply Chain and Subcontractor Management Plan ("SCSMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

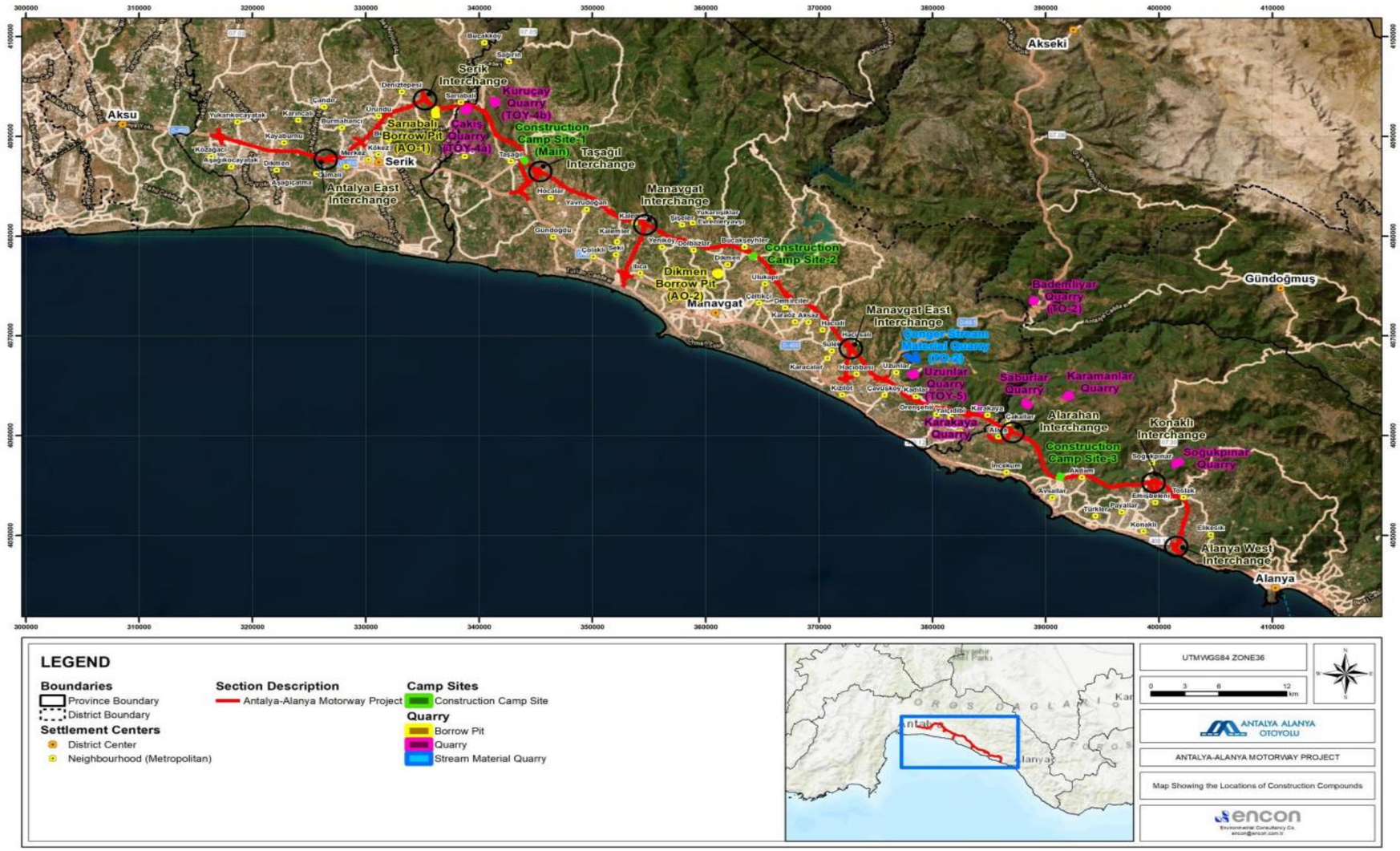

Figure I-1.Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

I.2 Purposeand Scope

The purpose of this Supply Chain and Subcontractor Management Plan (SCSMP) is to identify risks that may be encountered in the Project's procurement processes in order to comply with the Project's applicable Environmental and Social ("E&S") standards, mitigate the impacts of these risks, and ensure sustainable, ethical, environmentally and socially appropriate supply chain management. Additionally, the Plan defines the roles, responsibilities, and processes for AAOİAŞ to evaluate and manage Project suppliers.

AAOİAŞ aims to purchase goods and services from local suppliers as much as possible to ensure that the Project's economic benefits are shared at the local level to the maximum extent. However, if local businesses cannot meet the Project's quality standards and procurement requirements, AAOİAŞ reserves the right to purchase from alternative sources, including regional, national, and ultimately international suppliers, if necessary, in order of priority.

This Plan evaluates and manages AAOİAŞ and EPC supplier compliance with the applicable E&S standards within the Project.

• Supplier – company providing goods and services related to the The Project (suppliers of equipment and materials, services and activities which do not include construction works – catering, cleaning, etc.)

The selection, management and monitoring of sub-contractors will be carried out through this management plan.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

The Plan has been structured to align with both national and international requirements, including legislation, guidelines, and sectoral standards that govern supply chain risk management, labor practices, environmental and social safeguards, and ethical procurement. Accordingly, the following reference sources will guide the implementation, monitoring, and compliance procedures throughout the supply chain.

The regulations and standards to be applied in the project are provided in the following section.

II.1 National Requirements

The following Turkish laws and regulations should be considered as the legal foundation for ensuring subcontractor compliance with labor rights, occupational health and safety, and environmental protection during the construction phase:

- Environmental Law (Law No. 2872)
- Occupational Health and Safety Law (Law No. 6331)
- Labor Law (Law No. 4857)
- Regulation on Risk Assessment of Health and Safety
- Regulation on Occupational Health and Safety Services
- Regulation on Occupational Health and Safety Sign
- Regulation on Emergency Situations in Workplaces
- Regulation on Health and Safety Measures to be Taken in Workplace Buildings
- Regulation on the Use of Work Equipment in Terms of Occupational Health and Safety
- Regulation on the Use of Personal Protective Equipment in Workplaces
- Regulation on Occupational Health and Safety Requirements for Temporary or Fixed-Term Employment
- Regulation on Occupational Health and Safety in Construction Works
- Regulation on the Protection of Workers from Risks Related to Noise
- Regulation on Health and Safety Measures for Working with Chemical Substances
- Regulation on Fire Protection in Buildings
- Regulation on First Aid
- Regulation on Duties, Authorities, and Responsibilities of Occupational Physicians and Other Health Personnel
- Regulation on the Procedures and Principles of Employing Child and Young Workers,
- Law on the Protection of Personal Data No. 6698,
- Public Procurement Law No. 4734,
- Law on the Human Rights and Equality Institution of Turkey No. 6701.

II.2 International Standards and Guidelines

In addition to national requirements, the following international guidelines frameworks, standards and agreements should be considered to ensure alignment with best practices and financial institution requirements.

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework (“ESF”) document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects, supported by Environmental and Social Standards (“ESSs”).

Moreover, the following standards, guidelines and directives should be used to align Project practices with international lender requirements and good practice environmental and social management:

- International Finance Corporation (IFC) (the private sector arm of the World Bank Group), which has published environmental and social sustainability performance standards;
    - IFC Performance Standards (January 2012);

- IFC Environmental, Health, and Safety (EHS) General Guidelines;
- IFC Stakeholder Engagement Handbook;
- Good Practice Note: Managing Subcontractors' Environmental and Social Performance, IFC 2017;
- Addressing Gender-Based Violence and Harassment: Emerging Good Practice for the Private Sector, IFC;
- Good Practice Note: Managing Risks Associated with Modern Slavery, IFC

II.3 Project Standards

The Project Standard will encompass all national and international legal, regulatory, and performance-based requirements governing all environmental, social, labor, health and safety, and ethical aspects of the Project, including those related to supply chain operations.

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are considered directly relevant and should be implemented in coordination with the Supply Chain and Subcontractor Management Plan to ensure consistent management of subcontractor-related risks and responsibilities during the construction phase:

- Human Resources and Labor Management Plan
- Communication and Training Plan
- Occupational Health and Safety Management Plan
- Community Health and Safety Management Plan
- Environmental Accident and Spill Response Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Responsible Sourcing Policy (As part of this SCMP (*Appendix 1*))
- Public Procurement Policy (Limak Group),
- Code of Business Ethics (Limak Group),

IV. ROLES AND RESPONSIBILITIES

The key roles in the procurement process are shared between AAOİAŞ (SPV) and EPC. AAOİAŞ (SPV) will have the main role in monitoring of E&S performance of all project participants during implementation of works and services (in addition to their other roles not related to supplier).

General Manager (SPV):

- Define and implement the overall business strategy and direction of the SPV in alignment with stakeholder expectations.
- Ensure the provision of necessary resources and organizational support for the implementation of SCSMP.

Procurement Department (SPV):

- Coordinate with the Procurement Department (EPC) throughout the construction phase of the Project
- Monitor EPC's purchases,

E&S Manager (SPV):

- Responsible for reporting to Lenders on implementation of E&S requirements of the Project.
- Collating feedback on supplier performance and reporting.

Project Director (EPC):

- Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards.
- Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones.

Procurement Department (EPC):

- Identifies and selects the companies that could comply with the specifications included in the tender documents (technical and E&S specifications developed by EPC, as per below) – in order to ensure a favourable offer, at least 3 companies have to be approached for proposals.
- Performs initial Supplier assessment using the Supplier Assessment Framework
- Manages coordination with EPC Construction Manager and E&S Manager (EPC) to ensure the assessments of suppliers are performed at tender stage.
- Collate feedback on performance of suppliers from EPC teams.
- Manage supplier evaluation database.

Technical Department (represented by Construction Manager) (EPC):

- Identifies the need to engage suppliers and notifies Procurement Department.
- Develops technical specifications / criteria to be included in the tender documentation.
- Evaluates proposals against technical specifications.
- Assess the performance of suppliers and provide feedback to Procurement Department and SPV E&S Manager.

E&S Manager (EPC):

- Assess the performance of suppliers and provide feedback to Procurement Department and SPV E&S Manager.
- Evaluates proposals against E&S specifications.
- Performs detailed Supplier Assessment using the Supplier Assessment Framework

Community Liaison Officer (CLO)) (SPV &EPC):

- Collating grievances on supplier performance (external grievances – from host communities; internal grievances – workers on site) Facilitate resolution of grievances. Reporting to SPV & EPC E&S Manager.

V. SUPPLY CHAIN and SUBCONTRACTOR MANAGEMENT APPROACH

All subcontractors will be responsible of full compliance with the legislation, standards, procedures, rules and objectives identified in detail in of this Plan. Within this scope, LİMAK will manage the subcontractor and supplier evaluation mechanism with criteria targeting the assessment of sufficiency and compliance of existing environmental and social management structure and labor practices of the subcontractor/supplier that is being considered. Following selection of the subcontractors and suppliers,

the Scope of Work to be agreed on will ensure compliance of the subcontractor/supplier with Project Standards through contractual terms.

V.1 Subcontractor Selection Process

The subcontractor selection process will involve a multidisciplinary team involving Environmental and SocialManager. Primary responsibility of the team will be the project's E&S matters, including E&S performance, worker and community health, safety and security, and human resources (HR).

The participation and engagement of the Environmental and Social Manager in the subcontractor selection process is aimed at providing an early consideration of E&S matters and variables when selecting a subcontractor.

The first step in the subcontractor procurement process is the preparation of a Request for Proposal (RfP). This RfP is typically prepared by procurement staff with input from the project manager, internal counsel,technical department (for example, construction managerand lawyers.

This is a common industry practice that helps clarify AAOİAŞ's main Environmental, Social, Health, and Safety (ESHS) requirements, conditions, and provisions that every subcontractor must follow when entering into an agreement with the AAOİAŞ. In this way, management of Project risks and anticipated impacts and E&S performance will be done more effectively.

A high-level definition of ESHS expectations allows the subcontractor to better understand the minimum requirements that must be met. It also helps AAOİAŞ to set basic expectations of the HSE framework that will govern the AAOİAŞ–subcontractor relationship from the outset.

The Environmental and Social (E&S) Requirements encompass all relevant obligations, commitments, and provisions derived from various source documents. These include, as applicable, the Equator Principles (EPs) IV, the IFC Environmental, Health and Safety (EHS) Guidelines for Toll Roads, IFC Performance Standard 2 (PS2), the commitments outlined in the Environmental and Social Impact Assessment (ESIA) Report and E&S-related permits, applicable legal obligations and codes and standards, as well as company policies and internal procedures.

V.2 Proposal Evaluation and Subcontractor Selection

Evaluation methodology, criteria, key performance indicators (KPIs), and weightings need to be established in discussion with the rest of the project team. The following questions should be asked when developing the weightings: "What answers are we looking for?" and "What KPI scores are acceptable?" Significant E&S records and safety metrics are important, and poor records related to these matters should preclude the subcontractor from qualifying, regardless of technical aspects or price.

The subcontractor's existing management systems, its capacity to implement E&S requirements and the subcontractor-supplied information on past E&S performance will be among the key criteria used to evaluate subcontractors. Capacity may be judged by past performance, existing or projected management, technical ability, and resources. The latter can include solutions or options proposed by the subcontractor to implement the mitigations described in the E&S documentation, such as management plans that are contained in the bid package. A lack of capacity to establish an ESMS (if one does not exist), implement E&S requirements, and meet applicable standards will disqualify a subcontractor from further consideration. Referees should be asked to validate claims regarding E&S performance.

In addition, all recruitment agencies and labor providers must be approved, licensed, and have no past violations or associations with child or forced labor. Due diligence documentation, including

license verification and labor law compliance records, must be submitted as part of the subcontractor prequalification process. This criterion is considered mandatory and non-negotiable for selection eligibility.

As AAOİAŞ and EPC evaluates proposals, past E&S performance and key personnel of bidders can be evaluated on a numerical basis, which can then be included in overall comparisons (including technical and financial).

While the evaluation methodology varies according to the project, scope of work of the activity, and any project-specific feature, it will need to be agreed on by the project team. The following will be considered grounds for disqualification:

- Failure to provide information on past E&S performance, including health and safety records;
- Reports of past performance deemed unacceptable for the current project;
- Notices of material labor issues between workers and management;
- Fines and sanctions imposed by E&S and labor regulators and authorities;
- Poor security management records from previous projects; and
- Material community grievances and high profile adverse press reports on E&S matters.

The team evaluating proposals will include at least one qualified and experienced E&S professional, who has been involved in the tendering processes and the establishment of the criteria that will be used to evaluate bidders' E&S qualifications.

If a prospective subcontractor propose to substitute personnel for any proposed key E&S position(s) at any stage of the selection and or contract negotiation process, AAOİAŞ may require that the replacement(s) have at least equivalent qualifications and experience of the previous professional and that they be approved by AAOİAŞ or EPC, or the entire proposal may be re-evaluated using the substitute personnel.

At the end of the evaluation and selection process, AAOİAŞ will issue a letter of intention to place a contract subject to certain conditions, including E&S requirements and conditions, which should be listed. These could be over and above those in the offer, but they must have been discussed with the subcontractor during the selection process. In *Figure V-1*, the subcontractor management process that AAOİAŞ will comply with is presented.

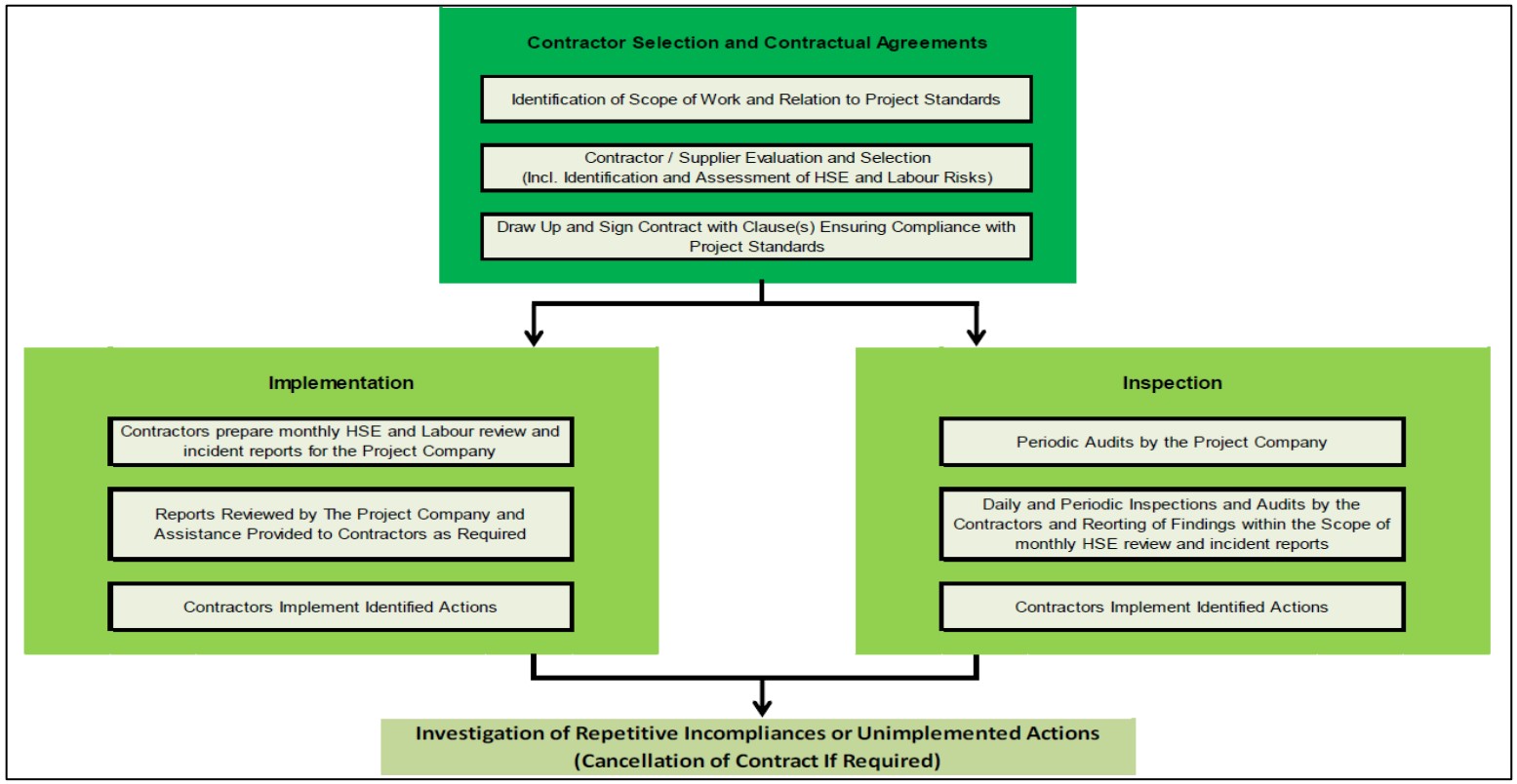

Figure V-1 Subcontractor Management Process

V.3 Subcontracting and Procurement

It is AAOİAŞ's responsibility to comply with IFC Guidelines, EHS Guidelines, loan agreement commitments, ESIA, EIA, Turkish laws and regulations, and permits and standards, ensuring that any subcontractor providing services of any kind to AAOİAŞ duly follows these requirements throughout the duration of the contract, including any activity or services performed by third parties undertaking a contract from the subcontractor.

V.4 Existing Clients – Managed Contracts (Amending Existing Contracts)

For large development projects, there may be existing, smaller contracts managed by AAOİAŞ that will continue into the construction phase alongside major contracts. For consistency, these contracts and the performance requirements associated with them shall be reviewed and, if necessary, brought in line with the other contracts through amendments to properly incorporate all applicable E&S requirements.

V.5 Project Planning

The following content outlines key planning requirements to ensure safe, coordinated, and compliant execution of subcontractor activities during the construction phase of the Project.

V.5.1 Information Exchange

In order to ensure that the project is planned and executed in a safe and controlled manner, all information related to existing hazards and risks at the project site should be exchanged mutually between the Contractor and the Project management. Similarly, any potential hazards and risks that may arise from the Contractor's scope of activities should also be communicated by the Contractor. Prior to the commencement of project activities, the Contractor should submit the necessary documentation and information to AAOİAŞ for review and verification.

The Contractor is required to provide its Occupational Health and Safety (OHS) Policy, as well as details of the designated OHS representative responsible for addressing all health and safety matters throughout the execution of the project. Documentation demonstrating the engagement of an occupational safety expert, workplace physician, and other health personnel should be presented in the form of official system records or certified copies.

In addition, method statements and detailed work instructions describing how project activities will be initiated should be submitted. The Contractor should also present risk assessments along with the proposed preventive and control measures. Information regarding the types of waste expected to be generated; methods for waste collection, and relevant waste disposal documentation should also be included.

A list of vehicles to be deployed at the project site must be provided, accompanied by copies of the drivers' licenses of those authorized to operate them. Likewise, operator certificates for machinery operators, and G-class driving licenses for those operating equipment on public roads, should be submitted.

The Contractor is also expected to provide a list of personnel to be mobilized to the site, along with copies of their identification documents and criminal background checks. Medical reports confirming fitness for duty, including suitability for night work and work at height, must also be submitted. Social security registration records should be provided in the form of system-generated documents or copies.

All contractor personnel must have received appropriate training on occupational health and safety before starting project activities, and copies of training certificates must be submitted. Evidence of the distribution and use of personal protective equipment (PPE), including signed inventory records, should also be provided.

Furthermore, the Contractor must present inspection certificates for lifting equipment, compressors, air tanks, and all pressurized vessels to be brought to the project site. A list of chemicals and other substances to be used during the project, along with Turkish versions of their Safety Data Sheets (SDS), should also be submitted.

V.5.2 Risk Management

All contractors should adopt a proactive approach to risk management, which involves identifying potential hazards in advance, planning accordingly, and implementing control measures before the start of project activities or before there is any significant exposure to risk.

An evaluation tool (*see Appendix 3*) is used to generate a general risk categorization which based on the qualitative assessment of the level of risk for each parameter outlined within the tool. Once all parameters are assessed a general risk classification is calculated based on the individual risk levels. There is no grading of parameters applied.

Based on the Supplier Assessment Questionnaire and using the evaluation tool results, a risk assessment will be conducted to consider potential non-compliances with EPCs ESMMP and this SCSMP and classify potential suppliers according to one of three categories. The risk assessment is led by the Procurement Department supported by the EPC E&S Department.

The final risk assessment is defined within the following boundaries.

Risk Score	Risk band	Description
1	Low	Acceptable; the risk is low, and no additional measures are required. Continue to monitor to ensure that E&S risks do not escalate to a higher level.
2	Medium	Partially acceptable; the risk may be acceptable to continue engagement, but mitigation measures should be considered. Further analysis or verification should be performed to give a better estimate of the risk.
3	High	Not acceptable. The project will not purchase goods and services from high risk suppliers.

V.5.3 Management of Contractor During Execution

The Contractor and all subcontractors are responsible for full compliance with Project standards. In this context, a contractor evaluation mechanism will be implemented which includes criteria aiming to evaluate the competence of the contractor and compliance with environmental, social, health and safety requirements.

During the execution of the works, the contractor will monitor their monthly environmental, social, health and safety performance as well as mitigations and corrective actions, and report it to SPV on a regular basis. SPV will review these reports and, if necessary, develop further suggested actions with the relevant contractor. Further reports will also include the performance of the actions taken. When urgent action is required in case of a nonconformity, the contractor is responsible for taking the necessary actions in a timely manner and reporting the results to SPV. The following subjects will be in consideration and will be followed by SPV:

- Contractor is responsible for providing support to ensure that their subcontractors also meet the requirements set by the Project environmental and social standards. All non-compliance situations of subcontractors on E&S and OHS management will be reported to SPV. The contractor will ensure that their subcontractors take adequate mitigation and corrective/preventive actions.
- In the monthly environmental, social, health and safety reports; there will be evaluations of the performance of the project related to environmental, social, health and safety, as well as the mitigation and corrective/preventive actions implemented.
- SPV will provide assistance in the implementation of mitigation and corrective/preventive activities by auditing the monthly environmental, social, health and safety reports and is responsible for keeping the E&S and OHS performance of the Project at a level that fully complies with the project environmental, social, health and safety standards.
- The contractor and its subcontractors' personnel will have access to the Project grievance mechanism.
    - Grievance records will be checked by relevant SPV to ensure that grievances are answered adequately and satisfactorily.
    - All contracted workers will also have access to the grievance mechanism.

With the aim of monitoring E&S and OHS performance of subcontractors and suppliers, SPV will collect the following data from subcontractors and suppliers:

- Incident investigation records,
- Environmental, social, health and safety training records,
- Information on waste management, waste types, amount, disposal methods, etc.,
- Hazardous substance registration and inventory, including Material Safety Data Sheets,
- Internal and external complaint records, studies to resolve complaints,
- Stakeholder interviews and information meeting records,
- Information on the social responsibility projects carried out,
- Corrective/Preventive Action records,
- Risk analysis records,
- Emergency drill records,
- Records of environmental measurements and analysis,
- Occupational hygiene measurement records,
- Medical records,
- Labor force statistics including gender data and local employment data.

V.5.4 Periodic Review of Contractor's Performance

The contractor will be evaluated on ongoing basis in order to confirm or revoke their inclusion in the vendor list. The evaluation will be made based on the quality of products and services delivered. The evaluation will be based on a scoring scale.

For contractor, SPV will perform the evaluation and records its outcome. The evaluation will generally be performed following the below indicators:

- Compliance with delivery and quantity due dates,
- Compliance with the technical specifications,
- Level of technical assistance guaranteed.

Negative feedback may render the contractor as "unreliable" which in turn may result in removing the respective supplier from the database. The contractor may be re-included in the database upon confirmation of compliance with pre-qualification requirements.

SPV will review periodically the supplier information and updates the database accordingly on ongoing basis.

VI. TRAINING

Upon hiring, all subcontractor personnel will receive structured training on human resources, labor rights, and occupational health and safety topics relevant to their roles. This includes awareness of potential social risks such as labor violations, unsafe working conditions, discrimination, and grievances, as well as the associated mitigation measures applicable to their responsibilities (e.g., proper use of personal protective equipment, safe working practices, respectful workplace behavior, and reporting procedures). In addition, personnel assigned to monitoring or supervisory duties will be provided with specialized training to ensure accurate, effective, and compliant performance.

SPV staff will deliver E&S training to contractors. The training will cover the following topics:

Lenders E&S Requirements and Project E&S Requirements for contractors as per financing agreement conditions. The SPV will identify specific training programs and will ensure the implementation.

The SPV will ensure that E&S training programs are extended to subcontractors by contractors if they are involved in the implementation of the Project.

In addition to above, the necessary funds and scheduling time will be provided to ensure effective health and safety training is provided. This commitment will include paid work time for training and training in the language that the workers understand. Both management and employees will be involved in developing the program. To most effectively carry out their safety responsibilities, all personnel must understand (1) their role in the program, (2) the hazards and potential hazards that need to be prevented or controlled, and (3) the ways to protect themselves and others.

Training program will focus on health and safety concerns that determine the best way to deal with a particular hazard. When a hazard is identified, it shall be removed entirely. If that is not feasible, workers shall be trained to protect themselves, if necessary, against the remaining hazard.

At a minimum, employees must know the general safety and health rules and CMP of the worksite, specific site hazards and the safe work practices needed to help control exposure, and the individual's role in all types of emergency situations. SPV will ensure all employees understand the hazards to which they may be exposed and how to prevent harm to themselves and others from exposure to these hazards.

SPV will commit available resources to ensure employees receive safety and health training during the circumstances below.

- Whenever a person or contractor is hired - general safety orientation including an overview of company contractor management systems, policies, procedures and rules,
- Whenever an employee or contractor is given a new job assignment -during formal classroom training, and again, when the supervisor provides specific task training.
- Whenever new work procedures are used - during formal classroom training and supervisor on-the-job training.
- Whenever new equipment is installed - if new hazards are introduced.
- Whenever new substances are used
- To conclude, safety trainings to be conducted whenever a new hazard is introduced.

Employees and contractors must know they are responsible for complying with all company safety rules, and that most accidents will be prevented by their safe work practices. They must be very familiar with any personal protective equipment required for their jobs. They must know what to do in case of emergencies.

Each employee and contractor need to understand that they are not expected to start working a new assignment until they have been properly trained. If a job appears to be unsafe, they will report the situation to their supervisors.

All line managers must understand their responsibilities within the scope of this Plan. This may require classroom training and other forms of communication. The subject can be covered periodically as a part of regular management meetings.

Managers will be trained in the following subject areas:

- The elements of the CMP, and the positive impact the various processes within the system can have on corporate objectives,
- Their responsibility to communicate the CMP goals and objectives to their employees,
- Their role that includes making clear assignments of CMP responsibilities, providing authority and resources to carry out assigned tasks, and holding subordinate managers and supervisors accountable, and
- Actively requiring compliance with CMP, policies and rules and encouraging employee involvement in discretionary safety activities such as making suggestions and participation in the safety committee.

Training will emphasize the importance of managers' visibly showing their commitment to the safety and health and CMP. They will be expected to set a good example by scrupulously following all the safety and health rules themselves.

VII. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of human resources and labor management strategies outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities may be reviewed and revised as needed, based on site-specific labor practices, performance trends, stakeholder concerns, or changes in national labor regulations and international standards.

Monitoring activities will be coordinated by the Human Resources and Environmental and Social Departments, in close collaboration with the Technical Department. . Key responsibilities will include verifying subcontractor compliance with labor-related obligations, ensuring fair recruitment and employment practices, monitoring working conditions, verifying implementation of grievance mechanisms, and reviewing compliance with occupational health and safety requirements applicable to the workforce.

Subcontractors will be required to regularly report on labor-related performance metrics, including but not limited to working hours, contract status, wage payments, worker accommodation (where applicable), OHS training, and grievance records. AAOİAŞ will review these submissions on a scheduled basis to ensure that performance targets are met, labor rights are upheld, and workforce-related risks are minimized. Monitoring reports should document all relevant evidence, including statistics, audit findings, and records of worker interviews or inspections.

To ensure comprehensive oversight, subcontractors must also demonstrate active implementation of Human Resources and Labor Management Plan requirements. This includes clear adherence to the Code of Business Conduct (CoC) (Limak Group), provision of safe and equitable working conditions, delivery of regular health & safety and rights-based trainings, and the operation of accessible grievance mechanisms for all non-employee and third-party engaged workers. Monitoring documentation should include evidence such as worker interview summaries, training attendance logs, and grievance resolution records to verify compliance with these key requirements.

Practices such as identity checks at project site entrances and the complete recording of personal identification details in the visitor logbook will be utilized to enable the early detection of child labor and forced labor cases. Security personnel will be specifically informed and sensitized on this critical issue. A worker's ability to present their own identification is an indication that their ID has not been confiscated by a third party for the purpose of forced labor. Additionally, verifying the date of birth on the identification document serves as an effective measure for the early detection of child labor.

In case of actual or suspected forced/child labour incidents involving the SPV, EPC, subcontractors, or their core suppliers, specific investigation procedures will be activated immediately. These will include risk screening, immediate cessation of related work, and prioritization of the child's safety and well-being. Subcontractor Management Plan will be revised as necessary to include lessons learned and prevent recurrence. Corrective actions will be documented and tracked via the Corrective Action Plan system, and authorities will be notified in line with legal obligations.

In addition to routine internal monitoring, daily field-level site checks will be conducted by the Environmental and Social Department to gather information on site organization, workforce deployment, and general labor conditions. Monthly coordination meetings will also be held jointly by the Environmental and Social Department and the OHS Department to present the main findings of the monitoring process, identify systemic issues, and ensure that feedback is integrated into corrective action planning and performance improvement.

Subcontractor performance in implementing human resources and labor-related measures will be reviewed through regular audits, site supervision reports, and direct field observations. Any identified non-conformities—such as failure to provide contracts, non-payment of wages, unsafe working conditions, or misuse of the grievance mechanism—will trigger the preparation of corrective and preventive action plans. Follow-up monitoring will be conducted to confirm the effectiveness of implemented actions and to prevent recurrence.

In parallel to internal oversight, inspections may also be conducted by public institutions, including the Ministry of Labor and Social Security, the Ministry of Environment, Urbanization and Climate Change, the Ministry of Health, and their respective provincial directorates. The frequency and scope of such inspections will be determined by the authorities and may include review of documentation, worker interviews, and site-based compliance checks.

Monitoring efforts will be guided by the framework provided in Table VII.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of measurements, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of labor and workforce management practices and ensuring full compliance with national labor laws, international standards, and Project-specific commitments.

Table VII.1 Key Monitoring Activities

Parameter	Monitoring Location	Monitoring Method	Monitoring Frequency	Responsible Parties
The composition of the workforce, including the ratio of local to non-local workers, gender distribution, and representation in supervisory roles	Construction sites and AAOİAŞ Headquarters	Review of personnel and employment records submitted by subcontractors	Quarterly	SPV EPC
The number of labor-related grievances submitted	Construction sites and grievance registry	Review and analysis of grievance logs, resolution documentation, and interview feedback	Weekly	SPV EPC
The percentage of workers who have completed mandatory occupational health and safety and project-specific trainings	Construction sites and training venues	Review of attendance records, training logs, and cross-checking with annual training plans	Quarterly	SPV EPC,
Reported cases of discrimination, harassment, or other violations of equal opportunity principles	Construction sites and AAOİAŞ Headquarters	Review of incident reports, complaint investigations, and confidential interviews where applicable	Quarterly	SPV EPC
The extent to which labor policies and procedures are being implemented as per the Project's Labor Management Plan	Construction sites	Field inspections, document checks, and subcontractor interviews	Monthly	SPV EPC
Subcontractor compliance with national labor legislation and contractual labor obligations	Subcontractor offices and construction sites	Labor audits, payroll record reviews, and compliance inspections	Quarterly	SPV EPC

In cases of non-compliance identified through internal oversight, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor and relevant subcontractors.

All labor-related findings, including violations of labor rights, non-compliance with working conditions, or complaints received from workers or other stakeholders, will be documented in accordance with national labor legislation and Project procedures. In the event of serious violations—such as repeated wage payment issues, lack of employment contracts, or unsafe working conditions—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

VIII. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table VIII.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Percentage of local employment	Up to 50% of the workers will be hired from the local population	Quarterly	AAOİAŞ,
Percentage of workers from directly project-affected areas	At least 50% of the workers will be hired from directly affected communities	Quarterly	AAOİAŞ,
Percentage of women employees	Priority will be given to hiring women; targets to be adjusted based on workforce requirements	Quarterly	AAOİAŞ,
Number of worker grievances	Less than five	Monthly	AAOİAŞ,
Percentage of employee complaints resolved	100% of complaints received will be concluded within the designated resolution timeframe	Monthly	AAOİAŞ,

IX. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities related to subcontractor and labor management will be documented and reported as outlined in this Plan. Subcontractors will be inspected by the EPC Environmental Engineer and H&S Chief. Both EPC and subcontractors will also be subject to audits and oversight by the SPV Environmental and Social (E&S) Manager, H&S Manager and relevant are assigned by them in line with the scope and schedule defined under the Subcontractor Management Plan. These audits and associated records should be managed in compliance with the Project's approved plans and procedures. Relevant documents that should be reviewed during audits may include subcontractor-specific records such as the external and internal grievance and suggestion tracking databases related to subcontracted personnel, subcontractor labor and employment records (e.g., worker contracts, payroll), training attendance logs for subcontractor staff, non-conformity and incident reports, and subcontractor performance evaluation forms prepared. Observations and deficiencies identified during the audit process should be documented in formal audit reports, and all findings requiring improvement should be tracked under the Corrective Action system. Project management should regularly review audit results and corrective action records, ensure timely follow-up, and implement additional measures as needed to maintain full compliance with labor and subcontractor management requirements.

X. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of subcontractor management activities throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions should be identified, and required updates should be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps related to subcontractor performance, occupational health and safety, or compliance with Project requirements. Regular audits and site observations should be carried out to verify that all subcontractor-related activities are implemented in accordance with the provisions of this Plan.

Reports should be prepared using data gathered through the subcontractor monitoring activities defined under this Plan. The results and supporting documentation (e.g., grievance records, attendance logs, training records, and interview notes) should be clearly documented within appropriate reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

Reporting activities under this Plan primarily relate to subcontractor workforce composition, grievances and resolution status, training participation rates, working hours compliance, registration with the Social Security Institution, and adherence to occupational health and safety procedures. In the event of serious subcontractor-related incidents—such as confirmed cases of discrimination, wage violations, or occupational accidents—an incident report including root cause analysis (RCA), corrective measures, and follow-up actions should be submitted to the relevant authorities, including the Ministry of Labor and Social Security, within 30 business days.

All data, together with the results of inspections and audits, should be summarized in the subcontractor management chapter of the Environmental and Social Monitoring Report, prepared on a quarterly basis. This report will document any identified non-compliances, corrective actions taken, and recommended time-bound improvements. Reporting should be supported by documentary evidence such as signed attendance forms, site inspection photographs, and subcontractor interviews.

All personnel are encouraged to raise concerns, suggestions, or complaints related to subcontractor operations through the established grievance mechanism by completing a grievance form. Grievances submitted by subcontractor workers regarding contracts, wages, working conditions, or other concerns should be addressed and followed up appropriately. Communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

Throughout the construction phase of the Project, this Plan will be reviewed by the SPV Environmental and Social (E&S) Manager and H&S Manager, based on audit results, subcontractor performance findings, and any major changes in site operations. Updates to the Plan will be coordinated between the E&S Manager and H&S Manager.

APPENDICES

Appendix 1: Responsible Sourcing Policy

Appendix 1: Responsible Sourcing Policy

RESPONSIBLE SOURCING POLICY

Wherever it operates, AAOİAŞ aims to be among the top businesses contributing favorably to the environment and society.

We want to make sure that the suppliers we work with are aware of their obligations to the people they employ, the communities they influence, and the environment both locally and globally.

We will engage with suppliers to support any required improvements and promote continual improvement. Suppliers are expected to follow applicable project standards at all times. If suppliers do not follow this policy, we will expect them to make the necessary corrections and improvements, working as cooperatively as they can with AAOİAŞ. Serious violations will result in AAOİAŞ ceasing its contractual obligations.

Our Commitments

- We are committed to sourcing only goods that are produced, processed, and traded in accordance with applicable national law and accepted international good practice;
- We aim to ensure that our suppliers join us in committing to Code of Business Ethics (Limak Group), Human Resources and Labor Management Plan.
- We are dedicated to preventing forced labour, child labour, modern slavery, human trafficking, bribery, and corruption in all areas of our business and supply chains;
- We have put in place measures to promote the reporting of issues. As stated in the Worker Grievance Mechanism, employees are required to voice problems, and management is expected to address them;
- We are dedicated to avoiding discrimination based on race, color, sex, language, religion, political opinion, national or socioeconomic origin, birth, union membership, sexual orientation, health condition, family obligations, age, disability, or any other distinctive personal features;
- We expect our suppliers to act in accordance with all environmental and social applicable laws and regulations, as well as applicable project standards, with suitable controls and processes in place to maintain compliance;

ANTALYA-ALANYA MOTORWAY PROJECT

Revision No: 3 **Date:** 08.09.2025

TRAFFIC MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.04.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per ESDD Report comments
08.09.2025	03	Revision as per ESDD Report comments

TRAFFIC MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
BOT	Build-Operate-Transfer
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ENCON	ENCON Environmental Consultancy Co.
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
HSE	Health, Safety and Environment
H&S	Health and Safety
IFC	International Finance Corporation
ITS	Intelligent Transportation Systems
KGM	General Directorate of Highways
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
OHS	Occupational Health and Safety
PCE	Passenger Car Equivalents
RCA	Root Cause Analysis
SEP	Stakeholder Engagement Plan
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
WHO	World Health Organization

TRAFFIC MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Traffic Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange.

As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels

The map showing the construction components and road route within the scope of the Project's construction activities is provided in Figure I.1.

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design.

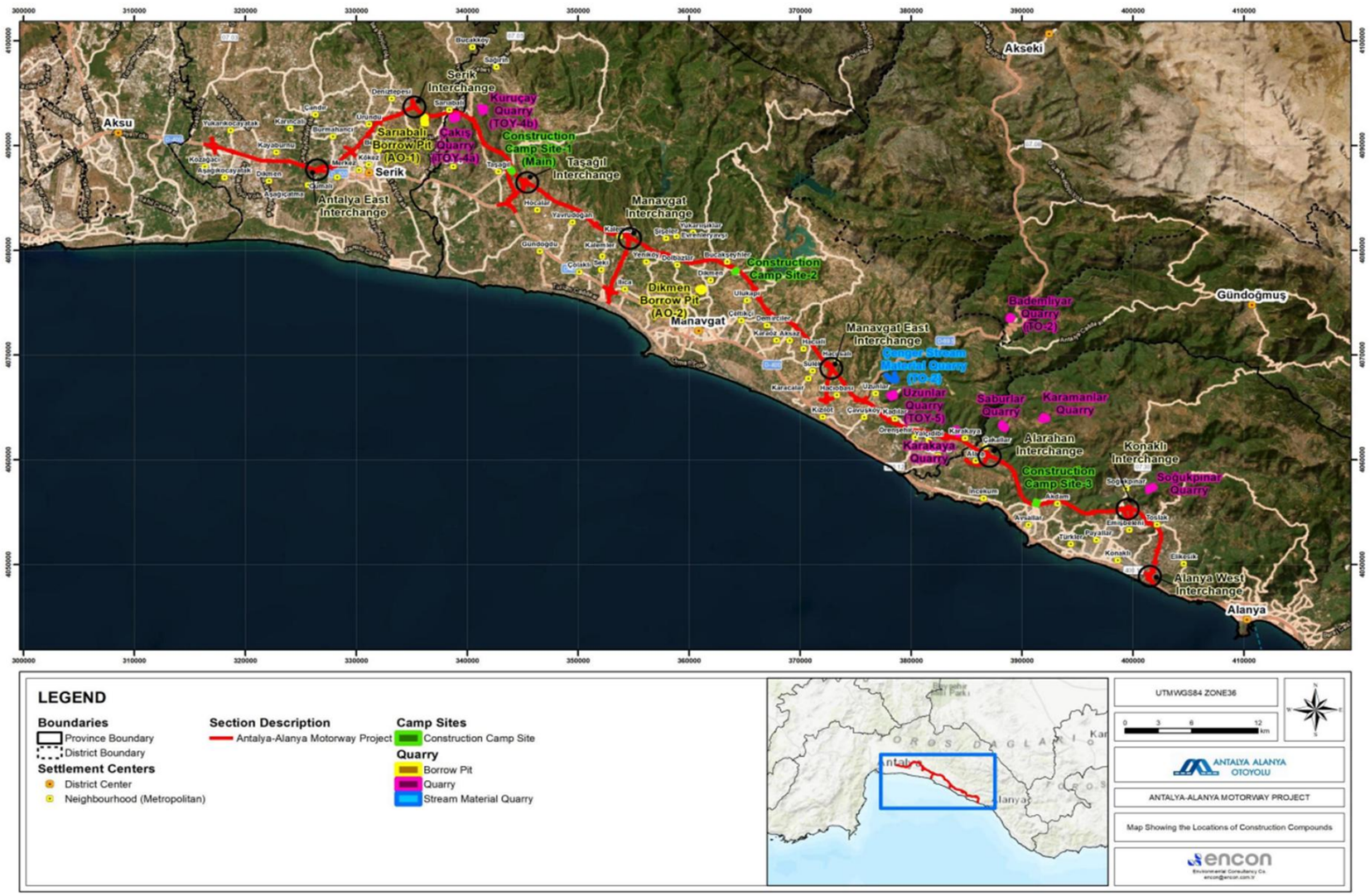


Figure I.1 Map Showing the Locations of Construction Compounds

II. PURPOSE AND SCOPE

This Traffic Management Plan ("the Plan") has been prepared for the Antalya-Alanya Motorway Project ("the Project").

The purpose of this Plan is to identify and mitigate traffic-related risks and impacts that may arise during the construction phase of the Project. This includes preventing, minimizing, and managing adverse impacts on community health and safety, environmental conditions, and worker safety caused by project-induced traffic activities. The Plan defines the key principles, mitigation measures, and monitoring requirements that should be done to ensure effective traffic management throughout the construction works.

This Plan has been developed in line with national legal requirements and applicable international standards, including those of international financial institutions. It aims to provide a structured framework for minimizing traffic-related risks resulting from driver behavior, vehicle conditions, road design, construction works, and site-specific traffic intensity. This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The purpose of this plan is to ensure the safe management and control of trucks, cars and earth moving machines including all vehicles to be used for transportation of humans, materials and equipment during the execution of construction activities carried out on the Project.

The Plan applies to:

- Access roads to construction sites, manufacturing sites, active work fronts, quarries, borrow pits and dump sites, camp sites, etc.
- Delivery of machinery, equipment and materials,
- Movement of machinery and equipment within the manufacturing sites such as beam production facilities, batching plants and asphalt plants,
- Interaction with pedestrians and vehicle traffic

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

The Plan has been structured to align with both national and international requirements, including legislation, guidelines, and sectoral standards that govern road safety, traffic regulation, and transport risk management. Accordingly, the following sources of reference should be used to guide the implementation, monitoring, and compliance procedures related to traffic management activities during the construction phase of the Project.

III.1 National Requirements

The following Turkish laws and regulations form the legal framework for traffic management and occupational safety throughout the construction activities of the Project:

- Highway Traffic Law (Law No. 2918)
- Regulation on Highway Traffic
- Regulation on Traffic Signs
- Regulation on the Transportation of Hazardous Goods by Highway
- Regulation on Health and Safety Signs
- Regulation on the Use of Personal Protective Equipment in Workplaces
- Labor Law (Law No. 4857)

- Regulation on Procedures and Principles of Health and Safety Training for Employees
- Regulation on the Control of Exhaust Gas Emissions
- Regulation on Monitoring of Greenhouse Gas Emissions
- Regulation on Decreasing Ozone Depleting Substances
- Regulation on Reduction of Sulphur Content of Certain Fuels
- Regulation on Control of Excavation Soil and Construction Debris
- Regulation on the Evaluation and Management of Environmental Noise

These legal instruments define the mandatory requirements for traffic safety, signage, emissions control, workplace protective measures, and occupational health training that should be implemented throughout the construction phase.

III.2 International Standards and Conventions

In addition to national legislation, the Project should be implemented in accordance with internationally recognized guidelines and performance standards. These standards are essential for meeting the expectations of international financial institutions and ensuring best practice application in traffic management and community safety.

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework (“ESF”) document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects, supported by Environmental and Social Standards (“ESSs”).

- IFC Performance Standards (2012), specifically:
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- World Bank Environmental and Social Standard 4 (ESS4): Community Health and Safety (2017)
- European Union Road Safety Policy Guidelines and Directives

These international references should guide the planning and execution of traffic safety measures and support continual improvement in managing risks associated with Project-related traffic during the construction phase.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are directly relevant to the implementation of the Traffic Management Plan and should be applied in coordination to ensure comprehensive environmental and social risk management throughout the construction phase:

- Environmental Accident and Spill Response Management Plan

- Subcontractor Management Plan
- Construction Camp Site Management Plan
- Noise and Vibration Management Plan
- Labor Management Plan
- Community Health and Safety Management Plan
- Occupational Health and Safety Management Plan
- Communication and Training Plan
- Emergency Preparedness and response Plan
- Air Pollution and Emissions Management Plan
- Solid Waste Management Plan
- Hazardous Material Management Plan

The effective integration of these plans should be ensured to maintain alignment with national legislative requirements and international best practice standards. Coordination among these plans will help mitigate cumulative risks and enhance the efficiency and safety of construction operations.

V. ROLES AND RESPONSIBILITIES

The roles and responsibilities of key workers such as flagmen, drivers and operators are given below.

Project Manager (EPC)

- Providing the necessary resources for the development, implementation and monitoring of this Traffic Management Plan and associated strategies.
- Ensuring that employees or subcontractors have the required skills and training to conduct worksite traffic management activities.
- Ensuring any incidents are recorded and closed out and appropriate actions taken with minimal time frames
- Ensuring that all identified hazards are controlled
- Ensuring this Traffic Management Plan is complied with national legislations and international requirements.

E&S and OHS Manager (EPC)

- OHS Manager ensures that Traffic Chief is implementing this management plan.
- Monitoring and assurance of the EPC Contractor's subcontractors E&S and OHS system performance and requirements of the Project.
- Reviewing subcontractors and suppliers E&S and OHS documentation to ensure that they are aligned with Projects' requirements.
- Monitoring performance through Key Performance Indicators (KPIs), reports, audits, and meetings.
- Reporting E&S and OHS performance to the SPV E&S and OHS Management, and other related parties.
- Ensuring that all E&S and OHS training needs are identified, provided and recorded.

- Disclosing relevant E&S and OHS information to Project staff and the public and coordinating activities for raising awareness.
- Ensure that this traffic management plan is being implemented.
- Document and investigate incidents or near-miss incidents relating to the worksite traffic management processes.
- Regularly inspect the workplace, monitoring working and traffic conditions and taking appropriate action where necessary.
- Ensure that grievances received by the stakeholders through CLO's are resolved in a timely and transparent manner.

Traffic Chief

- Implement this Traffic Management Plan and report any non-compliance and accidents to the OHS Manager.
- Leading risk assessment studies on Traffic Management,
- Carry out planning activities that will reduce traffic loads by meeting with the responsible of activities that will cause vehicle - equipment traffic in the project at regular intervals
- Ensure that the flagmen, operators and drivers working in the project are familiar with the requirements of this Plan and to provide them with training on traffic safety practices, to take a priority role in creating and updating the training content,
- Conduct daily site inspections and share the findings with the OHS Manager.
- Ensure that the current status of vehicles - equipment and pedestrian roads in the field are inspected on a daily basis, ensure that unsafe situations are eliminated,
- Analyze the necessity of traffic signs, signalization and warnings in the field, guide the logistics units about the necessary standards in the supply of these elements, ensure that regular controls and inspections are carried out after their installation.
- Ensure that toolbox talks and refresher trainings for drivers and operators on safe traffic practices are given by Traffic Supervisor.

Traffic Supervisor

- Implement this Traffic Management Plan, ensuring compliance at site level, and report any non-compliance or accidents to the Traffic Chief.
- Inspect the current status of vehicles, equipment and pedestrian roads in the field on a daily basis, eliminate unsafe situations. Report findings of these inspections to the Traffic Chief.
- Supervising daily vehicle and equipment movements within the construction site and along access roads, ensuring safe circulation.
- Monitoring flagmen's performance during traffic control, ensuring they follow instructions and safety rules.
- Checking the placement and visibility of traffic signs, barriers, and warning boards, reporting deficiencies to the Traffic Chief.
- Coordinating with Security Personnel at site gates to manage entry/exit of vehicles and prevent congestion.
- Reporting unsafe driving, near misses, or violations to the Traffic Chief and recommending corrective actions.
- Supporting toolbox talks and refresher trainings for drivers and operators on safe traffic practices.
- Ensuring pedestrian routes and crossing points in work areas remain safe and free from obstructions.

- Resolve the grievances or suggestions received from the CLO's related to community traffic issues in timely and transparent manner, and escalate them to the Traffic Chief.
- Give specific flagmen trainings to flagmen and record these trainings.

Flagmen

- Join given specific flagmen trainings, toolbox talks and refresher trainings and guide vehicles safely.
- Giving signals to the driver-operator to ensure safe movement of vehicle-equipment in work areas,
- Report any non-compliance of vehicles and operators to the Traffic Supervisor.
- In case of any accident, report to the Traffic Supervisor immediately.
- Making directions to prevent drivers and operators from hitting people and other equipment,
- Supervising the operation of vehicles and equipment in the field and ensuring their safe parking,
- Guiding in order to reduce pedestrian and vehicle interaction in areas where vehicles and equipment are busy,
- Inform workers about using the pedestrian way,
- To use and maintain the PPE provided to him, indicating that he is the Flagman.

Drivers and Operators

- Having knowledge of the traffic rules in and out of the field,
- Having the appropriate driver's license and the necessary legal documents.
- To ensure that the vehicle or equipment used is maintained and in good condition,
- Wearing the seat belt while using the vehicle or equipment, ensuring that all other passengers wear seat belts, not moving until the other passengers are wearing their seat belts,
- To comply with the speed limits determined on and off the field,
- Complying with all traffic signs, signals and mandatory directions on and off the field,
- To use the vehicle or equipment with its headlights on, motion signals and alarms (reverse gear alarm, beacon lamp and alarms that work with the movement of pallets in tracked work machines),
- Do not disable the safety equipment's of the vehicles,
- To comply with the flags' signs and warnings,
- Not reversing where the flagman is not present,
- Parking in designated places only.
- Not to close or block in-field transition routes unplanned,
- Not to carry any unauthorized person in the vehicle or equipment,
- To make pre-use checks before using all vehicles and equipment,
- To use all PPE required by the project when going out of the cabin in the field,
- Not smoking in vehicle or equipment cabins,
- Keeping vehicle and equipment cabins clean and tidy,
- Not to consume food or hot drinks in vehicle and equipment cabins,
- Not using materials that will reduce the field of view on vehicle and equipment cabin windows (curtains, paper, cardboard, etc.)
- Not to leave the cabin while the vehicle or equipment is in operation,
- Stopping the engine of the vehicle or equipment when not in use,
- Not to use mobile phones and other communication tools while the vehicle or equipment is in operation
- Not to move unless the transported load is safely loaded.

- Joining toolbox talks and refresher trainings given by Traffic Supervisor and obliging to the rules.

CLO

- Communicating traffic arrangements and restrictions to local communities, subcontractors, and drivers.
- Collecting feedback, grievances, or complaints from affected stakeholders regarding traffic and reporting them to the EPC, ensure that they are resolved in a timely manner.
- Ensuring that advance notice of road closures, detours, or heavy vehicle movements is delivered to nearby settlements, grazing area users.
- Notifying and train nearby settlements, schools, and near institution users in advance about traffic arrangements and heavy vehicle usage where project traffic interacts with these areas.
- Supporting awareness campaigns about traffic safety for both workers and communities.

VI. GENERAL TRAFFIC RULES

General rules for traffic caused by construction are listed as below:

- All subcontractors and other project road users will be required to comply with this plan,
- School bus drivers will be informed about the busiest hours of project activities,
- Necessary training and awareness training will be given to heavy vehicle drivers,
- A follow-up mechanism will be established to continuously monitor and inspect the speed control of heavy vehicles, the routes they use, and the transportation routes,
- Regulations and laws regarding the transportation of materials and loads by heavy vehicles will be implemented and additional measures will be taken in accordance with national legislation, if required. Tarpaulin, closed transport, load limits, maintenance and measurements of vehicles will be checked, environmental and social security measures will be taken,
- The grievance mechanism will be used effectively, and traffic related complaints will be recorded, evaluated, resolved and managed
- Safe work zones will be established to physically separate workers on foot from the traffic;
- The timing for works implementation (Traffic management) will be optimized to minimize traffic delays due to rehabilitation, widening or maintenance work zones on existing road sections.
- Activities, e.g., maintenance, that affect traffic will, if possible, be conducted during low traffic hours in order to avoid affecting local traffic.
- For the construction works to be conducted at locations where traffic exists, the Contractor will establish safe work zones by taking relevant measures (closure of roads, diversion of traffic, use of protective barriers, cones, warning lights, etc.) in consultation with the pertinent authorities (police, traffic authorities, local authorities, etc).
- Weather forecasts will be monitored to provide advance warning of extreme weather to drivers and schedule the work accordingly.
- Temporary traffic control devices, such as signage, warning devices, physical barriers will be set up where required in a consistent manner throughout the work zone to provide passing motorists with advanced warning of upcoming work zones;
- Traffic Supervisor will train the workers in topics such as traffic flow, work zone setup, and proper placement of channelizing devices.
- All workers will wear high-visibility safety apparel.
- Speed Limits of vehicles related to the Project must be compliant with the limits.
- Speed limits will be implemented for trucks travelling to and from construction sites (local traffic speed limits).

- Slow driving rules in will be implemented, particularly near sensitive areas which will be identified prior to start of construction related activities;
- Project traffic routing through settlement areas will be reduced wherever possible.
- Optimum traffic routes will be identified and communicated to the drivers (both heavy and light vehicle drivers)
- Noise monitoring will follow the provisions set in Noise and Vibration Management Plan. Noise levels will be managed and monitored according to the Noise and Vibration Management Plan.
- Any grievances received from stakeholders will be managed in accordance with the Grievance Mechanism as detailed in the Project SEP
- Roads will be assessed to ensure suitability for heavy and large vehicles prior to use by Project vehicles
- Engagement will be made with local authorities on the issue of traffic movement during the construction phase whenever necessary but at least once a month.
- Residents in nearby communities will be informed about the transport routes to be used. Signage will be erected in the weeks prior to any works commencing along and on adjacent roads to the Project area, notifying the public of the construction activity and related transportation to take place and the timing
- Supervision and escort for heavy machinery (which requires escort and permit in line with national Legislation) will be provided.
- Supervision for vehicles carrying construction materials and equipment that pass over public or private roads and motorway crossings will be provided.
- Project related traffic will be regulated during certain dates and times where local community will require to commute (to/from schools, commercial areas etc.) or take on any agricultural activity (animal grazing or other farming activities etc.).
- In order to minimize off-site traffic, the Contractor will give priority to the determination of excavation material storage areas within the expropriation corridor of the motorway and the selection of quarries and borrow quarries with the least possible transport distance.
- The contractor will evaluate and approve subcontracted site locations considering the potential impacts of site-related traffic on nearby communities.
- The contractor will clearly identify construction zones with appropriate visual means such as reflective barriers and flashing signs.
- Temporary access to private property or appropriate accessing alternatives will be determined in consultation with the land owners or users.
- Local authorities and communities will be provided with detailed information on the planned closure of roads at least 2 week in advance by the communication channels defined in the SEP such per email, signage boards, traditional media (newspapers, radio), etc. as applicable. Routes envisaged for construction traffic and critical places (including sensitive receptors such as hospitals, schools) will be determined and agreed upon in consultation with relevant authorities and, if necessary, local people.
- Methods for every road crossing will be determined and agreed upon with authorities
- prior to taking any action. All methods and construction techniques proposed by the Contractor will aim to minimize possible disruptions caused by road crossings.
- Contractor will ensure that road safety training will be provided to employees.
- The schools nearby the Project site will be informed about the peak movements of the vehicles and vehicle traffic will be avoided during hours when children are traveling to and from school.
- Heavy machinery and vehicles utilized in transportation activities (including transportation of personnel) will be used by qualified and licensed drivers.
- All drivers will know and comply with all traffic signs, will be made aware of hotspots of intense traffic that are expected along the route and are trained properly for on and off road conditions.

- Managing and monitoring of working and resting hours drivers will be undertaken according to Turkey Legislation.
- Monitoring security arrangements for loads, vehicles and drivers will be undertaken according to national legislation.
- All project work sites, Project Facilities, temporary roads, and traffic management works will be signposted in line Turkey Legislation and as required by the Traffic Management Plan.
- Night drive/transportation will be limited as much as possible to reduce the risk of accidents and obtaining necessary permits shall night transportation be required.
- Compensating damages caused by an accident due to project activities will be undertaken according to national legislative requirements.
- A Grievance Mechanism Procedure will be set up for communities and individuals to formally communicate their concerns, complaints and grievances and facilitate resolutions that are mutually acceptable by the parties.
- The routes of the roads that will be used and the peak hours of the usage of the roads will be shared with village heads and management of the schools by the communication channels defined in the SEP such as email, as applicable.
- The CLOs of the contractors will arrange awareness training for schools, to be given by the HS Manager or Officer, if there is a school located on the route of the roads that will be used.
- Installation of barriers (e.g. fencing,) to prevent pedestrian access to the Project construction area except at designated crossing points.
- Landfill irrigation system will be applied to prevent dust formation on the road. Regular and frequent irrigation will be applied especially in the dry period for dust reduction.
- Where there are sensitive products, dust screening measures will be applied.
- The grievance mechanism will be strengthened and operated along the entire route, all complaints will be recorded and resolved in accordance with the GRM procedure.
- In case of complaints, additional measurements will be made and the results will be shared with the complainant.
- Road improvement/rehabilitation will be implemented when necessary.
- The level crossings used for livestock breeding and for passing to pasture areas will be determined and signposted, indicating an approaching speed limit of 10 km/h and installing a Stop signal at the crossing point.
- During the construction period, a passageway will be left at certain intervals for animal passages,
- It will be determined in consultation with the villagers so that the animal crossings do not cause difficulties in their livelihoods and do not lengthen the roads,
- Where necessary, safe and functional passageways or underpasses etc. will be constructed.
- Mitigation Measures for the Impact on the Community Health and Safety:
- In terms of children's health, taking dust-preventing screening measures to prevent dust towards schools, in order to prevent the schools from being affected by dust during the construction process and the security problems that may arise from the construction activities, the existing firewalls and wires should be developed and strengthened with more functional and protective measures.
- Improvement of the firewall so that students are not exposed to a risk from construction.
- Fire walls should extend through the roof and terminate close to the base of the wall. They should be finished off on the top with a sheet metal cap to protect it against harsh weather conditions. The appointed subcontractor in charge of the firewall’s
- improvement should ensure and provide documentation that the firewalls can withstand
- a standard fire resistance test (fire-resistance rating).

- Continuous monitoring and reporting of social and environmental impacts around schools, by means of signage boards and email and other appropriate communication channel as defined in the SEP.
- Underpasses and overpasses that are suitable for public use and that can pass at
- important points should be planned and implemented,
- The security measures and lighting of the passages should be taken at a sufficient level and they should be accessible; it will be built in accordance with the use of children, elderly, disabled and parents with children,
- The construction activities on the existing roads will only start after the relevant permits are obtained, and signage, barrier, fence, lighting, etc. will be completed in cooperation with the relevant authorities. All necessary precautions will be taken.
- The contractor will clearly identify construction zones with appropriate visual means such as reflective barriers and flashing signs. Routes envisaged for construction traffic and critical places
- (including sensitive receptors such as hospitals, schools) will be determined and agreed upon in consultation with relevant authorities and, if necessary, local people.
- Construction vehicles will only operate within these regions and routes.
- In order to minimize off-site traffic, the Contractor will give priority to the determination of excavation material storage areas within the expropriation corridor of the motorway and the selection of quarries and borrow quarries with the least possible transport
  distance.
- The contractor will evaluate and approve subcontracted site locations considering the potential impacts of site-related traffic on nearby communities.
- A follow-up mechanism will be established for the speed control of heavy vehicles, the routes they use and the continuous monitoring and inspection of transportation routes.
- Truck activity reports based on GPS technology will be periodically requested from the contractors.
- Considering the pedestrian traffic, the construction will continue without closing the pedestrian crossing routes or by providing alternative crossings,
- Heavy vehicle offsite traffic will be planned in such a way that it does not coincide with the entrance and exit times of the schools. The Contractor or the specific subcontractor will be responsible for this, as applicable.
- School bus drivers will be informed about the busiest hours of project activities,
- Necessary training and awareness training will be given to heavy vehicle drivers,
- Pits, splits and deteriorations that may pose danger will be maintained immediately.
- Road improvement works to prevent risks arising from weather conditions will be carried out.
- Considering that the traffic from villages to districts will increase on the days when the district market is established, heavy vehicle traffic will be kept under control in order to prevent risks these days.
- Duration of traffic density and dense points etc information will be given to the local people by mukhtars or by holding safety meetings.
- A follow-up mechanism will be established for the speed control of heavy vehicles, the routes they use and the continuous monitoring and inspection of transportation routes,
- The grievance mechanism will be used to ensure traffic-related complaints are recorded, evaluated, resolved and managed. Steps and time scales for managing grievances will follow the Grievance Mechanism provisions included in the Stakeholder Engagement Plan (SEP).
- A shuttle bus will transport the project workers from the workers camp to the project construction site.

Risk Assessment

- Preferring the hours when the traffic is not very busy when planning high-risk activities,
- The location of the work carried out in the field, its interaction with vehicles or pedestrians, hazards specified in the traffic management plan prepared specifically for the site Control of Risks
- Separation of routes with appropriate traffic controls to minimize pedestrian and vehicle interaction,
- Suitable marking, signaling and using barriers to reduce vehicle speed and control pedestrian movements,
- Separation of vehicle and pedestrian roads with physical barriers,
- Providing safe access for pedestrians and people with disabilities,
- Recording traffic management regulations for the site,
- Regular control and inspection of field traffic routes and all traffic control devices
- In cases where it is not possible to completely eliminate the risk as a result of the risk assessment, one or more of the following options are considered in order to minimize the risks:
    - Ensuring the job is done with safer equipment (Ex: Replacing forklifts with other load handling equipment such as walker stackers or pallet trucks),
    - Avoiding contact between hazards and people (e.g. creating a delivery area away from other pedestrians or their activities),
    - Using engineering controls (Ex: Speed limiters on forklifts, presence detection devices, breakers, etc.)
- If a risk still remains after applying the above control measures, the following controls are considered in order to minimize the residual risk, as reasonably practicable:
    - Using administrative controls (eg, reviewing warning signs or delivery times to prevent or reduce the need for pedestrians and vehicles to interact),
    - Use of personal protective equipment (eg: high-visibility workwear)
    - If a single control is not sufficient to minimize risks, a combination of the above mentioned controls may be used.

VI.1 License Classes

Class age requirement, experience requirement, the period of validity, and other classes for authorization are provided in Figure VI.1.

SINIFI	YAŞ ŞARTI	DENEYİM ŞARTI	GEÇERLİLİK SÜRESİ	YETKİLİ OLDUĞU DİĞER SINIFLAR
M	16		10	
A1	16		10	M
A2	18		10	M-A1
A	20	EN AZ İKİ YIL A2 *	10	M-A1-A2
B1	16		10	M
B	18		10	M-B1-F
C1	18	EN AZ B	5	M-B-B1-F
C	21	EN AZ B	5	M-B-B1-C1-F
D1	21	EN AZ B	5	M-B-B1-F
D	24	EN AZ B	5	M-B-B1-D1-F
BE	18	B	10	M-B-B1-F
C1E	18	C1	5	M-B-BE-B1-C1-F
CE	21	C	5	M-B-BE-B1-C-C1-C1E-F **
D1E	21	D	5	M-B-BE-B1-D1-F
DE	24	D	5	M-B-BE-B1-D-D1-D1E-F***
F	18		10	M
G	18		10	M

Figure VI.1 License Classes and Details

VI.2 Vehicle Classification

The following vehicles will be classified as Light Vehicles.

- Passenger cars and pickups
- Vans
- Four-wheel drive, minibuses and pickups
- Personnel transport vehicles with a capacity of 12 or less passengers
- Trucks or vans with a capacity of less than 2.5 tons.
- 2- or 4-wheel drive vehicles with a capacity of less than 2.5 tons.

The following vehicles will be classified as Heavy Vehicles.

- Trucks or vans with a capacity of more than 2.5 tons.
- Buses with a capacity of 12 or more passengers
- Semi dumpers
- Light loaders and loaders
- All dump/freight trucks
- 2- or 4-wheel drive vehicles with a capacity of more than 2.5 tons;
- Water tankers.

VI.3 Traffic Signs

With regard to off-site project-related traffic, it is mandatory to comply with all traffic regulations and warning signs in accordance with the Highway Traffic Law and related regulations, to ensure that works are carried out safely. For on-site traffic, the necessary arrangements and warning signs will be established within the work areas and in locations where interaction with third parties may occur.

VII. MITIGATION MEASURES FOR TRAFFIC-RELATED RISKS AND IMPACTS

Following measures will be taken in accordance with the KGM's Technical Specifications for Motorways and relevant international standards to ensure traffic safety at the construction sites and minimize the risk of accidents:

- Significant numbers of trucks and other construction machinery will be involved in the land preparation and construction activities. Since the heavy machinery will work within the construction corridor, the risks posed on the users of public roads would be insignificant. On the other hand, delivery of the construction materials extracted at the quarries and material borrow sites to the construction site and transportation of the unused excavated materials from the work sites to the storage sites by means of trucks, delivery of construction materials (steel, beams, concrete, etc.) by means of trailers and trucks, transportation of personnel accommodating at campsites to the work sites will be the main activities associated with increased traffic.
- Roads and intersections with heavy construction traffic will be supported with additional safety measures such as traffic control personnel, speed reduction systems, warning signage, and awareness initiatives for drivers. The safety of the local population and road users will be prioritized. Details on traffic signage to be used at the construction site are provided in Table XII.1
- Construction activities on existing roads will not commence until all necessary traffic safety measures, including traffic signage and placement of control equipment, are implemented to protect both pedestrians and vehicles. During construction, some public roads will be diverted to another route or closed for a certain period of time. During the works, road signs will be installed and adequate lighting measures will be taken at night to minimise the risk of accidents. The passage of trucks and other construction machinery through residential areas with alternative routes will be kept to a minimum. A service road will be constructed to provide access to campsites, and there will be no interaction with nearby residential areas.
- Limak and all subcontractors and other Project road users will be required to comply with this plan,
- Road signage for nighttime traffic will be provided through the use of reflectors and flashing lights. Upon completion of construction works, temporary signage will be promptly removed and replaced with standard permanent signage.
- All roads designated for Project vehicle use will be assessed beforehand to ensure they are suitable for the movement of heavy and oversized vehicles.
- Where alternative routes are available, construction traffic will be rerouted to avoid passing through residential areas. Hazardous or unsuitable routes will be identified, and dedicated service roads will be constructed wherever feasible, including where temporary diversions are needed. These service roads will be used for the transport of machinery, equipment, and materials.
- Valid licenses for all drivers and machinery operators will be required and verified.

- Drivers and operators will be trained in traffic safety, with emphasis on recognizing and complying with signage, respecting speed limits, and anticipating high-traffic areas. Training will include preparation for both on-road and off-road conditions.
- Transport schedules, particularly for large vehicles, will be arranged to avoid peak traffic hours (07.30-09.00 and 17.00-18.00) and minimize conflicts with community use of roads.
- Traffic delays caused by construction activities will be minimized. Traffic flow will be allowed to proceed at intervals of no more than 30 minutes.
- Limits on daily working and trip durations for drivers and operators will be established to prevent fatigue. These limits will be managed and monitored in accordance with Article 98 of the Motorway Traffic Regulations and will not exceed 9 hours.
- Construction materials, machinery, or equipment will not be left on active roads. All unused items will be stored in designated, secure areas to prevent obstruction and accidents.
- Necessary training and awareness training will be given to heavy vehicle drivers,
- A follow-up technic will be established to continuously monitor and inspect the speed control of heavy vehicles, the routes they use, and the transportation routes,
- Regulations and laws regarding the transportation of materials and loads by heavy vehicles will be implemented and additional measures will be taken in accordance with national legislation, if required. Tarpaulin, closed transport, load limits, maintenance and measurements of vehicles will be checked, environmental and social security measures will be taken,
- The grievance mechanism will be used effectively, and traffic related complaints will be recorded, evaluated, resolved and managed.
- Safe work zones will be established to physically separate workers on foot from the traffic;
- The timing for works implementation (Traffic management) will be optimized to minimize traffic delays due to rehabilitation, widening or maintenance work zones on existing road sections. Activities, e.g., maintenance, that affect traffic will, if possible, be conducted during low traffic hours in order to avoid affecting local traffic.
- For the construction works to be conducted at locations where traffic exists, Limak will establish safe work zones by taking relevant measures (closure of roads, diversion of traffic, use of protective barriers, cones, warning lights, etc.) in consultation with the pertinent authorities (police, traffic authorities, local authorities, etc).
- Weather forecasts will be monitored to provide advance warning of extreme weather to drivers and schedule the work accordingly.
- Temporary traffic control devices, such as signage, warning devices, paddles, and concrete barriers will be set up where required in a consistent manner throughout the work zone to provide passing motorists with advanced warning of upcoming work zones;
- Traffic control workers will be trained in topics such as traffic flow, work zone setup, and proper placement of channelizing devices.
- All workers will wear high-visibility safety apparel.
- Speed limits (40 km/h) will be implemented for trucks travelling to and from construction sites (within built-up areas and on village roads of poor condition: 20 km/h). For monitoring purposes, a truck speed report will be regularly required to the companies responsible for the transportation.
- Slow driving rules in villages (e.g., max. speed 20km/h) will be implemented, particularly near sensitive use areas which will be identified (at least one month) prior to start of construction related activities;
- Project traffic routing through community areas will be reduced wherever possible. Optimum traffic routes will be identified and communicated to the drivers (both heavy and light vehicle drivers)
- The motorway alignment will be used for transportation whenever possible.

Mitigation Measures for the Impact on the Local Road Network:

- Ongoing stakeholder engagement will include consultation with authorities, local communities and any other relevant stakeholders, as per the SEP and additional stakeholders are to be identified in the course of the project as necessary, with regard to Traffic Management. Any grievances received from stakeholders will be managed in accordance with the Grievance Mechanism as detailed in the Project SEP
- Roads will be assessed to ensure suitability for heavy and large vehicles prior to use by Project vehicles
- Engagement will be made with local authorities on the issue of traffic movement during the construction phase.
- Residents in nearby communities will be informed about the transport routes to be used. Signage will be erected in the weeks prior to any works commencing along and on adjacent roads to the Project area, notifying the public of the construction activity and related transportation to take place and the timing thereof, including contact details of AAOİAŞ and Limak,
- In cases where transit from existing settlements is inevitable, AAOİAŞ and Limak will take all necessary precautions (speed limits, traffic signs, driver trainings) to prevent safety risks that concern the public, and will contact the public representatives to plan the traffic by taking into account the daily life of the people and by appropriate means such as brochures, notices, signs, etc, it will inform the public about the construction program, activities to be carried out and safety measures taken.
- Supervision and escort for heavy machinery (which requires escort and permit in line with national Legislation) will be provided.
- Supervision for vehicles carrying construction materials and equipment that pass over public or private roads and motorway crossings will be provided.
- Project related traffic will be regulated during certain dates and times where local community will require to commute (to/from schools, commercial areas etc.) or take on any agricultural activity (animal grazing or other farming activities etc.).
- Limak will evaluate and approve subcontracted site locations considering the potential impacts of site-related traffic on nearby communities.
- Limak will clearly identify construction zones with appropriate visual means such as reflective barriers and flashing signs.
- Temporary access to private property or appropriate accessing alternatives will be determined in consultation with the land owners or users.
- Local authorities and communities will be provided with detailed information on the planned closure of roads at least 2 week in advance by the communication channels defined in the SEP such per email, signage boards, traditional media (newspapers, radio), etc. as applicable. Routes envisaged for construction traffic and critical places (including sensitive receptors such as hospitals, schools) will be determined and agreed upon in consultation with relevant authorities and, if necessary, local people.
- Methods for every road crossing will be determined and agreed upon with authorities prior to taking any action. All methods and construction techniques proposed by Limak will aim to minimize possible disruptions caused by road crossings.
- Limak will ensure that road safety training will be provided to employees.
- The schools nearby the Project site will be informed about the peak movements of the vehicles and vehicle traffic will be avoided during hours when children are traveling to and from school.
- Heavy machinery and vehicles utilized in transportation activities (including transportation of personnel) will be used by qualified and licensed drivers.
- All drivers will know and comply with all traffic signs, will be made aware of hotspots of intense

traffic that are expected along the route and are trained properly for on and off-road conditions.

- Managing and monitoring of working and resting hours drivers will be undertaken according to national legislation.
- Monitoring security arrangements for loads, vehicles and drivers will be undertaken according to national legislation.
- All project work sites, Project Facilities, temporary roads, and traffic management works will be signposted in line national legislation and as required by the Plan
- Night drive/transportation will be limited as much as possible to reduce the risk of accidents and obtaining necessary permits shall night transportation be required.
- Compensating damages caused by an accident due to project activities will be undertaken according to national legislative requirements and the Grievance Mechanism defined in the Stakeholder Engagement Plan (SEP) of the Project.
- A Grievance Mechanism set up for communities and individuals to formally communicate their concerns, complaints and grievances and facilitate resolutions that are mutually acceptable by the parties.
- The routes of the roads that will be used and the peak hours of the usage of the roads will be shared with village heads and management of the schools by the communication channels defined in the SEP such as email, as applicable.
- The CLOs of the AAOİAŞ and Limak will arrange awareness training for schools, to be given by the HS Manager or H&S Engineer, if there is a school located on the route of the roads that will be used.
- Installation of barriers (e.g. fencing,) to prevent pedestrian access to the Project construction area except at designated crossing points.
- Landfill irrigation system will be applied to prevent dust formation on the road. Regular and frequent irrigation will be applied especially in the dry period for dust reduction. Where there are sensitive products, dust screening measures will be applied.
- The grievance mechanism will be strengthened and operated along the entire route, all complaints will be recorded and resolved in accordance with the Grievance Mechanism,
- In case of complaints, additional measurements will be made and the results will be shared with the complainant.
- Road improvement/rehabilitation will be implemented when necessary.
- The level crossings used for livestock breeding and for passing to pasture areas will be determined and signposted, indicating an approaching speed limit of 10 km/h and installing a Stop signal at the crossing point.
- During the construction period, a passageway will be left at certain intervals for animal passages,
- It will be determined in consultation with the villagers so that the animal crossings do not cause difficulties in their livelihoods and do not lengthen the roads,
- Where necessary, safe and functional passageways or underpasses etc. will be constructed.

Mitigation Measures for the Impact on the Community Health and Safety:

- In terms of children's health, taking dust-preventing screening measures to prevent dust towards schools, in order to prevent the schools from being affected by dust during the construction process and the security problems that may arise from the construction activities, the existing firewalls and wires should be developed and strengthened with more functional and protective measures.
- Continuous monitoring and reporting of social and environmental impacts around schools, by means of signage boards and email and other appropriate communication channel as defined in the SEP.

- The security measures and lighting of the passages should be taken at a sufficient level and they should be accessible; it will be built in accordance with the use of children, elderly, disabled and parents with children,
- The construction activities on the existing roads will only start after the relevant permits are obtained, and signage, barrier, fence, lighting, etc. will be completed in cooperation with the relevant authorities. All necessary precautions will be taken. Limak will clearly identify construction zones with appropriate visual means such as reflective barriers and flashing signs. Routes envisaged for construction traffic and critical places (including sensitive receptors such as hospitals, schools) will be determined and agreed upon in consultation with relevant authorities and, if necessary, local people. Construction vehicles will only operate within these regions and routes.
- Limak will evaluate and approve subcontracted site locations considering the potential impacts of site-related traffic on nearby communities.
- Considering the pedestrian traffic, the construction will continue without closing the pedestrian crossing routes or by providing alternative crossings,
- Heavy vehicle offsite traffic will be planned in such a way that it does not coincide with the entrance and exit times of the schools.
- Necessary training and awareness training will be given to heavy vehicle drivers,
- Pits, splits and deteriorations that may pose danger will be maintained immediately. Road improvement works to prevent risks arising from weather conditions will be carried out.
- Considering that the traffic from villages to districts will increase on the days when the district market is established, heavy vehicle traffic will be kept under control in order to prevent risks these days.
- Duration of traffic density and dense points etc information will be given to the local people by mukhtars or by holding safety meetings.
- The grievance mechanism will be used to ensure traffic-related complaints are recorded, evaluated, resolved and managed. Steps and time scales for managing grievances will follow the Grievance Mechanism provisions included in the Stakeholder Engagement Plan (SEP).
- A shuttle bus will transport the project workers from the workers camp to the project construction site.
- Movement of delivery and private vehicles will be limited to predefined areas and routes. One-way circulation systems will be implemented where feasible to improve traffic safety and flow.
- Rigid objects will not be used for diverting traffic. Only approved, flexible traffic control equipment will be utilized to ensure safe redirection.

Table VII.1 Construction Site Signage

Typical Signs	Translation	Locations
	Warning – Construction Vehicles	Installed at site access points
	All visitors must report to site office	Installed at site access points

Typical Signs	Translation	Locations
	20 km/h Speed Restriction Sign	Installed at construction site access point
	50 km/h Speed Restriction Sign	Installed at site access point and along site roadway
	Stop Sign	Installed at site road intersections if required
	No Entry	Installed at main access
	Parking Sign	Installed at entrance to site parking
	Roadwork Sign	Installed at the beginning of the access roads if required

VIII. TRAINING

The overall training process to be implemented for the Project activities will address the identification of training requirements by job description and will provide basic procedures for conducting and documenting training activities.

As part of their standard job-specific training, employees who will directly engage in transportation and vehicle operation will also receive specific training on how their job responsibilities must be performed to prevent accidents, and to minimize related risks to their own health and safety and the health and safety of their co-workers and the general public. Training topics will, at a minimum include a general introduction to this Plan, the standard operating procedures applicable to individual work assignments. Training will include recognition of the general traffic rules and traffic safety. The documents will be made available to all Project staff via the controlled document distribution to be developed. Required trainings will be provided by Traffic Supervisor. Refresher training on traffic rules and traffic safety will also be conducted for all workers.

IX. MONITORING

As part of this Plan, regular monitoring activities will be conducted to assess the implementation of mitigation measures during the construction phase. To support continuous improvement, monitoring and reporting mechanisms will be established throughout the Project.

Monitoring efforts will include on-site inspections to verify the implementation of traffic flow arrangements, signage, and temporary traffic control measures. The application of traffic safety measures at construction sites and along the motorway alignment will be closely observed.

Automated systems and communication links will be used for obtaining, recording and reporting the traffic weather and road conditions, as well as traffic incidents. Any adverse conditions, accidents and/or illegitimate incidents will be recorded and monitored by the personnel in charge of traffic management during the construction phase.

Real-time traffic data, including speed, density, and flow, will be continuously monitored through the use of Intelligent Transportation Systems (ITS), where applicable. Additional inputs such as incident records, driver feedback, and field assessments will also be gathered and reviewed on a regular basis.

Traffic accident rates and their underlying causes will be systematically analyzed to identify patterns and areas in need of improvement. Based on these findings, necessary revisions will be made to traffic routing and management plans to enhance safety and operational efficiency.

Monitoring efforts will be guided by the framework provided in Table IX.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of measurements, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of air quality and emissions mitigation measures and ensuring full compliance with national regulations and Project standards.

Table IX.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Number of trainings conducted related to traffic	Construction camp and administrative offices	Tracking the number of Project personnel and contractor workers who have received training	Quarterly	EPC SPV
Compliance with Plan implementation	Project documentation and management system	Review of records and documents uploaded to the system in accordance with the Plan	Quarterly	EPC SPV
Number of complaints received on traffic	Public relations records and grievance system	Logging and monitoring of grievances as per the Grievance Mechanism Procedure	Weekly	EPC SPV

In cases of non-compliance identified through internal oversight, SPV will ensure that corrective and preventive measures are promptly implemented in coordination with the EPC and relevant subcontractors.

All traffic-related findings, including safety incidents, traffic flow disruptions, or complaints received from surrounding communities, will be documented in accordance with national regulations and Project procedures. In the event of serious violations—such as major accidents, repeated safety breaches, or significant obstruction of public roads—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Number of reported accidents and incidents	Zero major accidents; decreasing trend in minor incidents	Monthly	EPC
License / Medical surveillance	100% of drivers/operators compliant with licensing and health checks	Annually	EPC
Condition of the access roads	Access roads in safe and serviceable condition	Monthly	EPC
Maintenance records of vehicles	All vehicles maintained as per schedule	Annually	EPC
Speed control devices	All trucks equipped and devices functioning	Monthly	EPC
Weather forecast	Weather-related risks identified and communicated daily	Daily	EPC

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established human resources and labor-related procedures. Records to be reviewed during traffic management audits will include, but are not limited to, traffic incident and accident reports, driver license and medical surveillance records, maintenance records of vehicles and equipment, speed control monitoring logs, traffic signage and control measures documentation, and traffic-related grievance logs. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with labor legislation and international standards.

XII. REPORTING

Regular reporting should be conducted to ensure effective implementation and continuous improvement of E&S management activities throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing results, as well as stakeholder reporting obligations.

Based on the monitoring results, necessary corrective and preventive actions will be identified and required changes will be reflected to this Plan. Training program will also be updated accordingly. Regular audits and visual inspections shall be conducted in order to ensure all activities are being undertaken according to this Plan.

Reports will be produced by using the findings of the monitoring programs for each issue regarding this Plan. Evidences and results of the monitoring (measurements) activities have to be described in detail in appropriate monitoring reports. This section of the Plan provides instructions and requirements for this reporting activity.

Reporting activities for this Plan is mainly related to data on accident/incident records, license and medical surveillance of the drivers/operators, and maintenance records of vehicles. In case of injury in traffic accidents, reporting is required according to local legislation. Any significant incidents will be immediately reported to local authorities and an incident report, including root cause analysis (RCA), precautions and compensation measures taken will be submitted to local authorities within 30 business days.

These data together with the results of the inspection and audit activities will be summarized in a dedicated chapter to traffic management in the Environmental and Social Monitoring Report to be prepared on quarterly basis. Any non-compliance observed, corrective actions taken and/or recommended time-bound corrective actions to be taken will be included to Report, and these will be supported with documentary proofs such as photos in the report.

All personnel can raise their concerns, suggestions and complaints according to grievance mechanism by filling grievance form. In addition, grievances from public regarding traffic issues will be make sure that resolved in a timely and transparent manner.

APPENDIX A

Access roads to construction sites, plant areas, active work fronts, quarries, borrow pits and camp sites and the transportation routes of construction materials are listed in Table XII.1 and satellite views of the roads are given in below. Table XII.1 shows the transportation routes from Toy-4a, Karamanlar and Çenger quarries, where route studies have been completed, to the facility areas (camp site areas, concrete plants, mechanical plants, asphalt plants) and from these facility areas to the relevant construction sites. In addition when new routes are needed, this plan will be revised before the relevant route is put into use.

In addition, construction materials such as cement and rebar will be supplied from production factories. Since different suppliers can be used in the supply of construction materials and therefore transportation will be carried out via the existing state road network up to Antalya Province, the starting point in the material supply route planning was taken as the D-685 exit of the Antalya Ring Road (see Table XII.2).

Table XII.1: Site Access Roads

Road ID	Start	End	Location	Closest Neighborhood
Yol-1	Concrete Plant 1	T1-Entrance (Structures)	Between 52+000–55+000	Sarıabalı
Yol-2	Concrete Plant 1	Serik Interchange	Between 52+000–55+000	Sarıabalı, Deniztepesi
Yol-3	Concrete Plant 1	Between T1 Exit and Viaduct-1	Between 52+000–55+000	No settlement
Yol-4	Concrete Plant 1	T1 Entrance Section	Between 52+000–55+000	Sarıabalı
Yol-5	TOY4a Rock Quarry	Concrete Plant 1	Between 52+000–55+000	Belkıs, Taşağıl, Sarıabalı
Yol-6	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	Viaduct 1 Exit	Between 55+000–68+000	No settlement
Yol-7	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	T2 Entrance	Between 55+000–68+000	No settlement
Yol-8	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	T2 Exit	Between 55+000–68+000	No settlement
Yol-9	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	T3 Exit	Between 55+000–68+000	Taşağıl
Yol-10	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	T3 Exit–Main Camp Area	Between 55+000–68+000	Taşağıl
Yol-11	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	Taşağil K1 Interchange	Between 55+000–68+000	Taşğıl, Bereket, Hocalar
Yol-12	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	Km:68+500 Structures	Between 55+000–68+000	Taşğıl, Bereket, Hocalar

Road ID	Start	End	Location	Closest Neighborhood
Yol-13	Concrete Plant 2 Mechanical Plant-1 Asphalt Plant-1 Temporary Camp Site	Km:65+800 Structures	Between 55+000–68+000	Taşğıl, Bereket, Hocalar
Yol-14	Toy4a Rock Quarry	Concrete Plant 2	Between 55+000–68+000	No settlement
Yol-15	Concrete Plant 3	Viaduct 4 Entrance And Structures	Between 68+000–83+000	Yeniköy
Yol-16	Concrete Plant 3	Viaduct 3 And Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Yavrudoğan
Yol-17	Concrete Plant 3	Km:75+000 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Yavrudoğan
Yol-18	Concrete Plant 3	T4	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Yavrudoğan
Yol-19	Concrete Plant 3	Km:68+500 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Gündoğdu, Hocalar
Yol-20	Concrete Plant 3	Km:68+500 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Gündoğdu, Hocalar
Yol-21	Concrete Plant 3	Taşağil K1 Interchange	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Gündoğdu, Hocalar
Yol-22	Concrete Plant 3	Km:75+000 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Yavrudoğan
Yol-23	Concrete Plant 3	Km:73+000 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Yavrudoğan
Yol-24	Concrete Plant 3	Km:71+850 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Yavrudoğan
Yol-25	Concrete Plant 3	Km:75+750 Structures	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Yavrudoğan, Kalemler
Yol-26	Toy4a Rock Quarry	Concrete Plant 3	Between 68+000–83+000	Yeniköy, Gültepe, Hatipler, Ilıca, Evren, Seki, Çolaklı, Gündoğdu, Bereket, Taşağıl
Yol-27	Concrete Plant 4a	Km:90+000 Structures	Between 89+000–94+000	Ulukapı
Yol-28	Concrete Plant 4a	Km:89+000 Structures	Between 89+000–94+000	Ulukapı
Yol-29	Concrete Plant 4a	Km:91+000 Structures	Between 89+000–94+000	Ulukapı, Aşağıışıklar
Yol-30	Concrete Plant 4a	Km:92+500 Structures	Between 89+000–94+000	Ulukapı, Aşağıışıklar
Yol-31	Concrete Plant 4a	Km:92+750 Structures	Between 89+000–94+000	Ulukapı, Aşağıışıklar
Yol-32	Concrete Plant 4a	Km:93+500 Structures	Between 89+000–94+000	Ulukapı, Aşağıışıklar, Demirciler
Yol-33	Çengel Stream Material Quarry (Remote)	Concrete Plant 4	Between 89+000–94+000	Uzunlar, Çavuşköy, Kızlot, Çavuşköy, Kızılağaç, Karacalar, Seydiler, Doğançam, Aksaz, Karaöz, Demirciler, Aşağıışıklar, Çeltikçi, Ulukapı

Road ID	Start	End	Location	Closest Neighborhood
Yol-34	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Viaduct 7	Between 83+000–89+000	Bucakşeyhler
Yol-35	Çengel Stream Material Quarry (Remote)	Concrete Plant 4a	Between 83+000–89+000	Uzunlar, Çavuşköy, Kızlot, Çavuşköy, Kızılağaç, Karacalar, Seydiler, Doğançam, Aksaz, Karaöz, Demirciler, Aşağıışıklar, Çeltikçi, Örnek, Eskihisar, Bahçelievler, Aydınevler, Mimar Sinan, Sorgun, Hatipler, Sarılar, Dikmen, Bucakşeyhler
Yol-36	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:87+000 Structures	Between 83+000–89+000	Bucakşeyhler
Yol-37	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Viaduct 6	Between 83+000–89+000	Bucakşeyhler
Yol-38	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Viaduct 6	Between 83+000–89+000	Bucakşeyhler
Yol-39	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:84+750 Structures	Between 83+000–89+000	Bucakşeyhler, Dikmen
Yol-40	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Manavgat K1 Interchange	Between 83+000–89+000	Bucakşeyhler, Dikmen, Yukarıışıklar
Yol-41	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:81+000 Structures	Between 83+000–89+000	Bucakşeyhler, Dikmen, Sarılar, Dolbazlar, Evrenleryavşı
Yol-42	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:82+000 Structures	Between 83+000–89+000	Bucakşeyhler, Dikmen, Sarılar, Dolbazlar, Evrenleryavşı
Yol-43	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Km:83+000 Structures	Between 83+000–89+000	Bucakşeyhler, Dikmen, Yukarıışıklar
Yol-44	Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	Viaduct 8	Between 83+000–89+000	Ulukapı

Road ID	Start	End	Location	Closest Neighborhood
Yol-45	Çengel Stream Material Quarry (Remote)	Concrete Plant 5	Between 94+000–111+000	Uzunlar, Çavuşköy, Kızlot, Çavuşköy, Kızılağaç, Karacalar, Seydiler, Sülek
Yol-46	Concrete Plant 5	Viaduct 13	Between 94+000–111+000	No settlement
Yol-47	Concrete Plant 5	Viaduct 12	Between 94+000–111+000	Sülek, Cevizler, Hacıali
Yol-48	Concrete Plant 5	Viaduct 13	Between 94+000–111+000	Sülek, Cevizler
Yol-49	Concrete Plant 5	Km:97+200 Structures	Between 94+000–111+000	Sülek, Cevizler, Hacıali
Yol-50	Concrete Plant 5	Viaduct 11	Between 94+000–111+000	Sülek, Cevizler, Hacıali
Yol-51	Concrete Plant 5	Viaduct 10	Between 94+000–111+000	Sülek, Cevizler, Hacıali
Yol-52	Concrete Plant 5	Km:95+450 Structures	Between 94+000–111+000	Sülek, Cevizler, Hacıali, Seydiler, Aksaz
Yol-53	Concrete Plant 5	Viaduct 9	Between 94+000–111+000	Sülek, Cevizler, Hacıali, Seydiler, Aksaz, Karaöz
Yol-54	Concrete Plant 5	Manavgat East K1 Interchange	Between 94+000–111+000	Sülek
Yol-55	Concrete Plant 5	Km:105+000 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası, Uzunlar
Yol-56	Concrete Plant 5	Km:104+950 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası
Yol-57	Concrete Plant 5	Viaduct 14	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası
Yol-58	Concrete Plant 5	Km:102+100 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası
Yol-59	Concrete Plant 5	Km:105+900 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası
Yol-60	Concrete Plant 5	Km:107+550 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Hacıobası, Kadılar
Yol-61	Concrete Plant 5	Km:110+850 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Çenger, Örenşehir
Yol-62	Concrete Plant 5	Km:109+150 Structures	Between 94+000–111+000	Sülek, Seydiler, Kızıağaç, Karacalar, Kızılot, Çenger, Örenşehir, Kadılar
Yol-63	Karamanlar Rock Quarry	Concrete Plant 6	Between 111+000–141+000	No settlement
Yol-64	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:124+250 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü, Yalçıdibi
Yol-65	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:120+000 Structures	Between 111+000–141+000	Avsallar
Yol-66	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:115+200 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü, Karakaya

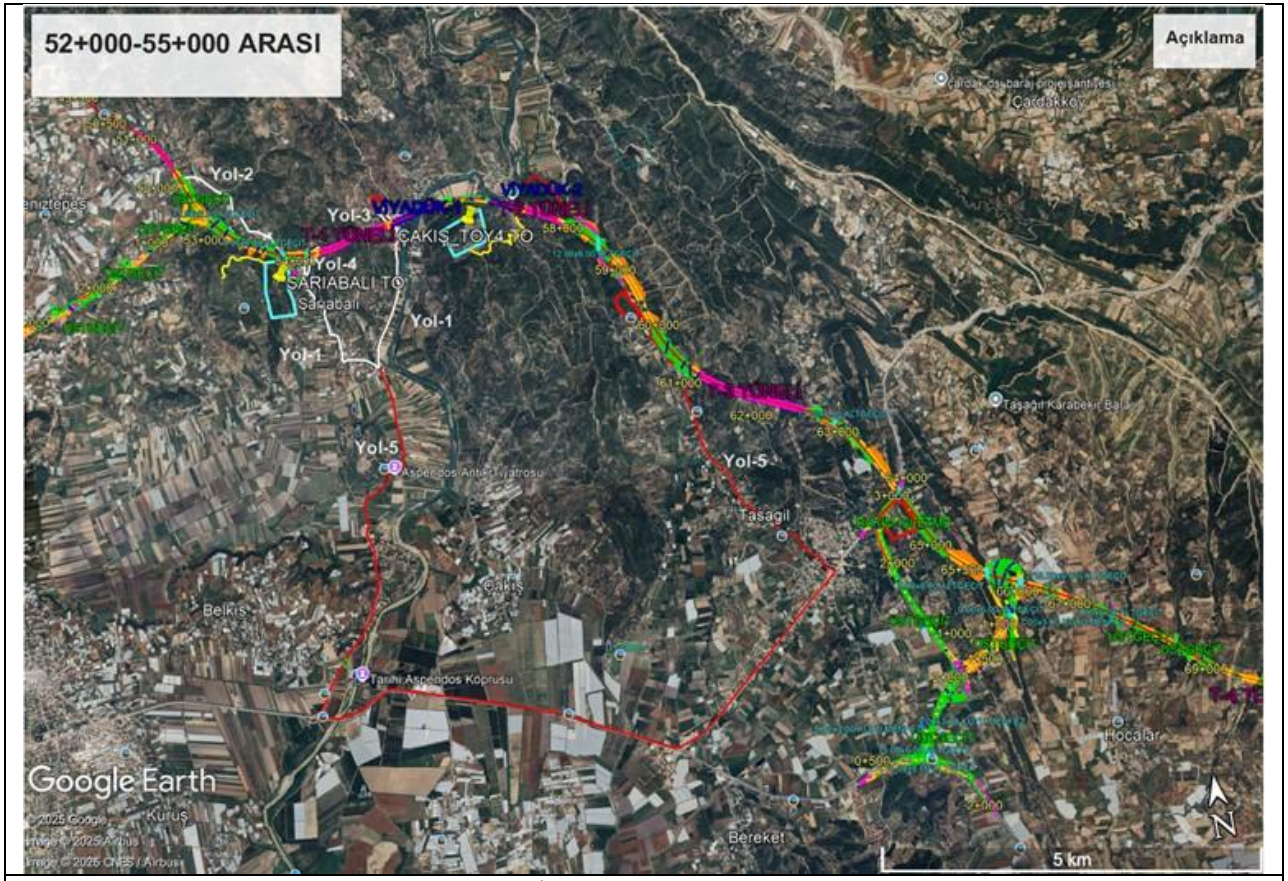
Road ID	Start	End	Location	Closest Neighborhood
Yol-67	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:115+950 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü, Karakaya
Yol-68	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:114+000 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü
Yol-69	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:112+700 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Örenşehir, Boztepe, Odaönü, Yalçıdibi
Yol-70	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:119+000 Structures	Between 111+000–141+000	Avsallar, İncekum, Okurcalar, Alara, Çakallar
Yol-71	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:133+400 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Emişbeleni, Soğukpınar
Yol-72	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Viaduct 15	Between 111+000–141+000	Avsallar, Türkler, Akdam
Yol-73	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Viaduct 16	Between 111+000–141+000	Avsallar, Türkler, Payallar, Emişbeleni
Yol-74	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Alanya West K1 Interchange	Between 111+000–141+000	Avsallar, Türkler, Payallar, Konaklı
Yol-75	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:136+550 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Emişbeleni, Toslak
Yol-76	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:139+700 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Emişbeleni, Toslak
Yol-77	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:140+150 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Konaklı
Yol-78	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:141+100 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Konaklı

Road ID	Start	End	Location	Closest Neighborhood
Yol-79	Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	Km:140+550 Structures	Between 111+000–141+000	Avsallar, Türkler, Payallar, Konaklı

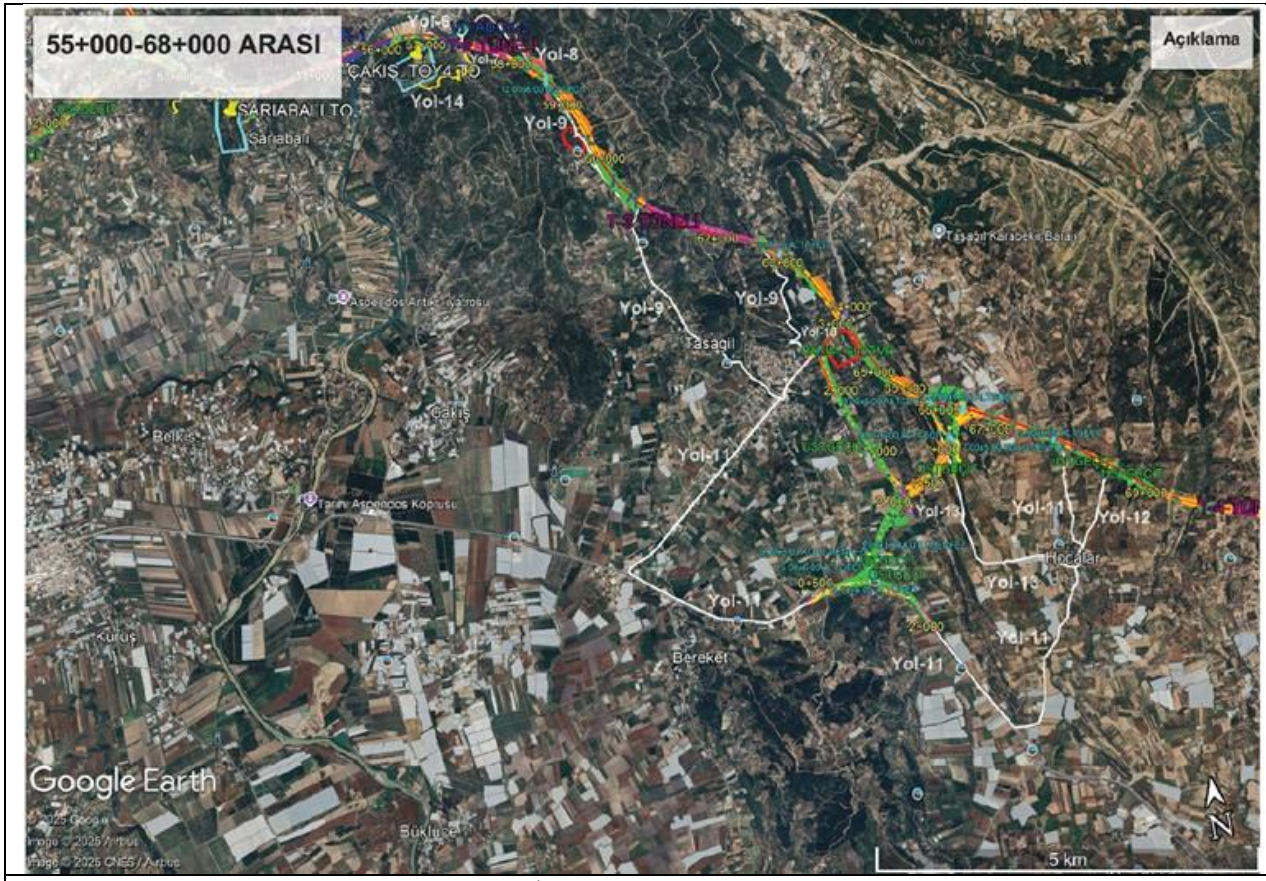
Table XII.2: Transportation Routes

Road ID	Start	End	Road
Yol-1	Antalya Ring Road	Concrete Plant 1	D685 D400 Sarıabalı Rural Road / Forest Road / Field Road
Yol-2		Concrete Plant 5	D685 D400 Karacalar Rural Road / Forest Road / Field Road
Yol-3		Concrete Plant 4a	D685 D400 Ulukapı and Demirciler Rural Road / Forest Road / Field Road
Yol-4		Concrete Plant 4 Mechanical Plant-2 Asphalt Plent-2 Construction Camp Site-2	D685 D400 Manavgat Urban Road Dikmen Rural Road / Forest Road / Field Road
Yol-5		Concrete Plant 3	D685 D400 Manavgat Urban Road Dolbazlar Rural Road / Forest Road / Field Road
Yol-6		Concrete Plant 2 Mechanical Plant-1 Asphalt Plent-1	D685 D400 Taşağıl Rural Road / Forest Road / Field Road
Yol-7		Concrete Plant 6 Mechanical Plant-3 Asphalt Plent-3 Construction Camp Site-3	D685 D400 Avsallar Urban Road

The routes given in Table XII.2, which will be used for both access to the sites and material transportation, are asphalted and generally D-600 state road and district roads. There will be an increase in truck traffic due to material transportation on the roads between the quarries and plant areas (ready-mixed concrete plant, asphalt plant, mechanical plant). Transportation of cement and rebar, etc., which are the main material items, will generally be provided via D400, which is used for transportation to district settlements and roads, and there will be an increase in truck traffic on these roads.



Access Roads Between Km52+000 – Km 55+000



Access Roads Between Km:55+000 – Km:68+000

TRAFFIC MANAGEMENT PLAN


68+000-83+000 ARASI
Açıklama
Yol-26
Yol-26
Yol-26

TRAFFIC MANAGEMENT PLAN



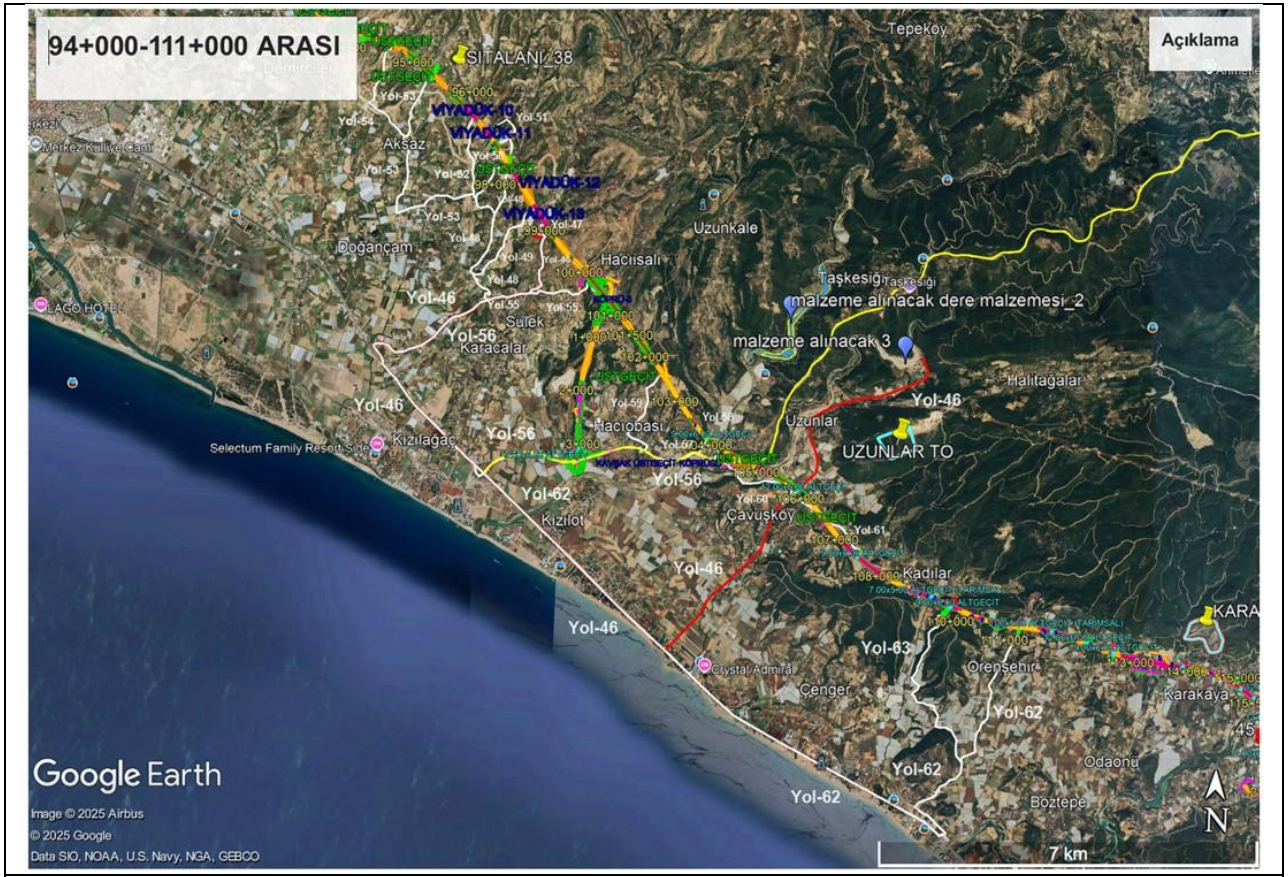
Access Roads Between Km:83+000 – Km:89+000

TRAFFIC MANAGEMENT PLAN

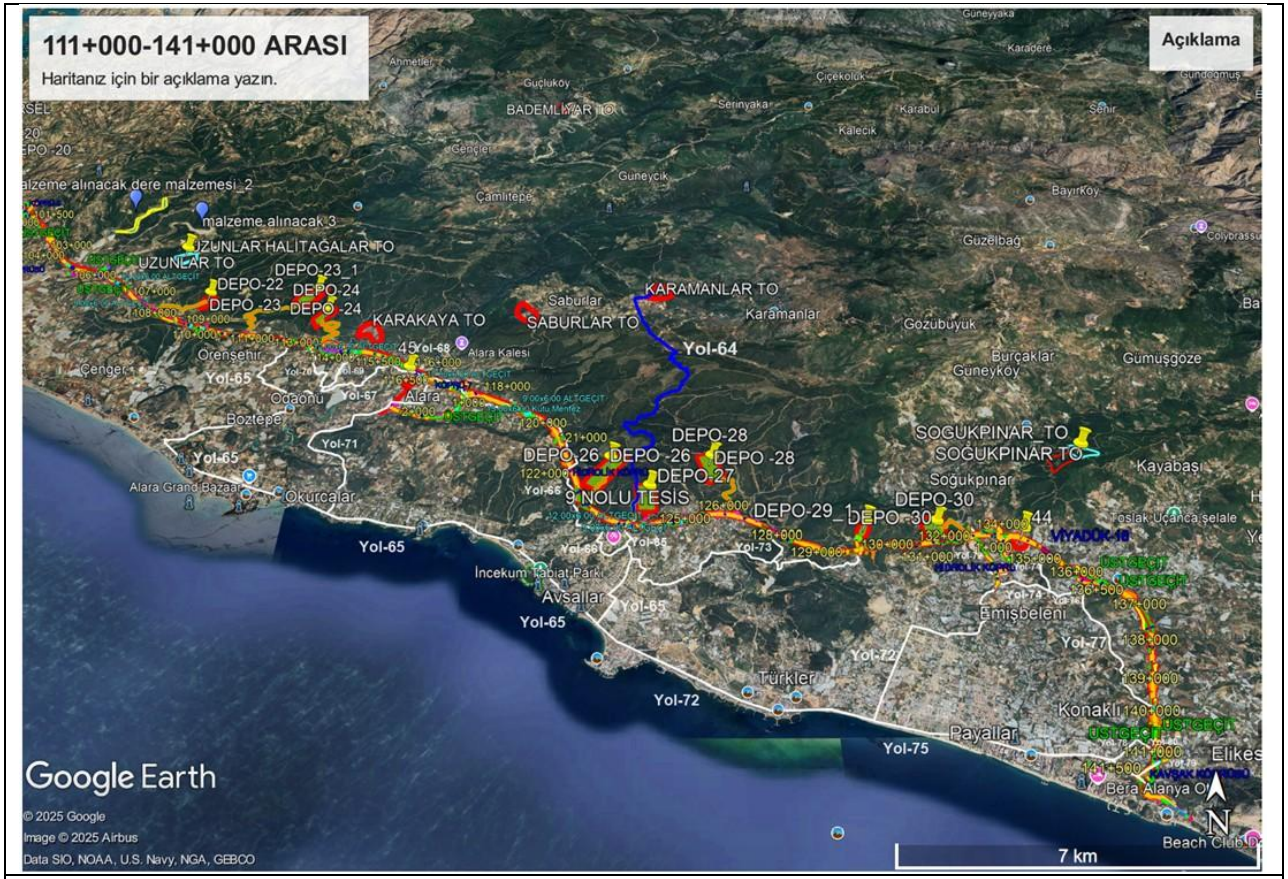


Access Roads Between Km:89+000 – Km:94+000

TRAFFIC MANAGEMENT PLAN

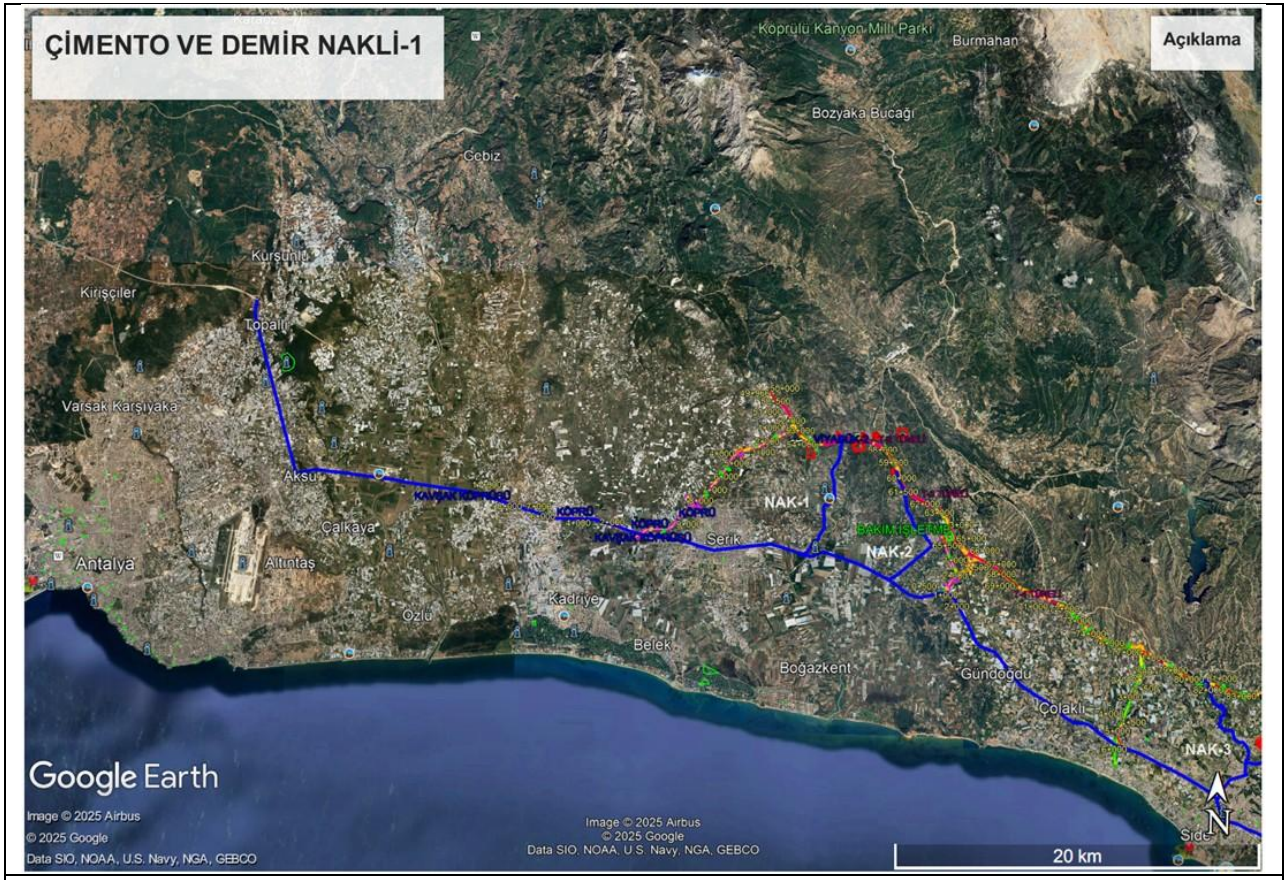


Access Roads Between Km:94+000 – Km:111+000



Access Roads Between Km:111+000 – Km:141+000

TRAFFIC MANAGEMENT PLAN



Transportation Routes of Construction Materials

TRAFFIC MANAGEMENT PLAN



Transportation Routes of Construction Materials

APPENDIX B

PERSONNEL TRANSPORTATION VEHICLE



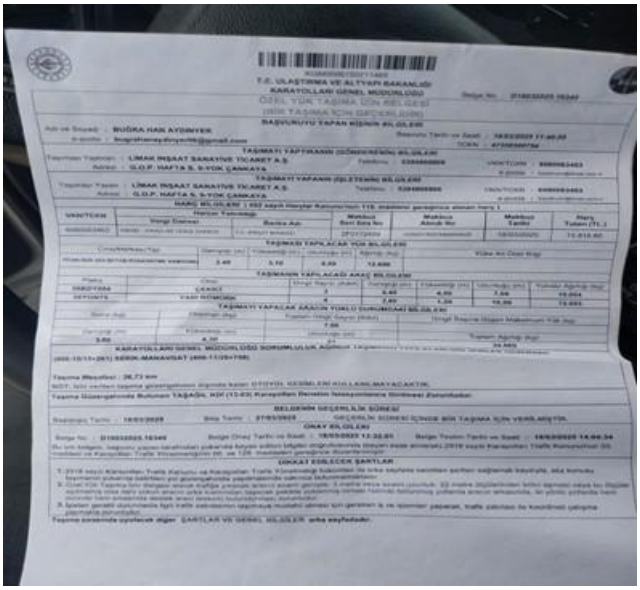


HEAVY VEHICLE TRANSPORTATION VEHICLE









TRAFFIC SIGNS SAMPLES FROM PROJECT SITE








Gözcü
V-8 giden yol
T-5 Tünel giden yol 4








Cami 2
20
T-5 Tünel giden yol 2


Okul tabelası

APPENDIX C

At the entrance of T-2 Tunnel, a site entry signboard will be placed, and 200 m before the tunnel entrance, information signs will be installed to warn drivers to slow down (see Figure XII.1).



Figure XII.1 T-2 Entrance

At the exit of T-2 Tunnel, workers will be given training on stopping before connecting to the main road, checking traffic flow, and then merging safely. A STOP sign will be placed.
For civil vehicles, 200 m before the exit area, “Caution – Construction Vehicles May Exit” signs will be installed (see
Figure XII.2).



Figure XII.2 T-2 Exit

On the V-2 access road, since there are residential roads, construction machinery will comply with the 30 km/h speed limit. Awareness training will be given to machine operators (see Figure XII.3).



Figure XII.3 V-2 Access Road

On the V-1 access road (Sarıabalı), the local speed limit will be observed. Operators and drivers will be informed about the speed limit (see Figure XII.4).



Figure XII.4 V-1 Access Road

On the T-1 access road, the 30 km/h speed limit will be observed. Operators/drivers will be informed about the speed limit. Slowdown signs will be installed 200 m before the tunnel entrance area (see Figure XII.5).



Figure XII.5 T-1 Access Road

On the Kalemler connection road, the local speed limit will be observed. Operators and drivers will be informed about the speed limit (see Figure XII.6).



Figure XII.6 Kalemler Connection Road

On the Bucakşeyhler/Ulukapı road, the local speed limits will be observed. Operators and drivers will be informed about the local speed limits (see Figure XII.7).



Figure XII.7 Bucakşeyhler/Ulukapı Road

On the Manavgat site access road, the local speed limits will be observed. Operators and drivers will be informed about the speed limits. The site entrance will be marked with signboards, and slowdown signs will be installed 200 m before the site entrance. At the site exit, a STOP sign will be placed to ensure drivers control the traffic flow before merging into the road (see Figure XII.8).



Figure XII.8 Manavgat Site Access Road

On the V-8 access road, vehicles will comply with the 20 km/h speed limit (for dust control and traffic safety) (see Figure XII.9).



Figure XII.9 V-8 Access Road

Within the V-8 site boundaries, the 20 km/h speed limit will be observed. Flagmen will be placed at turning points and blind spots (see Figure XII.10).



Figure XII.10 V-8 Site Boundaries

Within the T5 – Storage Area 31 site boundaries, the 20 km/h speed limit will be observed. Flagmen will be placed at turning points and blind spots. Drivers will be informed about the risks of the working area (see Figure XII.11).



Figure XII.11 T5 – Storage Area 31 Site Boundaries

On the V-12 access road, compliance with local speed limit signboards will be ensured. Operators and drivers will be informed about the speed limits. Within the V12 site, the 20 km/h speed limit will be observed. Flagmen will be placed at turning points and blind spots. Drivers will be informed about the risks of the working area. At entry and exit points, STOP–SLOW signs will be installed to ensure operators are cautious when merging onto the main road (see Figure XII.12).



Figure XII.12 V-12 Access Road

On the V-11 access road, compliance with local speed limit signboards will be ensured. Operators and drivers will be informed about the speed limits. Within the V-12 site, the 20 km/h speed limit will be observed. Flagmen will be placed at turning points and blind spots. Drivers will be informed about the risks of the working area. At entry and exit points, STOP–SLOW signs will be installed to ensure operators are cautious when merging onto the main road (see Figure XII.13).



Figure XII.13 V-11 Access Road

TRAINING AND COMMUNICATION MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
01.04.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
23.05.2025	01	Revision
16.06.2025	02	Revision as per revision made under ESDD submitted by the Lender consultant
08.09.2025	03	Revision as per revision made under ESDD submitted by the Lender consultant

TRAINING AND COMMUNICATION MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
IFC	International Finance Corporation
ILO	International Labor Organization
KPIs	Key Performance Indicators
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
SEP	Stakeholder Engagement Plan
WHO	World Health Organization

TRAINING AND COMMUNICATION MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

This Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange.

As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels

The map showing the construction components and road route within the scope of the Project's construction activities is provided in Figure I-1

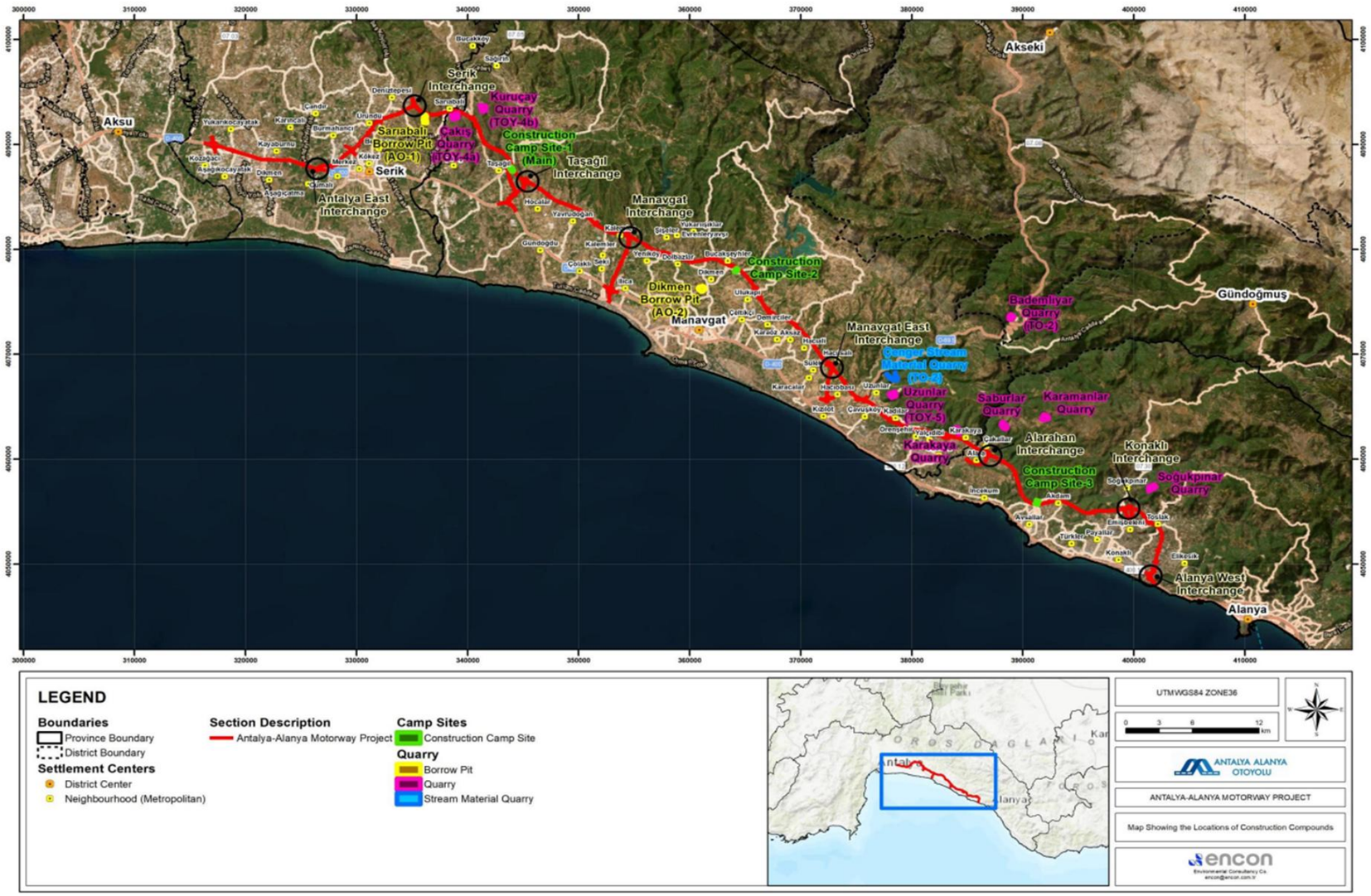

Figure I-1: Map Showing the Locations of Construction Compounds

II. PURPOSE AND SCOPE

This Training and Communication Management Plan ("the Plan") has been prepared for the Antalya-Alanya Motorway Project ("the Project").

The purpose of this Plan is to outline the procedures and responsibilities necessary to ensure that all personnel—including direct employees, subcontracted workers and site visitors—receive adequate Occupational Health and Safety (OHS) training and information during the construction phase. The Plan aims to ensure that all individuals possess the required knowledge and competencies to carry out their duties safely and effectively, thereby minimizing occupational risks on-site.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

This Plan defines procedures for planning, implementing, and monitoring OHS training programs that are responsive to site-specific risks, task modifications, technological changes, equipment updates, and workplace relocations. Specialized training should be provided for personnel assigned to emergency response roles, including first-aid and rescue duties. In parallel, visitor orientation and access control protocols should be established to prevent unauthorized access to hazardous areas and to safeguard both workers and visitors.

Training obligations should also be extended to subcontractors and service providers through appropriate contract provisions and active performance monitoring. AAOİAŞ, as the Project Sponsor, should ensure that all contracted entities fulfill these training requirements before assignment commencement.

This Plan should be implemented by all relevant Project stakeholders, including AAOİAŞ (Project Sponsor), the Main Contractor Limak, and all subcontractors. Roles and responsibilities related to implementation, monitoring, and reporting should be clearly defined. The Plan should be revised as necessary to accommodate changes in construction methodologies, organizational structures, or regulatory frameworks.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been structured in accordance with relevant national legislation and aligned with international standards and guidelines. These references should be used to guide the development, implementation, and monitoring of training programs and communication practices throughout the construction phase of the Antalya Alanya Motorway Project.

III.1 National Requirements

The following Turkish laws and regulations should form the legal basis for ensuring OHS training and communication throughout construction activities:

- Environmental Law (Law No: 2872)

- Labor Law (Law No. 4857)
- Occupational Health and Safety Law (Law No. 6331)
- Regulation on Occupational Health and Safety Training of Employees
- Regulation on Health and Safety Measures in Construction Works
- Regulation on the Duties, Authority, and Responsibilities of Occupational Safety Experts
- Regulation on the Procedures and Principles of Occupational Health and Safety Services

These legal instruments provide the foundation for planning and executing adequate training strategies for workers and site visitors, including requirements for risk-based training, emergency preparedness, and employer obligations in occupational health and safety.

III.2 International Standards and Conventions

In addition to national legislation, the following international standards and agreements should be considered to ensure consistency with best practices and compliance with requirements of international financial institutions:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
  - Performance Standard 2: Labor and Working Conditions
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- International Labor Organization (ILO) Occupational Safety and Health Convention (No. 155)
- ILO Occupational Health Services Convention (No. 161)
- ILO Convention on Vocational Guidance and Training (No. 142)

These standards and conventions should be used to guide the planning, implementation, and periodic evaluation of OHS training and communication measures on-site. The Project Sponsor (AAOİAŞ), the Main Contractor (Limak), and all subcontractors should ensure that all training activities reflect the principles outlined in these documents.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Training and Communication Plan:

- Human Resources and Labor Management Plan
- Subcontractor Management Plan
- Community Health and Safety Management Plan
- Occupational Health and Safety Management Plan
- Traffic Management Plan
- Hazardous Material Management Plan

- Environmental and Social Management and Monitoring Plan (ESMMP)
- Security Management Plan
- Resettlement Action Plan (RAP)
- Stakeholder Engagement Plan (SEP)

The effective integration of these plans should be ensured to maintain consistency in training delivery, enhance health and safety awareness, ensure subcontractor compliance, and support alignment with national regulations and international standards throughout the construction phase of the Project.

V. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

SPV Environment & Social and Health & Safety Manager

- Ensure safety inductions, toolbox talks, and job-specific training are conducted and recorded.
- Supervise the integration of safety controls into daily work permits, toolboxes, and field activities.
- Ensure the preparation, revision, and implementation of training plans and documents in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements.

SPV HSE Specialist

- Conduct regular site inspections, hazard identification, safety inductions, toolbox talks, and job-specific training.

EPC Health and Safety Manager

- Ensure the completion of the safety inductions, toolbox talks, and job-specific training, safety briefings, and daily pre-task planning meetings to reinforce safety culture and awareness on site.
- Supervise the integration of safety controls into daily work permits, toolboxes, and field activities.
- Conduct the site-specific H&S training plan and programs for EPC and subcontractors.
- Coordinate HR and E&S departments to prepare site and job-specific annual training plan according to the Project and regulation requirements and implement through activities.

EPC HSE Chief

- Ensure the completion of the safety inductions, toolbox talks, and job-specific training, safety briefings.

EPC Environment and Social Manager

- Ensure the preparation, revision, and implementation of this Plan and documents, policies in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC.

- Conduct periodic audits, inspections, and spot checks for subcontractor to ensure alignment with Project requirements.
- Coordinate HR and H&S departments to prepare site and job-specific annual training plan according to the Project and regulation requirements and implement through activities.
- Review and validate training records and related documentation from Contractor/Subcontractor.

HR Chief

- Ensure the preparation, revision, and implementation of this Plan and documents, policies in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC.
- Conduct periodic audits, inspections, and spot checks for subcontractor to ensure alignment with Project requirements.
- Coordinate E&S and H&S departments and all other department managers to prepare site and job-specific annual training plan according to the Project and regulation requirements and implement through activities.
- Review and validate training records and related documentation from Contractor/Subcontractor.
- Review the Training Request form and respond, and conduct training organisation with relevant parties.

Project Manager

The Project Manager is responsible for the approval of the OHS Training list, Tranning Matrix.

Line Managers

Line Managers are responsible for filling out and submitting the Training Request Form to the HR Department.

The comments and justifications of the requesting manager should be documented in the and forwarded sequentially to the Project Manager, and ultimately to the General Manager for approval.

VI. COMMUNICATION AND TRAINING MANAGEMENT APPROACH

Effective communication and systematic occupational health and safety (OHS) training are critical components for minimizing occupational accidents and promoting a safe working environment throughout the construction phase of the Antalya-Alanya Motorway Project. The accident rate on construction sites is significantly influenced by the awareness and attentiveness of personnel regarding task-specific hazards. Therefore, ensuring that all individuals involved in construction activities—whether directly employed, subcontracted, or visiting the site—receive appropriate training and safety information should be prioritized.

A comprehensive OHS Training Program specific to the Project will be developed and implemented in accordance with a predefined schedule. This program should cover all essential safety aspects and be adapted to address site-specific conditions, emerging risks, and technological

developments. Training should be provided to all categories of personnel, including direct and contracted workers, management and supervisory staff, and visitors.

Training modules should include the following key topics:

- Basic site rules and hazard awareness;
- Hygiene requirements and practices;
- Identification of site-specific hazards and associated health risks;
- Safe work practices and procedures;
- Proper use and maintenance of materials, tools, and equipment;
- Selection and use of appropriate personal protective equipment (PPE);
- Safety protocols for working near machinery and moving vehicles;
- Prevention of injury to co-workers and self;
- Safe working practices under low-visibility conditions (e.g., nighttime operations, use of high-visibility apparel, adequate lighting with minimal glare);
- Emergency response procedures for incidents such as fires and natural disasters.

In addition, refresher and task-specific training should be conducted under the following conditions:

- Prior to the commencement of work for newly recruited project personnel;
- When a worker's task or assigned work location is modified;
- Upon the introduction of new equipment, tools, or construction techniques;
- When new occupational hazards are identified.

To ensure the safety of non-operational personnel, a Visitor Orientation and Control Program should be established. Visitors should not be allowed to access hazardous zones unescorted. This program should include checkpoint monitoring, entry restrictions, safety briefings, and proper record-keeping practices to safeguard both workers and visitors.

Training sessions provided to both contracted and subcontracted employees, as well as site visitors, should ensure that participants acquire an understanding of:

- Materials, equipment, and tools used at the site;
- Recognized operational hazards and control measures;
- Exposure risks and mitigation strategies;
- Required hygiene standards and practices;
- Correct use of PPE;
- Causes and consequences of incidents and near-misses.

Communication tools such as warning signs and hazard labels should be designed in accordance with international standards to ensure they are universally understandable and visible to workers, visitors, and emergency responders. A standardized hazard coding system should be visibly displayed in key locations, including emergency entrances and fire safety systems.

Additionally, information regarding the nature of hazardous materials stored, handled, or used at the construction site should be communicated proactively to emergency services and security personnel. This will ensure timely and efficient response actions in the event of an emergency and contribute to overall risk reduction.

The successful implementation of the Training and Communication Program should be supported through routine monitoring, performance reviews, and periodic updates to training content in alignment with evolving construction practices and legal requirements.

VII. MITIGATION MEASURES TO ADDRESS TRAINING AND COMMUNICATION RISKS

The following measures, focusing on structured training planning, training formats and content, and training documentation practices, should be implemented to mitigate risks associated with training and communication throughout the construction phase of the Project. These measures are described in detail in the subsequent subsections of this Plan.

VII.1 Training Planning

Training planning should form the foundation of effective occupational health and safety practices and overall capacity development during the construction phase of the Project.

In this context, an annual training needs analysis should be carried out to identify priorities for both mandatory and non-mandatory training programs. Based on the identified development requirements, an individual development plan should be prepared for each employee. This plan should be developed through mutual agreement between the employee and their direct supervisor, reviewed regularly, and updated as necessary in line with evolving Project requirements.

A comprehensive Training Matrix, including OHS training list which is identified under Regulation on Occupational Health and Safety Training of Employees should be used to support the structured planning and scheduling of these programs. Trainings should be repeated periodically, taking into account emerging and changing risks. Employees who have been absent from work for more than six months, regardless of the reason, should be provided with refresher training before resuming their duties. The OHS Annual Training Program is identified under the Occupational Health and Safety Management Plan.

If new training needs arise during the year, additional training requests from department managers should be submitted through the same process using the Training Request Form. The comments and justifications of the requesting manager should be documented in the Training Request Form and forwarded sequentially to the Project Manager, and ultimately to the General Manager for approval. The Approved Request Form will be submitted to the HR Department to prepare or revise the Draft/Annual Training Program and Training Matrix.

The main sources used to identify training needs include legal training requirements, the company’s strategies, management plans and objectives, job descriptions outlining key duties and required competencies, performance evaluation results, internal and external audit findings, the effectiveness of previous trainings, changes in legislation and technological developments, and feedback from clients, subcontractors, and employees.

The feasibility of delivering the requested training, considering company objectives and available resources such as budget, time, and physical capacity, should be assessed by the relevant Project Manager.

Training Matrix, Appendix A, should be used as the basis for preparing the Draft Annual Training Program by HR Chief Annual Training Program should document key information related to all scheduled training activities throughout the year, including training topics, content, target participants, training type (in-house or external), training duration, trainer or training provider, training location, and training date.

Annual Training Program will be approved by Project Manager and HR Chief. EPC and its subcontractors will provide training for the relevant positions in accordance with this Program.

VII.2 Training Formats and Content

The Annual Training Plan should include a comprehensive range of core training content applicable to the construction phase of the Project. These training topics should cover the following areas :

Use of Personal Protective Equipment (PPE)
Emergency procedures
Working at height, excavation safety, and heavy equipment operations
Waste management
Water and air pollution control
Noise and vibration management
Erosion and sediment control
Construction procedures and techniques
Quality control and inspection procedures
Traffic management and temporary road arrangements
Rules for interacting with local communities
On-site and off-site safety precautions
Public relations and grievance mechanism procedures

Trainings should be conducted in appropriate and adequately equipped venues that allow for practical applications. Training venues should meet acceptable thermal comfort conditions and provide adequate lighting to support effective learning.

Training sessions should be implemented in three main formats: internal in-house training conducted by company personnel using company facilities; internal external training conducted at company premises by external experts such as training institutions, consultants, suppliers, or subcontractors; and external training held outside company premises by third-party training providers, public institutions, or suppliers/subcontractors. In-house training should be prioritized, and internal trainers should be identified in consultation with department managers. Employees who attend external training may be requested to share the key knowledge gained with their colleagues upon returning to work.

Occupational health and safety trainings should be delivered by workplace safety experts and occupational physicians assigned to the Project. Additionally, such trainings may also be provided by institutions including labor, employer, and public service organizations; training foundations and centers established by such organizations; universities; training units of public institutions; professional associations with public institution status; and training institutions or joint health and safety units

authorized by the Ministry. Trainers should be selected based on their subject-matter expertise relevant to the topics included in the training program.

The following categories represent the primary types of training to be implemented under the Training and Communication Plan. These training types should be designed to foster continuous learning, maintain compliance with applicable legislation, and improve employee competencies during the construction phase of the Project:

- **Personnel Training and Development:** Includes all activities intended to maintain, update, and improve employee knowledge, skills, and capabilities. This encompasses formal, informal, and on-the-job training, as well as e-learning, self-learning, participation in conferences, mentoring and coaching, job shadowing, and job rotation.
- **Mandatory Training:** Refers to employer-required training to ensure that employees are competent to perform their roles. This includes general skill training applicable to all workers and specific training tailored to certain staff groups.
- **Legal Training:** Encompasses training programs that are legally required to ensure the health, safety, and security of employees and all individuals interacting with the worksite. This includes mandatory EHS training.
- **Training for New Employees:** Covers orientation and role-specific training provided to newly hired personnel. Each new employee will follow a personal training plan, including both on-the-job training and general induction, prepared by the relevant department supervisor.

Employees who wish to participate in congresses, conferences, seminars, or similar professional development activities, outside the scope of company-planned trainings, may do so with the prior approval of their respective department manager, provided these activities are offered free of charge and contribute to professional knowledge enhancement.

VII.3 Evaluation of Training Effectiveness

The effectiveness of trainings should be assessed through two complementary methods, and the outcomes should be taken into consideration by managers during the planning and implementation of future training programs. Following each training session—whether conducted internally or externally—participants should be asked to complete a Training Evaluation Form to assess the training content, trainer performance, and suitability of the training venue. The results of these forms should be reviewed and recorded for reference in future training planning and implementation processes.

Additionally, the impact of training on employee development should be evaluated by supervisors, who should monitor participant progress based on specific criteria. These criteria include the extent to which the training is reflected in job performance, behavioral changes and interpersonal interactions, improvements in motivation levels, contributions to personal development, and readiness for future responsibilities. The evaluation results should be used in revising the Annual Training Plan and planning subsequent training activities. Relevant findings regarding training effectiveness should also be communicated to the E&S Manager, as appropriate.

VII.4 Training Documentation

All training activities conducted under the scope of the Project should be properly documented, and training records should be maintained in the personnel files of each employee. Each training record should include the full name of the participant, job title, subject and duration of the training, the name, title, and signature of the trainer, as well as the training date. In cases where the training is delivered by an external provider, the name of the institution should also be clearly indicated on the issued certificate.

VIII. MONITORING

A structured internal monitoring program should be implemented to assess the effectiveness of the training and communication measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities should be reviewed periodically and revised where necessary, based on site-specific observations, feedback from stakeholders, the results of internal audits, or changes in applicable legal or institutional requirements.

Monitoring activities should be coordinated by the Human Resources (HR) Department, in close collaboration with the OHS and Construction Management teams. Key responsibilities should include verifying the timely implementation of training sessions, reviewing attendance and certification records, evaluating the relevance and quality of training content, and ensuring the consistent application of training requirements across contractors and subcontractors, particularly in high-risk work areas.

Regular monitoring should be conducted across all worksites to ensure that planned trainings are delivered as scheduled, participants are properly recorded, and feedback is systematically collected. This includes reviewing records such as the Annual Training Plan, Training Attendance Forms, Evaluation Forms, and issued Certificates. Spot checks and field verifications should be conducted to confirm that trained personnel are applying learned practices on-site.

The performance of contractors and subcontractors in fulfilling training-related obligations should be reviewed through internal audits, site supervision reports, and direct observations. Any identified non-conformities should trigger the preparation and implementation of corrective and preventive action plans. Follow-up monitoring should be carried out to verify the effectiveness of these measures and to ensure continuous improvement and avoidance of repeat deficiencies.

In addition to internal monitoring, inspections may also be conducted by relevant public institutions, including the Ministry of Labor and Social Security or other competent authorities, in accordance with Turkish legislation. The scope and frequency of these inspections will be determined by the relevant authority and may include review of training records, on-site verification of trained personnel, and compliance with mandatory training standards.

Monitoring efforts should be guided by the framework provided in Table VIII.1, which outlines the training-related parameters to be monitored, the locations where records are held or verified, methods of monitoring, the frequency of monitoring activities, and the responsible parties. These activities are essential for evaluating the overall performance of the Training and Communication Plan and ensuring full compliance with national regulations and Project-specific commitments.

Table VIII.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsibility
Number and scope of trainings (e.g. security, health and safety), number of participants, training hours per employee, training materials, and trainings provided to subcontractors	Project office	Document review	Monthly	EPC AAOİAŞ,
Number of raised training requests from stakeholder	Project office	Document review	Quarterly	EPC AAOİAŞ,

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ should ensure that corrective and preventive measures are promptly implemented in coordination with the Main Contractor (Limak) and relevant subcontractors. Any training-related gaps or deficiencies—such as missing records, low participation rates, or failure to meet legal training obligations—should be documented and addressed through appropriate management actions.

All findings related to training implementation, including unresolved grievances, non-compliance with training schedules, or absence of certification where required, should be recorded in accordance with national legislation and internal Project procedures. In the event of serious violations—such as systemic failure to provide mandatory training or recurrent non-compliance—LİMAK should notify the relevant authorities and initiate appropriate technical, procedural, or contractual remedies to ensure compliance and prevent recurrence.

IX. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table IX.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Number of trainings conducted	All personnel should receive training	Monthly Quarterly	EPC SPV

X. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established plans and procedures. Relevant records that should be reviewed during audits may include the external grievance and suggestion tracking database, internal grievance and suggestion tracking database, training records, and non-conformity records. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary.

XI. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of training and communication activities throughout the construction phase of the Project. Reporting should be structured to reflect internal monitoring and audit findings, as well as external compliance obligations and stakeholder engagement feedback related to capacity-building efforts.

Based on monitoring results, necessary corrective and preventive actions should be identified, and corresponding updates should be incorporated into this Plan. The training program should be revised accordingly to address observed implementation gaps or unmet performance targets. Periodic audits and field verifications should be conducted to ensure that all training-related activities are carried out in accordance with the provisions of this Plan.

Reports should be prepared using data gathered through training monitoring activities defined in this Plan. This includes reviewing the status of implemented trainings, participation rates, evaluation outcomes, grievances received, and actions taken in response. All supporting documentation—such as training logs, attendance records, evaluation forms, and photographs of training activities—should be compiled in appropriate reporting formats.

Reporting activities under this Plan should focus on key performance indicators such as the number of trainings conducted, the percentage of trained personnel, the frequency of refresher trainings, and the responsiveness to training-related grievances. In the event of critical non-compliance—such as failure to provide legally required training or repeated complaints about inadequate safety awareness—an incident report, including root cause analysis and corrective measures, should be submitted to the relevant department within 30 business days.

All relevant data, including findings from audits, performance monitoring, and field observations, should be consolidated within the training section of the Environmental and Social Monitoring Report, prepared on a semi-annual basis. These reports should summarize non-compliance issues, detail corrective actions taken, and outline any time-bound improvement measures, supported by documentary evidence such as signed attendance sheets, certificates, and photographic documentation.

All personnel should be encouraged to raise concerns, suggestions, or complaints related to training and communication practices through the established grievance mechanism by submitting a grievance form. Internal and external grievances about training delivery, participation, or effectiveness should be recorded, addressed, and followed up as per the procedures defined in the Stakeholder Engagement Plan.

This Plan should be reviewed semi-annually by the E&S Manager and H&S Manager, based on the results of audits, employee feedback, and any significant changes in site operations or training requirements. Updates to the Plan should be approved in coordination with the relevant Managers and the Project Sponsor to ensure it remains aligned with national legislation, international standards, and Project-specific objectives.

APPENDIX-A: TRAINING MATRIX RELATED WITH E&S AND H&S ISSUES

TRAINING AND COMMUNICATION MANAGEMENT PLAN

Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
1.Orientation Training / Induction Training							
Orientation Training	1-Introduction of the Project 2-Project OHS and Environmental Rules 3-Duties, Authorities, and Responsibilities 4-Emergencies, Emergency Response Methods, and Actions to Take in Emergencies 5-Hazards and Risks in the Work Area, Precautions Against These Hazards and Risks, Safe Working Methods, and Establishing Safe Working Environments	All Newly Recruited Employees	Visual Training Presentation (Before each new worker starts working on site)	2 Hours	Every Month	Training Room	Until the Basic OHS trainings are provided, employees are informed about the Project, made aware of the OHS and Environmental rules and instructions that must be implemented in the Project, and are aimed to gain knowledge about the hazards and risks in the work areas, the precautions to be taken against these hazards and risks, and the necessary actions in case of emergencies.
2.Basic Occupational Health and Safety Trainings							
General Topics	a) Information on labor legislation b) Legal rights and responsibilities of employees c) Workplace cleanliness and order ç) Legal consequences of occupational accidents and diseases d) Use of Personal Protective Equipment (PPE) e) General Occupational Health and Safety rules and safety culture	All Newly Recruited Employees	Relevant Legal Requirements and Procedures	2 Hours	Every Month	Training Room, Worksite	At the time of recruitment (in-person/remote) and at one-year intervals, the trainings specified under General Occupational Health and Safety topics are provided to employees and documented. Following the training, it is expected that employees will demonstrate changes in behavior regarding occupational health and safety knowledge and safe working methods, and they will be subject to supervision.
		All Employees	Toolbox Talks				
Health Topics	a) Causes of occupational diseases b) Principles of disease prevention and implementation of protection techniques c) Biological and psychological risk factors ç) First aid d) Harmful effects of tobacco products and passive exposure	All Newly Recruited Employees	Special Training Documents			Training Room, Worksite	
		All Employees	Toolbox Talks				
Technical Topics	a) Chemical, physical, and ergonomic risk factors	All Newly Recruited Employees	Special Training Documents			Training Room, Worksite	

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Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
	b) Flammability, explosion, fire, and fire prevention c) Working with display screen equipment d) Safety and health signs e) General occupational health and safety rules, safety culture, and behavior-based OHS	All Employees	Toolbox Talks				
	Safe Manual Lifting and Handling	Newly Recruited Employees and All Employees	Special Training Documents	30 Minutes	Every Month	Training Room, Worksite	Employees are informed about the hazards and risks involved in manual lifting and handling activities, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods for manual lifting and handling. A change in behavior is expected following the training.
			Toolbox Talks	15 Minutes			
	Safe Use of Work Equipment	Newly Recruited Employees and All Employees	Special Training Documents	30 Minutes	Every Month	Training Room, Worksite	Users of work equipment are informed about the potential hazards and risks that may arise during the use of such equipment, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods based on the equipment's user manual. It is expected that the equipment will be used safely following the training.
			Toolbox Talks	15 Minutes			
	Electrical hazards, risks, precautions, electrical hand tools, and cable management	Newly Recruited Employees and All Employees	Special Training Documents	30 Minutes	Every Month	Training Room, Worksite	Users of electrical hand tools are informed about electrical hazards and risks in the work areas, as well as the safe use of electrical hand tools.
			Toolbox Talks	15 Minutes			
	Causes of Occupational Accidents, Legal Responsibilities, and Reporting	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the causes of occupational accidents, the legal responsibilities of managers and workers, and the legislation related to the reporting of occupational accidents.
			Toolbox Talks	15 Minutes			

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Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
	Evacuation and Rescue	Newly Recruited Employees and All Employees	Specialized Training Documents	30 Minutes	Every Month	Training Room, Worksite	In situations requiring evacuation, employees are informed about the necessary actions to quickly reach the assembly point from the work areas.
			Toolbox Talks	15 Minutes			
Other Topics	Safe Working at Heights	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the existing hazards and risks associated with working at heights, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods at heights. Compliance with rules and instructions is expected.
			Toolbox Talks	15 Minutes			
	Safe Working in Confined/Restricted Spaces/Environments	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the existing hazards and risks in confined/restricted spaces, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods for tasks performed in confined/restricted spaces. Compliance with instructions is expected.
			Toolbox Talks	15 Minutes			
	Safe Working During Hot Work (Welding, Grinding, Cutting, etc.)	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the existing hazards and risks during hot work (welding, grinding, cutting), the necessary OHS precautions to be taken against these hazards and risks, and safe working methods for hot work activities.
			Toolbox Talks	15 Minutes			
	Safe Working with Chemical Substances	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the hazards and risks of the chemicals used according to their SDS (Safety Data Sheets) forms, as well as the necessary OHS precautions to be taken against these hazards and risks. Compliance with instructions is expected.
			Toolbox Talks	15 Minutes			
	Safe Working in Areas with Radiation Risk		Specialized Training Documents	30 Minutes	Every Month		Employees are informed about radiation-related hazards and risks, the necessary

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Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
		Newly Recruited Employees and All Employees	Toolbox Talks	15 Minutes		Training Room, Worksite	OHS precautions to be taken against these hazards and risks, and safe working methods in radiation areas.
	Safe Working in Lifting Operations	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the hazards and risks related to lifting machines and equipment or lifting operations, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods during lifting operations.
			Toolbox Talks	15 Minutes			
	Working with Special Risk Equipment	Newly Recruited Employees and All Employees	Specialized Training Documents	30 Minutes	Once every 2 months	Training Room, Worksite	Users of special risk or specific work equipment are informed about the safe use of the machine/equipment they will operate before starting work.
			Toolbox Talks	15 Minutes			
	Potential Health Risks Caused by Carcinogenic Substances	Newly Recruited Employees and All Employees	Specialized Training Documents	30 Minutes	Every Month	Training Room, Worksite	Lists of materials with carcinogenic effects are prepared, their SDS (Safety Data Sheets) are obtained, and employees are provided with training on safe working methods related to these materials.
			Toolbox Talks	15 Minutes			
	Safe Working at Night/In the Dark	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Once every 2 months	Training Room, Worksite	Employees are informed about the hazards and risks that may occur in environments without daylight or in darkness, the necessary OHS precautions to be taken against these hazards and risks, and safe working methods for working at night or in the dark.
			Toolbox Talks	15 Minutes			
	Safe Working in Excavation Operations	Newly Recruited Employees and All Employees	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees are informed about the hazards and risks involved in all excavation works, as well as the measures to be taken to eliminate or reduce these hazards and risks to an acceptable level. They are expected to apply this knowledge in practice
			Toolbox Talks	15 Minutes			
	Safe Working in Tunnel Operations		Specialized Training Documents	1 Hour	Every Month		Employees are informed about the existing hazards and risks in energized areas

Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
		Newly Recruited Employees and All Employees	Toolbox Talks	15 Minutes		Training Room, Worksite	(mechanical, electrical), the precautions to be taken against these hazards and risks, and safe working methods.
	Return-to-Work Training for Employees Who Have Experienced a Work Accident or Occupational Disease	Employees Who Have Experienced a Work Accident or Contracted an Occupational Disease	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Employees who have experienced a work accident or contracted an occupational disease are informed about the root causes of the accident or disease, and all employees are educated to prevent similar incidents from occurring in the future.
			Toolbox Talks	15 Minutes			
3.Emergency Training							
General Emergency Training	Emergency Response Plan Training of Emergency Teams Training on Emergency Response Methods Testing of Response Plans (Drills) and Subsequent Performance Evaluation	All Employees, Emergency Teams	Specialized Training Documents	1 Hour	Every Month	Training Room, Worksite	Emergency teams are informed about their duties, authorities, and responsibilities in potential emergency situations according to the emergency response plan. Practical field drills are conducted to reinforce the training.
			Toolbox Talks	15 Minutes			
First Aid	First Aid Training (Certified)	First Aiders	Legal Requirements	3 Days	Once every 3 months	Training Room	First aid personnel are provided with information about their duties, authorities, and responsibilities, and their qualifications are documented.
Fire Safety	Fire Formation, Types of Fire Extinguishers, and Their Use	All Employees	Specialized Training Documents	1 Hour	For 4 months, once a month	Training Room, Worksite	Employees are informed about fire formation, combustible materials, fire prevention methods, types of fire extinguishers, and fire-fighting techniques. They are expected to know how to respond in the event of a fire.
			Toolbox Talks	15 Minutes			
4.Risk Assessment Trainings							
Risk Assessment	Concept of hazard and risk Identification of hazards in the workplace Evaluation of risks arising from hazards Risk assessment	Risk Assessment Team and All Employees	Specialized Training Documents	1 Hour	Once a month for 6 months	Training Room, Worksite	The risk assessment team and employees are informed about the identification, analysis, and evaluation of hazards and risks that may arise in all ongoing project activities, as well as the implementation of

TRAINING AND COMMUNICATION MANAGEMENT PLAN

Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
	Elimination of risks or reduction to an acceptable risk level						OHS measures. A change in OHS awareness is expected.
5.Specialized Trainings							
Visitor Training	Hazards and risks that guests and visitors may encounter in the work area, the precautions to be taken to protect against these hazards and risks, safe working practices, and safe working environments.	Guests and Visitors	Special Training Documents	1 Hour	Every Month	Training Room	Personnel who come to the work area as visitors, guests, etc. are informed about the hazards and risks in the work area, the precautions to be taken to protect against these hazards and risks, and safe working environments.
Training of Apprentices, Interns, and Individuals Requiring Special Policies	Apprentices, interns, and individuals requiring special policies are informed about the project, the rules to be followed within the project, their specific rules and instructions, working conditions, and hazards and risks in the work areas.	Apprentices and Interns	Special Training Documents	2 Hour	Every Month	Training Room	Hazards and risks in the work area, the OHS measures to be implemented against these hazards and risks, and safe working methods are communicated to apprentices, interns, and individuals requiring special policies by the relevant personnel when they start working.
Hygiene Training	Training and information for personnel involved in cleaning and food handling on prevention of infectious diseases and skin conditions.	Kitchen and Cleaning Staff	Authorized Organization/Person	8 Hour	Once	Training Room	Canteen, tea kitchen, and cleaning staff are expected to comply with hygiene rules.
Employee Representative / Support Staff	Duties, Authorities, and Responsibilities of Employee Representatives and Support Staff	Employee Representatives, Support Staff	Special Training Documents	1 Hour	Twice	Training Room	Designated employee representatives and support staff are informed about their duties, authorities, and responsibilities.
Occupational Health and Safety (OHS) Committee Training	Duties and authorities of the committee National legislation and standards on OHS Common occupational accidents and their causes Basic principles of occupational hygiene Communication techniques Emergency measures Occupational diseases Specific risks related to workplaces Risk assessment	OHS Committee Members	Relevant Legal Requirements and Special Training Documents	2 Hours	Once	Training Room	Occupational Health and Safety committee members are informed about their duties, authorities, and responsibilities as defined in the relevant legislation. They are expected to perform and implement their roles accordingly throughout the committee's term.

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Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
Safe Driving Training	Project-specific rules and instructions regarding the safe use of company vehicles	All Personnel Who Drive Vehicles	Relevant Legal Requirements and Special Training Documents	1 Hour	First 3 months, then twice thereafter	Training Room, Worksite	All personnel driving vehicles on the project are informed about the driving rules they must follow, and compliance with the specified rules and instructions is expected.
6.Environmental Trainings							
Environmental Cleanliness and Waste Management	Legal legislation and project plans and procedures related to environmental cleanliness and waste management	All Employees	Documents specially prepared for the training content: ● Solid Waste Management Plan and Hazardous Materials Management Plan ● Relevant legal legislation ● Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	Employees are informed about the disposal of waste in the work area, housekeeping and waste management procedures in the work areas, and the existing procedures are explained to them. A change in behavior is expected.
Environmental Emergency Management	What are environmental emergencies? Which procedures should be followed? What actions need to be taken? What are the duties, authorities, and responsibilities of employees?	All Employees	Documents specially prepared for the training content: ● Emergency Management Plan ● Relevant legal legislation ● Project's EIA (Environmental Impact Assessment) and ESIA (Environmental	1 Hour	Every Month	Training Room	Communication and response methods during environmental emergencies are explained.

Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
			and Social Impact Assessment) Reports				
Biodiversity Awareness and Code of Conduct	What are the sensitive areas and species that may be encountered within the project sites? What should the rules be for working in natural environments? What actions should be taken when encountering fauna species within the site or during transportation? What are the endemic species in and around the project area? What measures should be taken to protect wildlife?	All Employees	Documents specially prepared for the training content: • Biodiversity Action Plan • Relevant legal legislation • Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	The precautions to be taken in field operations are explained according to the Biodiversity Management Plan prepared for the project.
Water and Energy Efficiency	What is efficiency in water consumption? What is efficiency in energy consumption? What is the importance of saving water and energy for the project, the country, and the world? How can individuals contribute to water and energy efficiency?	All Employees	Documents specially prepared for the training content: • Water, Wastewater, and Surface Water Management Plan • Relevant legal legislation • Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	During the project, both on-site and in camp areas, the necessary actions to be taken regarding water and energy efficiency are explained.

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Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
Rules for Communication with the Community	What are the general characteristics of the local population in the area? What should be considered when establishing communication with the community? Are there any local communities specific to the project area and its surroundings? If so, what are the important points to consider when communicating with these communities? What are the correct communication methods within the construction site?	All Employees	Documents specially prepared for the training content: • Stakeholder Engagement Plan • Public Health and Safety Management Plan • Human Resources and Employee Management Plan • Relevant legal legislation • Project's EIA (Environmental Impact Assessment) and ESIA (Environmental and Social Impact Assessment) Reports	1 Hour	Every Month	Training Room	The rules for communication with the community are explained throughout the duration of the project.
Grievance Mechanism	What is a grievance mechanism? What is the purpose of the grievance mechanism? Who are the persons responsible for the grievance mechanism? Explanation of how employees can submit all their requests, demands, and complaints, including their personal rights and living standards, to the company.	All Employees	Documents specially prepared for the training content: • Stakeholder Engagement Plan • Relevant legal legislation • Project's EIA (Environmental Impact Assessment) and ESIA (Environmental	1 Hour	Every Month	Training Room	Both project employees and stakeholders affected by the project are informed about how to submit complaints related to the project and how to follow up on the outcomes.

Name of the Training	Subject of the Training	Participants	Training Document	Training Duration	Training Continuity	Training Location	Goal and Objective
			and Social Impact Assessment) Reports				

REVISION STATUS		
Revision Date	**Rev. No**	**Description**
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INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project ("The Project"), has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and
Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The Project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

1.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange.

As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads. Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels

The map showing the construction components and road route within the scope of the Project's construction activities is provided in Figure 1-1.

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

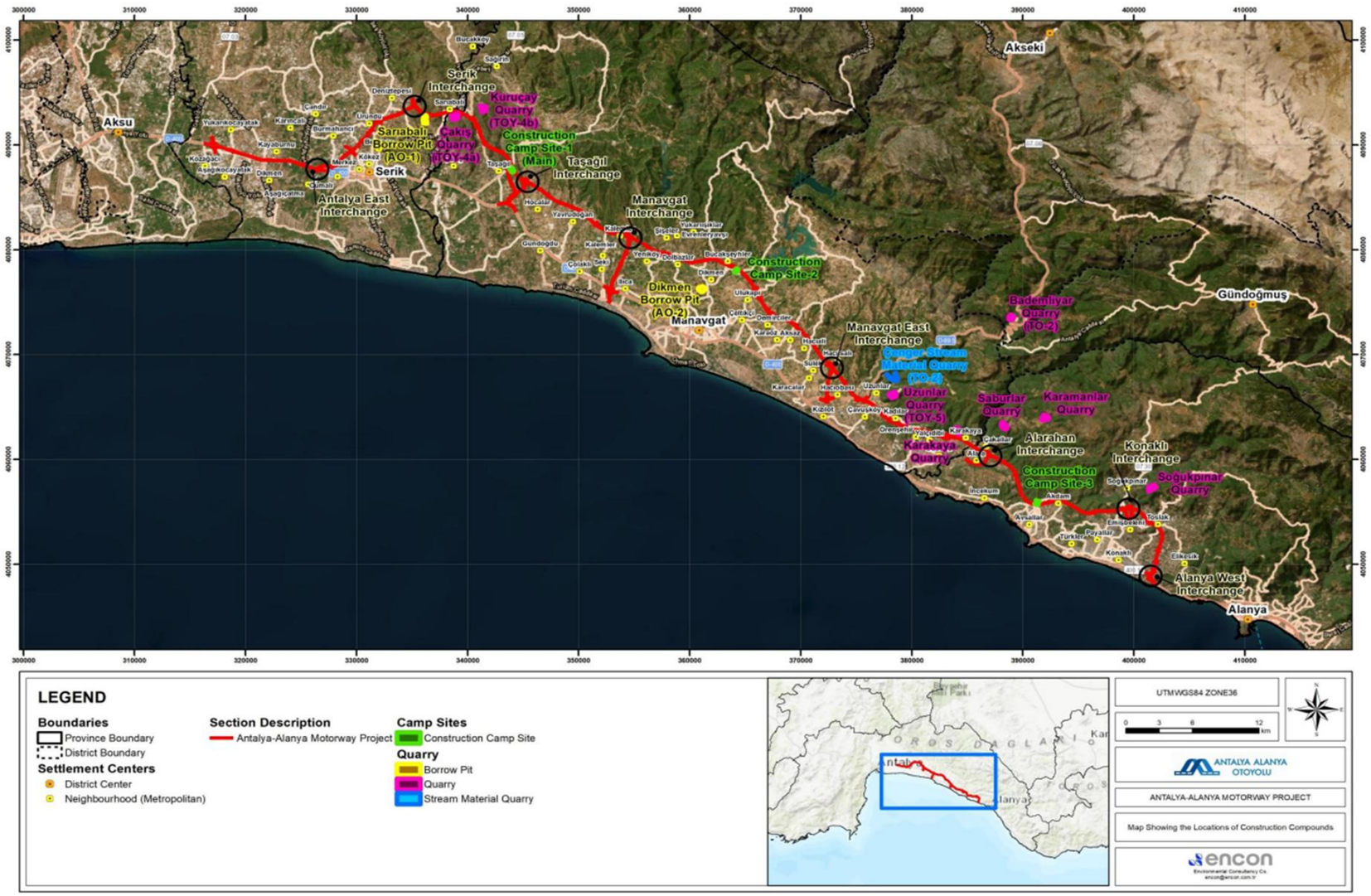


Figure 1-1.Map Showing the Locations of Construction Compounds

1. Purpose and Scope

The purpose of the Occupational Health and Safety Plan (OHSP) is to identify the actions and measures required for the general management of factors affecting the health and safety of the Project employees. This plan aims to:

- Provide general information about the applicable legislation and standards related to this procedure;
- Define roles and responsibilities;
- Incorporate the findings of the Environmental Impact Assessment (EIA, dated 17.08.2018), requirements foreseen by the Environmental and Social Impact Assessment (ESIA), international standards, the legislation of the Republic of Türkiye, requirements set by lenders, and project-specific permits into the procedure;
- Identify impact sources and mitigation measures;
- Define risk management;
- Define communication and training programs.

This plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

2. LEGISLATION AND STANDARDS

The Plan has been structured to align with both national and international requirements, including legislation, guidelines, and sectoral standards that define permissible emission levels and air quality thresholds. Accordingly, the following sources of reference will be used to guide the implementation and compliance procedures.

2.1. National Requirements

During the construction stage of the Project, National legislation will be followed and complied with by the EPC Contractor and its subcontractors. The key Turkish Occupational Health and Safety legislations are as follows:

- Occupational Health and Safety Law and all regulations
- Turkish Labour Law and all regulations

2.2. International Requirements

In addition to national requirements, the following international guidelines frameworks, standards and and agreements should be considered to ensure alignment with best practices and financial institution requirements:

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework (“ESF”) document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects.

In addition to above following international requirements and standards, and Good International Industrial Practice (GIIP) regarding occupational health and safety.

- ISO 45001:2018 Occupational Health and Safety Management Systems
- IFC Performance Standards (2012), specifically:
  - Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

- Performance Standard 2: Labor and Working Conditions
- Performance Standard 4: Community Health, Safety, and Security

- Worker' accommodation: process and standards. A guidance note by IFC and the EBRD, 2009

- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- European Union Road Safety Policy Guidelines and Directives=

- European Bank for Reconstruction and Development's (EBRD's) Performance Requirement (PR) 4 – Health, Safety, and Security (2019)
- Addressing Gender-Based Violence and Harassment – Good Practice Note for the Private Sector, December 2019 – Emerging Good Practice for Private Sector
- Addressing Gender-Based Violence and Harassment – Emerging Good Practice for Private Sector
- Asian Infrastructure Investment Bank's (AIIB's) Environmental and Social Framework (2021)
- Worker' accommodation: process and standards. A guidance note by IFC and the EBRD, 2009
- International Finance Corporation's (IFC's) Sustainability Framework (2012) and associated applicable Performance Standard (PS) 2 - Labour and Working Conditions
- Approved Code of Practice and guidance on regulations L8 (Fourth edition)
- The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
- OSHA 1926.651 Specific Excavation Requirements
- OSHA 1910.252 Welding, Cutting and Brazing (Hot Works)
- ILO Safety and Health in Building and Engineering Work
- ILO Safety and Health in Construction, 1992Health and Safety in Construction, HSG150, 2006
- Health and Safety at Work etc. Act 1974

2.3. Linkage with Other Documents and Plans

In addition to the above, the following impact assessment reports prepared for the Project shall be used as reference documents:

- Antalya-Alanya Motorway ESIA Report;
- Antalya-Alanya Motorway EIA Report;
- The Environmental and Social Management Plan (ESMP)

The **" Environmental Legal Requirements Monitoring and Evaluation Procedure"** and the **" Occupational Health and Safety Legal Compliance and Evaluation Procedure"** will be implemented to ensure the continuous monitoring of legal regulations related to occupational health, safety, and environment, and to ensure that site practices are carried out in compliance with the relevant legislation. In order to evaluate compliance with applicable and current legal requirements in relation to the project activities. The performance regarding legal compliance is assessed based on this form, and the HSE Committees are informed and consulted accordingly.

Additionally, EPC Contractor has prepared its own project-specific HSE Management Procedure in Turkish listed below;

No	Procedure
1	Proje İş Sağlığı ve Güvenliği Planı (Project H&S Plan)
2	Acil Durum Müdahale Planı (Emergency Response Plan)
3	Risk Değerlendirme Prosedürü (Risk Assessment Procedure)

4	İSG İzleme, Ölçme ve Değerlendirme Planı (OHS Monitoring, Measurement and Evaluation Plan
5	ISG Yasal Mevzuat Takip Prosedürü (H&S Legislation Monitoring Procedure)
6	Çevresel Mevzuat Takip Prosedürü (Environmental Legislation and Monitoring)
7	Elektrik İşleri İSG Prosedürü (Electrical Safety Procedure)
8	İskele ve Yüksekte Çalışma Prosedürü (Scaffolding & Work at Hight Procedure)
9	Vinçler ve Kaldırma İşleri Prosedürü (Cranes & Lifting Procedure)
10	ISG Komitesi Prosedürü (H& S Commitee Procedure)
11	Toprak İşleri Kazı Güvenliği Prosedürü (Earthworks & Excavation Safety Procedure)
12	Yangın Güvenliği Prosedürü (Fire Safety Procedure)
13	NATM Tünel Çalışmaları İş Güvenliği Prosedürü (NATM Tunneling Procedure)
14	Patlatma Prosedürü (Blasting Procedure)
15	Yol ve Trafik Güvenliği Prosedürü (Traffic Management Procedure)
16	Bilgi Paylaşımı ve İletişim Prosedürü (**Procedure for Information Exchange and Communication)**
17	ISG Yıllık Çalışma Planı (OHS Annual Working Plan)
	ISG Yıllık Eğitim Planı (Annual Training Plan)
18	Çalışma İş İzin Prosedürü (Work Permit Procedure)
19	Ekipman kontrol ve bakım prosedürü (Equipment control and maintenance procedure)
20	Acil durumlara hazır olma ve müdahale prosedürü (Emergency preparedness and response procedure)
21	Olay Araştırma Yönetimi Prosedürü(Incident Management Procedure)
22	Malzeme/Ekipman Transfer Güvenliği ve Saha Giriş Prosedürü (Transfer control and site Access procedure)

The occupational health and safety participation plans and procedures for the Antalya-Alanya Motorway Project will also be used as reference documents:

- Solid Waste Management Plan
- Hazardous Material Management Plan
- Environmental Accident and Spill Response Management Plan
- Community Health and Safety Management Plan
- Construction Camp Site Management Plan
- Air Pollution and Emission Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Noise and Vibration Management Plan
- Change Management Plan
- Emergency Response and Management Plan
- Human Resources and Labour Management Plan
- Security Management Plan
- Subcontractor Management Plan
- Training and Communication Management Plan
- Resource Efficiency Management Plan
- Excavated Material Management Plan
- Soil Management and Erosion Control Plan
- Stakeholder Engagement Plan

- Employment Policy

Environmental and Social Management Plan As part of the occupational health and safety management systems, the ISO 45001:2018 standard will be used as a reference document.

Unless otherwise stated, where two or more of the listed standards are inconsistent or conflicting, the Antalya-Alanya Motorway Project shall apply the standard that contains the most stringent requirements.

3. POLICY AND PRINCIPLES

AAOIAS INTEGRATED MANAGEMENT SYSTEM POLICY

As Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş,

The purpose of our Integrated Management System, which encompasses all construction and maintenance activities related to Quality, Environment, Occupational Health and Safety, and Road Traffic Safety, is to meet the needs and expectations of our stakeholders, fulfill our responsibilities to society, the environment, and our employees, and continuously improve our service quality.

To hereby commit that:

- *We will adopt high-quality production / service and customer-oriented work as a basic principle in all our projects,*
- *We will create a positive impact for our society and our world with a holistic approach to sustainability wherever we operate and in all areas where we operate with the awareness of our strategic and environmental and social responsibilities.*
- *We will fulfil the obligations of the Quality, Environment, Occupational Health and Safety, Road Traffic Safety regulations,*
- *We will establish and increase the awareness of Quality, Environment, Occupational Health and Safety, Road Traffic Safety of our employees, stakeholders and society,*
- *We will provide safe and healthy working conditions to prevent injuries and health deterioration related to work and/or traffic accidents,*
- *We will undertake activities to overcome hazards and mitigate all risks,*
- *We will ensure sustainable resource utilization for prevention of pollution and protection of the environment,*
- *We will provide the resources needed for the mitigation of climate change and the protection of biodiversity and ecosystems,*
- *We will use energy and natural resources efficiently,*
- *We will continuously improve our Integrated Management System performance,*
- *We will establish and adopt the awareness that all activities related to Quality, Environment, Occupational Health and Safety, Road Traffic Safety are shared responsibility of all employees, and also ensure the consultation and participation of all employees,*
- *Knowing that our most important asset is the human resources, we will keep the quality and satisfaction of our employees at the highest level by employing highly competent employees and continuously investing in our employees.*

The Occupational Health, Safety and Environmental Plan fully defines the actions to be taken in relation to the matters specified in this policy.

Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. has adopted **the Occupational Health, Safety and Environmental Principles** described below.

OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL PRINCIPLES

- *To ensure the health and safety of all employees and the other persons who may be influenced by the activities.*
- *To implement control measures to prevent accidents/incidents and occupational diseases and/or to minimize the risk as low as possible by managing occupational health and safety risks in the workplace by risk assessments.*
- *To provide clear instructions, information and adequate training to ensure that all personnel are competent to carry out their works.*
- *To ensure that all employees are provided with active training to increase their awareness and participation in Occupational Health, Safety and Environment practices.*
- *To ensure and maintain safe and healthy working conditions - to provide equipment and facilities, carry out their maintenance operations and to ensure safe use, storage and disposal of all materials.*
- *To apply emergency response and evacuation procedures in case of fire, earthquake, landslide etc.*
- *To ensure that occupational health and safety conditions and standards are constantly updated and improved.*
- *To promote a culture that promotes occupational health and safety as its primary goal and aims to eliminate the hazards and health risks associated with its activities, by ensuring that Occupational Health and Safety is an essential part of every operation.*
- *To give priority to environmental protection and to ensure the prevention and/or proper mitigation of adverse environmental impacts associated with its activities through the implementation of effective environmental management practices.*
- *To conduct all of its activities in compliance with applicable environmental legislation and regulations as well as international standards and best practices that support the protection and improvement of environment.*
- *To sustain the commitment to reduce wastes at their own sources and prevent pollution and to implement these principles while carrying out its activities.*
- *To identify, evaluate and manage environmental risks and their impacts and minimize the likelihood of adverse environmental impacts.*

4. ROLES AND RESPONSIBILITIES

SPV General Manager

- Oversee the financial and legal wind-down of the SPV and ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements.
- Promote a culture of environmental and social responsibility across the SPV and its stakeholders.
- Define and implement the overall business strategy and direction of the SPV in alignment with shareholder and stakeholder expectations.
- Ensure the provision of necessary resources and organizational support for the implementation of all plans.
- Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.
- Support the H&S Manager in preparing, disseminating, and implementing this plan. In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the EPC and SPV's H&S Manager and other responsible parties.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, H&S compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including SPV, stakeholders and investors.

SPV Health and Safety Manager

Duties of the SPV H&S Manager are as follows:

- Ensure the preparation, revision, and implementation of the health and safety-related plans and documents in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
    - Ensure that all construction site activities are carried out safely by EPC and subcontractors.
    - Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
    - Ensure timely and appropriate resolution of complaints related to occupational health and safety.
    - Ensure safety inductions, toolbox talks, and job-specific training are conducted and recorded.

- Contribute to project risk assessments and job hazard analyses (JHAs) and ensure these are updated regularly.
- Collaborate with internal teams (e.g., E&S, Legal, Procurement) to integrate E&S criteria into EPC contract.
- Supervise the integration of safety controls into daily work permits, toolboxes, and field activities.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Conduct a comprehensive accident and incident investigation process.
- Support EPC and subcontractors in the development and delivery of site-specific H&S training programs.
- Provide technical support to EPC and subcontractors for the proper implementation of the health and safety plans.
- Ensure the accurate records of inspections, incidents, safety meetings, and training records
- Ensure the corrective actions process is followed up on by all parties strictly.
- Report on H&S performance, non-compliance, and corrective actions to the SPV General Manager and external stakeholders.
- Track and analyse safety performance metrics (e.g., LTIs, near misses, TRIR) and recommend corrective measures.
- Engage with regulatory authorities on inspections, audits, and compliance verification.

SPV HSE Specialist

The SPV HSE Specialist who will be reporting to SPV H&S Manager.The number of the H&S Specialist will be defined considering the existing workload, work locations and the work plan of the EPC Contractor.

The SPV HSE Specialist will be responsible for supporting H&S Manager and monitoring the compliance of all activities associated with the Project against the requirements of the ESMP and any other relevant health and safety legislation defined in this Plan. HSE Specialists will solely be responsible for the occupational health and safety issues.

- Support the execution of the safety, health and community safety related plans, and ensure site activities are carried out safely by EPC contractors and subcontractors in-line with applicable laws, international standards and lender requirements.

- Conduct regular site inspections, hazard identification, safety inductions, toolbox talks, and job-specific training,
- Ensure Maintain H&S documentation, including safety permits, incident records, and training logs, etc.
- Participate in accident and incident investigations, ensuring findings are documented and lessons are communicated across teams.
- Support H&S training delivery for all relevant site personnel and review contractor training records for adequacy.
- Ensure the construction site is properly demarcated and safety signage and barriers are in place and maintained.
- Assist in resolving complaints related to occupational health, site safety, and community safety in coordination with relevant teams.
- Contribute to the review and update of safety plans and procedures based on field experience and audit findings.
- Provide technical guidance to contractors and subcontractors to improve health and safety performance.
- Implement the integration of safety controls into daily work permits, toolboxes, and field activities.
- Assist to SPV H&S manager in monitoring the compliance of EPC and subcontractors.
- Assist to SPV H&S manager to improve safety performance metrics (e.g., LTIs, near misses, TRIR) and recommend corrective measures.

EPC Project Director

The EPC Project Director has the overall responsibility and accountability for the Project including delivery of the construction activities in line with applicable national and international standards. He/She ensures relevant activities are carried out in accordance with this OHSMP.

The EPC Project Director has the ultimate responsibility for ensuring the health, safety and wellbeing of all project personnel, sub-contractors, suppliers, visitors and members of the public that may be affected by the works that are being performed. He/She will also ensure the implementation of required corrective actions in response to identified nonconformities or incidents regarding to this Plan. He/she ensures periodical review of the OHSMP effectiveness.

The Project Director will ensure that necessary resources are allocated for the management of OHS including competent personnel and financial resources for implementing of risk mitigation measures such as engineering control measures, trainings, external sources, safety equipment and personal protective equipment, equipment and machinery.

- Ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements.
- Promote a culture of environmental and social responsibility across the EPC and its stakeholders.
- Define and implement the overall business strategy and direction of the EPC in alignment with SPV and stakeholder expectations.
- Ensure the provision of necessary resources and organizational support for the implementation of all plans.
- Supervise and coordinate subcontractors to ensure proper execution of construction and commissioning phase.
- Support the H&S Manager in preparing, disseminating, and implementing this plan.In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the SPV and other responsible parties.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, H&S compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including EPC, stakeholders and other related parties.
- Approval of project management plans (HSE, E&S, QA/QC, etc.) in line with company policies, legal frameworks, international standards, SPV and lender requirements.
- Ensure that all employees comply with the obligations specified in the project's management plans during activities.
- Serve as the primary EPC representative to the SPV, client, and key stakeholders.
- Maintain communication channels with SPV, subcontractors, and vendors to ensure alignment and compliance.
- Coordinate with regulatory authorities, community representatives, and auditors as required.
- Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters.
- Oversee risk management and mitigation strategies related to technical, health, safety, community safety, environmental, and social aspects.
- Supervise the preparation and approval of documentation related to claims, variations, and commercial issues.

EPC Construction Manager

The responsibilities of Construction Managers are as follows:

- Ensures the implementation of necessary precautions and give importance to OHS issues;
- Ensures that adequate considerations have been given to the provision of safe access;
- Ensures that all equipment is available, job-appropriate and certified;
- Ensures that works under their responsibility are conducted with due regard to OHS issues and industry practice;
- Ensures all staff have adequate tools and personal protective equipment (PPE) for the work;
- Shares lessons-learned assessment and implements program changes as required

EPC Line Managers

The Line Managers are responsible for the execution of activities in accordance with the standards and procedures at the worksites they are in charge.

Also, the Line Managers have the ultimate responsibility for the activities executed in their field of work and have the following duties:

- Ensure the preparation of job-specific method statements;
- Ensure that proposed methods do not conflict with standard operational practices;
- Understand Project health and safety requirements and implement mitigation measures defined in this Plan related with their scope of work;
- Evaluate the technical and OHS competence of all subcontractors prior to their engagement and OHS performance during work execution;
- Ensure that risks have been assessed adequately prior to commencement of activities and operations;
- Perform consultation meetings with ES&HS Manager on the nonconformities identified by the ES&HS team and determines necessary corrective/preventive action.
- Assist and/or participate in the investigation of accidents and incidents;
- Ensure that all personnel are allowed sufficient time from their activities to attend OHS trainings;
- Appoint department staff in sufficient numbers to correct nonconformities; and
- Ensure that department personnel are aware of the risks of the works they perform.

EPC Health and Safety Manager

The H&S Manager is responsible for health and safety management during the construction phase of the Project. Reporting to the EPC Project Director, he/she develops the necessary procedures, plans and training requirements for on-the-ground implementation of the related national and international requirements, standards, SPV's OHS commitments made in Environmental and Social Impact Assessment (ESIA), and this Plan.

Duties of the EPC H&S Manager are as follows

- Ensure the preparation, revision, and implementation of the health and safety-related plans and documents in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
- Collaborate with internal teams (e.g., E&S, Legal, Procurement) to integrate E&S criteria into subcontractor contracts.
- Ensure timely and appropriate resolution of complaints related to occupational health and safety.
- Ensure the completion of the safety inductions, toolbox talks, and job-specific training, safety briefings, and daily pre-task planning meetings to reinforce safety culture and awareness on site.
- Contribute to project risk assessments and job hazard analyses (JHAs) and ensure these are updated regularly.
- Supervise the integration of safety controls into daily work permits, toolboxes, and field activities.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Conduct and lead a comprehensive accident and incident investigation process. Analyse trends from incidents and near-misses to identify systemic issues and develop long-term preventive strategies.

- Conduct the site-specific H&S training plans and programs for EPC and subcontractors.
- Provide technical support to EPC and subcontractors for the proper implementation of the health and safety plans.
- Ensure the accurate records of inspections, incidents, safety meetings, and training records
- Ensure the corrective actions process is followed up on by all parties strictly.
- Report on H&S performance, non-compliance, and corrective actions to the EPC Project Director.
- Track and analyse safety performance metrics (e.g., LTIs, near misses, TRIR) and recommend corrective measures.
- Engage with regulatory authorities on inspections, audits, and compliance verification.
- Maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project.
- Implement health, safety and community safety measures through site practices and method statements.
- Ensure the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site.
- Coordinate emergency preparedness and response procedures, including drills and communication protocols, in collaboration with relevant departments.
- Prepare regular reports to Project Director summarizing H&S performance, compliance status, and key risks.
- Foster a safety-first culture by promoting active participation, feedback, and ownership of safety responsibilities at all levels of the workforce.

EPC HSE Chief

The EPC HSE Chief who will be reporting to EPC E&S Manager. The number of the H&S Chief will be defined considering the existing workload, work locations and the work plan of the EPC Contractor.

The EPC HSE Specialist will be responsible for supporting H&S Manager and monitoring the compliance of all activities associated with the Project against the requirements of the ESMP and any other relevant health and safety legislation defined in this Plan.

- Implement the safe execution of all construction site activities in accordance with project standards, procedures, legal requirements, international standards, lender and SPV requirements.
- Support all employees in fulfilling the conditions and obligations of this health and safety plans during project activities.
- Provide technical support to Contractor/subcontractors.

- Ensure the completion of the safety inductions, toolbox talks, and job-specific training, safety briefings.
- Monitor the compliance of Contractors/Subcontractors with the requirements of the health and safety plans and report non-conformities.
- Maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project.
- Monitor health, safety and community safety measures through site practices and method statements.
- Review and validate training records and related documentation from Contractor/Subcontractor.
- Participate a comprehensive investigation in the event of accidents, incidents, or near misses.
- Implement and monitor the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks.
- Prepare regular reports to H&S manager summarizing H&S performance, compliance status, and key risks.

EPC HSE Engineer

The EPC HSE Engineer who will be reporting to SPV HSE Chief. The number of the HSE Engineer will be defined considering the existing workload, work locations and the work plan of the EPC Contractor.

The EPC HSE Engineer will be responsible for supporting HSE Chief and monitoring the compliance of all activities associated with the Project against the requirements of the ESMP and any other relevant health and safety legislation defined in this Plan.

- Implement the safe execution of all construction site activities in accordance with project standards, procedures, legal requirements, international standards, lender and SPV requirements.
- Perform the implementation and compliance of the conditions and obligations specified in the H&S Plan during project activities.
- Support all employees in fulfilling the conditions and obligations of this health and safety plans during project activities.
- Provide technical support to Contractors/Subcontractors for the implementation of health and safety plans.
- Review and maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project.
- Review the health, safety and community safety measures through site practices and method statements.

- Monitor the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site.
- Review and validate training records and related documentation from Contractor/Subcontractor
- Support a comprehensive investigations in the event of accidents, incidents, or near misses, ensuring findings are documented and corrective actions are implemented.
- Ensure the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks.
- Follow prompt and structured resolution of complaints related to public health, safety, and security.

EPC HSE Technician

The EPC HSE Technician who will be reporting to SPV HSE Engineer. The number of the HSE Tehcnician will be defined considering the existing workload, locations and the work plan of the EPC Contractor.

The EPC HSE Technician will be responsible for supporting HSE Engineer and monitoring the compliance of all activities associated with the Project against the requirements of the ESMP and any other relevant health and safety legislation defined in this Plan.

- Support the implementation of the Health, Safety, and Environmental (HSE) Management Plans on-site.
- Conduct field-level hazard identification and risk assessments under the supervision of the HSE Engineer or HSE Chief.
- Assist in the inspection of site conditions, equipment, and practices to ensure compliance with HSE protocols.
- Monitor proper use of PPE by workers and subcontractors and ensure daily compliance.
- Assist in the documentation of incidents, near-misses, and unsafe acts/conditions.
- Support the organization of safety toolbox talks and drills, and participate in site safety briefings.
- Assist in maintaining updated HSE records, permits to work, and site-specific risk registers.
- Coordinate with site teams to ensure safe work zones and adherence to safety signage and barriers.
- Escalate HSE issues and observations to senior HSE personnel for timely corrective actions.
- Promote a proactive safety culture through daily site presence and informal engagement with workers.

EPC HSE Worker

Duties of the EPC HSE Worker are as follows

- Perform routine safety checks and observations on construction activities to support accident prevention.
- Support field-level enforcement of basic HSE requirements such as PPE usage, housekeeping, and emergency access.
- Report unsafe behaviours, near-misses, or incidents to the HSE Technician or Engineer.
- Assist with basic safety logistics such as placement of safety signs, first aid kits, and fire extinguishers.
- Provide assistance during emergency drills and real-time evacuations if needed.
- Participate in on-site HSE briefings and serve as a communication link between labour teams and HSE staff.
- Support the distribution and collection of HSE materials, permits, and records.
- Assist in controlling site entry for compliance with safety rules (e.g., helmet, vest, ID badge).
- Support spill response and clean up efforts as guided by supervisors.

EPC Trainer and Document Controller

Duties of the EPC Trainer and Document Controller are as follows

- Develop and deliver HSE training modules tailored to job roles and risk levels in collaboration with the HSE Manager.
- Maintain training matrices, attendance records, and competency certifications for all EPC and subcontractor staff.
- Organize safety induction programs for new employees and visitors.
- Organize refresher trainings, emergency drills, and awareness campaigns (e.g., heat stress, confined space).
- Ensure that all training materials, method statements, and HSE procedures are up-to-date and properly archived.
- Manage document control systems related to HSE plans, permits, inspection reports, and safety data sheets.
- Ensure traceability of document revisions and compliance with audit requirements.

- Support internal and external audits by providing required HSE documentation and evidence.
- Contribute to the improvement of training content based on site observations and lessons learned

Site Doctor

Adequately experienced and certified Occupational Doctors will be employed as required according to national regulation requirements.

Duties of the Site Doctor are as follows

- Ensure and support the preparation, revision, and implementation of the health and safety-related plans and documents in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards, disease control guidelines, industrial good practices, and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Provide on-site medical care, first aid, and emergency response to site personnel.
- Monitor the health status of workers through routine check-ups, Pre-employment or pre-placement examinations and undertake health assessments for fitness to work.
- Maintain accurate and confidential health records and incident logs.
- Identify and manage occupational health risks and recommend preventive measures.
- Ensure availability and readiness of medical equipment, first aid kits, and emergency protocols.
- Conduct health awareness sessions and support mental health and wellness programs.
- Coordinate with H&S teams to implement hygiene, sanitation, and disease control measures.
- Ensure compliance with local occupational health laws and project-specific health standards.
- Collaborate with external hospitals or clinics for referrals and medical emergencies.
- Participate in site inspections and contribute to health-related sections of HSE audits.
- Provide medical input to risk assessments, method statements, and H&S Plans.
- Support pandemic response procedures as needed.
- Detect occupational injuries and illnesses and prepare relevant prevention plans.
- Track of all health records of all employees including occupational injuries and illnesses.

Paramedic

Adequately experienced Paramedic will be employed for each shift.

Duties of the Paramedics are as follows

- Provide immediate emergency medical care, stabilize patients, and coordinate medical evacuation when necessary.
- Assist the Site Doctor in conducting health checks, maintaining patient records, and supporting follow-up treatments.
- Monitor the stock and condition of emergency medical supplies, medicines, and first aid kits.
- Respond to health-related incidents, accidents, or illnesses on-site and record incident details accurately.
- Participate in health and safety drills and emergency response exercises.
- Support hygiene monitoring and health awareness campaigns.
- Maintain clean, safe, and operational medical facilities and first aid stations.
- Contribute to incident investigations involving health or medical issues.
- Report health risks or trends to the Site Doctor and H&S Manager.

All Workers, Subcontractors and Suppliers

All workers including subcontractor's workers will fulfil the requirements of the OHS training that they receive and will take the necessary precautions in their work. In addition, all workers will report all dangerous situations and behaviours, accidents, injuries, and near-misses that occur in the worksite.

Visitors and Consultants

All visitors and project consultants will receive general OHS site induction before entering the site to recognize specific workplace hazards or potential hazards. No visitors will be allowed in the Project Area without general OHS training and an accompanying trained employee/guide with them.

5. COMMUNICATION

The EPC Contractor will develop and maintain clear lines of communication for keeping all parties informed of OHS issues. Matters to be communicated to all employees, subcontractors, the SPV will include but not be limited to;

- Requirements of the OHS Plan
- Site OHS rules
- Relevant OHS procedures and instructions
- Scheduled events (training, meetings, consultation sessions, toolbox talks, etc.)

- OHS induction and training requirements
- Emergency procedures and emergency contact numbers
- Safety notices
- Incident reports / lessons learned
- OHS hazards
- Safe work method statements
- Job Safety analyses
- Requirements from Safety Data Sheets
- Safety non-conformances and agreed corrective actions

The above matters and any other matter that needs to be communicated to employees; subcontractors will be communicated via the following mechanisms;

- Site inductions
- Pre-start briefing
- Toolbox talks
- Posting information on notice boards/safety boards
- Emails
- Flyers
- Formal and informal meetings

Relevant HSE matters shall also be communicated to the SPV. All contractually required statistics and information shall be submitted to the SPV periodically in the form of a report.

5.1. Relations with Legal Authorities

Official correspondence related to OHS shall be submitted to the EPC H&S Chief by the EPC Project Director. The initial evaluation regarding the subject will be carried out by the EPC H&S Manager, who will verbally inform the EPC Project Director, and further actions will be decided accordingly.

5.2. Complaints and Suggestions friom Relevant Stakeholders

Complaints and suggestions received from relevant stakeholders (client, neighboring facilities, citizens, all workers, etc.) shall be processed by the H&S Chief, and related correspondence will be handled by the Project Director. All workers shall be adequately informed about the scope of occupational health and safety legislation and their rights. Suggestion boxes will be placed at specific points on the construction site, allowing workers to submit complaints or feedback. All complaints and suggestions will be recorded and tracked.

5.3. Communication and Meetings with Subcontractors, Suppliers and Employees

Initial Monthly EPC & SPV OHS Meetings:

OHS personnel (H&S Manager, Environmental Engineers, H&S Specialists, HSE Foremen, and Community Liaison Officers) shall organize monthly internal meetings.

The decisions taken will be documented through a **Meeting Minutes Form** and distributed to all members and responsible parties. Follow-up of these decisions will be carried out by the H&S Chief.

AAOIAS shall be invited to the Antalya-Alanya Motorway Project OHS Department meetings via email notification that includes the meeting date, location, and agenda.

The agenda for these meetings will include at least but not limited:

- Status of the Project
- Open items on previous MoMs
- Accidents, incidents and near misses and lessons learned
- OHS Committee Meeting Decisions

New Subcontractor OHS Meeting (OHS Kick-Off Meeting):

An initial OHS meeting will be held with all new subcontractors (represented by their own management teams), attended by the relevant Linet Manager/Chief and the H&S Manager/Chief. The agenda for these meetings will include at least but not limited:

- Project OHS Rules
- HSE Requirements per the Contract
- Project HSE Plan
- HSE organizational structure
- Documentation requirements (employees, equipments, materials, etc.)
- Employees onboarding and assignment procedures
- Provision of protective controls and necessary resources for high-risk activities (qualified personnel for OHS topics, supervision and inspection requirements, emergency equipment, etc.).
- Noise restriction, including local requirements
- Interfaces with other subcontractors
- Reporting of incidents and accidents and near misses.
- Permit to Work System – administration and requirements
- Any other specific anticipated hazards related to the new work scope
- Environmental considerations

Limak will ensure that all subcontractors comply with the Occupational Health and Safety (OHS) requirements outlined and in applicable national and international standards. Prior to mobilization, subcontractors shall submit their site-specific OHS plans and risk assessments for review and approval. Limak HSE Department shall conduct on boarding audits and site inspections to verify readiness. During construction, subcontractor performance shall be monitored through regular inspections, safety performance evaluations, participation in joint toolbox talks, and review of incident records. Non-conformities shall be documented and followed by time-bound corrective actions. Repeated or serious non-compliance may result in work suspension or termination in accordance with contractual provisions. Monthly compliance reports shall be submitted by each subcontractor and consolidated by Limak for reporting to lenders and relevant authorities. All contractor-related HSE documents shall be kept on file for a minimum of five years and made available upon request.

In addition, all subcontractors shall prepare and submit their site-specific Occupational Health and Safety (OHS) Plans prior to mobilization for review and approval by the Limak's HSE Department. These plans must align with the overarching Project OHS Management Plan, relevant Turkish legislation (6331 sayılı Kanun), and applicable international standards including IFC EHS Guidelines. The review process

shall assess risk identification, mitigation measures, emergency preparedness, training plans, and roles and responsibilities. Subcontractors shall not commence any site activities without formal written approval of their OHS Plans. Once approved, subcontractors are required to submit monthly OHS compliance reports, including leading and lagging indicators (e.g., training sessions conducted, near misses, incidents, inspections, and non-conformities). These reports shall be reviewed by the Limak HSE Department, consolidated, and included in periodic lender reporting. Limak reserves the right to suspend or terminate subcontractor operations in case of serious or repeated non-compliance.

Biweekly Antalya-Alanya Motorway Project – Subcontractor OHS Meetings:

These meetings will be held following the weekly OHS site visits. The agenda will include current OHS issues, observations from site visits, and OHS topics for upcoming tasks.

Weekly Site Walkdown
The EPC Contractor conducts weekly HSE walkdowns to monitor site HSE performance. It is going to be performed by the attendees of EPC HS Department, EPC Construction Manager, SPV HS Department and Subcontractor Site Lead HSE representative and Subcontractor Site Manager. Within 2 days of the walkdown, A Walkdown Report will be prepared with in 2 days after the site tour. The Report will be prepared by EPC HS Manager with the observation and corrective actions. The Report Distribution List shall be included as a minimum to;

- SPV General Manager and all Line Manager also HS Team
- EPC Project Director and all Line Manager also HS Team

All Subcontractor Project Management Team *OHS Committee and Meetings*

The EPC Contractor will establish an OHS Committee “Committee” to bring together management and workers to help create and maintain a safe workplace. The Committee will participate in the development, implementation and monitoring of health and safety policy and procedures. The committee will receive safety concerns from workers and help investigate and resolve them.

The size of the committee will depend on the total number of workers and in compliance with the Regulation on Occupational Health and Safety Committees. The Committee should have representation from both management and workers, as well as from all departments and shifts.

The committee will hold regularly scheduled meetings, at least once every month. The committee should be of sufficient size and number to provide for effective representation of the workforce.

The members of the committee will include, but not limited to:

- Project Director,
- H&S Manager,
- H&S Chief
- Site Doctor,
- Human Resources Chief,
- Construction Manager,
- Security Manager,
- Workers’ Representatives from each subcontractor and from each shift.

The H&S Chief is responsible for the committee secretariat. The Worker's Representative shall be elected by open vote at a meeting attended by more than half of the foremen, supervisors, or masters. If an election cannot be held, the representative shall be appointed by the Project Director. When determining the candidates for Worker's Representative, the Communiqué on the Qualifications of the Occupational Health and Safety Employee Representative and the Procedures and Principles of Election shall be taken into consideration.

SPV will conduct an OHS Committee Meeting Training on below items to all members of the Committee:

- Organisation Chart of the Project
- Duties and rights of the Committee
- Regulations on HSE
- Common accidents and their root causes on construction sites
- Industrial hygiene rules
- Behavioral trainings
- Emergency procedures
- Occupational illnesses
- Specific risks about the construction sites
- Grievance mechanism

The responsibilities of the safety committee will be to:

- Review and annually approve the Health and Safety Policy,
- Review the procedures, working practices and performance regarding health and safety and recommend improvements as are considered appropriate,
- Receive reports from the HS team as to health and safety performance including workers' wellbeing, and specifically any major health and safety incidents, so as to ensure that management identify and implement any corrective action considered appropriate in order to achieve compliance and raise performance where required,
- Ensure that all department managers are kept informed of their health and safety responsibilities and duties as necessary,
- Ensure that the alignment with any regulatory changes in relation to health and safety and the impact such changes may have on the Project,
- Monitor the resources provided by EPC Contractor in relation to health and safety and where appropriate receive reports from independent advisers,
- Review the main risks faced by the EPC Contractor in relation to health and safety,
- Communicate with employees regarding safety committee activities,
- Review incidents, injuries and illnesses,
- Review of accident statistics and trends, so that reports can be made to management on unsafe and unhealth conditions and practices, together with recommendations for corrective actions,
- Record and review any complaint and/or recommendations from workers, and discuss the actions to be taken against those complaints and/or recommendations.

OHS Minutes of Meeting will be prepared and shared with EPC and subcontractors via e-mail and safety Boards. OHS Committee meeting invitations shall be sent via e-mail, WhatsApp, and safety boards at least 48 hours prior to the scheduled meeting date.

Pre-Work and Safety Meetings

To increase OHS awareness and enhance the effectiveness of training programs, a daily pre-work meeting will be conducted. The pre-work meeting will be organized by the H&S Manager/Chief and subcontractor representatives for their respective workers. In the absence of the H&S Manager/Chief, the responsibility for conducting the meeting will rest with the OHS personnel, whose main responsibility includes supporting the H&S Manager/Chief. The H&S Manager/Chief must notify their absence at least two days in advance.

In addition to the daily pre-work meeting, a weekly safety meeting (at least 20 minutes) will be held for all workers and documented using the OHS Safety Meeting Form. The safety meeting agenda will be distributed by the H&S Manager/Chief at the beginning of each week to all parties.

Subcontractors shall submit their own safety meeting forms to the H&S Manager/Chief on a weekly basis.

Monthly SPV and EPC Coordination Meeting

Monthly Coordination Meetings are held to review and discuss the Contractor's progress reports and any other relevant topics. These meetings take place as soon as possible after the submission of the monthly report. All meetings are held at locations as deemed appropriate by the SPV.
Meeting participants are defined by each Party depending on the topic under discussion.
The EPC suggests a meeting agenda be commented on or completed by SPV. The Monthly Coordination Meetings are held with the EPC Project Director and Construction Manager and H&S and E&S Manager, SPV General Manager, H&S Manager, E&S Manager, Expropriation Manager, and Line Managers to review all aspects of construction, including planning, coordination, and environment, safety and resourcing.
The EPC records the minutes of the meeting. The MoM will be reviewed and signed at the end of the meeting by all Parties for agreement on wording.

6. TRAINING

All safety training programs, including site inductions, task-specific training, toolbox talks, and emergency response drills, shall be provided to all personnel—including subcontractor and third-party workers—in a language they fully understand. Limak shall ensure that all training materials, verbal instructions, and written assessments are delivered in the worker's native language or in a language that ensures full comprehension. Where diverse languages are spoken on-site, multilingual trainers or interpreters shall be engaged to prevent any misunderstanding of critical safety procedures. Attendance and comprehension shall be verified through sign-in sheets and, where applicable, practical demonstrations or assessments. Training records shall be maintained for each individual and subject to audit by the HSE Department. No worker shall be allowed to commence site activities without having completed the mandatory safety training in an appropriate language.
Level 1, Level 2 and Level 3 trainings are an obligation for all employees in accordance with the Regulation on Worker Health and Safety Training.

7.1 Level 1 Training Programs and Visitor Information

Level 1 Training, which will last at least 2 hours, is also called "OHS Initial Training/Site Induction" and is given by the H&S Manager/HSE Chief/HSE Technician to cover all Antalya-Alanya Motorway Project, subcontractor and supplier employees. Those who have not received this training are not allowed to enter the construction site or work in the field. The content of the training and revisions are subject to the approval of the H&S Manager/Chief.

The topics covered in this training are as follows:

- Integrated Management System Policy
- OHS and Environmental Principles
- OHS and Environmental standards, rules and practices
- Risk assessment
- Emergency preparedness and response
- Any special hazards associated with the activities
- Incident/accident management, near misses
- Traffic safety
- Environmental awareness
- Pollution prevention
- Waste management
- Proper use and maintenance of personal protective equipment (PPE)
- Correct use of machinery and electrical equipment
- Brief description of the project and the works covered by the project
- Basic legal requirements regarding OHS
- Legal rights and responsibilities of employees
- Antalya-Alanya Project's HSE rules
- Project OHS Plan
- Project OHS rules and employees' responsibilities
- Project emergency management practices
- Grievance Mechanism

Short-term visitors who will not be working on the construction site are subject to the short version of this training program (initial briefing) given by the H&S Manager/Chief/Expert. Visitors who do not attend this briefing session cannot enter the construction site.

7.2 Level 2 Training Programs

Level 2 Training programs are also called "job-specific OSH training" and are provided due to the risks associated with the work to be performed. Subcontractors and suppliers are responsible for providing these training programs for their own employees and training records will be submitted to the OSH Manager/Chief.

7.3 Level 3 Training Programs

Level 3 Training includes "advanced OSH training programmes" that are required for advanced qualifications or are specific to the task to be performed (first aid personnel or emergency management team member training, etc.).

The Annual OHS Training Plan is prepared by the H&S Manager and Site Doctor every January. The Project Manager is responsible for the approval of the Annual OHS Training Plan. This Training Plan covers all training which is specified under the Regulation on Occupational Health and Safety Training of Employees.All training activities, including Initial Training and Visitor Information, will be recorded.

In order to obtain feedback from the participants, a training evaluation form will be used for half-day or longer programs. Subsequent activities will be monitored by the H&S Manager/Chief after analyzing this feedback. Following the training programs, relevant tests will be applied to measure the level of understanding of the participants.

7.4 Qualification Assessment

To ensure that relevant training programs are effective and that workers have the skills, experience, abilities and knowledge required to perform their jobs safely, their competence should be assessed. The methods for this assessment are:

Training Tests: After all trainings, tests will be distributed to measure the understanding and knowledge level of the participants. The main topics of the tests will be:

- What are the dangers
  - The impact of hazards and how they can affect people
  - How to assess risk and decide on appropriate controls
  - Basic elements of this plan
  - How occupational health and safety law applies to the workplace

- Daily Field Observations: The H&S Manager/Chief and representatives will conduct daily field observations. While conducting these observations, they will check whether the employees are performing their duties in accordance with the occupational health and safety rules and measures. If a non-conformity is detected, they will warn the employee and may also instruct the relevant training to be given again. In addition, they will randomly ask questions to the employees about the occupational health and safety rules and measures and conduct interviews with them.
- Identified Hazards: Employees will be encouraged to report any hazards they identify during work. These hazards will be assessed by the H&S Manager/Chief and their representatives, and the quantitative and qualitative identification of hazards will be an indicator of competence.

7.5 Toolbox Trainings

When a new work commences on the site or when the site conditions or hazards/risks change significantly; Site chiefs and supervisors or the OHS and Environment Manager/Engineer shall provide toolbox training to announce the work-related information and instructions, the work-specific hazards/risks and control measures necessary to eliminate/mitigate these risks. Training shall take place between small groups of employees assigned to carry out a private work and the content of the training shall include the following:

- The hazards/risks associated with such works and the control measures necessary to eliminate/mitigate these risks
- The deficiencies or omissions identified on site OHS and environment audits
- Use of PPE
- Any accidents/incidents in the past and the lessons learned from them
- General arrangement and organization
- Acting in accordance with the warning signs and warning signboards/tags.

The employees are always preferred and encouraged to tell about their past experience regarding the work.

The records for each toolbox training shall be kept indicating that it is a toolbox training and shall be maintained by the OHS and the Environment unit.

7.6 Basic OHS and Environmental Training

It is mandatory to receive Basic OHS and Environmental Training before being assigned to any work site. Employees who do not attend this training, including Subcontractor employees, will not be allowed to work on site. Basic OHS and Environmental Training will be renewed periodically to refresh the information.

Visitors will also be given a Visitor Training covering basic topics such as general field OHS and Environmental rules, emergency preparation, use of PPE in the field, etc. before entering the field. The safety rules that all visitors to the work areas must follow are defined in **the Visitor Safety Instruction.**

All OHS and Environment related trainings to be given to employees are planned and recorded in **Annual Training Plan**. Each training conducted will be recorded and evaluated with **Training Participation Form**. All records will be kept by OHS and Environment unit.

7. GENERAL MANAGEMENT OF HAZARDS AND RISKS

The purpose of the Risk Assessment is to define the hazards related to the operations and work activities within the Antalya Alanya Motorway Project, to determine the risks for each hazard and to rate the risk magnitudes with the risk analysis method explained in **Occupational Health And Safety Risk Analysis Procedure**; to determine the relevant risk control methods and improvements to be made in order to eliminate or reduce the risks in question and to reduce the risks to an acceptable level.

Risk analyses cover the activities of all departments, supplier and subcontractor activities, and the hazards that all employees, visitors and those in neighboring areas may be exposed to.

7.1. Potential Hazards

According to the Project ESIA Report, hazards and risks to occupational health and safety are defined as follows:

- **Health and safety risks due to general occupational health and safety hazards:** A large workforce will be employed during the site preparation and construction phase of the Project. The activities of field personnel will carry the typical construction risks encountered on construction sites, such as risks arising from moving equipment, working at heights, working on water, excavation, confined spaces, working with electricity, etc.

- **Health and safety risks due to physical and chemical hazards:** Physical hazards refer to the possibility of accidents, injuries or illnesses that may occur due to repeated exposure to mechanical movement or work activity. Construction and maintenance personnel may be exposed to physical hazards during the land preparation and construction phase of the Project. Dust generated during excavation works, exhaust emissions produced by numerous construction machines, and harmful substances used for painting and paving activities are among the main sources of chemical hazards for the workforce carrying out construction work.

- **Health and safety risks from construction traffic:** Poorly trained or inexperienced drivers will increase the risk of accidents with other vehicles, pedestrians and equipment. In addition, heavy equipment operators have very limited visibility near the machines they are using and may therefore not see pedestrians in the vicinity of their vehicles.

- **Health and safety risks due to emergencies:** Emergency situations such as accidents, fires, natural disasters, etc. may occur during the land preparation and construction phase of the Project. If these are not managed appropriately, risks related to the health and safety of personnel working in the Project may cause concern.

- **Health and safety risks due to poor accommodation conditions:** No significant number of workers, including permanent or contracted workers, will be used in the land preparation and construction phase. Accommodation will be provided in the Camp Sites within the scope of the

Project. Therefore, the promotion of safe and healthy working conditions and the provision of good working and accommodation conditions will be important in this phase of the Project

8.2 Mitigation Measures

Potential hazards will be managed appropriately during the construction phase by implementing risk mitigation measures for each hazard as outlined below.

8.2.1 General Occupational Health and Safety Measures

- Project Sponsor will ensure that qualified first-aid can be provided at all times at the working/construction sites.
- Adequate lightning (that would not distract drivers' sight) will be provided for works to be conducted at night-time. Lightning system will be moved forward in parallel to the progress of works.
- Good cooperation will be ensured with local medical services.
- A system will be established for the reporting and recording of occupational accidents and dangerous occurrences/incidents.Personal protective equipment will be selected based on the specific hazards and risks involved in the task to be performed and will be properly maintained to ensure that they are effective and functional throughout their lifespan. It should be noted that personal protective equipment should be considered as a last resort. All other necessary active and embedded control measures should be taken first. The approach of the Antalya-Alanya Motorway Project envisages not to rely solely on personal protective equipment.
- Personal protective equipment/devices (PPE/PPD) and seasonal working outfits, meeting the requirements of the relevant Turkish regulations and good site practices, will be provided to all construction personnel by the Project Sponsor at no cost. Effective use of the PPEs/PPDs by the construction personnel will be monitored and ensured by the Project Sponsor.
- Sub-contractor workers will also be strictly required to use necessary PPEs/PPDs by means of contractual stipulations to be done with the sub-contracting companies.
- Orientation training will be given to all newly hired personnel.
- In addition to orientation training, all permanent and contract workers will receive relevant training before starting their new duties (change of workplace/task, change of machinery and equipment worked on, introduction of new technologies, etc.).
- Employees assigned to rescue and first aid will be given special training on this subject.
- In addition to having first aid equipment and a doctor in the campsite, it is recommended to make agreements with private hospitals in the surrounding area, as these measures may not be enough in possible situations.
- Through appropriate contract specifications and monitoring, service providers and contract and subcontracted workers will be ensured to receive adequate training before starting work.
- A visitor orientation and control program will be established to ensure that visitors do not enter danger zones without an escort. In this regard, relevant checkpoints and record keeping practices will be used to ensure the safety of both business and visitors.
- Properly maintained construction machinery, equipment and vehicles shall be used to ensure that all alarms, brakes, lights, seat belts and other general safety devices are operating normally and that tyre pressures, windows, mirrors and closed circuit camera systems (if any) are in working order. Accordingly, relevant users shall perform quick checks prior to use, for example by testing the brakes for operation and checking that lights are on.
- Construction equipment will not be left in any enclosed space close to the work area. Concrete pumping operations shall be conducted under a valid Permit to Work (PTW), particularly in areas near excavations, live traffic, or overhead power lines.
- All operators must be trained, competent, and certified, and possess equipment-specific knowledge (in line with EN 12001 and ISO 21573)
- Concrete pump trucks must be parked on stable, level ground, with outriggers fully deployed on load-distributing plates to ensure stability.

- Daily pre-operation checks will be conducted and recorded, including inspection of pump stability systems, hoses, clamps, and couplings, remote controls and emergency stop buttons.
- All maintenance or cleaning of the hopper must be performed only after power is locked out, and hopper guards must never be bypassed or removed.
- Warning signs and physical barriers will be placed around the boom's swing radius to restrict unauthorized access.

8.2.2 Measures againts Physical Hazards

- Safe work zone will be established to separate workers on foot from the traffic.
- For the construction works to be conducted at location where traffic exists, safe work zones will be established by taking relevant measures (closure of roads, diversion of traffic, use of protective barriers, cones, warning lights, etc.)
- Dedicated traffic management plans shall be developed and implemented
- Unauthorized entry will be prevented by barricading the area where elevated work is being done, and personnel on elevated structures will avoid working underneath them.
- Cranes and lifting equipment shall be classified and properly maintained, and operators shall be trained in their use. Lift platforms shall be maintained and operated in accordance with established safety procedures, including the use of fall protection measures (e.g., guardrails), equipment movement protocols (e.g., moving only when the lift is in the retracted position), ensuring repairs are performed by qualified personnel, and the installation of locks to prevent unauthorized use by untrained persons.
- Ladders shall be used in accordance with established safety procedures regarding proper placement, climbing, standing and use of extension pieces.
- When working at heights, appropriate fall protection measures shall be applied. Safety belts of suitable thickness and made of suitable materials providing sufficient strength shall be used. Rope safety belts shall be replaced before signs of wear and fraying become too apparent. When operating power tools at heights, workers shall use a second (spare) safety belt.
- Personnel exposed to high levels of noise will be required to use personal hearing protection devices/equipment, which will be provided free of charge. If required for specific tasks, job rotation programs will be implemented to reduce cumulative exposure.
- Weather forecasts will be monitored for outdoor work to provide early warning of unusual weather conditions and plan work accordingly. Protective clothing will be used when necessary.
- Work above 2 meters must not be performed without a valid Permit to Work (PTW) and fall protection measures.
- Use of full-body harnesses connected to certified anchor points is mandatory.
- Scaffolding must be erected, inspected, and certified by competent personnel before use (in line with Turkish Regulation on Work Equipment).
- All trenches deeper than 1.2 meters must have shoring, benching, or sloping based on soil classification (per Regulation on Occupational Health and Safety in Construction Works).
- A competent person must inspect excavations daily and after any weather event.
- Access and egress ladders must be provided every 7 meters.
- Confined spaces shall be identified, registered, and marked with appropriate warning signs at all entry points.
- Entry is only permitted under a valid Confined Space Entry Permit (CSEP) issued by a competent person, and the permit must be renewed daily.
- All personnel involved (entrant, attendant, supervisor) must be trained and authorized for confined space operations.
- Entry points must be unobstructed and large enough to allow for emergency rescue, as per Turkish regulations.
- A trained attendant shall remain outside the confined space at all times, maintaining communication with the entrant.
- A dedicated Confined Space Rescue Plan shall be prepared for each space, and rescue drills shall be conducted at least every 6 months.

- An entry logbook shall be maintained at each entry point, showing times of entry/exit and atmospheric test results
- All trenches deeper than 1.2 meters must have shoring, benching, or sloping based on soil classification (per Regulation on Occupational Health and Safety in Construction Works).
- A competent person must inspect excavations daily and after any weather event.
- Access and egress ladders must be provided every 7 meters
- Life vests must be worn near open water.
- Emergency rescue equipment for working over/near water (lifebuoys, throw ropes) will be available.
- Rescue drills for working over/near water will be conducted.
- All tools and equipment must have CE certification and maintenance records.
- Only trained personnel are authorized to operate tools/machinery.
- Daily pre-use checks for tools/machinery will be logged.
- Lone workers must carry emergency communication devices.
- In ısolated works "check-in/check-out" protocol will be implemented by supervisors.
- High-risk lone work is prohibited unless supervised or with a buddy system
- Hot work permits are required and will be issued daily.
- Fire watch and fire extinguishers will be present.
- Gas cylinders will be stored upright, away from ignition sources, and fitted with flashback arrestors
- For cold or hot weather, work-rest cycles will be defined.
- Shade and hydration will be provided in summer; thermal clothing and warm shelters in winter.
- Concrete pump boom arms and delivery lines must not operate within 5 meters of overhead power lines unless officially isolated and confirmed by utility authorities.
- All pipes and hoses for concrete pump will be securely clamped and equipped with restraint cables or chains to prevent hose whipping or accidental disconnection.
- Concrete pump operators will test emergency stop devices and pressure release valves before beginning operations.
- In case of pipe blockage for concrete pump; pumping will stop immediately, pressure will be relieved before disconnection or flushing and only trained personnel may intervene using proper tools and PPE.
- Concrete pump’s vertical delivery systems will include non-return valves and support structures to prevent collapse or uncontrolled material discharge.
- Mechanical and hydraulic components for concrete pump (hoses, cylinders, fittings) will be inspected regularly for wear, corrosion, and leaks.
- All electrical systems associated with the pump shall comply with EN 60204-1 and include fail-safe remote control systems.

8.2.3 Measures againts Chemical Hazards

- Properly maintained construction machinery, equipment and vehicles will be used to minimize air emissions.
- Engine idling time will be reduced in construction sites.
- Direct diesel exhaust will be properly disposed of to minimize operator exposure.
- Interior work areas where vehicles or engines will be operated shall be ventilated or exhaust gases shall be diverted appropriately.
- Lead-containing paints containing shall be avoided and appropriate respiratory protection shall be worn when cutting galvanized steel
- Dust masks will be used by relevant personnel in work areas where dust levels are excessive.
- Hazardous materials will be replaced with a less hazardous substitute whenever feasible.
- Engineering and administrative control measures will be performed in order to prevent or reduce the release of hazardous materials into the work site. Level of exposure will be kept below internationally established or recognized limits.
- The number of workers to be exposed will be kept in minimum.

- Hazardous materials will be labelled and marked properly considering national and international regulations and guidelines. Materials Safety Data Sheets (MSDS) will be prepared. All written communication will be readable and available to workers to be exposed and first-aid personnel.
- Workers will be trained in use of information related to hazardous materials (MSDSs etc.), safe work practices and appropriate use of PPE.
- Before entry, atmospheric testing shall be performed using calibrated detectors by trained personnel.
- Continuous gas monitoring is required during confined space activities, with immediate evacuation if limits are exceeded.
- Mechanical forced ventilation must be used to control the concentration of hazardous gases and ensure adequate oxygen levels. Personnel working in atmospheres with residual chemical vapors or insufficient oxygen shall use SCBA (Self-Contained Breathing Apparatus) or equivalent.
- Containers or vessels previously used for storing hazardous substances must be cleaned, inerted, and certified gas-free before entry.
- SDSs (Safety Data Sheets) for all chemicals used or previously stored in the confined space must be reviewed before work begins.

8.2.4 Measures againts Emergencies

- An Emergency Response Plan will be prepared and implemented that includes:
    - Emergency response in cases such as spills, accidents, earthquakes, floods
    - Procedure for reporting incidents for staff and subcontractors and investigation, correction and protective actions for such incidents
    - Regular emergency response training, including on the use of spill response equipment
    - Emergency Communication Procedure, including with local communities and authorities

8.2.5 Measures againts Construction Traffic

- A safe work area will be created to separate walking workers from traffic.
- For construction work to be carried out in areas with traffic, safe working areas will be created by taking the relevant measures (closing roads, directing traffic to another direction, using protective barriers, cones, warning lights, etc.).
- Weather forecasts will be monitored to provide drivers with early warning of unusual weather conditions and plan work accordingly.

8.2.6 Measures againts Workers Accommodation Conditions

- The accommodation provided will be clean and safe, will meet the basic needs of the workers and will provide each worker with a minimum amount of space for sanitation, laundry and cooking facilities. Overcrowding will be avoided.
- Heating, air conditioning and ventilation facilities will be suitable for climatic conditions and will provide a comfortable and healthy environment for workers to rest and spend their free time.
- The drinking water to be provided for the project workforce and the water to be supplied for food preparation, washing and bathing areas will meet the requirements stipulated in the Regulation on Water Intended for Human Consumption.
- Sufficient toilet facilities (toilet, urinal, sink and shower) shall be provided according to the number of people expected to work in the facility and signs shall be available indicating whether

the toilet facility is “Occupied” or “Vacant.” Toilet facilities shall also be equipped with sufficient hot and cold water, soap and hand drying devices.

- Domestic wastewater and wastes from the Camp Sites will be managed and disposed of in accordance with the requirements set forth in the relevant Turkish regulations and good site practices.
- First aid and medical facilities as well as safety equipment against possible dangers (fire, etc.) will be provided in the Camp Sites.
- Residents of the Camping Sites will be informed about the rules regarding accommodation.
- There will be an infirmary, a domestic wastewater processing facility and a social facility in the construction site.
- Project’s Grievance Mechanism to be established will provide means to the Project personnel to express their complaints. Project Sponsor will ensure that the workers are informed of the grievance mechanism at the time of recruitment and make it easily accessible to them.

8. GENERAL RISK MANAGEMENT

The OHS management process of the Antalya-Alanya Motorway Project is implemented in accordance with the document Risk Assessment Procedure.

According to the Risk Assessment Procedure, OHS hazards will be determined from mobilization to job completion; relevant risks for jobs and facilities will be analyzed, relevant risk control methods will be determined and will be implemented on site and in relevant places accordingly.

Throughout the project, the risk assessment process will be carried out in 4 categories:

- General OHS risks (known risks, facilities, etc.)
- Risk assessments related to field works of Antalya-Alanya Motorway Project
- Risk assessments related to activities performed by subcontractors (prepared by the subcontractor and submitted to the Antalya-Alanya Motorway Project)
- OHS risk assessments related to non-routine field activities before the start of the field activity
- The risk assessment process will be recorded using the risk assessment form and will be communicated to the Antalya-Alanya Motorway Project subcontractor and supplier responsible persons.

8.1. Risk Assessment Method

The risk assessment methodology is based on the ISO 31000:2018 guide.

The risk score is calculated using the following basic risk assessment approach:

Risk Score (Risk) (R) = Likelihood of Occurrence (L) * Consequence (C)

Both likelihood of occurrence and consequence parameters are set to 5*5 quantitative grading method such that:

Scale of Likelihood of Occurrence (L):

Value	Level	Definitions / Criteria
A	Very unlikely	Not any event of this kind is known to have occurred but may rarely happen
B	Unlikely	The detected failure may cause damage in case of a simultaneous occurrence of several hardly probable independent events.

C	Possible	The detected failure may cause a damage only in the event of possible circumstances
D	Likely	The detected failure may cause a damage, even though not automatically or directly
E	Very Likely	There is a direct relation between the failure detected and the occurrence of assumed damage to the workers

Scale of Severity (S):

Değer	Seviye	Definitions / Criteria
1	*Negligible*	*Only first aid or near miss cases*
2	*Slight*	*No lost work day cases*
3	*Moderate*	*Lost work day cases*
4	*High*	*Injury or acute exposure event with effects of partial invalidity* *Chronic exposure with irreversible and/or partial invalidation effects*
5	*Very High*	*Injury or acute exposure event having lethal effects or total invalidity* *Chronic exposure with lethal and/or total invalidation effects*

The representation of the risk matrix is as follows:

LIKELIHOOD	**CONSEQUENCES**				
	Insignificant (1)	**Minor (2)**	**Moderate (3)**	**Major (4)**	**Catastrophic (5)**
(E) Very Likely	**M 11**	**H 16**	**H 20**	**E 23**	**E 25**
(D) Likely	**M 7**	**M 12**	**H 17**	**H 21**	**E 24**
(C) Possible	**L 4**	**M 8**	**H 14**	**H 18**	**H 22**
(B) Unlikely	**L 2**	**L 5**	**M 9**	**M 13**	**H 19**
(A) Very Unlikely	**L 1**	**L 3**	**M 6**	**M 10**	**H 15**

As indicated in above matrix, risks are classified in three levels and subsequent actions are as follows:

Very High Risk (Red Area): Stop work; immediate action required

High Risk (Yellow Area): Proceed work short time according to procedure under close supervision

Medium Risk (Blue Area): Corrective and/or preventive actions to be scheduled in the short-term

Low Risk (Green Area): Acceptable risk, existing risk control methods are to be and reviewed

8.2. Risk Activities and Management

As stated in Section 1.1, this Plan document covers only the construction phase of the Antalya Alanya Motorway Project and is valid for all activities of the Antalya-Alanya Motorway Project and its subcontractors (including sites subcontracted to third parties (quarries, borrow pits, etc.)). Therefore, the scope of influence is limited to all Project activities related to the construction process.

8.3. Job Specific Risk Asessments

Job Specific Risk Asessments / Job Safety Analysis (JSA) is a formal process to identify the dangers of specific job tasks in order to reduce the risk of injury to workers. It involves breaking down the steps of performing a job, identifying hazards at each step, and creating controls to keep workers safe while performing that task.

On the other hand, risk assessment is a formal process to identify potential hazards related to an activity or operation, analyse the level of risk associated with those hazards, and propose controls to reduce the level of risk. Oftentimes, a risk assessment will use a risk scoring system to assign numerical value to each risk depending on the severity and likelihood it will occur.

The key difference between job safety analysis and risk assessment is the scope. Job safety analysis has a much narrower scope, as it involves only job-specific risks. Risk assessment, on the other hand, gives a big picture view of all operational risks including environmental hazards, storm water and waste management, equipment maintenance, and more.

Job safety analysis will be completed by the immediate supervisor. The supervisor observes a worker perform the job and takes notes about potential hazards. By contrast, a risk assessment can be completed by anyone in the organization depending on what it's for. It can either be a self-assessment or completed by a third party such as a supervisor or EHS specialist.

JSA will be carried out for the following types of jobs, but not limited to:

- Jobs with the highest injury or illness rates,
- Jobs with the potential for severe injuries or illness,
- Jobs in which one error could lead to a severe accident,
- New jobs, or those that have undergone changes in processes and procedures,
- Complex enough to require written instructions.

Risk assessments, on the other hand, will be conducted any time a hazard is identified or there's a change to operations or methodologies that could introduce new risks.

9. MONITORING- MEASUREMENT AND INSPECTIONS

9.1. Monitoring and Measurement Activities

The parameters having significant impact on the OHS and environment due to the activities construction sites shall be periodically monitored, measured and/or controlled by taking into account the provisions of the legislation. The monitoring and measurements to be performed shall be recorded. The measurement period and the persons in charge shall be indicated.

The persons in charge shall convey the records established after the necessary monitoring and measurement to the OHS and Environment Unit. In external measurements, the accredited and or qualified organizations or companies shall be preferred. All monitoring and measurement records shall be kept by the persons in charge of the competent unit and the OHS and Environment Unit.

In case of a tendency to act against the legislation during the inspections carried out within the specified periods, the control frequency of such parameters may be increased by the OHS and the Environmental Unit. If significant deviations from the targets are detected as a result of the monitoring or if the results

non-compliant with the legislation are obtained, the necessary actions shall be initiated by the OHS and Environment Unit

The parameters given below, which vary depending on the characteristics of the project being implemented and are not limited to these, are monitored, measured and/or controlled

- Periodic inspections of the equipment used
    - Pressure equipment: The inspections of the pressure vessels shall be carried out and reported by a qualified mechanical engineer/technician or by an accredited organization within the periods and under the conditions in accordance with the provisions of the legal legislation.
    - Lifting and moving equipment: The inspections of the lifting and moving equipment shall be carried out and reported by a qualified Mechanical Engineer/Technician or by an accredited organization within the periods and under the conditions in accordance with the provisions of the legal legislation. The reports and periodical inspections shall be followed-up by the OHS and Environment Unit.
    - Inspections of the electrical installations, lightning rods and groundings: The inspections of the electrical installations, lightning rods and groundings on the site shall be carried out and reported by a qualified Electrical or Electrical-Electronics Engineer/Electrician within the periods and under the conditions in accordance with the provisions of the legal legislation.
    - Firefighting equipment: The inspections of the firefighting equipment shall be carried out and reported by a qualified Mechanical Engineer/Technician or by an accredited organization within the periods and under the conditions in accordance with the provisions of the legal legislation.
    - Fire extinguishers: The inspections of the fire extinguishers shall be carried out through the **Fire Extinguishers Control Form**.
- Personal exposure measurements (personal noise, personal dust, personal vibration): Personal exposure measurements shall be carried out by accredited laboratories within the periods specified in the legislation.
- Workplace environment measurements: Workplace environment measurements such as thermal comfort, lighting, noise, dust must be carried out by authorized institutions at the beginning of the activity and compared with the limit values, and in case the results exceeding the limit are determined, necessary actions must be determined and performed to make them suitable. These measurements shall be repeated in case of changes in activities or placements.
- Environmental Measurements (Ambient noise, emission): Environmental measurements must be carried out by authorized institutions at the beginning of the activity and compared with the limit values, and in case the results exceeding the limit are determined, necessary actions must be determined and performed to make them suitable. These measurements shall be repeated in case of changes in activities or placements.
- Drinking/service water quality: Drinking/service waters shall be analyzed, monitored and controlled within the periods specified in legal regulations.
- Discharge Water Quality
- Waste quantities (Hazardous wastes, solid wastes, etc.)
- Natural resource consumption (Electricity, water, natural gas, LPG, etc)

9.2. Audits and Reporting

Audits shall be planned and applied according to the YS-P11 Internal Audit Procedure.

The F-11.1 Internal Audit Plan, including audit frequencies, shall be prepared to assess and monitor the compliance with existing policies and procedures and their effective implementation on the site.

When one or more non-conformances are detected during the audits, the process shall be started according to the YS-P12 Non-Conformity and Corrective Action Procedure. At the end of the audit, the auditors prepare the “F-11.3 Internal Audit Report”.

The results of the audit shall be evaluated by the H&S Manager and be communicated to the management.

9.3. Routine Site Inspections

The OHS and Environment Department shall routinely audit the work site. All inspections will aim to verify the effective implementation of health and safety risk mitigation measures.

During inspections, the OHS and Environmental Department carries out procedures in accordance with the **YS-P12 Nonconformity and Corrective Action Procedure** for the nonconformities it identifies and reports the nonconformities using the **F-16.5 Weekly OHS-Environmental Activity Report Form.** Two types of actions are envisaged for identified nonconformities.

1. Elimination of detected nonconformity as soon as possible
2. Minimize the likelihood of re-encountering the nonconformity by identifying and eliminating the root cause causing the identified nonconformity.

For the nonconformities identified with the **Weekly OHS-Environmental Activity Report Form**, responsible parties are determined, and a deadline is set for the closure of the nonconformity. If the nonconformity is closed by the deadline, the closure date is recorded on the form. Nonconformities that remain unresolved are subject to the reopening of the Nonconformity Report (DFI).

10.3.1. Reporting

9.3.1.1. Daily Reporting

HSE Department will prepare a Daily **OHS-Environmental Activity Report Form** including daily HSE issues and on-site observations and submit them to HSE Manager at the end of their shifts. HSE Manager will be responsible for the follow-up of the issues specified in the report.

9.3.1.2. Weekly Reporting

Every week, one of the OHS Responsible Persons will prepare a Weekly HSE Report including weekly HSE issues and on-site observations and submit them to HSE Manager at the end of the week. HSE Manager is responsible for the follow-up of the issues specified in the report.

9.3.1.3. Monthly Reporting

Monthly Project HSE Statistical Report will be prepared by HSE Manager and sent to related department by e-mail.

9.3.1.4. Annual Reporting

As a legal requirement, in every January, **Annual OHS Assessment Report** of the previous year will be prepared by HSE Department and submitted to Project Director for approval.

Table 9.3.1.4-1.Key Performance Indicator

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
-Number of work incidents/accidents/near misses -Number of personnel who are infected with an infectious disease -Source and quality of drinking water	-Project office -Camp Sites	-Document review	Weekly	-SPV -EPC
-Use of PPEs -Health and safety signs -Fire safety equipment/systems -Accommodation conditions	-Camp Sites -Road construction sites - Quarries	-Site audit -Visual observation	Daily	-SPV -EPC
Number of health and safety trainings provided	Construction camp and administrative offices	-Document review	Monthly	SPV EPC
-Number of drills conducted	Project office	-Document review	Semi-Annual	SPV EPC
-Grievance mechanisms for Project personnel -Grievances received from Project personnel	Project office	-Document review	Weekly	SPV
Number of trainings conducted related to traffic	Construction camp and administrative offices	Tracking the number of Project personnel and contractor workers who have received training	Quarterly	-SPV -EPC

10. NONCONFORMITY AND CORRECTIVE ACTIONS MANAGEMENT

Procedures will be conducted according to the **YS-P12 Nonconformity and Corrective Action Procedure** in relation to nonconforming conditions and behaviors that may arise during the execution of tasks. In the event of nonconformity detection, the **F-12.1 Nonconformity and Corrective Action Form** will be used, and all identified nonconformities will be documented, with their root causes investigated.

Additionally, if the nonconformity poses a high risk, work in the area where the nonconformity occurred will be immediately halted until the nonconformity is rectified. Necessary safety measures will be implemented at the work site, and on-the-job training will be provided to the personnel involved in the nonconformity. Following the resolution of the nonconformity and an inspection by the Occupational Health and Safety (OHS) and Environmental Unit, work will resume.

The OHS and Environmental Unit also fills out the **Weekly OHS-Environmental Activity Report Form** for all nonconformities identified in the field.

11. REPORTING THE ACCIDENT/INCIDENT

All incidents/accidents, occupational diseases and near-miss events in the workplace shall be recorded, investigated and reported.

Incidents occurring in the workplace that have the potential to cause damage to employees, the workplace, or equipment/materials, but do not result in injury, illness, or death, and/or may cause environmental pollution, are recorded through written statements of the victim(s) and any witnesses using the **Incident Statement Form**, and then reported using the **Near Miss Report.**

All incidents/accidents that occur in the workplace and cause injury, illness or death, damage to equipment/materials and/or environmental pollution are reported using the **Incident/Accident Investigation Report.**

The Root Cause Analysis shall be performed by using the **F-16.7 Incident/Accident Investigation Report** in order not to repeat the incidents/accidents or occupational diseases in the workplace. The following stages shall be followed during the incident/accident investigations;

Stage 1: Collection of Information

Stage 2: Analysis of information

Stage 3: Determination of primary causes and root causes as a result of analysis

Stage 4: Identification of appropriate corrective actions

Stage 5: Planning and implementation of corrective actions

The nonconformities identified as a result of the root cause analysis shall be recorded using the **F-12.1 Nonconformity and Corrective Action Form** and necessary planning shall be carried out to ensure that the nonconformity and/or corrective actions are realized and necessary measures shall be taken to prevent recurrence of similar incidents/accidents.

Information that incident/accident reports must include;

- Date and place of accident/incident
- Those involved (person and/or equipment)
- stages of occurrence accident/incident
- Accident/incident details
- Nature of injuries / damage / cost estimate
- Witness statements
- Scene of incident photos
- Immediate (primary) causes
- Root causes
- Measures to be taken
- Corrective actions

Occupational accidents shall be notified to the relevant legal authorities within the periods specified in the legislation.

All incidents/accidents, near-misses and other cumulative data related to occupational health, safety and environment shall be recorded with the **Monthly HSE Performance Indicators** form and be reported. Details of fatality cases and lost time incidents (LTI's) shall also be recorded with the **Monthly HSE Performance Indicators** form.

12. EMERGENCY MANAGEMENT

In the event of any emergencies and unexpected situations that may occur, the operations carried out in order to ensure the safety of people, workplace, environment and equipment, to minimize the effects of the situations having damage potential and to systematically perform the necessary activities are within the scope of emergency management.

The following basic principles shall be applied in emergency management and planning.

- To identify hazards and problems in advance and make necessary preparations,
- To develop effective and correct response methods in advance to minimize the effects and to be well-prepared at all times,
- To perform the necessary responses in a coordinated manner and not respectively, and to minimize the duration and effect of the incident,
- To make necessary interventions for the protection of all those concerned,
- To disseminate Corporate Culture by conveying the lessons and doctrines gained to all field personnel to prevent the recurrence of the events,
- To constantly make the necessary improvements to have a better system.

12.1. Emergency Response

The emergency response system essentially consists of 6 main elements;

1. Prevention, Minimization
2. Emergency Preparations,
3. Emergency Response Methods,
4. Emergency Exercises,
5. Rescue,
6. Briefing.

12.1.1. To Prevent and Minimize

All studies, practices and machinery and equipment used are evaluated for possible hazards and risks and a risk analysis study is conducted. As part of the risk analysis prepared, necessary measures are taken to prevent and minimize, they are continuously controlled and all legislation and standard requirements are followed and fulfilled. These studies ensure that the necessary studies are carried out systematically beforehand in order to prevent the emergence of dangerous situations.

12.1.2. Emergency Preparations

These are the preparations and measures to be carried out in order to minimize the negative effects of the emergencies that may occur and shall be coordinated by the employer or the employer representative (Project Director/Site Chief) as the Emergency Manager. Emergency Preparations;

- Organization of Emergency Teams.
- Field personnel, emergency teams and site management to receive theoretical and practical training on emergencies, emergency plans and safety measures and exercises to be organized within particular periods.
- Supply of equipment to be used in emergencies.
- Establishment and efficient use of quality internal and external communication networks.
- Communication and coordination with external emergency teams.
- Conducting emergency exercises and identifying the deficiencies identified during exercises and making necessary improvements.

12.1.3. Emergency Response Method

Emergency response is the activities to be applied in case of unexpected situations. it involves eliminating, minimizing the source of the harmful impact and subsequently, the restoration activities when an emergency occurs. Personnel in Emergency Teams are the persons who have sufficient knowledge and experience about the required interventions according to the type of incident. Negative harmful impacts are minimized by effective and correct interventions.

12.1.4. Emergency Drill

An important part of emergency preparedness is performed through exercise. The above-mentioned teams shall meet at least once a year and perform the exercises. Scenarios shall be built in line with natural and non-natural disasters during the exercises. As part of these scenarios, practices shall be performed and suggestions for being prepared for possible disasters, also the solution of problems that may be encountered during disasters shall be brought and evaluated and solutions shall be provided. All information about the solution shall be shared with the employees. The effectiveness assessment of emergency exercises shall be recorded by the **Training Participation Form** and the **Emergency Drill Report**.

12.1.5. Rescue

This is to intervene to the persons, equipment and buildings that are negatively affected or about to be affected as a result of emergencies, to provide necessary assistance and support, to carry out improvement works and to ensure that the effects are eliminated or minimized and taken under control. Rescue activities include the pre-planned and tested practices to minimize the duration and impact of emergencies.

12.1.6. Briefing

After each serious and dangerous incident, it is important to provide the necessary information/briefing and explain the causes and consequences. The necessary corrective and remedial activities are determined by ascertaining which systems are working properly and which deficiencies are identified in relation to the incident and all personnel are informed about this issue.

12.2. Preventive and Restrictive Measures Taken for Emergencies

The **Emergency Plan** shall be prepared in accordance with the provisions of the legislation for emergencies that may occur at the Head Office and Construction Sites considering the characteristics of the activities and the site.

All personnel are given the **"Things to Do In Case Of Emergency and the Measures to Be Taken"** training once a year about identified emergencies. It is ensured that Emergency teams receive the necessary trainings (certified first aid trainings, etc.) through authorized institutions. Emergency exercises are recorded at least once a year, the deficiencies are identified and the response and performance of the personnel in case of extraordinary situations are measured. Firefighting equipment, first aid equipment and alarm systems are checked once a month and their competencies are reviewed. The machinery and equipment that may cause emergencies are subject to measurement and assessment every year and additional maintenance is performed when necessary. Emergency direction signs and emergency exit doors being opened outward and their inspections are performed in accordance with the provisions of the legislation.

12.3. Emergencies Determined

The emergencies that may occur in the workplace have been determined by taking into account the following:

a) Risk assessment results.
b) Emission and explosion probability arising from fire and hazardous chemicals
c) Incidents requiring first aid and evacuation.

d) Probability of natural disasters.
e) Probability of sabotage.
f) Wild animal attack, snake bite, scorpion sting.

Emergency situations that may occur in the company according to the mentioned issues,

Natural Disasters

a. Earthquake
b. Flood-Water Deluge
c. Lightning
d. Avalanche
e. Landslide
f. Storm

Other Emergency Situations

a. Fire
b. Natural Gas Fire
c. LPG Fire
d. Electricity Fire
e. Burst and Explosion
f. Sabotage, Terror and War
g. Spillage of Chemicals
h. Epidemics
i. Traffic Accident
j. Poisoning
k. Electric Leakage
l. Work-related accidents

12.4. Emergency Teams

12.4.1. Organization of Emergency Teams

The employer, under the legal legislation, shall establish teams for the following matters consisting of appropriately equipped persons considering the number of employees.

a) Emergency response and firefighting,
b) Search, rescue and evacuation,
c) First aid,
d) Protection

Those assigned for these teams shall be listed in the **Emergency Team List** and **Emergency Plan** posted in areas where everyone can see and reach them.

12.4.2. Duties of Emergency Teams

Emergency Teams;

- Participating in training and drills related to emergencies.
- Calling the Emergency Manager when an emergency alarm is heard to obtain information about the situation and coordinate.
- To carry out the necessary interventions in the most effective and correct way in line with the training they have received until the professional teams arrive.
- Coordinating the people in the assembly area and directing people to the assembly areas.
- To fulfill the responsibilities in the job descriptions.

Emergency Response and Fire Fighting Team: They are supposed to make the first response to emergencies that may occur in the workplace, to respond immediately in case of fire and prevent the expansion of fire, to completely or partially disable electricity, natural gas and similar systems that may create a danger to intervene in the fire and to extinguish fire if it is capable.

Search, Rescue and Evacuation Team: They are assigned to determine the places of the persons and materials which need to be removed from the site during fire and other emergencies, remove the

determined elements from the scene of accident, ensure that all employees reach to emergency gathering points in a controlled way and take the necessary precautions to prevent the emergency from growing and evacuate persons safely.

First Aid Team: They are supposed to inform the medical teams and to apply the necessary first aid interventions to the wounded brought to the safe zone by the search, rescue and evacuation team until the medical teams arrive. The team consists of employees with First Aid Certificates.

Protection Team: They are supposed to protect the materials and documents recovered by the search, rescue and evacuation team in an emergency, to prevent possible panic and confusion.

Security Officers:

- To inform the emergency manager when witnessing events that occur in the field or that may occur outside and affect the site,
- To inform professional teams (ambulance, fire department, police),
- To meet the out-of-site teams and accompany them on site,
- To guide the vehicles and people in the most proper manner until the emergency event ends,
- To bring the exit-entry points under control,
- To serve in assistant position to emergency teams,
- To participate in emergency trainings and exercises.

12.5. Emergency Assembly Area

It is a pre-determined assembly area as a safe area for the employees to gather in case of emergency. Emergency assembly area:

- Shall be designated as a place where the employees shall not be harmed by environmental conditions in emergency situations,
- The movement of response vehicles such as ambulance and fire brigade shall not be restricted,
- People shall not be exposed to electrical and chemical hazards,
- Which can be quickly evacuated in case of mass evacuation,
- All employees can locate with the help of emergency signs.

Depending on the works, the number of employees in the workplace, the differences in the work locations and the emergency hazards in the workplace, more than one emergency assembly area shall be determined if necessary.

Emergency exits within the working area shall be determined under the legal legislation.

The evacuation arrangements, emergency exits, emergency response and first aid equipment, alarm systems and emergency assembly areas that can be monitored to ensure that personnel can go to a safe place in case of emergencies shall be shown in the **Emergency Equipment and Evacuation Plan** and they shall be hung on the suitable places so that employees can easily see them.

12.6. Emergency Equipment

12.6.1. Fire Cabinet

Fire cabinets to be used in the workplace and construction site shall be selected suitable for the need and in sufficient numbers and be placed in the required places in accordance with the provisions of the legislation.

12.6.2. Fire Extinguishers

Considering the possibility of fire in the workplace, fire extinguishers and their number shall be determined based on fire classes and be placed in appropriate places. The locations of fire extinguishers are specified in the **Emergency Equipment and Evacuation Plan**.

The inspections of the fire extinguishers shall be carried out through the **Fire Extinguishers Control Form**.

Class A Fires
These are the solid matter (wood, paper, cotton etc.) fires. These are controlled and extinguished by cooling and removal of combustible material. Multi-purpose dry chemical powder or water fire extinguishers are used in this kind of fires.



Class B Fires
These are the fires caused by combustible liquids (petrol, benzene, oils, oil paints, tar, etc.). Dry chemical powder, carbon-dioxide or foamy fire extinguishers are used in this kind of fires.



Class C Fires
These are the fires caused by combustible gases (Methane, propane, LPG, acetylene gas etc.). Dry chemical powder or carbon-dioxide fire extinguishers are used in this kind of fires.



Class D Fires
These are the fires caused by flammable light metals and alloys (sodium, potassium, titanium, magnesium, etc.). Dry metal powder fire extinguishers are used in this kind of fires.



Class E Fires
These are electrical fires. For fires caused by electricity, a fire extinguisher shall be used according to the type of objects burning after the electrical current is cut.

12.6.3. First Aid and Medicine Cabinet

First aid and/or medicine cabinets shall be available in the facility for emergency use. The contents of the cabinets are arranged according to the working conditions and the work performed.

The locations of fire cabinets are specified in the **Emergency Equipment and Evacuation Plan**. The contents of the medicine cabinets shall be checked by the Administrative Supervisor and Workplace Physician at regular intervals.

12.7. Emergency Equipment and Evacuation Plan

The **Emergency Equipment and Evacuation Plan** shall be prepared on the layout plan according to the sections of the workplace and construction site and shall be hung on suitable places for the employees to see them easily. In this evacuation plan;

- Locations of firefighting vehicles,
- Emergency equipment and their locations,
- Locations of the first aid materials,
- Evacuation roads and emergency exits,
- Emergency assembly areas

shall be shown.

12.8. Emergency Flow Diagrams

The **Emergency Flow Diagrams** have been prepared concerning the following subjects according to the sections of the workplace and construction site.

- Earthquake flow diagram,
- Work accident flow diagram,
- Sabotage flow diagram,
- Leakage and spillage flow diagram,
- Fire flow diagram,
- Explosion flow diagram,
- Flood and landslide flow diagram,
- Terrorist attach flow diagram,
- Poisoning flow diagram

13. HEALTH SERVICES

The **Occupational Hygiene Instructions** has been prepared to provide a healthy working environment to the employees, to identify and control the health hazards and risks in the workplace, and which includes hygiene conditions related to the working environment and personal hygiene issues for the employees.

1. The provision of the personnel health files in accordance with the legislation is essential. Employees shall be subjected to general health examinations under the following circumstances;
   a) Upon recruitment.
   b) In work changes.
   c) When they request to return to work after recurrent suspensions form work due to work accident, occupational disease and health status.
   d) They must be renewed periodically during the course of the work.
2. The personnel cannot be hired without a health report showing that they are suitable for the job.
3. Health examinations shall be performed and reported by the Workplace Physician.
4. It is important for the health personnel to be involved in night works to indicate that "they are suitable for night work".
5. Hygiene trainings shall be given to all personnel working in the work area such as tea-makers, camp staff, cooks etc. and their records shall be kept. The trainings received shall be checked by the Workplace Physician.
6. The Inspection reports shall be treated as confidential information. Access other than the units/persons responsible for monitoring and control is prohibited.

13.1. Monitoring Health Status of Employees

1. The personnel to be employed shall be examined by the Workplace Physician before the work and be recorded in the **Pre-Employment/Periodic Examination Form**.
2. Employees are required to be examined by the Workplace Physician within the periods specified in the legislation.
3. Medical examination of the employees who come to orientation training must be completed in order to be accepted.
4. The personnel who have lost their workforce must be examined by the Workplace Physician before starting the work again and the **Pre-Employment/Periodic Examination Form** must be renewed.
5. In the case where those who left the job starts to work again, the examination procedures must be repeated again even if the interval is short.

13.2. Workplace Health Unit

A workplace health unit (infirmary) shall be established in the company and construction site close to the office area, which shall be equipped with medical equipment and materials in accordance with the legislation. A Workplace Physician in compliance with the requirements of the legislation and, if necessary, a nurse or health officer shall be appointed to the health unit.

Hospitals and ambulance services in the region shall be used until the health unit is established. Necessary contact information for the nearest hospitals and ambulance services shall be provided to the employees.

Health units, together with occupational safety specialists, shall each year prepare the **Workplace Health and Safety Unit Annual Work Plan and Assessment Report** regarding the health services carried out in the workplace.

In addition to the health units, a sufficient number of personnel complying with the requirements of the legislation shall be certified by receiving "First Aid Training" from the authorized institutions.

14. GRIEVANCE MECHANISM

14.1. Recording Grievances

Communication Procedure has been established for written and/or verbal grievances (complaints and suggestions) from employees, visitors, subcontractors, suppliers, customers, legal and other authorities within the scope of Quality, Environment, Occupational Health and Safety. **Complaint and Suggestion Form** is used for complaints and suggestions. Received complaints and suggestions are evaluated by the Project Director, Site Manager and OHS and Environment unit. Complaint and Suggestion status are evaluated by the person who fills out the form.

Depending on the severity of the grievance, the following actions are taken in the Complaint Status section:

- If the grievance is caused by a non-conformity which harms the property and/or health of the parties concerned, creates financial loss, damages the environment and is caused by the products and services, then its severity is marked as “**high**”. A corrective action (CAR) is initiated, actions are planned and realized as soon as possible.

- If the grievance is caused by a non-conformity arising as a result of the non-satisfaction of the requirements of the parties concerned, then its severity is marked as “**moderate**”. A corrective action (CAR) is initiated and action will be taken depending on its urgency.

- If the grievance is caused by a very rare non-conformity that does not belong to the system, then its severity is marked as “**low**”. No corrective action is initiated for the grievances with low severity.

Grievances are recorded in **Complaint and Suggestion Follow-up List**” and evaluated at regular intervals. Complaints with high and moderate severity and suggestions to be answered must be recorded in the follow-up list. The parties concerned are notified verbally and in writing.

14.2. Closing Grievances

Complaints recorded in the Complaint and Suggestion Tracking List are followed up with the opened DFIs. If the person following the complaint finds the activity sufficient, he/she closes the record. If he/she does not find it sufficient, he/she marks the “Needs Monitoring” section and assigns a responsible person and continues to monitor the nonconformity that the complaint originates from. Complaints and suggestions are discussed and evaluated in the Management Review meetings, OHS and Environmental Board Meetings.

14.3. Reporting Grievances

OHS and Environment Unit shall assess and report the Complaints and Suggestions records every 6 months regarding the receipt of grievances, severities, CAR’s initiated and closing of grievances.

15. REWARD AND PUNISMENT PRACTICES

15.1. Punishment Practice

In case of non-compliance with the OHS and Environment rules and practices in the work are, verbal and written warnings shall be given to inappropriate employees and sub-employers based on the determinations to be made by the OHS and Environment Unit. The employees and sub-employers who do not take verbal and written warnings seriously shall be fined by the OHS and Environment Committee. Such penalties shall provide deterrence for the individuals and organizations against non-compliance with the most common rules on construction sites and the challenges faced by the OHS and Environment Unit. The OHS and Environment Unit shall notify the supervisor of the relevant unit and the sub-employer agent in writing about the termination of the employment contract of the employees who receive three warnings during the year. However, the persons who show the behaviour that jeopardizes the safety of themselves or their colleagues are strictly not allowed to work and if such an act is detected, their employment contract shall be terminated immediately.

The authority on how to use the financial income obtained after the penalty deduction has been given to the OHS and Environment Committee within the scope of legal legislation. The Committee shall decide on the use of the income obtained by paying regard to the legal requirements. The list of penalty imposition shall be established and applied by the OHS and the Environment Committee.

15.2. Reward Practice

In addition to penalties, the employees are given Reward practice for their strict observance of all Occupational Health, Safety and Environment rules and practices and working without jeopardizing the safety of others and themselves.

For the reward practice, the "OHS EMPLOYEE OF THE MONTH" shall be selected among all employees, including the sub-employer employees. The reward to be given shall be discussed in the OHS and Environment Committee and be unanimously decided. The selection criteria are listed below.

1. Not to be subjected to verbal warnings and penalties by the OHS and Environment Unit with zero nonconformity in monthly studies,
2. Not to act in any way that may jeopardize the safety of others or him/herself,
3. To inform the OHS and Environment Unit about occupational safety's inappropriate conditions and behaviours that occur on the site,
4. To use the personal protective equipment delivered to him on the site completely and continuously,
5. To participate fully and actively in the OHS and Environment trainings

16. PERSONAL PRPTECTIVE EQUIPMENT (PPE)

Personal protective equipment (PPE) is used where the risks cannot be prevented or fully limited by technical measures to ensure collective protection or by work organization and working methods. PPE is used to prevent occupational accidents or diseases, to protect employees from health and safety risks, and to improve health and safety conditions.

The procurement unit must receive information from the OHS and the Environment Unit concerning the minimum characteristics and standards of the PPE to be supplied. The conformity of the PPE to the standards shall be controlled by the OHS and Environment Unit. The use of the PPE without CE marking is strictly forbidden. The PPE conforming to the legislation and standards, the works to be carried out and the work environment, material safety Data Sheets and the risk assessments shall be delivered to the employees with the **Submission Form.**

All employees are provided with training on the correct use and maintenance of PPE in accordance with **the Annual OHS Training Plan**. In these trainings, employees are informed that they must replace PPE that is worn out and has lost its properties by reporting it to the OHS and Environment Unit. In addition, warning labels and signs indicating which type of PPE should be used are hung in work areas.

As a rule of thumb, the helmets, protective footwear and reflective vests, are mandatory in the work areas, including the visitors. If necessary, additional PPE shall be provided in accordance with the work to be performed, the work environment and the climatic conditions. These are:

- Eye and face protectors: The goggles, face shields and masks are used for welding, chemical work, grinding, etc., where there is a risk of part jumping.
- Ear protectors: Earplugs and earmuffs are used for high-noise work.
- Head protectors: Hardhats, caps and helmets are used to protect against falling objects and strike.
- Respiratory system protectors: The equipment such as respirators, gas and dust masks are used in dusty, confined environments, where oxygen is insufficient.
- Foot and leg protectors: Shoes, boots, leggings and knee guards, etc. are used to protect against electricity, temperature, slip, and the objects falling, splashing and stinging.
- Hand and arm protectors: Gloves and armbands are used to protect against the risks such as the cuts, puncture and burns that might be caused by the elements like chemicals, electricity, temperature, vibration.
- Body protectors: Protective clothing, vests and safety belts are used as protectors against dust, temperature, electricity, radiation, chemicals and falling down from height Protective clothing (overalls, coats, aprons, etc.) and vests must be of high visibility to ensure that users are recognized in their environment.
- Full body harness: These are protective equipment consisting of full protection body-type belts and ropes that are used to prevent the worker from falling down from height and to protect against falling in places where there is a risk of falling.
- Parachute type safety belt: These are protective equipment consisting of fully protected body type belts and ropes used to prevent workers from falling from heights and to protect against falls in places where there is a risk of falling.

Personal protective equipment (PPE) appropriate to the risks associated with electrical works will be provided to personnel engaged in such tasks. In work situations that require special safety precautions -such as working alone or near water- supervisors will be required to exercise due diligence and ensure that all relevant safety measures are fully implemented.
In areas where heavy machinery is operated, visible safety measures will be implemented to reduce risks of collision or crushing. These include placing warning signs and safety barriers around active machinery zones and assigning flaggers to guide operations. Additionally, all machinery operating in reverse will be equipped with audible warning systems, and spotters will be deployed in low-visibility areas. Records related to PPE use, safety briefings, and trainings will be kept up to date and monitored regularly. Any nonconformities identified will be promptly corrected, and occupational health and safety practices will be continuously improved.
The Project will be carried out in compliance with the Turkish Law on Occupational Health and Safety and the Regulation on the Use of Personal Protective Equipment in Workplaces, which is aligned with relevant European Union Directives. All PPE will bear CE certification and meet EU standards.
The use of PPE will be tailored to different work areas and job types across the site. For example, workers on high structures such as bridges and viaducts will use double-hook safety harnesses and fall arrest systems; those working with hot asphalt or welding will wear heat-resistant gloves, welding masks, and fireproof aprons. Tunnel workers will be equipped with gas masks and headlamps, while reflective vests and proper lighting systems will be used for night shifts
All PPE is regularly inspected, properly maintained, and replaced when damaged, worn, or expired. PPE items must meet applicable national and international standards (e.g., EN or ISO) and be matched to the specific task and risk level. A PPE register shall be maintained to track issuance, inspections, and replacement intervals. Supervisors are responsible for monitoring PPE compliance during routine

worksite inspections, and all personnel shall be subject to disciplinary action in cases of non-compliance. PPE refresher training shall be provided as part of periodic safety training, and proper use and maintenance shall be verified through visual checks and record reviews. Subcontractors shall be held to the same PPE standards and will be subject to regular audits.

17. GENERAL WARNING SIGNS AND LABELS

The warning signs and labels to be used in the work areas are listed below in subject headings.

17.1. Color Codes for Warning and Labels

Importance and/or purpose	Instruction and information
Prohibited	Hazardous action or behavior
Hazard	Stop, shut down, activate emergency stop, evacuate
Fire fighting equipment	Indication of equipment location
Warning	Be cautious, inspect, take precautionary measures
Mandatory,Order	Specific behavior or action required
	Use personal protective equipment (PPE)
Safe to use	Can be used appropriately for its intended purpose
No hazard	No harm under normal conditions
Emergency escape, First aid	Emergency exits, First aid equipment

17.1.1. Mandatory

















17.1.2. Warning











Radioactive Material



Overhead Load



High Voltage



Heavy Machinery Operating

17.1.3. Prohibition



Smoking and
Naked Flames Forbidden



No Smoking



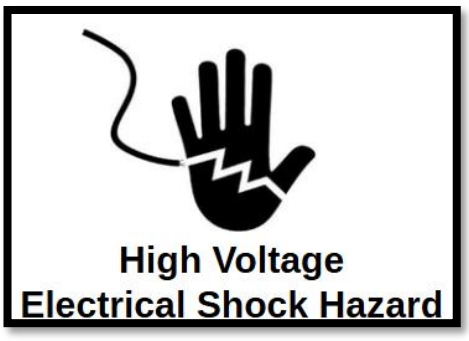
No Entry



Not Drinkable



Hot Surface
Do Not Touch





Inhalation Hazard



Do Not Extinguish With Water



Do Not Touch

17.1.4. Informing





17.2. Color Codes Regarding Monthly Inspections

The devices and equipment listed below are routinely checked every month and are labeled every 3 months with labels prepared in easily visible sizes in the month color specified below or are taped with tape appropriate to the color code. Labeling means that the control for that month has been performed. In this regard, the OHS and Environment Unit checks whether the labeling has been done in routine controls. In case of any non-conformity detected during the controls, the **General Safety Instruction for Power Tools** is followed.

Device type	Description	The personnel in charge of control
Lifting equipment	Strap, chain, lifting eye etc.	The operator of the lifting equipment in which the equipment is used
Electrical panel/panelboards	Main distribution boards, sub-boards, on-machine panelboards, etc.	Electrical technical personnel responsible for its maintenance and installation
Scaffolding, Platform and stairs	-	The personnel responsible for its maintenance and installation

Color Codes

January-February-March		Blue
April-May-June		Yellow
July-August-September		Green
October-November-December		White
Out of use, faulty or scrap		Red

The personnel performing the inspection will stick labels with the color of the month in which the inspection was carried out, in a clearly visible manner, on the devices/equipment that they have checked and have not detected any problems.

18. LOCK OUT TAG OUT

Lock Out Tag Out: It is a method developed to correctly disconnect or isolate the connection to the energy source, to provide a safe working environment, to prevent unauthorized persons from interfering during these operations, or to prevent the use of unsuitable facilities, machinery or equipment in case of any maintenance, repair, installation, facility addition etc. operation on the facility, machinery or equipment.

The plates and tags to be used as part of the Lock Out Tag Out system are indicated below.

Safe for use label



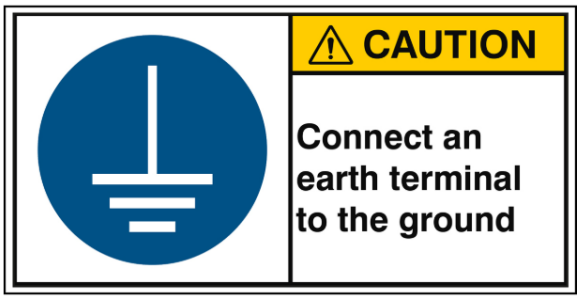
Unsafe for use label



Out-of-use label for maintenance

Connect an earth terminal to the ground





Mandatory labels;









19. WORK PERMIT SYSTEM

EPC Contractor will develop a safe system of work that results from a systematic examination of a working process, that identifies hazards and specifies work methods designed either to eliminate the hazards or controls and minimize the relevant risks.

Prior to execution of work, the EPC Contractor will establish a Job Safety and Permit-to-Work system for the Site.

The EPC Contractor will develop Method Statements, including the relevant Risk Assessment for high-risk activities at least listed below;

- Steel erection/heavy crane lifts
- Hot work (Cutting/Welding)

- Entry into confined spaces and restricted areas
- Transport, storage and handling of explosives
- Blasting
- Working at height
- Excavation work
- Transport, earth moving and materials – handling equipment
- Working along unstable slope
- Working near heavy machinery
- Working in dusty environment
- Working on asbestos surface (ıf any)
- Grouting
- Concrete Works
- Demolition Works
- Operation of heavy equipment or machinery

The matters subject to the work permit system are as follows.

A. Working with electricity
B. Hot Works
C. Working at height
D. Excavation works
E. Working in enclosed areas

The work permits related to the aforementioned matters are issued through work permit forms, the details of which are explained below. The relevant checks are carried out and recorded by the OHS and Environment Unit. The work permit forms are also signed by the responsible supervisor.

19.1. Electricity Work Permit

Since electrical works are under the high-risk activities group, they must be carried out under a permit audit. The yellow colored **Electrical Work Permit Form** shall be used for Electrical Works. Such tasks may be one of the following;

- Studies related to isolated electrical equipment
- Installation
- Grounding
- Maintenance and repair

19.2. Hot Works

The Hot Work permit is issued for the tasks to be performed using open flame or ignition sources. This permit shall be used if the task assigned generates a possible source of ignition or poses a risk to it.

The red coloured **Hot Work Permit Form** shall be used for Welding works. Welding may be carried out only by the personnel with the appropriate welding certificate.

The use of mobile phones in hazardous areas is strictly not permitted even if the Hot Work Permit has been obtained.

19.3. Working at Height

The works carried out at height are subject to the work permit system since they are under the high-risk activities group. The purple coloured **Working at Height Work Permit Form** shall be used in the works at the height.

Work at height work permit form shall be performed prior to operation during the installation of first scaffold/platform and the inspections shall be periodically renewed during the economic life of the scaffold/platform. When working at height work permit form is issued, a copy shall be attached to the controlled scaffold appropriately (not to be affected by environmental conditions, not to fall).

Appropriate measures shall be determined to minimize the risks involved in the structure of the work equipment, depending on the type of work equipment selected. If necessary, protectors to prevent falls shall be built. These protectors shall be of suitable structure and sufficient strength to prevent falling down from height and not to injure the employees. Protectors for collective protection which prevent falls may only be interrupted on the top of the mobile or fixed ladders.

In the cases where the protectors for collective protection to prevent falls are to be temporarily removed for the purpose of performing a particular work, other safety measures shall be taken to ensure the same protection. Work shall not be carried out until these measures are taken. Once this particular work has been completed temporarily or finally, the protectors shall be placed again.

Temporary works carried out at height shall be performed at feasible atmospheric conditions that shall not endanger the health and safety of the employees.

19.4. Excavation Work Permit

Excavation works are subject to the work permit system. The green coloured **Excavation Work Permit Form** shall be used for excavation works. This permit includes the following works;

- Deep Excavations
- Wells
- Ground openings, holes and sharp edges

Many hazards exist when personnel are required to work below ground level some are obvious, others less so. To prevent harm to personnel or damage to equipment a risk assessment and a permit-to-work system must be used as essential control tools.

- No deep excavation or digging shall be performed within a facility without a written permit to work.
- When personnel are working in a trench, one or more ladders must be securely placed in the trench to provide routine and emergency exit from the bottom to the surface.
- Excavations and trenches must be shored or sloped appropriately based on soil conditions in an approved manner.
- No materials including spoil banks, shall be stored closer than 1 meter from the edge of any trench or excavation.
- Excavated areas must be closed with barriers, such as guardrails made from scaffold tubes, steel or equivalent materials. These barriers must be located at least 2 meters from the edge of the excavation.

- Suitable barriers, handrails, signals or other warning devices must be provided protect personnel from any hazardous operation or excavation. If handrails or ails or barriers are not in place, open trenches or excavations must be securely covered.
- In conditions of darkness, trenches or similar openings must be illuminated with electrical lamps and physical barriers must be installed to prevent accidental entry.
- A competent person must inspect excavations and trenches prior to the start of any work and as necessary thereafter. If any signs of slippage or collapse are observed, work must cease until appropriate safety precautions have been implemented.
- Trench inspections must be conducted daily before to entry is allowed.
- In areas where underground cables or pipes are known or suspected to be present, exploratory holes must be dug by hand. Mechanical excavation is strictly prohibited of any identified underground utility.
- Before any personnel may enter an excavation, either the sides must be graded to the angle-of-repose or proper shoring must be installed to prevent wall collapse.

19.5. Working in closed areas

The areas that are not designed for continuous operation and have limited entry/exit are considered closed areas. The term areas that require closed area permit covers the areas that are subject to health and safety hazards provided below.

- Which are dangerous or potentially dangerous,
- Which contain material/chemicals/exhaust gas to be hazardous to inhale for a person entering the environment,
- Which contain insufficient oxygen (Lack of oxygen causes loss of consciousness and death very quickly. Since the lack of oxygen can be seen in all closed spaces, it appears to be the most dangerous factor in closed spaces),
- Inward-closing doors or downward-sloping walls,
- The walls that narrow into a smaller area, which may cause the person to suffocate or get stuck,
- Temperature stress.

Working in closed spaces is subject to the work permit system. The blue coloured **Confined Space Work Permit Form** shall be used in the works carried out at closed areas.

If entry to the closed area cannot be avoided, it must be ensured that a safe system is available for working in the closed area. Risk analysis must be carried out in order to determine the existing hazards in the closed area and necessary measures must be taken according to the structure of the closed area and related risks pursuant to the risk assessment. A safe working system, including the measures taken, must be established, developed and applied. The matters that need to be considered within a safe working system are listed below.

1. Appointment of an observer
2. Suitability of the persons to work
3. Insulation
4. Cleaning before entering the closed area
5. Providing ventilation
6. Making necessary measurements in the closed area
7. Special equipment and lighting
8. Breathing apparatus
9. Emergency plans
10. Rescue harnesses

11. Work Permit System
12. Personal Protective Equipment (PPE)
13. Training of the employees

19.6. Working Over/Near Water

Working over or near water is considered a high-risk activity and shall not be carried out without a valid Work Permit. The permit shall be issued following a detailed risk assessment and approval by the H&S Manager. The work area must be clearly marked with physical barriers and warning signs to prevent unauthorized access. A life-saving plan shall be developed before work begins, and it shall include designated rescue personnel, equipment locations, and emergency communication protocols.

All personnel working near or over water shall wear EN ISO 12402-compliant life jackets, safety helmets with chin straps, high-visibility vests, and non-slip footwear. Fall protection equipment must also be used where there is a risk of falling from height. A safety standby person, trained in water rescue and first aid, must be assigned and positioned to maintain constant communication with the work team.

The permit shall only be valid for the specific time period and task defined, and weather conditions must be assessed before and during the activity. Operations must be suspended in case of strong currents, high waves, storms, or poor visibility. Rescue equipment such as lifebuoys, throw ropes, and ladders must be located within easy reach of the work area. No worker shall enter the water unless specifically authorized and properly equipped.

19.7. Working on Live Roads

Work on live roads involves construction or maintenance activities conducted in areas with ongoing vehicular traffic, posing significant risks to both workers and the public. A Work Permit is required prior to starting any such activity. The permit shall be issued only after the implementation of a site-specific Traffic Management Plan (TMP), prepared and reviewed by the H&S Manager in coordination with relevant authorities, if applicable.

Before commencing the work, appropriate traffic control measures shall be installed, including reflective road signs, warning boards, traffic cones, light beacons, and barriers. Flaggers and traffic spotters must be assigned as needed, especially during reversing or lane closures. The work zone shall be separated from live traffic lanes with physical barricades, and alternative routes for vehicles and pedestrians shall be arranged.

All workers in the area shall wear, safety helmets, gloves, and steel-toed boots. Night work requires additional lighting and reflective gear. Activities shall be suspended during poor weather conditions that affect visibility, such as fog, rain, or snow. The Work Permit shall define the task, location, duration, and responsibilities of all parties involved. Any deviation from the approved traffic plan shall require immediate reassessment and reauthorization of the permit.

19.8. Concrete Pumping

Concrete pumping is a high-risk operation involving pressurized delivery of concrete through fixed or mobile pipeline systems, and shall not be conducted without a valid Work Permit. The permit shall be prepared in coordination with the Pump Operator, Site Engineer, and H&S Manager. Before issuing the permit, a comprehensive inspection must be conducted to confirm that the concrete pump, booms, pipes, couplings, and all safety devices are in good working condition and conform to relevant standards.

The pump shall be placed on level and stable ground with fully extended outriggers secured on base plates. The pumping area must be cordoned off with warning signs, and only authorized personnel shall be allowed to enter. A signal person shall be assigned to communicate between the pump operator

and receiving crew. The hopper guard must remain in place and shall never be removed during operation. Emergency stop buttons and pressure release systems must be tested and confirmed operational.

All personnel involved in concrete pumping shall wear appropriate PPE, including safety helmets, face shields or goggles, chemical-resistant gloves, rubber boots, long-sleeved clothing, and hearing protection. In case of a blockage, pumping must be stopped immediately, pressure must be relieved, and only trained personnel shall be allowed to intervene. The Work Permit shall specify the scope of work, equipment to be used, emergency contact information, and the validity period. The permit must be signed and approved by both the Site Manager and the H&S Manager.

As part of the work permit system, the EPC Contractor shall ensure that all personnel assigned to safety-critical activities meet the required competency criteria. Competency shall include appropriate education, role-specific experience, valid licenses or certifications (e.g., for working at height, confined space entry, hot works, lifting, blasting), and completed safety training. A centralized competency tracking process shall be maintained to verify and document each worker's qualifications, training dates, and certification validity. This system shall be regularly updated and reviewed by the HSE Department. Supervisors shall confirm that assigned workers meet the competency requirements before permitting them to conduct high-risk tasks. Subcontractors shall also be required to report and maintain up-to-date competency records for their workforce.

20. VEHICLE AND ROAD TRAFFIC SAFETY

The **Road Traffic Safety Procedure and/or Traffic Management Plan** shall be applied for the implementation of vehicle and road traffic safety issues. In case of transportation work on traffic roads, sufficient safety distance shall be provided for the other persons using this road or the appropriate protective measures shall be taken. Roads shall be marked visible. Necessary markings and precautions shall be taken in relation to overhead lines and similar barriers along the route of traffic roads.

Necessary measures shall be taken by taking into account the following criteria in the areas where personnel and material transportation is carried out within the site and on the main roads and also on access roads to be used by the Project vehicles and heavy equipment.

- Drivers and operators must be licensed and certified
- Vehicles and construction equipment must be overhauled and in suitable condition for use
- Traffic safety rules must be observed:
  - Traffic signs (speed limits, other restrictions and warnings etc.)
  - Traffic control
  - Rules of night drive
  - Vehicle requirements for personnel transport
  - Maximum load, securing the load
  - Ensure access on public roads with particular attention to vulnerable road users (school children, pedestrians, bicycle riders).
- Safety standards of construction sites
  - Road width considering maximum vehicle widths and traffic direction (one/two-way)
  - Maximum slope
  - Roadside barriers
  - Protection against landslides, loose slopes, rockfalls and avalanches
- Controlled access to site roads, control of driver and vehicle standards
- Applying appropriate driving restrictions according to weather conditions:
  - Harsh weather conditions, flood, avalanche risk
  - Slope instability hazards

21. WORKS AT HEIGHT

Works at height are classified as risky activities. All personnel who shall work at height shall be provided with Working at Height Training, which includes entry-exit, safe working systems and fall protection systems (proper use, protection and maintenance of seat belts etc.).

Secure access to all business areas shall be provided. Adequate barriers shall be placed in all elevated work areas to prevent people, equipment or materials from falling. In cases where the risk of falling cannot be eliminated, the measures (safety net etc.) to minimize the fall distance and its possible consequences shall be applied.

Full body harness shall be provided to the personnel who shall work at heights and this harness shall be fastened to a secure fastening point by means of a fastening device. In severe windy and rainy weather conditions, installation/dismantling of scaffolding, platform etc. shall not be performed.

The installation, dismantling and inspection of scaffolds and platforms may be carried out by trained personnel and shall be considered safe for operation only after checking and "tagging". Scaffolds and platforms shall be checked before the use by personnel and may be used if the "suitable" (green) tag has been attached. Informing the personnel who shall work at height about tagging (where yellow, red tag attached scaffolds and the scaffolds without green tag shall not be used) is included in basic OHS training, working at height training and routine toolbox trainings.

21.1. Scaffolds and Platforms

1. The suitability of the scaffold area shall be checked before installation. Earth compaction against sinking and collapse must be performed, and if the earth is not stable, it must be strengthened by the appropriate method.
2. Installation, grounding and anchoring must be performed in accordance with its instructions and standards supplied from the manufacturer.
3. To prevent it from moving, it must be ensured that the scaffold is fastened or fixed to the building or structure at appropriate distances.
4. Grounding plate shall be hung on the grounding place.
5. The width of the work platform must be sufficient for the work to be performed on that platform.
6. Balustrades, toe boards and floorboards shall be placed in accordance with their standards.
7. A ladder must be provided for access to the work platforms and the ladder must be placed appropriately as a precaution against tipping over.
8. The scaffold must not be overloaded. No material must be loaded on the platform unless it is specifically designed for that purpose.
9. If mobile scaffold is to be installed, the appropriate wheel and lock system shall be installed. When it is required to work on the mobile scaffold, the wheels of the scaffold must be locked before starting work.
10. The mobile scaffold must never be climbed on unless its wheels are locked on a flat surface.
11. The mobile scaffold must absolutely not be moved while any work or material is carried out on it.
12. Before dismantling, the necessary measures shall be taken in accordance with its manual and the “scaffold is out of use” tag shall be attached.

21.2. Ladders

The **Ladder Use and Safety Instructions** has been prepared in order to define the proper and safe use of the ladders to be used in the work areas. All ladders must be checked before use and any ladder not deemed appropriate for use must be removed.

1. Handrails and suitable wainscots must be placed on the platforms to be climbed on for the fixed construction ladders.
2. Wooden steps to prevent slipping or falling shall be built to the reinforced concrete staircases with no steps and suitable railings shall be attached to the edges of the bucket gap.
3. Ladders steps made of flat sheet metal or metal material shall be covered with non-slip material.
4. The slope of the ladders shall be at least 20 and at most 45 degrees to the base, except those used for maintenance works. In the workplaces where a slope of less than 20 degrees from the base is required, ramps shall be constructed, and fixed ladders in the form of service stairs with railings shall be installed in the cases where a steep of more than 45 degrees is required.
5. The ladders shall have overhead gaps and the height of these gaps shall not be less than 220 centimeters.
6. The width of the steps shall not be less than 22 centimeters, except for the maintenance ladders and shall have a height of minimum 13 centimeters and maximum 26 centimeters.
7. Each ladder with more than four steps shall have a balustrade and a handrail.
8. There must be a separate handrail in the middle of the ladders exceeding 225 centimeters in width.
9. In two-hand ladders, it shall be connected by hooked iron bars or shackles on both sides so that the legs do not diverge from each other.

22. LIFTING MOVING WORKS

Lifting and moving works shall be classified as risky activities. The inspections of the lifting and moving equipment shall be carried out and reported by a qualified Mechanical Engineer/Technician or by an accredited organization within the periods and under the conditions in accordance with the provisions of the legal legislation. The reports and periodical inspections shall be followed-up by the OHS and Environment Unit.

The wind speed limit in this project is 45 km/h. It is strictly forbidden to lift loads and people above this limit. However, if the maximum working wind speed limit determined by the manufacturer is below 45 km / h for the equipment (Tower Crane, Mobile Crane etc.), work will not be carried out above the limit determined by the manufacturer. If the maximum working wind speed limit determined by the manufacturer of the equipment is above 45 km/h, these load lifting equipment can work up to the specified limit with the approval of the project management. In any case, personnel will not be allowed to work in the Load Basket of the Cranes above 45 km/h.

1. Lifting and conveying equipment must be checked by appropriately certified operators before each start of work, steel ropes, chains, hooks, slings, brakes and automatic stoppers must be periodically reviewed and those found unsuitable for use must be removed from use immediately.
2. Since some work accidents that occur in lifting and transmission operations are the result of rope, chain and sling breaks, loads falling off the hooks, and brakes and automatic stoppers malfunctioning, these periodic checks should never be neglected and the machine should not be put back into operation before the malfunctions detected during the check are eliminated.
3. Lifting, lowering or carrying of loads on lifting machines must be done according to hand and arm signals given by trained maneuverers (signallers) or by radio assistance. In cases where more than one employee is on duty during a lifting operation or when the operator cannot see the load, a signaller must be used and the signaller must be positioned where he can be easily seen by the operator. The operator must obey every stop signal, regardless of who gives it.
4. Loads must be lifted vertically. In cases where it is necessary to lift them inclined, manoeuvres must be carried out under the supervision of a responsible person and necessary precautions must be taken against load swings and dangerous situations of the load.

5. Before giving the signal to pull the ropes that are slinging from under a lowered load, the signalman must ensure the safety of the workers. Operators must not leave their machines unattended while there is a load hanging from them.
6. When the electric magnet crane is at rest, the magnets should not be left hanging high on the crane. They should either be dropped directly onto the ground or lowered onto platforms designed for this purpose. The magnets should be removed from the crane when not in use.
7. Only authorized persons should be present in moving crane cabins or on crane cars, and crane operators should not allow anyone to ride on the load or hang on empty ropes or hooks. In cranes operating on rails in the open air, the effect of wind should be taken into account, and they should be wedged, tied and equipped with a sliding safety system.
8. In cranes operating on rails, there must be chocks at both ends of the rails on which the crane and the crane trolley travel and at least as high as the radius of the wheels. In overhead and suspended cranes, there must be appropriate hand, arm and foot protectors on the wheels of the bridge and crane trolley.
9. In case of operation of two cranes to lift the same load, each crane operator should be given command by only one signalman and special measures should be taken to ensure harmony in the movements of the cranes.
10. Signalmen and workers assigned to carry loads suspended from cranes must go in front of the loads, check the rail switches and ensure that the loads are carried at a height where they will not hit anyone or any obstacles.
11. In motorized cranes, audible and visual warnings should be given when the load is lifted or the crane is moved, their headlights and stop lights should be turned on during night work, and the cabins should be illuminated appropriately.
12. The mobile crane must be installed on solid ground and kept in a horizontal position, and load-distributing bases (wooden blocks) must be used under the crane legs. During the installation phase, appropriate safety distances must be maintained from the construction site excavation slopes and excavation edges.
13. A safety distance of half a meter must be left between the mobile crane's moving parts and the surrounding stationary objects (scaffolding, material lifts, etc.). If the safety distance cannot be maintained, the dangerous area must be closed off or the current work (scaffolding and other work) must be temporarily stopped.
14. The operator must be careful about open power lines and work with a safe distance.
15. When the load is being lifted or lowered, no one will be under the load and there will be a safety latch on the hook. Carrying people with a crane is prohibited.

23. ELECTRICAL WORKS

The periodical inspections of the electrical installations, lightning rods and groundings on the site shall be carried out and reported by a qualified Electrical or Electrical-Electronics Engineer/Electrician within the periods and under the conditions in accordance with the provisions of the legal legislation.

The potential electrical work on the site shall be carried out only by the personnel with a professional competence certificate. All electrical equipment to be used on the site must bear the CE marking. The use of electrical equipment and devices that do not comply with CE norms is prohibited.

The points that are taken into consideration in the inspections of electrical devices/equipment are as follows.

1. Particularly the parts of the electrical device/equipment that protects the electrical components shall be checked for physical deterioration. Necessary repair/maintenance works shall be initiated in case of reparable defects. Damaged devices that do not seem reparable shall be removed from the work area.
2. The Electrical cables shall be checked for signs of wear and darkening/hardening after overheating. The physically damaged cables shall not be allowed to be repaired with electrician tape, etc, and the damaged part of the cable shall be repaired by cutting and in case the cable

distance does not allow, the cable shall be replaced with a cable of equivalent characteristics and cross-section.

3. Grounding connections of metal body and components shall be checked. Loose, worn connections shall be tightened or replaced.
4. Plug, socket components shall be checked for signs of wear and darkening/hardening after overheating. Worn, corroded plug/socket components shall be replaced with new plug/socket with equivalent amperage characteristics.
5. The device to be controlled shall be operated and whether it fully fulfils its functions and the presence of problems such as excessive vibration, noise and heating shall be investigated. The devices/equipment identified with such problems during normal operation shall not be allowed to be used until the malfunction is corrected. Damaged devices that do not seem reparable shall be removed from the work area.
6. Repair/maintenance works may not be carried out by anyone other than the personnel with a professional competence certificate.

Devices with a fixed energy connection (directly supplied from the panel/panel board, not using plugs/sockets) and the power panels/panel boards must be de-energized for maintenance and control. In that case, according to the lock out tag out system, the device must be directly disconnected from the switchgear (fuse, etc.) to which it is connected and the panel/panel board to which it is connected must be locked and tagged in order to prevent unauthorized operation during maintenance and control operation. Tags must be secured so that they cannot be displaced due to the environmental impacts.

The out of use tag must be affixed on the device/equipment that is not approved for use as a result of the inspections so that it can be easily seen by the authorized personnel performing the inspection. Equipment that do not seem reparable must be removed from the work area as soon as possible.

Electrical motors, transformers and fixed facilities and fixed electrical heavy equipment shall be provided with protective grounding and the efficiency of the system shall be checked by periodic measurements.

Likewise, the lightning rod grounding level must also be measured and reported periodically. The resistance value limit for the lightning rod grounding line is assumed to be 10 ohms.

During the control and maintenance of electrical equipment, the personnel with professional competence certificate shall use the following protective elements.

1. Isolated gloves (Fully insulated protective gloves that shall not limit finger and hand movements)
2. Isolated mop (The personnel in charge shall carry out all work on the isolated mop.)

Control and maintenance work shall not be carried out in rainy weather and wet areas.

24. HAND TOOLS AND ELECTRICAL HAND TOOLS

24.1. Use of Hand Tools

1. The hand tools that shall be used at the workplace shall be made of materials compatible with the work to be performed and shall only be used in works specific to their build. Their wooden handles shall be made of knot-free, good-type and fibre wood, in compatible form and dimensions, the edges shall be rounded and smooth, free from splinters.
2. Hand tools that shall be used in areas where sparks would be hazardous shall be made of materials that do not cause sparks and any tools that are not of this nature shall not be used in these areas.
3. Hammer, sledge hammer, chisel, cutter, punch and similar tools shall be made in compliance with their standards, from good quality steel and the damaged or burred heads of these shall be smoothed by honing or filing.

4. The hardening or whetting and pressing and repair works of hand tools shall be made by qualified personnel and their sharp edges of tips shall be suitably protected while they are not being used.
5. Hand tools shall not be left outside on ladders, passages or any other areas that the employees may use as passages; and suitable cabinets, hanging panels or shelves with at least 2 centimetres skirting shall be made for these.
6. These shall not be released from the hand without taking necessary precautions against falling from above the head heights.
7. Hand tools such as axes, adzes, choppers shall always be kept sharp, their handles shall be inserted into the tools tightly and sturdily and shall be kept in cases, slings, enclosures against abrasion.
8. In chisels, cutters (cutters with handles), punches and similar hand tools, the chisel tips, cutter blades and punch tips shall be in shape compatible with the work to be performed and always be sharp, and suitable shields or screens and similar protectors shall be available when these are being used.
9. Levers and similar tools shall not be left as propped on the ground or the bench or perpendicularly when they are not being used, they shall be left in the horizontal position.
10. Rasps and files shall have sturdy handles with metal rings or other types of handles, and these shall not be used without a handle.
11. Rasps and files shall not be used in operations such as opening a case, removing a nail and hitting a hard object, these shall not be hit by a hammer or a similar tool, and tools such as chisels, cutters and punches shall not be made from old rasps.
12. Handle cases made of fibre, leather or stainless steel shall be made on the handles of knives when necessary, or finger grasps or shield shall be placed.
13. The tips of knives used to cut rubber shall be compatibly rounded.
14. Lifting jacks shall be placed sturdily and perpendicularly on the ground when lifting a load and after the loads have been lifted to the desired height, any work shall not be performed under or above these loads unless the lifting jacks are supported by sturdy ad compatible wedges, and necessary precautions shall be taken while lowering loads with a lifting jack.
15. When cutting taut wires, springs or similar wires by pliers, wire cutters and nippers, one of the ends of the wire that shall be cut shall be appropriately fixed.
16. Suitable wrenches shall be used to tighten or loose nuts; pliers and similar tools shall not be used for these purposes.

b. Use of Electrical Hand Tools

1. The handles of portable electrical hand tools shall be coated by a non-conductive material of adequate type and thickness or shall be made from such materials, and there shall be circuit breakers with springs that need to be kept pressed in order to keep the circuit closed.
2. Electrical hand tools used at construction sites and other outdoor workplaces shall be operated by low voltage or voltage supplied by safety transformers (dis-connector transformer) with 1/1 ratio and separated windings, or shall be manufactured specially, with double insulation. In case a safety transformer is used, only one electrical hand tool shall be connected to the output circuit.
3. Safety automats that break the electrical circuit supplied to the hand tool before the leakage that may occur on electrical hand tools reach a hazardous level shall also be accepted as compatible occupational safety measures. On grounded hand tools, the presence of a contactor that breaks the electrical circuit in case of a break in the grounding circuit shall also be accept as applicable.
4. Grounding of portable electrical hand tools shall be made by special plugs and sockets with grounding elements, there shall also be a switch on high amperage sockets, the cables that

supply current to these tools shall not be scattered and shall be routed from above in passages. Tools shall be grounded by a special grounding conductor in the supply cable

5. Electrical hand tools shall not be used in areas where flammable, explosive substances are handled and stored.
6. Portable electrical tools that are required to be used as suspended shall be suspended from the end of a spring or cable or chain and kept in balance with suitable weights.
7. Portable, heavy hand tools shall be moved from one place to another using special slings or straps and these slings, straps shall not be used during operation.
8. Workers, who work with portable hand tools, shall not wear loose apparel with wide skirts, and shall not wear any gloves other than rubber.
9. The electrical hand tools shall be checked by authorized individuals prior to use, and those with faulty grounding, with high sparking motors, with damaged sockets, plugs, switches and connection cables shall not be allowed to be used.
10. Portable electrical lamps shall only be used in areas where continuous lighting cannot be made adequately, the lamp sockets and live parts shall be inside non-conductive, protective meshes and lamps shall be inside glass protection in areas where organic dusts of explosive substances are available and in humid areas.
11. Compatible personal protective equipment must be used during operation. (Goggles and face protection against spattering substances, ear protectors against noise, dust mask against hazardous dusts, and a glove and hardhat according to the work performed).

25. EARTHWORKS AND EXCAVATION WORKS

1. On excavation areas, the presence of electrical cables, gas pipes, waterways, sewerage and similar installations shall be investigated in advance and necessary measures shall be taken accordingly.
2. If it is discovered that there is poisonous and suffocating gas during the excavation, the employees shall be removed immediately; gas shall be prevented and excavation works shall not be started unless the accumulated gas is discharged.
3. Measures shall be taken by supporting the excavation surfaces with horizontal shoring bars for collapse and demolition.
4. Bevelled excavation is necessary to prevent the collapse and demolition of soft surfaces during excavation.
5. Proper entry-exit facilities shall be provided for the employees to climb up and down in excavations exceeding 1.5 meters in depth. It is forbidden to use the shoring device and its supports for climbing up and down.
6. Personnel shall not work in case of rain during excavation works. The work can be restarted after rain stops and safety measures are taken.
7. Appropriate wellington boots shall be provided to the employees in the cases where it is necessary to work on the water. Water exceeding the length of the knee must first be drained by motors.
8. During the excavations done by excavators, bulldozers and similar machines, no personnel can be assigned within the range of motion of these machines. No one other than a licensed driver may operate on these machines.
9. Ramp slopes shall be created to enable the vehicles to carry the excavated soil out enter an exit the excavation site easily.

26. UNDERGROUND AND TUNNEL WORKS

26.1. General Tunnel Safety

Tunnelling works involve complex and high-risk operations due to confined working environments, geotechnical instability, use of heavy machinery, and potential for hazardous gas accumulation. All tunnel activities must be carried out in accordance with the national mining safety regulations and in alignment with the IFC EHS Guidelines for Construction and Hazardous Materials Management.

Method Statements shall be prepared which are include OHS measures before construction begins. This plan must identify location-specific hazards, outline mitigation measures, assign responsible personnel, and define communication and evacuation protocols. Entry to tunnel works shall be restricted to authorized personnel only, and all workers must receive tunnel safety induction and confined space training prior to mobilization.

26.2. Blasting in Tunnels

Blasting activities within tunnels must be planned and executed under strict supervision and in line with applicable laws and engineering standards. A licensed blasting engineer shall prepare a daily blasting plan specifying the charge layout, hole depth, delay timing, type and quantity of explosives, safety distances, and firing procedures.

Explosives and detonators must be transported to the site using certified vehicles and in compliance with the regulation on the transport of dangerous goods.

Before blasting, exclusion zones must be clearly marked and evacuated. Warning signals shall be given before and after firing. Misfires must be treated as emergencies, with access restricted until the area is declared safe by a blasting expert. All blasting records, including quantities used and anomalies, must be logged daily and reviewed by the HSE team.

26.3. Gas and Air Quality Monitoring

Tunnelling operations must include continuous atmospheric monitoring to ensure safe working conditions and prevent incidents related to poor air quality or gas build-up. Gas detectors (portable or fixed) shall be used to monitor for methane (CH_4), carbon monoxide (CO), hydrogen sulfide (H_2S), and oxygen levels.

Gas measurements must be taken:

- Prior to the start of each shift,
- During all confined or enclosed work,
- After blasting or ventilation stoppages.

If any measurement exceeds safe limits, work must stop immediately. The tunnel must be evacuated and ventilated before re-entry. All gas detection equipment must be calibrated regularly and operated by trained personnel. Records of all readings must be documented.

26.4. Structural Stability and Support

To prevent collapses or rock falls during tunnelling, geotechnical conditions must be assessed regularly by competent engineers. Excavation sequences shall be designed to minimize unsupported areas. Support systems—such as steel arches, rock bolts, lattice girders, and shotcrete—must be installed in accordance with geotechnical risk assessments.

Scaling of loose materials must be performed after each blast and at the beginning of every shift using long-handled tools from a safe distance. The tunnel face and roof shall be inspected continuously. Unstable areas must be closed and reinforced immediately. All support installations must be documented and reviewed periodically.

26.5. Emergency Preparedness in Tunnels

Tunnels must be equipped with clearly marked and illuminated emergency escape routes leading to safe areas or exits. At regular intervals, refuge chambers or safe havens must be installed, stocked with water, communication devices, breathing apparatus, and first aid kits.

An emergency response plan specific to tunnel works shall be developed and made available on-site. It must include evacuation procedures, roles and responsibilities, assembly points, rescue protocols for trapped or unconscious personnel, and communication flow. Workers shall be trained in tunnel-specific emergency scenarios, including blasting accidents, gas exposure, and collapse response.

Communication systems (e.g., landlines, two-way radios) must be functional throughout the tunnel at all times. Emergency drills, including evacuation and rescue simulations, must be conducted at least every six months and evaluated for improvement.

The safety measures to be taken during the tunnel works are detailed in the **Tunnel Works Safety Instructions**.

1. As for the underground works, necessary measures shall be taken against collapse and item falls and floods.
2. Adequate and appropriate ventilation installations shall be provided in underground works to protect the health and safety of workers during exerciseing and digging.
3. No open-flame lamps or devices shall be used in underground works where various gases may form an explosive mixture with air.
4. Necessary measures shall be taken in the brick walls or concrete reinforcement of wells, tunnels, galleries and similar sections.
5. In underground works requiring rock excavation, hydraulic exercise machines shall be used or other necessary measures shall be taken in order to prevent dust damage to workers' health.
6. In the roadway works carried out in the area where flooding is possible, the exit points shall be provided to ensure the quick evacuation of the workers, or appropriate measures shall be taken, such as the construction of a sufficient number of elevated cells.
7. The barriers that pose a hazard or congestion to the employees such as gaps, level differences, narrowing passages, low arches, vehicle roads used and crossings used in the roadways' bases shall be adequately and properly illuminated.
8. Indoor underground and tunnel works are subject to work permit system. Therefore, the works to be carried out in these areas may only be carried out after the necessary measurements and inspections by OHS and the Environment Unit.

27. DRILLING WORKS

1. Before starting work in the work area, natural gas, electricity, wiring, sewerage and transmission lines shall be identified and be displaced and marked by the authorities.
2. Drilling and boring machines shall be used in accordance with the rules of use specified by the manufacturer.
3. Unauthorized persons shall not be allowed in the work area. If stopping in a hazardous area is unavoidable in some cases, additional safety measures are necessary. If the machine operator does not have sufficient visibility, a banksman must be assigned.
4. When drilling on unsound surfaces, measures must be taken to prevent the materials from collapsing down.
5. It is necessary to create safe work areas and to use additional devices in order to connect the exercise pipes to each other during drilling.
6. The pile holes must be covered or surrounded by barriers after drilling against falling and there must warning sings there.
7. When using drilling machines, it is necessary to use the appropriate ear protectors, taking into account the high noise.
8. The personnel working alongside the anchorage machines shall be provided with the appropriate personal protection against dust and noise.

28. FORMWORK, CONCRETE AND IRON WORKS

a. Installation and Disassembly of Formworks

1. It shall be ensured that the metal or concrete carcasses and their parts, temporary supports and buttresses and prefabricated construction elements are planned, designed, installed and protected to withstand the loads and stresses falling on them.
2. Lifting, loading, transportation, installation and disassembly operations of metal or concrete carcasses and their parts, temporary supports and buttresses and prefabricated construction elements and steel construction elements shall be carried out by the employees who have professional competence certificate and under the supervision of competent person in accordance with the project. The cranes to be used in lifting operations must have high lifting capacities.
3. It is essential that the strength and other properties of all main carriers, subcarriers and fastening materials to be used in steel constructions comply with the standards according to the loads to be carried and that the corroded and deformed materials are not be used in such constructions unless necessary measures are taken.
4. The surrounding area of the installation site shall be marked with a safety tape. The signs indicating that installation is being made around this area shall be hung and the entrance and exit to the installation site shall be prohibited except for the employees in charge.
5. Necessary measures shall be taken to protect the employees from the risks arising from the temporary instability and fragility of the construction.
6. Work platforms must be placed in such a way that they are suitable for the nature of the work to be carried out and the load to be transported and safe works and passes shall be possible. Work platforms must not be overloaded.
7. Guardrail systems shall be installed around work platforms to prevent falling from height.
8. Access to the work platforms shall be provided with the most suitable roads and equipment (scaling ladders, etc.), taking into consideration the frequency of passes, the height of the said place and the periods of use.
9. Workers must be provided with appropriate work equipment during the disassembly of the formwork, the lowering of the formwork material or the lifting of the formwork material.
10. The person other that the employees in charge must be prevented from entering the area during disassembly.
11. The disassembled formwork materials must be stacked appropriately.
12. During the manufacturing of viaduct legs, wind speed limits will be observed. In the use of scaffolding ladders, the wind speed limits recommended by the manufacturer will be followed. If we can use scaffolding, we can also work at height.
13. During formwork installation and removal operations with cranes, work will not be carried out without providing an environment where the formwork does not oscillate.

b. Concrete Casting

1. All personnel working during concrete casting must wear appropriate personal protective equipment. In concrete castings (columns and partitions) performed higher than 3 meters and covering edges, side railings must be built against falling from height and safety harnesses must be used.
2. The vibrator used during concrete casting must be electrically grounded and the extension cables used must not be in a damaged or exposed condition.
3. The personnel must not stand under the pump during concrete casting.
4. The worker holding the hose during the concrete casting is required to use the hose after the concrete comes up. It is known that in the work done higher than the pressure to occur when the concrete comes to the end of the hose, falls occur due to loss of balance.
5. The personnel holding the hose during concrete casting shall wear protective goggles against cement splashes.
6. Adequate artificial lighting is required for night castings.

7. In balanced cantilever reinforced concrete productions, suitable lifelines will be created so that all workers are connected to horizontal lifelines independent of the formwork.

c. Iron Works

1. All personnel involved in iron works must wear appropriate personal protective equipment.
2. The irons shall be prepared and installed in accordance with their projects.
3. There shall be no more than enough iron on the formwork and the irons shall not be placed unbalanced on the formwork.
4. During the joint work with the concrete team, there shall be a cooperation in a way that shall not hinder the rise of the formwork.
5. The disarrangement of the binding wire and irons in the formwork shall be prevented.
6. It shall be checked if the iron to be used on the stand has been prepared beforehand and the formwork shall not be disrupted.
7. The workers who perform iron mounting at high places shall definitely use safety belts.

2. WELDING WORKS

1. Welding and cutting works shall not be performed near flammable, combustible and explosive materials. It shall be investigated whether there is a fire risk in the immediate environment before such works are carried out. If there is such a risk, such works shall be performed by taking special fire precautions.
2. Drums and metal cans, which have previously been put in place with flammable or combustible materials, shall never be welded or cut even if they are empty. These operations may be carried out after cleaning their interiors with hot water vapor and filling them with water or pressing gases such as carbon dioxide or nitrogen into them, and with the ventilation hatchs open.
3. Clean air shall be pressed in welding works to be done in closed places such as boilers and tanks and furthermore, welding gases and vapors heavier than air shall be sucked out near the base and discharged. In addition, the employees shall wear respirators with suitable filter elements.
4. The connections and sockets of electric welding machines shall be made or replaced only by the authorized electricians.
5. The competent welders with professional competence certificate be employed for all kinds of welding works.
6. The locations where the electric welding is performed shall be at least 2 meters above the working area of the other workers and shall be separated by fireproof and lightproof immovable or portable screens.
7. The electrical rectifiers of the electric welding and cutting machines or the metal parts of the transformers shall be properly grounded against leakage currents.
8. One pole of the output ends of the electric welding and cutting machines or the welding circuits shall be grounded in the workpiece against leakage currents.
9. In narrow and confined volumes such as boilers, as well as in the welding works in damp and wet areas, only direct current shall be used to reduce the risk of electric shock.

Measures to Be Taken in the Works Carried Out with Oxy-acetylene Welding apparatus:

1. There shall be no gas cylinders other than the gas cylinders in use present in the welding areas.
2. The gas cylinders shall be upright at the time of operation and necessary measures shall be taken by the link chain in order to prevent them from falling over and shall be tied in such a way that they can be easily dismantled in case of danger as specified in the legal legislation.
3. Special wheeled vehicles shall be used for the transport of gas cylinders and when these cylinders are not in use, their valves shall be closed and the caps protecting these valves shall be fitted. Gas cylinders shall be made under a shelter or sunshade built to avoid the sunlight
4. Oxygen cylinders shall not be held with greasy hands, and the valves, manometers and other equipment of the cylinders shall not be lubricated.
5. The gas and oxygen pipes in the workshop and the hoses that feed the welding torch shall be in separate and distinguishable from other facilities.

6. The welding torches shall not be hung on an operating gas cylinder or other equipment and shall not be left unless the gases are completely shut-off.
7. The welding torches must have check valves on them. Any gas backflow shall be prevented by a check valve placed at the gas inlet. One end shall be attached to the hose and the other end to the welding torch inlet.

Measures To Be Taken In the Works Carried Out With Welding Machine:

1. The electrical wiring shall be checked by the authorized electrician and examination shall be performed for leaks. It shall be started after making sure there are no leaks.
2. Grounding of the machine shall be checked and if grounding is connected, power shall be supplied.
3. The personnel in charge shall wear rubber shoes, rubber gloves, goggles and fireproof suit or protective clothing. The personnel using the machine shall put an insulating stand under their feet.
4. Attention shall be paid for the material ends to be welded to be clean and rust-free. The copper shoes of the welding machine shall be cleaned periodically.
5. The machine shall not subject to unnecessary over-arching.
6. The energy given to the machine shall be cut by the electrician at the end of the work; the machine shall be protected against rain and water.
7. In case a failure is detected, the related persons shall be notified.

a. Storage of Gas Cylinders

1. The oxygen cylinders in the storehouse must be kept separate from other gas cylinders.
2. Cylinders must be stocked upright and attached to the wall, lined up on the shelf or the racks.
3. One must not enter the storehouse with naked flame where the gas cylinders are kept and must not smoke, and the cylinder storehouses must be ventilated constantly.
4. In infirmaries, dining halls, social facilities and other places where LPG is used, the LPG cylinders must be kept upright outside the building and under a sunlight protection compartment, and the valves must be closed when the use of the cylinders ends.

b. Transportation of Gas Cylinders

1. Special hooks must be used for short-distance displacement of the cylinders or the cylinders must be circled on the base.
2. If the cylinders are transported over long distances, the cylinders must be tied and placed securely in the vehicle.
3. Cylinder cap must be fitted before the displacement to prevent damage to the valves.
4. Cylinders must be protected from abrasive and corrosive substances.
5. Cylinders must not be left under the impact of the sun or other heat sources.
6. Cylinders must not be used as supports, rolls or wedges and must not be dragged or rolled on the ground during transport.
7. Cylinders must be tied upright and tightly or kept inclined on a vehicle or support.
8. After a long period of operation, the valves of the cylinders must be closed. (Blow pipe may be left open).
9. Before the hood is mounted on the cylinder, it must be checked whether its screw has been loosened or not. The snow and ice of the hood must not be melted with flame.
10. Special connections must be used, these connections must be fixed with sleeves and fastened with bond or reinforcement ring.
11. No modifications on the cylinders or accessories and no maintenance and painting works on the cylinders must be performed.
12. Oxygen cylinder valves and welding torch taps must not be lubricated and must not be opened and closed with oily rags.
13. The leaks in the cylinders must not be inspected by flame.
14. The leaks in the cylinders must not be left under the influence of corrosive substances and shocks as well as sun and heat.

15. Oxygen gas must not be used to clean and blow the material and to start diesel engines.
16. In case of fire and after extinguishing the fire, the heated acetylene cylinder must be cooled by soaking for a long time with plenty of water.
17. Acetylene cylinders must not be heated to accelerate gas output at low pressure.
18. No smoking in and around the workplace.

29. MATERIAL STORAGE

The safe storage of materials and equipment in warehouses is described in the **Warehouse Safety Instructions**.

1. When stacking, piling up the materials or placing the devices, they shall be placed in such a way that they shall not fall apart.
2. The height, width and length of the stacks must be proportional.
3. Obstacles must not be created by placing material on walkways or entry-exit doors.
4. Stack spacing must be sufficient for the required works.
5. The materials shall be taken from the top row and thus they shall be prevented from falling apart. Obstacles must not be created by standing in front of the pipes and similar materials when they are being transported.
6. After a height of 120 cm, for each 30 cm height to be stacked, the stack must be 25 cm from the edge.
7. In particular, there shall be definitely no stacking in front of emergency exit doors and fire cylinders and hoses.
8. Stacking of the materials must not exceed 3 meters.
9. Heavy sacks and bags shall be stacked with four corners diagonally and minus 1 bag once every 5 rows at most.
10. Rods and pipes shall be stacked on suitable shelves or stands, or where they cannot be provided, on a base made of planks and both sides of the stack shall be supported by durable piles.
11. Large and long parts must be at the bottom when stacking.
12. Stacking and storage must be in a manner that does not constitute an impediment for production. The carrying capacity of the base on which the stacking is performed must be known.
13. The weight of the stacking load must be known. The items with the same properties must be stacked together. Stacking must not be done near electrical installations.

30. CHEMICAL SUBSTANCES AND THEIR STORAGE

The use and storage principles of the chemical substances to be used in the work areas without damaging the environment and human health and safety are specified in the **Chemical Substance Use and Storage Instructions**.

1. All chemicals shall be stored in the designated storage areas, separately, on firm grounds, and in sealed pans and tagged.
2. It shall be ensured that the safety and security measures specified in the Material Safety Data Sheets are taken for the chemical substances to be used and stored on the site.
3. It is necessary to act in accordance with the Material Safety Data Sheets and Emergency Plan concerning the storage activities and emergencies that may occur during use.
4. Special precautions against fire, spills/leaks are defined for potentially hazardous substances such as explosives, oils, petroleum products, solvents, reducing agents.
5. Flammable substances are tagged and stored in compliance with the legislation requirements in fire-proof rooms.
6. In areas where work is being conducted, the leak-eliminating equipment and the absorbent required for intervention when a spill occurs shall be kept ready in a temporary tank. The area contaminated with the chemical substance is covered with sand, sawdust or other absorbents in case of a spill.

7. Radioactive sources, if used, are tagged and stored in compliance with the legislation. The appropriate permits are obtained for the use, storage and tagging of such materials.
8. It is ensured that substances with asbestos additives are not kept on site or used as construction materials.
9. Hazardous chemical substances are stored in compliance with the legal legislation in force.

Oil and Fuel Storage Tanks

1. All oil and fuel storage tanks are placed at a distance of at least 20 meters from stream beds, surface and underground water masses and wetlands, and at least 3.5 meters or further away from buildings, borders and any type of other explosive and flammable substances.
2. A secondary reservoir is provided for all oil and fuel tanks. Such secondary reservoirs are constructed of impermeable materials or coated so as to ensure impermeability, complete with base and walls and have a capacity to hold 110% of the tank contents.
3. The tank filling and discharge connections are located within the reservoir. Wherever possible, tanks and secondary reservoirs are covered to protect them from rainwater.
4. Drainage taps shall always be kept closed and be only opened to discharge clean, uncontaminated rain water and the water is pumped outside.
5. In any event, contaminated water shall be collected and disposed of in compliance with the regulations concerning waste oils.
6. Spills that occur during filling activities shall be promptly intervened in and the materials and equipment that shall be used during intervention are stored in areas close to the tanks.
7. Compatible absorbent materials (sand, sawdust, etc.) are kept available at the area in adequate quantities.
8. A compatible, leak-proof container is provided to store oiled equipment (filters, tray contents and oil replacements, etc.). The contents shall be delivered to licensed disposal facilities.
9. Fuels and oils shall be stored in tanks or drums with tightly closed lids and protected from the effects of outdoor air. The safety and fire protection precautions shall be closely complied with.

Mobile Tanks

1. It shall be ensured that mobile oil and fuel tanks are stored and kept under control, in order to prevent seepage and spills to the soil and water sources.
2. The tank is placed on firm ground and the ground must have the adequate strength to support the weight of the tank and the tank contents.
3. Adequate precautions are taken to prevent any seepage while filling any tanks. An adequate number of fire extinguishers shall be kept at a close distance to the tank.
4. Safety signs with “No Smoking”, “Bare lights prohibited“, “Hazard” etc. inscriptions shall be provided and the requirements of the related legislation shall be complied with. The product contained in the tank shall be clearly written on the tank.

31. USE AND STORAGE OF FLAMMABLE MATERIALS

1. The acquisition and use of the explosives by persons other than the authorized persons is prohibited.
2. Use of explosives in the workplace must only be performed by the qualified persons.
3. The licensed fireman shall see the work order at the beginning of the shift and take the necessary orders. He/she shall take the necessary amount of explosives s/he takes from the warehouse to the workplace (where the explosion takes place) by filling it in his/her locked chest. He/she shall fill the prepared holes here and fire. Shall keep a record of consumables related to the explosives used and have it signed by the authorities.
4. The fireman is responsible for the tools and materials he uses, and he/she must place the dynamite only in the spot indicated by the site manager or the engineer in charge.
5. Explosives and capsules must not be transported in the same chest, and the fireman must not put anything other than explosives in their chest.

6. No one must get on the transport vehicle of the fireman carrying explosives.
7. Necessary measures must be taken to prevent the capsules from falling down or other objects falling onto them.
8. If there is no electricity in the explosives warehouse, flashlights shall used. It is also forbidden to use the flaming lighting devices such as lighters, matches and lanterns.
9. Warehouses must be ventilated in hot weathers and protected from humidity in cold weathers.
10. In warehouses, dynamite chests must not be stacked more than 2 rows, and nitrate bags more than 3 rows.
11. The first explosive material to be stored in the warehouse must be used first.
12. The warehouse record book and the stock status that must be kept in each explosive warehouse must always be kept under control.
13. Necessary safety measures must be taken when the explosives are brought to the explosion area. They must protected against sun and rain as much as possible.
14. When ignition, the area must be equipped with the guards with whistles and flags as required (Being outside the ignition range).
15. The heavy equipment shall be taken out of the impact area before ignition and their back sides shall be turned towards the ignition area.
16. Necessary safety measures shall be taken for the ignition and then, the ignition shall be done followed by an intermittent three-time siren or any other warning.
17. Ignition must be carried out during meal breaks, shift changes and in broad daylight.
18. After ignition, the site shall be examined by the fireman and with the permission to be given after the conclusion that all the holes have exploded, the operation shall be started at the explosion area. Otherwise, it is strictly forbidden to enter the site.
19. If an unexploded hole is detected in the examination after the ignition, the site chief or the engineer in charge shall be notified of the situation. First, the ignition cable shall be checked and reconnected to the unexploded holes and ignition shall be made by means of a magneto at least three times. If it does not explode this time either, if the cable is found to be broken in the hole;
    a) A new hole shall be drilled 1 m away from the unexploded hole and the explosive material shall be filled and ignited.
    b) Water amounting 2–3 tankers shall be introduced from the cracks around the hole and after the firemen have ensured that the discharged water thoroughly degrades ammonium nitrate, eliminating the possibility of detonation, the removal of the loosened portion shall begin and in the meantime, a watchman shall be assigned here, no one shall approach the loading area. First, both sides of the exploded hole shall be emptied. The work, starting from the bottom of the hole, must be carried out in such a way as to ensure that the dynamite falls into the bucket of the digger without causing the bucket tabs to touch the dynamite. This event shall be carefully observed, and if the dynamite is found, a fireman shall take out the capsule by shielding with a wooden plate without shaking the dynamite and breaking the hole into which the capsule has been placed. The capsule and dynamite shall then be disposed of in a safe pit by taking the necessary measures. These operations shall be carried out during the daylight and shall not be continued after getting dark.
    c) The material consumable report shall definitely be kept after each explosion.
    d) Explosive ignition operations shall be performed by the licensed firemen.

c. Measures To Be Taken for the Storage of Explosives

1. Residual explosives that remain after the explosive ignition shall be returned to the warehouse immediately.
2. The personnel working in the warehouse shall strictly comply with the provisions of the legislation concerning explosives.
3. Explosives may not be stored in the warehouse in the quantities more than written on the permit.
4. Lighting with open flame is not permitted in warehouses. In this respect, warning signs must be hung indicating that no one shall approach with open flame.

5. Employees are not allowed to enter the warehouse except for warehouse personnel. However, the personnel and carriers who are not the warehouse personnel may only bring explosive packs to the warehouse's door. They shall also take the ones to be removed from the warehouse from the warehouse door again.
6. Ignition of the explosives shall be performed by the licensed firemen with a fireman's certificate of competency. Ignition is prohibited for those without certificate of competency.
7. It is forbidden to store the flammable substances, such as fodder, paper, gasoline, gas, spirit and diesel, which can easily ignite on their own or by any effect.
8. It is forbidden to enter the warehouse with the materials such as lighters, matches, etc., which may create a fire at the entrance to the explosive warehouse.
9. Care shall be taken to keep the inside of the warehouses clean. It is forbidden to keep empty packages such as chests, barrels, boxes, tools and other foreign materials in the warehouse.
10. You cannot enter the store with spiked shoes. In addition, warehouse employees may not use the clothing such as nylon and perlon, which can generate static electricity.
11. Explosive material packages in warehouses shall not be disposed of, dragged, drawn, crashed, and care shall be taken not to drop them.

d. Precautions for Use of Inflammable Materials

1. Combustible, flammable and explosive materials in the places where they are necessary to be kept shall be kept away from heat and in safe containers.
2. Not flaming tools shall be used (matches, lighters, candles, etc.) during the filling or emptying of fuel tanks and in the control of gasoline and oil of motor vehicles.
3. Tanks, reservoirs and pipe connections where flammable and explosive liquids and substances are placed shall be properly grounded against static electricity.
4. Dispensing ports of the containers with hazardous liquid shall be upside and kept at cool places.
5. High voltage lines shall not be passed over the places where flammable, combustible and explosive materials are stored.
6. Special safety rules and warning signs shall be posted in the places visible to the employees in the areas where flammable, combustible and explosive materials are stored.
7. In the event of any danger in the workplace that operates with flammable, combustible, explosive, dangerous and harmful materials, measures shall be taken to ensure that the employees can be evacuated immediately, in a planned and regular manner.
8. In the buildings where flammable, combustible, explosive, dangerous and harmful materials are produced, processed and stored, operation must be stopped in whole or in part before starting construction, maintenance and repair work, such materials must be taken out of the danger zone, if any, after the proper cleaning of its residues, the construction, maintenance and repair must be provided under the constant supervision of a technical, authorized personnel in charge.
9. Whether various flammable, combustible, explosive, dangerous and harmful chemicals exceed the limit in the workplace air shall be determined by measuring at certain and required time intervals and the ventilation installation shall be checked by the authorized personnel.
10. The repair work shall be carried out under the supervision of a competent team and technical personnel in charge during elimination of the breakdowns in tools, devices and piping equipment operating with flammable, explosive and dangerous materials.
11. In the presence of flammable, combustible, explosive, dangerous and harmful materials, the appliances, devices and systems which rise to the temperature that may ignite these materials or their vapor and gases and produce sparks and high flames shall not be used.
12. Adequate amount of fire extinguishing equipment and materials shall be kept in the places where such substances are stored and necessary measures shall be taken against fire, natural disaster, theft and sabotage.

e. Precautions To Be Taken in Flammable Liquid Tanks

1. Tanks and pipe connections where flammable liquids are stored shall be properly grounded against static electricity.
2. When filling and emptying the tanks with flammable liquids, grounding line connection between the vehicle and the tank shall be made and measures shall be taken against static electricity.

Tankers moving on rubber wheels shall not be entered into filling points unless they are completely free of static electricity loaded.

3. Aboveground tanks shall be placed on solid bases and surrounded by suitable safety walls.
4. The entrances and exits to the places where flammable materials are kept or stored shall be kept under control and their surroundings shall be cleaned up to 30 meters against fodders and other flammable materials
5. Persons other than the ones in charge of furnace rooms shall be prevented from entering and exiting, the operating instructions and warning signs shall be posted and adequate fire extinguishing devices shall be kept available.
6. Maximum attention shall be paid to cleanliness in furnace rooms, a minimum number of electrical appliances and devices shall be kept, and these shall be grounded.

32. HEAVY EQUIPMENT

An inspection and preventive maintenance program shall be established and implemented for all site equipment, machinery, tools, scaffolding, lifting devices, vehicles, and temporary structures. Inspection schedules shall be developed based on manufacturer recommendations, legal requirements under Turkish Regulation on Health and Safety Conditions in the Use of Work Equipment, and site-specific risk assessments. Preventive maintenance shall be conducted at defined intervals to avoid equipment failure and ensure operational safety. All inspections and maintenance activities shall be recorded in a central register maintained by the EPC HSE Department and corrective actions arising from deficiencies shall be tracked to closure. Only certified personnel shall be permitted to carry out maintenance activities. Equipment or structures deemed unsafe shall be tagged and withdrawn from service until remedial actions are completed. Periodic internal audits shall verify compliance with the maintenance program and summary data shall be included in monthly HSE reports.

Maintenance and inspection of the Equipment (Heavy Equipment, Trucks, Vans etc.) shall be carried out by the workshop unit.

1. When riding on the machine, it must be checked for any obstructions.
2. Heavy Equipment shall not be used by the personnel without appropriate operator certificate.
3. Operation shall be performed outside the location designated on the construction site. In the event of a danger in the workplace, the supervisor must be notified of the dangerous working situation.
4. No person other than the operator must be allowed into the operator's cab during operation. No person must be allowed on the steps and the bucket while the machine is active.
5. The lubricant must not be allowed to maintain or check anything during operation. After the maintenance is complete, no movement or rotation must be made unless it is ensured that the lubricant or repairman is away from the machine.
6. Before making in a narrow space, the lubricant must check the back of the machine. Even if it is a short distance, the operator must not reverse without looking back.
7. No one must be allowed underneath when the bucket is full. When lifting or transporting, one must make sure that it is safe.
8. The works other than for construction and use purpose of the machine must not performed.
9. Traffic and road rules must be followed when on the road.
10. Machine maintenance and the control cards must be kept regularly and their periodical maintenance must be done according to these cards.

33. HOLE DRILLING AND BLASTING INSTRUCTIONS

Drilling and blasting operations are classified as high-risk activities due to the use of explosives and potential impacts on worker safety, structural stability, and nearby communities. All such activities shall be conducted in accordance with national legislation including the “Regulation on Health and Safety in Mining Workplaces,” the Explosives and Firearms Law, and in alignment with the IFC Environmental, Health and Safety Guidelines for Construction and Hazardous Materials Management.

A site-specific drilling and blasting plan must be developed and approved by a licensed blasting engineer. The plan shall include details of the blast area layout, type and quantity of explosives, initiation method, sequencing, safety distances, and communication procedures. The use, transportation, storage, and disposal of explosives must be carried out by authorized personnel only, with appropriate documentation and in secure facilities complying with legal storage requirements.

Prior to each blasting activity, exclusion zones must be established and cleared of all personnel. Adequate warning signals shall be used before and after detonation. Misfires or anomalies must be immediately reported, the area evacuated, and the issue investigated by competent personnel. Emergency response equipment and first aid provisions must be available near all blasting sites, and all staff involved in such operations must be trained in blasting safety and emergency procedures.

The following instructions shall be followed by all site personnel involved in drilling and blasting activities:

1. Procurement, transportation and use of explosives must be carried out under the supervision of the person responsible for blasting.
2. Matches, cigarettes, lighters that may create an open flame shall not be used near the explosive depot or during the transportation of explosives. The use of substances such as etc. should never be allowed.
3. Mobile phones and other radio-like devices should not be used and should be turned off during the transportation and use of explosive materials in the storage area.
4. Wooden tools should be used to open explosive crates.
5. Explosive crates or boxes should not be opened inside explosives storage or in closed areas.
6. Explosives and detonators should not be carried together.
7. Explosives and detonators should not be carried together with metallic tools.
8. Explosives and detonators must be kept separate from each other until the final ignition moment.
9. Filling of explosive materials into sewer holes will be done under the supervision of the blasting officer.
10. Explosives should not be forced into the hole.
11. Only wooden sticks should be used when filling and tightening sewer holes.
12. If a stick of dynamite gets stuck in the sewer, it should be removed using wooden materials.
13. There should be no knots or bends in the electric capsule wires. The wires should be kept away from the capsule while being straightened.
14. Before firing, a sufficient and clear warning signal must be given, a siren or whistle must be sounded to prevent anyone from entering the firing area.
15. Lookouts should be placed on all roads leading to the firing area. The fireman should fire after making sure that everyone, including himself, has entered safe places.
16. No one should enter the firing area immediately after the firings. Against unexploded manholes, this period should not be less than 5 minutes for electric firings and 30 minutes for others.
17. If safety wicks must be used, no more than 5 pieces should be used as per the legal warning.
18. The person responsible for blasting will check the sewers and give permission to work after it is seen that there is no unexploded sewer left.
19. Sewage filling and firing shall always be carried out in daylight and in weather without rain or lightning.

34. ENVIRONMENTAL PROTECTION

The main principle of environmental protection is prevention of pollution. Pollution prevention refers to the elimination, modification or reduction of operating activities that cause interference of waste to the soil, air or water.

a. Prevention of Water Pollution

All activities shall be carried out in such a way to prevent the interference of solids, contaminants, construction residues and other hazardous pollutants and wastes into surface waters or dry stream beds and groundwater resources. All necessary measures shall be taken to prevent contamination of surface waters and groundwater resources around the work site. To minimize potential negative impacts on surface waters and groundwater:

- No construction site must be located within a 10 m area (measured from the nearest shore) around a surface water and all construction works within the 30 m surrounding area of surface water must be minimized as far as possible.
- Storage areas must be located at least 50 m away from any surface water or drainage channel.
- The existing vegetation along the surface waters shall be protected as much as possible and shall function as a sediment filter.
- Refueling, washing or maintenance-repair work for any construction site or machine must not be carried out in, on and next to a drainage or surface water, or in areas where groundwater is high.
- Discharge of wet concrete or cement into or near any surface water must be prevented.

b. Prevention of Air Pollution

During the course of the work, appropriate and effective measures shall be taken as often as necessary to reduce the dust-related discomfort and prevent dust emitted from the activities carried out. Exhaust emissions above the limits must be avoided by keeping the machines in a maintained state at all times.

Dust emissions originating from the construction site activities or vehicle traffic shall be minimized by measures such as good traffic management, low speed, irrigation, dust source units and over-current activities.

Dust reduction measures shall be taken to prevent erosion and pollution originating from dust. Dust production and airborne dust level shall be monitored visually. In case of excessive dust formation in windy weather conditions or upon visual monitoring, dust preventive measures must be applied on exposed areas. Dust prevention measures shall include:

- Irrigation on bare surfaces and stone crusher operations.
- Covering the stock areas.
- The vehicles carrying dusty material (excavation soil, etc.) shall be covered in such a way as to prevent dust emission.
- The wastes originating from the activities shall not be burned on the site.
- Dusty works must be performed in the closed system according to technical facilities or such works must be isolated from the others.
- The dust amount in the workplace air must not exceed the amount specified in the legislation.
- In dust-producing works, the workplace base shall be kept wet according to the characteristics of the work and the technical possibilities; in drilling works, wet methods shall be applied to prevent the generation of dust.
- Personal protective equipment and masks shall be provided to the personnel working in dust-producing works according to the nature of the work and of the dust.

c. Prevention of Noise Pollution

The measures to be applied in the prevention of noise pollution originating from activities, not limited to the following, are:

- General construction works must be performed during agreed working hours decided as primary hours.

- The explosion activities to be carried out within the 1 km area around the villages and construction camps shall be carried out primarily during the daylight hours. The inhabitants in the area shall be informed at least 12 hours in advance that the explosion shall be carried out and information shall be provided on the estimated time and number of explosion operations.
- In case of working during the night hours, the working hours shall be determined in advance.
- All facilities and power equipment shall be maintained to minimize noise emissions and, if appropriate, silent facilities shall be selected for site use.
- Where the facilities have been designed to work with engine covers to reduce noise, the engine covers shall always be used and kept closed during the period of operation of the facility.
- All facility units that do not require continuous operation on the site shall be kept in the closed state unless they are used.
- Routine checks shall be carried out to detect equipment that causes noise emission above acceptable limits or are in an uncomfortable sound characteristic, and the noise emitted by these equipment may be reduced with appropriate maintenance and repair.
- If excessive noise emissions are detected in any facility or equipment due to a defective muffler, broken or loose engine cover, etc., the facility or equipment shall be immediately take out of service and subjected to adequate maintenance, repair or rehabilitation.
- The facilities shall be located away from residential areas as far as possible and, where necessary, sound shielding elements suitable for reducing noise levels in sensitive receiving environments shall be used. Noise barriers shall be used where severe noise effects are seen.
- Facilities that are known to generate a strong noise emission towards a particular direction shall be directed, where possible, away from noise sensitive areas.
- Trainings for proper use and maintenance of machinery and equipment and positioning of the machinery on the site in such a way as to reduce the impact of noise emissions on neighboring settlements shall be provided to the site personnel.
- Effective communication shall be established with the affected communities.

Additional noise measurements may be carried out, if necessary, in noisy activities, sensitive points and in the cases where complaints of local people are received. Additional measures shall be taken if the legal noise level limits are exceeded. If it is determined that any workplace exceeds the noise limit, ear protection devices shall be provided to the personnel working in the affected area as a short-term measure, or the operation shall be stopped until appropriate measures are taken to reduce noise levels.

d. Prevention of Soil Pollution

Matters to be taken into consideration in the prevention of soil pollution:

- All fuels, petroleum and chemicals shall be stored in protective sets capable of holding 110% of the maximum amount stored.
- All storage areas must be located in such a way that any leakage could be easily maintained and the possibility of overflow could be avoided.
- All areas that shall be affected by the storage or use of Hazardous Substances (Workshops, Repair Shops & Storage Areas) must be designed as closed areas so that they shall not affected by rain water and the drainage system must be connected to dump wells.
- Concrete wastes and the wastes originating from cleaning of concrete plants/mixers shall be disposed of in accordance with the legislation.
- Mud and debris must not be kept on highways and pedestrian roads.
- Intervention must be performed with regard to the information contained in the MSDS (Material Safety Data Sheet) regarding the cleaning of leaks/spills and the elimination of subsequent wastes.

e. Cultural Heritage

If any cultural resources or artifacts of archaeological, religious, cultural or historical value are found during the performance of the activities, the operations shall be stopped immediately and the competent authorities shall be informed. No artifacts, objects or materials in the findspot shall not be deformed or

removed from the findspot. The artifact, object or material found shall be kept safe and protected until it is delivered to the competent authorities. Construction activities shall be carried out after appropriate conservation measures have been taken for the protection of cultural heritage.

35. USE OF NATURAL SOURCES

In order to reduce the environmental impacts of natural resources by increasing their use efficiency, consumption of natural resources such as energy, fuel and water are monitored and measures are being developed to encourage their efficient use.

Energy, electricity and water consumptions shall recorded, monitored and reported with the **Monthly HSE Performance Indicators** form.

Measures to be taken to increase the efficiency of natural sources:

- Taking into account the unit energy and water consumption values and energy efficiency assessments during new material, equipment purchase and/or workplace designs (including transportation and carrying) or in current material, equipment renewal
- Increasing efficiency in heating, cooling, air conditioning and heat transfer
- Minimizing heat losses with proper thermal insulation
- Prevention of losses in electricity consumption
- Minimizing human factor with automatic control applications
- Minimizing pollutant air emissions
- Using energy-saving lighting
- Using sensor lighting system
- Switching off unused lighting systems
- Use of small motor vehicles
- Shutting down unused vehicles and engines
- Closing unused taps
- Repair of dripping taps, faulty valves and pipes
- Calibration of the meters such as electricity, gas, water etc.
- Prevention and control of over-consumption of the consumables such as paper, toner, etc. and using them consciously
- Ensuring the recycling of wastes (paper, plastic, metal, etc.) as much as possible
- Supplying materials as close to the site as possible to minimize transport and transport impacts
- Placing appropriate warning signs to promote the efficient use of natural resources
- Organizing trainings on the efficient use of natural resources.

36. HOUSEKEEPING

All work areas in the field must be kept clean and tidy at all times. Entrance and exit roads must be free of construction debris and materials and all areas must be cleaned regularly to prevent waste and unused material accumulation. All waste and unnecessary materials must be disposed of in accordance with applicable legislation. All wastes suitable for reuse or recycling must be sent for reuse or recycling, and the wastes classified as hazardous must be disposed of in accordance with the legislation in force.

Housekeeping and providing a clean working environment are the responsibility of all employees.

RESOURCE EFFICIENCY MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
16.06.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
08.09.2025	01	Revision as per Environmental and Social Due Diligence comments

RESOURCE EFFICIENCY MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
REMP	Resource Efficiency Management Plan
CLO	Community Liaison Officer
CO	Carbon Monoxide
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
HC	Hydrocarbons
HSE	Health, Safety and Environment
H&S	Health and Safety
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
NO_x	Nitrogen Oxides (NO_2 and NO)
PM	Particulate Matter
RCA	Root Cause Analysis
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
SO_2	Sulfur Dioxide
VOCs	Volatile Organic Compounds
WHO	World Health Organization

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Resource Effieceny Management Plan ("REMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor
[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

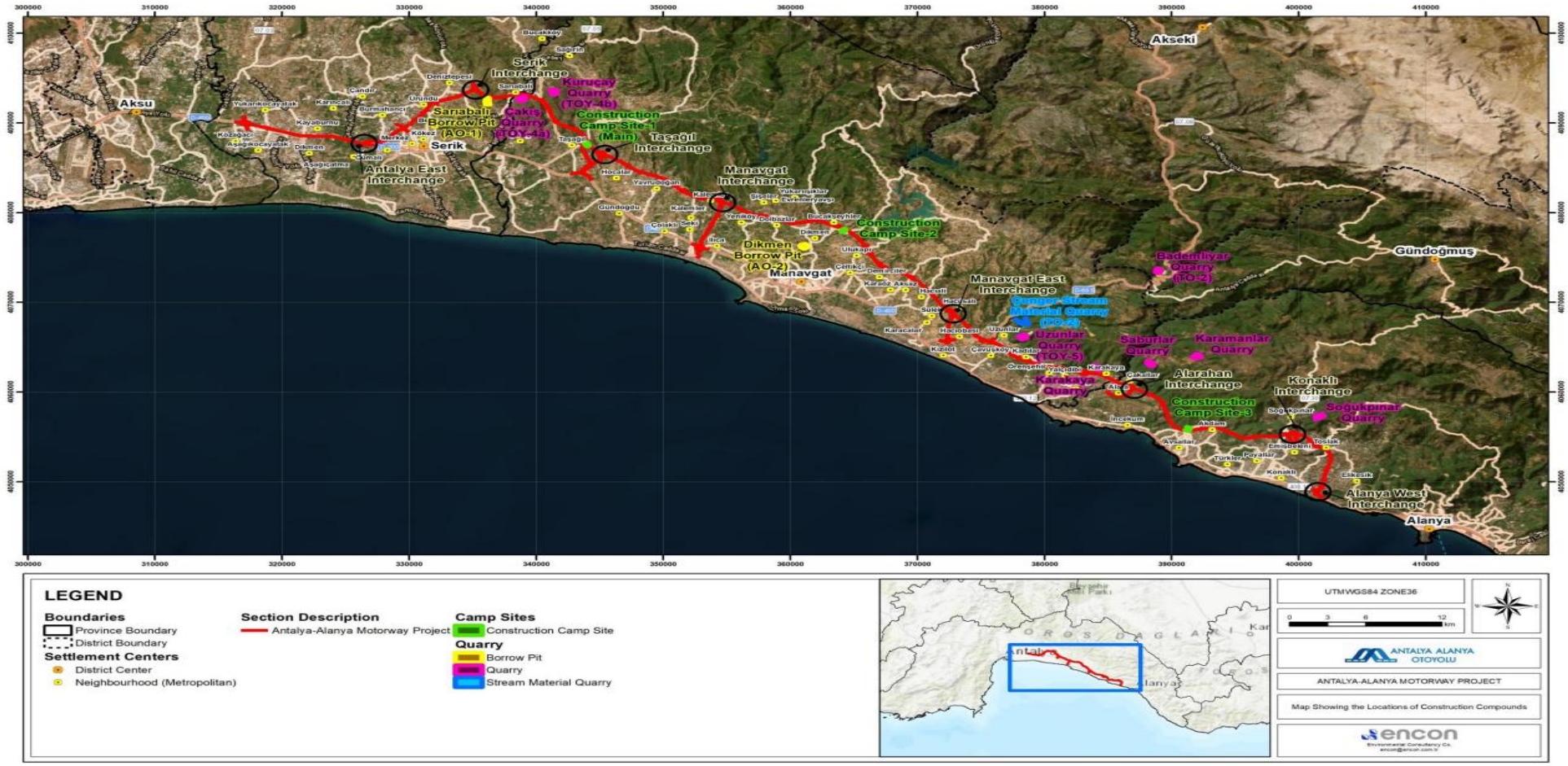

Figure I-1.Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

I.2 Purpose and Scope

The purpose of this Plan;

- Defining country legislation and project standards,
- Defining the duties and responsibilities of the personnel, and
- Identify measures and corporate targets to reduce resource consumption, to avoid or, when avoidance is not possible, minimize and control impacts on the environment resulting from environment and greenhouse gases during the construction phase.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The Plan has been developed to provide further details on the measures to be implemented during the construction phase of the Project to ensure that the actual environmental impacts are consistent with those evaluated in Environmental and Social Impact Assessment (ESIA) and that mitigation measures are applied as intended and effective. The requirements set out in this Plan are applied to all activities during the construction phase of the Project, including those carried out by subcontractors.

This Plan has been developed according to the Turkish regulatory framework, International Finance Corporation (IFC) Performance Standards (PSs) and IFC General and Sector Specific Environmental, Health and Safety (EHS) Guidelines, IFC Environmental, Health, and Safety Guidelines for Railways, IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction and related EU Directives.

The Plan has been developed in alignment with applicable national legislation and relevant international standards, including the requirements of international financial institutions. This plan will provide mitigation alternatives and an impact monitoring schedule in accordance with Turkish and international regulations and standards.

This Plan should be applied by all parties involved in the construction phase, including the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ), the Main Contractor (EPC or Limak), and all subcontractors. Responsibilities for implementation, monitoring, and reporting of resource efficiency related issues should be clearly assigned. Necessary updates to the Plan should be considered in case of changes in project design, construction methodology, or regulatory requirements.

The purpose of this Plan is to identify measures and corporate targets to reduce resource consumption, to avoid or, when avoidance is not possible, minimize and control impacts on the environment resulting from environment and greenhouse gases.

This Plan applies to all Project activities under the Contractor's supervision, its subcontractors and to all employees. The Contractor is the main responsible for the implementation of this Plan. Subcontractors will be responsible to work in line with all environmental and social management systems

(ESMS) of the Contractor. This Plan applies to normal conditions during the construction phase activities and it is a living document, and the responsibilities, procedures and compliance actions should be updated as appropriate.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This section includes policies, standards and requirements of reference for this Plan that are applicable for, but not limited to, construction phase of the Project. Project standards are described in the Project ESIA and are listed below:

- National legislative requirements and all permits, licenses and approvals
- IFC PSs
- Equator Principles (EPs) IV
- Other good international industry practices (GIIP) including ISO 9001:2015 - Quality Management Systems, ISO 14001:2015 – Environmental Management Systems and ISO 45001:2018 - Occupational Health and Safety Management Systems
- International Conventions and Protocols Türkiye is a party to
- The Contractor's Quality Policy, Health, Safety and Environmental Policy and related practices and procedures.

II.1 National Requirements

The following Turkish laws and regulations will be used as the legal basis:

- Environmental Law No. 2872
- Regulation on Decreasing the Ozone Depleting Materials
- Regulation on Reduction of Sulphur Content of Some Fuel Types
- Regulation on Control of Exhaust Gas Emission and Quality of Fuel and Diesel
- Regulation on Monitoring of Greenhouse Gases Emissions
- Groundwater Law, Law No: 167,
- Regulation on Management of Surface Water Quality
- Regulation on the Water for Human Consumption of the Ministry of Health of Turkey, limit values for drinking and utilization waters
- Energy Efficiency Law No. 5627 dated 18/4/2007
- Regulation on the Improvement of the Energy Sources and the Efficiency in the Energy Usage
- Regulation on Assessment and Management of Environmental Noise
- Regulation on Environmental Noise Generation due to Equipment Used in Open Space
- Law on Protection of Soil and Land Use
- Regulation on Safety Data Sheets for Hazardous Substances and Mixtures
- Regulation on Registration, Evaluation, Permitting and Restrictions of Chemicals
- Regulation on the Classification, Labelling and Packaging of Hazardous Substances and Mixtures

II.2 International Standards and Conventions

In addition to national requirements, the following international guidelines frameworks, standards and agreements should be considered to ensure alignment with best practices and financial institution requirements:

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework ("ESF") document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development

practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects, supported by Environmental and Social Standards ("ESSs").

Moreover, the following standards, guidelines and directives should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- EU Ambient Air Quality Directive (2008/50/EC)
- European Landscape Convention (entered into force in 2000, ratified by Türkiye in 2003)
- European Union Road Safety Policy Guidelines and Directives
- World Health Organization (WHO) Ambient Air Quality Guidelines (2005 and 2021)

These references should be used to guide the implementation, monitoring, and performance evaluation of air pollution and emissions control measures on-site throughout the construction phase.

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Resource Efficiency Management Plan:

- Solid Waste Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Environmental Accident Spill Response Management Plan
- Community Health and Safety Management Plan
- Traffic Management Plan
- Hazardous Material Management Plan
- Blasting Management Plan
- Demolition Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Training Management Plan

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

IV. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV):

-Define and implement the overall business strategy and direction of the SPV in alignment with shareholder and stakeholder expectations.

-Ensure the provision of necessary resources and organizational support for the implementation of APEMP.
-Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.
-Ensure that managerial decisions are made regarding the implementation of all SPV policies and plans by EPCs and subcontractors.
-Support the E&S Manager in preparing, disseminating, and implementing this plan.
-Make executive decisions on project budgeting, resource allocation, and capital management to support project execution and sustainability, H&S and E&S compliance.
-Ensure sufficient funding and personnel are dedicated to environmental, social, and H&S obligations under the project's contractual and regulatory frameworks.
-Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to stakeholders and investors.
-Ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements.

E&S Manager (SPV):

-Review and ensure the preparation, revision, and implementation of REMP in accordance with national laws, regulations, company policies, international standards and lender requirements.
-Ensure the development, revision, and execution of project-specific management plans, including the Environmental and Social Management Plan (ESMP) in accordance with company policies and international standards.
-Review and update the REMP in coordination with the EPC's E&S Manager and construction teams.
-Ensure that all construction site activities are carried out safely by EPC and subcontractors.
-Monitor the environmental and social performance of EPC and subcontractors to ensure compliance.
-Monitor EPC and subcontractor adherence to the requirements of the E&S Management Plan.
-Ensure EPC and subcontractors maintain accurate records, including those of corrective and preventive actions.
- Oversee the Grievance Mechanism (GM) and ensure timely resolution of community and worker complaints.
-Engage with regulatory authorities, auditors, and NGOs on E&S compliance and performance matters
-Coordinate obtaining environmental related permits.

H&S Manager (SPV):

-Ensure the conditions and obligations specified in the health, safety, community related plans and documents are implemented and adhered to by EPC and subcontractors in accordance with company policies, regulatory obligations, international standards and lender requirements.
-Contribute to project risk assessments and job hazard analyses (JHAs) and ensure these are updated regularly.
-Ensure that all construction site activities are carried out safely by EPC and subcontractors.
-Ensure that physical site boundaries are clearly defined and maintained by EPC and subcontractors to control site access and protect public safety.
-Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
-Ensure timely and appropriate resolution of complaints related to public health and safety.
-Engage with regulatory authorities on inspections, audits, and compliance verification.

Deputy E&S Manager (SPV):

-Lead the development, implementation, and continuous improvement of the Environmental and Social Management.
-Review the ESHS documents of subcontractors and suppliers and ensure that they comply with the Project ESHS requirements.

-Monitor performance through Key Performance Indicators (KPIs), reports, audits, and meetings.
-Oversee incident and non-compliance regarding to noise and vibration, including investigations, corrective/preventive measures, and stakeholder communication.
-Support E&S Manager (SPV) executive decision-making by providing timely reports and insights on E&S performance, risks, and emerging trends.
-Lead community engagement strategies in collaboration with the Environmental Engineer and, and Social Chief to ensure effective grievance management and positive relations with project-affected communities.
-Ensure that EPC and subcontractor provide the necessary training through the review of training records and relevant training documents.
-Coordinate environmental and social monitoring programs.

Social Chief (SPV):

-Supervise and mentor CLOs, ensuring their work aligns with project priorities and stakeholder engagement strategy.
-Develop and implement work plans and schedules for the CLO team.
-Ensure that complaints regarding air quality are recorded, processed, and resolved in a timely and transparent manner.
-Ensure accurate, timely, and complete reporting of CLO activities, stakeholder interactions, and grievance outcomes and inform the E&S Deputy Manager about the complaints and coordinate the assessment and solution of grievances with EPC team.
-Coordinate with the E&S Deputy Manager, CLOs and Environmental Engineer, E&S Specialists, and construction teams to address community-related impacts.
-Train subcontractors and relevant staff on community interaction protocols and grievance management.
-Support alignment between community concerns and project execution through proactive communication with technical departments.

HSE Specialist (SPV):

-Support the execution of the safety, health and community safety related plans, and ensure site activities are carried out safely by EPC contractors and subcontractors in-line with applicable laws, international standards and lender requirements.
-Conduct regular site inspections, hazard identification, and risk assessments; follow up on corrective and preventive actions.
-Monitor compliance with safety protocols and ensure H&S measures are integrated into method statements and work procedures.
-Maintain H&S documentation, including safety permits, incident records, and training logs, etc.
-Support H&S training delivery for all relevant site personnel and review contractor training records for adequacy.
-Contribute to the review and update of safety plans and procedures based on field experience and audit findings.
-Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
-Engage with regulatory authorities on inspections, audits, and compliance verification.

Project Director (EPC):

-Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards.
-Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones.
-In case of non-compliance regarding to air quality, ensure appropriate corrective and preventive actions are taken in coordination with the E&S Manager and H&S Manager.
-Communicate all relevant plans clearly to subcontractors and monitor their performance.
-Approve and monitor regular site inspections and safety reviews.

-Track project KPIs, timelines, and budgets to ensure performance objectives are met.
-Ensure that all employees comply with the obligations specified in the project's management plans during activities.
-Approve training plans and assess their implementation across EPC and subcontractor teams.
-Coordinate with regulatory authorities, community representatives, and auditors as required.
-Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters

E&S Manager (EPC):

-Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.
-Implement environmental and social measures through site practices and method statements.
-Ensure that all conditions and obligations outlined in the The Plan are implemented and adhered to during project activities.
-Ensure all project personnel are fully informed of and compliant with project plans and standards.
-Ensure employees and contractors in fulfilling the requirements and relevant trainings of The Plan.
-Ensure all site personnel receive appropriate related training.

H&S Manager (EPC):

-Ensure the safe execution of construction activities in compliance with NVMP, H&S Plan, legal requirements, international standards, SPV and lender obligations.
-Prepare, review, and improve H&S Plans by integrating noise and vibration control measures into site-specific risk registers, method statements, and monitoring programs.
-Supervise and support Contractors/Subcontractors to implement noise and vibration mitigation measures, and monitor their compliance with H&S and NVMP requirements.
-Coordinate with SPV H&S Manager and EPC HSE Manager to address noise/vibration-related incidents, risks, and community safety concerns.
-Ensure that all site personnel receive regular training and toolbox talks covering NVMP obligations, noise/vibration risks, and safe working practices.
-Oversee emergency preparedness and response procedures for noise and vibration incidents (e.g., blast vibration exceedances, community complaints).
-Conduct investigations of noise/vibration-related incidents or complaints, ensure corrective/preventive actions are taken, and report findings to Project Director and SPV.
-Promote a safety-first culture by ensuring noise and vibration risks are proactively managed and lessons learned are integrated into continuous improvement.

HSE Chief (EPC):

-Supervise daily implementation of HSE requirements on-site, with emphasis on noise and vibration control.
-Monitor contractor and subcontractor compliance with REMP and report deviations to the HSE Manager.
-Perform the implementation and compliance of the conditions and obligations specified in the REMP during project activities.
-Provide technical support to Contractor.
-Coordinate with the SPV HSE team during audits, inspections, and reporting.

HSE Engineer (EPC):

-Conduct site inspections and monitor compliance with REMP
-Collect, maintain, and report noise and vibration measurement data.

-Support investigations and corrective actions for REMP-related non-compliances.
-Provide technical input and guidance to workers on resource efficiency measures.

HSE Trainer and Document Controller (EPC):

-Organize safety induction programs for new employees and visitors.
-Support internal and external audits by providing required HSE documentation and evidence.

Environmental Engineer (SPV and EPC):

-Implement the monitoring and recording of this Plan's execution (including implementation by Subcontractors).
-Ensure project activities comply with national environmental legislation, permits, international standards and lender requirements.
-Implement and monitor the REMP and its site-specific sub-plans to ensure compliance with national legislation, international standards, and lender requirements.
-Implement environmental monitoring programs.
-Ensure that necessary training on environmental management is provided and that all personnel receive the required training.
-Report the implementation performance of this Plan.
-Support the review and update of this Plan.
-Coordinate with subcontractors to ensure implementation of project-specific environmental measures.
-Conduct internal audits and inspections; identify non-conformities and follow up on corrective and preventive actions.

Community Liaison Officer (CLO) (SPV and EPC):

-Log, track, and follow up on grievances and appeals in a timely and respectful manner.
-Facilitate resolution of community disputes or concerns related to project activities.

All Personnel (including Contractor/Subcontractor Personnel):

-Follow this Plan and all related Plans and Procedures, and carry out all activities in accordance with the requirements of this Plan.
-Participate in relevant trainings.
-Ensure self-sufficiency in the implementation of this Plan.
-Fulfil and ensure the implementation of the requirements of this Plan.

V. MANAGEMENT MEASURES

The primary goal of the resource efficiency is to create opportunities for economics and efficiencies in the use of resources.

Monitoring of Resource Usage

As a main scope of this Plan, the Contractor and the subcontractors will regularly monitor the below items:

- Energy/Electricity consumption trends and identify where action can be taken to reduce energy use (e.g., Reduce loads of the energy systems, reduce losses in energy distribution, improve energy conversion efficiency)

- Water consumption trends and identify where action can be taken to reduce water use (e.g., reduce losses in water distribution, wastewater recovery)
- Material consumption and identify where action can be taken to reduce material use (e.g., reduce chemicals use, if possible)
- Fuel consumption and assess what action can be taken to reduce fuel consumption

Work Instructions

Preparation of written standard work instructions will improve the resource efficiency such as:

- Checking conditions of vehicles, tools and equipment
- Periodic maintenance of vehicles and equipment
- Turning off backup power generators when possible
- Shutting down of electronic goods when not used

GHG Management

The Project will quantify and monitor its direct Scope 1 GHG emissions as well as indirect Scope 2 emissions associated with the consumption of energy. Quantification of GHG emissions will be conducted annually in accordance with internationally recognized methodologies and good practice.

In addition, the following measures will be applied to reduce GHG emissions as much as possible:

- The Best Available Techniques will be taken into consideration in Project design as much as possible. The applicability of the Best Available Techniques (BATs) developed within the European regulatory framework [i.e., Integrated Pollution Prevention and Control, “IPPC”, BAT Reference Documents (BREFs) according to the European Directive 2010/75/EU (IED)] should been evaluated and integrated into the Project design.
- All employees will be provided climate, resource and energy efficiency awareness training.
- Maintenance of all machinery and equipment will be periodically conducted to ensure efficient fuel use and effective operation.
- All the fuels and other energy sources will be chosen among those that have the highest calorific values and minimum emissions per unit consumed.
- The use of recycled and locally sourced materials will be encouraged to reduce indirect emissions from material transportation.
- Efficient resource and material use will be promoted to reduce direct and indirect GHG emissions due to the Project.
- Energy consumption will be met, where possible, through the use of renewable energy sources.No idling and out-of-scope operation of the machinery and equipment will be allowed.
- During the closure phase, rehabilitation of land will help to recover lost carbon sink, which will act as a long-term mitigation measure.

An effective solid waste management plan will be implemented to control organic waste that may cause methane emissions.The increase of renewable energy production in national grid electricity may induce a decrease in Scope 2 related GHG emissions which is linked to the construction phase of the Project. However, it should be noted that this situation is out of Project control.

Energy Efficiency Design and Control Measures

Project will use energy efficient equipment (e.g., electric goods, backup power generators, lights etc.) as much as possible. The equipment purchasing process will consider the energy consumption features of the equipment.

When air conditioning systems are used, energy efficiency techniques will be considered as much as possible according to the following criteria:

- Placing air intakes and air-conditioning units in cool, shaded locations;
- Improving building insulation including seals, vents windows, and doors;
- Installing timers and/or thermostats and/or enthalpy-based control systems

Water Use Efficiency Design and Control Measures

- Project will reduce, as much as possible, water use. The water distribution system at the Site (e.g. taps, toilet flushing) will be periodically checked to ensure that they are working properly and that taps are not left open.
- In order to reuse the water used during vehicle washing operations, vehicle washing stations will be established and the necessary settlement pools and installations will be constructed for the reuse of water at these stations. It is planned to reuse treated water to prevent dusting.

VI. TRAINING

The employees of the Contractor and subcontractors will require to attend the new-hire induction training that includes environmental and social awareness and compliance training to be aligned with Project ESIA and ESMS.

Regular internal and external (when necessary) trainings will be given to ensure that the mitigation measures indicated in this Plan are applied during the construction phase of the Project for all involved parties. Regular internal inspections will be conducted to ensure that the mitigation measures indicated in this Plan are applied during the construction phase of the Project.

All workers will be informed about practices aimed to enhance resource efficiency. The records of resource usages (as defined above) will be announced at the information boards placed regularly and communicated to the workers.

VII. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of resource efficiency mitigation measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, air quality trends, stakeholder concerns, or changes in applicable environmental regulations.

Monitoring activities will be coordinated by E&S Manager and his/her team, in close collaboration with the H&S Manager and his/her team. Key responsibilities will include verifying the implementation of dust suppression practices, monitoring equipment and vehicle emissions, evaluating the maintenance status of construction machinery, and ensuring the consistent application of mitigation measures near sensitive receptors such as residential areas, schools, and healthcare facilities.

The performance of contractors and subcontractors in implementing resource efficiency management requirements will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and to ensure recurrence is prevented.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, including the Ministry of Environment, Urbanization and Climate Change, in accordance with Turkish

legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of monitoring data, on-site emission control practices, and documentation of compliance.

Monitoring efforts will be guided by the framework provided in Table VII.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of measurements, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of air quality and emissions mitigation measures and ensuring full compliance with national regulations and Project standards.

Table VII.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Consumption of resources	All site activities*	Quantify the resource consumption by installing appropriate devices; record and aggregate data on the consumption of the following resources: a) Water consumption (for industrial and civil purposes) b) Fuels (for heating, vehicle refuelling, equipment usages) c) Electricity (only if supplied by external sources/network using counters) d) Explosives	Monthly	AAOİAŞ and Limak
GHG Emissions	All site activities*	GHG emission levels (combined Scope 1 and Scope 2 Emissions, and, if appropriate, the GHG efficiency ratio) from the facilities owned or controlled within the physical project boundary, as well as indirect emissions associated with the off-site production of energy used by the Project during the construction phase, will be quantified and reported publicly on annual basis.	Annually	AAOİAŞ, Limak
Grievances	The field subject to the complaint	Grievances are recorded regarding resource efficiency	Upon grievance	AAOİAŞ, Limak
Training	All site activities*	Employee training	Monthly	AAOİAŞ, Limak

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Main Contractor (Limak) and relevant subcontractors.

VIII. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table VIII.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Water consumption	Minimize and continued improvement in consumption (No increase in the average consumption rate on a per capita basis)	Monthly	AAOİAŞ, Limak
Energy consumption	Minimize and continued improvement in consumption (No increase in the average consumption rate on a per capita basis)	Monthly	AAOİAŞ, Limak
Fuel consumption	Minimize and continued improvement in consumption (No increase in the average consumption rate on a per capita basis)	Monthly	AAOİAŞ, Limak
Number of non-compliances regarding resource efficiency measures identified in this Plan	Minimise the number of non-compliances and continuous improvement	Monthly	AAOİAŞ, Limak
Number of trainings planned vs completed	100%	Monthly	AAOİAŞ, Limak
Number of grievances received regarding resource efficiency	Minimise the number of grievances and continuous improvement	Monthly	AAOİAŞ, Limak

IX. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All labour-related incidents and non-conformities should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Supply Chain Subcontractor Management Plan.

Results of the monitoring will be reported to responsible parties to ensure that the Project activities comply with the national legislation and international standards. . Depending on the monitoring results, the Plan will be reviewed and updated by Project E&S and H&S Managers.

internal audit will address:

- The correct implementation of this Plan;
- The correct and timely implementation of an auditing and review system;
- Each of the point indicated in the table in Section 7 (Monitoring Activities) and Section 8 (KPIs) of this Plan.

Evidence and results of the inspection and audit activities are included in the audit reports and in the “Non-Conformity and Preventive/Corrective actions” records. Project Management reviews result of audits and inspections and the progress of the Preventive/Corrective actions and takes additional appropriate actions if necessary.

These audits and the associated records should be managed in compliance with the Project’s established human resources and labour-related procedures.

Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with labour legislation and international standards.

X. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of resource efficiency management activities throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions should be identified and the required updates should be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections should be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Evidence of the implementation of the actions/measures and related results are collected through inspection and auditing activities as detailed in Section IIX “Audit and Review” of this Plan; these evidences are described in the audit reports.

Contractors are responsible to collect the statistics (including all types of training delivered to employees, incident records, grievance records, their own subcontractor selection processes, etc.) on a monthly basis and report to the Contractor. If any subcontractor is involved, it is responsible for duly implementing requirements included in this Plan under the Contractor supervision.

The results and supporting evidence of these monitoring activities (e.g., measurements, logs, and photos) should be documented in detail within appropriate reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

All personnel are encouraged to raise concerns, suggestions, or complaints related to air quality management through the established grievance mechanism by completing the grievance form. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

Throughout the construction phase of the Project, this Plan will be reviewed by the E&S manager, based on the results of audits.

EXCAVATED MATERIAL MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
16.06.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
08.09.2025	01	Revision as per Environmental and Social Due Diligence comments

EXCAVATED MATERIAL MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
BAT	Best Available Techniques
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
MoTAT	Mobile Hazardous Waste Tracking System
MSDS	Material Safety Data Sheets
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
WEEE	Electrical and Electronic Equipment
WHO	World Health Organization

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project ("The Project"), has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Excavated Material Management Plan ("EMMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

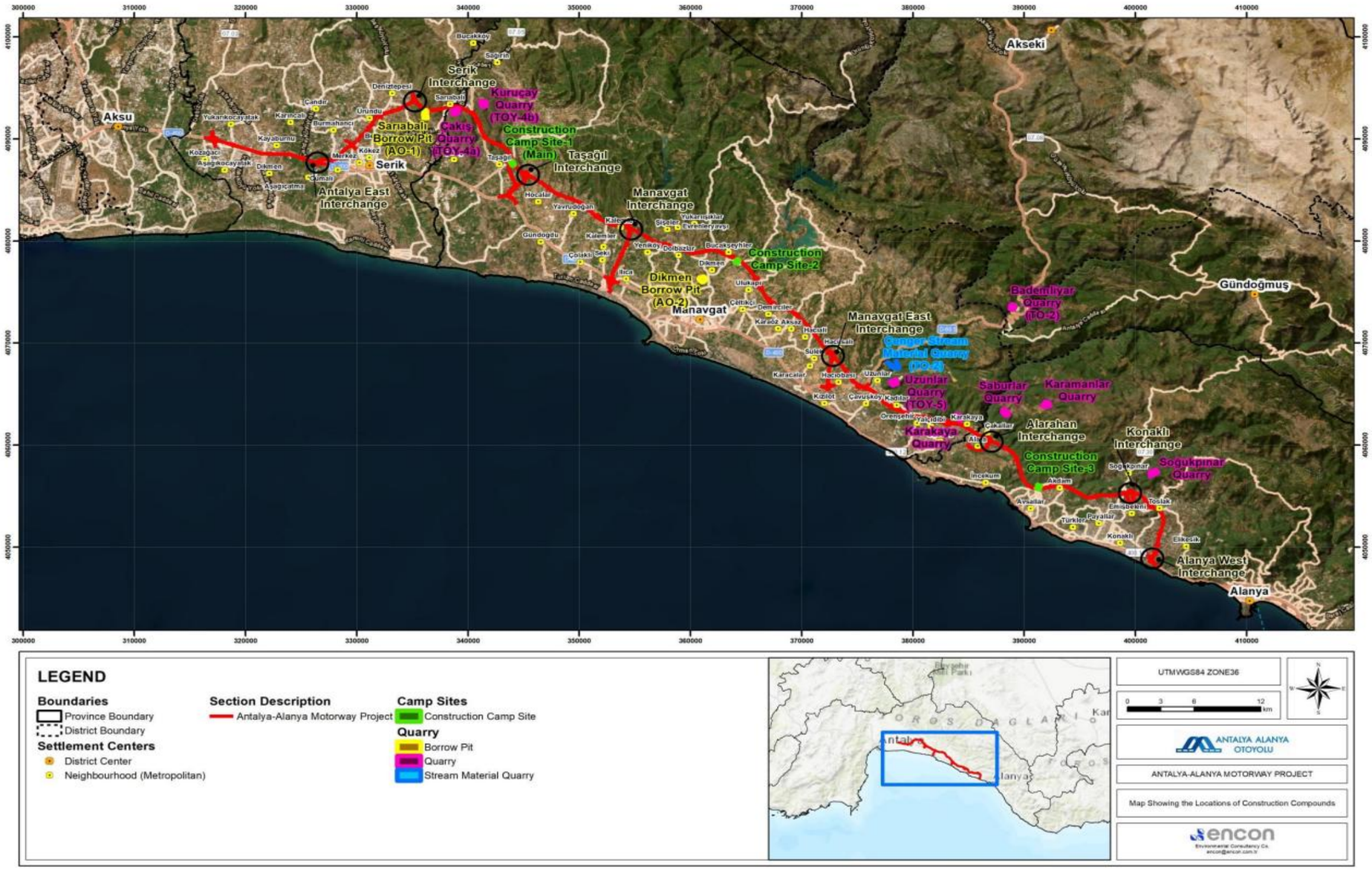

Figure I-1.Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

I.2 PURPOSE AND SCOPE

This Excavated Material Management Plan ("the Plan") has been prepared by Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Motorway Project ("the Project").

The purpose of this Plan is to identify the main sources of excavated materials generated during the construction phase and to outline the measures that should be implemented to prevent, minimize, reuse, and recycle waste in accordance with applicable national legislation and international standards. This Plan aims to support sustainable waste management practices and promote circular economy principles throughout construction activities.

The Plan has been developed to provide further details on the measures to be implemented in dumpsites during the construction phase of the Project to ensure that the actual environmental impacts are consistent with those evaluated in Environmental and Social Impact Assessment (ESIA) and that mitigation measures are applied as intended and effective.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

This Plan has been developed according to the Turkish regulatory framework, International Finance Corporation (IFC) Performance Standards (PSs) and IFC General and Sector Specific Environmental, Health and Safety (EHS) Guidelines, IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction and related EU Directives.

This Plan will be implemented by the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ), the Main Contractor (Limak), and all subcontractors involved in the construction phase. Roles and responsibilities for waste management, monitoring, and reporting should be clearly defined, and this Plan should be reviewed and updated in line with changes in project activities or legal requirements.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

The Plan has been developed in alignment with applicable national legislation and international standards and requirements of reference for this Plan that are applicable for, but not limited to, construction phase of the Project.

Project standards are listed below:

- National legislative requirements and all permits, licenses and approvals
- IFC PSs
- Equator Principles (EPs) IV
- Other good international industry practices (GIIP) including ISO 9001:2015 - Quality Management Systems, ISO 14001:2015 – Environmental Management Systems and ISO 45001:2018 - Occupational Health and Safety Management Systems

- International Conventions and Protocols Türkiye is a party to
- The Project Sponsor's Quality Policy, Health, Safety and Environmental Policy and related practices and procedures

II.1 National Requirements

The following Turkish laws and regulations should be used as the primary legal framework for solid waste management:

- Environmental Law (Law No. 2872)
- Regulation on Waste Management
- Regulation on the Control of Excavation, Construction, and Demolition Wastes
- Regulation on Landfilling of Waste
- Regulation on Zero Waste Management

These regulations should be used as the legal basis for waste segregation, temporary storage, transport, recycling, recovery, and disposal activities at all construction sites and associated facilities.

II.2 International Standards and Guidelines

In addition to national requirements, the following international guidelines frameworks, standards and agreements should be considered to ensure alignment with best practices and financial institution requirements:

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework ("ESF") document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices.

The EPs are a set of voluntary environmental and social guidelines that have been adopted by a significant number of financial institutions influential in the project finance market. The EPs comprise a set of ten broad principles that are underpinned by the environmental and social policies, standards and guidelines:

IFC PS 1 Assessment and Management of Environmental and Social Risks and Impacts, underscores the importance of managing environmental and social performance throughout the life of a project. An effective ESMS is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.

IFC PS 3 Resource Efficiency and Pollution Prevention, outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices. In addition, this PS promotes the ability of private sector companies to adopt such technologies and practices as far as their use is feasible in the context of a project that relies on commercially available skills and resources.

IFC EHS Guidelines - The EHS Guidelines are technical reference documents with general and industry-specific examples of GIIP. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. General EHS Guidelines – Waste Management document is applicable for the Project.

IFC EHS Guidelines for Railways and EHS Guidelines for Construction Materials Extraction are also applicable to the Project.

In addition to these, related EU directives are given below:

- Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste
- Directive 2006/21/EC on the Management of Waste from Extractive Industries and Best Available Techniques (BAT) Reference Document
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

These international references provide the broader sustainability framework and technical benchmarks to be integrated into solid waste management procedures, particularly in relation to source reduction, reuse and recycling targets, occupational health and safety, and environmental protection.

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Excavated Materials Management Plan to ensure consistency in environmental and social performance and regulatory compliance throughout the construction phase:

- Environmental Accident and Spill Response Management Plan
- Solid Waste Management Plan
- Resource Efficiency Management Plan
- Traffic Management Plan
- Soil Management and Erosion Control Plan
- Water, Wastewater, and Storm Water Management Plan
- Hazardous Materials Management Plan
- Construction Camp Site Management Plan
- Occupational Health and Safety Management Plan
- Community Health and Safety Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)

The effective integration of these plans should be ensured to maintain alignment with Turkish legislation, IFC Performance Standards, and other international best practices. Cross-plan coordination is essential for minimizing cumulative impacts, supporting resource efficiency, and enhancing overall environmental and social risk management during the construction phase.

IV. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV):

- Promote a culture of social responsibility across the SPV and its stakeholders.
- Ensure the provision of necessary resources and organizational support for the implementation of plan.
- Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.
- Support the E&S and H&S Manager in preparing, disseminating, and implementing this plan. In the event of any incompatibility regarding the storage or transportation of excavation materials, ensure that the EPC and SPV collaborate with the E&S and H&S Manager and other responsible parties to take appropriate and preventive measures.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, environmental and social compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including SPV, stakeholders and investors.

E&S Manager (SPV):

- Review and ensure the preparation, revision, and implementation of all plans in accordance with national laws, regulations, company policies, international standards and lender requirements.
- Ensure and monitor that EPC and subcontractors correctly implement site practices and management plans.
- Provide technical support to EPC and subcontractors for the implementation of the Plan.
- Collaborate with internal teams (e.g., H&S, Legal, Procurement) to integrate E&S criteria into project operations and contracts. Monitor the environmental and social performance of EPC and subcontractors to ensure compliance.
- Prepare and submit E&S compliance and performance reports to internal and external stakeholders, including lenders and regulators.
- Support stakeholder engagement activities and consultations with local communities.
- Engage with regulatory authorities, auditors, and NGOs on E&S compliance and performance matters.
- Lead the implementation of corrective actions and incident prevention measures.

Health and Safety Manager (SPV):

- Ensure the preparation, revision, and implementation of the health and safety-related plans and documents in accordance with the SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.

- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Conduct a comprehensive accident and incident investigation process.
- Provide technical support to EPC and subcontractors for the proper implementation of the health and safety plans.
- Ensure the accurate records of inspections, incidents, safety meetings, and training records
- Engage with regulatory authorities on inspections, audits, and compliance verification

Project Director (EPC):

- Ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements.
- Promote a culture of environmental and social responsibility across the EPC and its stakeholders.
- Define and implement the overall business strategy and direction of the EPC in alignment with SPV and stakeholder expectations.
- Support the E&S and H&S Manager in preparing, disseminating, and implementing this plan. In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the SPV and other responsible parties.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, H&S compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including EPC, stakeholders and other related parties.
- Approval of project management plans (HSE, E&S, QA/QC, etc.) in line with company policies, legal frameworks, international standards, SPV and lender requirements.
- Coordinate with regulatory authorities, community representatives, and auditors as required.
- Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters.

E&S Manager (EPC):

- Coordinate the preparation, revision, and implementation of the Plan with H&S Manager in accordance with the Project SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure the excavated material is assessed and managed by waste recycling and reuses good practices.
- Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.

- Implement environmental and social measures through site practices and method statements.
- Ensure that all conditions and obligations outlined in the environmental and social management plans are implemented and adhered to during project activities.
- Ensure employees and contractors fulfil the requirements and relevant training of the environmental and social management plans.
- Ensure the environmental and social management plans are communicated and implemented by Contractors/Subcontractors.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Monitor compliance of Contractors/Subcontractors with environmental and social management plans requirements.
- Ensure the development and follow-up of corrective/improvement actions.
- Conduct comprehensive investigations of accidents and incidents and promote continuous improvement via lessons learned.

H&S Manager (EPC):

- Coordinate the preparation, revision, and implementation of the Plan with E&S Manager in accordance with the SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable legislation, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Provide technical support to EPC and subcontractors for the proper implementation of the Project's plans.
- Ensure the accurate records of inspections, incidents, safety meetings, and training records.
- Ensure the corrective actions process is followed up on by all parties strictly.
- Report on H&S performance, non-compliance, and corrective actions to the EPC Project Director.
- Engage with regulatory authorities on inspections, audits, and compliance verification.

V. WASTE MANAGEMENT AND RECYCLING APPROACH

IFC EHS Guidelines-Waste Management document provides a waste hierarchy which lays down priorities for the best overall environmental option. Based on that, management of wastes will be carried out as following, in the order of decreasing preference:

1. Prevent waste generation where possible
2. Reduction of wastes by setting measures where possible
3. Reuse waste/excess materials where feasible
4. Recover waste materials where feasible
5. Recycle waste materials where feasible

6. Dispose waste off-site by a licensed waste company

Solid waste generated during the construction phase of the Project will originate from various activities, including construction operations, excavation works, material usage, accommodation facilities, and routine consumption of goods and supplies such as paper, plastic, metal, and glass containers. All solid waste streams will be classified and managed in accordance with their physical and chemical characteristics to enable effective separation, reuse, recycling, and disposal. The detail of management of all types of solid wastes, hazardous and non-hazardous wastes are given in Solid Waste Management Plan.

The fundamental principle of solid waste management is to prevent waste generation at the source and, where prevention is not possible, to minimize, reuse, or recycle waste to the greatest extent practicable. All waste management activities will be carried out in compliance with relevant Turkish legislation and applicable international standards.

Waste types expected to be generated during the construction phase include excavation materials (soil, rock, inert debris), construction wastes (such as concrete remnants, packaging materials, and surplus materials), domestic and residential waste from worker accommodation and administrative areas, packaging waste (paper, plastic, metal, glass), reusable components (such as timber, metal, and topsoil), and recyclable materials including waste tires and electrical or electronic equipment.

A Solid Waste Management Plan, Hazardous Material Management Plan, Environmental Accident and Spill Response Management Plan, and Excavated Material Management Plan will be implemented in accordance with national regulations and international standards for the management of all types of waste.

The management of excavated material, storage areas, and management strategies within the scope of national regulations and international standards are specified in this management plan.

In order to minimize and appropriately manage the wastes generated on site, following good management practices will be used:

- During the construction, Contractor and subcontractors will identify all potential waste streams at their point of generation, their nature (classification) and quantity to be generated in order to identify opportunities to apply waste management hierarchy. Types and quantities of the wastes to be generated will be monitored throughout the construction phase. A waste minimization practices will be applied during the construction activities.
- Prevention of waste generation via management practices (such as instituting procurement measures that recognize opportunities to return usable materials, avoiding or decreasing amount of excavated material by backfilling activities, etc.) will be the primary aim of this Plan.
- Reduction of waste generation (via management practices, avoiding or decreasing materials use, etc.) will be the secondary aim of this Plan.
- Waste recycling will be promoted within all Project activities and related trainings will be provided accordingly.
- Excavated material will be separated from other wastes.
- Personnel responsible from the handling of wastes will be trained regarding to proper handling and management practices.
- Dumpsites will be inspected regularly to ensure proper waste management measures are taken.
- Excavated material will not be disposed on-site under any circumstances unless it will be using during backfilling stage of the construction activities.

Construction of the Project and related structures such as the cuttings, earthworks, etc. will generate significant volumes of material from earthmoving and site clearance. The cut and fill balances along the Project route indicates that total amount of surplus material to be disposed will be around 10,8 million m^3. 22 surplus material dumpsites are planned to be used for the Project which are listed below.

Table V.1 The List of Dumpsites and Capacities

Location		Description of the Site	Capacity Information (m^3)	Planned Capacity Usage (m^3)
Km 52+544	Antalya, Serik	D-2	736,660.28	470,850.34
Km 59+580	Antalya, Serik	D-3	2,111,705.36	56,553.44
Km 61+500	Antalya, Manavgat	D-6	4,378,853.62	156,734.25
Km 64+160	Antalya, Manavgat	D-7	3,327,945.41	615,670.09
Km 71+800	Antalya, Manavgat	D-10	7,516,026.00	184.77
Km 74+360	Antalya, Manavgat	D-11	1,037,880.08	149,039.49
Km 76+240	Antalya, Manavgat	D-14	371,940.90	160,175.41
Km 78+790	Antalya, Manavgat	D-15	1,261,077.59	223,457.91
Km 86+340	Antalya, Manavgat	D-16	4,869,058.60	1,050,435.77
Km 87+800	Antalya, Manavgat	D-17	2,504,385.12	262,361.54
Km 95+410	Antalya, Manavgat	D-18	1,124,258.46	73,868.29
Km 95+410	Antalya, Manavgat	D-19	1,522,633.16	162,563.18
Km 98+290	Antalya, Manavgat	D-20	711,115.13	41,87.43
Km 100+000	Antalya, Manavgat	D-21	1,648,102.37	2,174.86
Km 107+850	Antalya, Manavgat	D-22	1,222,720.44	301,963.83
Km 110+820	Antalya, Manavgat	D-23	20,093,692.94	584,686.39
Km 113+050	Antalya, Manavgat	D-24	2,552,495.14	205,287.40
Km 123+000	Antalya, Alanya	D-26	5,638,396.17	871,743.65
Km 124+250	Antalya, Alanya	D-27	1,926,864.50	1,297,126.46
Km 127+000	Antalya, Alanya	D-28	3,763,723.90	383,579.61
Km 130+400	Antalya, Alanya	D-29	1,991,642.98	1,625,062.08
Km 132+720	Antalya, Alanya	D-30	3,307,202.05	2,132,211.56

Although as a worstcase scenario, it was considered that all dumpsites will be used during the site preparation and excavation works of the construction phase, in practice, dumpsites will be used with the consideration of the construction schedule, project needs, backfilling capability of the excavation material etc.

As it can be seen from Table V.1, total capacity of the dump sites are two times more than project demands. Before use of new dumpsites started necessary permits and licenses will be acquired from relevant authority and AAOİAŞ will need to take opinion from relevant authorities (such as Ministry of Agriculture and Forest, municipality of the relevant district and/or province, and/or other authority which has responsibility on possible storage area in any manner) and the material will be stored accordingly. The statutory process is that the relevant authority will determine where the surplus materials are to be

deposited (e.g. in abandoned quarries or borrow pits), and these instructions must be followed by AAOİAŞ and the subcontractors. In addition to local regulations, Project's ESHS requirements will be followed by AAOİAŞ during management of surplus material and dumpsites.

Where technically and economically feasible, reusable materials such as wood, metal, topsoil, and excavation waste will be repurposed for use in other construction activities or site restoration works. This approach will contribute to minimizing the volume of waste requiring off-site disposal.

VI. MITIGATION MEASURES FOR SOLID WASTE-RELATED RISKS AND IMPACTS

Although the primary principle of solid waste management is to prevent waste generation at the source, mitigation measures should be implemented to minimize the adverse environmental and social impacts of the solid waste generated during the construction phase. These measures are designed in accordance with the waste management hierarchy—prevention, minimization, reuse, recycling, recovery, and safe disposal—and are essential to ensure full compliance with Turkish legislation and international standards.

Excavated material will be collected and stored separately from other wastes in designated temporary excavated material storage areas.

Transportation and Access

The following management practices given below will be used during the transportation, reuse and disposal of excavated material:

- Protocols will be signed with the related municipalities or provincial administrations for the transfer of excavation material for the disposal. As per the clauses to be included in the protocols, when required licensed facilities will be obligated to provide relevant reports, drawings, agreements, calculations or any other related document in order for Contractor to check the suitability and capacity of the services provided. Additionally, Project personnel will be allowed to conduct periodic site visits/audits to visually confirm that the Project wastes are being managed in an environmentally responsible manner.
- The materials unearthed after the excavation will be evaluated in order to determine their technical properties. In this context, materials that meet the technical specifications, among the formations in the nature of backfilling material specified in the geotechnical report, will be used in the backfilling. Use of suitable excavation material as backfilling material will be the primary priority in backfilling works in order to maximize the reuse of the materials and reduce the amount of disposed excavated material. Based on that, the following items will be evaluated while deciding filling materials:
    - Materials that do not include the following contents:
        - Topsoil,
        - Trees, shrubs, roots and similar organic materials,
        - Materials subject to internal combustion, including coal dust,
        - Swamp or water-saturated clayey and marly soils,
        - Waste materials such as garbage, debris, etc.,
        - Snowy, icy and frozen soils, materials that will easily crumble with water and cause settlements,
        - Soils containing soluble matter more than 20% by weight such as gypsum and rock salt,
        - Highly serpentinized rocks that show clay behavior when weathered.
    - Rocks prone to weathering (marl, claystone, shale, etc.) dispersed under water and pressure will not be used in filling.

During the excavation activities, topography of the Project Area will also be taken into consideration in order to minimize the excavation amount.

For excavations that are not suitable for backfilling, will be transferred to the Excess Excavated Material Storage Areas (i.e. Dump Sites). Locations of the excavation activities that will be carried out along the Project route, and list of corresponding Excess Excavated Material Storage Areas defined in the Project ESIA Report that are determined in accordance with the locations of the excavation activities and will be used for the disposal of excess excavated materials, are given in Table V.1.

In any case, during all excavation works, Regulation on Control of Excavation Soil, Construction and Demolition Wastes will be complied with.

Records for generated excavated material, from time of generation to final destination, will be maintained. Within this regard, a sample excavated material log form is provided in *Appendix A.*

Daily inspections regarding on-site management of wastes will be conducted during the construction phase of the Project. A sample checklist for subjects to be covered during inspections is provided in *Appendix B.*

Pollution Prevention

The primary goal of the pollution prevention is to incorporate all the measures necessary to avoid or minimize the creation of costly contamination.

Air Quality:

- Use of water suppression at dump sites and transportation routes, especially in hot-dry seasons and in windy conditions,
- Loads in all trucks transporting dust-generating materials will be sprayed with water to suppress dust,
- Use of water suppression for control of loose materials on paved or unpaved road surfaces,
- Use of dust suppression techniques, such as covers, water suppression, or increased moisture content for open materials storage piles,
- In case alternative roads are present, traffic to the dump site will avoid passing through the settlements. If unavoidable, necessary measures (i.e. speed limits) will be taken to prevent/minimise transportation related emissions and inform the communities about the activities and schedule.
- Speed reduction for the means travelling inside the dump site.
- Trucks carrying fine material (excavation soil or fine material, etc.) will be covered with tarpaulin to prevent dust emissions.
- During the days of extreme wind conditions construction and material extraction works will be suspended temporarily and/or production amounts will be reduced (e.g. amount of material extracted at the quarries/borrow sites) at locations close to sensitive receptors.
- Loading and unloading of material will be carried out without scattering to the extent possible.
- Lighting of fire and burning of materials in will be prohibited.

In order to reduce the exhaust emissions from trucks using during the transportation of excavated material, the following actions shall be implemented:

- Activities will be conducted trying to use the minimum required number of means at the same time,

- Transportation distances will be minimized where possible,
- Vehicle engines and other machinery shall be kept turned on only if necessary, avoiding any unnecessary emission,
- All equipment and machinery must be maintained for compliance with standards and technical regulations for the protection of the environment and have appropriate certification,
- Machinery and equipment shall be periodically checked and maintained to ensure their good working condition.
- Monthly monitoring campaign will be conducted during the construction phase at baseline locations close to the dump sites. In case of any air quality related grievance, air quality measurement campaign (except from this plan and to be specific to the locations of the grievance) will be carried out immediately at the area where air quality related grievance is received.

Noise and Vibration Management:

Mitigation measures to be taken for noise and vibration management are given below:

- Trucks with lower sound power levels will be selected where possible.
- The sound power levels of the trucks to be used will meet the standards given in the Regulation on Machinery Safety.
- Maintenance of all the equipment / vehicles will be periodically undertaken in order to minimize the possible high noise levels generated by the equipment / vehicles.
- Suitable mufflers will be installed on engine exhausts and compressor components.
- Workers will be trained in noise abatement best practices, including avoiding unnecessary revving of engines and switching off equipment when it is not required.
- Haul routes will be well maintained and where steep gradients are required, operatives will be trained to minimize engine noise through avoiding unnecessary revving etc.
- Acoustic enclosures will be installed for equipment casing radiating noise.
- Operation hours of the specific pieces of equipment or operations, especially mobile sources operating through community areas, will be limited to hours between 7 am and 10 pm.
- Noise sources will be relocated to less sensitive areas where possible, in order to take advantage of distance and shielding.
- Project traffic routing through community areas will be reduced where possible.
- Grievance mechanism will also be used to record and respond to complaints.
- Monitoring campaigns will be performed monthly at the baseline noise measurement locations close to the dump sites.
- In case of any noise related grievance, noise measurement campaign (except from this plan and to be specific to the locations of the grievance) will be carried out immediately at the area where noise related grievance is received.

Hazardous Materials Management

In order to prevent incidents causing pollution of soil, water, groundwater and air; application of proper methods for transportation, handling, storage, usage and disposal of hazardous materials is crucial. Therefore, comprehensive measures set for management of hazardous materials in the scope of the Project are explained in Hazardous Material Management Plan and Environmental Accident and Spill Response Plan in order to ensure proper management to prevent (and/or reduce) environmental pollution and maintain health and safety in dumpsites, as well.

Rehabilitation

Rehabilitation of the dump sites will be planned with a separate Rehabilitation Plan after the completion of construction phase by AAOİAŞ.

VII. TRAINING

The employees of the Limak and subcontractors will require to attend the new-hire induction training that includes environmental and social awareness and compliance training to be aligned with Project ESIA and ESMS.

Regular internal and external (when necessary) trainings will be given to ensure that the mitigation measures indicated in this Plan are applied during the construction phase of the Project for all involved parties. Regular internal inspections will be conducted to ensure that the mitigation measures indicated in this Plan are applied during the construction phase of the Project.

Moreover, personnel responsible from the transportation of excavated material will be trained specifically in order for application of proper handling and management practices. A training on the management of excavated material will be provided to the workers. The training subjects at least includes:

- Requirements of this Plan;
- Precautions and risks when transportation of excavated material;
- Proper usage of Personal Protective Equipment (PPE);
- Excavated material minimization, segregation and storage; and
- Excavated material appropriate disposal.

VIII. MONITORING

Excavated material will be recorded on a monthly basis. Records for excavated material from time of generation to final destination, will be maintained. Within this regard, a sample waste log form is provided in Appendix A.

Daily inspections regarding on-site management of excavated material will be conducted during the construction phase of the Project. A sample checklist for subjects to be covered during inspections is provided in Appendix B.

Monitoring activities will be coordinated by the Limak's E&S Manager, in close collaboration with the Management teams. Key responsibilities will include reviewing the type and quantity of waste generated and disposed, verifying the implementation of waste segregation at source, and ensuring the consistent application of management measures.

The performance of contractors and subcontractors in implementing excavated material management requirements will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger timely corrective and preventive action plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and to ensure recurrence is prevented.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, including the Ministry of Environment, Urbanization and Climate Change, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of monitoring data, on-site waste handling practices, and documentation of compliance.

Monitoring efforts will be guided by the framework provided in Table VIII.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of inspections, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of excavated material mitigation measures and ensuring full compliance with national regulations and Project standards.

Table VIII.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
-Excavation and fill volumes (m^3) -Volume of reused materials (m^3) -Conditions at the storage sites	Excavated material storage sites	Site audit	Daily	AAOİAŞ, Limak, Sub-Contractor
Excavated Material Management	Road construction sites, quarries, dump sites	Excavated material storage areas and site excavated material management practices (separation, storage) will be inspected	Daily	AAOİAŞ, Limak
Annual Excavated Material Generation	Road construction sites, quarries, dump sites	Annual waste declaration records will be checked including excavated material.	Annually	AAOİAŞ, Limak
Grievance	All active construction and camp areas, dump sites, settlements near the Project areas	Number of grievances received regarding to excavated material management, will be recorded.	Weekly	AAOİAŞ, Limak
Training	All Project Areas	Employees will be trained.	Monthly	AAOİAŞ, Limak

In cases of non-compliance identified through internal oversight, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Main Contractor (Limak) and relevant subcontractors.

All excavated material-related findings, including violations of handling protocols, non-compliance incidents, or complaints received from surrounding communities, will be documented in accordance with national environmental regulations and Project procedures. In the event of serious violations—such as illegal disposal or mismanagement of hazardous waste—AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

IX. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table IX.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Excavated material amount collected of each dump site	Minimized and continued improvement in excavated material generation amounts	Quarterly	AAOİAŞ, Limak
Excavated material management practices planned vs completed	100%	Quarterly	AAOİAŞ, Limak
Number of non-compliances with excavated material management practices identified in this Plan	Minimized and continued improvement	Quarterly	AAOİAŞ, Limak

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
% of the validity of the agreements and protocols regarding excavated material transfer and disposal	100%	Quarterly	AAOİAŞ, Limak
Annual amount of declared excavated material	Declared every year	Annually	AAOİAŞ, Limak
Number of spillages / leakages resulting soil contamination	Zero per year	Annually	AAOİAŞ, Limak
Number of grievances received regarding excavated material management	Minimized and continued improvement in number of grievances	Monthly	AAOİAŞ, Limak
Number of trainings planned vs completed	100%	Monthly	AAOİAŞ, Limak

X. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All incidents and non-conformities should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established plans and procedures. Relevant records that will be reviewed during audits may include the external grievance and suggestion tracking database related to waste management issues, the internal grievance and suggestion tracking database concerning excavated material handling and site practices, training records, waste inventory logs, contractor waste transfer documentation, and non-conformity records related to excavated material segregation, storage, or disposal. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary.

XI. REPORTING

Regular reporting will be conducted to ensure the effective implementation and continuous improvement of management activities throughout the construction phase of the Project. Reporting will be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Evidence of the implementation of the actions/measures and related results are collected through inspection and auditing activities as detailed in Section X "Audit and Review" of this Plan; these evidences are described in the audit reports.

Limak and Subcontractors are responsible to collect the excavated material related statistics (including all types of training delivered to employees and incident records) on a monthly basis and report to the AAOİAŞ. If any subcontractor is involved, it is responsible for duly implementing requirements included in this Plan under the Contractor's supervision.

The results of the inspection and audit activities will be summarized in a Report on a biannual basis that will be made available to stakeholders, if requested, which is under the responsibility of the Contractor. This report will constitute the basis for the monitoring report to be available for the Lenders.

The following reporting requirements apply for AAOİAŞ:

- Incident reporting;
- Emergency response reporting;

- Records of annual emergency response training exercises;
- Semi-annual reports on KPIs and performance trends;
- Monthly reports of relevant training activities completed and attendance registers to be maintained;
- Daily/Weekly/Monthly reports of site inspection activities;
- Audit reports;
- Inspection logs and status of non-compliances.

In addition, the following external reporting will be done:

- Monthly and biannual ESHS reports on KPIs and performance trends will be submitted by EPC to SPV,
- All environmental and social incidents will be appropriately documented, notified and reported in accordance with established procedures the terms and conditions by EPC to SPV,
- The Lenders will be notified of incidents pursuant to the terms and conditions agreed upon in the Finance Agreements through SPV.

Reports will be prepared using data gathered through excavated material monitoring activities defined under this Plan. The results and supporting evidence of these monitoring activities (e.g., waste quantity logs, contractor compliance records, and photographs) will be documented in detail within appropriate reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

APPENDIX A – EXCAVATION MATERIAL LOG FORM

No	Date	Amount (ton or m^3)	Transporter	Disposer	Name of the Dumpsite
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

APPENDIX B – EXCAVATION MATERIAL MANAGEMENT INSPECTION CHECKLIST

Inspection Date:		
Inspection Location:		
Control Measure	**Compliance (Yes/No)**	**Comment**
Are excavated material being stored at separate location from other wastes?		
Has a map been produced showing the temporary excavated material storage locations at the site which are visible to all workers?		
Are all temporary excavated material storage area separated and signed to prevent cross contamination of other waste materials?		
Are licenses of companies contracted for excavated material transport and disposal valid and up-to-date?		

SOIL MANAGEMENT and EROSION CONTROL PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
16.06.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards
08.09.2025	01	Revision as per Environmental and Social Due Diligence comments

SOIL MANAGEMENT and EROSION CONTROL PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CH	Critical Habitat
CLO	Community Liaison Officer
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ER	Employee Relations
ERT	Emergency Response Team
ESHS	Environmental, Social, Health And Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
IFC	International Finance Corporation
ISO	International Organization for Standardization
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
MSDS	Material Safety Data Sheet
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
RCA	Root Cause Analysis
SEP	Stakeholder Engagement Plan
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
SRP	Spill Response Personnel
WHO	World Health Organization

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project ("The Project"), has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Soil Management and Erosion Control Plan ("SMECP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

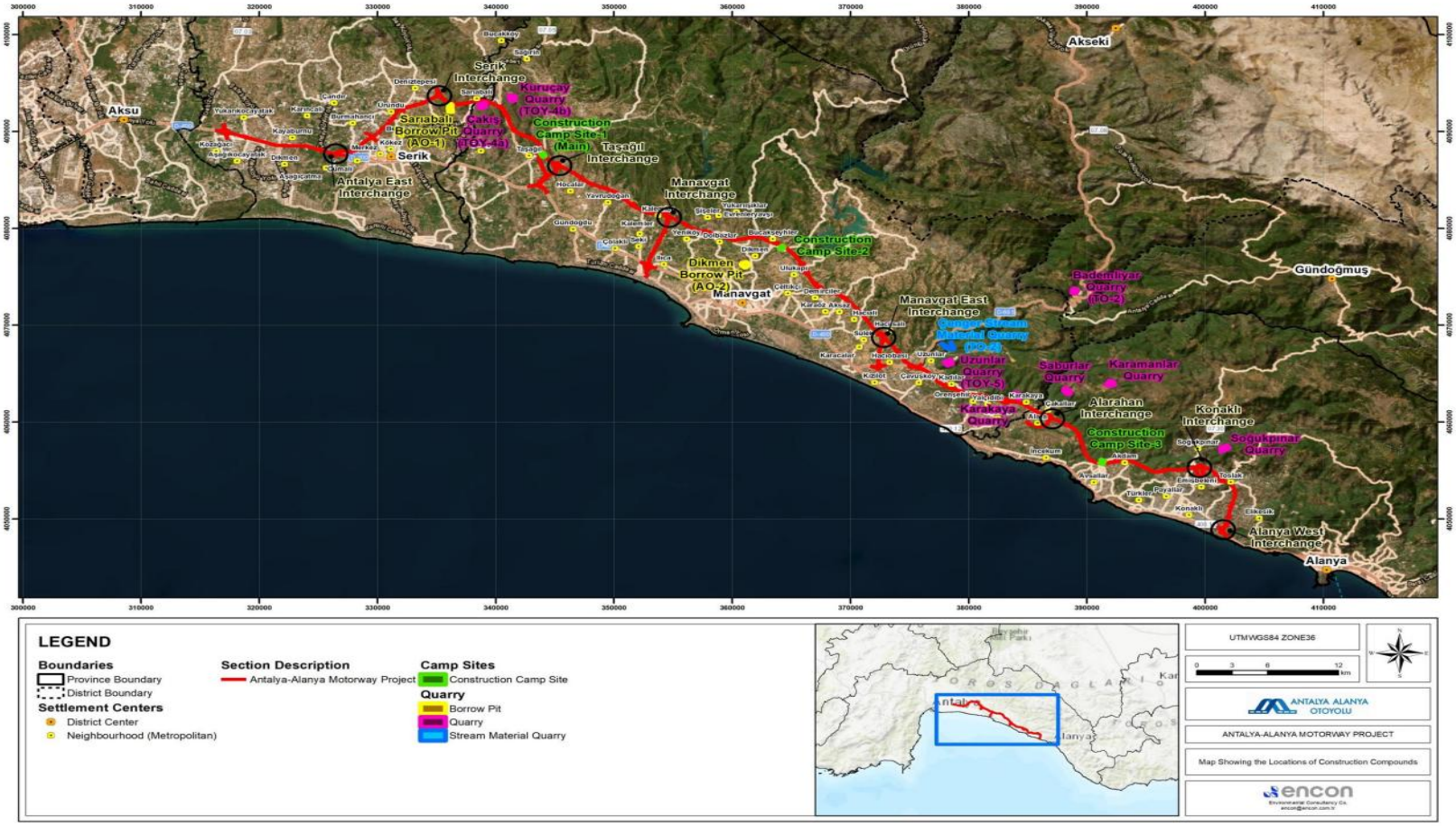

Figure I-1.Map Showing the Locations of Construction Compound

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

I.2 Purpose and Scope

This Soil Management and Erosion Control Plan (SMECP) ("the Plan") has been prepared for the Antalya–Alanya Motorway Project ("the Project").

This Plan has been developed to provide further details on the measures to be implemented during the construction phase of the Project to ensure that the actual environmental impacts are consistent with those evaluated in Environmental and Social Impact Assessment (ESIA) and that mitigation measures are applied as intended and effective.

This SMECP has been developed according to the Turkish regulatory framework, International Finance Corporation (IFC) Performance Standards (PSs) and IFC General and Sector Specific Environmental, Health and Safety (EHS) Guidelines, IFC Environmental, Health, and Safety Guidelines for Railways, IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction and related EU Directives.

The purpose of this SMECP is to provide a clear set of actions and responsibilities to:

- Ensure proper topsoil stripping, stockpiling and application measures are taken, in order to achieve successful rehabilitation of the Project Area
- Prevent/minimize erosion at the Project Area
- Prevent/minimize soil pollution at the Project Area

This Plan applies to all Project activities under the Contractor's supervision, its subcontractors and to all employees. The Contractor is the main responsible for the implementation of this Plan. Subcontractors will be responsible to work in line with all environmental and social management systems (ESMS) of the Contractor.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

This Plan should be implemented by all construction-phase parties, including the Project Sponsor (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. – AAOİAŞ), the Main Contractor (Limak), and all subcontractors. Responsibilities related to implementation, training, monitoring, and reporting should be clearly defined and communicated across all relevant levels. In case of changes in project design, materials used, or construction methodology, this Plan should be reviewed and updated accordingly.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This section includes policies, standards and requirements of reference for this Plan that are applicable for, but not limited to, construction phase of the Project. Project standards are described in the Project ESIA and are listed below:

- National legislative requirements and all permits, licenses and approvals
- IFC PSs

- Equator Principles (EPs) IV
- Other good international industry practices (GIIP) including ISO 9001:2015 - Quality Management Systems, ISO 14001:2015 – Environmental Management Systems and ISO 45001:2018 - Occupational Health and Safety Management Systems
- International Conventions and Protocols Türkiye is a party to
- The Contractor's Quality Policy, Health, Safety and Environmental Policy and related practices and procedures.

II.1 National Requirements

The following Turkish laws and regulations provide the legal foundation for managing environmental accidents, hazardous material spills, and associated risks during the construction phase of the Project:

- Environmental Law (Law No. 2872)
- Law on Protection of Soil and Land Use (No. 5403)
- Regulation on Reclamation of Land Deteriorated by Mining Activities
- Regulation on Control of Soil Pollution and Contaminated Lands by Point Sources
- Regulation on Waste Management
- Regulation on Mining Wastes
- Regulation on Control of Excavation Soil, Construction and Demolition Wastes
- Regulation on Contaminant Release and Transportation Record

II.2 International Standards and Conventions

In addition to Turkish national legislation, the following international standards and guidelines should be taken into account to ensure compliance with best practices and international lender requirements.

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework ("ESF") document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects, supported by Environmental and Social Standards ("ESSs").

The EPs are a set of voluntary environmental and social guidelines that have been adopted by a significant number of financial institutions influential in the project finance market. The EPs comprise a set of ten broad principles that are underpinned by the environmental and social policies, standards and guidelines:

- Principle 2: Environmental and Social Assessment will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project.
- Principle 3: Applicable Environmental and Social Standards - The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.
- Principle 4: Environmental and Social Management System - an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards.

IFC PS 1 Assessment and Management of Environmental and Social Risks and Impacts, underscores the importance of managing environmental and social performance throughout the life of a project. An effective ESMS is a dynamic and continuous process initiated and supported by

management, and involves engagement between the clients, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.

IFC PS 3 Resource Efficiency and Pollution Prevention, outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices. In addition, this PS promotes the ability of private sector companies to adopt such technologies and practices as far as their use is feasible in the context of a project that relies on commercially available skills and resources.

IFC EHS Guidelines - The EHS Guidelines are technical reference documents with general and industry-specific examples of GIIP. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs.

IFC EHS Guidelines for Railways and EHS Guidelines for Construction Materials Extraction are applicable to the Project.

In addition to these, related EU directives are given below:

- Directive 2004/35/CE of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage
- Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Soil Management and Erosion Control Plan:

- Solid Waste Management Plan
- Resource Efficiency Management Plan
- Excavated Material Management Plan
- Water, Wastewater, and Storm Water Management Plan
- Hazardous Materials Management Plan
- Occupational Health and Safety Management Plan
- Community Health, Safety, and Security Management Plan
- Traffic Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

IV. ROLES AND RESPONSIBILITIES

To support this structure, the roles and responsibilities specifically related to the implementation, monitoring, and reporting requirements of this Plan are summarized below .

General Manager (SPV):

- Promote a culture of social responsibility across the SPV and its stakeholders.
- Ensure the provision of necessary resources and organizational support for the implementation of plan.

- Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.
- Support the E&S and H&S Manager in preparing, disseminating, and implementing this plan. In the event of any incompatibility regarding the storage or transportation of excavation materials, ensure that the EPC and SPV collaborate with the E&S and H&S Manager and other responsible parties to take appropriate and preventive measures.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, environmental and social compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including SPV, stakeholders and investors.

E&S Manager (SPV):

- Review and ensure the preparation, revision, and implementation of all plans in accordance with national laws, regulations, company policies, international standards and lender requirements.
- Ensure and monitor that EPC and subcontractors correctly implement site practices and management plans.
- Provide technical support to EPC and subcontractors for the implementation of the Plan.
- Collaborate with internal teams (e.g., H&S, Legal, Procurement) to integrate E&S criteria into project operations and contracts. Monitor the environmental and social performance of EPC and subcontractors to ensure compliance.
- Prepare and submit E&S compliance and performance reports to internal and external stakeholders, including lenders and regulators.
- Support stakeholder engagement activities and consultations with local communities.
- Engage with regulatory authorities, auditors, and NGOs on E&S compliance and performance matters.
- Lead the implementation of corrective actions and incident prevention measures.

Health and Safety Manager (SPV):

- Ensure the preparation, revision, and implementation of the health and safety-related plans and documents in accordance with the SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Conduct a comprehensive accident and incident investigation process.
- Provide technical support to EPC and subcontractors for the proper implementation of the health and safety plans.

- Ensure the accurate records of inspections, incidents, safety meetings, and training records
- Engage with regulatory authorities on inspections, audits, and compliance verification

Project Director (EPC):

- Ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements.
- Promote a culture of environmental and social responsibility across the EPC and its stakeholders.
- Define and implement the overall business strategy and direction of the EPC in alignment with SPV and stakeholder expectations.
- Support the E&S and H&S Manager in preparing, disseminating, and implementing this plan. In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the SPV and other responsible parties.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, H&S compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including EPC, stakeholders and other related parties.
- Approval of project management plans (HSE, E&S, QA/QC, etc.) in line with company policies, legal frameworks, international standards, SPV and lender requirements.
- Coordinate with regulatory authorities, community representatives, and auditors as required.
- Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters.

E&S Manager (EPC):

- Coordinate the preparation, revision, and implementation of the Plan with H&S Manager in accordance with the Project SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure the excavated material is assessed and managed by waste recycling and reuses good practices.
- Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.
- Implement environmental and social measures through site practices and method statements.
- Ensure that all conditions and obligations outlined in the environmental and social management plans are implemented and adhered to during project activities.
- Ensure employees and contractors fulfil the requirements and relevant training of the environmental and social management plans.
- Ensure the environmental and social management plans are communicated and implemented by Contractors/Subcontractors.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Monitor compliance of Contractors/Subcontractors with environmental and social management plans requirements.

- Ensure the development and follow-up of corrective/improvement actions.
- Conduct comprehensive investigations of accidents and incidents and promote continuous improvement via lessons learned.

H&S Manager (EPC):

- Coordinate the preparation, revision, and implementation of the Plan with E&S Manager in accordance with the SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable legislation, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Provide technical support to EPC and subcontractors for the proper implementation of the Project's plans.
- Ensure the accurate records of inspections, incidents, safety meetings, and training records.
- Ensure the corrective actions process is followed up on by all parties strictly.
- Report on H&S performance, non-compliance, and corrective actions to the EPC Project Director.
- Engage with regulatory authorities on inspections, audits, and compliance verification.

V. SOIL MANAGEMENT and EROSION CONTROL MANAGEMENT MEASURES

V.1 Topsoil Management

Topsoil Stripping

Maximization of the topsoil recovery during the land preparation and construction phase is essential to ensure that sufficient topsoil would be available for use in restoration works. Within this regard, following measures will be taken:

- The boundaries of clearing and construction areas will be clearly marked or fenced to prevent impacts beyond these areas.
- Vegetation covering the topsoil, can cause difficulty in the removal of specific topsoil depths and excessive quantities of vegetative matter in stockpiles may promote chemical and biological degradation of the seed reserves that will be the future source of natural regeneration during rehabilitation process. Therefore, prior to topsoil stripping process, vegetation will be removed or reduced by grazing and/or clearing. Before the beginning of site preparation (vegetation clearing and topsoil removal) an expert biologist will perform surveys of the flowering period of the species identified as triggering Critical Habitat (CH)in the areas to be cleared of vegetation and its immediate surroundings. Please refer to Biodiversity Management Plan for the actions to be taken before vegetation clearance.
- Weed control will be conducted before vegetation clearance to prevent the formation of invasive species during revegetation.
- All cleared vegetative material will be buried in-pit, or if suitable, will be placed as habitat within the conservation areas.

- Machinery used for topsoil stripping will be cleaned of weeds, plants, and diebacks before being brought to the Project Area and between operations to prevent the introduction and spread of these elements.
- Soil infected with dieback and weeds will be sent to landfill to minimize the risk of spreading these species across the Project Area.
- Topsoil will be stripped separately from subsoil, considering the soil's depth and characteristics. Topsoil will be stripped to a depth of 10 to 30 cm. In areas with little or no topsoil, the Contractor will determine the depth (if any) to be stripped.
- The stripping and handling of topsoil will be carried out when the soil moisture content is optimum for the soil texture class.
- Topsoil stripping will not be conducted during windy and rainy periods. Construction is to be delayed 24 hours following a 24-hour rainfall of 10 mm or more during the preceding day, after which soil condition will be reassessed.
- Appropriate equipment will be used for the topsoil stripping activities. Surface grading of stockpiles will be performed with lightweight tracked vehicles or wheeled vehicles to prevent soil compaction.
- Vehicular traffic on soils to be stripped will be minimized to prevent soil compaction.
- Topsoil will be stripped progressively in order to reduce erosion.

Topsoil Storage

Depending on the topsoil characteristics, stripped topsoil will be stockpiled as agricultural topsoil and forest topsoil separately. During the storage of topsoil, following measures will be taken:

- To prevent the loss of the biological fraction in stockpiled topsoil due to long storage times, additional soil amelioration measures such as seeding and fertilization will be implemented to maximize topsoil recovery for rehabilitation. If topsoil and stockpiles are stored for over a year, they will be seeded using appropriate methods to prevent erosion from wind and rain and to protect the organic matter content. Fast-growing, ground-covering flora species will be used for revegetation to minimize soil erosion. Suitable species and seed mixtures (fast-growing, local plants) will be selected in consultation with biodiversity specialists. Refer to the Biodiversity Management Plan for topsoil conservation actions.
- The average height of topsoil stacks will be 1.5 meters. The side slope of the stacks will not exceed 3:1 ratio (h:v)..
- The stockpile surface will be lightly compacted as needed to restrict rainfall penetration, maintain aerobic conditions, and will be protected from flooding by placing berms around the outside. Topsoil and subsoil piles will be free-draining, with gaps left in linear topsoil piles to allow access and prevent water from being held against the stack.
- The area where topsoil will be stored will have a maximum inclination of 5%.
- All stockpiles will be positioned away from drainage lines, if applicable.
- Topsoil will be stored separately from subsoil at designated storage areas along the route and other work sites under suitable conditions to preserve its vegetative properties.
- Each topsoil stockpile will have appropriate signage to ensure it is identifiable to all personnel.
- Stockpiles will be surrounded by silt fencing, temporary drainage lines, or similar erosion control devices to prevent soil erosion.

Rehabilitation

Areas cleared during construction for temporary use will be restored, as soon as possible, with the goal of producing a stable vegetative cover to minimize erosion, dust and spreading of invasive alien species, and the aim of re-establish the original habitat with a positive impact on biodiversity. Vegetation and topsoil rehabilitation activities will be performed in all temporary facilities (mobilization areas, storage areas) in order to restore their original habitat.

During the rehabilitation of the Project Area at the closure phase, it is expected that the rehabilitation will include the use of topsoil recovered from the stockpiles, ground preparation such as ripping and scarification of the top surface and the planting of local native seeds. Some degree of soil amelioration such as addition of fertilizer and/or soil pH adjustment may also be required. Within this regard, following measures will also be applied:

- Topsoil will not be used as a fill material.
- Topsoil will be respread in even layers at a thickness appropriate for the landform and capability of the area to be rehabilitated.
- Areas where topsoil is spread will be ripped while trying not to bring subsurface materials to the surface (e.g. large rocks).
- Following the respreading, topsoil will be seeded to establish revegetation cover as early as possible. Please refer to Biodiversity Management Plan for plant selection.
- Rehabilitated areas will be controlled regarding to diseased plants and weed outbreaks, and significant weed outbreaks will be taken under control by using chemical or mechanical control methods.

Rehabilitation of the land will commence immediately on removal of each individual facility. The rehabilitation condition will be to a condition at least as good as that prevailing before establishment of the facilities, depending on the post construction land use and Project's access agreement. Disturbed areas will be rehabilitated to the satisfaction of the Limak, the regulatory authority or landowner and will obtain written approval from the Limak, the appropriate regulatory authority or the landowner of the level of rehabilitation. Photographs of the condition of the area prior to construction may be used for reference.

For detailed information regarding to the rehabilitation of the Project Area at the closure phase of the Project, please refer to Biodiversity Management Plan.

V.2 Soil Management

Earthworks including excavation, backfilling and filling will be conducted through the Project. Suitable cut material will be used as backfill material for the Project. Optimization of cut and fill will be implemented during the construction process. Excess material will be hauled and stockpiled at designated areas to minimize impacts on the area of influence of the project prior to transportation to final disposal area. Storage areas to be constructed within the scope of the Project will be used for the storage of the excess excavated materials which could arise from the tunnel and route excavation works and not used as backfilling material.

Details regarding the excavation and backfilling operations within the scope of the project and the management, transportation, and final storage of the excavated material in storage areas are provided in the Excavated Material Management Plan. Following list is provided for soil management:

- Excavated material controlled and approved in terms of quality can be used as filling material.
- Designated material storage areas will be managed by dikes to prevent loss of soil.
- Observed contaminated areas at construction site will be rehabilitated in accordance with the Environmental Accident and Spill Response Management Plan.
- Disposal areas will be rehabilitated as per the regulatory requirements.
- .

Spill risks during the construction phase are particularly associated with the use of heavy construction equipment, mobile fuel tanks, chemical storage areas, and processing units such as asphalt and concrete batching plants. The improper handling of waste oils, chemical solvents, and other construction-related liquid wastes can lead to contamination incidents if preventive measures are not

adequately implemented. Substances such as petroleum hydrocarbons, detergents, and acids may have persistent impacts on environmental media if not promptly contained and remediated.

However there will be three construction camp sites (Main Camp Site (Manavgat), Camp Site-2 (Manavgat) and Camp Site-3 (Alanya), temporary construction camp site in Taşağıl is in use. In addition to these areas, there will be usage land for mechanic and asphalt plant and concrete plant areas which are listed below (see Table V.1). In these areas, activities such as refueling and oil changes will be intensive, so the spill risk is highest. Additionally, construction activities along the route, in quarries, and during transportation are also at risk of environmental accidents and spills. In these areas, in addition to spill kits located in risky areas, extra kits will be kept for delivery to nearby construction sites in case of an emergency.

Table V.1 Information on Camp Sites, Mechanic, Asphalt and Concrete Plant Areas

Location	Province	District	Nearest Neighbourhood	Description of the Site / Plant	Area (m²)
Km 55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1	13,946
Km 59+400	Antalya	Manavgat	Taşağıl	Temporary Construction Camp Site	66,450
				Concrete Plant-2	
				Mechanical Plant-1	
				Asphalt Plant-1	
Km 64+400	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)	-
Km 80+400	Antalya	Manavgat	Yeniköy	Concrete Plant-3	15,000
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2	42,371
Km 87+700	Antalya	Manavgat	Bucakşeyhler	Concrete Plant-4	
				Mechanical Plant-2	
				Asphalt Plant-2	
Km 89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a	11,665
Km 99+200	Antalya	Manavgat	Sülek	Concrete Plant-5	11,977
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3	85,000
				Concrete Plant-6	
				Mechanical Plant-3	
				Asphalt Plant-3	

To prevent or minimize the environmental consequences of spills, proactive strategies should be implemented. These include proper handling, storage, and transportation of hazardous substances, the provision of appropriate containment infrastructure, and the development of robust emergency response and remediation procedures that are systematically applied throughout construction activities.

In case of a spill in any area, contaminated soil, water and used spill kits will be treated as hazardous waste. These wastes will be disposed of in hazardous waste containers in the area where the work is carried out and from there they will be transferred to the Temporary Hazardous Waste Storage Areas in Temporary Construction Camp Site, Main Camp Site, Camp Site-2 or Camp Site-3 which one is the closest.

Soil Sampling and Analyses

Most of the Motorway route passes through agricultural lands and forest areas where the historical soil contamination potential is considered to be low. However, there are quarries, and remote settlement areas close to the study area where illegal waste disposal activities could occur. Thus, such areas may include contaminated lands.

Soil contamination is evaluated as a potential risk during the land preparation and construction works, road repair and maintenance activities, and accidents/emergencies during operation phase. This potential risk may arise from accidental spills during transfer, mixing, and storage of hazardous materials or from unexpected incidents.

A soil sampling and laboratory analysis program was conducted as part of the baseline studies for the Project. Initial soil sampling and laboratory analyses were conducted as of September 2024. An additional round of soil sampling was carried out at 35 locations in May 2025 to support the baseline data set. The locations of these additional sampling points are illustrated in Figure V-1 and Figure V-2.



Figure V-1 Soil Sampling Points of the Project (September, 2024)

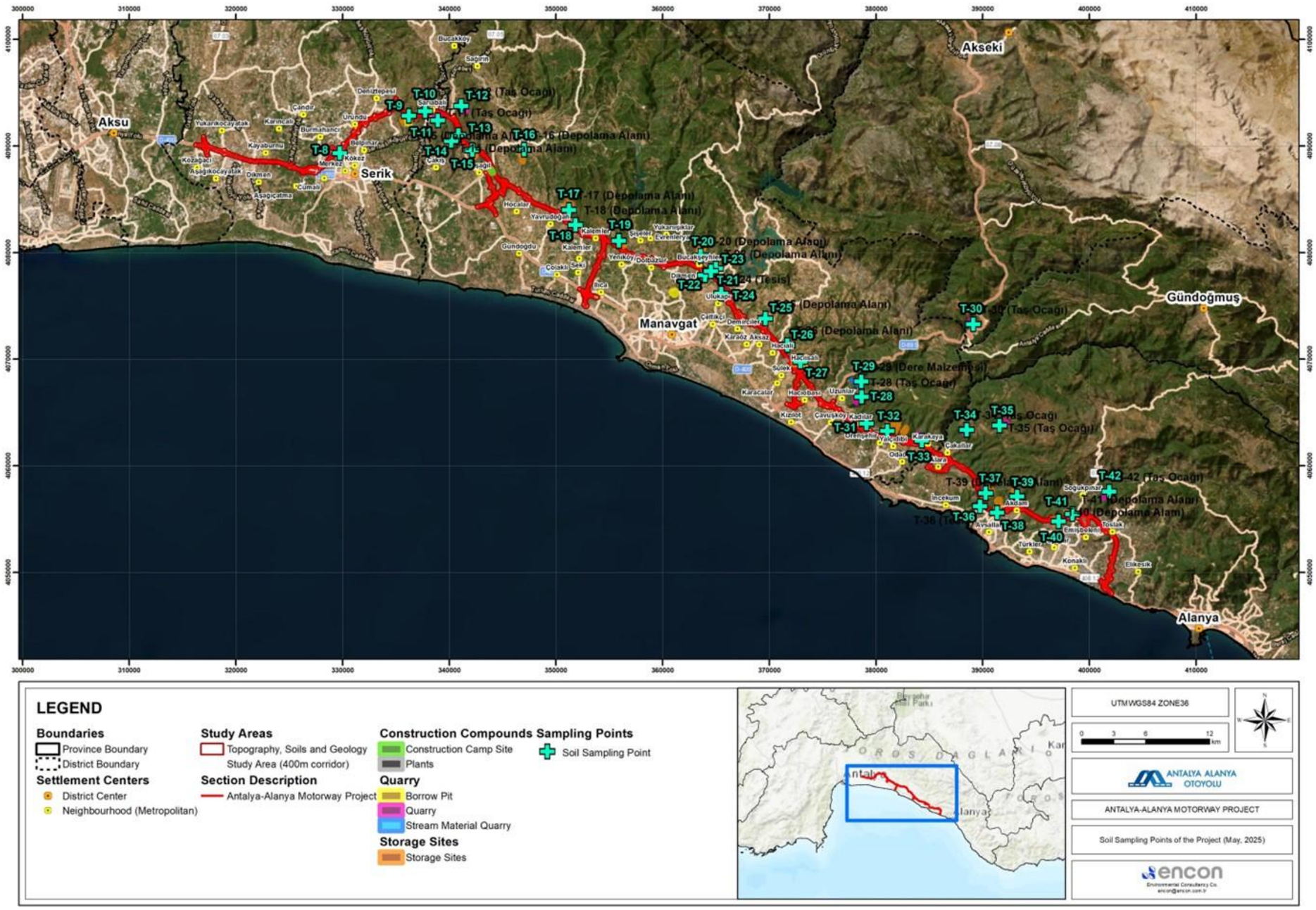

Figure V-2 Soil Sampling Points of the Project (May, 2025)

Soil Pollution Control Mitigation Measures

During construction activities soil contamination may be seen due to accidental leakages/spillages and, poor waste and wastewater management. If necessary mitigation measures will not be taken, these impacts may affect the soil quality in the Project Area. Within this regard following measures will be taken, in addition to the measures given in above sections:

- The amount of soil that could be subject to contamination/pollution and compaction will be minimized by ensuring the use of only the designated work sites and routes for the machinery, equipment and personnel.
- Related PPEs will be provided to the personnel handling the excavation soil/waste.
- The fuel required for the machinery and equipment to be used within the Project, will be supplied in accordance with the Hazardous Material Management Plan.
- Provisions of the Regulation on Control of Soil Pollution and Contaminated Lands by Point Sources, and Regulation on Contaminant Release and Transportation Record will be complied within the scope of the Project.
- In case of a spillage/leakage at the site, actions defined in the Environmental Accident and Spill Response Plan will be taken immediately.
- The soil contaminated due to spillages during handling fuel and other hazardous liquids will be removed from the site for suitable treatment and/or disposal according to the Waste Management Plan.
- No fuelling of vehicles or equipment will take place within excavated areas. If heavy equipment cannot be moved to appropriate fuelling points, an impervious surface (such as a drip-tray) has to be used for refueling this equipment to hinder accidental spillage to drain into the soil and therefore in potential groundwater aquifers.
- Wastes and wastewater to be generated within the scope of the Project, will be stored and disposed in a controlled manner in accordance with the Waste Management Plan, and Water Quality, Wastewater and Storm Water Management Plan, respectively. Thus, it will not be possible for the wastes and wastewater to be generated in the Project Area, interacting with the soil environment and cause any impacts.
- The areas, where the hazardous materials (chemicals, liquids etc.) storage tanks located (i.e., hazardous material storage areas), will be designed and constructed to avoid potential contamination into the soil (paved areas with sufficient secondary containment, proper drainage systems, storage as per Safety Data Sheet (SDS) requirements etc.). Also, the Project will comply with relevant legal and project safety requirements to avoid leakages from hazardous materials (chemicals, liquids etc.) storage facilities on-site
- Regular maintenance of vehicles and machinery/equipment will be undertaken to ensure that leakages of oil/fuel or any other hazardous material is prevented
- Safe Fueling and Gasoline Handling Guidelines will be developed in the construction areas. No fueling of vehicles or equipment will take place within excavated areas, if practically feasible. If heavy equipment cannot be moved to appropriate fueling points, an impervious surface (such as a drip-tray) has to be used for refueling this equipment to hinder accidental spillage to drain into the soil and therefore in potential groundwater aquifers
- Generators will be equipped with drip trays and to be checked regularly to prevent soil contamination
- Secondary containments, ponds and drip trays will be checked regularly, especially during extreme weather conditions
- Portable spill containment and clean-up materials (spill kits) will be made available and easily accessible at the construction site, instructions on how to use spill containment and clean-up materials will be included in the kits
- Pumps and trans mixers will be washed only at the concrete plants, concrete slurry will not be discharged into environment

V.3 Erosion Control Measures

Erosion is the process under the impact of water flow or wind consist of soil detachment, transportation and deposition of particles. Erosion control and sediment control are defined as any temporary or permanent steps used to reduce erosion and control sedimentation the process of settling or deposition of sediments due to motion through a fluid body. Proper erosion control along with sediment control reduce availability of particles for settling downstream.

Soil erosion is refers to the displacement of the upper layer of soil, leading to degradation of the land. This process can occur naturally due to factors such as weather conditions (winds, rains, ice or extreme heat), or as a result of anthropogenic activities like deforestation, agriculture, and construction. The rate of erosion is increased due to improper agricultural practices such as cultivation on relatively high slope lands, plowing through the fields in the direction of the slope, and excessive grazing on pasturelands or deforestation. The primary agents of soil erosion are water and wind, where the former is more prominent. Water erosion takes place on lands with weak or no vegetative cover where runoff can flow with sufficient energy, transporting loosened soil particles down the slope. Consequently the fertile top layer of the soil is lost from the agricultural lands resulting in reduced agricultural productivity, and water quality of the surface water resources deteriorates as a result of sedimentation and eutrophication (Former Ministry of Agricultural and Rural Services. July 2008).

Evaluation of the erosion level to which soils are exposed is done based on the erosion classification system developed by US Department of Agriculture and adopted by several state authorities including Türkiye. Erosion levels specified in this classification system are listed in Table V.2.

Table V.2. Erosion Levels according to Technical Procedure on Soil and Land Classification Standards

Erosion Level	Definition
Level 1	Low
Level 2	Moderate
Level 3	Severe
Level 4	Very severe

Source: Former Ministry of Agricultural and Rural Services. July 2008.

Following the erosion level classification, erosion potential of the soils corresponding to the study corridor (6,856 ha total area; settlement, river, river flood plain, and coastal dune areas that cover 1.1% of the study corridor and not categorized under any of the soil groups. and are not taken into consideration in the following figures) have been described based on the land use, and soil database of the former GDRS published for Antalya province in 1993. The results of the analyses done in this scope are provided in Table V.3.

As presented in the table, approximately 57% (3,933.2 ha) of the study corridor corresponds to soils with severe erosion levels (Level 3). This is followed by no or very low erosion level (Level 1), which accounts for about 25% (1,691.8 ha) of the study corridor. Soils with very severe erosion levels (Level 4) occur in about 2% of the study corridor. Soils with moderate erosion levels (Level 2) along the study corridor account for approximately 15% of the area. In addition, it should be noted that the Project area has experienced a rapid urbanization rate, especially in the last 30 years resulting in significant changes in the land use patterns and an increase in the overall area of artificial surfaces, including urban areas, industrial sites, transport networks, mine extraction sites, etc. Consequently it is likely that the erosion rate has accelerated, and the erosion exposure levels of the soils corresponding to the study corridor have increased.

Additionally, erosion levels of soils of the settlements within the study area are listed in Table V.3.

Table V.3. Erosion Potential of the Soils within the Study Corridor of the Project (GDRS. 1993)

Erosion Levels	Risks	Area (m^2)	Area (ha)	Percent (%)
None or very low	-	4,599,930.62	459.99	6.71
	Slope and erosion damage	2,107,249.47	210.72	3.07
	Soil insufficiency	553,026.62	55.30	0.80
	Drainage problems, oldness, flood damage	9,657,676.43	965.77	14.09
Sub-total (None or very low)		**16,917,883.15**	**1,691.79**	**24.67**
Moderate	Slope and erosion damage	7,656,224.52	765.62	11.17
	Slope and erosion damage Soil insufficiency	2,416,436.79	241.64	3.52
Sub-total (Moderate)		**10,072,661.30**	**1,007.27**	**14.69**
Severe	Slope and erosion damage. Soil insufficiency	39,331,463.24	3,933.15	57.37
Sub-total (Severe)		**39,331,463.24**	**3,933.15**	**57.37**
Very severe	Slope and erosion damage. Soil insufficiency	1,521,465.97	152.15	2.22
Sub-total (Very severe)		**1,521,465.97**	**152.15**	**2.22**
Settlements		184,874.57	18.49	0.27
River		44,053.60	4.41	0.06
River Flood Plain		428,820.08	42.88	0.63
Coastal Dunes		60,104.88	6.01	0.09
Total		**68,561,326.77**	**6,856.13**	**100.00**

Table V.4. Erosion Levels of Soils in the Settlements within the Study Corridor (GDRS. 1993)

Province	District	Neighborhood	Erosion Level
Antalya	Serik	Kozağacı	None or very low
		Yukarıkocayatak	None or very low
		Aşağıkocayatak	None or very low
		Kayaburnu	None or very low
		Dikmen	Moderate
		Çandır	None or very low
		Aşağıçatma	None or very low
		Cumalı	None or very low
		Burmahancı	Moderate

Province	District	Neighborhood	Erosion Level
		Merkez	None or very low
		Üründü	None or very low
		Kökez	None or very low
		Deniztepesi	Moderate
		Sarıabalı	Severe
	Manavgat	Çakış	Severe
		Sağırin	Severe
		Taşağıl	Severe
		Hocalar	Severe
		Gündoğdu	Moderate
		Yavrudoğan	Severe
		Kalemler	Severe
		Evren	None or very low
		Seki	None or very low
		Ilıca	None or very low
		Yeniköy	Severe
		Şişeler	None or very low
		Evrenleryavşı	Severe
		Dolbazlar	Severe
		Yukarıışıklar	Severe
		Dikmen	Severe
		Bucakşeyhler	Severe
		Ulukapı	Severe
		Aşağıışıklar	Severe
		Demirciler	Severe
		Karaöz	Severe
		Aksaz	Severe
		Hacıali	Severe
		Cevizler	Severe
		Sülek	Moderate
		Hacıisalı	Severe
		Hacıobası	Severe
		Karacalar	Moderate
		Kızılot	None or very low
		Uzunlar	Severe

Province	District	Neighborhood	Erosion Level
		Çavuşköy	Severe
		Kadılar	Moderate
		Örenşehir	Severe
		Yalçıdibi	Severe
		Odaönü	Severe
		Karakaya	Moderate
	Alanya	Çakallar	Severe
		Alara	Severe
		İncekum	Very severe
		Avsallar	Severe
		Akdam	Severe
		Türkler	Severe
		Soğukpınar	Severe
		Emişbeleni	Severe
		Toslak	Severe
		Konaklı	Severe
		Elikesik	Severe

Erosion control and sediment control during construction phase of the Project should mainly aim for preventing any type of erosion, ensuring interception and drainage for surface runoff, ensuring surface runoff does not cause erosion or collect sediments from disturbed areas and ensuring stabilization of disturbed slopes.

Topsoil stripping, earthworks and excavation activities will disturb and expose the soil surfaces at working areas which will be disposed to erosion due to rain and wind. Exposed working areas will be rehabilitated without delay to prevent soil erosion after completion of construction activities.

Measurements for erosion control and sediment management are provided below:

- Erosion control measures (e.g. geotextile filter barriers that would reduce the flow velocity and trap the sediments, drainage channels, settling structures, etc.) will be implemented along the route prior to the start of construction works in order to reduce or prevent off-site sediment transport during construction. Temporary erosion control measures will be moved forward as the construction progresses.
- Stripping and excavation works will be planned in a way that maximum 30.000 m2 of exposed land will be created at once. Mulching will be applied to stabilize exposed areas.
- Activities will be modified or suspended during extreme rainfall and high winds to the extent practical.
- Contouring will be applied and length and steepness of slopes will be minimized.
- All the earth works will be structured at the end of each work day in a way to control probable surface run-off due to precipitation and minimize associated erosion.

- All the water flow coming from the areas surrounding the work sites and from the side slopes will be diverted by means of temporary channels, earth banks and temporary engineering structures to avoid mixing of clean (non-contact) and contaminated (contact) runoff.
- Erosion control measures will be implemented at the outlet of culverts.
- At the outlet of the erosion control structures, relevant measures (i.e. use of riprap) will be taken to reduce the flow velocity and erosion impact.
- Following the completion of base excavations, permanent erosion control measures will be taken and slope improvement works will be conducted.
- Dikes will be formed around the excavated material storage sites in order to prevent loss of soil due to erosion.
- Channels and ditches will be designed in consideration of post-construction flows. • Following the completion of concrete lining of the drainage ditches, temporary erosion control structures will be dismantled and the sites will be rehabilitated.
- Temporary service road gradients will be limited to reduce runoff-induced erosion.
- All the work sites will be revegetated to the extent possible promptly following the completion of works at that site.
- Operation and Rehabilitation of Quarries and Material Borrow Sites
- Open pit mining method will be used at quarries and tunneling will not be applied. Open pit will be developed in benches.
- Borders of the quarry and material borrow sites will be identified by using proper methods (i.e. fencing, etc.) and material extraction activities will be conducted within these borders.

VI. TRAINING

The employees of the AAOİAŞ, Limak and subcontractors will require to attend the new-hire induction training that includes environmental and social awareness and compliance training to be aligned with Project ESIA and ESMS.

Regular internal and external (when necessary) trainings will be given to ensure that the mitigation measures indicated in this Plan are applied during the construction phase of the Project for all involved parties. Regular internal inspections will be conducted to ensure that the mitigation measures indicated in this Plan are applied during the construction phase of the Project.

All Project workers shall receive adequate training regarding soil and topsoil management. Specific trainings will be provided to operators and key personnel involved in activities which involve vegetation clearance, topsoil stripping, subsoil handling and rehabilitation. All personnel will receive structured training upon hiring as part of the Project's onboarding and orientation program. This training will cover the prevention and management of environmental accidents and hazardous material spills, including identification of potential spill sources, associated risks to human health and the environment, and appropriate response actions.

The training program will include the following core elements:

- General environmental awareness and potential impacts of spills;
- Applicable national legislation and international standards related to hazardous material handling and spill response;
- Where this Plan and other relevant procedures (e.g., Hazardous Materials Management Plan, Solid Waste Management Plan) can be accessed;
- Typical sources of spills on construction sites, such as equipment failure, leaks during fuel transfer, and improper storage of chemicals or lubricants;
- Precautionary measures for spill prevention;

- Use, location, and application of spill kits and absorbent materials in various work areas;
- Spill containment and control procedures;
- Proper use of personal protective equipment (PPE) during spill response;
- Procedures for clean-up, recovery, and appropriate disposal of contaminated materials;
- Replenishment of spill kits following use or routine inspection.

Subcontractors will be responsible for ensuring that their employees receive equivalent training, consistent with Project requirements and aligned with the overall ESMS.

All personnel will receive refresher training at regular intervals, and additional training will be provided to newly hired staff. The E&S Manager will prepare a detailed training schedule, which will be reviewed and approved by the Project Manager.

Attendance and completion of all training sessions will be documented through the Training Participation Form. These records will be managed and retained by the E&S team, and subject to periodic audits to verify compliance with training and preparedness requirements.

VII. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific risks, incident trends, stakeholder concerns, or changes in applicable environmental regulations.

Monitoring activities will be coordinated by the E&S Manager, in close collaboration with the H&S Manager. Key responsibilities will include verifying the proper storage and handling of hazardous materials, monitoring implementation of spill prevention measures, checking the availability and condition of spill response kits, and ensuring that spill containment practices are consistently applied across critical work areas such as fuel storage sites, maintenance zones, and material handling areas.

Regular inspections will be conducted at designated locations across all worksites to evaluate compliance with national environmental regulations and Project-specific spill prevention requirements. This will include visual inspections for potential leaks or spill risks, control of secondary containment systems, checks on the use of drip trays and absorbent materials, and review of maintenance and inspection logs for storage tanks and hazardous material containers.

Monitoring efforts will be guided by the framework provided in Table VIII.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of inspections, and responsible parties.

Table VII.1 Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Number of trainings conducted	Project site offices	Tracking the number of trained personnel	Quarterly	AAOİAŞ, Limak
Invasive Species	Site-wide	Weed control will be conducted to prevent the formation of invasive species during the revegetation.	Once prior to the topsoil stripping Monthly on closure phase	AAOİAŞ, Limak
Invasive Species	Site-wide	All machinery will be visually checked regarding to weeds, plants and diebacks sticked to them.	Once before machinery brought to the Project Area Between the operations	AAOİAŞ, Limak

Topsoil Management	Site-wide	Amount of stripped/stored and used topsoil will be recorded	Following the topsoil stripping and rehabilitation process	AAOİAŞ, Limak
Soil Management	Site-wide	Amount of subsoil stored/transferred for disposal will be recorded	Following the subsoil removal and disposal process	AAOİAŞ, Limak
Erosion Control	Site-wide	Erosion control measures at will be visually checked.	Monthly	AAOİAŞ, Limak
Soil Pollution	Site-wide	Soil quality analyses will be conducted at the areas where any possible contaminated site identified during the surveys conducted under the scope of Pre-Construction Site Assessment Procedure or any spillage/leakage occurs, for the suitable parameter sets corresponding the spilled/leaked material defined in the Regulation on Control of Soil Pollution and Contaminated Lands by Point Sources	In case of any contaminated site identified during Pre-Construction Site Surveys or In case of any spillage/leakage occurs	AAOİAŞ,
Rehabilitation	Site-wide	Areas progressively restored will be inspected	Monthly during the vegetative season (from April to October) of the first year after restoration Every 2 months during the vegetative season (from April to October) of year 2 and 3 after restoration	AAOİAŞ, Limak
Reported spill/leak incidents or non-compliance records	Site-wide	Review of non-compliance, accident, and spill records	Quarterly	AAOİAŞ,
Number of complaints related to environmental accidents	Project site offices	Logging and reviewing records as per the Stakeholder Engagement Procedure	Quarterly	AAOİAŞ,
Spill kits in work areas and on heavy machineries	All construction and maintenance areas and vehicles	Visual check and control list	Daily	AAOİAŞ, Limak and Subcontractors

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Main Contractor (Limak) and relevant subcontractors.

VIII. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table VIII.1 Key Performance Indicators – Construction Phase KPIs

Key Performance Indicator	Target	Frequency	Responsible Party
Conduction of the weed controls	Weed controls are conducted according to the proposed schedule	Monthly	AAOİAŞ, Limak
Removal of weeds, plants and diebacks sticked to the Project machinery	All machinery is cleared from the weeds, plants and diebacks sticked to them	Monthly	AAOİAŞ, Limak
Performance of topsoil stripping and storage as planned	100%	Monthly	AAOİAŞ, Limak
Amount of stripped/stored and used topsoil	Topsoil amounts recorded	Monthly	AAOİAŞ, Limak
Amount of stored/transferred for disposed subsoil	Subsoil amounts recorded	Monthly	AAOİAŞ, Limak
Presence of the determined erosion control and storage measures	All erosion control and storage measures are present at the site	Annually	AAOİAŞ, Limak
Number of spillage/leakage resulted in soil contamination or number of contaminated land identified during Pre-Construction Site Surveys	Zero per year	Annually	AAOİAŞ, Limak
Vegetation cover and sign of erosion at the restored areas	Restored areas with vegetation cover and composition similar to undisturbed areas. No sign of erosion.	Semi-year	AAOİAŞ, Limak
Number of non-compliances regarding soil and topsoil measures identified in this Plan	Minimise the number of non-compliances and continuous improvement	Monthly	AAOİAŞ, Limak
Number of trainings planned vs completed	100%	Quarterly	AAOİAŞ, Limak
Number of grievances received regarding soil and topsoil management	Minimise the number of grievances and continuous improvement	Quarterly	AAOİAŞ, Limak

IX. AUDIT AND REVIEW

Results of the monitoring will be reported to responsible parties to ensure that the Project activities comply with the national legislation and international standards regularly... Depending on the monitoring results, the Plan will be reviewed and updated according to the Internal Audit Program that will be developed and updated by Project E&S Manager.

The regularly internal audit will address:

- The correct implementation of this Plan;
- The correct and timely implementation of an auditing and review system;
- Each of the point indicated in the table in Section 7 (Monitoring Activities) and Section 8 (KPIs) of this Plan.

Evidence and results of the inspection and audit activities are included in the audit reports and in the “Non-Conformity and Preventive/Corrective actions” records. Project Management reviews result of audits and inspections and the progress of the Preventive/Corrective actions and takes additional appropriate actions if necessary.

X. REPORTING

Quarterly reporting should be conducted to ensure the effective implementation and continuous improvement of this Plan throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions which are defined in this Plan should be identified and the required updates should be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Monthly basis audits and visual inspections should be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Evidence of the implementation of the actions/measures and related results are collected through inspection and auditing activities as detailed in Section IX “Audit and Review” of this Plan; these evidences are described in the audit reports.

Subcontractors are responsible to collect the soil, topsoil, rehabilitation and soil contamination statistics (including all types of training delivered to employees and incident records) on a monthly basis and report to the Limak and AAOİAŞ. If any subcontractor is involved, it is responsible for duly implementing requirements included in this Plan under the EPC and SPV supervision.

The results of the inspection and audit activities will be summarized in a Report on a biannual basis that will be made available to stakeholders, if requested, which is under the responsibility of the Contractor. This report will constitute the basis for the monitoring report to be available for the Lenders.

All personnel are encouraged to raise concerns, suggestions, or complaints related to environmental accident and spill response management through the established grievance mechanism by completing the grievance form. Public grievances regarding chemical spills, fuel leaks, or other contamination-related concerns should also be addressed and followed up accordingly. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

Throughout the construction phase of the Project, this Plan will be reviewed quarterly by the E&S Manager, based on the results of audits and any spill-related incidents or changes in site activities. Updates to the Plan will be agreed upon between the E&S Manager and the General Manager.



ANTALYA ALANYA MOTORWAY PROJECT

CULTURAL HERITAGE MANAGEMENT PLAN

REV 3

Revision LOG			
REV. Date	**Prepared by**	**Quality Checked by**	**Reviewed and Approved by**
02.09.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**
22.09.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**
23.10.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**

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APPENDIX 4 : BOARD DECISIONS

ABBREVIATIONS

AD	Anno Domini
Archeo-Team	Archaeological Field Survey Team / Expert
Asst. Prof.	Assistant Professor
BC	Before Chris
CF	Chance Find
CHA	Cultural Heritage Area
CHMP	Cultural Heritage Management Plan
ICOMOS	International Council on Monuments and Sites
ICCROM	The International Centre for the Study of the Preservation and Restoration of Cultural Propert
GIS	Geographical Information System
KM	Kilometre
KML	Keyhole Markup Language
KMZ	Keyhole Markup Language Zipped
IFC	International Finance Corporation
EBRD	European Bank for Reconstruction and Development
M	Meter
No	Number
Shp (shape)	Netcad data name
Project Name	Antalya Alanya Motorway Project
UK	United Kingdom
UNESCO	The United Nations Educational, Scientific and Cultural Organization
WB	World Bank
WGS	World Geodetic System

1. PURPOSE AND SCOPE

The purpose of this Cultural Heritage Management Plan (CHMP) is to safeguard the archaeological and cultural heritage within the scope of the Antalya–Alanya Motorway Project and to minimize potential impacts arising from Project activities. The CHMP is designed not only to preserve **tangible archaeological remains** but also to address **intangible cultural heritage elements**, including traditions and practices associated with cultural sites and local communities.

The CHMP applies to all phases of the Project lifecycle, including **pre-construction, construction, and operation**. Its scope covers:

- Implementation of **archaeological baseline surveys** and ongoing investigations in newly accessible areas,
- Application of the **Chance Find Procedure**, ensuring immediate response in case of discoveries,
- **Stakeholder engagement and coordination**, particularly with the Antalya Regional Directorate for the Protection of Cultural Heritage, relevant Museum Directorates, and local communities through the **Project Archaeologist and Consultant Archaeologist**,
- Management of **grave relocation processes** in accordance with **Law No. 3998 on the Protection of Cemeteries (1994)**, **Law No. 2863 on the Protection of Cultural and Natural Assets**, and international standards,
- Delivery of **training programmes** to Project staff and contractors on cultural heritage awareness,
- Periodic **monitoring and updating** of the CHMP as a living document, incorporating new findings, stakeholder input, and decisions of the competent authorities.

All activities under this CHMP should be implemented in compliance with **national legislation** and the provisions of **international standards** (including IFC Performance Standard 8, EBRD PR8, and AIIB Environmental and Social Standards), thereby ensuring full alignment with lender requirements.

The Project will engage with the ARHB in accordance with the engagement methods and frequency indicated in the Project SEP as further detailed in Section 5.2..

2. LEGISLATION FRAMEWORK

In this section, the legislation framework that is related to the management of cultural heritage is summarized.

All HRM-coded areas identified during the baseline surveys along the project route have been inspected on site with the participation of the ARHB specialist archaeologist and the survey engineer. On-site inspections have been completed for all identified areas; however, for some areas, the definition of protection zone boundaries and the receipt of official opinions from the relevant authorities are still pending. Conservation Boards often determine the protection zone boundaries of areas identified during baseline studies at varying scales (either broader or narrower). The main reasons for this include the status of land parcelisation and the need to define a protection (buffer) zone in proportion to the nature and significance of the findings. When a major archaeological site is encountered, as described in the Principle Decision No. 658, the 1st-Degree Archaeological Site is generally delineated to include the entire extent of surface material distribution within and around the settlement. Subsequently, in order to further protect the 1st-degree site boundary, a 3rd-Degree buffer zone is established. There is no uniform national standard for the application of this practice.

All activities under this CHMP should be implemented in compliance with national legislation and the provisions of international standards, thereby ensuring full alignment with lender requirements.

In line with these requirements, all nationally designated or registered cultural heritage resources will require relevant permits and adherence to applicable conditions prior to the commencement of any construction activities.

2.1 Law on Protection of Cultural and Natural Assets (Law No: 2863 (published in the Official Gazette dated July 21, 1983))

The management plan for archaeological heritage mitigation strategies along the project site corridor is to be designed to meet the requirements stipulated in the Law on Protection of Cultural and Natural Assets, Law No. 2863, (July 21, 1983).

The objective of the Law is to set the definitions regarding the movable and fixed cultural and natural assets that shall be protected; to define the procedures and activities to be performed and to establish the formation and responsibilities of the organization that will enforce the required principles and implementation of action decisions on this subject." (Official Gazette, 23/7/1983 number 18113).

In the law archaeological sites are classified under three categories. These are:

- 1st Degree Archaeological Sites,
- 2nd Degree Archaeological Sites,

- 3rd Degree Archaeological sites

Principle Decision No: 658 defines these sites as follows:

- **1st Degree Archaeological Sites:** Areas requiring highest level of protection. They should be preserved with the exception of scientific excavations. The area should be free of any type of buildings and construction. All kinds of construction, excavation, and modification activities are prohibited. However, for exceptional cases such as the necessity for infrastructure construction, Regional Preservation Boards may permit such activities based on the approval of the relevant museum and the head of the scientific excavation team.
- **2nd Degree Archaeological Sites:** Areas requiring ***high*** level of protection. They should be preserved based on the conditions of protection and utilization set by the Regional Preservation Boards. Additional construction is prohibited. As for the 1st Degree Site Degree archaeological sites, for exceptional cases such as the necessity for infrastructure construction, Regional Preservation Boards may permit such activities based on the approval of the relevant museum and the head of the scientific excavation team.
- **3rd Degree Archaeological Sites:** Lowest level of protection area. Construction is permitted based on the decisions of Regional Preservation Boards. Before applying for a construction permit, test pit excavations should be conducted and the outcomes of these excavations should be reviewed by the relevant museum and, if present, the head of the scientific excavation team. ***All excavations are under the supervision of museum expert.*** Reviews should be submitted to Regional Preservation Boards. The Boards may ask for extension of the areal test pit coverage before taking any decision.

2.1.1 Definitions *(Article 3 of the Law numbered 2863)*

Article 3 of the Protection of Cultural and Natural Entities Law provides the following definitions:

- *Cultural Assets are all over-ground, underground or submarine movable and fixed assets related with science, culture, religion and fine arts, belonging to prehistoric and historic eras.*
- *Natural Assets are the over-ground, underground or submarine assets that belong to geological eras, prehistoric and historic eras and that shall be protected because of their rarity or specifications and preciousness.*

2.1.2 Obligation to Inform (Article 4 of the Law numbered 2863)

In case of chance find of movable or immovable cultural assets, the nearest museum directorate or mukhtar in the villages, local authorities in other places should be informed. If these cultural assets are encountered within military posts and forbidden areas, major

commands should be duly informed. Mukhtar should inform the nearest ***local*** authority within a day (24 hours), the ***local*** authority and other authorities should report the incident to the Ministry of Culture and Tourism and the related museum directorate via formal letter. The Ministry of Culture and Tourism, General Directorate of Cultural ***Heritage and Museums*** and related ***Regional Board Directorate of Protection of Cultural Heritage*** are responsible for the registration of the cultural heritage

2.1.3 Legal Necessities before the Impact Mitigation Measures (Article 7 of the Law numbered 2863)

In Article 7, it is stated that the related ***Regional Board Directorate of Protection of Cultural Heritage*** are responsible for the registration of the cultural and natural heritage. Therefore, for the registration of the immovable cultural assets, it is required to apply officially and directly to the related ***Regional Board Directorate of Protection of Cultural Heritage***.

2.2 Regulation on Determination and Registration of Immovable Cultural and Natural Heritage (Official Gazette dated 10.12.1987 and numbered 19660)

The aim of this regulation is to introduce principles on permits about researches and excavations to be conducted under the law of protection of cultural and natural entities, the preservation necessities of the findings, studies on these findings, the assignments, duties and authorizations, rights and expenses of the related persons.

2.3 Legal Framework on Cemeteries

According to the **Law No. 3998 on the Protection of Cemeteries**, adopted on 9 June 1994:

- **Ownership (Article 1):** Except for the State Cemetery, historical cemeteries managed by the Directorate General of Foundations, martyrdom cemeteries, and cemeteries belonging to religious communities with special status, the ownership of public cemeteries rests with municipalities in municipal areas and with village legal entities in villages. These lands cannot be sold, acquired through acquisitive prescription, or transferred by possession.
- **Protection (Article 2):** Cemeteries, martyrdom cemeteries, and graves cannot be altered, damaged, or polluted. They cannot be converted, through planning regulations or by any other means, into parks, gardens, squares, parking areas, playgrounds, green zones, or any other use outside their primary function. An exception is only provided where road construction is deemed necessary and approved by the Ministry of Environment, Urbanization and Climate Change.

In Türkiye, modern cemeteries are primarily used for burials; however, many of these cemeteries also possess **cultural heritage significance**. As a result, and due to the presence of registered cultural heritage within many cemeteries, any works affecting

cemeteries must be conducted in line with both **Law No. 3998 (1994)** and **Law No. 2863 on the Protection of Cultural and Natural Assets**.

2.4 European Convention on The Protection of The Archaeological Heritage (Revised) (Valetta, 16/01-1992)

This convention is known as the Valetta Convention. It sets guidelines for the funding of excavation and research work and publication of research findings. It also deals with public access, in particular to archaeological sites, and educational actions to be undertaken to develop public awareness of the value of the archaeological heritage

2.5 Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972

Turkey is a signatory to this Convention (The World Heritage Convention), which was approved by The General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO), meeting in Paris from 17 October to 21 November 1972.

The signatories to this Convention have agreed "to ensure that effective and active measures are taken for the protection, conservation and presentation of the cultural and natural heritage" on their territories.

3. ROLES AND RESPONSIBILITIES

Project Owner will be responsible for the preparation and implementation of the environmental and social impact assessment-based management plans, which will be project specific. These plans shall be practical, detailed procedures for use in the field.

Project Owner will ensure the implementation of the commitments stated in the ESIA.

Project Owner will also be responsible for the performance of all sub-contractors with respect to the project-specific plans and shall comply with all relevant project standards, statutory requirements, permit and license conditions and secure all applicable permits and licenses.

Table 1 Table of Roles and Responsibilities

Role	Responsibilities
Ministry of Culture and Tourism	• Acts as the national competent authority for cultural heritage. • Provides oversight and ensures compliance with national legislation and regulations.
Regional Conservation Board (Regional Board Directorate of Protection of Cultural Heritage)	• Serves as the sole decision-making body for interventions on cultural heritage assets. • Issues binding instructions regarding protection, salvage excavations, or further conservation actions.
Museum Directorate	• Provides archaeologists and technical experts to the site within 24 hours of notification. • Officially defines and classifies chance finds in line with national heritage law. • Responsible for conducting or supervising excavations in chance find areas. • Implements the decisions and instructions issued by the Regional Conservation Board.
Project Owner	• Holds overall responsibility for preparation and implementation of ESIA-based management plans, including the CHMP and Chance Find Procedure. • Ensures implementation of commitments stated in the ESIA. • Accountable for the performance of all sub-contractors in line with project-specific management plans, standards, statutory requirements, and permits. • Employs qualified archaeologists at the Project site to monitor ground disturbance activities and oversee CHMP and Chance Find Procedure implementation. • Ensures the adequate enforcement of the Chance Find Procedure during construction activities.
Construction Contractor	• Implements CHMP measures and Chance Find Procedure on site. • Ensures workers follow training and awareness requirements. • Immediately suspends works in the event of a chance find and secures the area until official instructions are received.

Archaeologists (Project-appointed)	• Conduct baseline surveys, monitoring of excavation and ground disturbance activities. • Document and report findings in coordination with the Museum Directorate. • Provide expert advice to ensure compliance with CHMP and national regulations. • Directly reports any chance find to the Museum archaeologist and the relevant Regional Conservation Board. • Responsible for organizing and delivering necessary trainings to field staff on the implementation of the Chance Find Procedure. • Records all chance finds in the Chance Find Report Form and maintains the Chance Find Register. • If required, ensures the execution of salvage excavations and provides necessary resources. • Within the scope of the project, the continuous updating of the status of permits and consultations for the areas listed in the CHMP is the responsibility of the Project Archaeologist and the archaeology consultant. • The reports to be prepared by the field archaeologist following the completion of the pre-construction activities shall be regularly shared with the construction teams. The archaeological reports in question shall be submitted to the lender on a monthly or quarterly basis. • The findings shall be regularly communicated to the site personnel through archaeological awareness trainings and toolbox talks. In addition, one hard copy of the pre-construction reports shall be kept on site for reference. • Intangible Cultural Heritage issues will be managed under the oversight and coordination of the Project Archaeologist and the Project CLOs.
Third-Party Archaeological Consultancy Services	In addition to the statutory responsibilities of the Ministry of Culture and Tourism, the Regional Conservation Boards, and the Museum Directorates, a third-party archaeological consultancy service has been engaged by the Project Owner. The consultancy is responsible for ensuring compliance with national legislation and international standards (e.g., IFC PS8, EBRD PR8), and for providing independent expertise in the management of cultural heritage.

Scope of Services	• Baseline Archaeological Surveys: Conducting field surveys and preparing an inventory of movable and immovable cultural heritage assets within the Project footprint and buffer zones. • Preparation of Management Documents: Drafting and updating the Cultural Heritage Management Plan (CHMP) and the Chance Find Procedure in alignment with international lender requirements. • Training & Awareness: Delivering induction and toolbox trainings for contractors and workers regarding chance finds and cultural heritage protection. • Regulatory Liaison: Coordinating with Museum Directorates and Regional Conservation Boards, assisting with official reporting and obtaining necessary permits. • Advisory Role: Providing recommendations for mitigation measures, conservation approaches, and alignment with lender standards. • Documentation & Reporting: Preparing chance find reports, registers, and cultural heritage monitoring reports for submission to the Project Owner, authorities, and lenders. • Through these services, the archaeological consultancy acts as an independent expert body, complementing the statutory authorities and supporting the Project Owner in managing cultural heritage issues effectively. • Within the scope of the project, the continuous updating of the status of permits and consultations for the areas listed in the CHMP is the responsibility of the Project Archaeologist and the archaeology consultant.

Together with this, a summary table of roles and responsibilities is provided below for better clarity.

Table 2 Summary Table for Mitigation Measures – Responsibilities & Stages

Activity	Responsible Party(ies)	Stage of Implementation
Pre-clearance surveys (walkovers)	Project Archaeologist (lead), relevant Museums / Antalya Regional Board for the Protection of Cultural Heritage (ARHB) oversight	Pre-construction planning and mobilization period
Pre-construction testing (evaluation) and/or excavations	Project Archaeologist and Ministry/Museum archaeologists, with ARHB approval	Pre-construction (after excavation permit is obtained)
Pre-construction site relocations	Project Archaeologist, Community Liaison Officers (CLOs), relevant Municipality and Directorate of Cemeteries, with ARHB approval	Pre-construction, after official permits and community consents are secured
Construction Monitoring (watching brief)	Project Archaeologist (field archaeologists), Construction Contractor coordination, ARHB notification	Construction phase (during earthworks, blasting and excavation activities)
Chance Find Procedure	All site-based contractors (initial notification), Project Archaeologist (documentation and museum reporting), ARHB/Museum	Throughout the construction phase (immediately upon discovery)
On-going engagement & permitting	Community Liaison Officers (CLOs), Project Archaeologist, Project	Throughout the project: from planning through completion of construction

	Management, ARHB and relevant Ministry departments	

3.1 Management of Cultural Heritage

The basic definitions regarding the management of cultural heritage are given in the following bullets:

- Ministry of Culture and Tourism is the responsible authority.
- Museum Directorate is responsible to provide experts for the sites within 24 hours after being informed and to officially define the Chance Find (see Appendix-1). ***Museum directorate is responsible excavation of chance find areas. Museum Directorate will follow the directions and decisions from Regional Board Directorate of Protection of Cultural Heritage***.
- The Chance Find Procedure is designed as an emergency response mechanism in areas of predicted low archaeological sensitivity. It is not a substitute for systematic baseline reconnaissance or pre-construction archaeological surveys, which remain mandatory in areas identified as medium or high sensitivity.
- ***Regional Board Directorate of Protection of Cultural Heritage*** is the only decision maker on any intervention, which would be made on the site after the chance find.
- Project Owner is responsible for the management of archaeological issues during the progress of construction of the Project site area and implementation of related management plan and chance find procedure.
- *Project Owner will employ archaeologists at the Project site responsible for the monitoring of ground disturbance activities. They are also responsible with the monitoring of the implementation of the Cultural Heritage Management Plan (CHMP) and chance find procedure.*
- *Project Owner will ensure that Chance Finds procedure is adequately enforced during ground disturbance activities. During the implementation of the Chance Finds procedure on site, Project Owner will directly report the issue to Museum archaeologist and relevant Regional Preservation Board.*
- *Salvage excavation (and other Chance find issues) (If necessary) are under the responsibility of Project Owner.*
- Project Owner is also responsible for giving necessary trainings to the field staff about the implementation of the chance find procedure.

- *Project Owner will record all chance finds on the Chance Finds Report Form and in the Chance Finds Register as per the Chance Find Procedure in Appendix-1.*

3.2 Management Structure and Responsibilities

Project Owner will be responsible for the management of the plan and procedure about archaeological issues of Project site. The Archaeologist of Project Owner will train the employees about cultural heritage and chance find procedure (see Section 4.1). Also, the monitoring of the construction works will be the responsibility of Project Owner Archaeologist (see Section 4.3).

The Project Manager will be in charge of the all-construction work team.

The Archaeologists will work with the equipment operators and have authority to the stop work. Each will accompany a topsoil stripping crew during ROW clearing. They will direct the operator to stop work or redirect stripping activities in case of a chance find. They will submit scheduled progress reports and special reports of chance finds to Environmental and Social Coordinators.

In addition to the Chance Find Procedure, the Antalya Regional Board Directorates will decide for the requirement of a salvage excavation if needed. The contact information of these board directorate is given in Appendix-2. The excavation permissions will be obtained by the relevant museum directorate from the General Directorate of Cultural Heritage and Museums. Following the permission, Project Owner will provide a team of qualified archaeologist to conduct the salvage excavation within the framework of their contract under the guidance of Project Archaeologist / Consultant archaeologist, who will follow the instructions of the related museum directorate). These works may cover non- destructive research methods such as remote sensing and geophysics and test pit excavations. The negotiations and meetings with the related Regional Board Directorate of Protection of Cultural Heritage on technical topics during and after the salvage excavation will be held by Project Archaeologist / Consultant archaeologist.

3.3 Site-Specific Mitigation and Management

All site-specific mitigation and management measures must be developed in close consultation with the Antalya Regional Directorate for the Protection of Cultural Heritage (ARHB) to ensure full compliance with Law No. 2863 on the Protection of Cultural and Natural Assets (1983) and other applicable Turkish legislation.

Mitigation shall follow the principles of the IFC Mitigation Hierarchy:

1. Avoidance – In all instances, avoidance of impacts must be the preferred measure. Where cultural heritage sites are classified as critical or non-replicable, avoidance through route realignment or design modification must be prioritised and applied.

2. Minimisation – Where avoidance is not feasible, impacts should be minimised through protective measures, restricted access, or adapted construction methodologies.
3. Restoration / Conservation – If impacts occur, restoration and conservation works must be conducted under the authority of the Museum Directorate and in line with Conservation Board decisions.
4. Offset / Compensation – Only as a last resort, offset measures (such as enhanced conservation or public access to alternative sites) may be considered.

All measures must be formally documented, integrated into the CHMP, and monitored throughout the Project lifecycle. Consultation outcomes with ARHB should be recorded, ensuring transparency and compliance with both Turkish law and international lender standards.

3.4 Grave Relocation Procedure

In Türkiye, cemeteries are not only places of burial but also sacred spaces where collective memory, beliefs, and identity are preserved. Cemeteries are regarded as places where families and communities maintain their ties with the past and ensure intergenerational transmission of traditions. They are therefore both tangible cultural assets and integral components of the nation's intangible cultural heritage. Practices such as remembrance, mourning, religious rituals, and community gatherings make cemeteries indispensable elements of cultural continuity.

Grave relocation activities in Türkiye are carried out under the authority of local municipalities (Cemeteries Directorate) and the Provincial Directorate of Environment, Urbanization and Climate Change, Department of Local Administrations. All activities must be conducted in accordance with Law No. 3998 on the Protection of Cemeteries (1994) and Law No. 2863 on the Protection of Cultural and Natural Assets, as well as other applicable national legislation.

In metropolitan municipalities in Türkiye, the management and administration of cemeteries are primarily the responsibility of the Metropolitan Municipality Cemeteries Directorate, which oversees cemetery planning, maintenance, and grave relocation. The District Municipality supports on-site operations and daily management, while the District Mufti's Office ensures that all religious rituals and ceremonial procedures are properly observed during grave relocation. The District Governorship coordinates the administrative approvals and ensures that all activities comply with national legislation. Together, these institutions provide a structured framework to manage grave relocation in a manner that respects both tangible and intangible cultural heritage and addresses social sensitivities.

Given the cultural and social sensitivities, grave relocation must be managed with particular care. It is essential that the process is carried out under the close supervision of the Project archaeologist and the Community Liaison Officer (CLO), ensuring continuous

communication with affected families and respect for intangible cultural values. Details of these steps are included in the Stakeholder Engagement Plan prepared for the Project (see EIA Annex 9 SEP).

3.4.1 Procedure Steps

The relocation of graves is a highly sensitive process and will be implemented in line with national legal requirements and local practices.

If graves identified during the archaeological baseline study are determined to be of historical significance, the Regional Conservation Board will first be notified.

Through the Board's process, if the graves are confirmed to have historical value, the registration procedure must be completed.

In all cemetery areas where the alignment cannot be modified or where cemeteries are encountered incidentally, and in cases where modern-era cemeteries are affected by construction, the following procedures will be followed.

Whenever work is required in any such area, the identified graves will be first reported by the SPV to General Directorate of Highways (KGM), and KGM will them notify the relevant public authorities, as detailed below.

1- Identification of Need – Determining that a grave must be relocated due to project alignment or other compelling reasons.
2- Submission of Application – Submission of a formal request by the responsible parties (e.g., SPV, General Directorate of Highways, Municipality) to the relevant Metropolitan Municipality Cemetery Directorate.
3- Stakeholder Coordination – Engagement with relevant authorities including health institutions, religious representatives (e.g., imam), and families of the deceased.
4- Notification Stage – Written notifications will be delivered to the families of the deceased whose graves will be relocated.
5- Public Announcement (Mukhtars) – Public notices will be posted for 15 days in the offices of relevant mukhtars, ensuring coverage for all affected communities.
6- Local Newspaper Announcement – A notice will also be published in a local newspaper to ensure wider public awareness.
7- Selection of New Grave Site – The Metropolitan Municipality Cemeteries Directorate, in consultation with relevant authorities and affected families, will identify and approve a suitable new grave location within an officially designated cemetery area.
8- Start of Relocation – Within one week after the posting period, relocation works will commence under municipal supervision, with participation of a medical doctor, imam, and administrative staff.
9- Completion of Relocation – Due to the sensitive nature of the matter, all relocations will be completed **as quickly as possible**. The Metropolitan Municipality will coordinate the process and provide the necessary resources.

10- Support Services – If required, heavy machinery or other technical support may be requested from the Project Owner, and such requests will be met promptly.
11- Documentation and Reporting – All steps will be officially documented, including photographic evidence, grave identification, and new burial location, and reported to the competent authorities.

All necessary requirements are fulfilled within the competent authority, and the SPV and EPC will provide support if required.

Community engagement and respect for local sensitivities are essential throughout the process. By integrating both tangible and intangible cultural heritage considerations, the Project will ensure compliance with national legislation and international lender requirements.

Further details regarding the implementation are outlined in the Grave Relocation Procedure attached as an Annex.

4. CONSOLIDATED COMMITMENTS, IMPLEMENTATION PROGRAMME AND BUDGET

4.1 Consolidation of Commitments

The Antalya–Alanya Motorway Project has committed to meeting performance standards in compliance with both the legislation of the Republic of Türkiye and international requirements. In this context, an independent archaeological firm conducted the initial baseline studies. These surveys identified the overall condition of high-risk areas along the route, as well as the status of potential archaeological sites that had not yet been discovered. Impact assessment forms were also prepared, and the necessary procedures were initiated prior to the commencement of construction, in accordance with the applicable legislation.

Building on the ESIA studies, site investigations, training, and consultations with relevant institutions are to be continued without interruption. The Antalya Regional Directorate for the Protection of Cultural Heritage is the highest competent authority on archaeological matters; therefore, consultations should be maintained with this institution.

For known archaeological locations, excavation permits must be obtained, and coordination with the Antalya Museum Directorate and the Side Museum Directorate should continue throughout the construction phase.

In summary, the Project reports are expected to ensure the fulfillment of the commitments set out in Table 3.

Table 3 Cultural Heritage Commitments Table

No	Commitment	Project Phase	Responsible Party	Implementation Method	Monitoring / Reporting
1	Conducting archaeological baseline field surveys and notifying the Regional Conservation Board and Museum Directorate of the findings	Pre-Construction	Project Owner	Preparation of relevant documents	Follow-up by consultant and/or Project archaeologist, permit register tracking
2	Preparation of CHMP and Chance Find Procedure before construction begins	Pre-Construction	Project Owner	Preparation of relevant documents	Submission to contractors, implementation monitoring
3	Training of construction units and teams on actions to be taken in case of chance finds	Pre-Construction	Project Owner	Preparation of training materials and delivery of programme	Training records
4	In case of archaeological finds during construction, all works to be stopped and the Museum archaeologist informed	Construction	Contractor & Project Archaeologist	Staff training, site demarcation and marking	Incident reports, photographic and coordinate records
5	Establishment of protection buffer zones around designated archaeological sites	Construction	Contractor	Restriction of machinery access, installation of signage	Pre-construction survey reports or Site Monitoring Reports

6	Annual repetition of cultural heritage awareness trainings for new and ongoing staff	Construction & Operation	Project Owner & Project Archaeologist	Implementation of training programme	Training attendance lists, periodic reporting
7	Updating of the CHMP and	Construction Phase	Project Owner, Project Archaeologist	Report update	Every 6 months (annually depending on construction progress)
8	Updating of the CF Procedure	Construction Phase	Project Owner, Project Archaeologist	Report update	Every 6 months (annually depending on construction progress)

4.2 Implementation Programme

All archaeological requirements are expected to be carried out in accordance with the commitments outlined in the table below

Table 4 Commitment / Action Table

No	Commitment / Action	Pre-Construction	Construction	Operation
1	Conducting archaeological baseline field surveys and reporting all identified findings to the Regional Conservation Board and the relevant Museum Directorate	●	-	-
2	Preparation of the Cultural Heritage Management Plan (CHMP) and the Chance Find Procedure prior to commencement of construction works	●	-	-
3	Delivery of induction and toolbox trainings to construction teams on the Chance Find Procedure, outlining the required actions in case of chance finds	●	(refresh as needed)	-
4	Immediate cessation of works and notification of the Museum archaeologist in case of archaeological finds during construction activities	-	● (ongoing)	-
5	Establishment and enforcement of protection buffer zones around designated archaeological sites to prevent disturbance	-	●	-
6	Annual repetition of cultural heritage awareness trainings for new hires and existing project staff	-	-	● (annual)

4.3 Budget & Contingency

As is widely recognized, management plans are considered living documents. The CHMP, while initially prepared to address the needs of the Project at the time, requires revision and updating to reflect current requirements. In addition to existing commitments, it is anticipated that archaeological excavations may be required. The budgetary provisions for such works have been based on the official 2025 Unit Price List published annually by the Ministry of Culture and Tourism.

For the purpose of this CHMP, estimated volumes (m³) of soil to be excavated within a typical archaeological investigation area have been calculated. Corresponding costs have been derived using the Ministry's unit prices, as provided in the latest annex. These unit prices are officially updated each year and serve as a reliable basis for preliminary cost estimation.

The consolidated budget table (Table 3) therefore reflects the indicative costs for archaeological works, complemented by a contingency allocation (10–15%) to accommodate unforeseen requirements such as extended excavations or additional conservation measures.

As an illustrative example, if an archaeological site were to require excavation of approximately 300 m³ and 500 m³ of soil, the corresponding calculations have been presented in the table below.

This table can be applied according to the number of areas to be excavated.

Table 5 Ministry of Culture and Tourism – Indicative Unit Price Calculation Table**

Code	**Description**	**Estimated Volume (m³)**	***Unit Price (TRY/m³)**	
V.0512/01	Careful excavation in soft soil, for scientific purposes, conducted under the supervision of the Museum Directorate and in line with the decision of the Regional Conservation Board	300	3.950 TL	1.185.00 TL
V.0512/02	Careful excavation in hard soil, for scientific purposes, conducted under the supervision of the Museum Directorate and in line with the decision of the Regional Conservation Board.	500	5.135 TL	2.567,5000 TL
Contingency		%15		562,875 TL
Total				4,315,375,00 TL

*Source:
https://kvmgm.ktb.gov.tr/Eklenti/130752,kulturveturizmbakanligi2025yilifiyatlistesi10022025sonpdf.pdf?0

**Note: The cost estimates presented in Table 5 have been calculated based on the 2025 Unit Price List published by the Ministry of Culture and Tourism. Estimated excavation volumes are expressed in cubic meters (m³), while unit prices correspond to the official schedule of rates provided by the Ministry. The table also includes a 15% contingency to account for unforeseen archaeological requirements.

Following the issuance of the necessary permits, tenders have been organized by the EPC for the areas where excavations have commenced. The companies participating in the tender have submitted their proposals for the works and activities listed in the table below. These proposals are being evaluated by the EPC tender committee.

The scope of works and activities is defined in line with the decisions of the Conservation Board regarding excavation planning and the expected tasks to be carried out. The bids are collected specifically for the works requested by the ARHB.

The tenders are conducted transparently by collecting proposals from interested companies. In this context, firms with prior experience in such works are contacted in advance, provided with the **Technical Specifications**, given a site orientation, and asked to submit their proposals. The incoming bids and the portfolios of the firms are then reviewed, and the company achieving the highest score is selected to carry out the work.

Since works have commenced at the HRM 32 structural remains, an estimated cost has been prepared in the table below. This example has been specifically selected because no similar structural remains are known to exist along the route.

Table 6 Approximate Cost Calculation Table for HRM 32

Work to be Performed	Description	Estimated Price	Estimated Time
Vegetation clearance in the archaeological area	The ARHB requires that vegetation be cleared before any work begins.		
Georadar and geodetic survey and documentation	In almost all areas, the ARHB requires georadar and geodetic surveys so that possible remains on the surface can be documented and potential subsurface remains can be identified.		
Opening of trial trenches	To better understand the size and extent of the archaeological site, the ARHB requires that trial trenches be opened under the supervision of the Museum Directorate.		
Execution of salvage excavation	After completion of the georadar documentation and trial trench works, the ARHB makes a general assessment and decides on the implementation of a salvage excavation.		
Dismantling, relocation and reconstruction of the structure	After completion of the salvage excavation, the following must be carried out and approved by the ARHB:	Totals with 15% added + 15% = 750.000 USD	8 Months
	• Creation of 3-D point-cloud data and preparation of drawings and measured surveys (röleve).		
	• Preparation of a report on the methods of relocation (e.g., cutting, block-by-block, cage lifting, etc.).		
	• Mortar analyses.		
	• Proposals for structural consolidation.		
	• Preparation of a geotechnical (soil investigation) report for the relocation site.		
	• Soil improvement and levelling at the relocation site.		
	• Description of the methods for reassembly and completion.		
	• Design of the surrounding landscaping.		

Work to be Performed	Description	Estimated Price	Estimated Time

Note: It has been calculated using an exchange rate of 1 USD = 41.35 TL

Note: These costs are provided as estimates/approximations.

Based on the work completed to date and the bids received, the current situation stands at around USD 750,000.

Simpler methods are applied for cemetery excavations, since under the relevant legislation all cemeteries fall under the authority of the Cemetery Directorate. This unit manages the entire process once they have been notified.

In this context, the only requirements expected from the contractor are to mark the grave locations, carry out vegetation clearance, and, if necessary, conduct trial trenching.

However, as no cemetery excavation has yet commenced, this part will be developed once the bids have been collected.

Moreover, since the CHMP is a living document and will be updated every six months, the expenditure items related to the tenders and their associated costs will be regularly reported to the lender through the document.

In addition, any potential chance find situations that may arise during this process will also be recorded in these excavation cost tables.

4.4 Consultancy Service Procurement

Under the third-party archaeology service described in Section 3, Table 1, an average monthly payment of approximately 5.000 USD is being made.

The service is expected to continue for roughly two years, with a decision on whether to extend the process to be taken based on the overall progress. Approximately one year of this service period has already been completed. The total cost over two years can therefore be estimated at roughly USD 5,000 × 24, i.e. about USD 120,000. These figures are approximate and may vary.

Within the scope of the archaeological fieldworks, archaeological monitoring will be carried out by the Project Archaeologist, while activities related to intangible heritage will be undertaken jointly by the Project Archaeologist and the Community Liaison Officer (CLO).

4.5 Site-Specific Monitoring Commitments

Site-specific monitoring must be undertaken to assess and manage potential impacts on cultural heritage sites, particularly in relation to vibration effects from construction activities (e.g., blasting, piling, heavy vehicle movement). The following commitments apply:

- **Baseline Monitoring** – Prior to construction, baseline measurements of vibration levels **must** be conducted in the vicinity of known archaeological sites to establish reference conditions.
- **During Construction** – Continuous or periodic monitoring of vibration levels shall be carried out when works are undertaken near sensitive archaeological areas.
- **Threshold Values** – Monitoring must be based on national regulations and international best practice thresholds for vibration impact on built heritage.
- **Blasting Activities** – Where blasting near archaeological sites is unavoidable, it is recommended that the charge size be reduced. By conducting blasts with lower explosive quantities, the transmission of vibration impacts to archaeological sites shall be minimised.
- **Reporting** – Monitoring results must be recorded, evaluated, and included in periodic cultural heritage monitoring reports submitted to the Project Owner and relevant authorities.
- **Corrective Actions** – If thresholds are exceeded, construction methods **must** be adapted (e.g., further reduction of blast charge, increased distance, or use of alternative equipment) to prevent damage to archaeological assets.

During land preparation and construction, blasting activities are expected to generate ground vibration, air shock, and flyrock. These effects may pose direct risks to cultural heritage assets, such as structural stress, displacement of masonry, or dislodgement of fragile materials.

The assessment of these potential impacts has been based on the vibration thresholds and modelling results presented in Chapter XI.2.3 (Noise and Vibration). Sensitive heritage receptors identified within the potential impact zone include HRM 5, HRM 6, HRM 8, HRM 9, HRM 16, HRM 20, HRM 38, HRM 41, HRM 45, HRM 50, HRM 51, HRM 52, HRM 53, HRM 57, and HRM 58. At these locations, the proximity of heritage features to blasting operations increases the likelihood of cumulative vibration and air pressure effects.

Without mitigation, such effects could result in short-term, reversible physical damage or partial loss of contextual integrity. The overall significance of these unmitigated impacts is assessed as moderate to high, depending on the receptor sensitivity and proximity.

To address these risks, site-specific mitigation and monitoring measures have been developed in coordination with the Noise and Vibration assessment and are detailed in Table 7 (Blasting-Induced Impact Mitigation and Monitoring Measures).

These monitoring commitments shall be developed in consultation with the Antalya Regional Directorate for the Protection of Cultural Heritage and the Museum Directorate, to ensure full compliance with Turkish law and lender requirements.

Table 7 Site-Specific Vibration Measures for Cultural Heritage

Site	Explanation	Mitigations	Residual Impact	Assurance Measures
HRM 5	For HRM 5, salvage excavation is underway, with construction paused until the salvage excavation is finished.	*Application of protective blasting mats or coverings to prevent flyrock and reduce air shock		
HRM 6	Construction activities will only proceed once the archaeological excavation has been fully completed and the necessary approvals have been obtained from the Board, the Municipality, and the Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. Upon permit approval, minimal explosive charges will be used to prevent damage to the site.	Wait until the excavation is finished *Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	Change of location of the site; minumum impact on archaeological site	Archaeological surveys coordinated with the Museum Directorate.
HRM 8	Remains of an architectural structure, possibly from the Roman Period, likely representing a frontier garrison settlement. A dense accumulation of rubble stone and visible wall rows, which may belong to the structure, are present on the surface. Additionally, numerous roof tile fragments and a small number of sherds from daily use vessels have been observed.	No blasting will be carried out before the decision of the conservation board. After the decision, a control survey/drilling operation will be done on the area. The measures determined by the Board will be implemented based on the results of the survey. *Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	-No impact on archaeological site	-
HRM 9	This area is a natural protected zone. Therefore, throughout the entire process, we will reduce the maximum charge per delay (kg) and conduct survey and monitoring activities through an external contractor.	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be placed at 53 m, with weekly ecological surveys and compliance reporting to the Ministry of Environment.

Site	Explanation	Mitigations	Residual Impact	Assurance Measures
HRM 16	HRM 9 has not been registered by the Board (Permitting date and No.: 26.12.24/18914) and a construction permit has been granted for working on this area. But in case of Chance Find during the construction, Article 4 of Law No. 2863, the work is to be halted, and the Museum Directorate must be notified.	Visual inspections for chance find will be implemented. In accordance with Article 4 of Law No. 2863, if any archaeological remains are encountered during construction, all activities must be halted immediately and the Museum Directorate must be notified. * Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	Negligible risk unless chance finds occur.	An on-site archaeological observer will monitor works, with immediate halting and notification to the Museum Directorate in case of chance finds (Law No. 2863).
HRM 20	Lowering the maximum Charge per Delay (kg).	For HRM 16, at 60 meters, the maximum charge per delay (kg) will be reduced.		
HRM 38	Use a charge of 2.2 kg with electronic detonators will be applied.	PPV: 4.968 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting. *Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	Seismographs will be positioned at 60 m, and a pre-blast structural stability survey will be conducted.	

Site	Explanation	Mitigations	Residual Impact	Assurance Measures
HRM 41	HRM 20 is a 1st degree archaeological site. This area is not located on the project route, but is located within the Dikmen Quarry. The HRM-20 registered archaeological site is an aqueduct that supplied water to the ancient city of Side. Because the area has been designated a first-degree archaeological site, the opinion of the Antalya Board will be sought before any activity begins. Additionally, a 100-meter buffer zone will be established between the blasting area and the archaeological site to provide protection, and no activity will be carried out within this zone.	a 100-meter buffer zone will be established between the blasting location and the archaeological site to provide protection, and no activity will be carried out within this zone. The opinion of the Antalya Board will be sought before any activity begins. A charge of 6.15 kg using electronic detonators will be employed. A 100 m buffer zone from the ancient waterway must be maintained. The site is currently on standby. If the appointed specialist contractor determines that blasting is not a viable option, mechanical breaking may be used as an alternative. *Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	PPV: 4.968 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting.	Seismographs will be positioned at 100 m, and a pre-blast structural stability survey will be conducted.

Site	Explanation	Mitigations	Residual Impact	Assurance Measures
HRM 45	The archaeological site lies at the summit of the hill, whereas the designated blasting area is located along the foothill. Given the topographical separation and distance, vibrations are expected to be attenuated. Furthermore, the recent design change led to the determination of the work area by the shoring (IKSA) wall, which established a clear boundary. Within this defined area, preventive measures can be implemented using a small amount of explosives or through mechanical breaking methods to minimize any potential impact as explained in the above paragraphs.	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs. A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. Based on the external contractor the charge can be modified based on the attenuation. * Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be placed at 15 m and behind the IKSA wall, with structural surveys of the hill summit before and after blasting.
HRM 50	Lowering the maximum Charge per Delay (kg).	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be installed at 20 m to monitor vibration attenuation over distance.

Site	Explanation	Mitigations	Residual Impact	Assurance Measures
HRM 51	Lowering the maximum Charge per Delay (kg.	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs.	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible.	Seismographs will be installed at 30 m to verify compliance with PPV limits.
HRM 52	Lowering the maximum Charge per Delay (kg).	Use a charge of 3 kg with electronic detonators.	PPV: 4.975 mm/s. Low or negligible risk, but nearing threshold. Monitoring recommended during blasting.	Seismographs at 70 m to monitor vibration attenuation over distance. Pre-blast survey.
HRM 53	Lowering the maximum Charge per Delay (kg).	Use a charge of 6.15 kg with electronic detonators.	PPV: 4.993 mm/s. Low or negligible risk, but nearing threshold. Monitoring recommended during blasting. *Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	Seismographs at 100 m to monitor vibration attenuation over distance.
HRM 57	Lowering the maximum Charge per Delay (kg).	Use a charge of 6.92 kg with electronic detonators.	PPV: 4.999 mm/s. Low risk or negligible, but nearing threshold. Monitoring recommended during blasting. *Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	Seismographs will be installed at 106 m to monitor vibration attenuation over distance.

Site	Explanation	Mitigations	Residual Impact	Assurance Measures
HRM 58	Lowering the maximum Charge per Delay (kg).	A minimum charge of 2 kg for 3 m hole (as common practice) will be used at distances of 56.96 meters or more, establishing a conservative baseline for safe blasting near sensitive archaeological features. Within 56.96 meters, no blasting will occur; instead, mechanical breaking with excavators will be employed as explained in the above paragraphs .	With these measures, any impact on sensitive archaeological features is expected to be minimal or negligible. *Application of protective blasting mats or coverings to prevent flyrock and reduce air shock	Seismographs at 29 m to monitor vibration attenuation over distance.

* The implementation of these measures will ensure that ground vibration, air shock, and flyrock remain within the safe threshold limits defined in Chapter XI.2.3, and no adverse effects are expected on cultural heritage receptors. Therefore, when properly applied, these mitigation actions are expected to prevent the occurrence of significant vibration-, air shock-, or flyrock-related impacts.

5. TRAINING, REPORTING AND MONITORING

5.1 Training

The Archaeological Monitoring Archaeologist/Consultant of the Project Owner will deliver cultural heritage awareness training to all project personnel, including contractors and subcontractors. This training will form part of the mandatory Project induction programme and will specifically include the implementation of the Chance Find Procedure.

The training is designed to raise awareness among the workforce about the significance of cultural heritage, relevant legal and institutional requirements, and the practical steps to be followed in case of chance finds. It will also include visual examples of potential archaeological materials and clear guidance on reporting and communication procedures.

In addition, the Project Owner's archaeologists will receive specialized training focused on monitoring methodologies, documentation of archaeological features, and reporting requirements under the CHMP.

The detailed outline of the training modules is presented in Table 4: Cultural Heritage Awareness Training – Project-Specific Outline.

Table 8 Cultural Heritage Awareness Training – Project-Specific Outline

Module	Content	Target Audience
Introduction to Cultural Heritage	Definition of culture and cultural heritage; significance of protecting archaeological and historical assets.	All project staff, contractors
UNESCO and Turkey's UNESCO Record	Overview of UNESCO World Heritage List, Turkey's current status and obligations.	All project staff, contractors
IFC Standards	Introduction to IFC Performance Standard 8 (Cultural Heritage) and its relevance to the Project.	All project staff, contractors, supervisors
Archaeology	Basics of archaeology, types of archaeological sites and artefacts, importance of preservation.	All project staff, contractors
Principle Decision No. 658	Explanation of the Regional Conservation Board Principle Decision No. 658 and its application in construction projects.	All project staff, supervisors
Law No. 2863	Key provisions of Law No. 2863 on the Protection of Cultural and Natural Assets, particularly those relevant to construction.	All project staff, supervisors, contractors
Construction Process in the Context of Cultural Heritage	How construction activities are monitored from a cultural heritage perspective; responsibilities of site staff and archaeologists.	All project staff, contractors
Chance Find Procedure	Step-by-step explanation of what to do in case	All project staff, contractors

	of chance finds; responsibilities and reporting lines.	
Do's and Don'ts on Site	Practical guidance: do not move artefacts, stop work immediately, inform supervisor, secure the area.	All project staff
Reporting and Communication	How to report chance finds; communication chain (site supervisor → project archaeologist → Museum Directorate).	All project staff, supervisors, contractors
Health, Safety and Security	Safe handling of finds, ensuring security of chance find areas, avoiding contamination or damage.	All project staff
Specialized Training for Archaeologists	Detailed methodology for monitoring ground disturbance activities and documenting chance finds.	Project Owner archaeologists

5.2 Ongoing Statutory Engagement with the Regional Conservation Board (ARHB)

The Project Owner will maintain continuous statutory engagement with the Regional Conservation Board (ARHB) throughout the lifecycle of the Project. This engagement will be aligned with the Project schedule and will ensure that all cultural heritage management activities are conducted in compliance with national legislation and regulatory requirements.

The meetings with the ARHB will be conducted according to engagement method and frequency indicated in SEP. As outline in the SEP, the engagement with the ARHB will be led by the EPC Archaeologis with support from SPV and EPC E&S Managers, as needed. The meetings will be conducted on an ongoing basis throughout the construction phase, with a frequency of at least monthly. The engagement method will include face-to-face meetings, regular monitoring and reporting by Project Archaeologist, joint review meetings for grave relocation planning and execution, vibration-related findings and/or other heritage risks, as appropriate. Cultural heritage engagement activities will be conducted at the relevant cultural heritage sites, at the Project site, or in the ARHB offices. Official correspondence with the ARHB will be carried out as necessary.

The engagement programme includes:

- Pre-Construction Phase: Submission of baseline archaeological survey results to the ARHB for review and approval. Formal request for guidance and decisions on identified archaeological sites within the Project footprint.
- Construction Phase: Regular updates to the ARHB on ongoing monitoring activities and chance find reports. Immediate notification of the ARHB in case of significant discoveries, followed by official correspondence and site inspections as required.
- Operation Phase: It is not expected that any cultural heritage assets will be affected during the operation phase, and no additional coordination with the

Ministry of Culture and Tourism regarding cultural heritage areas will be necessary

The Project Owner will ensure that minutes of meetings, official correspondence, and ARHB decisions are systematically recorded and integrated into the Project's Environmental and Social Management System (ESMS). This structured engagement programme will guarantee timely regulatory approvals and ensure that cultural heritage management is fully aligned with the overall Project schedule.

5.3 Other Excavation Area

Information on the areas where route modification was not possible and excavation has been planned is provided in the table below.

Table 9 Table of High-Risk Archaeological Areas

Type	Status – Contractor Procurement	Planned / Ongoing Activities
HRM 1- Cemeteries	ARHB permitting process is ongoing. The finalization of the design is awaited. Excavation of approximately 10 modern and historic graves is planned under the supervision of the Museum Directorate. The graves are planned to be relocated within the boundaries of the same cemetery. The specific relocation site will be determined by the Metropolitan Municipality Cemeteries Directorate.	Excavations are scheduled to commence as of Q4, 2025.
HRM 5- Cemeteries	ARHB permitting process is ongoing. The design has been finalized. The presence of the Museum Directorate specialist is awaited, and under the supervision of the specialist, the excavation of approximately 40 graves is planned. Since the area is not registered at this stage, it cannot be confirmed whether the graves are of historical character; the outcome of the excavation is awaited. However, the Board has indicated that in either case, the graves may be relocated. The graves are planned to be relocated within the boundaries of the same cemetery. The specific relocation site will be determined by the Metropolitan Municipality Cemeteries Directorate.	Excavations are scheduled to commence as of Q4, 2025.
HRM 15- Cemeteries	ARHB permitting process is ongoing. The design has been finalized. Under the supervision of a Museum specialist, the excavation of approximately 25 graves is planned. Modern graves are also present within the cemetery. The Board has indicated that in either case, the graves may be relocated. The graves are planned to be relocated within the boundaries of the same cemetery. The specific relocation site will be determined by the Metropolitan Municipality Cemeteries Directorate	Excavations are scheduled to commence as of Q4, 2025.
HRM 32- Church Remains	ARHB permitting process is ongoing. Archaeological excavation works are ongoing. The site, located within the expropriation corridor but outside the active construction footprint, will be relocated and exhibited in a designated safe area to ensure its protection and continued visibility. The official coordination process between the Antalya Regional Board for the Protection of Cultural Heritage (ARHB), the General Directorate of Highways (KGM), and the Project Sponsor is ongoing to determine the final relocation site.	The completion of the excavations and the relocation and reconstruction of the structure are scheduled for Q2/Q3 2026.
HRM 37- Settlement	ARHB permitting process is ongoing. An application has been submitted to the Antalya Regional Board for the Protection of Cultural Heritage (ARHB) regarding this area. Following the route revision, the alignment has been shifted outside the boundaries of the 1st-degree archaeological site. However, since no design revision could be implemented within the 3rd-degree registered area, a test trench excavation was requested in accordance with the applicable legislation and will be carried out under the supervision of the Antalya Museum Directorate.	Excavations are scheduled to commence as of Q4, 2025.
HRM 42- Settlement	ARHB permitting process is ongoing. An application has been submitted to the Antalya Regional Board for the Protection of Cultural Heritage (ARHB) regarding this area. Following the route revision, the alignment has been shifted outside the boundaries of the 1st-degree archaeological site. However, since no design revision could be implemented within the 3rd-degree registered area, a test trench excavation was requested in accordance with the applicable legislation and will be carried out under the supervision of the Antalya Museum Directorate.	Excavations are scheduled to commence as of Q4, 2025.

5.4 Reporting

The Project Owner will ensure systematic documentation and reporting of all chance finds in line with the Chance Find Procedure (Appendix-1).

- **Chance Finds Report Form:** Every chance find will be recorded by the Project Owner's archaeologist on the official form (Appendix-1). The form will include details such as date, GPS coordinates, description of the find, photographs, preliminary assessment, and actions taken on site.
- **Chance Finds Register:** All completed forms will be consolidated into the Chance Finds Register (Appendix-2), which will be maintained and regularly updated by the Project Owner's archaeologist.
- **Hard Copy and Digital Records:** A signed hard copy of each report will be archived by the Project archaeologist, while digital versions will be stored within the Project's Environmental and Social Management System (ESMS) for traceability.
- **Reporting to Authorities:** Copies of the completed Chance Finds Report Form will be shared with the Museum Directorate within 24 hours of the discovery. Significant finds will also be notified to the Regional Conservation Board, accompanied by supporting documentation.
- **Internal Communication:** Summaries of chance find reports will be circulated to the Construction Contractor and relevant site supervisors to ensure awareness and implementation of necessary protective measures.
- **Periodic Reporting:** All chance find records will be compiled into quarterly cultural heritage monitoring reports, submitted to lenders and authorities as required.

5.5 Monitoring

The archaeological monitoring process will ensure that all ground disturbance activities are carried out in full compliance with national legislation and international standards. Monitoring will be undertaken by the Project Owner's archaeologists and will include the following key functions:

- **Advisory Role:** Provide advice to define areas where construction activities may continue or must be suspended due to archaeological findings.
- **Observation and Documentation:** Record archaeological features observed on, and in the vicinity of, the Project site. Maintain detailed logs, photographs, GPS coordinates, and field sketches.
- **Construction Monitoring:** Record and assess archaeological features discovered during excavation and construction works, including trenches, borrow pits, access roads, and Above Ground Facilities (AGFs).

- **Preliminary Assessment:** Provide advice in the form of a preliminary assessment to the construction superintendent on the significance and potential implications of new discoveries for Project design and schedule.
- **Verification of Protection Measures:** Ensure that buffer zones, fencing, and signage established for cultural heritage areas are respected throughout the construction process.
- **Compliance with Chance Find Procedure:** Ensure that the Chance Find Procedure (Appendix-1) is implemented immediately when archaeological materials are encountered, including cessation of works, site protection, and reporting to the Museum Directorate.
- **Liaison with Authorities:** Facilitate communication with the Museum Directorate and the Regional Conservation Board, including arranging site inspections where required.
- **Reporting:** Maintain monitoring logs and prepare monthly/quarterly monitoring reports summarising activities, observations, chance finds, and recommendations. These reports will be submitted to the Project Owner, relevant authorities, and lenders.

ll ground disturbance activities within the Project site and associated Above Ground Facilities will be monitored by the Project Owner's archaeologists. Monitoring activities will be scheduled in line with the construction programme and will continue until all relevant works are completed.

5.6 Monitoring and Updating of the CHMP

The Cultural Heritage Management Plan (CHMP) should be regarded as a **living document** and should be continuously monitored and updated throughout the construction phase of the Project. The Project Owner is expected to implement the following measures:

- **Regular Reviews:** The CHMP should be reviewed at least quarterly, or more frequently if required, to ensure that it remains aligned with site conditions and construction progress.
- **Integration of Monitoring Results:** Findings from archaeological monitoring, chance finds, and baseline surveys in newly accessible areas should be incorporated into updated versions of the CHMP.
- **Coordination with Authorities:** Decisions, instructions, and requirements issued by the Museum Directorate or the Regional Conservation Board should be reflected in CHMP revisions.
- **Stakeholder Input:** Updates should take into account inputs from the Community Liaison Officer (CLO) and Social Teams, particularly with regard to coordination with local communities and intangible cultural heritage.

- **Version Control and Documentation:** Each update of the CHMP should be documented with version numbers, dates, and records of changes to ensure transparency and traceability.
- **Submission of Updates:** Significant revisions to the CHMP should be shared with lenders and relevant authorities to maintain compliance with national legislation and international lender standards.

Through these measures, the CHMP is recommended to remain an effective and up-to-date tool for addressing archaeological and cultural heritage issues throughout the Project lifecycle.

5.7 Intangible Cultural Heritage

As highlighted in **Section 2 of the ESIA**, the **Yörük culture** is a dominant feature in the Project region. This is further evidenced by the **burials identified during the archaeological baseline survey**, which reinforce and complement the socio-cultural observations made in the area.

In addition to this general context, field observations and research have revealed the following findings:

- **Dependence on Traditions:** Local communities remain strongly attached to their traditions and cultural practices, which continue to shape social life and community identity.
- **Festivals Linked to Agricultural Cycles:** Various festivals are organized during the harvest season, often associated with agricultural production cycles. These events not only celebrate the yield but also provide important opportunities for community members to come together.
- **Social and Cultural Significance:** Beyond promoting agricultural products, these festivals serve as critical social gatherings where people strengthen bonds, socialize, and reinforce communal solidarity.
- **Preservation of Ethnic Identity:** Communities actively maintain their ethnic identities and continue to practice their cultural traditions across generations.
- **No Adverse Impacts Identified:** No intangible cultural heritage elements were identified in the immediate vicinity of the Project site that would be negatively affected by the Project.

However, it is recommended that **household surveys** be conducted in the surrounding region to further document and reveal any intangible cultural heritage elements that may not have been captured during the preliminary assessments. This approach will ensure that the Project remains sensitive to community values and traditions, while also contributing to the safeguarding of cultural heritage in line with international standards.

5.8 Intangible Cultural Heritage (ICH) Actions

Taking into consideration ESIA Chapter XIII together with the accompanying Archaeology Baseline Report, observations will be conducted particularly in districts, villages, and neighbourhoods where cemetery areas are located.

This work will proceed under the oversight and coordination of the Project Archaeologist and the Project CLOs. A review of Chapter XIII indicates that the ICH-related locations primarily comprise areas where the public congregates or performs religious rites—such as cemeteries—and that several such locations are affected by the Project, with some graves requiring relocation.

Grave relocation is a matter that may be assessed under IFC Performance Standard 5 (PS5). In this context, initial steps will include consultations with the relevant local authorities (the Municipality; the Ministry of Environment, Urbanization and Climate Change / Directorate of Local Administrations; the Directorate of Cemeteries). Official letters will be submitted to these entities; notices regarding the planned works in villages will be posted; the public posting period will be monitored; and one-to-one meetings will be held with grave owners to obtain signed consent forms.

Prior to construction, meetings will be held with village/neighbourhood headmen (muhtars) and the outcomes will be recorded. During the construction phase, potential construction-related issues will be identified through these meetings and the corresponding needs will be listed. As an initial action, during the muhtar meetings, communities will be informed to ensure that no difficulties are encountered regarding access to cemeteries; in addition to other potential complaints, it will be reiterated that complaints related to ICH can also be submitted through the established Project's Grievance Mechanism.

This issue, detailed in the Stakeholder Engagement Plan, will be monitored by the Project Archaeologist and the CLO team and will be reported regularly in monthly reports (see ESIA Annex-9 SEP).

6. ARCHAEOLOGICAL FINDINGS

The procedure given below that must be followed in case of encountering a chance find is based on national legislation and provisions in international standards. The significance of the archaeological finding may vary upon evaluation opinions of related museum experts.

6.1 Baseline Surveys in Previously Inaccessible Areas

The Project Owner commits to undertaking preliminary archaeological investigations in areas that were previously inaccessible and therefore not covered during the initial surveys. These investigations will be conducted by the Project Archaeologist prior to the commencement of construction, once such areas become accessible following vegetation clearance or other preparatory activities.

The ongoing surveys will include systematic walkover inspections, documentation and recording of cultural heritage features, and coordination with the Museum Directorate for verification. In the event of any discoveries, the Chance Find Procedure will be immediately implemented.

In addition, all vegetation clearance activities following tree cutting will be carried out under the supervision of the Project archaeologist to ensure that potential cultural heritage assets are not disturbed or overlooked.

Findings from these surveys will be reported to the relevant authorities and integrated into the Cultural Heritage Management Plan (CHMP), ensuring that the entire Project footprint is fully assessed and that cultural heritage should be appropriately managed throughout the Project lifecycle.

6.2 Intangible Cultural Heritage

Project Owner will liaise with local authorities to identify if project activities can interfere with traditional celebrations or festivities; alternative solutions will be agreed with local authorities. Furthermore, Project Owner will liaise with local authorities to identify if project activities restrict access to elements of traditional culture; alternative solutions will be agreed with local authorities

Some of the cemeteries identified along the project route have been formally registered and placed under legal protection. However, burials are still taking place in these cemetery areas today. As a result, some graves are of historical significance, while others belong to the modern period. This situation brings specific responsibilities.

The presence of modern-period burials within these registered cemeteries indicates that there are communities who regularly visit the site and pay their respects. Therefore, in addition to considering the matter from the perspective of tangible cultural heritage, it is also appropriate to include the perspective of intangible cultural heritage.

This circumstance makes it necessary to adopt additional precautionary measures to ensure that both the tangible and intangible cultural values are appropriately protected and respected. The following measures are recommended:

Recommended Precautionary Measures

- Stakeholder and Community Engagement:

- Conduct regular and documented consultations with families and local religious/community leaders to understand ongoing burial practices and ceremonial needs.

- Provide advance notice of any planned works and agree on temporary access routes for visitors.

- Access and Respect Measures:

- Ensure uninterrupted and respectful access for relatives and community members who wish to visit or perform rituals.

- Establish clearly marked buffer zones and quiet hours during community visits or religious ceremonies.

- Archaeological and Heritage Protection:

- Demarcate and fence historical burial areas and modern graves separately to avoid accidental disturbance.

- Implement vibration, dust and noise control measures during any nearby construction works.

- **Chance Find and Monitoring:**

- Apply a formal Chance Find Procedure for any unexpected discoveries of historical graves or artefacts.

- Maintain continuous archaeological monitoring during all ground-disturbing activities within or adjacent to the registered cemeteries.

By implementing these measures, the project will protect the legally registered cemeteries, respect ongoing modern burial practices and ensure that **both tangible and intangible cultural heritage values are preserved** in accordance with national regulations and international standards.

6.3 Archaeological Findings of Minor Significance

This type of archaeological findings is comprised of a finding isolated from its environment or findings in notably small sizes which may be found by chance. In this case, chance find procedure (CHMP, Appendix-1) will be followed.

The finding will be reported to the archaeologist. The construction activities will be ceased in the field where the finding is discovered and the finding will be reported to the

relevant museum expert by archaeologist. Following the completion of investigation of the notified relevant Museum Directorate, the necessary arrangements, such as the identification of the boundaries of the archaeological asset/site (finding), preservation by a protection band, notification of workers in order to prevent any physical intervention.

The preservation methods and mitigation measures to be applied are also listed in the CHIA report.

6.4 Archaeological Findings of Moderate Significance

This type of archaeological findings is small scale findings in groups or single findings with medium size architectural elements such as tombs. In this case, chance find procedure (CHMP, Appendix- 1) will be followed. In order to prevent a possible damage, necessary arrangements must be made to determine the boundaries of the archaeological remains to keep the construction equipment out of access.

The finding will be reported to the construction manager and archaeologist by the Project Owner. The construction activities will be ceased in the field where the finding is discovered and the finding will be reported to the relevant museum expert by archaeologist. Following the completion of investigation of the notified relevant Museum Directorate, the necessary arrangements will be taken, such as the identification of the boundaries of the archaeological asset/site (finding), preservation by a protection band, notification of workers in order to prevent any physical intervention.

6.5 Archaeological Findings of Major Significance

This type of findings is comprised of findings with great importance such as a settlement area, a tumulus, a mound or a big necropolis (wide graveyard areas with archaeological characteristic) and the construction activities must be immediately stopped and chance find procedure (CHMP, Appendix-1) will be followed. This type of chance find may cover the entire construction site in such a way that the entrance and exit of the construction equipment and vehicles cannot be managed without giving any damage to the archaeological remains.

The finding will be reported to the construction manager and archaeologist by the archaeologist of Project Owner. The construction activities will be ceased in the field where the finding is discovered and the finding will be reported to the relevant museum expert by archaeologist. Following the completion of investigation of the notified relevant Museum Directorate, the necessary arrangements will be taken, such as the identification of the boundaries of the archaeological asset/site (finding), preservation by a protection band, notification of workers in order to prevent any physical intervention.

6.6 Archaeologist.Pre-Construction Evaluation and Construction Phase Monitoring

It is considered appropriate for the Project Owner to conduct additional investigations in areas identified during the baseline surveys where only limited surface finds were observed but which have not been formally registered by the Regional Conservation Board. Although these areas are not officially designated, they may still contain archaeological potential. In locations identified as having such potential, and where land acquisition has been completed, the opening of test pits is recommended. The purpose of these works is to confirm the presence or absence of possible subsurface archaeological deposits prior to construction and to minimize the likelihood of chance finds during construction, thereby reducing the risk of potential delays.

Pre-construction survey activities will be carried out with the participation of the Project Archaeologist. This work can be regarded as a pro-active archaeological measure, as it ensures that potential risks are addressed in advance. **If potential archaeological sites are reported as a result of these pre-construction surveys, an archaeological watching brief will be established to oversee the follow-up works. Under this watching brief, and under the supervision of the Project Archaeologist—including during the excavation itself—trial trenches may be excavated using construction machinery.**

In this way, any potential archaeological sites will be identified prior to the construction phase, and the necessary preventive measures can be implemented in advance.

For the construction phase, the Project Owner will implement a clearly defined monitoring methodology in sensitive locations. This methodology will include:

- Continuous presence of qualified archaeologists during ground-disturbance activities in high-risk areas,
- Regular inspections and spot checks in medium-risk areas,
- Immediate suspension of works and initiation of the Chance Find Procedure in case of discoveries,
- Detailed documentation of all monitoring activities (photographs, GPS, forms, registers),
- Coordination with the Museum Directorate to arrange site inspections and obtain binding decisions where required.

Both the results of the pre-construction evaluation works and the construction-phase monitoring—including the archaeological watching brief—will be documented and integrated into the Cultural Heritage Management Plan (CHMP), ensuring that the Project is implemented in full compliance with national legislation and international lender standards.

6.7 Monitoring and Updating of the CHMP

The Cultural Heritage Management Plan (CHMP) should be regarded as a living document and is expected to be continuously monitored and updated throughout the construction phase. Regular reviews should be conducted at least quarterly, with findings from archaeological monitoring, chance finds, and surveys of newly accessible areas incorporated into updated versions.

Revisions should also reflect instructions or decisions from the Museum Directorate and the Regional Conservation Board, as well as inputs from the Community Liaison Officer (CLO) and Social Teams regarding community coordination. Each update should be recorded with version numbers, dates, and a summary of changes to ensure transparency. Significant revisions should be shared with relevant authorities and lenders to maintain compliance with national legislation and international standards.

7. REFERENCES and STANDARDS

7.1 International Financial Institutions and Standards

- IFC – International Finance Corporation
  - Performance Standard 8 (PS8): Cultural Heritage
  - Performance Standard 1 (PS1): Assessment and Management of Environmental and Social Risks and Impacts
  - Performance Standard 5 (PS5): Land Acquisition and Involuntary Resettlement
- EBRD – European Bank for Reconstruction and Development
  - Performance Requirement 8 (PR8): Cultural Heritage
  - Performance Requirement 1 (PR1): Assessment and Management of Environmental and Social Impacts
- AIIB – Asian Infrastructure Investment Bank
  - Environmental and Social Standard 1 (ESS1): Environmental and Social Assessment and Management
  - Environmental and Social Standard 2 (ESS2): Involuntary Resettlement
  - Environmental and Social Standard 3 (ESS3): Indigenous Peoples

7.2 International Conventions and Guidelines

- UNESCO World Heritage Convention (1972)
- UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003)
- ICOMOS Guidelines:
- International Charter for the Management of Archaeological Heritage (1990)
- Principles for the Preservation and Management of Archaeological Heritage
- Valetta (Malta) Convention (1992) – Protection of the Archaeological Heritage of Europe

7.3 National Framework (Türkiye)

- Law No. 2863 on the Protection of Cultural and Natural Assets
- Principle Decision No. 658 (Conservation Board)
- Ministry of Culture and Tourism Annual Unit Price Lists (for cost estimations in CHMP budgets)
- “The relocation of cemeteries will be carried out in accordance with the provisions of Law No. 3998 on the Protection of Cemeteries (adopted on 9 June 1994).”
- “Relevant activities will be undertaken in line with national legislation, including Law No. 2863 on the Protection of Cultural and Natural Assets and Law No. 3998 on the Protection of Cemeteries.”

7.4 Other References

- Council of Europe ETS No 143, “European Convention on the Protection of the

Archaeological Heritage (Revised) (The Valletta Convention)", 1992.

- General Directorate of Preservation of Cultural and Historical Heritage, "Law on Protection of Cultural and Natural Assets (1) Law No. 2863", 1983.
- ICOMOS (International Council of Monuments and Sites) "Guidance on Impact Assessment for Cultural World Heritage", January 2011.
- IFA (Institute of Field Archaeologists) Standard and Guidance for the Collection, "Documentation, Conservation and Research of Archaeological Materials", 2001.
- IFA (Institute of Field Archaeologists) 1994, "Standard and Guidance for an Archaeological Desk Based Assessment" (revised 1999)
- IFA (Institute of Field Archaeologists) 1994, "Standard and Guidance for an Archaeological Watching Brief" (revised 1999)
- IFA (Institute of Field Archaeologists) 1994, "Standard and Guidance for an Archaeological Field Evaluation" (revised 1999)
- Municipality Law (No. 5393) – Responsibilities of municipalities regarding cemeteries
- Directorate of Local Administrations, Ministry of Environment, Urbanization and Climate Change (Yerel Yönetimler Şube Müdürlüğü)
- Official practices communicated by the Provincial Directorate of Environment and local municipalities
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APPENDIX-1: Chance Find Procedure

APPENDIX 2: CONTACT INFORMATION OF RELATED MUSEUM DIRECTORATES AND REGIONAL BOARD DIRECTORATES

Table 10 Museum Contact Information

Name	Phone	Adress
Antalya Archaeology Museum	Tel: 0242 238 56 88/89	Bahçelievler Mahallesi, Konyaaltı Caddesi, No 88, 07050 ANTALYA E-posta: antalyamuzesi@kultur.gov.tr
Side Archaeology Museum	Tel: (0242) 280 23 00	Side, Liman Cd., 07330 Manavgat/Antalya

Table 11 Contact Information of Regional Board Directorates

Name	Phone	Adress
Antalya Cultural Assets Regional Board Directorate	0242) 243 21 60 (0242) 247 87 61 (0242) 244 55 74	Kılıçaslan Mahç Zafer Sk. No: 6 07100 KALEİÇİ / ANTALYA

APPENDIX 3: BOARD DECISIONS

Folder of the Antalya Regional Board for the Protection of Cultural Heritage decisions, received up to 20 September 2025.

Table 12 General Archaeology Status Table

Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 1	South of Kocayatak Antalya/Serik/Yukarıkocayatak	Cemetery	Late Ottoman	Within	Yes-partially	**1st Degree**	**1st Degree**	13.06.2025/20016	Late Ottoman-Modern Cemetery Area: The site contains hundreds of graves dating back to the Late Ottoman (18th-19th century) and modern periods Some of the graves have suffered damage due to illegal excavations.	**ARHB permitting process is <u>ongoing</u>.** A partial corridor narrowing has been implemented; however, due to the condition of the existing highway and settlement activities in the area, it was decided to carry out a salvage excavation and relocate the graves within the same cemetery. In order to carry out works in these areas, a Technical Justification Report has been submitted to the ARHB. The consultant academics within the ARHB, in line with the relevant legislation and taking into account the opinion of the Museum Directorate, have completed their evaluation and the permits for excavation have been obtained. The finalization of the design is awaited.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. * Document all graves prior to relocation, including photography, GPS mapping, and headstone inventory. • Provide heritage awareness training to all construction personnel before works commence. • Provide safe and uninterrupted access routes for relatives and community members. • Monitoring will be carried out by the Project Archaeologist continuously. • No activities will be carried out until the salvage excavation has been completed.	• Maintain fencing and signage to prevent unauthorized access. • Conduct periodic monitoring in coordination with ARHB and the Museum Directorate. * Continue vibration monitoring if traffic load is high. • Prohibit maintenance activities or expansion within the buffer zone. • Implement community engagement to raise awareness and respect for the site. • Provide safe and uninterrupted access routes for relatives and community members.

Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 2	South of Kocayatak Antalya/Serik/Yukarıkocayatak	Rural Settlement	Late Byzantium	138 m	No - does not overlap	**Non-registered**	**Not Registered**	13.03.2025/19388	Single Phase Rural Settlement: Surface findings include sherds from late-period daily-use vessels. This settlement falls within the project corridor.	**ARHB permitting process is complete.** The identified area has been reported to the Museum Directorate, and the procedures at the ARHB have been completed. It was evaluated by the Board and was not registered.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist.	-

Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 3	Serik K3 Interchange Access Road Km 8+800 Antalya/Serik/Burmahancı	Rural Settlement	Late Roman - Early Byzantium	26 m	Yes-partially	**1st Degree**	**1st Degree**	13.03.2025/19390 16.05.2025/19760	Single-Phase Settlement: Sherds of daily-use vessels from the Late Roman-Early Byzantine period have been identified on the surface. No architectural remains are visible. The site is situated between fields and the canal.	**ARHB permitting process is <u>complete</u>.** The identified area has been reported to the Museum Directorate, and the procedures at the ARHB have been completed. **There are no constraints for proceeding with the construction works.** There is a high probability of chance finds in these areas.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • If necessary, it is recommended to carry out a preliminary investigation along the project alignment, including survey and trial trenching. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Monitoring will be carried out by the Project Archaeologist continuously. • Quarterly monitoring (four times per year) is recommended.	

Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 4	Serik K3 Interchange Access Road Km 8+800 Antalya/Serik/Belpınar	Settlement	Late Byzantium	177 m	No - does not overlap	**Non-registered**	**Not Registered**	13.03.2025/19390 16.05.2025/19760	Late Period Settlement: Likely dating back to the 14th-15th centuries, this settlement is characterized by a distinct elevation. The site is situated between a stream bed and a road. The surface is scattered with dense tile fragments and sherds of daily-use vessels.	**ARHB permitting process is <u>complete</u>.** The identified area has been reported to the Museum Directorate, and the procedures at the ARHB have been completed. It was evaluated by the Board and was not registered. **All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works**.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist.	

Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 5	Serik K1 Interchange Km 52+500 Antalya/Serik/Deniztepesi	Cemetery	Late Ottoman	Within	Yes-partially	**Non-reigstered**	**Not Registered**	16.01.2025/18992 24.03.2025/19489 16.05.2025/19761	It is a cemetery spread over a vast area, located within the borders of Antalya, Serik, Deniztepesi neighborhood, on parcel 139-5/135-9. The land registry record, when queried from the system, identifies the area as a cemetery. It is likely an Early Republic to modern-era cemetery.	**ARHB permitting process is <u>ongoing</u>.** In order to carry out works in these areas, a Technical Justification Report has been submitted to the ARHB. The consultant academics within the ARHB, in line with the relevant legislation and taking into account the opinion of the Museum Directorate, have completed their evaluation and the permits for excavation have been obtained. The necessary permits have been obtained from the ARHB, and the **salvage excavations will commence.**	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No activities will be carried out until the salvage excavation has been completed. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Provide safe and uninterrupted access routes for relatives and community members.	

Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 6	Serik K1 Interchange Km 52+500 Antalya/Serik/Deniztepesi	Building Remains	Roman	Within	Yes-partially	**1st Degree**	**1st Degree**		Remains of an architectural structure, possibly from the Roman Period, likely representing a frontier garrison settlement. A dense accumulation of rubble stone and visible wall rows, which may belong to the structure, are present on the surface. Additionally, numerous roof tile fragments and a small number of sherds from daily use vessels have been observed.	**ARHB permitting process is <u>ongoing</u>.** Design change was completed before the trial pits study.In order to carry out works in these areas, a Technical Justification Report has been submitted to the ARHB. Trial pits will start.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No blasting will be carried out before the decision of the conservation board. After the decision a drilling operation will be done on the area. The measures determined by the Board will be implemented based on the results. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.	

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HRM 7	Serik K1 Interchange Km 52+500 Antalya/Serik/Sarıabalı	Tumulus	Roman	70 m	Yes-partially	**1st Degree**	**1st and 3rd Degree**	26.06.2025/20087	Tumulus: A row of stones, possibly belonging to the wall of the tomb, is visible on the surface. In the vicinity of the artificial hill, there are densely packed roof tile fragments and a sparse number of ceramic pieces from daily use vessels.	**ARHB permitting process is complete.** **All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works.**	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Monitoring will be carried out by the Project Archaeologist continuously.	

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HRM 8	Viaduct-4 Km 56+000	Manavgat Natural Site Border	Archeological or Natural Site Border	Within	Yes - fully	Natural Preservation Area	**1st Degree Natural Area**	Natural Site Border	Manavgat Natural Preservation Area	**Permitting process is <u>complete</u>.** All necessary permits have been obtained and there are no constraints for proceeding with the construction works.	Medium	Non-replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist. • Apply vibration and dust-control measures. • Weekly ecological surveys and compliance reporting to the Ministry of Environment will be maintained throughout construction.	

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HRM 9	Km 59+000 Antalya / Manavgat/ Taşağıl	Late Roman Settlement	Late Roman	Within	Yes - fully	**Non-registered**	**Not Registered**	26.12.24/18914	Late Roman Settlement: Due to its location, the settlement is believed to have been constructed for surveillance purposes. It is situated on a hill overlooking the valley and features a dense layer of rubble stone that may belong to architectural structures. Additionally, roof tile fragments and ceramic fragments from daily use vessels are visible on the surface.	**ARHB permitting process is <u>complete</u>.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works It was evaluated by the Board and was not registered. Board permit has been obtained.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • Conduct continuous monitoring during and after blasting by the Project Archaeologist. • Weekly ecological surveys and compliance reporting to the Ministry of Environment.	

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HRM 10	Km 62+000 Antalya / Manavgat Taşağıl	Settlement	-	Within (Tunnel)	Yes - fully	**1st Degree**	**1st Degree**	26.12.24/18916	1st Degree Registered Archaeological Site	**ARHB permitting process is complete.** **All necessary permits have been obtained from the Regional Conservation Board, and there are no constraints for proceeding with the construction works**	High	Non-replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Monitoring will be carried out by the Project Archaeologist continuously. • Quarterly monitoring (four times per year) by the Project Archaeologist is recommended	

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HRM 11	Km 62+750 Antalya / Manavgat Taşağıl	Archaeological Settlement	Roman	Within	Yes-partially	**Non-registered**	**Not Registered**	26.12.24/18913	Late Roman Settlement: Features a dense layer of rubble stone that may belong to architectural structures. Additionally, roof tile fragments and ceramic fragments from daily use vessels and terra sigilatta are visible on the surface.	**ARHB permitting process is complete.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works It was evaluated by the Board and was not registered.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Document all visible features and artifacts through GPS mapping and photography before construction. • Establish a fenced buffer zone where feasible around visible remains. • Implement vibration and dust control measures (e.g., wetting surfaces, limiting heavy machinery use). • Provide heritage awareness training to all construction personnel.	

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HRM 12	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	Necropolis	Roman	174 m	No - does not overlap	**1st Degree**	**1st Degree**	27.06.2025/20118	Roman Period Necropolis: In addition to high-quality ceramic and tile fragments dating back to the 4th-6th centuries AD, many slabs and covering stones that may belong to graves are present on the surface and in the section. It is anticipated that there is a nearby settlement area associated with this necropolis.	**ARHB permitting process is <u>complete</u>.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Avoid any ground disturbance within the 1st Degree boundary; clearly demarcate and fenced buffer zone. • Conduct vibration baseline measurements and continuous monitoring during construction to ensure thresholds are not exceeded. • Apply dust-control measures (watering, surface cover) and limit heavy-equipment operation near the buffer. • Provide heritage-awareness training to construction personnel. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Monitoring will be carried out by the Project Archaeologist continuously.	

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HRM 13	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	Settlement	Roman	800 m	No - does not overlap	**Non-registered**	**Not Registered**	13.03.2025/19375 12.06.2025/19878	Roman Period Settlement: No traces of architecture are visible on the surface. Thin-walled, high-quality ceramic fragments dating back to the 4th-6th centuries AD have been found. The site is situated on a hillside in a sheltered location overlooking the surrounding area.	**ARHB permitting process is <u>complete</u>.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works It was evaluated by the Board and was not registered. Route change was completed before the permit process	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.	

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HRM 14	Taşağıl Interchange Km 67+000 Antalya / Manavgat Hocalar	Cemetery	Early Republic	916 m	No - does not overlap	**1st Degree**	**1st Degree**	27.06.2025/20117	Hocalar Köyü Cemetery: Early Republican and modern cemetery.	**ARHB permitting process is complete.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works Route change was completed before the permit process.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist. • Provide safe and uninterrupted access routes for relatives and community members.	

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HRM 15	Taşağıl Interchange Access Road Antalya /Manavgat Taşağıl	Cemetery	Early Republic	Within	Yes-partially	**1st Degree**	**1st Degree**	30.01.2025/19088	Cemetery: Early Republican and modern cemetery. Use of spolia in some graves.	**ARHB permitting process is <u>ongoing</u>.** The necessary permits have been obtained from the ARHB), and the **salvage excavations will commence.**	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No activities will be carried out until the salvage excavation has been completed. • Provide safe and uninterrupted access routes for relatives and community members.	• Maintain fencing and signage to prevent unauthorized access. • Conduct periodic monitoring in coordination with ARHB and the Museum Directorate. * Continue vibration monitoring if traffic load is high. • Prohibit maintenance activities or expansion within the buffer zone. • Implement community engagement to raise awareness and respect for the site. • Provide safe and uninterrupted access routes for relatives and community members.

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HRM 16	Km 70+400 Antalya /Manavgat Gündoğdu	Tumulus and Necropolis	Roman	Within (Tunnel)	Yes-partially	**1st Degree**	**1st Degree**	16.01.2025/18980	Tumulus-Necropolis: In addition to high-quality ceramic and glass fragments from the 4th-5th centuries AD, a large number of tile fragments are also visible on the surface.	**ARHB permitting process is <u>complete</u>.** All necessary permits have been obtained from the Regional Conservation Board, and there are no constraints for proceeding with the construction works	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Document all visible surface materials (GPS, photographs) before construction. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.	

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HRM 17	Km 70+500 Antalya /Manavgat Yavrudoğan	Settlement	Roman	125 m	No - does not overlap	**Non-registered**	**Not Registered**	13.03.2025/19378 12.06.2025/19877	Tumulus-Necropolis Area: Various ceramic fragments from different shapes are visible on the surface, including bases of amphorae, handle pieces from very large amphorae, and fragments of daily use vessels.	**ARHB permitting process is <u>complete</u>.** All necessary permits have been obtained from the ARHB, and there are no constraints for proceeding with the construction works It was evaluated by the Board and was not registered.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Confirm the precise location and ensure the 125 m distance is maintained throughout construction. • Apply dust suppression (water spraying, speed control) during excavation and haulage. • Conduct periodic inspections by the Project Archaeologist during nearby excavation works.	

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HRM 18	Manavgat K1 İnterchange Km 83+500 Antalya /Manavgat Yukarıışıklar	Mound	Roman	313 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered Archaeological Site: Dense ceramic and tile fragments from the Roman Period are visible on the surface. Illegal excavation pits containing numerous rubble stones have been identified in the area.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.	

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HRM 19	Manavgat K3 İnterchange Km 88+000	Manavgat Waterfall Protected Area	-	2900 m	No - does not overlap	Natural Preservation Area	**1st Degree Natural Area**		Registered Natural Site: Manavgat Waterfall Preservation Area. Although it is not in direct contact with the Project area, it falls within the 400 m corridor. Due to its status as a natural asset, the Antalya Environment and Urbanization Provincial Directorate and the Antalya Board of Preservation must be informed before any work is conducted.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Medium	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.	

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HRM 20	Manavgat K2 Interchange Km 84+000 Antalya /Manavgat Sarılar	Aqueduct	Roman	1780 m	No - does not overlap	**1st Degree**	**1st Degree**	30.01.2025/19092	Registered Archaeological Site: This is the aqueduct supplying water to the ancient city of Side. Since the Project involves a first-degree archaeological site, the opinion of the Antalya Board of Preservation must be obtained before proceeding with any work.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site.	

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HRM 21	Manavgat Interchange Access Road Km 83+000 Antalya /Manavgat Yukarıışıklar	Settlement	Roman	1433 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered Archaeological Site: This is the aqueduct supplying water to the ancient city of Side. Since the Project involves a first-degree archaeological site, the opinion of the Antalya Board of Preservation must be obtained before proceeding with any work.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 22	Manavgat K3 Interchange Km 86+000	Aqueduct	Roman	2200 m	No - does not overlap	**Non-registered**	**Not Registered**	30.01.19089	Aqueduc Feet: For reference see kültürvarlıkları.gov.tr. However, no archaeological evidence was encountered during the examination.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.	

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HRM 23	Manavgat K4 Interchange Km 82+000 Antalya /Manavgat Hatipler	Cemetery	Late Ottoman	3900 m	No - does not overlap	**1st Degree**	**1st Degree**		Hatipler Village Cemetery Area: This site encompasses a cemetery from the Late Ottoman to the Early Republican period, as well as modern graves. Reused columns and column capitals are incorporated into the graves, and spiralled, monolithic columns are also present. Additionally, there are quilted gravestones dating from the Late Ottoman period.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Provide safe and uninterrupted access routes for relatives and community members. • No excavation, stockpiling, or machinery movement permitted within the confirmed cemetery boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 24	Manavgat K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	Mound	Roman	4500 m	No - does not overlap	**3rd Degree**	**3rd Degree**		Mound: The site is situated at a high elevation relative to the surrounding settlement. Ceramic fragments from the Late Roman to Early Byzantine period have been observed in great numbers. However, due to the area being a cultivated field, a detailed examination could not be conducted.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Medium	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.	

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HRM 25	Manavgat K4-K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	Tumulus	Roman	3100 m	No - does not overlap	**Non-registered**	**Not Registered**	13.03.2025/19376 16.05.2025/19768	Tumulus: A small number of ceramic fragments dating back to the Late Roman to Early Byzantine period are visible on the surface.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting by the Project Archaeologist.	

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HRM 26	Manavgat K4-K5 Interchange Km 81+000 Antalya /Manavgat Hatipler	Hilltop Settlement	Roman	3300 m	No - does not overlap	**1st Degree**	**1 st Degree**	13.03.2025/19377 16.05.2025/19769	Mound: A large number of ceramic fragments dating to the Late Roman period are visible on the surface. No traces of architecture have been observed.	**Process is <u>complete.</u>** As a result of the route change, the area has been excluded from the project's impact corridor	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • A route change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 27	Km 84+400 Antalya /Manavgat Yukarıışıklar	Settlement	Roman	84 m	No - does not overlap	**3rd Degree**	**3rd Degree**	28.07.2025/20294	Mound: A large number of ceramic and tile fragments dating back to the Roman period are visible on the surface and in the section. No traces of architecture have been observed.	**Process is <u>complete.</u>** The area is outside of the project's expropration corridor.	Medium	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 28	Km 85+900 Antalya/Manavgat Bucakşeyhler	Tumulus	Roman	Within	Yes - fully	**Non-registered**	**Not Registered**	16.01.2025/18981	Tumulus: The surface contains a small number of ceramic pieces dating back to the Roman period. The dense presence of stream stones at the top of the hill suggests that the hill was intentionally created.	**ARHB permitting process is complete.** It was evaluated by the Board and was not registered. And trial pits was completed and no archaeological material. Construction activities can be implemented	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 29	Km 86+500 Antalya/Manavgat Bucakşeyhler	Aqueduct	Roman	74 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered Archaeological Site: This is the aqueduct supplying water to the ancient city of Side. Although it is not in direct contact with the Project area, it falls within the 400 m corridor.	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 30	Km 86+500 Antalya/Manavgat Bucakşeyhler	Fountain	Ottoman	128 m	No - does not overlap	**1st Degree**	**1st Degree**	24.03.2025/19480	Fountain: An Ottoman-period fountain structure. The stones used in the construction were sourced from the nearby aqueduct.	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	Hig	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 31	Km 87+00 Antalya/Manavgat Bucakşeyhler	Necropolis	Roman	7 m	Yes-partially	**Non-registered**	**Not Registered**	16.01.2025/18981	Necropolis: A necropolis area. Skeletal remains and numerous covering tile fragments were found in the sections.	**ARHB permitting process is ongoing.** Design change was completed The area is outside of the project's expropration corridor.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 32	Km 87+100 Antalya /Manavgat/Bucakşeyhler	Church Remains	Roman	Within	Yes-partially	**1st Degree**	**1st Degree**	16.01.2025/18982 12.06.2025/19879	Registered Archaeological Site: The architectural walls from the Roman period are still standing, and a large number of ceramics and tile fragments from the same period can be observed in the surrounding area.	**ARHB permitting process is <u>ongoing.</u>** The necessary permits have been obtained from the Antalya Regional Board for the Protection of Cultural Heritage (RHB), and the salvage excavation is ongoing.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No activities will be carried out until the salvage excavation has been completed. • Once all archaeological works have been finalized and construction permits have been granted, all construction activities must be carried out under the supervision of both the Museum archaeologist and the Project archaeologist. • The structure and other remains uncovered during the excavation will be relocated to a site close to their current location and in an area that will not be affected by the Project. At the new relocation site, monitoring of the structure is recommended. The structure will be completed and restored; however, to guard against any potential damage caused by construction activities, monthly monitoring is recommended, to be carried out by the Project Archaeologist through surface inspections and reporting.	

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HRM 33	Km 87+700 Antalya/Manavgat Bucakşeyhler	Settlement	Roman	260 m	No - does not overlap	**1st Degree**	**1st Degree**		Mound: The surface features a dense concentration of high-quality ceramic pieces dating back to the Roman period. However, no architectural remains have been observed.	**Pocess is complete.** The area is outside of the project's expropration corridor.	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 34	Km 87+500 Antalya/Manavgat Bucakşeyhler	Cemetery	Ottoman	160 m	No - does not overlap	**Non-registered**	**Status of Protected Area****		Cemetery Area: Despite the intensive use of the cemetery, no uniform orientation of the graves was observed. It is believed that the cemetery was in use during both the Byzantine and Ottoman periods.	**Process is <u>complete</u>.** It was evaluated by the Board and was not registered. The area is outside of the project's expropration corridor.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document all graves prior to relocation, including photography, GPS mapping, and headstone inventory. • Provide safe and uninterrupted access routes for relatives and community members. • No excavation, stockpiling, or machinery movement permitted within the confirmed cemetery boundary.	

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HRM 35	Km 88+200 Antalya/Manavgat Bucakşeyhler	Building Remains	Ottoman	1 m	Yes-partially	**1st Degree**	**1st Degree**		Building: The main walls are visible on the surface. However, due to the location, the area surrounding the structure could not be thoroughly examined. It is located along the camp road alignment.	**ARHB permitting process is complete.** All necessary permits have been obtained from the Regional Conservation Board, and there are no constraints for proceeding with the construction works	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 36	Km 89+800 Antalya /Manavgat Ulukapı	Rural Settlement	Ottoman	65 m	No - does not overlap	**Non-registered**	**Not Registered**	24.03.2025/19481	Area with Pottery: Sparse pottery and tile fragments are visible on the surface. However, no architectural remains have been identified.	**Process is <u>complete</u>.** It was evaluated by the Board and was not registered. The area is outside of the project's expropration corridor.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 37	Km 92+200 Antalya /Manavgat Aşağıışıklar	Settlement	Roman	Within	Yes-partially	**1st and 3rd Degree**	**1st and 3rd Degree**		Roman Period Settlement: A dense accumulation of rubble stones, likely belonging to architectural structures, is visible on the surface. Additionally, a large number of tiles and fragments of daily use vessels from the 4th-5th centuries AD are present throughout the area.	**ARHB permitting process is <u>ongoing</u>.** An application has been submitted to the Antalya Regional Board for the Protection of Cultural Heritage (ARHB) regarding this area, consisting of 1st Degree and 3rd Degree sites. The ARHB required that archaeological trial (sondaj) excavations be carried out and the results submitted to the Board. For the 1st degree site, following the route revision (design change), the alignment has been shifted outside the boundaries of the 1st-degree archaeological site and impact on this site has been avoided However, for the 3rd degree site, since no route revision (design change) could be implemented within the 3rd-degree registered area, archaeological trial (sondaj) excavations, including vegetation clearance, will be undertaken at this site in accordance with the applicable legislation. Following the completion archaeological trial excavation and vegetation clearance, a final decision will be obtained from ARHB.	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 38	Km 95+600 Antalya /Manavgat Aksaz	Settlement	Roman	65 m	Yes-partially	**1st Degree**	**1st Degree**	30.01.2025/19090	Roman Period Settlement: The settlement, which dominates the valley, features a wide range of material dating from the Early Roman Period to the 4th-5th centuries AD. Numerous high-quality ceramic fragments, in various forms, are found on the surface, along with tile and glass pieces.	**Process is complete.** Design change was completed	High	Non-replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Cover sensitive areas with protective geotextile or sandbag barriers during blasting. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Based on the external contractor the charge can be modified based on the attenuation. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary.	

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HRM 39	Km 102+500 Antalya /Manavgat Hacıobası	Tumulus	Roman	35 m	Yes-partially	**Non-registered**	**Not Registered**	16.01.2025/18983	Tumulus: Tile fragments dating back to the Roman Period are visible on the surface. The site is situated on the edge of a slope filling area.	**Process is complete** It was evaluated by the Board and was not registered	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 40	Manavgat Interchange East Access Road Antalya /Manavgat Hacıobası	Cemetery	Late Ottoman	32 m	Yes-partially	**1st Degree**	**1st Degree**	30.01.2025/19091	Cemetery: This is a Late Ottoman period cemetery area with a dense number of burials observed throughout the site.	**ARHB permitting process is <u>ongoing</u>.** Design Processes are ongoing Salvage excavation and relocation will be carried out for certain graves after the necessary permits have been obtained. The expropriation corridor remains within the cemetery limits; however, no graves are affected according to the latest measurements. This has been ensured through a design change implemented along both the main route and the access road, effectively avoiding any physical interaction with the burial area.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No activities will be carried out until the salvage excavation has been completed. • Provide safe and uninterrupted access routes for relatives and community members.	• Maintain fencing and signage to prevent unauthorized access. • Conduct periodic monitoring in coordination with ARHB and the Museum Directorate. * Continue vibration monitoring if traffic load is high. • Prohibit maintenance activities or expansion within the buffer zone. • Implement community engagement to raise awareness and respect for the site. • Provide safe and uninterrupted access routes for relatives and community members.

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HRM 41	Km 104+500 Antalya /Manavgat Uzunlar	Church or Build Remains	Byzantium	61 m	No - does not overlap	**1st Degree**	**1st Degree**		Byzantine Period Church-Administrative Building: The structure, with its main walls standing approximately 2 meters high, features an apsidal section on its eastern facade. Numerous roof tile fragments are visible on the surface.	**Process is <u>complete</u>.** Design change was completed The area is outside of the project's expropration corridor.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Apply vibration and dust-control measures. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Quarterly monitoring (four times per year) is recommended.	

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HRM 42	Km 105+000 Antalya /Manavgat Uzunlar	Settlement	Roman	Within	Yes-partially	**1st Degree**	**1st Degree**	24.03.2025/19482 12.06.2025/19876	Mound: The surface of the settlement, located in a sheltered area by the river, contains a very dense concentration of ceramic and glass fragments dating back to the Late Roman period. The slope facing the river consists of natural rock, while the rear section is a landfill area suitable for settlement.	**ARHB permitting process is <u>ongoing</u>** Vegetation clearance has been completed, the excavation contractor has been appointed, and excavation works was completed. A report which is inclueded resul of excavation was submitted Museum Directorate. Final decision is awaited.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Quarterly monitoring (four times per year) is recommended by the Project Archaeologist.	

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HRM 43	Km 108+750 Antalya /Manavgat Kadılar	Cemetery	Early Republic	60 m	No - does not overlap	**Non-registered**	**Status of Protected Area****		Cemetery Area: Early Republican Period and modern cemetery. As the reference point is located adjacent to the cemetery, it is believed that the route passes through the cemetery. In this case, it must be remembered that Cemetery Laws will apply on anything related to the area.	**Process is <u>complete</u>.** It was evaluated by the Board and was not registered. The area is outside of the project's expropration corridor.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document all graves prior to relocation, including photography, GPS mapping, and headstone inventory. • Provide safe and uninterrupted access routes for relatives and community members. • No excavation, stockpiling, or machinery movement permitted within the confirmed cemetery boundary.	

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HRM 44	Km 109+600 Antalya /Manavgat Kadılar	Historical Plane Tree	-	24 m	Yes-partially	**Non-registered**	**Not Registered**		Historical Plane Tree: As a natural asset, notification should be made to the Antalya Provincial Directorate of Environment and Urbanization. Since the plane tree meets the criteria for a natural asset, with a diameter of 2 m and a height of 15-17 m, it must be protected in situ.	**Process is complete.** It was evaluated by the Board and was not registered.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 45	Km 112+250 Antalya /Manavgat Yalçıdibi	Cemetery	Late Ottoman	42 m	Yes-partially	**Non-registered**	**Status of Protected Area****		Cemetery: The area is a late Ottoman, early Republican, and modern cemetery. Numerous skullcap tombstones are also notable within the cemetery.	**Process is <u>complete</u>.** Design change was completed	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • Provide safe and uninterrupted access routes for relatives and community members. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.	

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HRM 46	Km 112+250 Antalya /Manavgat Yalçıdibi	Yalçıdibi Waterfall	-	168 m	No - does not overlap	Natural Preservation Area	**1st Degree (Natural Area)**		Registered 1st Degree Site: Yalçıdibi Waterfall is a registered natural asset.	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	Medium	Non-replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 47	Alarahan K2 Interchange Access Road Km 116+000 Antalya/Alanya Alara	Çardaktepe	Roman / Byzantium	266 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered 1st Degree Archaeological Site: This site is registered by the Antalya Preservation Board. The main walls of the structure are visible on the surface. The opinion of the Board must be obtained before construction.	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	High	Non-replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 48	Konaklı K1 Interchange Access Road Antalya/Alanya Payallar	Building Remains	Roman	9 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered 1st Degree Archaeological Site: Building remains are visible on the surface.	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 49	Konaklı K1 Interchange Access Road Antalya/Alanya Emişbeleni	Building Remains	Roman / Byzantium	Within	Yes-partially	**1st Degree**	**1st Degree**		Registered 1st Degree Archaeological Site: There is no indication of the function of the structure, whose main walls are preserved up to 3 meters. The structure is located within a 400-meter corridor.	**ARHB permitting process is <u>ongoing</u>.** The route has minimal contact with the building remain's conservation area. Design changes are ongoing there.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 50	Km 134+000 Antalya/Alanya Emişbeleni	Building Remains	Roman / Byzantium	113 m	No - does not overlap	**1st Degree**	**1st Degree**		Building: There is no indication of the function of the structure, with only 3 meters of the main walls preserved.	**Process is <u>complete</u>.** The area is outside of the project's expropriation corridor.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.	

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HRM 51	Km 136+200 Antalya/Alanya Toslak	Cemetery	Early Republic	17 m	Yes-partially	**Non-registered**	**Status of Protected Area****		Cemetery: Early Republican and modern cemetery. There may also be late Ottoman period graves in the area, which should be verified through further examination.	**Process is <u>complete</u>d.** It was evaluated by the Board and was not registered.	Low	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • Provide safe and uninterrupted access routes for relatives and community members. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.	

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HRM 52	Km 136+000 Antalya/Alanya Toslak	Settlement	-	122 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered 1st Degree Site	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.	

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HRM 53	Km 140+000	Building Remains	Roman / Byzantium	39 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered 1st Degree Archaeological Site: The presence of an apse on the eastern facade of the building, with main walls preserved up to 3-4 meters, indicates that the structure may have been a church.	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist.	

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HRM 54	Alanya West Interchange Access Road End Antalya/Alanya Telatiye	Building Remains	Roman / Byzantium	55 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered 1st Degree Archaeological Site: Numerous well-preserved structures are observed in the area near the coast.	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 55	Alanya West Interchange Access Road End Antalya/Alanya Telatiye	Building Remains	Roman / Byzantium	178 m	No - does not overlap	**1st Degree**	**1st Degree**		Registered 1st Degree Archaeological Site: The structure is situated in an elevated location with a commanding view of the surrounding area. Its main walls are preserved up to a height of 4 meters.	**Process is <u>complete</u>.** The area is outside of the project's expropration corridor.	High	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 56	Km 56+750 Antalya / Manavgat Çakış	Building Remains	Roman / Byzantium	Within	Yes - fully	**1st Degree**	**1st Degree**	26.12.24/18915	Registered 1st Degree Archaeological Site : The relevant matter was evaluated by the Regional Conservation Council on 26.12.2024. With Council Decision No. 6162842 dated 31.12.2024, the issue was approved by the Council, and the project design for this section was endorsed.	**Process is <u>complete</u>.** Design change was completed	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. * Working areas will be kept as small as practicable. Visual barriers will be implemented if the area is subjected to high visual impacts. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

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HRM 57	Km 120+800 Antalya/Alanya İncekum	Settlement	Roman / Byzantium	Within	Yes-partially	**1st Degree**	**1st Degree**	31.01.2025/19138	Registered 1st Degree Archaeological Site: The updated registration list was obtained from the Conservation Council. It has been observed that, in this section of the route, there is partial overlap with an archaeological conservation site. The project design team must revise the alignment to avoid encroachment on the registered site boundaries. If such an adjustment is not feasible, an application should be submitted to the Conservation Council accompanied by a technical justification report.	**Process is <u>complete</u>.** Design change was completed Although the expropriation boundary remained within the existing boundaries, the design change moved the building boundary outside the protected area.	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • Apply vibration and dust-control measures. • A design change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Quarterly monitoring is recommended.	

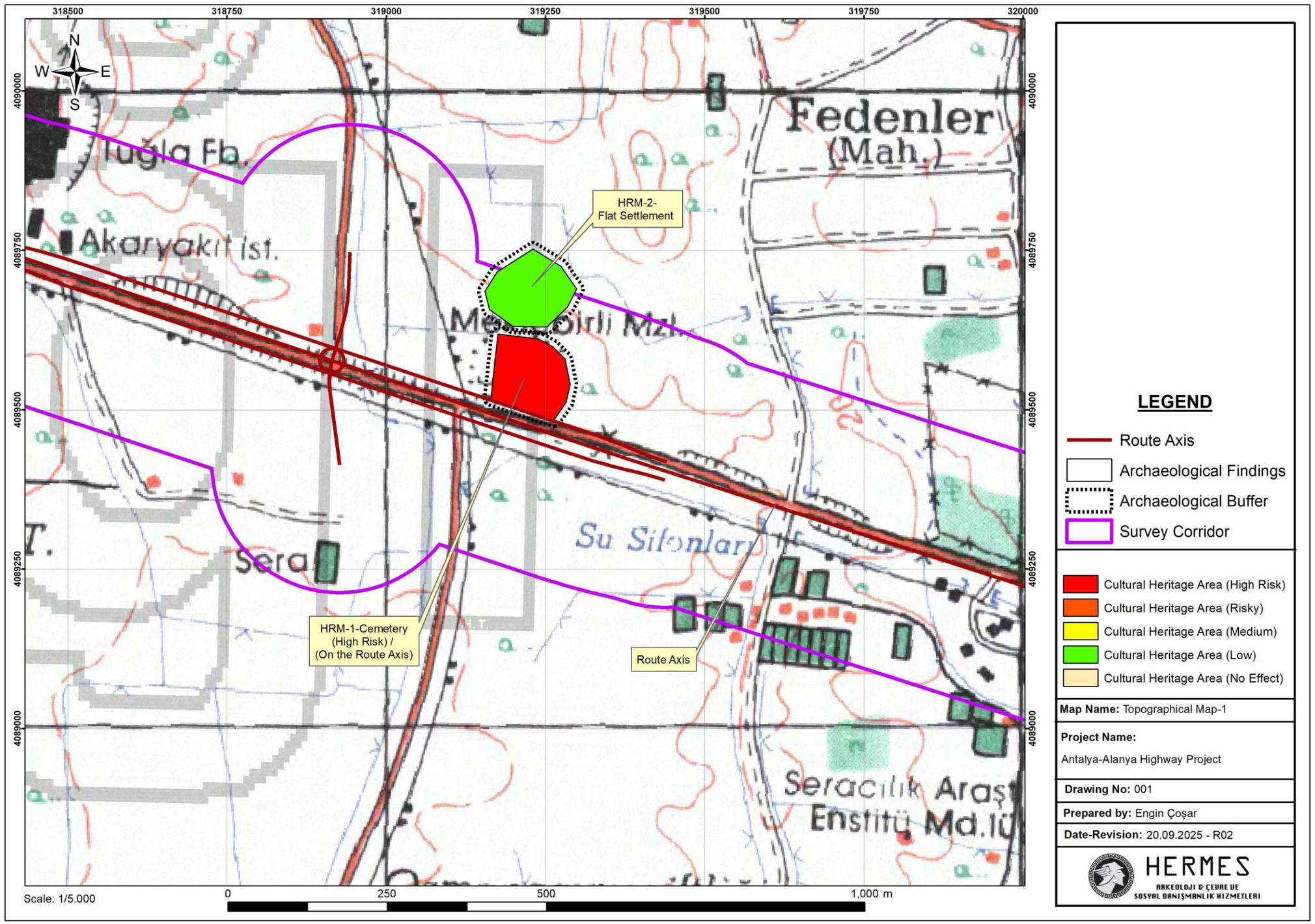
Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 58	Taşağıl Interchange Access Road Antalya / Manavgat Taşağıl	Settlement	Roman / Byzantium	Within	Yes-partially	**1st Degree**	**1st Degree**		Registered 1st Degree Archaeological Site: The updated registration list was obtained from the Conservation Council. It has been observed that, in this section of the route, there is partial overlap with an archaeological conservation site. The project design team must revise the alignment to avoid encroachment on the registered site boundaries. If such an adjustment is not feasible, an application should be submitted to the Conservation Council accompanied by a technical justification report.	**ARHB permitting process is <u>ongoing</u>** Design change completed The necessary permits are awaited from the Antalya Cultural Heritage Preservation Regional Board (ARHB).	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish a fenced no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • Blasting shall be planned conservatively with a safe vibration threshold; mechanical breaking shall be used in unsafe areas. • Blasting should take place in coordination with the ARHB and the relevant Museum Directorate, under the supervision of a qualified archaeologist. • A shoring (IKSA) wall will be installed to minimize vibration, and stemming applied to limit air overpressure near the site. • A design change has been implemented to shift the construction footprint outside the boundaries of the registered archaeological site. • Apply vibration and dust-control measures. • Conduct continuous monitoring during and after blasting and excavation by the Project Archaeologist. • Quarterly monitoring is recommended.	

Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 59	Located along the D-400 Highway and near the Taşağıl Access Road Antalya / Manavgat Taşağıl	Settlement	Roman / Byzantium	27 m	Yes-partially	**3rd Degree**	**3rd Degree**	NA	Registered 3rd Degree Archaeological Site: The updated registration list was obtained from the Conservation Council. It has been observed that, in this section of the route, there is partial overlap with an archaeological conservation site. The project design team must revise the alignment to avoid encroachment on the registered site boundaries. If such an adjustment is not feasible, an application should be submitted to the Conservation Council accompanied by a technical justification report.	**ARHB permitting process is <u>ongoing</u>** Design change completed The necessary permits are awaited from the Antalya Cultural Heritage Preservation Regional Board (ARHB).	Medium	Non-Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Confirm permit validity with the Antalya Regional Conservation Board (RCHB) and maintain updated correspondence at site level. • All construction within or near the registered boundary must be archaeologically monitored. • Define and fence the approved work corridor using visible markers to prevent unauthorized entry into adjacent sensitive zones. • Mechanical stripping and excavation to be conducted under archaeologist supervision to identify and record any remaining finds. • In-situ documentation and sampling of any materials uncovered during construction, following the RCHB-approved salvage protocol. • Limit vibration and compaction by avoiding heavy machinery operation within 25 m of any structural remnants. • Implement dust suppression, sediment control, and controlled drainage to prevent erosion or runoff over sensitive areas. • Provide toolbox training for workers on archaeological awareness and reporting procedures.	

Code	Location	Name/Type	Period	Distance with respect to Centreline of the Road*	Does it overlap with Project's expropriation corridor?	Registration Status	Register Degree	Register Decision No	Description	Current Status	Value of the Heritage Asset	PS 8 Heritage Value	Measures to be Taken (Land Preparation and Construction)	Measures to be Taken (Operation)
HRM 60	Located along the D-400 Highway and near the Taşağıl Access Road Antalya / Manavgat Taşağıl	Settlement or Necropolis	Roman / Byzantium	31 m	Yes-partially	**1st Degree**	**1st Degree**	NA	Registered 1st Degree Archaeological Site: The updated registration list was obtained from the Conservation Council. It has been observed that, in this section of the route, there is partial overlap with an archaeological conservation site. The project design team must revise the alignment to avoid encroachment on the registered site boundaries. If such an adjustment is not feasible, an application should be submitted to the Conservation Council accompanied by a technical justification report.	**ARHB permitting process is <u>ongoing</u>** Design change completed The necessary permits are awaited from the Antalya Cultural Heritage Preservation Regional Board (ARHB).	High	Replicable	• All works shall be carried out under the supervision of the Project Archaeologist and the Museum Directorate. • Establish no-go buffer zone, show the area on the constraint maps • The site will be assessed in accordance with the relevant thresholds specified in the ESIA report. • The stages and requirements set out in the CHMP must be fully implemented. • Chance Find Procedure shall be followed immediately with a stop-work protocol, upon discovery of any artefact. • Provide heritage awareness training to all construction personnel before works commence. • Document and monitor all visible surface materials (GPS, photographs) before, during, and after works near the site in coordination with the Project Archeologist. • No construction, excavation, or soil movement within the 1st-degree registered archaeological boundary. • Conduct continuous monitoring during and after blasting by the Project Archaeologist	

** All distances have been calculated based on the centerline of the road to ensure consistency and accuracy in spatial assessment.*

Project Constraint Maps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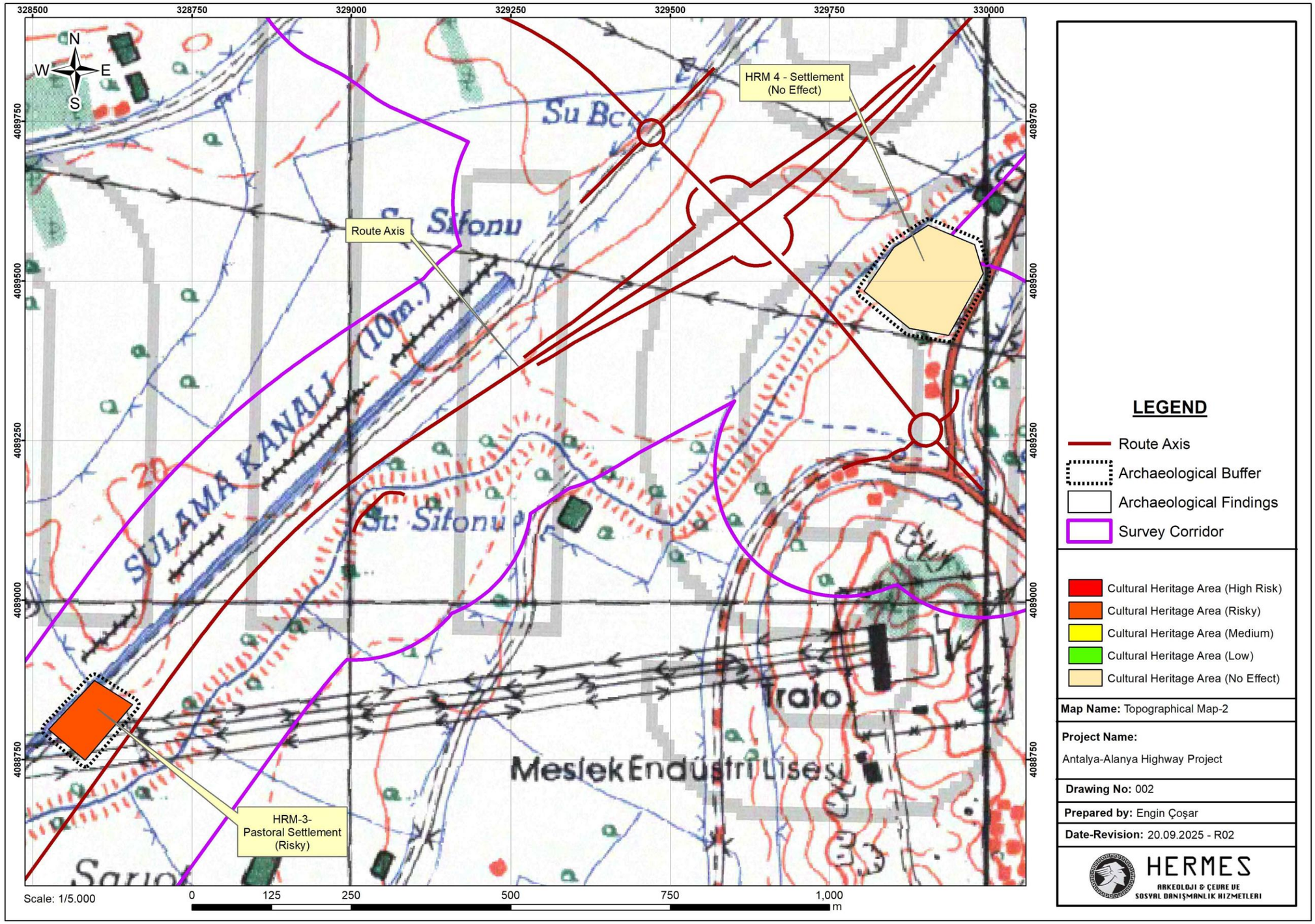
318750
319000
319250
319500
319750
320000
4090000
4089750
4089500
4089250
4089000
N
W
E
S
Tuğla Fb.
Akaryakıt İst.
Fedenler
(Mah.)
HRM-2-
Flat Settlement
Su Sifonları
Sera
HRM-1-Cemetery
(High Risk) /
(On the Route Axis)
Route Axis
Seracılık Araş
Enstitü Md.lü
Scale: 1/5.000
0
250
500
1,000 m
LEGEND
Route Axis
Archaeological Findings
Archaeological Buffer
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Topographical Map-1
Project Name:
Antalya-Alanya Highway Project
Drawing No: 001
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-2

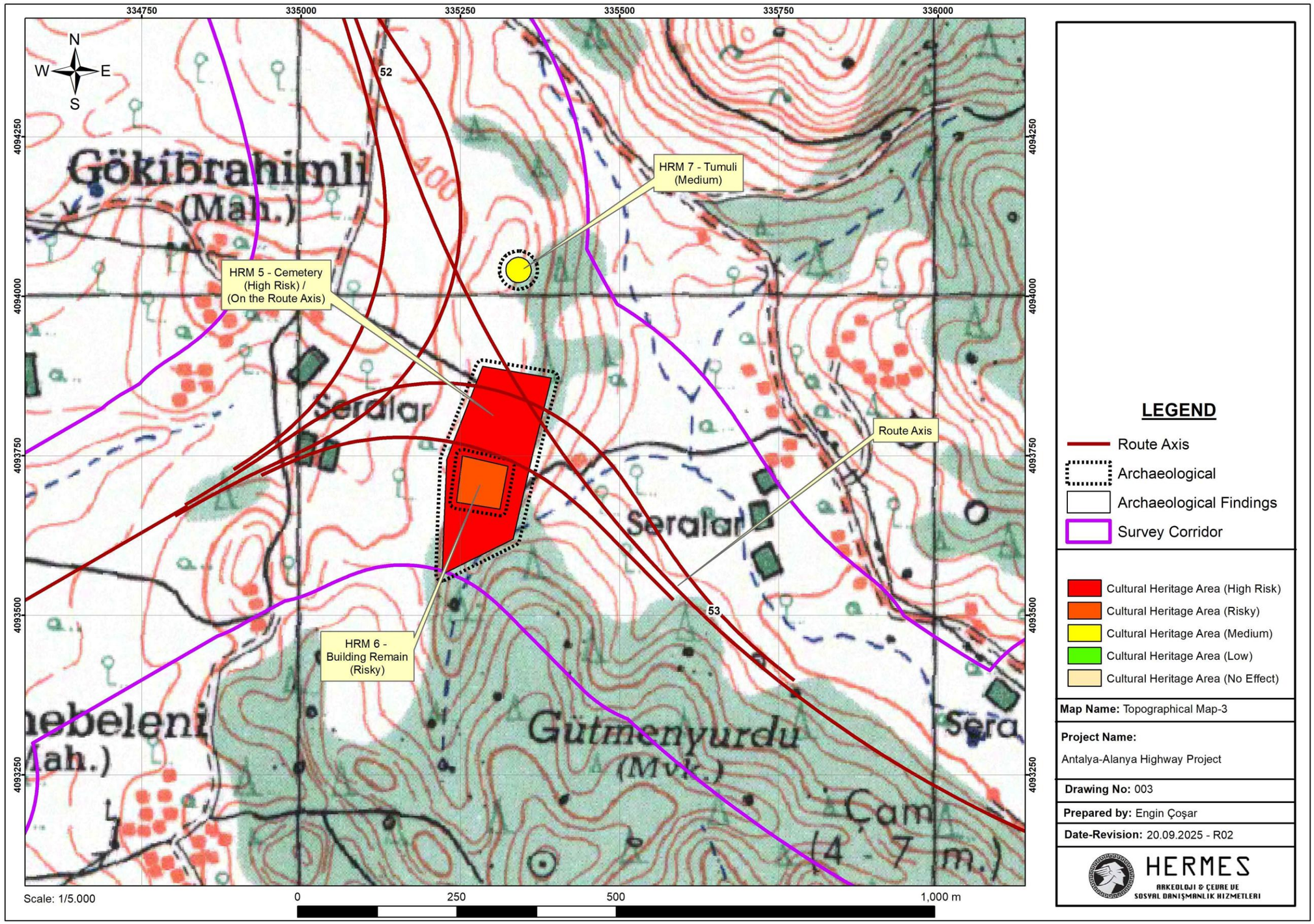
Project Name:
Antalya-Alanya Highway Project

Drawing No: 002

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI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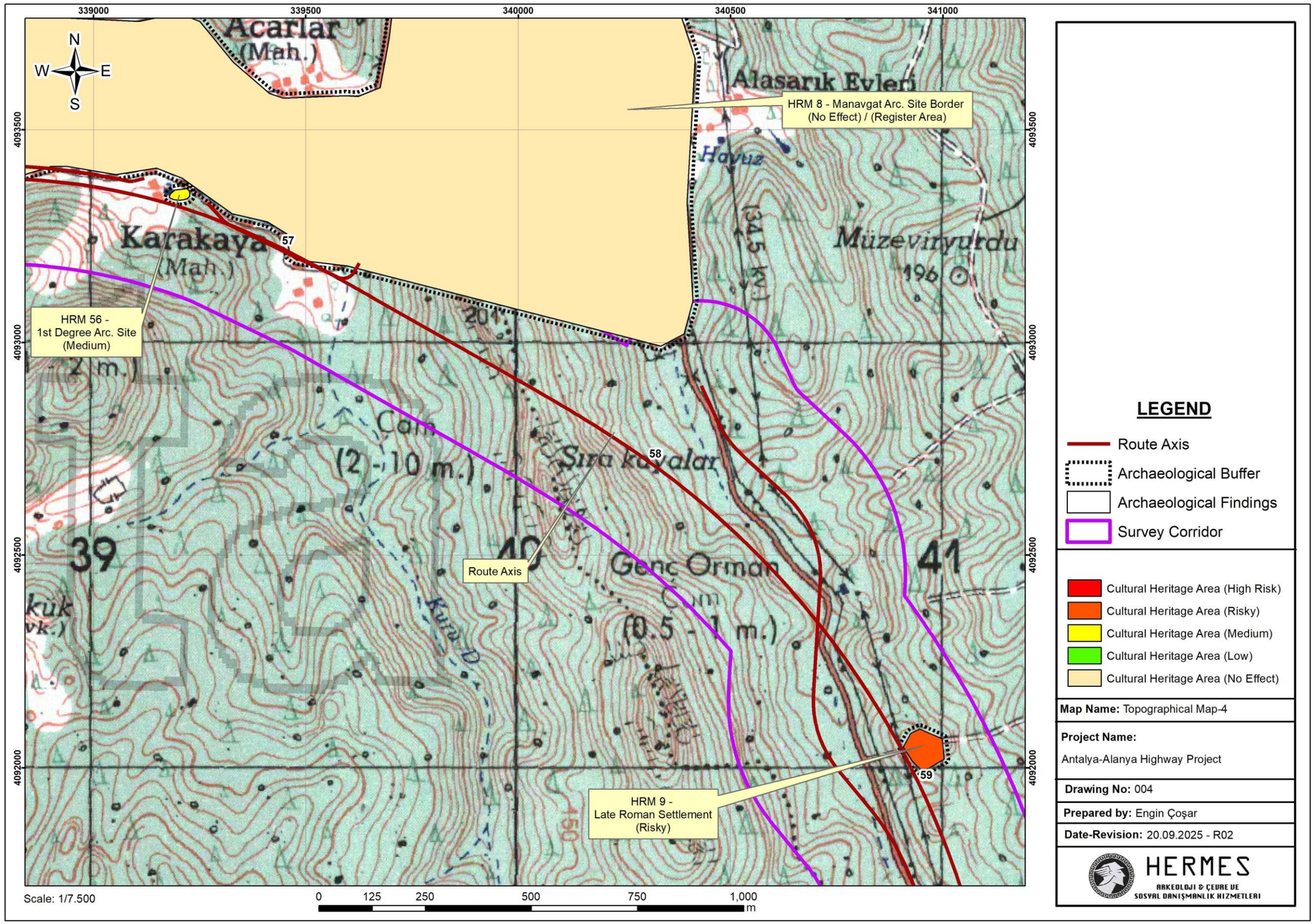
335000
335250
335500
335750
336000
4094250
4094000
4093750
4093500
4093250
N
W
E
S
52
53
Gökibrahimli
(Mah.)
Seralar
Seralar
Gütmenyurdu
(Mvk.)
Çam
(4 - 7 m.)
HRM 7 - Tumuli
(Medium)
HRM 5 - Cemetery
(High Risk) /
(On the Route Axis)
HRM 6 -
Building Remain
(Risky)
Route Axis
Scale: 1/5.000
0
250
500
1,000 m
LEGEND
Route Axis
Archaeological
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Topographical Map-3
Project Name:
Antalya-Alanya Highway Project
Drawing No: 003
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-4

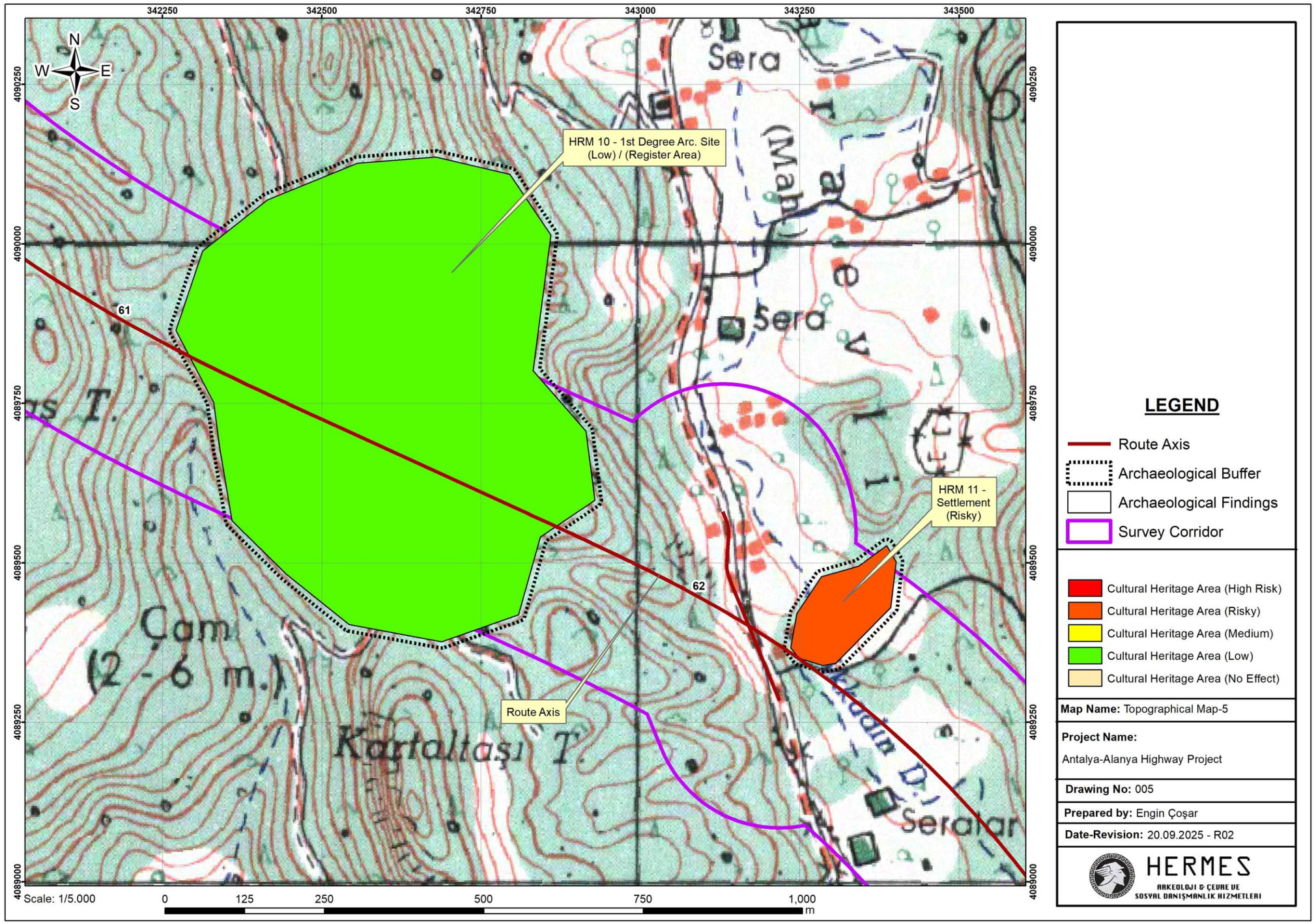
Project Name:
Antalya-Alanya Highway Project

Drawing No: 004

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI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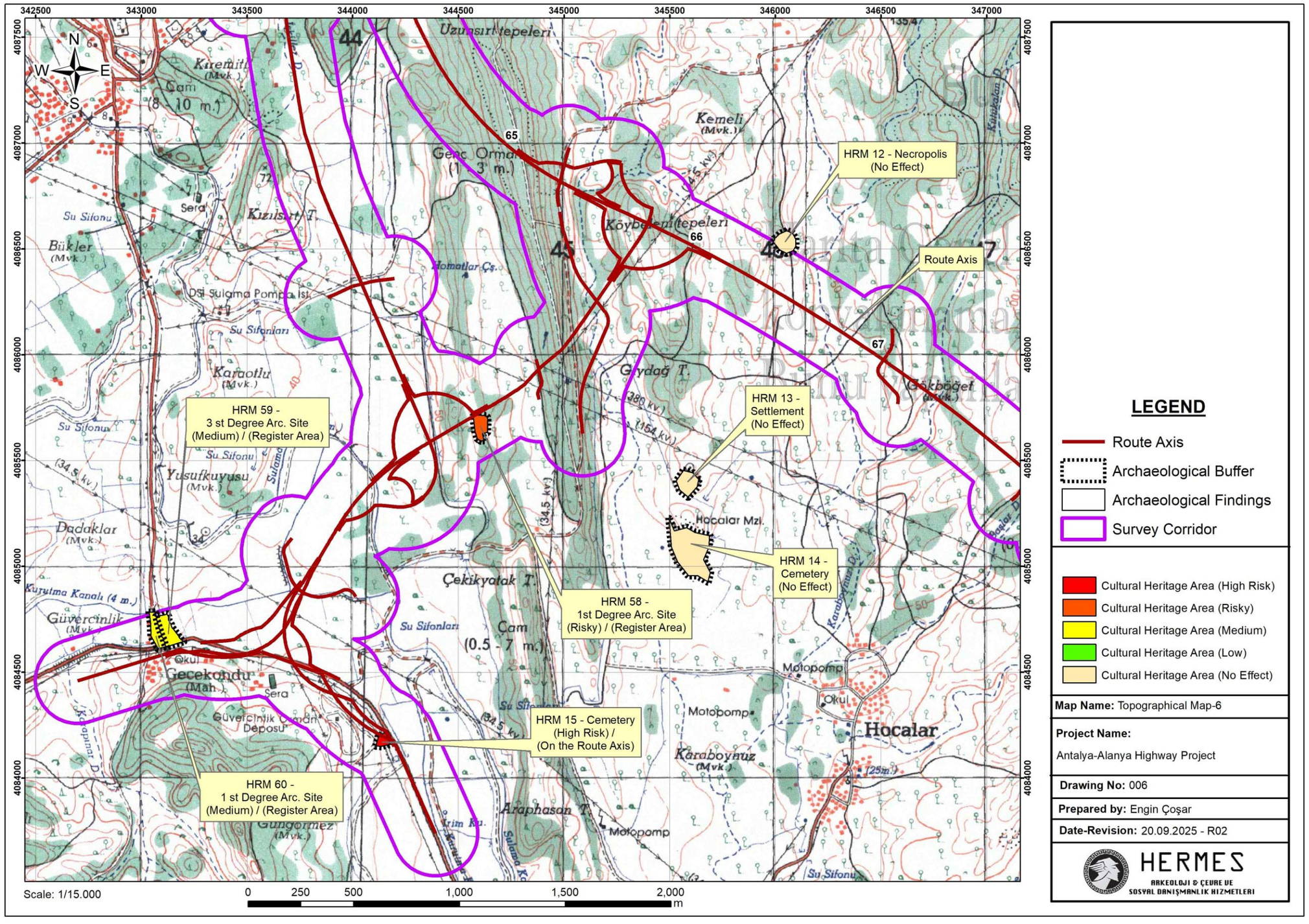
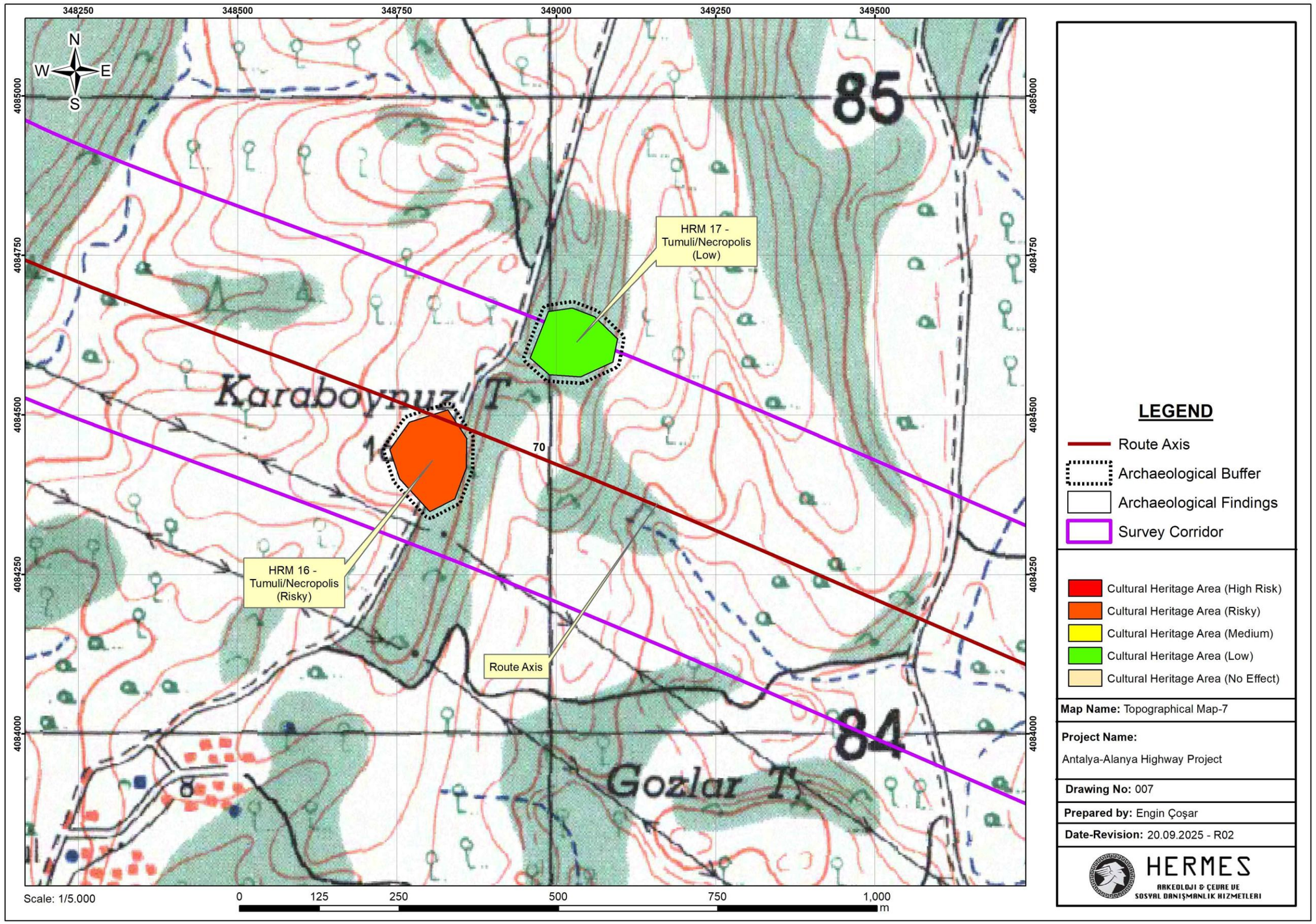
342500
342750
343000
343250
343500
4090250
4090000
4089750
4089500
4089250
4089000
N
W
E
S
HRM 10 - 1st Degree Arc. Site (Low) / (Register Area)
HRM 11 - Settlement (Risky)
Route Axis
61
62
Sera
Sera
Çam
(2 - 6 m.)
Kartalıaşı T.
Seralar
Scale: 1/5.000
0
125
250
500
750
1,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Topographical Map-5
Project Name:
Antalya-Alanya Highway Project
Drawing No: 005
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI


HRM 12 - Necropolis
(No Effect)
Route Axis
HRM 13 -
Settlement
(No Effect)
HRM 14 -
Cemetery
(No Effect)
HRM 59 -
3 st Degree Arc. Site
(Medium) / (Register Area)
HRM 58 -
1st Degree Arc. Site
(Risky) / (Register Area)
HRM 15 - Cemetery
(High Risk) /
(On the Route Axis)
HRM 60 -
1 st Degree Arc. Site
(Medium) / (Register Area)
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Topographical Map-6
Project Name:
Antalya-Alanya Highway Project
Drawing No: 006
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-7

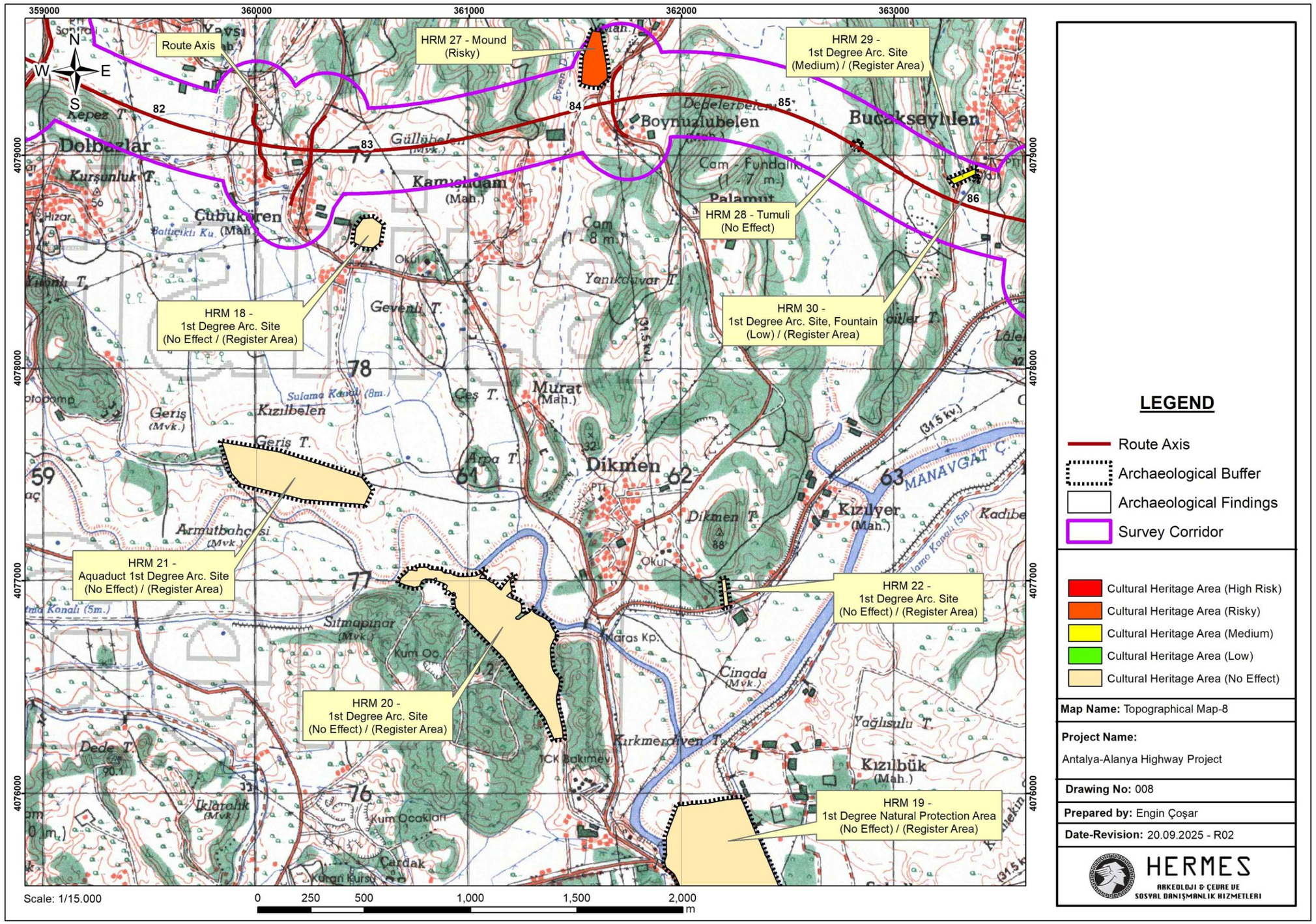
Project Name:
Antalya-Alanya Highway Project

Drawing No: 007

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-8

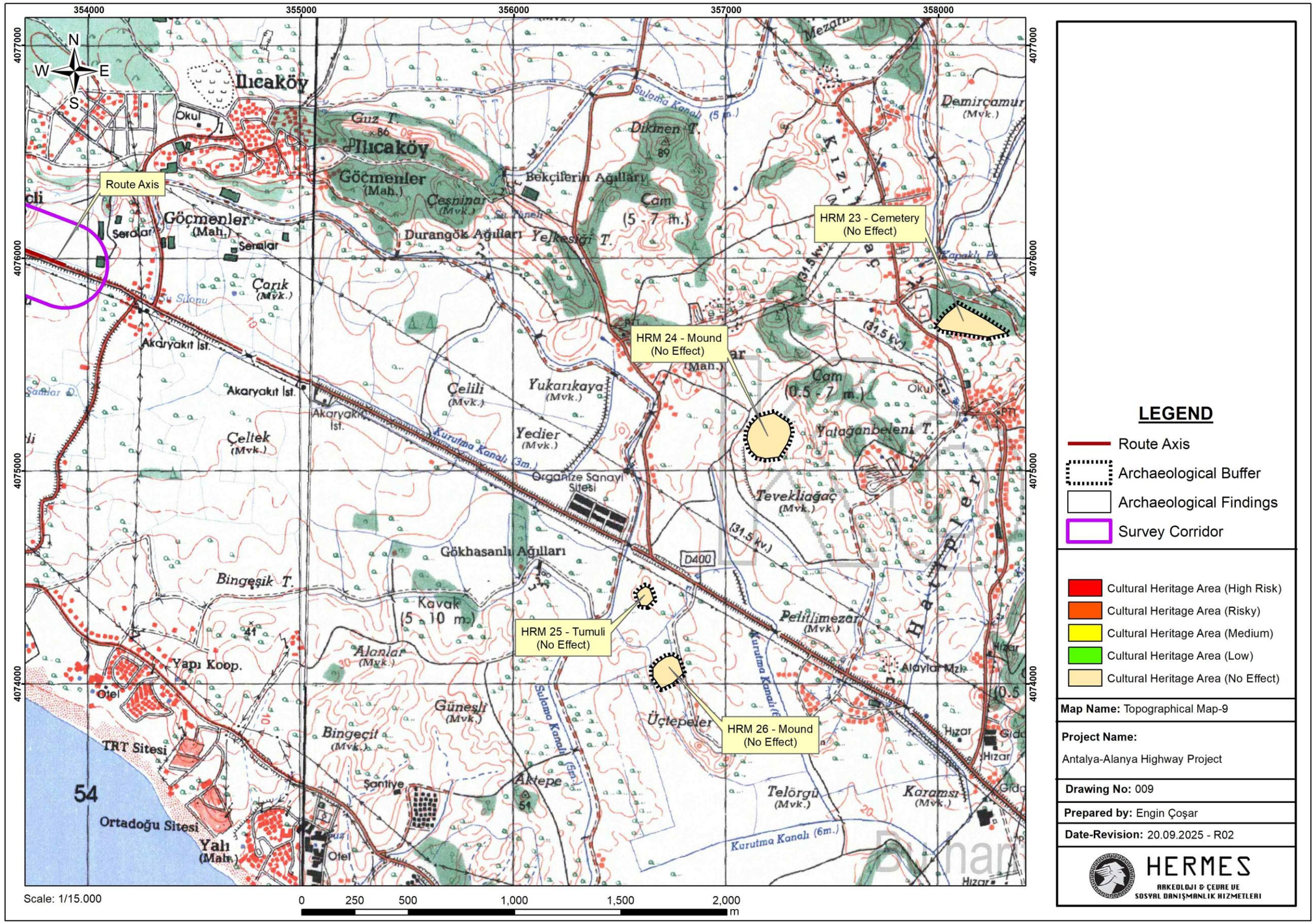
Project Name:
Antalya-Alanya Highway Project

Drawing No: 008

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-9

Project Name:
Antalya-Alanya Highway Project

Drawing No: 009

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
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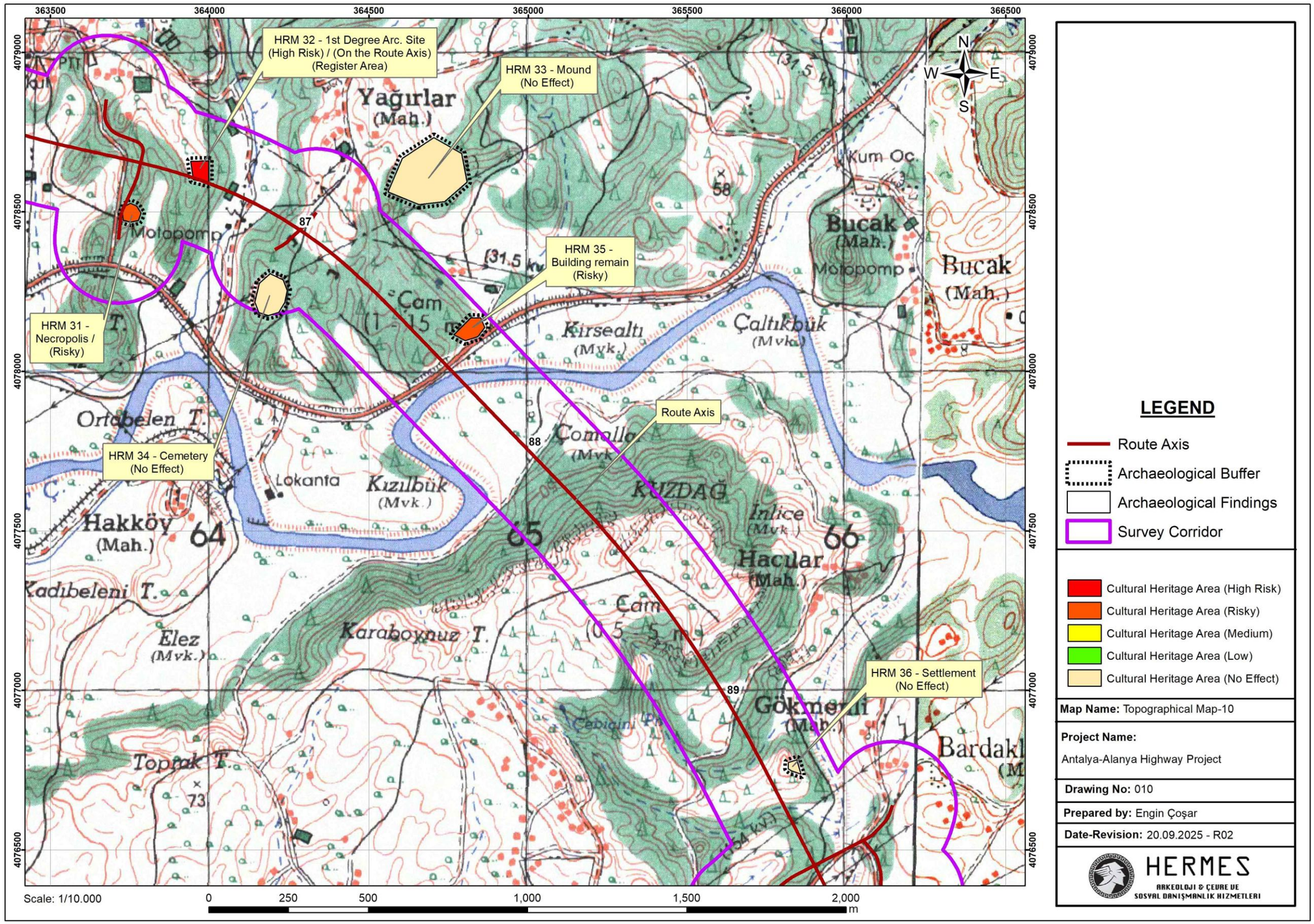


LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-10

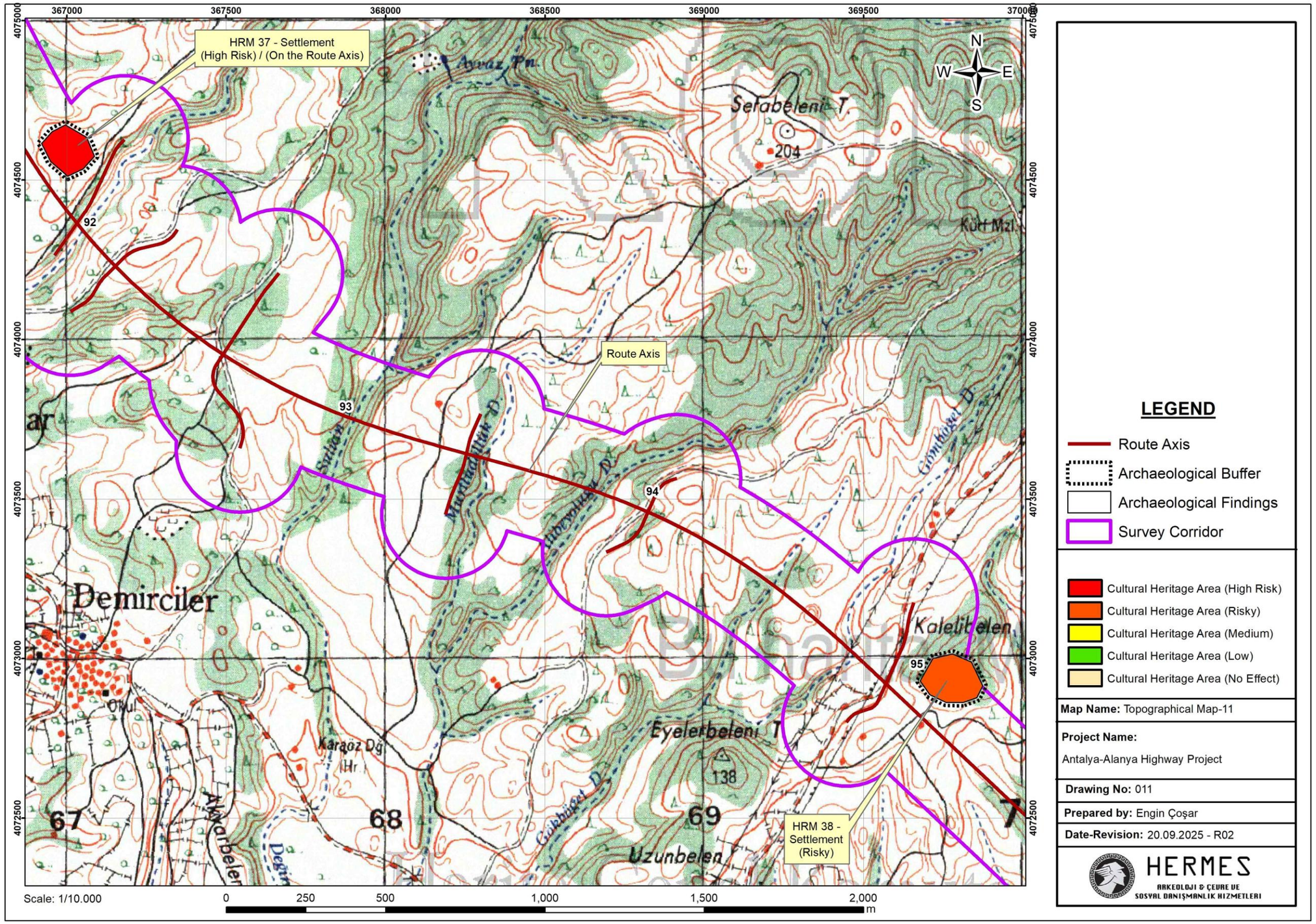
Project Name:
Antalya-Alanya Highway Project

Drawing No: 010

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-11

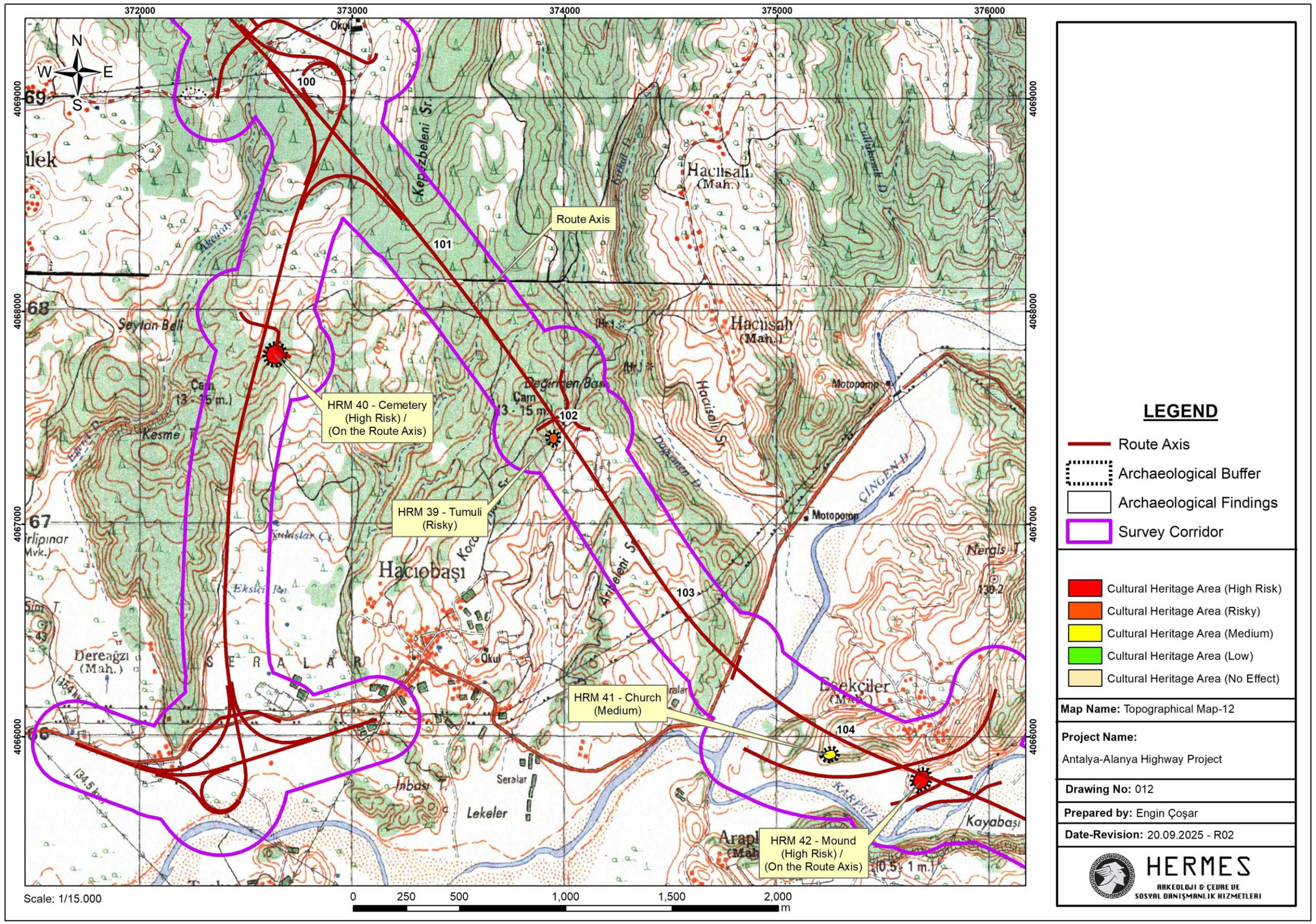
Project Name:
Antalya-Alanya Highway Project

Drawing No: 011

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-12

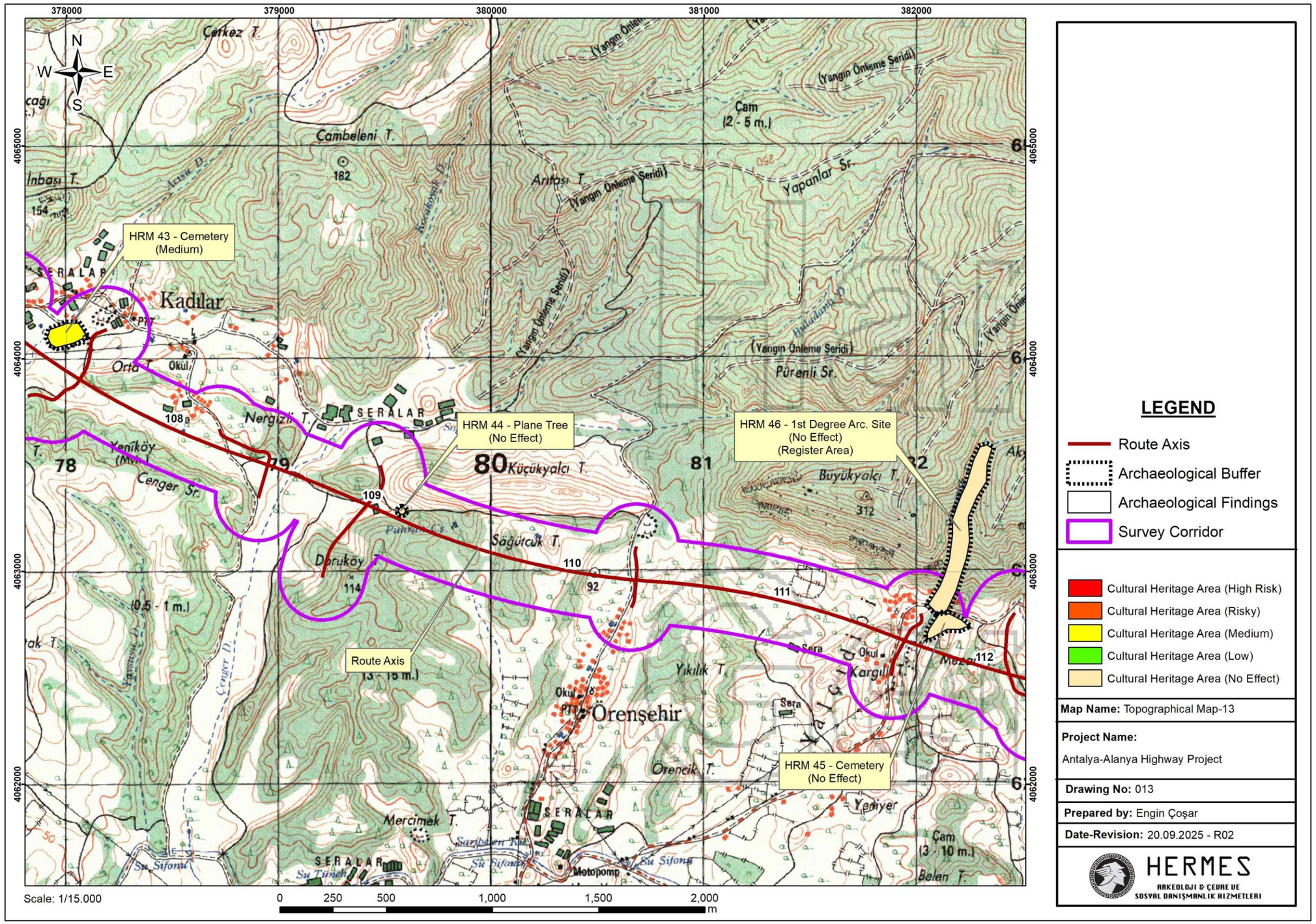
Project Name:
Antalya-Alanya Highway Project

Drawing No: 012

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-13

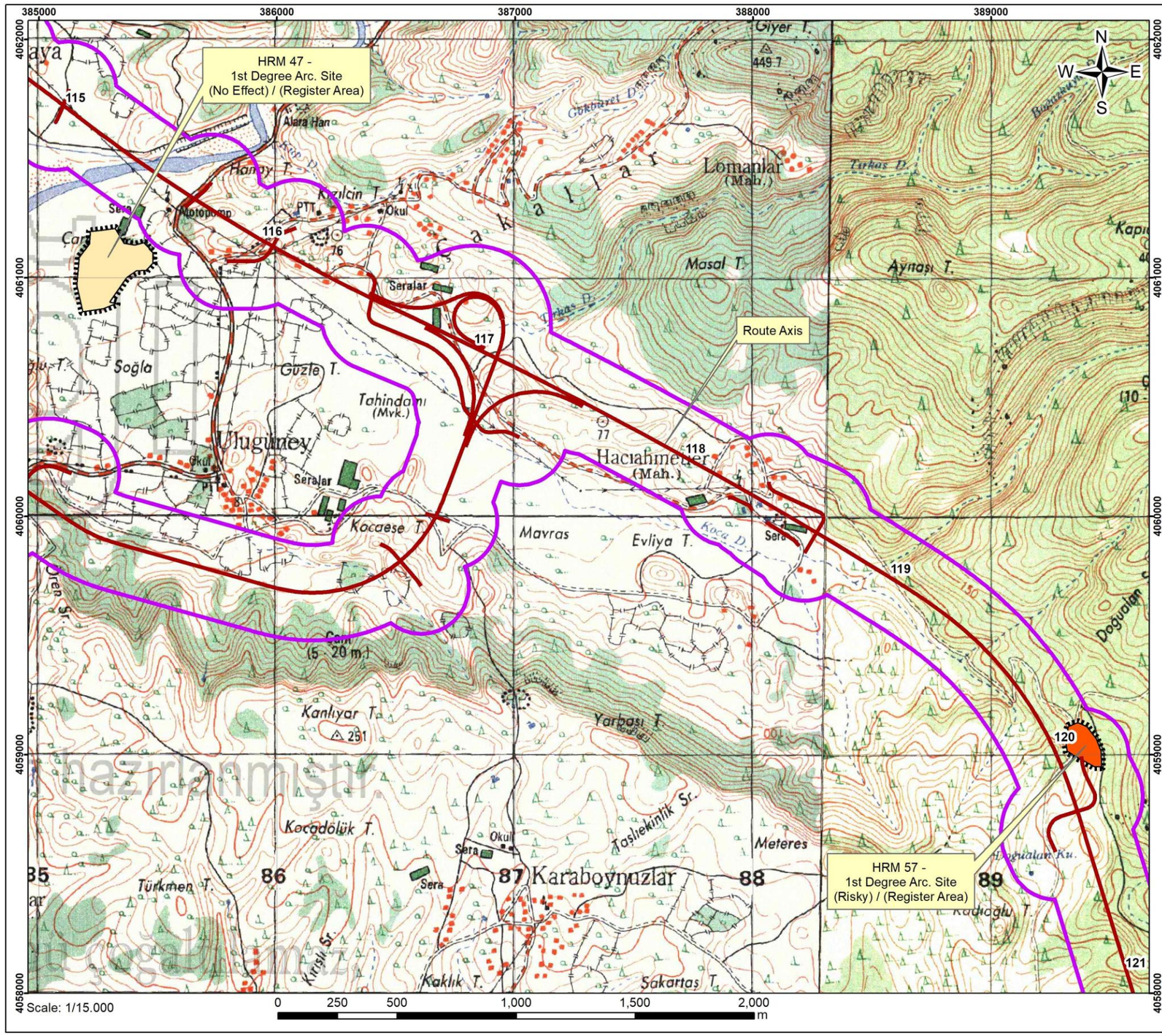
Project Name:
Antalya-Alanya Highway Project

Drawing No: 013

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-14

Project Name:
Antalya-Alanya Highway Project

Drawing No: 014

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI

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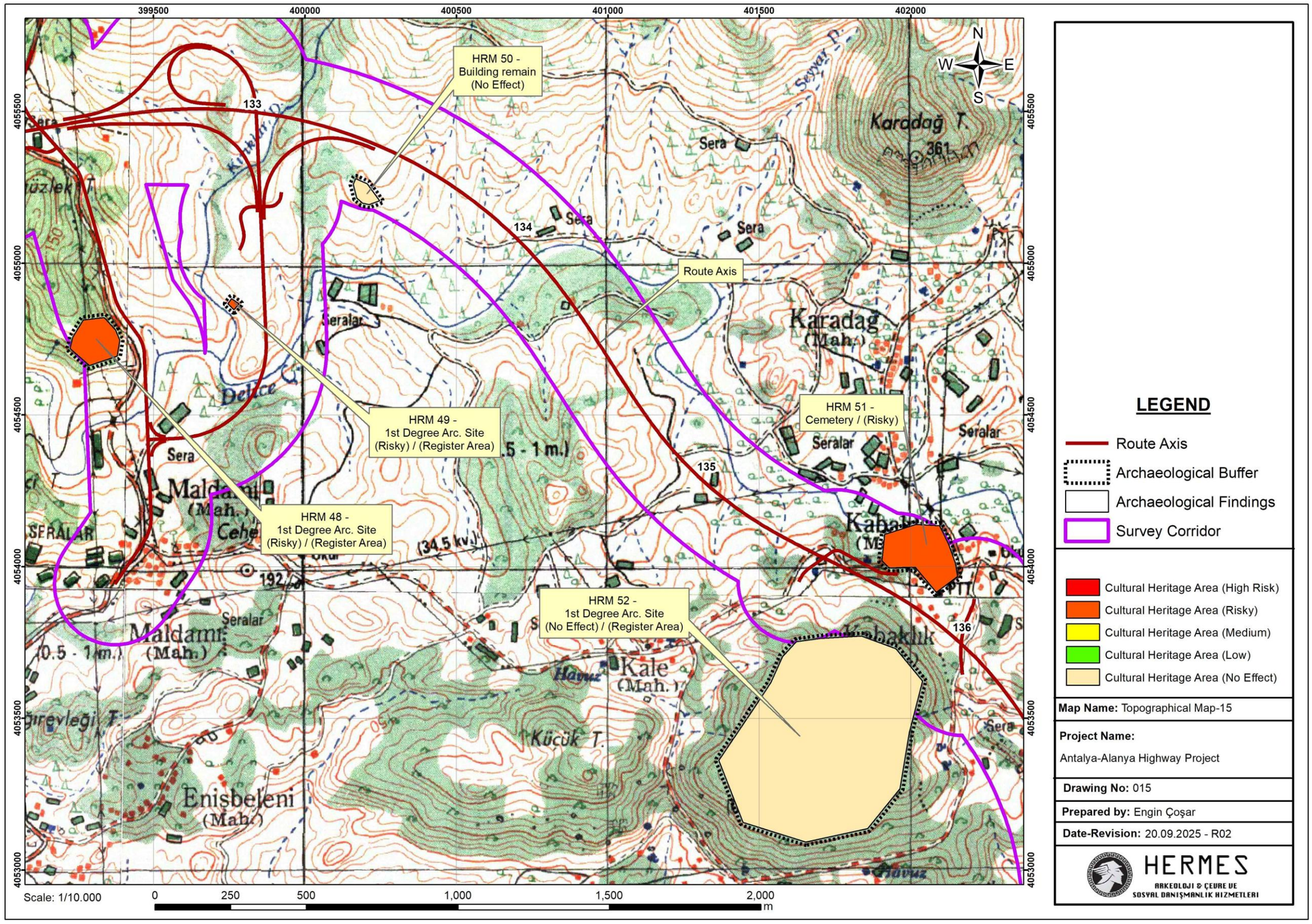


LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-15

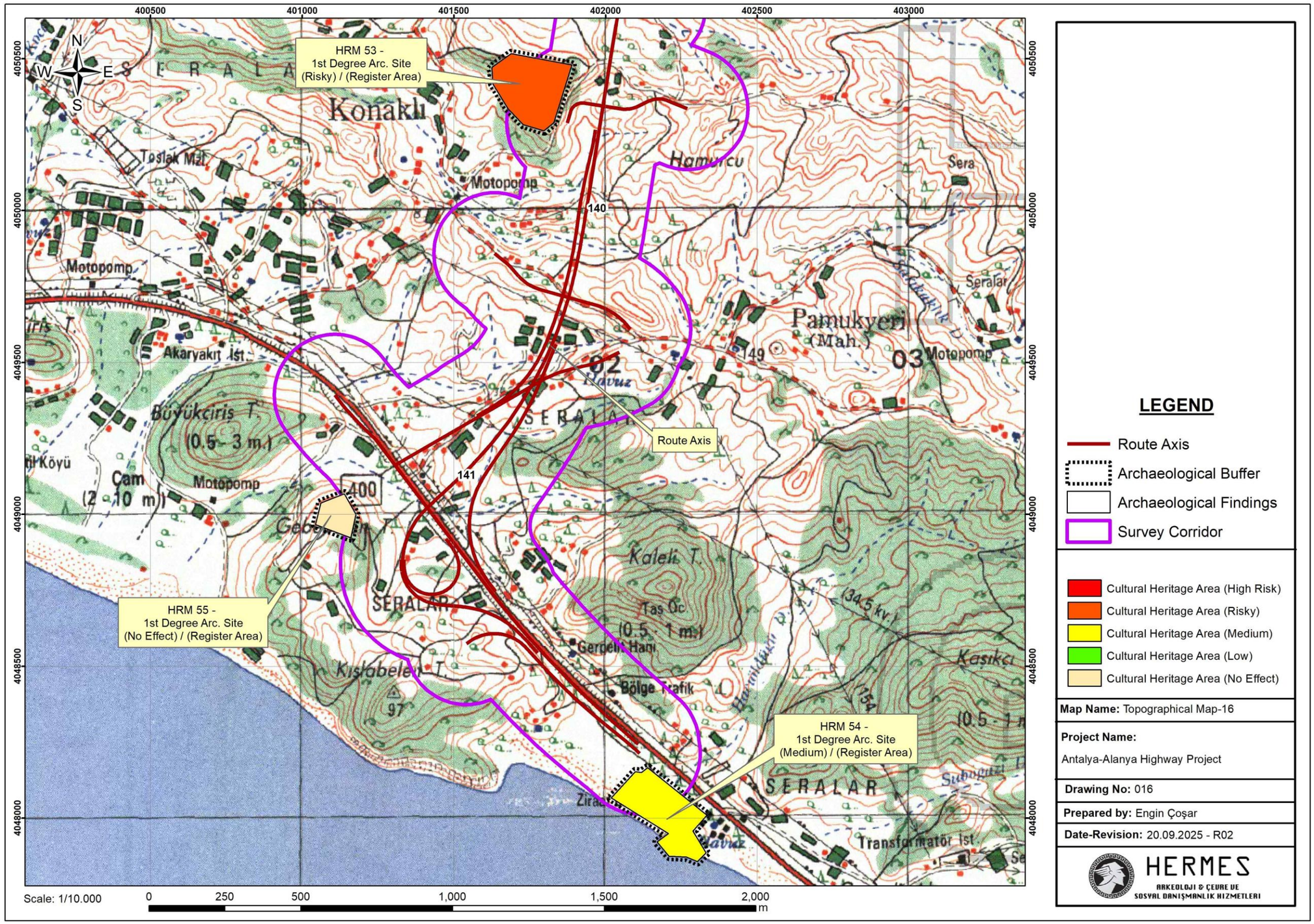
Project Name:
Antalya-Alanya Highway Project

Drawing No: 015

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-16

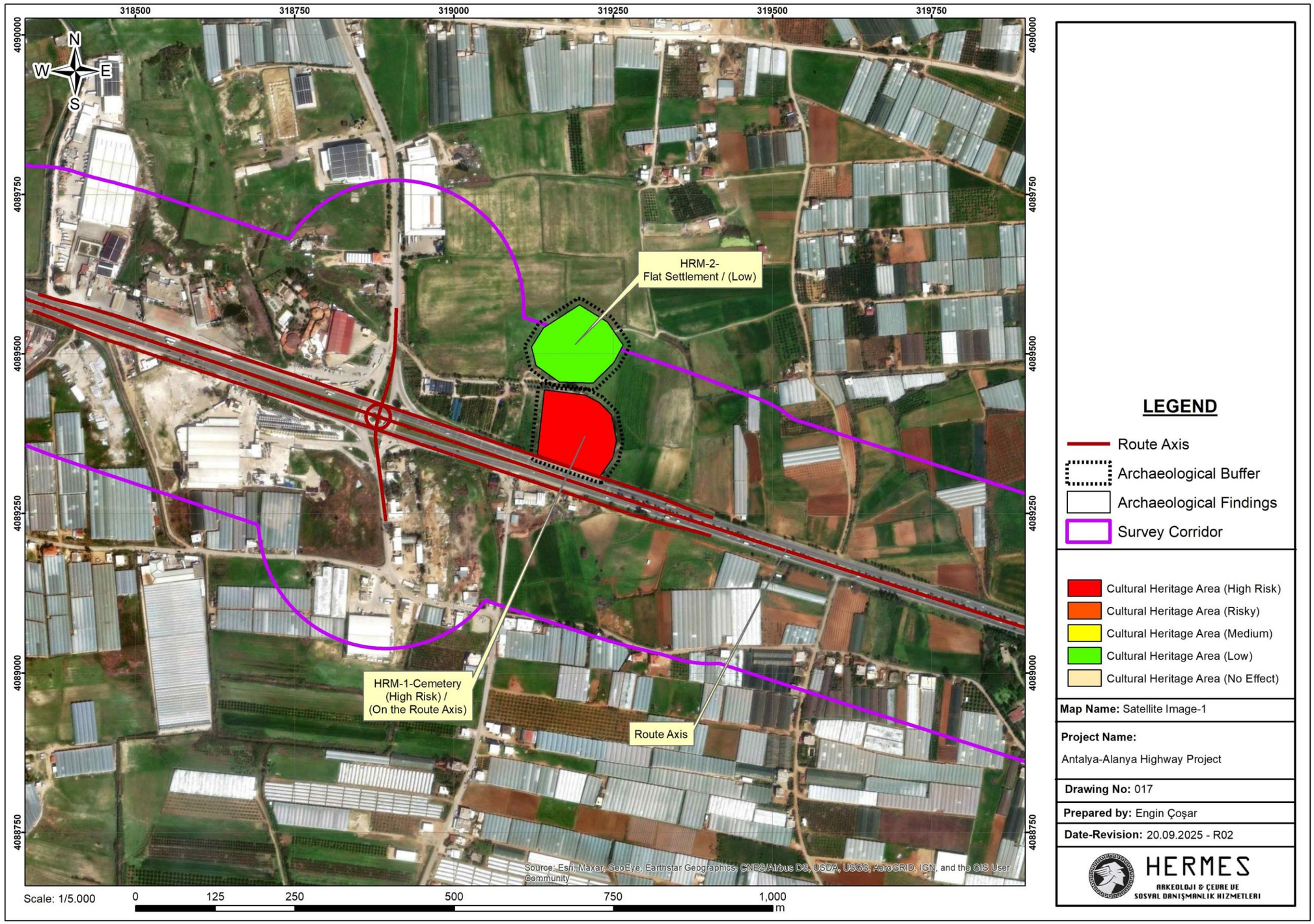
Project Name:
Antalya-Alanya Highway Project

Drawing No: 016

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI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319250
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319750
4090000
4089750
4089500
4089250
4089000
4088750
N
W
E
S
HRM-2-
Flat Settlement / (Low)
HRM-1-Cemetery
(High Risk) /
(On the Route Axis)
Route Axis
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/5.000
0
125
250
500
750
1,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-1
Project Name:
Antalya-Alanya Highway Project
Drawing No: 017
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
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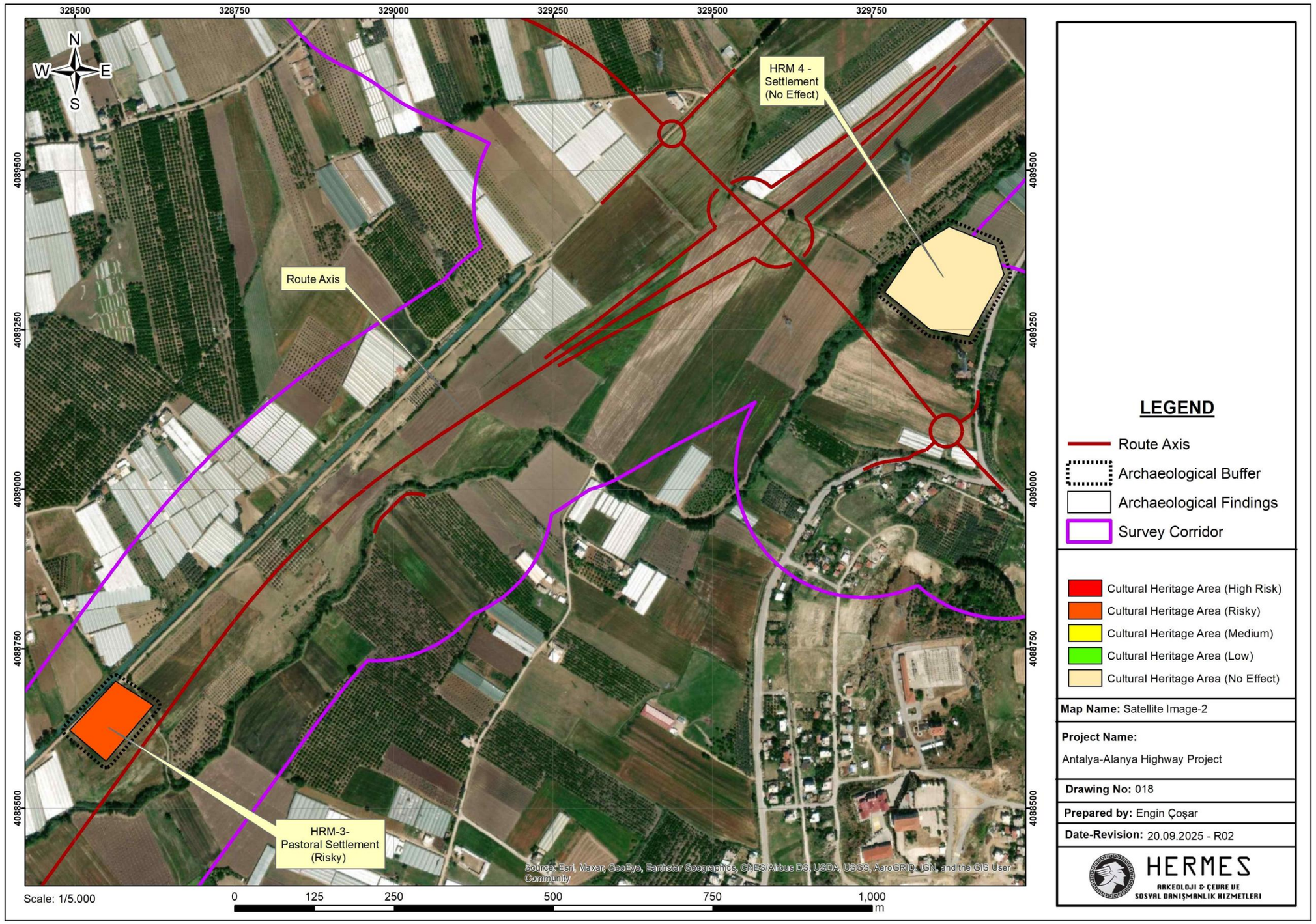
SOSYAL DANIŞMANLIK HIZMETLERI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328750
329000
329250
329500
329750
4089500
4089250
4089000
4088750
4088500
N
W
E
S
HRM 4 -
Settlement
(No Effect)
Route Axis
HRM-3-
Pastoral Settlement
(Risky)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/5.000
0
125
250
500
750
1,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-2
Project Name:
Antalya-Alanya Highway Project
Drawing No: 018
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
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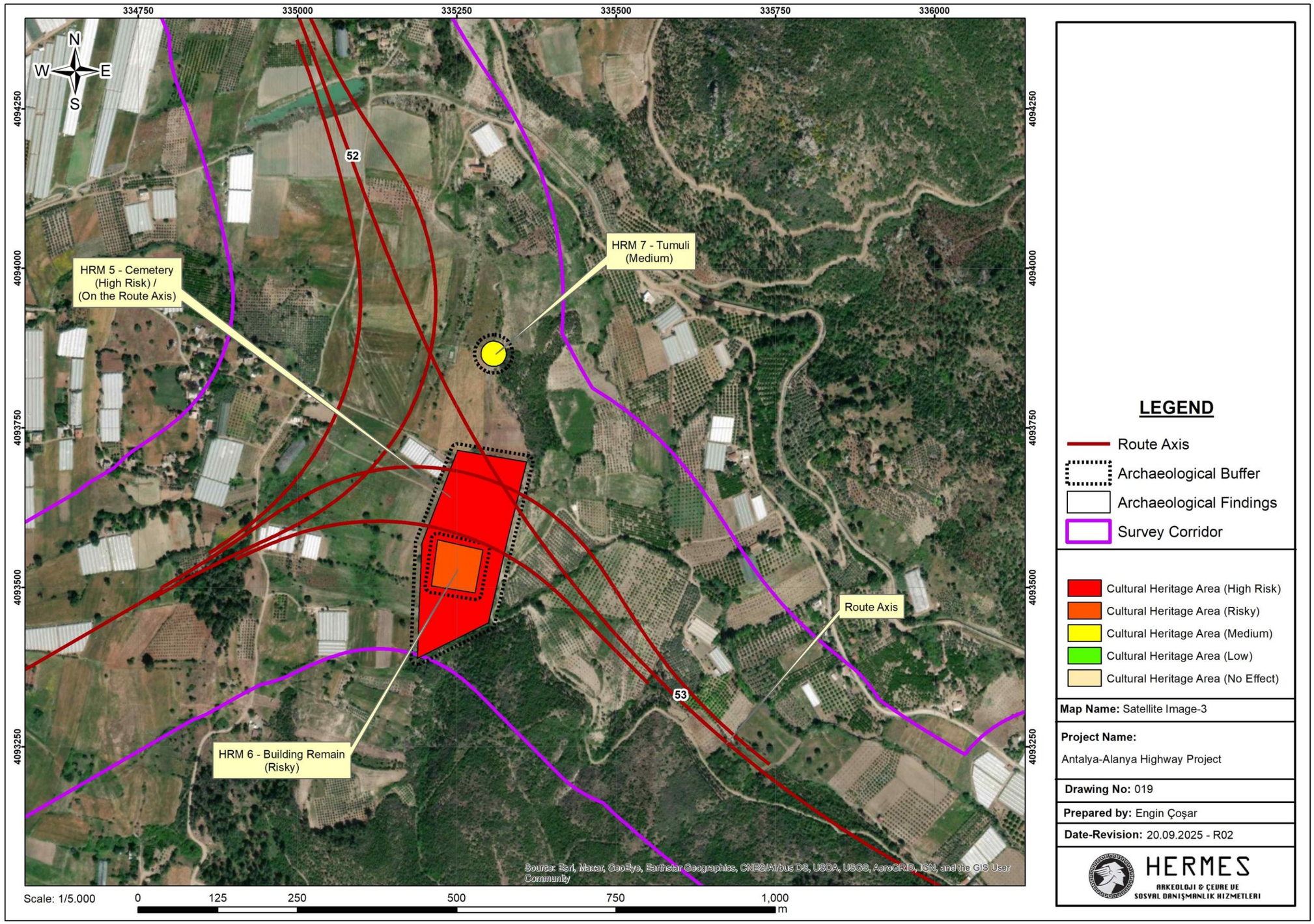
SOSYAL DANIŞMANLIK HIZMETLERI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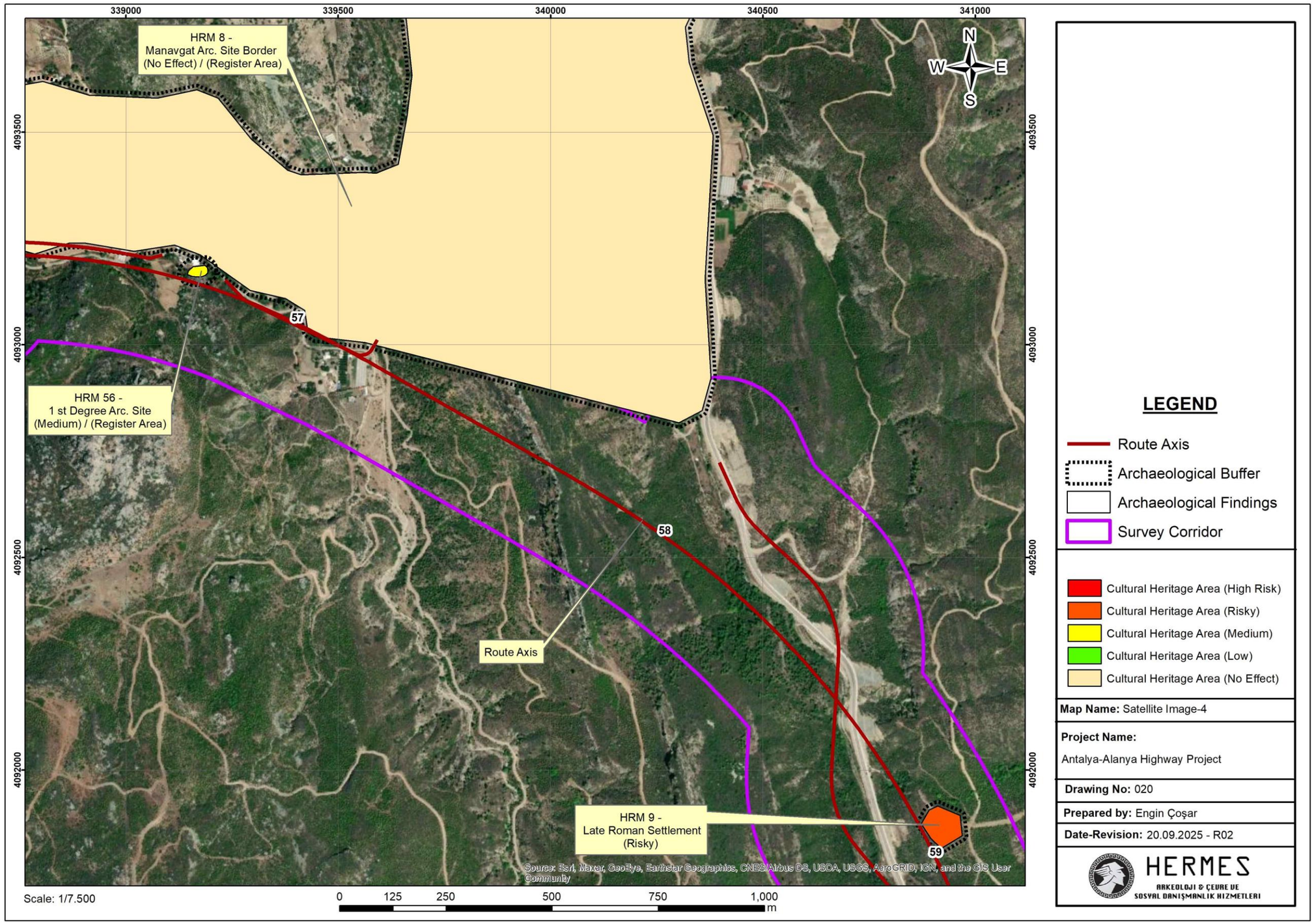
335250
335500
335750
336000
4094250
4094000
4093750
4093500
4093250
N
W
E
S
52
53
HRM 5 - Cemetery
(High Risk) /
(On the Route Axis)
HRM 7 - Tumuli
(Medium)
HRM 6 - Building Remain
(Risky)
Route Axis
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/5.000
0
125
250
500
750
1,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-3
Project Name:
Antalya-Alanya Highway Project
Drawing No: 019
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI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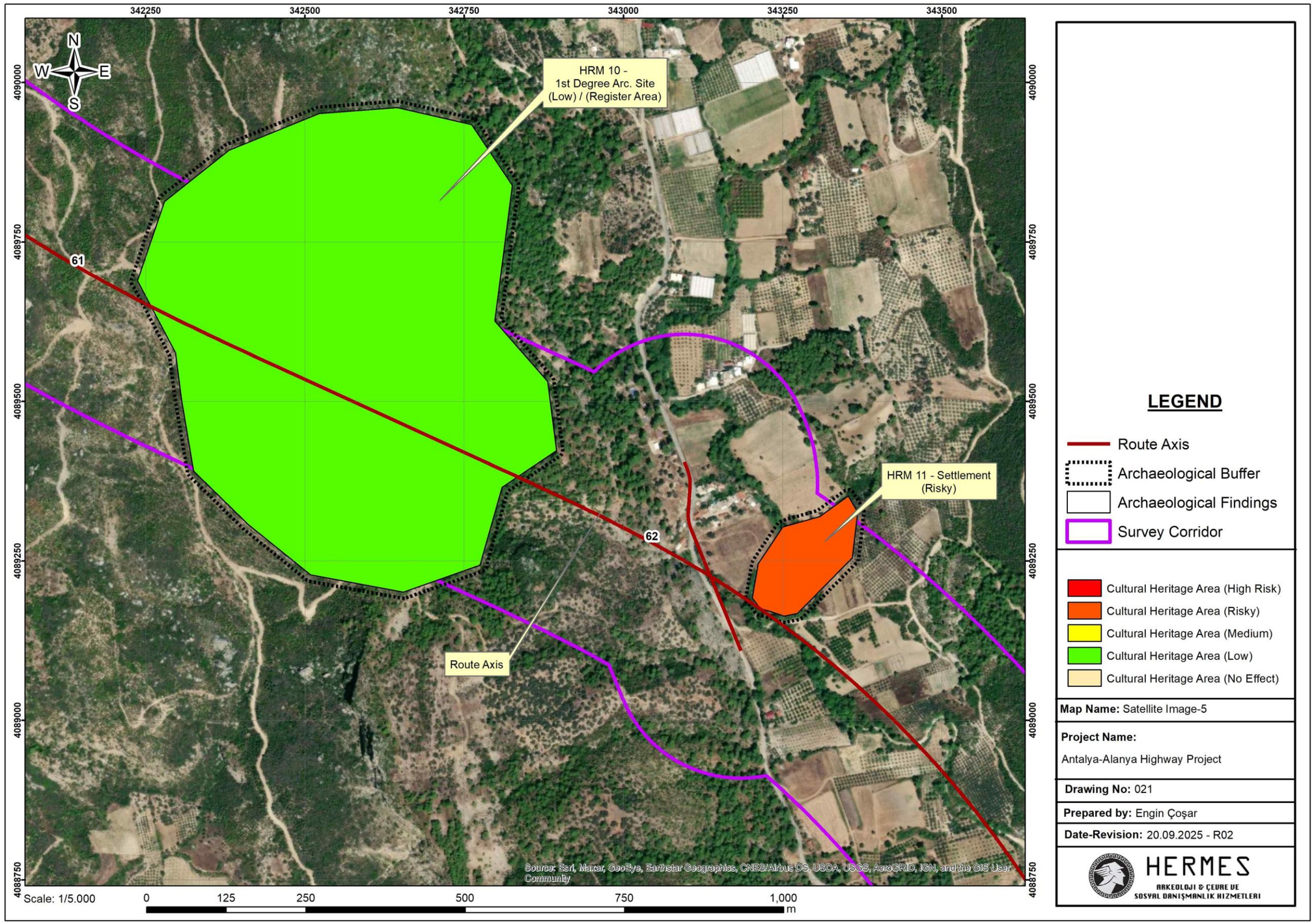
4092500
4092000
N
W
E
S
HRM 8 -
Manavgat Arc. Site Border
(No Effect) / (Register Area)
HRM 56 -
1 st Degree Arc. Site
(Medium) / (Register Area)
57
58
59
Route Axis
HRM 9 -
Late Roman Settlement
(Risky)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/7.500
0
125
250
500
750
1,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-4
Project Name:
Antalya-Alanya Highway Project
Drawing No: 020
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI


342250
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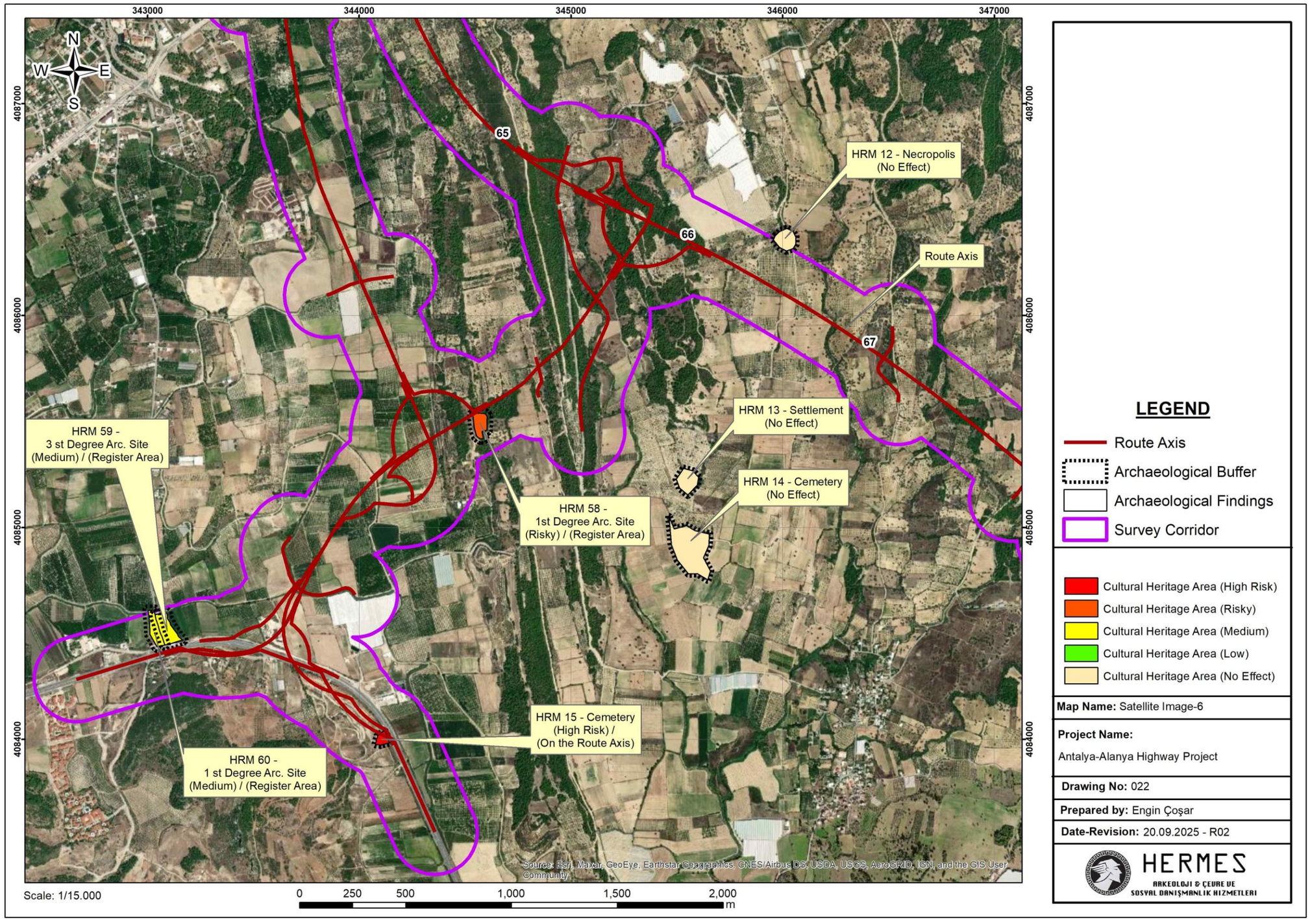
342750
343000
343250
343500
4090000
4089750
4089500
4089250
4089000
4088750
N
W
E
S
HRM 10 -
1st Degree Arc. Site
(Low) / (Register Area)
HRM 11 - Settlement
(Risky)
61
62
Route Axis
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/5.000
0
125
250
500
750
1,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-5
Project Name:
Antalya-Alanya Highway Project
Drawing No: 021
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI


343000
344000
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346000
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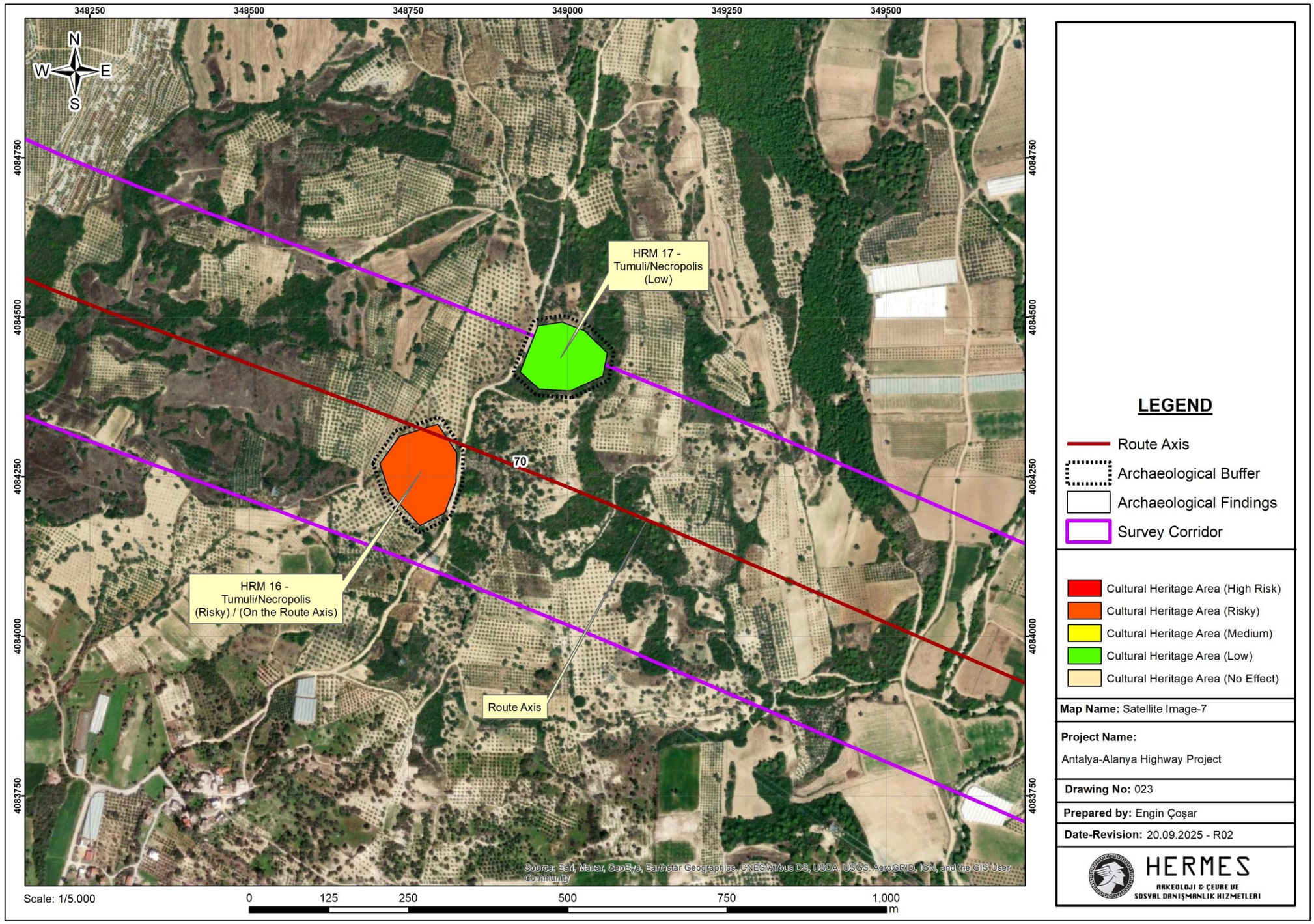
4087000
4086000
4085000
4084000
N
W
E
S
65
66
67
HRM 12 - Necropolis
(No Effect)
Route Axis
HRM 13 - Settlement
(No Effect)
HRM 14 - Cemetery
(No Effect)
HRM 59 -
3 st Degree Arc. Site
(Medium) / (Register Area)
HRM 58 -
1st Degree Arc. Site
(Risky) / (Register Area)
HRM 15 - Cemetery
(High Risk) /
(On the Route Axis)
HRM 60 -
1 st Degree Arc. Site
(Medium) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-6
Project Name:
Antalya-Alanya Highway Project
Drawing No: 022
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI


348250
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349250
349500
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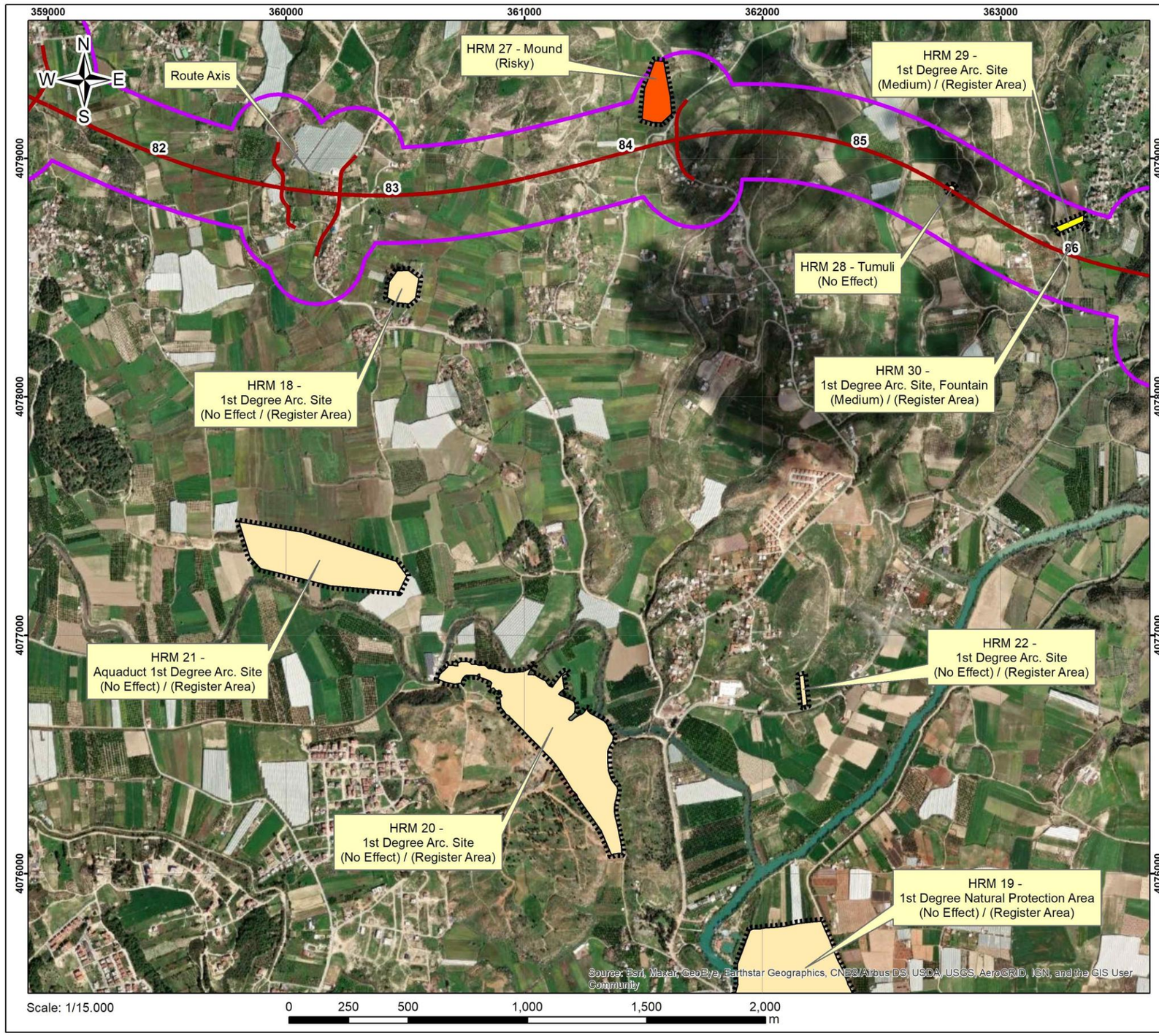
4084000
4083750
N
W
E
S
HRM 17 - Tumuli/Necropolis (Low)
HRM 16 - Tumuli/Necropolis (Risky) / (On the Route Axis)
70
Route Axis
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/5.000
0
125
250
500
750
1,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-7
Project Name:
Antalya-Alanya Highway Project
Drawing No: 023
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Satellite Image-8

Project Name:
Antalya-Alanya Highway Project

Drawing No: 024

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
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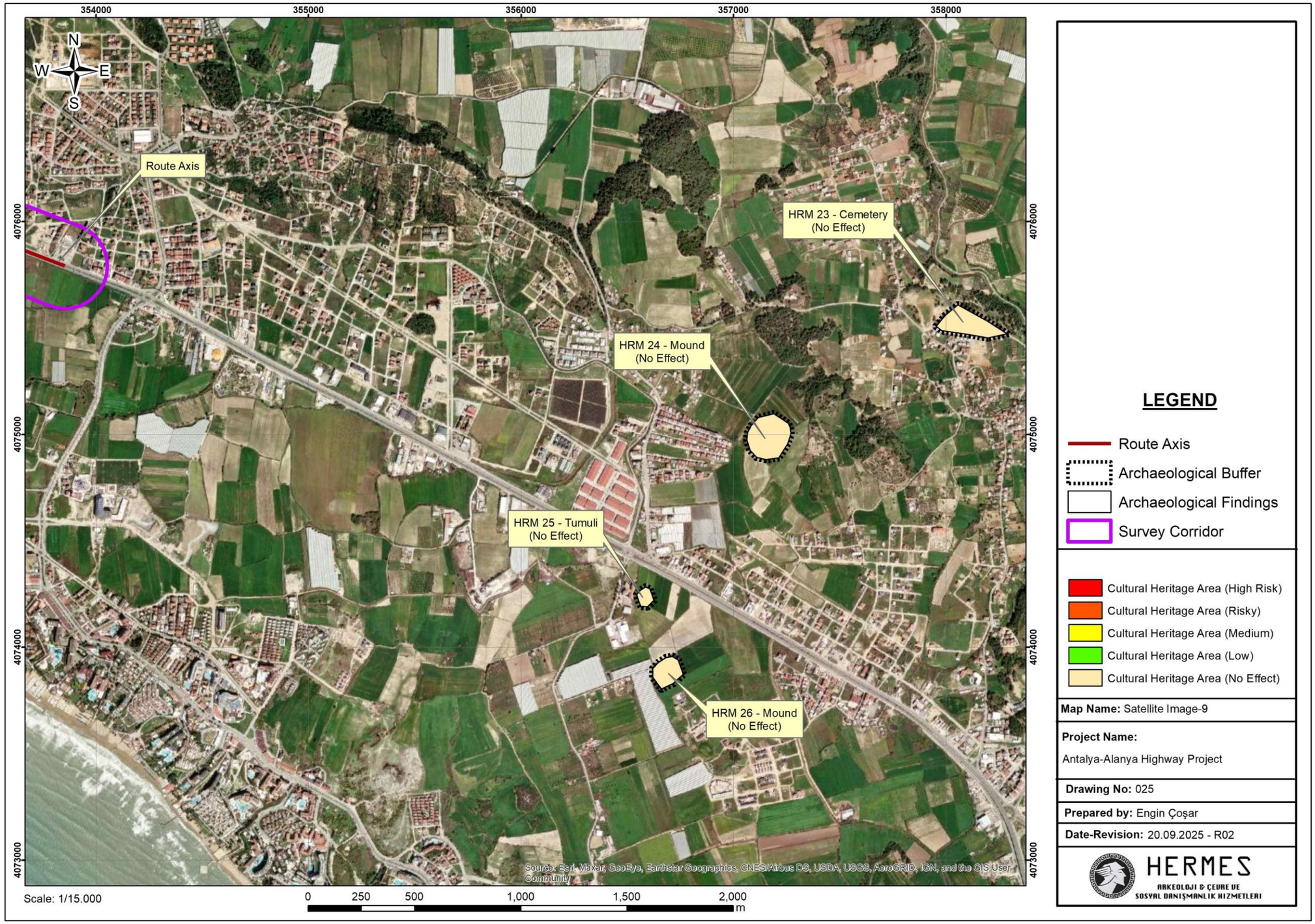
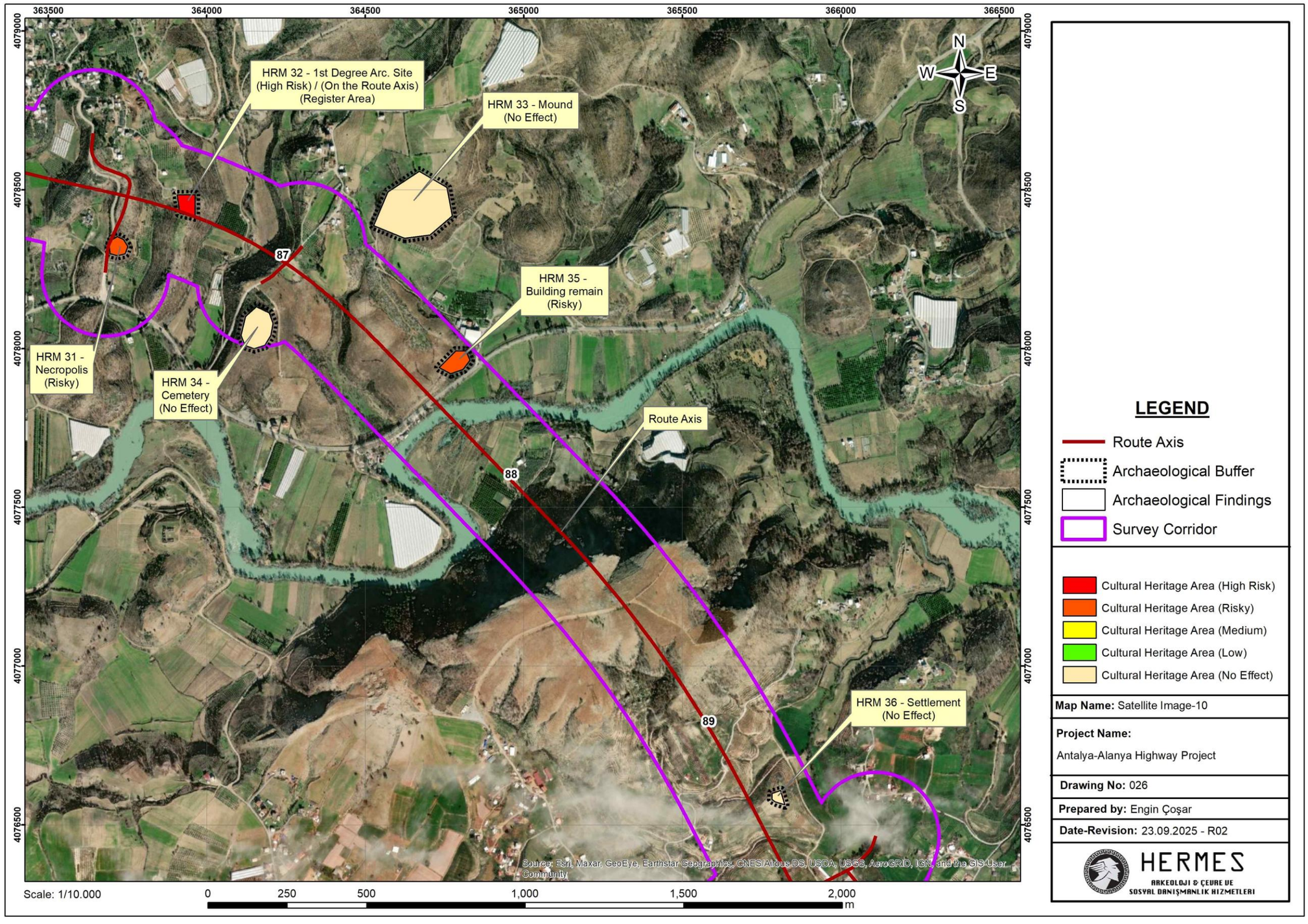
SOSYAL DANIŞMANLIK HIZMETLERI


354000
355000
356000
357000
358000
4076000
4075000
4074000
4073000
N
W
E
S
Route Axis
HRM 23 - Cemetery
(No Effect)
HRM 24 - Mound
(No Effect)
HRM 25 - Tumuli
(No Effect)
HRM 26 - Mound
(No Effect)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-9
Project Name:
Antalya-Alanya Highway Project
Drawing No: 025
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI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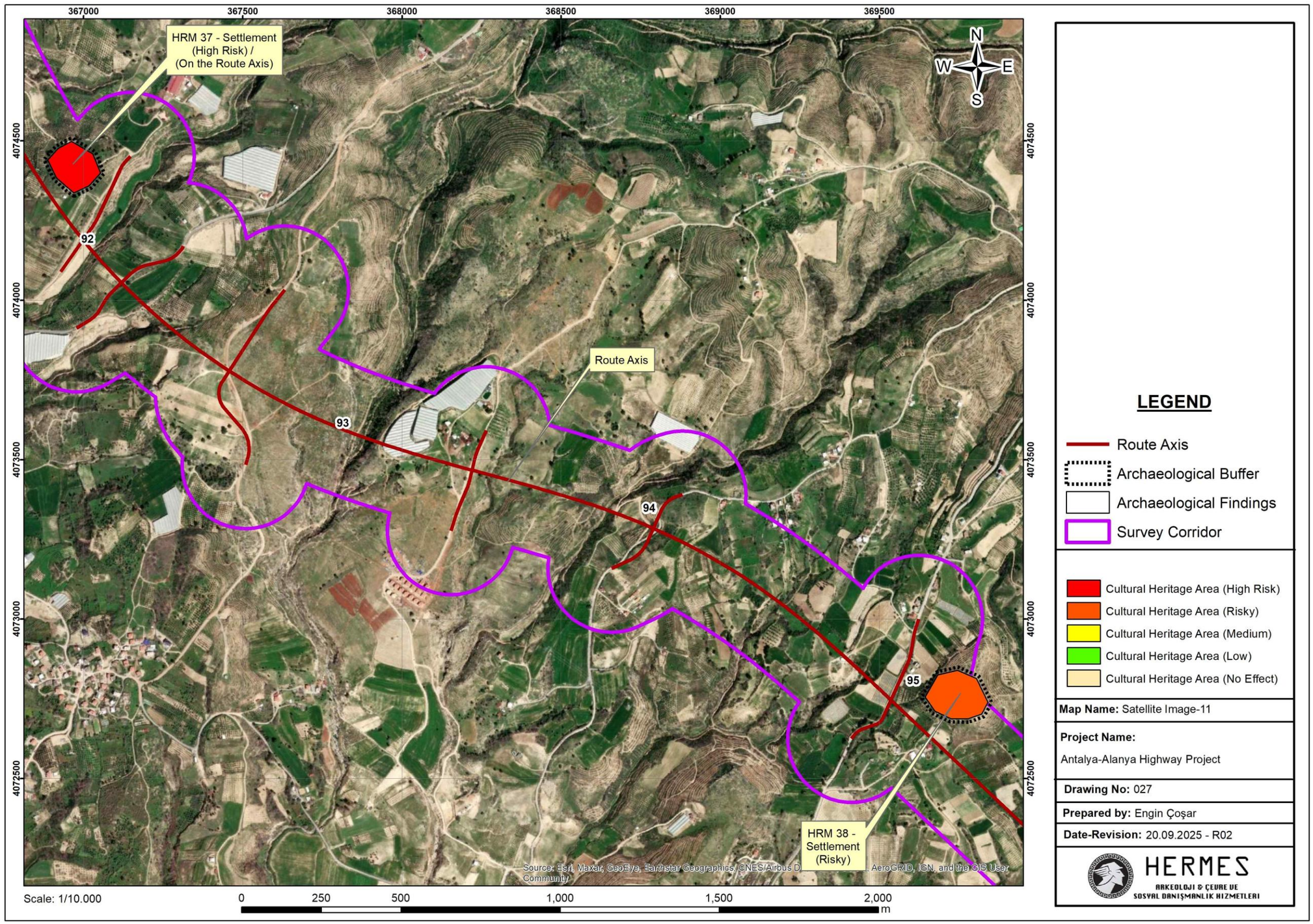
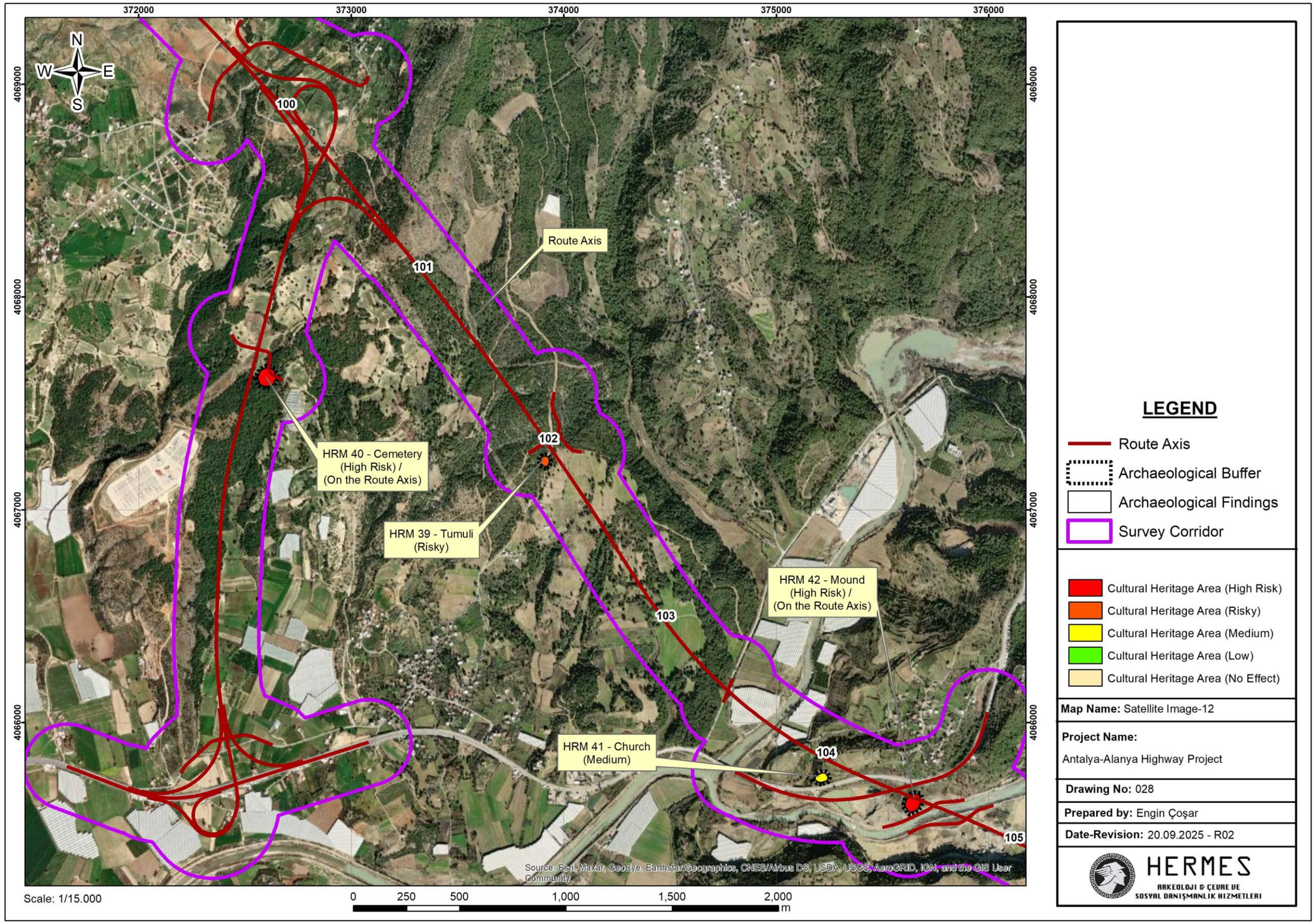
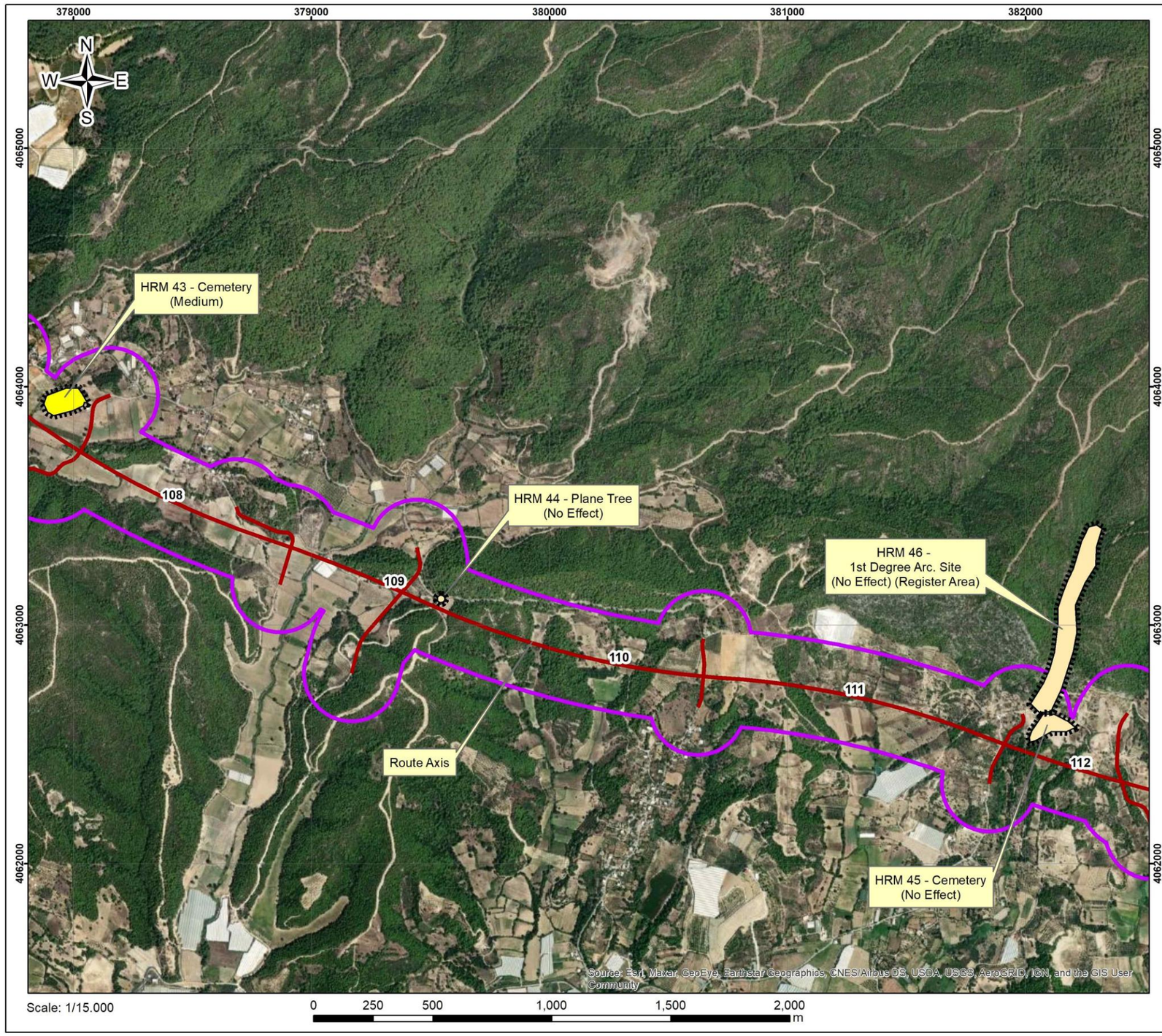
364500
365000
365500
366000
366500
4079000
4078500
4078000
4077500
4077000
4076500
N
W
E
S
HRM 32 - 1st Degree Arc. Site (High Risk) / (On the Route Axis) (Register Area)
HRM 33 - Mound (No Effect)
HRM 35 - Building remain (Risky)
HRM 31 - Necropolis (Risky)
HRM 34 - Cemetery (No Effect)
Route Axis
HRM 36 - Settlement (No Effect)
87
88
89
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/10.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-10
Project Name:
Antalya-Alanya Highway Project
Drawing No: 026
Prepared by: Engin Çoşar
Date-Revision: 23.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI


367000
367500
368000
368500
369000
369500
4074500
4074000
4073500
4073000
4072500
HRM 37 - Settlement (High Risk) / (On the Route Axis)
92
93
94
95
Route Axis
HRM 38 - Settlement (Risky)
N
W
E
S
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus D... AeroGRID, IGN, and the GIS User Community
Scale: 1/10.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-11
Project Name:
Antalya-Alanya Highway Project
Drawing No: 027
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI


372000
373000
374000
375000
376000
4069000
4068000
4067000
4066000
N
W
E
S
100
101
102
103
104
105
Route Axis
HRM 40 - Cemetery
(High Risk) /
(On the Route Axis)
HRM 39 - Tumuli
(Risky)
HRM 42 - Mound
(High Risk) /
(On the Route Axis)
HRM 41 - Church
(Medium)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-12
Project Name:
Antalya-Alanya Highway Project
Drawing No: 028
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI



LEGEND

- Route Axis
- Archaeological Buffer
- Archaeological Findings
- Survey Corridor
- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Satellite Image-13

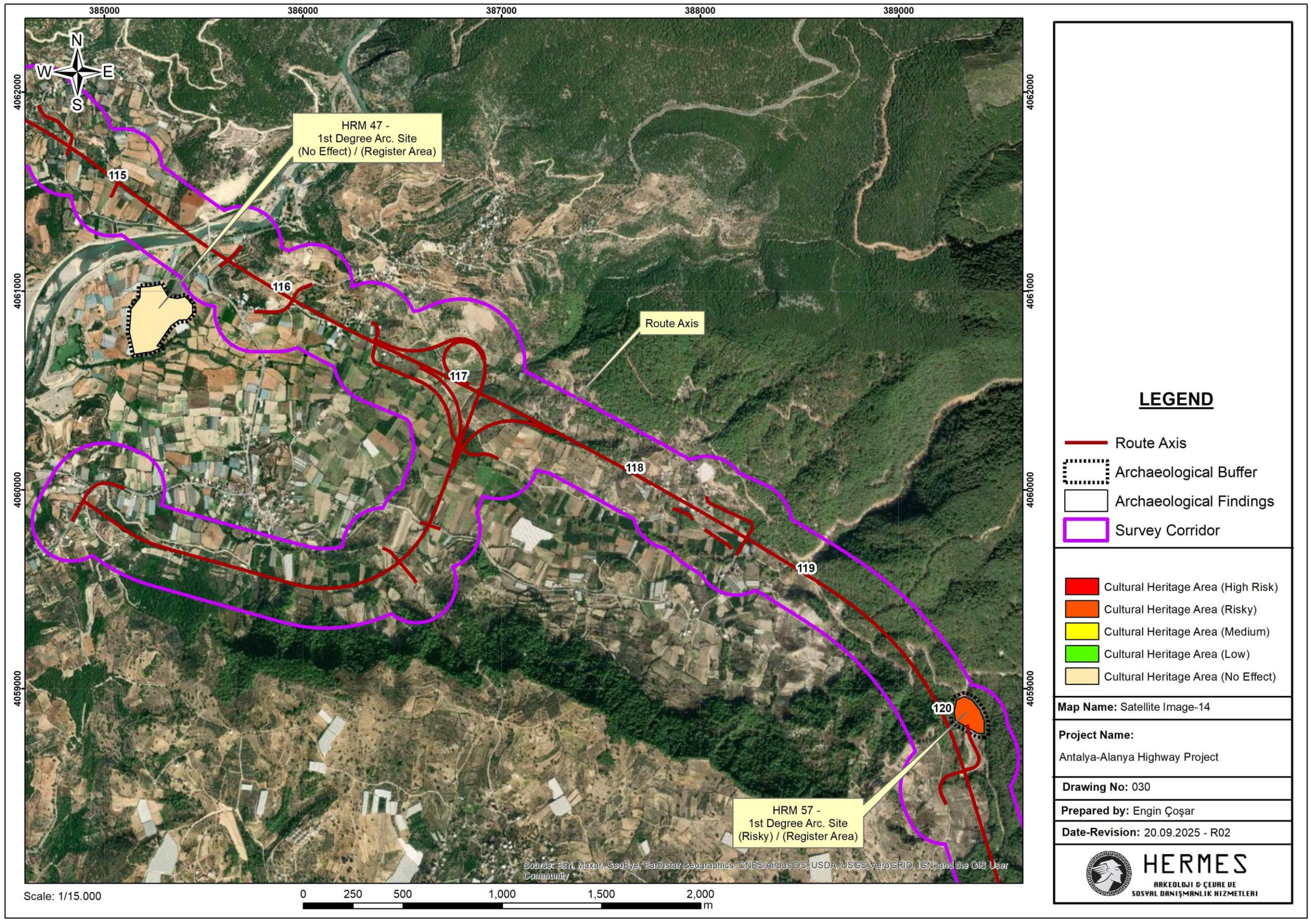
Project Name:
Antalya-Alanya Highway Project

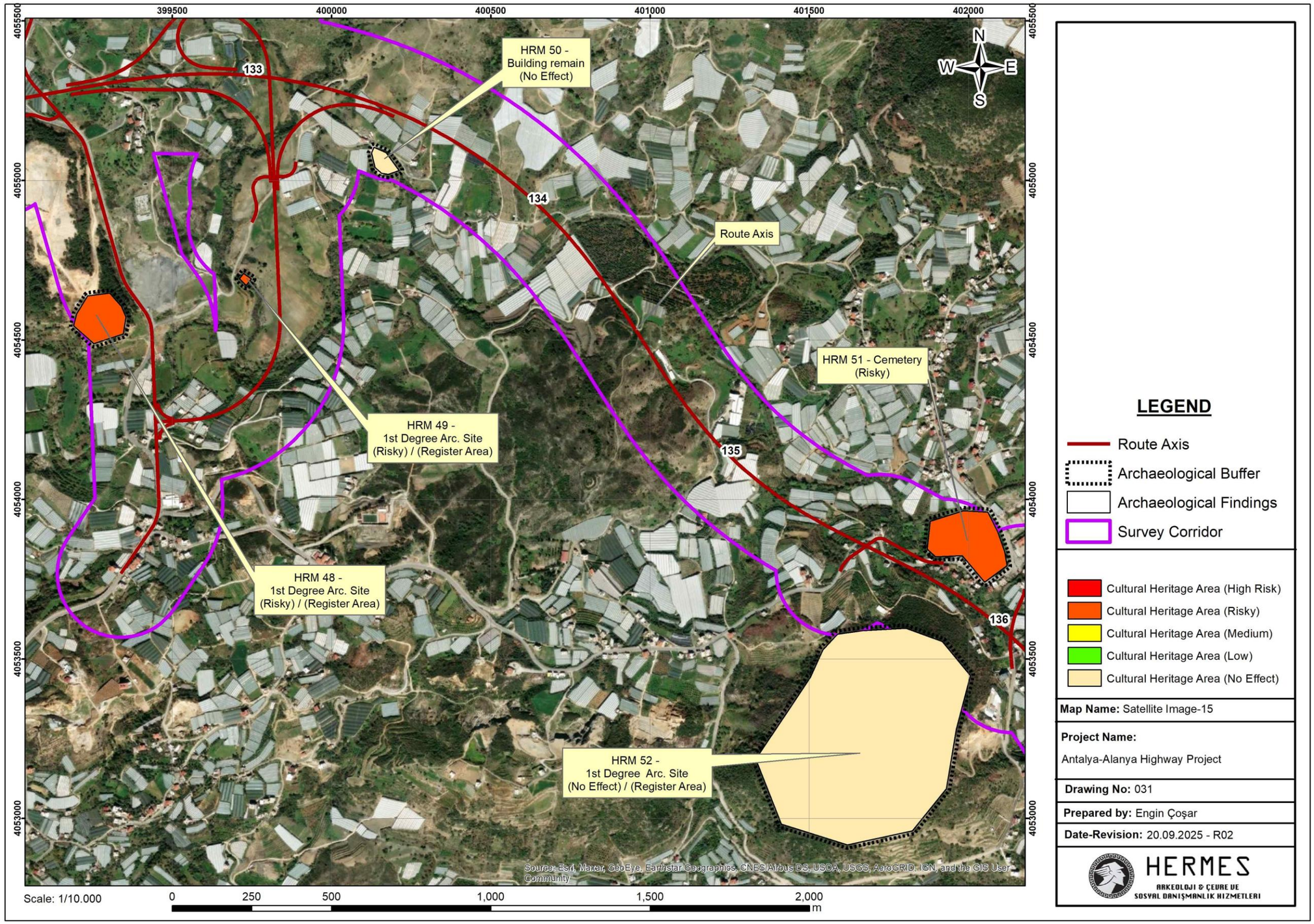
Drawing No: 029

Prepared by: Engin Çoşar

Date-Revision: 20.09.2025 - R02

HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI


385000
386000
387000
388000
389000
4062000
4061000
4060000
4059000
N
W
E
S
HRM 47 -
1st Degree Arc. Site
(No Effect) / (Register Area)
115
116
117
118
119
120
Route Axis
HRM 57 -
1st Degree Arc. Site
(Risky) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-14
Project Name:
Antalya-Alanya Highway Project
Drawing No: 030
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI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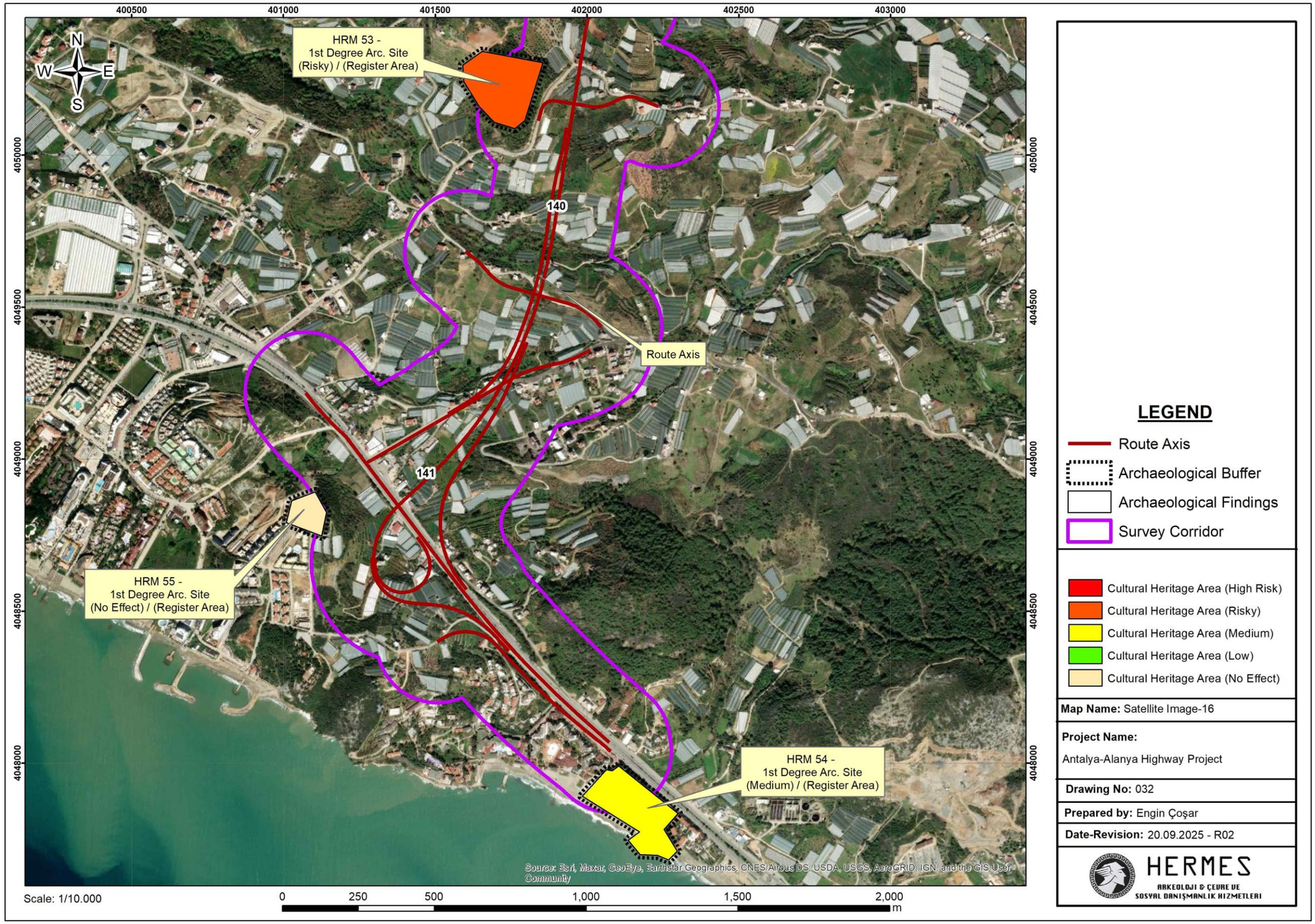
4055000
4054500
4054000
4053500
4053000
133
134
135
136
N
W
E
S
HRM 50 -
Building remain
(No Effect)
Route Axis
HRM 51 - Cemetery
(Risky)
HRM 49 -
1st Degree Arc. Site
(Risky) / (Register Area)
HRM 48 -
1st Degree Arc. Site
(Risky) / (Register Area)
HRM 52 -
1st Degree Arc. Site
(No Effect) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/10.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-15
Project Name:
Antalya-Alanya Highway Project
Drawing No: 031
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI


400500
401000
401500
402000
402500
403000
4050000
4049500
4049000
4048500
4048000
N
W
E
S
HRM 53 -
1st Degree Arc. Site
(Risky) / (Register Area)
140
Route Axis
141
HRM 55 -
1st Degree Arc. Site
(No Effect) / (Register Area)
HRM 54 -
1st Degree Arc. Site
(Medium) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/10.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Buffer
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-16
Project Name:
Antalya-Alanya Highway Project
Drawing No: 032
Prepared by: Engin Çoşar
Date-Revision: 20.09.2025 - R02
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SOSYAL DANIŞMANLIK HIZMETLERI



ANTALYA ALANYA MOTORWAY PROJECT

CHANCE FIND PROCEDURE

REV 3

Revision LOG			
REV. Date	**Prepared by**	**Quality Checked by**	**Reviewed and Approved by**
02.09.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**
22.09.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**
23.10.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**

HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI

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OCTOBER/2025

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3. PROCEDURE **6**

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APPENDICES

APPENDIX 1: CHANCE FIND REPORT FORM

APPENDIX 2: CHANCE FINDS REGISTER

APPENDIX 3: CONTACT INFORMATION OF RELATED MUSEUM DIRECTORATES AND REGIONAL BOARD DIRECTORATES,

APPENDIX 4: MAPS OF ARCHAEOLOGICAL SITES

ABBREVIATIONS

CHMP	Cultural Heritage Management Plan
ICOMOS	International Council of Monuments and Sites
IFA	Institute of Field Archaeologists
No	Number
PROJECT	Antalya Alanya Motorway Project
UNESCO	United Nations Educational, Scientific and Cultural Organization

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1. PURPOSE and SCOPE

The Archaeological Chance Find Procedure (CFP) has been prepared to provide clear guidance to all parties and employees on the actions to be taken in the event of the discovery of an archaeological asset. As archaeological finds may be encountered during the construction activities of the Project, this procedure sets out the minimum requirements to ensure their protection.

Any activity involving excavation, trenching, or other earthworks has the potential to uncover or inadvertently damage archaeological remains. Therefore, this procedure defines the responsibilities, reporting channels, and step-by-step measures to be implemented immediately upon encountering a chance find.

Within the Project scope, priority must always be given to avoidance of impacts on identified archaeological sites, primarily through route realignment or design modification. Where avoidance is not feasible, national legislation and international standards must be applied, and the relevant management plans and procedures implemented.

The CFP is designed as an emergency response mechanism in areas of predicted low archaeological sensitivity. It is not a substitute for systematic baseline reconnaissance or pre-construction archaeological surveys, which remain mandatory in areas identified as medium or high sensitivity.

2. ROLES AND RESPONSIBILITIES

The Project Owner will be responsible for the preparation and implementation of the environmental and social impact assessment-based management plans, which will be project specific. These plans shall be practical, detailed procedures for use in the field.

The Project Owner will ensure the implementation of the commitments stated in the ESIA and will be responsible for the performance of all sub-contractors with respect to project-specific plans. All contractors shall comply with relevant project standards, statutory requirements, permit and license conditions, and the Project Owner shall secure all applicable permits and licenses.

All project personnel **shall receive archaeological awareness training**. These trainings will be delivered **to all new employees before they commence work** and will constitute **one of the mandatory induction trainings**. The training will be provided **by the Project Archaeologist**.

In relation to archaeological chance finds, the Project Archaeologist is responsible for securing the area, documenting the find, and notifying the Museum Directorate immediately. The Museum Directorate is responsible for inspecting the site and reporting to the Regional Conservation Board for the Protection of Cultural Heritage, which is the sole authority to issue decisions on interventions and to authorize the restart of

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construction works. **No works may recommence until written clearance is received from the relevant authority.**

Table 1 Chance Find Procedure – Roles and Responsibilities Table

Actor / Party	Responsibilities	Authority
Project Archaeologist	- Stop works immediately upon discovery - Secure the area - Document with coordinates, photos, and forms - Notify the Museum Directorate - All site-based contractors have the authority to stop works is they suspect an archaeological chance find, and report to the Project Archaeologist	Has the authority to stop works. No authority to restart works.
Project Owner	- Ensure implementation of CHMP and CFP - Monitor contractor compliance - Coordinate with Museum Directorate and Regional Conservation Board	Responsible for managing legal processes. No authority to restart works.
Contractor	- Comply with procedures - Cease works when instructed - Follow directions from Project Archaeologist and Project Owner.	Cannot authorize restart. Acts only as the implementer. All site-based contractors have the authority to stop works is they suspect an archaeological chance find, and report to the Project Archaeologist.
Museum Directorate	- Receive notification - Conduct site inspection - Report findings to the Regional Conservation Board	Cannot authorize restart. Provides technical assessment and reporting.
Regional Conservation Board	- Decide on interventions regarding the site - Define protective measures for the find - Provide written clearance for the resumption of works	Sole authority to authorize the restart of construction works (in writing).

2.1 Chain of Custody for Archaeological Finds

All archaeological finds shall be managed under a clear and transparent chain of custody to ensure accountability and integrity. The process will be implemented as follows:

1. Initial Discovery and Recording
   - The Project Archaeologist documents the find with photographs, GPS coordinates, and forms.
   - The find shall be secured in situ, not moved, and kept under protection until the Museum representative arrives on site.

2. Handover to the Museum Directorate
   - The Project Archaeologist prepares a handover form including description, coordinates, and condition of the find.

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- The form is signed by both the Project Archaeologist and the Museum representative.
- The artefacts are handed over directly to the Museum representative on site, and an official handover receipt is obtained.

3. Museum Responsibility

- The Museum Directorate is the competent and responsible authority for all excavations and interventions to be conducted on the archaeological site.
- From the moment of handover, the transportation and custody of the artefacts fall under the full responsibility of the Museum Directorate.

4. Record Keeping

- All handover forms and custody records are archived by the Project Owner.
- Copies are entered into the Chance Finds Register and made available for lender review upon request.

No archaeological find may be removed from the site or transported without official documentation and signatures ensuring the chain of custody.

2.2 Requirements Related to Human Remains

In the event that human remains are encountered during Project activities, the following requirements shall apply in addition to the Chance Find Procedure:

1- Immediate Cessation of Works

- All works in the vicinity of the find must stop immediately.
- The area shall be secured by the Project Archaeologist and marked as a restricted zone.

2- Respectful In Situ Protection

- Human remains shall not be moved, disturbed, or removed by Project staff under any circumstances.
- The remains must be left in situ under protection until competent authorities arrive.

3- 3- Notification of Authorities

- The Project Archaeologist shall immediately notify the Museum Directorate, which will dispatch experts to the site.
- If the remains are suspected to be contemporary burials, local law enforcement shall also be informed, in line with national legal requirements.

4- Authority and Oversight

- The Museum Directorate is the competent authority for conducting or overseeing any excavation, exhumation, or handling of archaeological human remains.
- All decisions regarding the treatment, removal, or relocation of remains are subject to the written approval of the Regional Conservation Board.

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- If the remains are dated to the modern period, the case may be treated as a criminal matter. In such cases, a judicial investigation and police follow-up will be required, and all actions will be carried out in accordance with the instructions of the Public Prosecutor's Office.

5- Documentation and Custody

- The Project Archaeologist shall record the location, context, and condition of the remains through photographs, GPS, and official forms.
- A handover form must be completed at the time of transfer to the Museum authorities, ensuring a clear chain of custody.

6- Community Sensitivities

- All works must respect local cultural and religious sensitivities related to burial traditions.
- Engagement with local communities shall be conducted through the Project Archaeologist and Consultant Archaeologist, with sensitivity to intangible heritage values.

No human remains may be disturbed, removed, or transported without the explicit instruction and supervision of the Museum Directorate, and the written approval of the Regional Conservation Board.

2.3 Management of Cultural Heritage

The basic definitions regarding the management of cultural heritage are given in the following bullets:

- Ministry of Culture and Tourism is the responsible authority.
- Museum Directorate is responsible to provide experts for the sites within 24 hours after being informed and to officially define the Chance Find (see Appendix-1). ***Museum directorate is responsible excavation of chance find areas. Museum Directorate will follow the directions and decisions from Regional Board Directorate of Protection of Cultural Heritage***.
- ***Regional Board Directorate of Protection of Cultural Heritage*** is the only decision maker on any intervention, which would be made on the site after the chance find.
- Project Owner is responsible for the management of archaeological issues during the progress of construction of the Project site area and implementation of related management plan and chance find procedure.
- *Project Owner will employ archaeologists at the Project site responsible for the monitoring of ground disturbance activities. They are also responsible with the*

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monitoring of the implementation of the Cultural Heritage Management Plan (CHMP) and chance find procedure.

- *Project Owner will ensure that Chance Finds procedure is adequately enforced during ground disturbance activities. During the implementation of the Chance Finds procedure on site, Project Owner will directly report the issue to Museum archaeologist and relevant Regional Preservation Board.*
- *Salvage excavation (and other Chance find issues) (If necessary) are under the responsibility of Project Owner.*
- Project Owner is also responsible for giving necessary trainings to the field staff about the implementation of the chance find procedure.
- *Project Owner will record all chance finds on the Chance Finds Report Form and in the Chance Finds Register as per the Chance Find Procedure in Appendix-1.*

2.4 Management Structure and Responsibilities

Project Owner will be responsible for the management of the plan and procedure about archaeological issues of Project site. The Archaeologist of Project Owner will train the employees about cultural heritage and chance find procedure (see Section 4.1). Also, the monitoring of the construction works will be the responsibility of Project Owner Archaeologist.

The Project Manager will be in charge of the all-construction work team.

It should be noted that, if a potential archaeological feature or any suspicious find is encountered in the field, the team that discovers the find shall immediately stop work. This requirement applies to all site personnel without exception.

Following the discovery of a potential find and the suspension of works, the site archaeologist shall be informed without delay, and arrangements shall be made for the archaeologist to carry out an on-site inspection promptly.

This responsibility applies to all site personnel.

The Archaeologists will work with the equipment operators and have authority to the stop work. Each will accompany a topsoil stripping crew during ROW clearing. They will direct the operator to stop work or redirect stripping activities in case of a chance find. They will submit scheduled progress reports and special reports of chance finds to Environmental and Social Coordinators.

In addition to the Chance Find Procedure, the Antalya Regional Board Directorates will decide for the requirement of a salvage excavation if needed. The contact information of these board directorate is given in Appendix-2. The excavation permissions will be obtained by the relevant museum directorate from the General Directorate of Cultural

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Heritage and Museums. Following the permission, Project Owner will provide a team of qualified archaeologist to conduct the salvage excavation within the framework of their contract under the guidance of Project Archaeologist / Consultant archaeologist, who will follow the instructions of the related museum directorate). These works may cover non- destructive research methods such as remote sensing and geophysics and test pit excavations. The negotiations and meetings with the related Regional Board Directorate of Protection of Cultural Heritage on technical topics during and after the salvage excavation will be held by Project Archaeologist / Consultant archaeologist.

3. PROCEDURE

Any physical remains of past human activity, including artifacts, plant and animal remains, structural remains and soil features are defined as archaeological entities. All actions to be carried out in case of discovery of an archaeological entity should comply with the Law on Cultural and Natural Assets Conservation Law Numbered 2863 (**Law Number**: 2863, **Date of Approval**: 21.7.1983, **Publication in the Official Gazette**: Date: 23/7/1983 No: 18113).

In the event of discovery of an archaeological entity, the following procedure shall be implemented:

- All construction and other relevant activities in the vicinity of the chance find will be ceased by the Archaeologist of Project Owner or anyone, who encounters a chance find.
- Project archaeologist will contact construction manager as soon as a chance find is encountered.
- Project archaeologist contacts museum directorate archaeologist immediately.
- Archaeologist of Project will properly secure chance find site via flagging, no-entry signs, etc. and prevent/limit the vehicle traffic within the immediate vicinity of chance find and also protect the site by not moving, removing or further disturbing the chance find.
- Boundaries of discovered archaeological site coordinates will be recorded and photograph of the location and the finding shall be taken and also video record should be made.
- The site and its vicinity will be secured against damage or loss until a final decision is made about this site by Board.
- Archaeologist of Project will fill out Part A of Chance Find Form and send a copy to Museum archaeologist within 24 hours keeping a copy for Project as a record,
- If any human remains such as contemporary grave or graveyard are noticed, security forces will be informed. Unless the remains are determined to be

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recent, the local administration (village head: mukhtar, or district governor) has the full authority.

- Further steps to be followed and proper procedures to be implemented for the management of the finding(s) (changes in the layout, conservation, preservation, restoration or salvage) will be decided and reported in writing by the Museum Directorate.
- In case the site is considered to be of no significance by the Museum Directorate, Project archaeologist will inform the Construction Manager and they will inform their managers. Subsequent of filling out Part B of Chance Find Form by Archaeologist of Project within 24 hours while retaining a copy of the Chance Find form as a record, the construction works will proceed since no further actions are required.
- In case the site is considered to be of significance by the Museum Directorate, Project archaeologist will be informed by the Museum Directorate about the decision on the further actions. Project archaeologist will inform the construction manager and their managers. Subsequent of filling out Part B of Chance Find Form by Archaeologist of Project within 24 hours while retaining a copy of the Chance Find form as a record, the instructions of the Museum Directorate will be followed. After some field investigation, Museum Directorate will declare their decision on the significance of the site and the actions to be followed as per their decision are summarized in Table 1.
- Whenever a chance find occurs, first **Appendix-1: Chance Find Report Form** shall be completed to open a record. Then the **Chance Find Register provided in Appendix-2** shall be filled in. After all procedures described in the Procedure have been completed and the official letters regarding the chance find have been received, **the record will be closed**.
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Table 2 Actions to be followed

Site to be of no Significance	Site to be of Minor Significance	Site to be of Major Significance
✓ Project's archaeologists/relevant personnel will inform their managers, ✓ Archaeologist of Project will record the decision in Part C of Chance Find Form within 24 hours, ✓ Archaeologist of Project will retain a copy of Chance Find form as a record, ✓ No further actions will be required, ✓ This step closes out the chance find procedure, ✓ Construction activities may resume.	✓ A salvage excavation is to be completed ✓ Museum Directorate will provide instructions, and/or supervision for salvage archaeological excavation Project archaeologist, ✓ Project's archaeologists will inform their managers, ✓ Under the guidance of Museum archaeologist (following instructions from other authorities, Antalya Regional Board etc.), Project will provide a team of qualified archaeologist to conduct the salvage excavation, ✓ Once the excavation is completed, Archaeologist of Project will provide a report to construction manager, ✓ Project archaeologist will provide a report to the Museum Directorate, ✓ Regional Board Directorate of Protection of Cultural Heritage will officially confirm the completion of recovery and inform Project archaeologist, ✓ Project archaeologist will inform the construction manager that no further actions are required, ✓ Project's archaeologists will inform their managers, ✓ Archaeologist of Project will record the decision in Part C of Chance Find Form within 24 hours, ✓ Archaeologist of Project will retain a copy of Chance Find form as a record, ✓ No further actions will be required, ✓ This step closes out the chance find procedure ✓ Construction activities may resume.	✓ An excavation is to be completed, ✓ Site will be treated according to "Law on the Conservation of Cultural and Natural Property (2863)", ✓ Museum Directorate will provide instructions, and/or supervision for salvage archaeological excavation to Project archaeologist, ✓ Project's archaeologists will inform construction manager and their managers, ✓ Under the guidance of Museum archaeologist (following instructions from other authorities, Antalya Regional Board etc.), Project will provide a team of qualified archaeologist to conduct the salvage excavation, ✓ Once the excavation is completed, Archaeologist of Project will provide a report to construction manager, ✓ Project archaeologist will provide a report to the Museum Directorate, ✓ Regional Board Directorate of Protection of Cultural Heritage will officially confirm the completion of recovery and inform Project archaeologist, ✓ Site will be officially recorded and protected according to Turkish regulations, ✓ Project archaeologist will inform the construction manager that no further actions are required, or that a relocation is required, ✓ Project's archaeologists will inform their managers, ✓ Archaeologist of Project will record the decision in Part C of Chance Find Form within 24 hours, ✓ Archaeologist of Project will retain a copy of Chance Find form as a record, ✓ No further actions will be required, ✓ This step closes out the chance find procedure, ✓ Construction activities may resume, or relocation is implemented.

APPENDIX-1:

CHANCE FIND REPORT FORM
RASLANTISAL BULUNTU RAPOR FORMU

To be filled out in English
Ingilizce doldurunuz

PART A BÖLÜM A		
Location: *Mevkii*	Date: *Tarih*	ID:
Name of person reporting chance find: *Rastlantısal buluntuyu rapor eden kişinin ismi*		
Name of contractor employee contacted: *İletişime geçilen yüklenici çalışanı ismi*		
Was work stopped in the immediate vicinity of chance find? *Rastlantısal buluntunun tam çevresinde iş durduruldu mu?*	☐ Yes *Evet*	☐ No *Hayır*
Was a buffer zone created to protect chance find? *Rastlantısal buluntuyu korumak için tampon bölge oluşturuldu mu?*	☐ Yes *Evet*	☐ No *Hayır*
NOTIFICATION ***BİLDİRİM***		
Contractor construction manager contacted *Yüklenici inşaat müdürü ile irtibata geçildi*	☐ Yes *Evet*	☐ No *Hayır*
PROJECT archaeologist contacted *PROJE arkeoloğu ile iletime geçildi*	☐ Yes *Evet*	☐ No *Hayır*
CHANCE FIND DETAILS ***RASLANTISAL BULUNTU AYRINTILARI***		
GPS coordinates *GPS koordinatları*	Photo record ☐Yes ☐No (HD quality – no cell phone photos) *Fotoğraf kaydı Evet Hayır* *(HD kalitesinde – cep telefonu fotoğrafı değil)* If not, explain why: *Yok ise nedenini açıklayınız* Other records ☐Yes ☐ No Specify (drawings, HD quality videos, etc.): *Diğer kayıtlar* *Evet* *Hayır Belirtin* *(çizimler, HD kalite videolar, vb.)*	

Description of chance find: *Rastlantısal buluntunun tanımı*
Description of site and vegetation: (e.g. surface sediment type, ground surface visibility, distance to closest watercourse, etc.) *Sahanın ve bitki örtüsünün tanımı: (örn. Yüzey sediman türü, yüzey zemin görünürlüğü, en yakın suyoluna olan mesafe, vb.)*
PART B ***BÖLÜM B***
NOTIFICATION OF_____MUSEUM DIRECTORATE ARCHAEOLOGIST **_____*MÜZE MÜDÜRLÜĞÜ ARKEOLOĞUNA BİLDİRİ***
PROJECT archaeologist contacted museum directorate archaeologist ☐Yes ☐No *PROJE arkeoloğu müze müdürlüğü arkeoloğu ile irtibata geçti. Evet Hayır* Date of notification: *Bildirim tarihi* Name of museum directorate archaeologist : *Müze müdürlüğü arkeoloğunun ismi* Contact number of museum directorate archaeologist: *Müze müdürlüğü arkeoloğunun iletişim numarası*
DECISION OF_____MUSEUM DIRECTORATE ARCHAEOLOGIST **_____*MÜZE MÜDÜRLÜĞÜ ARKEOLOĞUNUN KARARI***
Date of initial investigation: *İlk araştırma tarihi*

☐ Site of no significance - Construction to proceed with no further investigation – End of chance find procedure *Önemsiz saha – İnşaat daha fazla araştırma yapılmadan devam edilebilir – rastlantısal buluntu prosedürün sonu.* Date of notice to resume work : *İşe başlama tarihi bildirisi*	☐ Site of significance - Further investigation required *Önemli saha – Ek araştırma gerekmektedir* Fill out Part C *Bölüm C'yi doldurun.*

Name of museum directorate archaeologist: *Müze müdürlüğü arkeoloğunun ismi* Contact information: *İletişim numarası*		
PROJECT construction manager contacted *PROJE inşaat müdürü ile irtibata geçildi*	☐ Yes *Evet*	☐ No *Hayır*
Contractor archaeologist contacted *Yüklenici arkeoloğu ile irtibata geçildi*	☐ Yes *Evet*	☐ No *Hayır*
PART C ***BÖLÜM C***		
FURTHER FIELD INVESTIGATION *EK SAHA ARAŞTIRMASI*		
☐ Site of no significance *Önemsiz saha*	☐ Site of minor significance *Az önemli saha*	☐ Site of major significance *Çok önemli saha*
Describe additional work to be conducted: *Yapılması gereken ek işlerin tanımları*		
Date started: *Başlangıç tarihi*	Date completed: *Bitiriş tarihi*	
Date of notice to resume work : *İşe başlama tarihi bildirisi*		
Name of museum directorate archaeologist: *Müze müdürlüğü arkeoloğunun ismi:* Contact information: *İletişim numarası*		
Construction manager contacted *İnşaat müdürü ile irtibata geçildi*	☐ Yes *Evet*	☐ No *Hayır*
PROJECT archaeologist contacted *PROJE inşaat müdürü ile irtibata geçildi*	☐Yes *Evet*	☐No *Hayır*

APPENDIX 2: CHANCE FINDS REGISTER

	CHANCE FIND REGISTER
	Reporting Period:

Total of chance find	
To date	**To date**

ID (*)	DATE OF CHANCE FIND	LOCATION	CHANCE FIND SUMMARY	NAME OF AUTHORITY NOTIFIED	DATE PART A COMPLETED	DATE PART B COMPLETED	DATE PART C COMPLETED	ACTION TAKEN	STATUS OPEN OR CLOSED	REMARKS
Project 1										
Project 2										
Project 3										
Project 4										

(*) Keep same ID format

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APPENDIX 3: CONTACT INFORMATION OF RELATED MUSEUM DIRECTORATES AND REGIONAL BOARD DIRECTORATES

Table 3 Museum Contact Information

Name	Phone	Adress
Antalya Archaeology Museum	Tel: 0242 238 56 88/89	Bahçelievler Mahallesi, Konyaaltı Caddesi, No 88, 07050 ANTALYA E-posta: antalyamuzesi@kultur.gov.tr
Side Archaeology Museum	Tel: (0242) 280 23 00	Side, Liman Cd., 07330 Manavgat/Antalya

Table 4 Contact Information of Regional Board Directorates

Name	Phone	Adress
Antalya Cultural Assets Regional Board Directorate	0242) 243 21 60 (0242) 247 87 61 (0242) 244 55 74	Kılıçaslan Mahç Zafer Sk. No: 6 07100 KALEİÇİ / ANTALYA

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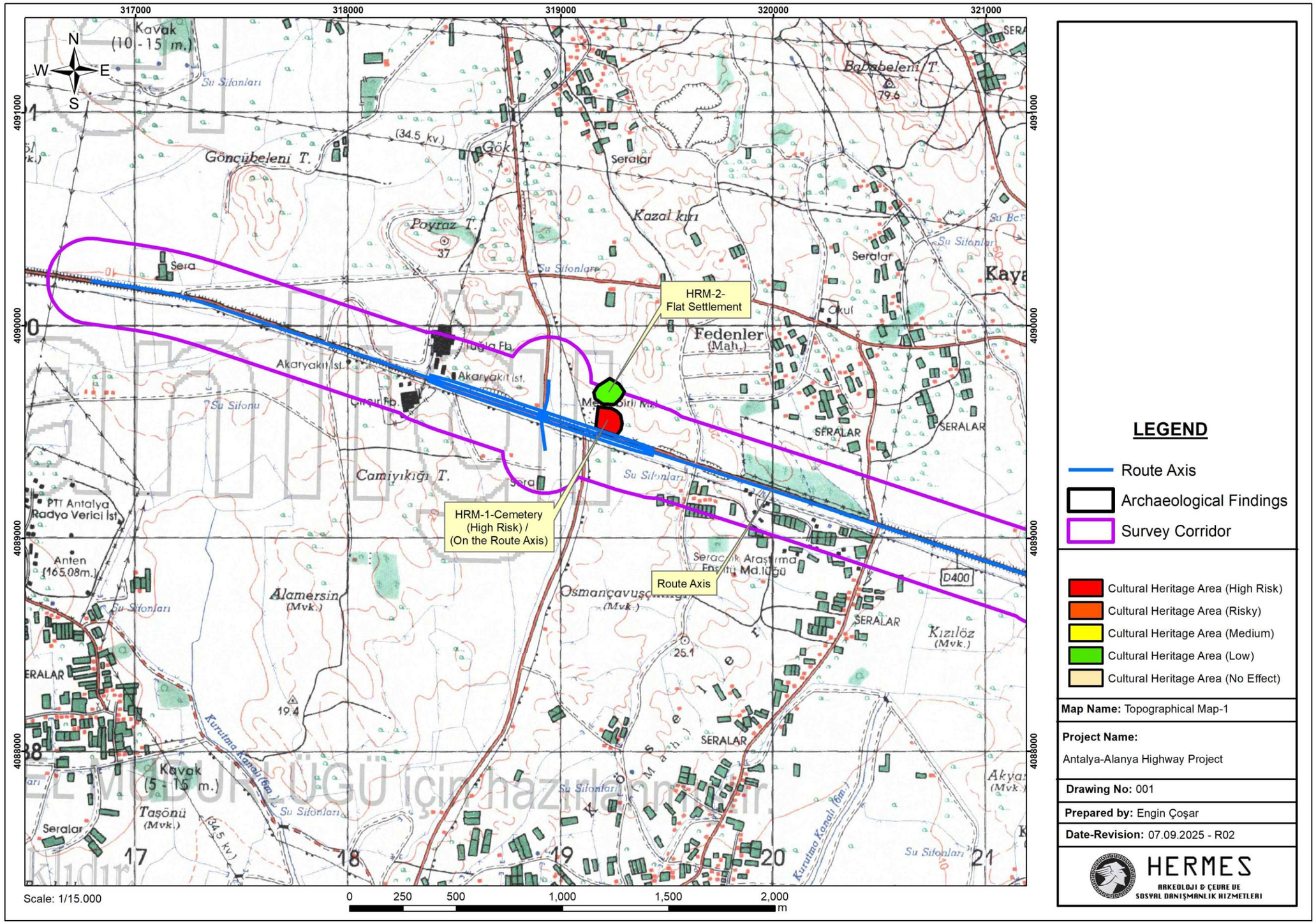
APPENDIX-4: MAPS OF ARCHAEOLOGICAL SITES FOR ROUTE AND FACİLİTİES AREAS



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-1

Project Name:
Antalya-Alanya Highway Project

Drawing No: 001

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

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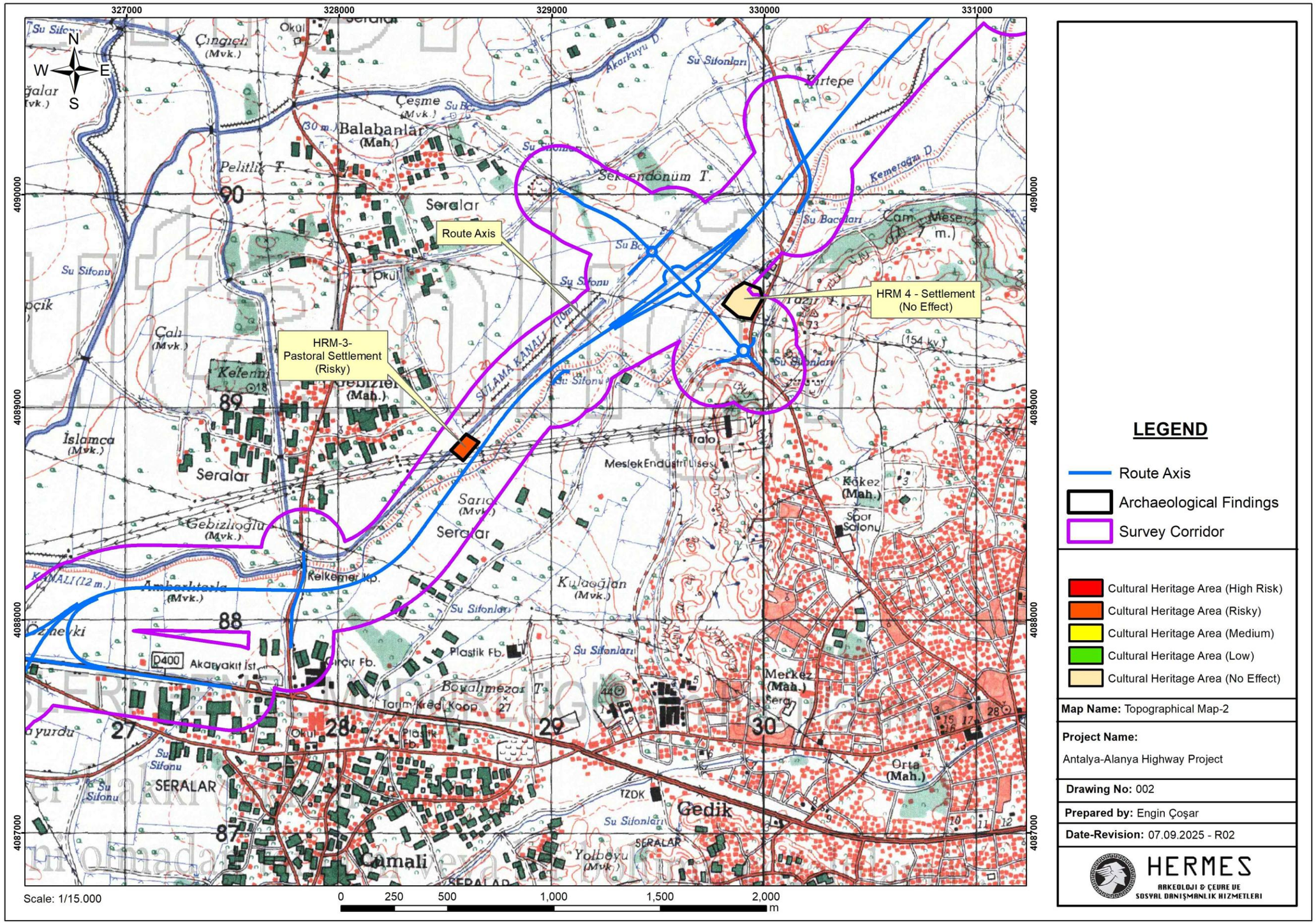
...LLER MÜDÜRLÜĞÜ için hazırlanmıştır.
...kudır



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-2

Project Name:
Antalya-Alanya Highway Project

Drawing No: 002

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

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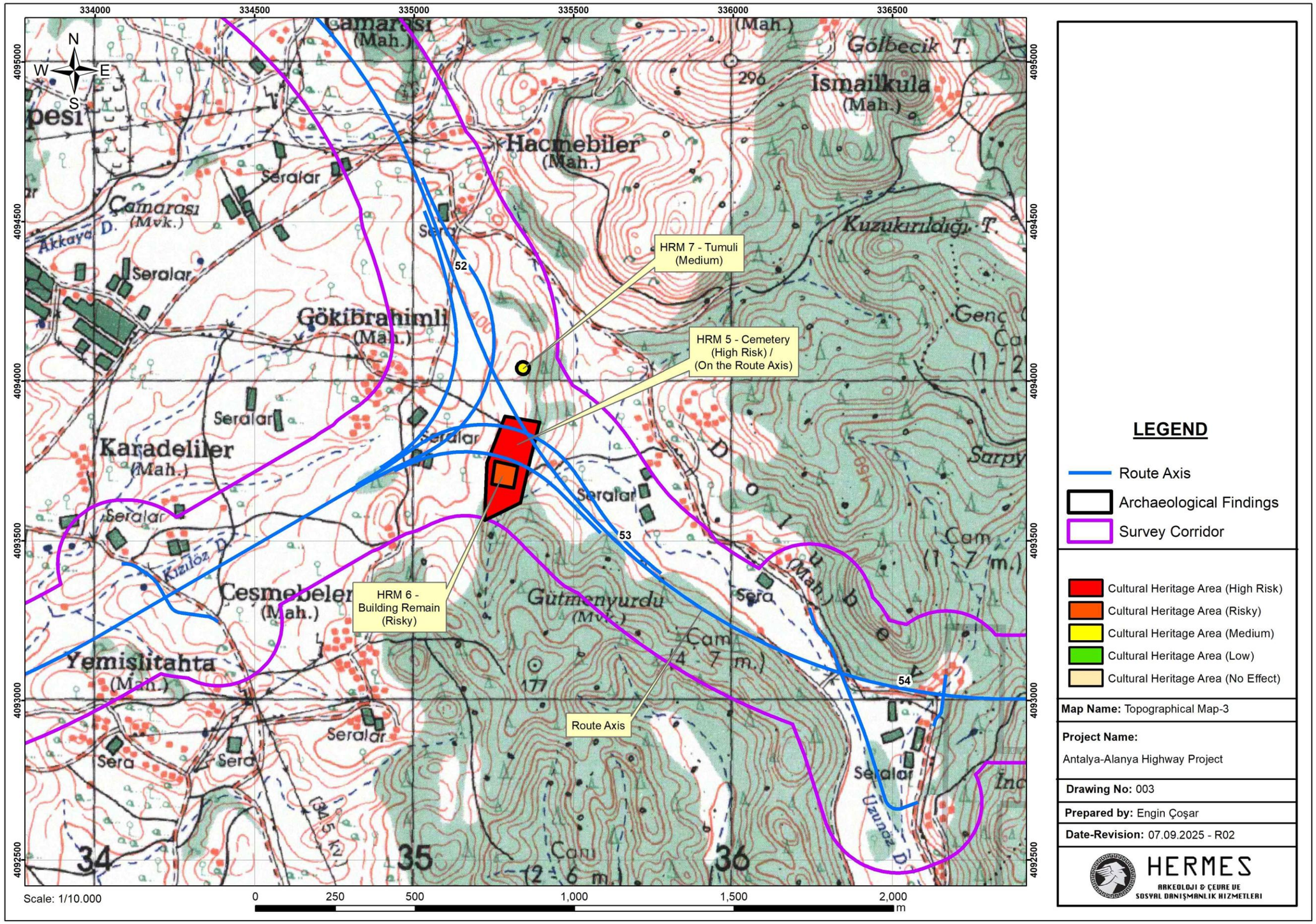

LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-3

Project Name:
Antalya-Alanya Highway Project

Drawing No: 003

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

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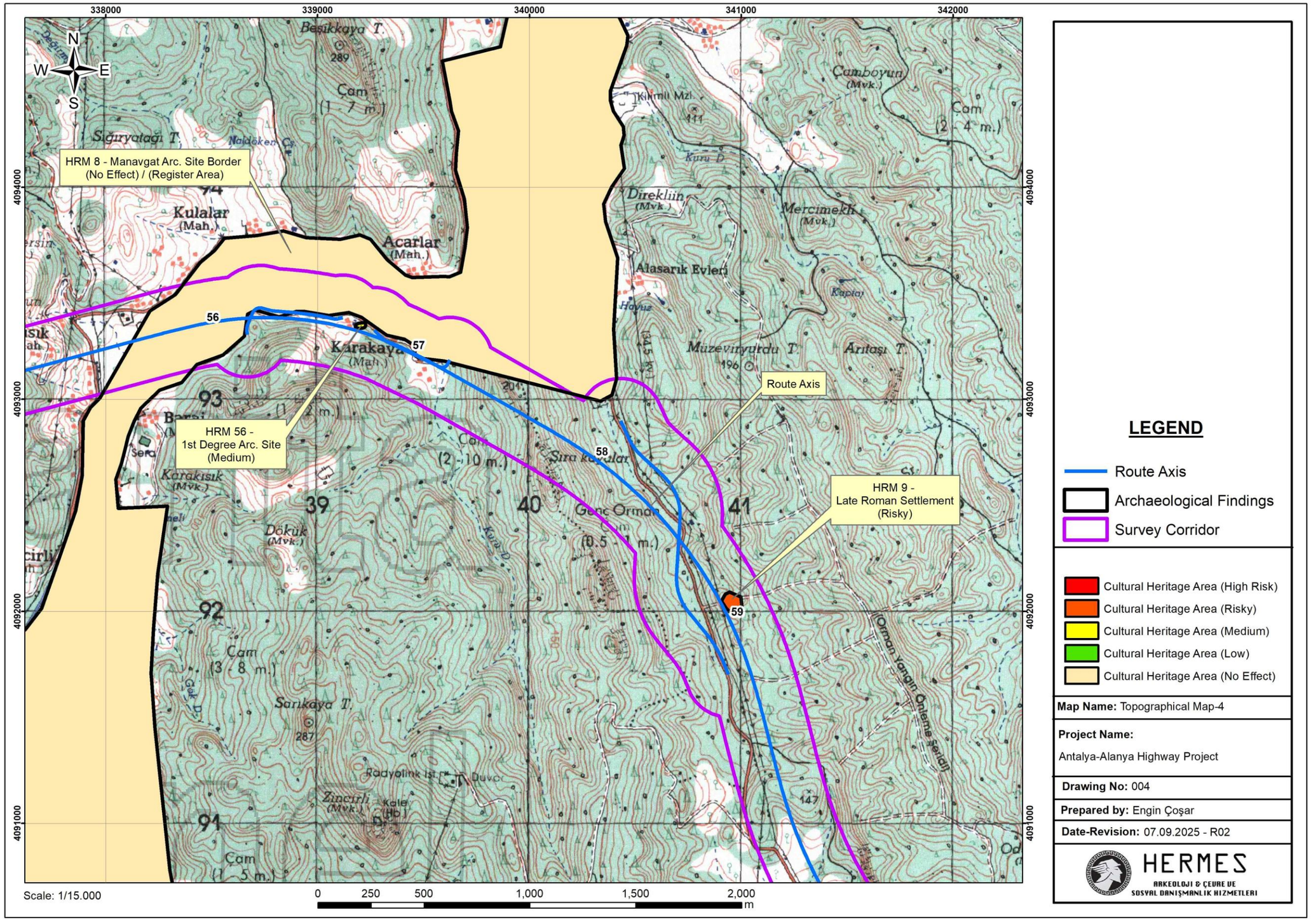

LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-4

Project Name:
Antalya-Alanya Highway Project

Drawing No: 004

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

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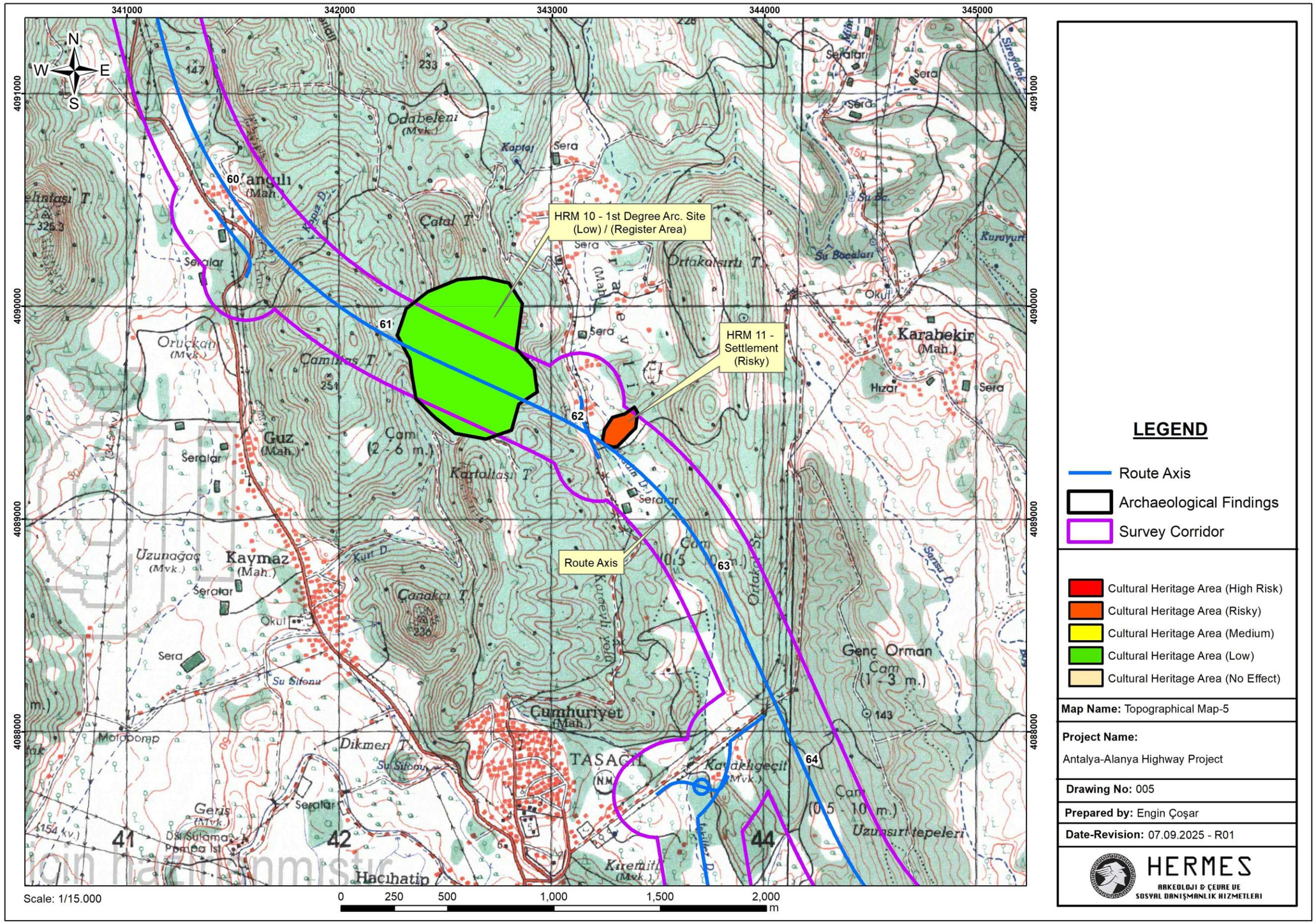

LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-5

Project Name:
Antalya-Alanya Highway Project

Drawing No: 005

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R01

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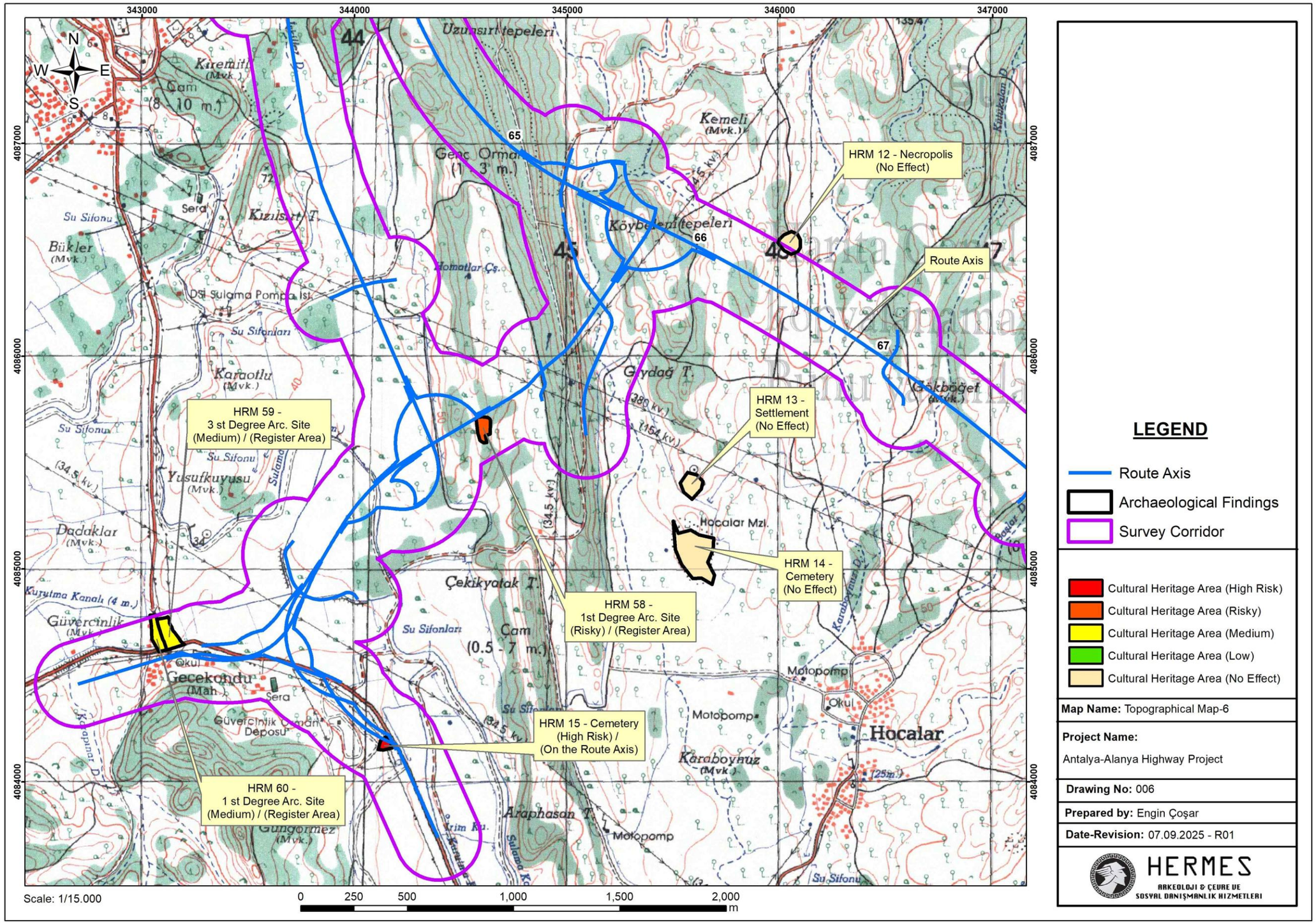
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-6

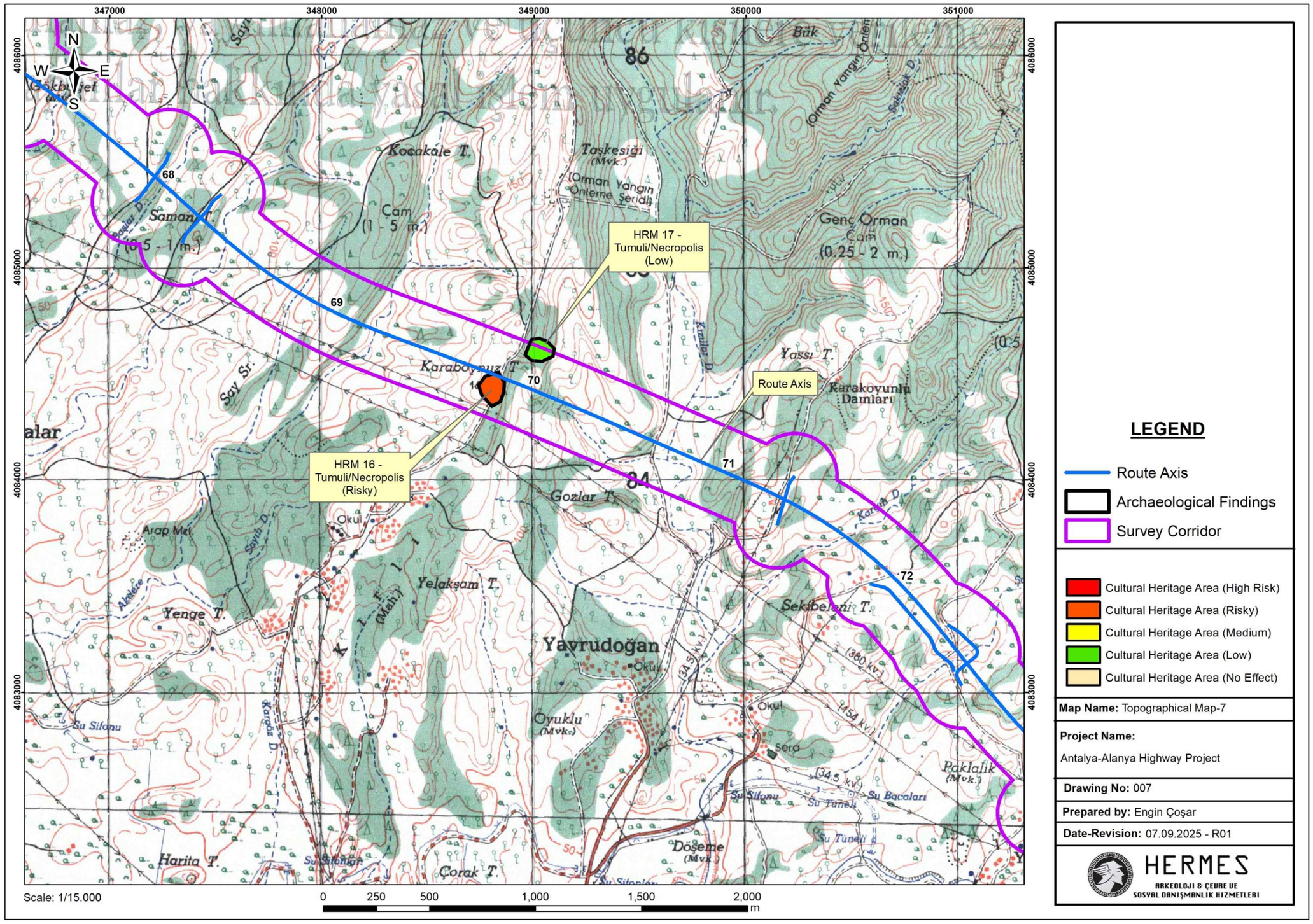
Project Name:
Antalya-Alanya Highway Project

Drawing No: 006

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R01

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-7

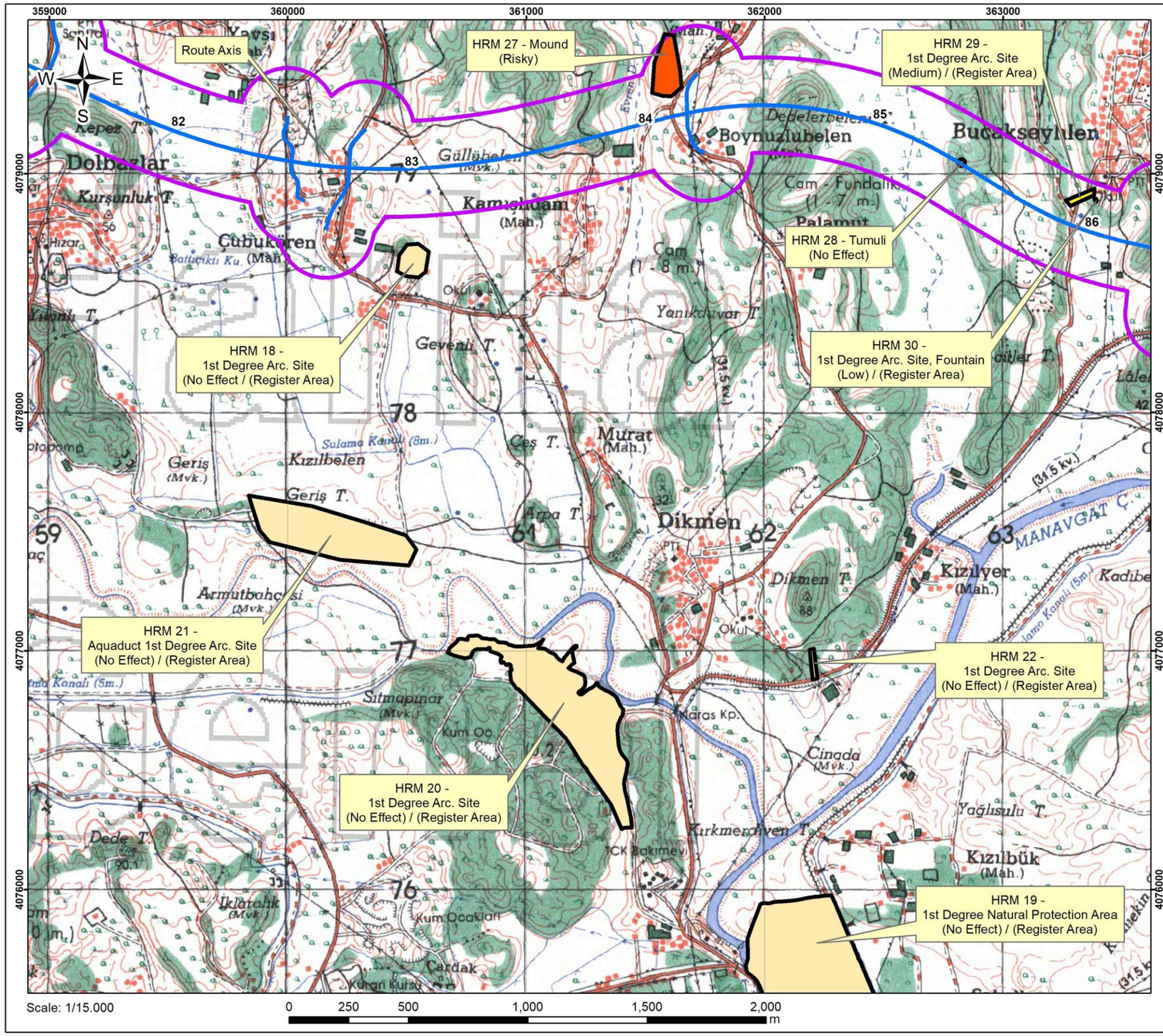
Project Name:
Antalya-Alanya Highway Project

Drawing No: 007

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R01

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-8

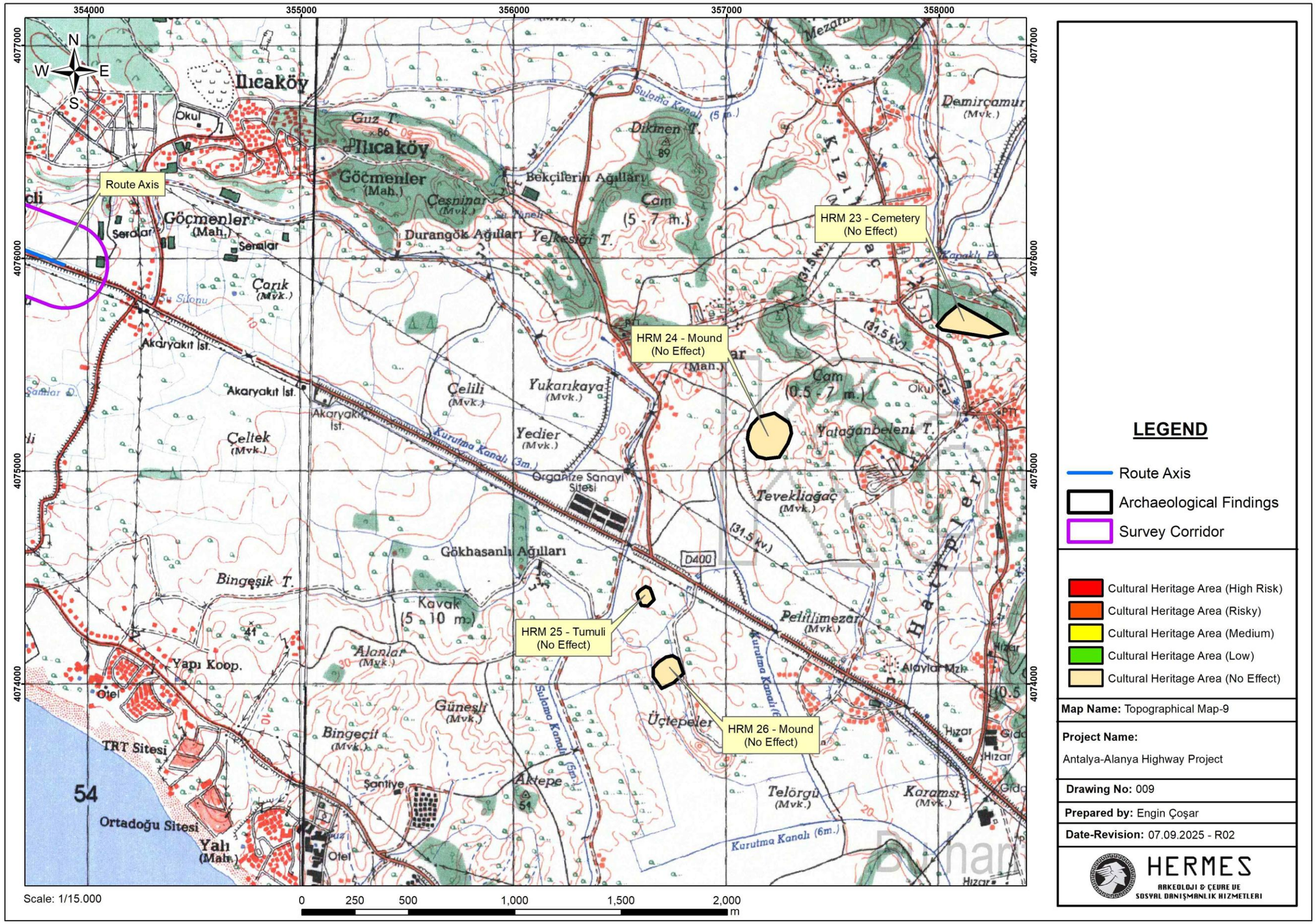
Project Name:
Antalya-Alanya Highway Project

Drawing No: 008

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-9

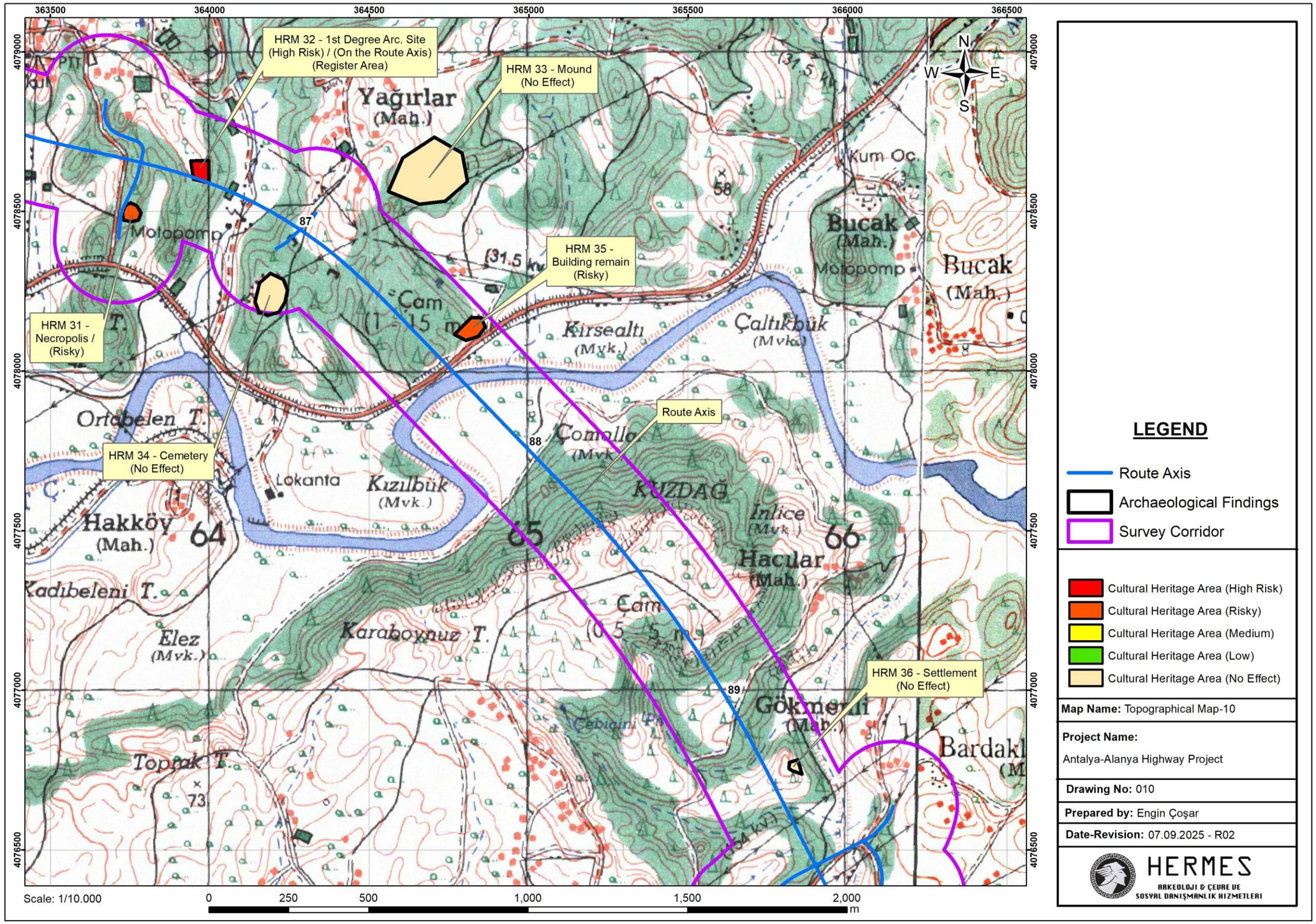
Project Name:
Antalya-Alanya Highway Project

Drawing No: 009

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-10

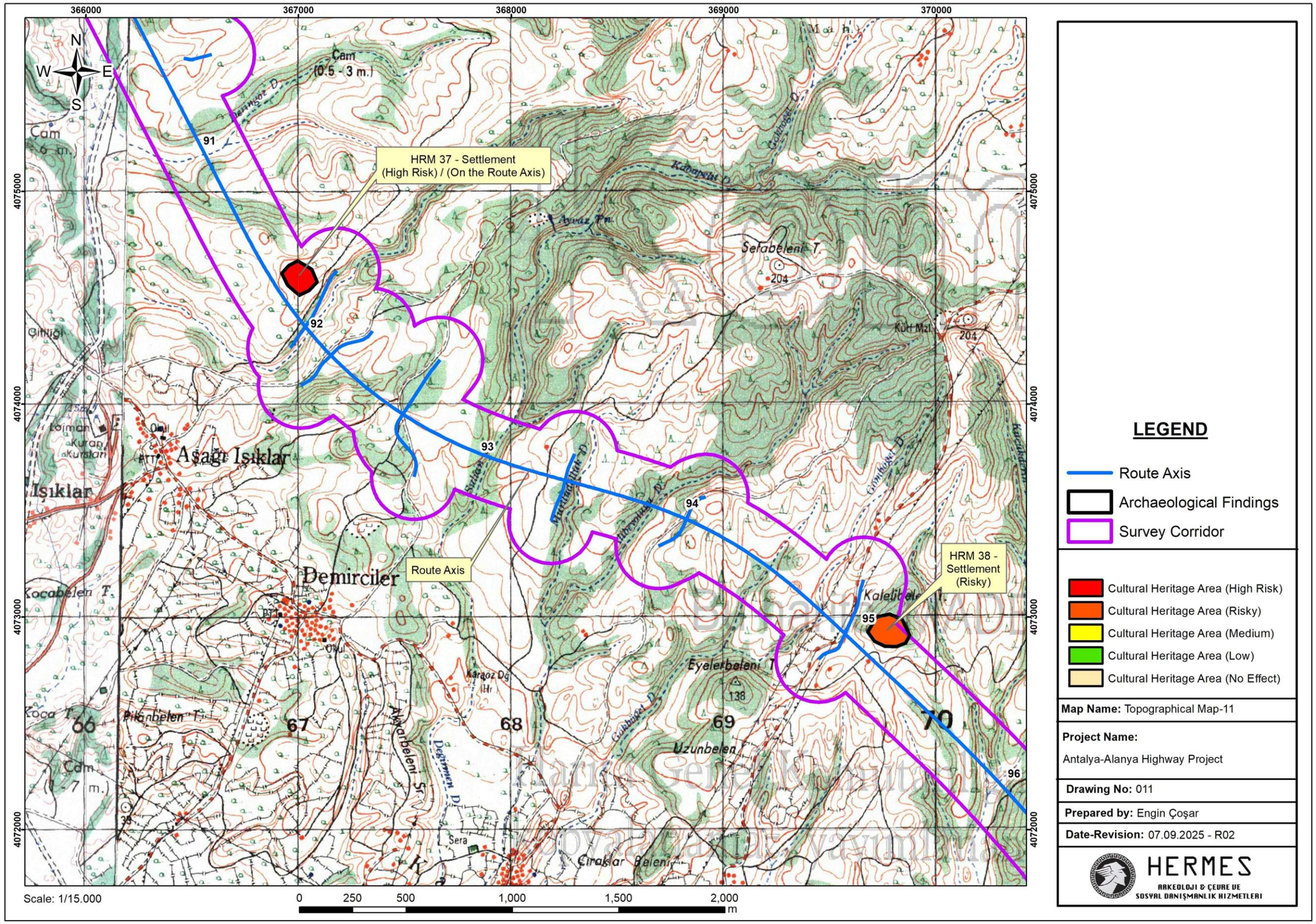
Project Name:
Antalya-Alanya Highway Project

Drawing No: 010

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-11

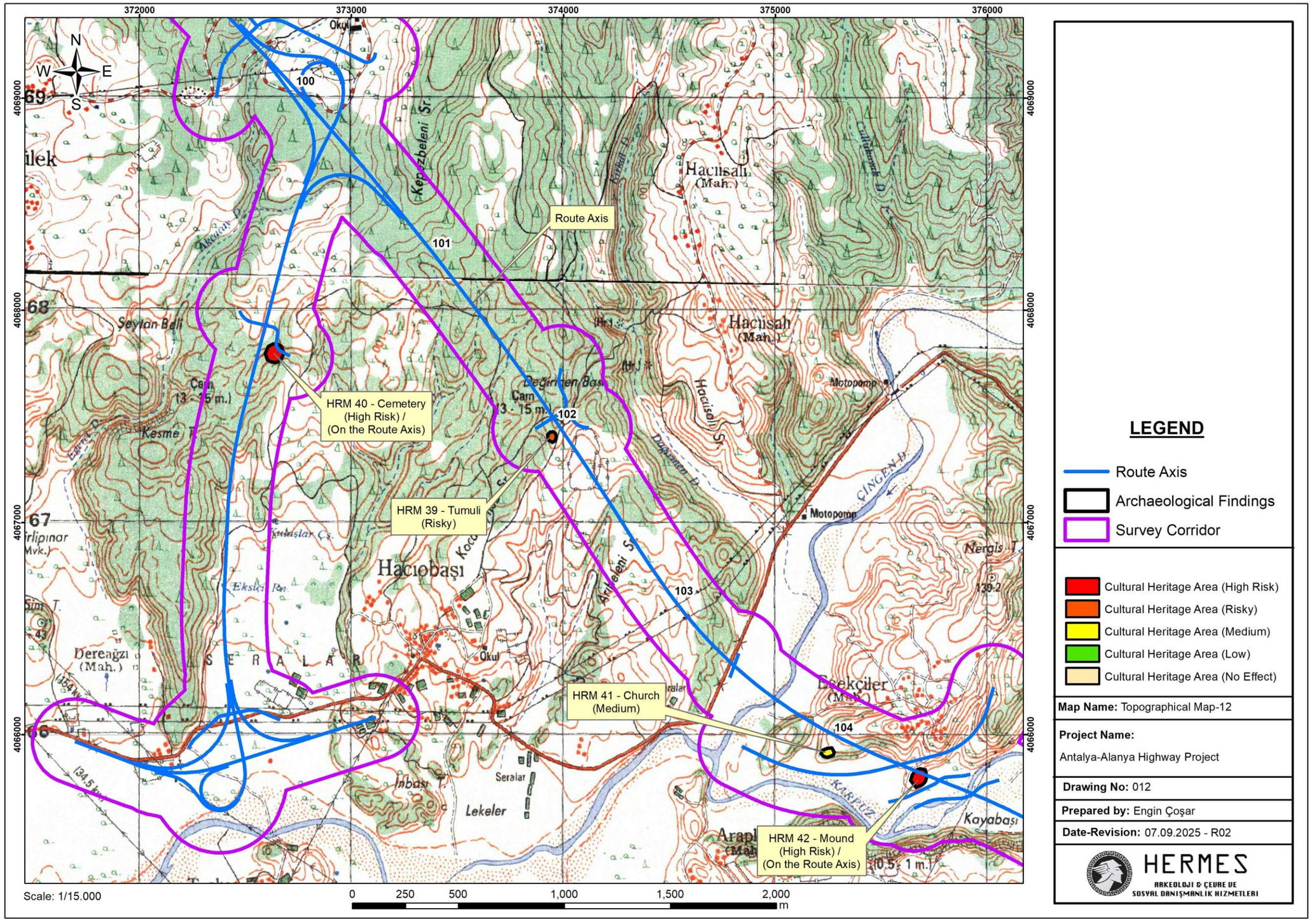
Project Name:
Antalya-Alanya Highway Project

Drawing No: 011

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-12

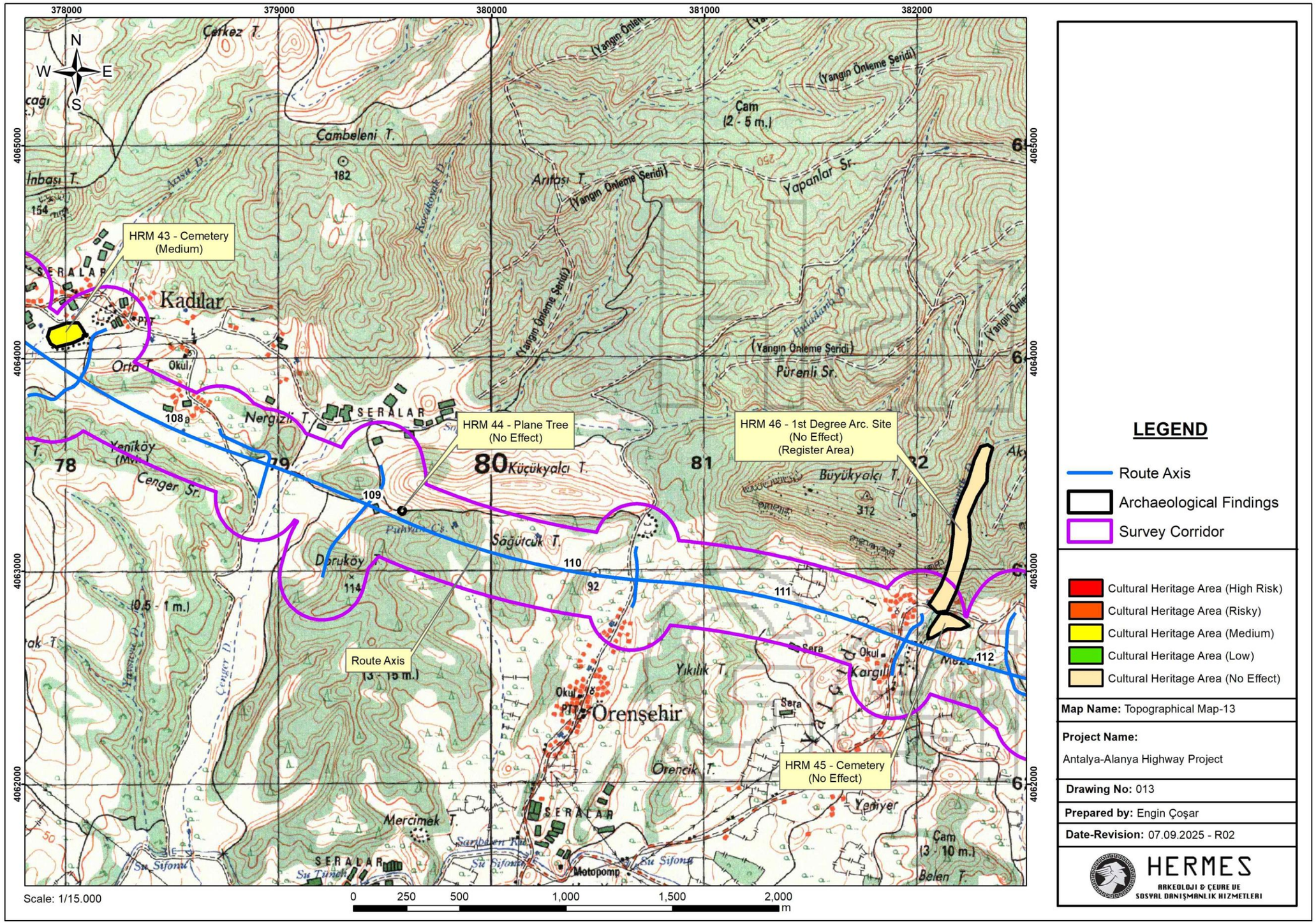
Project Name:
Antalya-Alanya Highway Project

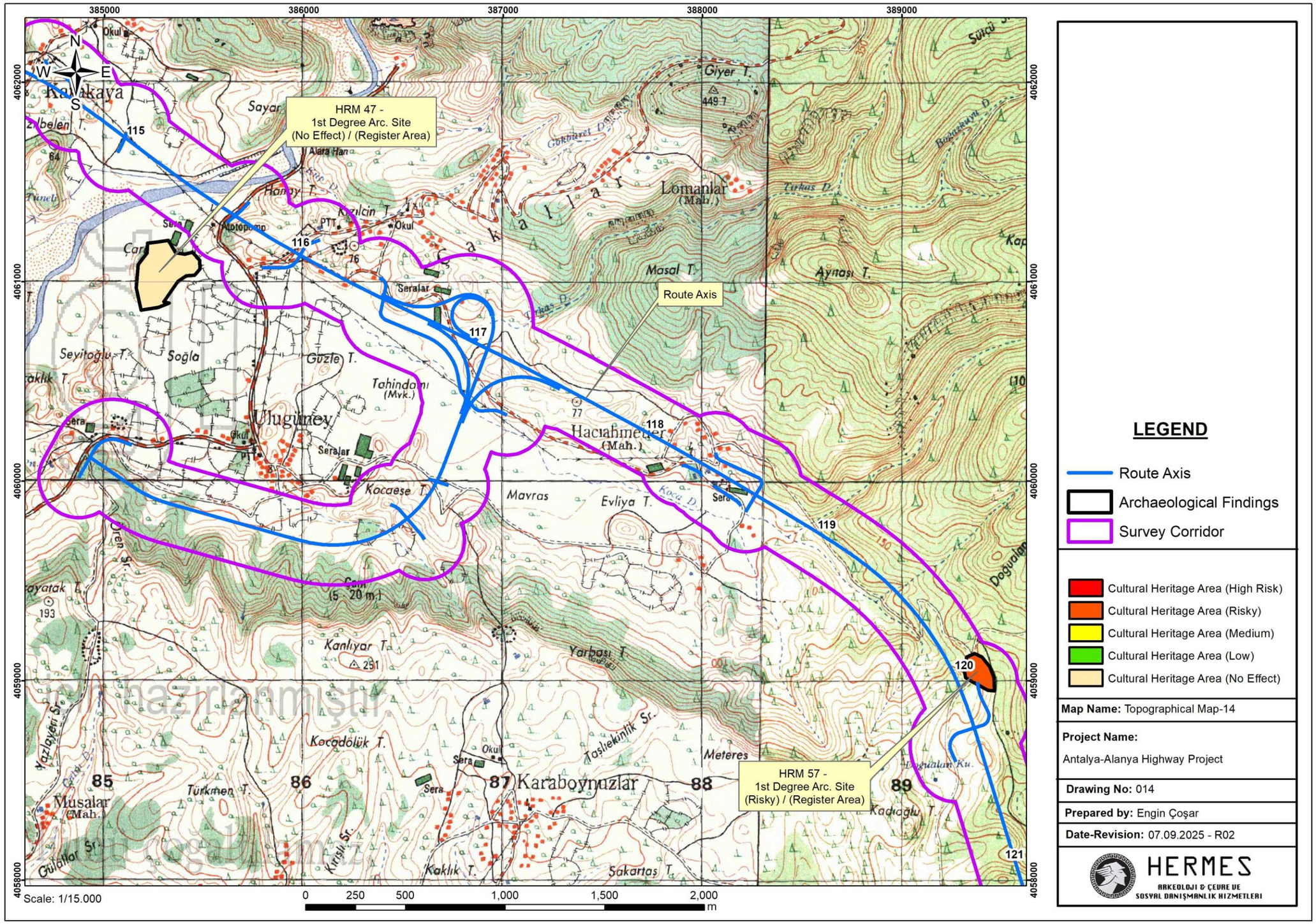
Drawing No: 012

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ


HRM 43 - Cemetery
(Medium)
HRM 44 - Plane Tree
(No Effect)
HRM 46 - 1st Degree Arc. Site
(No Effect)
(Register Area)
HRM 45 - Cemetery
(No Effect)
Route Axis
Kadılar
Örenşehir
Çambeleni T.
Arıtaşı T.
Yapanlar Sr.
Pürenli Sr.
Küçükyalçı T.
Büyükyalçı T.
Sağütcük T.
Doruköy T.
Yıkılık T.
Örencik T.
Mercimek T.
Cenger Sr.
Nergizli T.
Orta T.
Çam
(2 - 5 m.)
Çam
(3 - 10 m.)
Yeniyer
Motopomp
SERALAR
Scale: 1/15.000
0 250 500 1,000 1,500 2,000 m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Topographical Map-13
Project Name:
Antalya-Alanya Highway Project
Drawing No: 013
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-14

Project Name:
Antalya-Alanya Highway Project

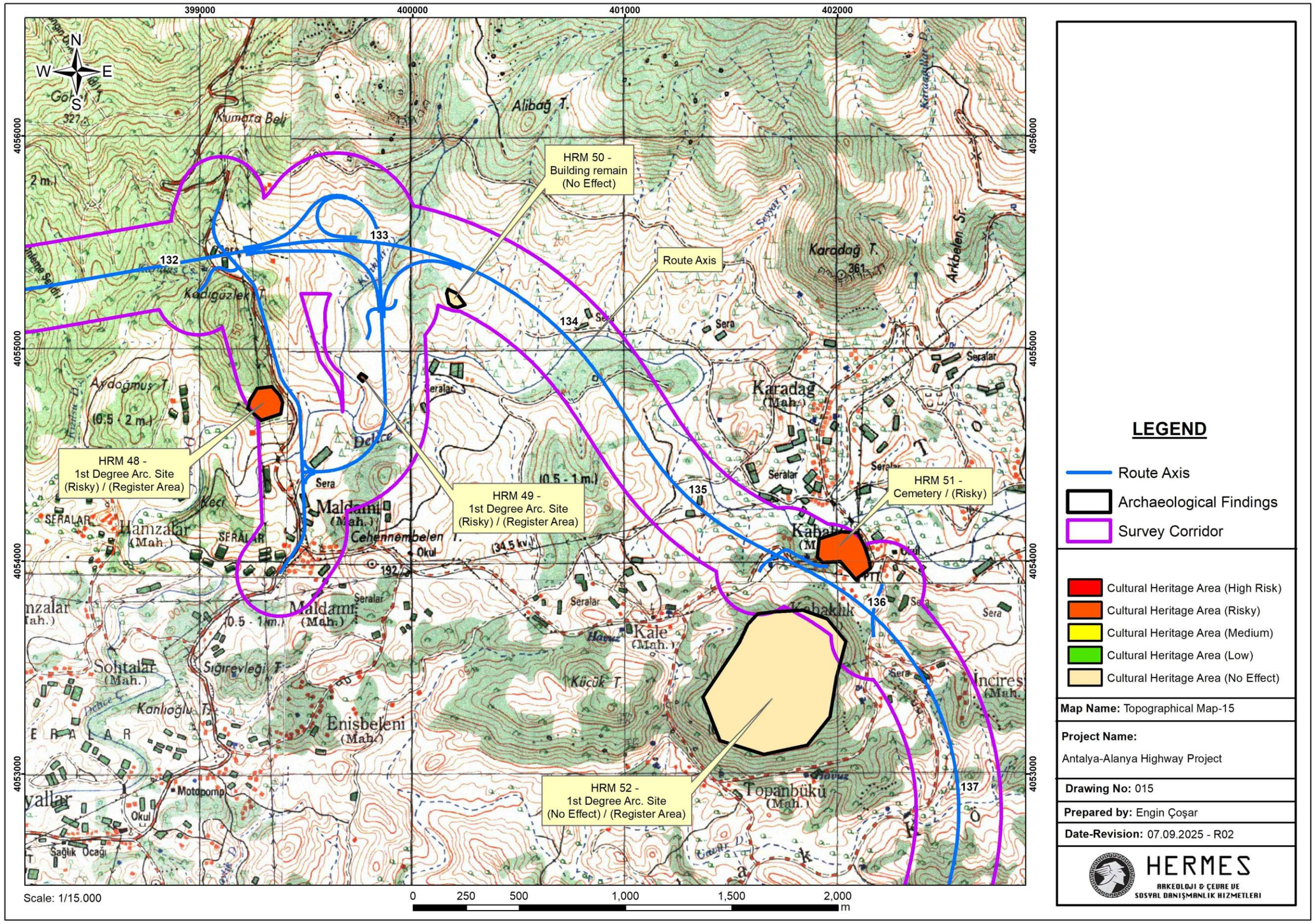
Drawing No: 014

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ

Bu rapor Hermes Arkeoloji & Çevre ve Sosyal Danışmanlık Hizmetleri tarafından hazırlanmıştır.
Yetkisiz kullanılamaz.



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-15

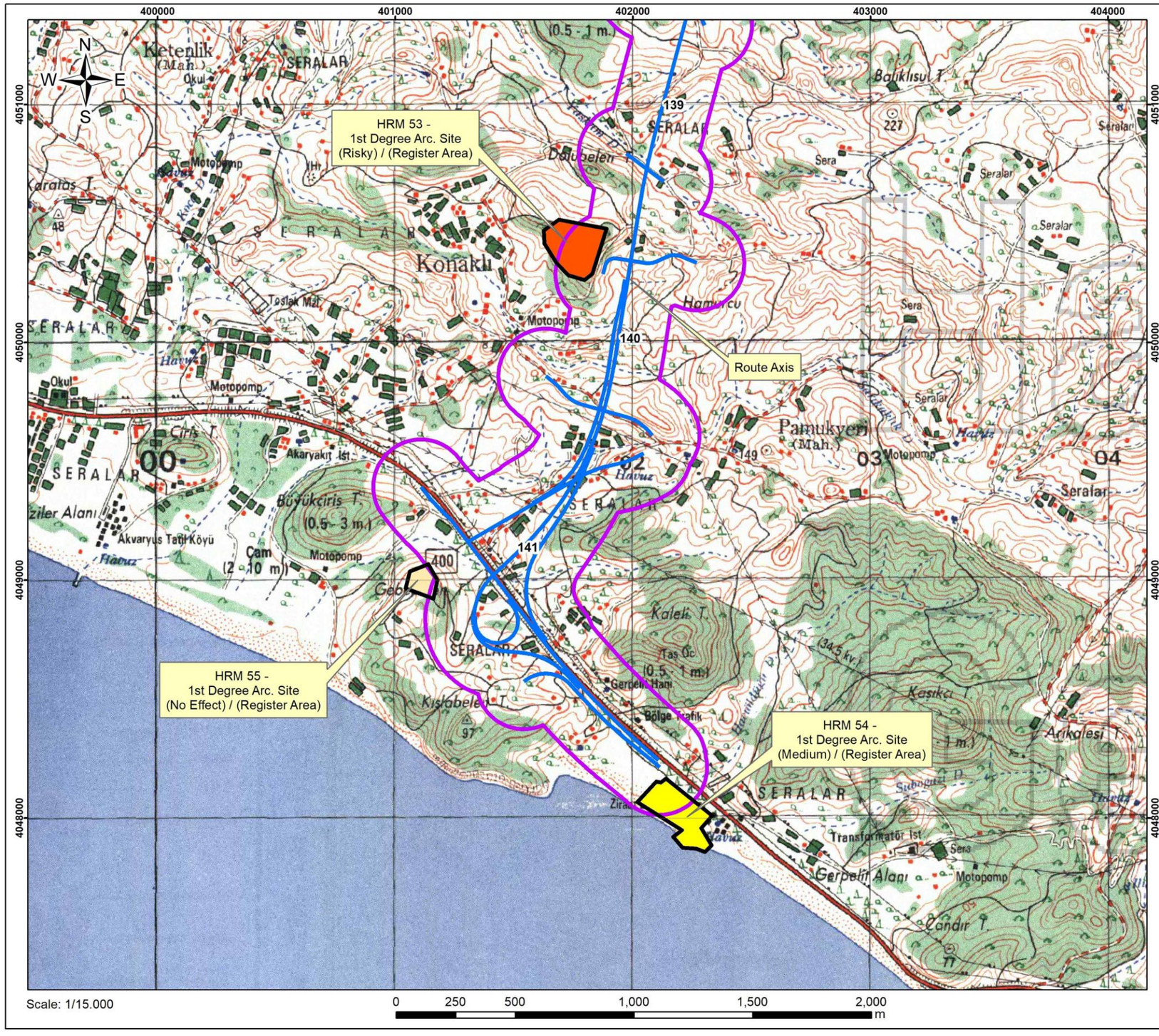
Project Name:
Antalya-Alanya Highway Project

Drawing No: 015

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Topographical Map-16

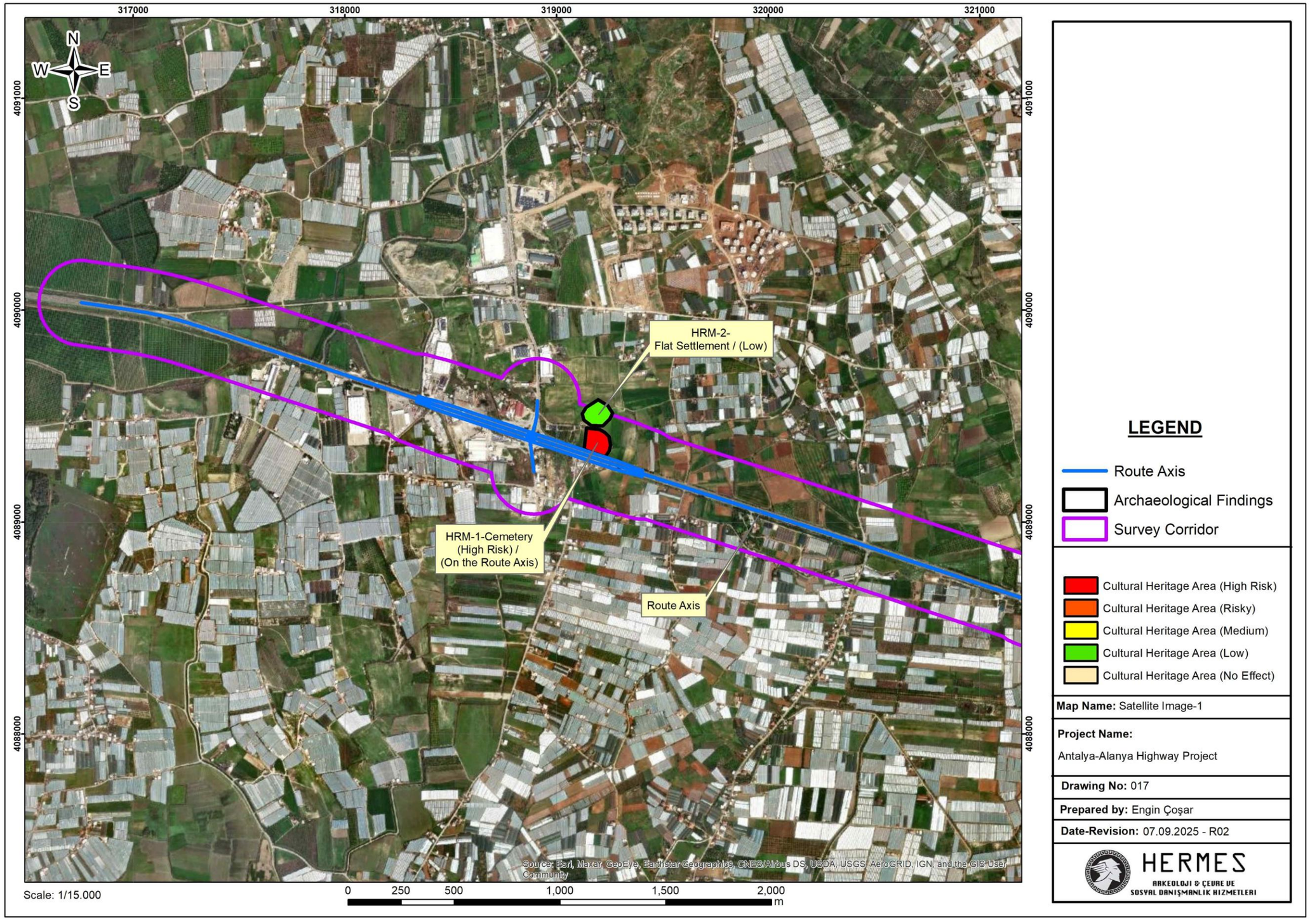
Project Name:
Antalya-Alanya Highway Project

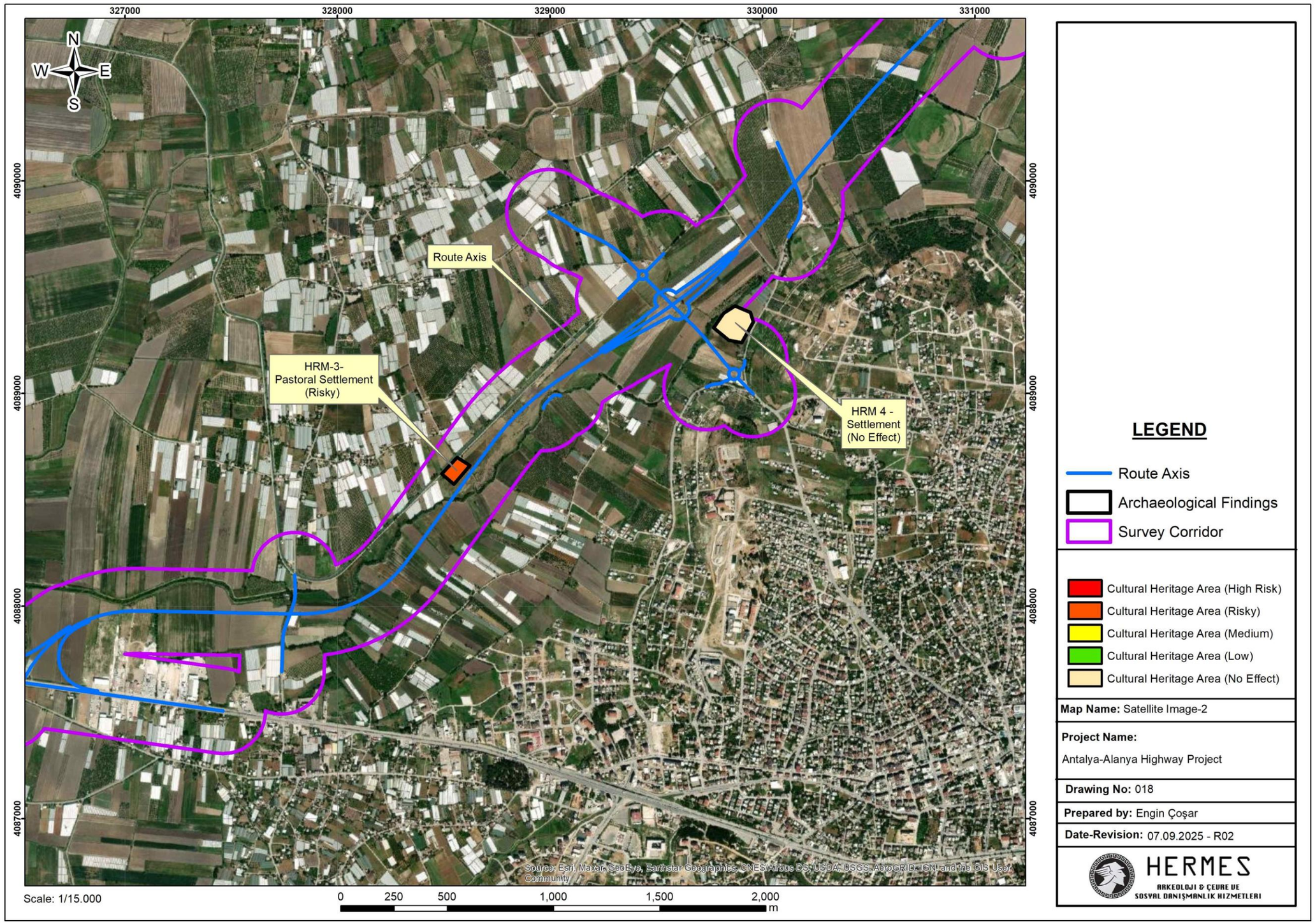
Drawing No: 016

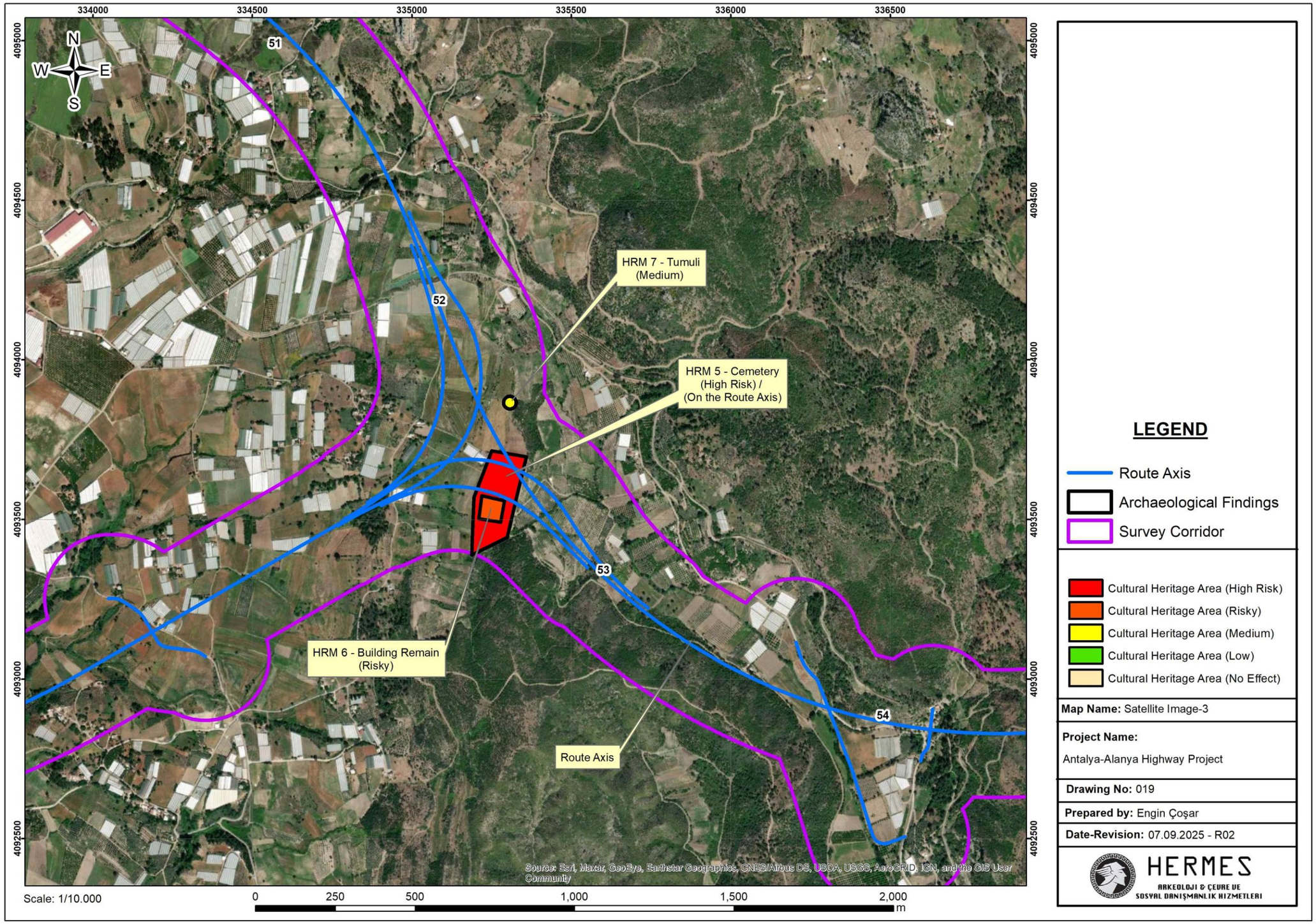
Prepared by: Engin Çoşar

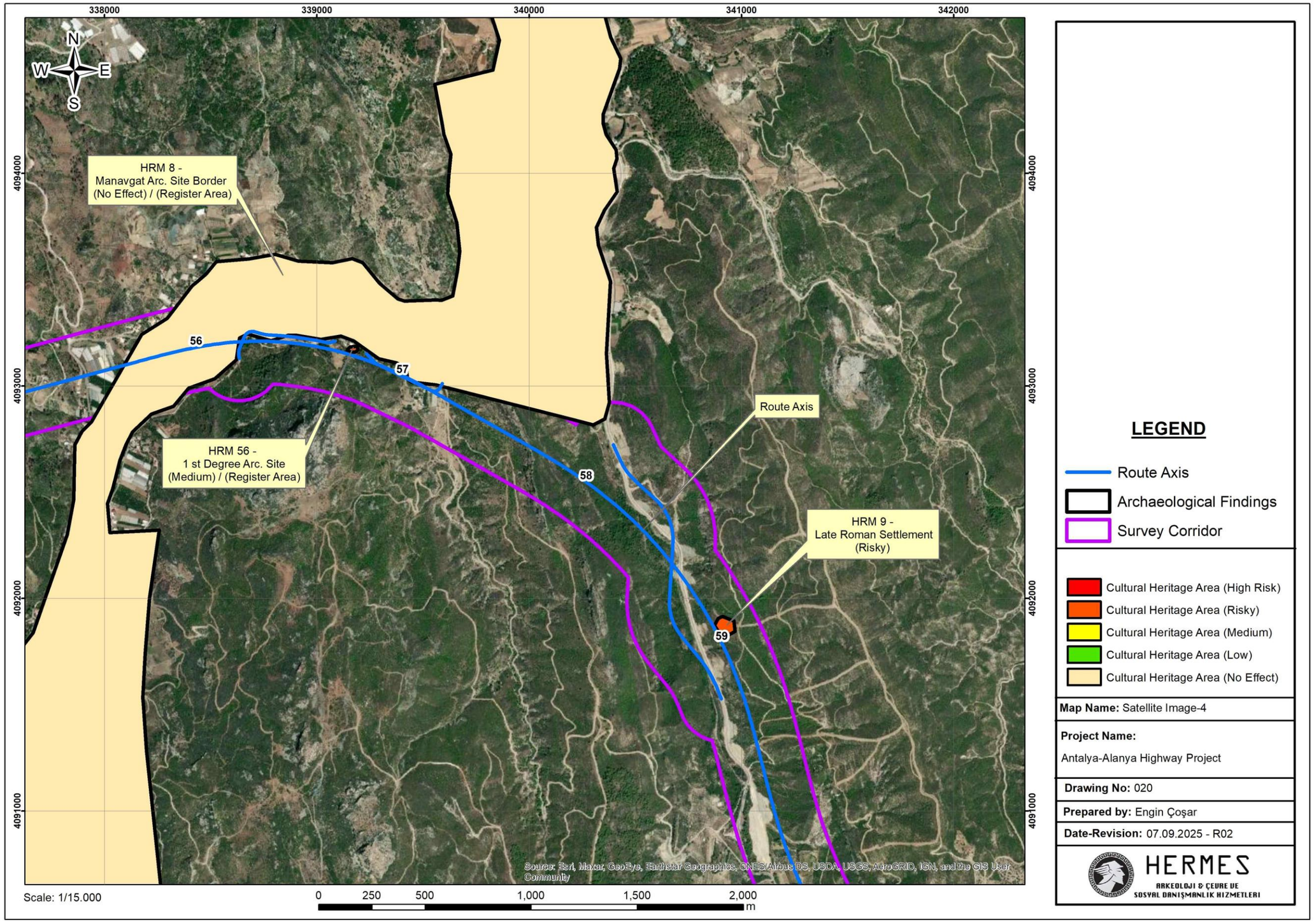
Date-Revision: 07.09.2025 - R02

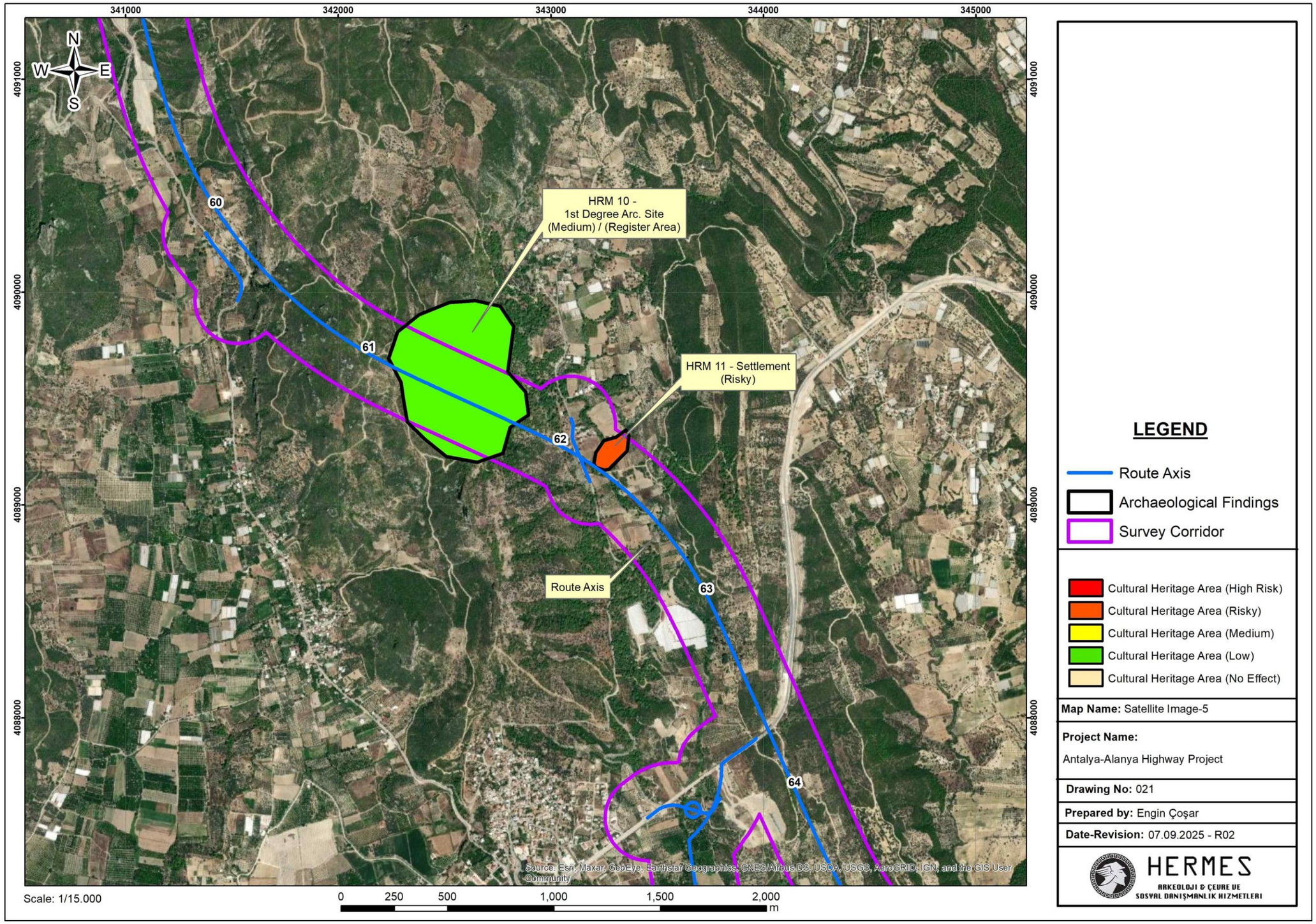
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ

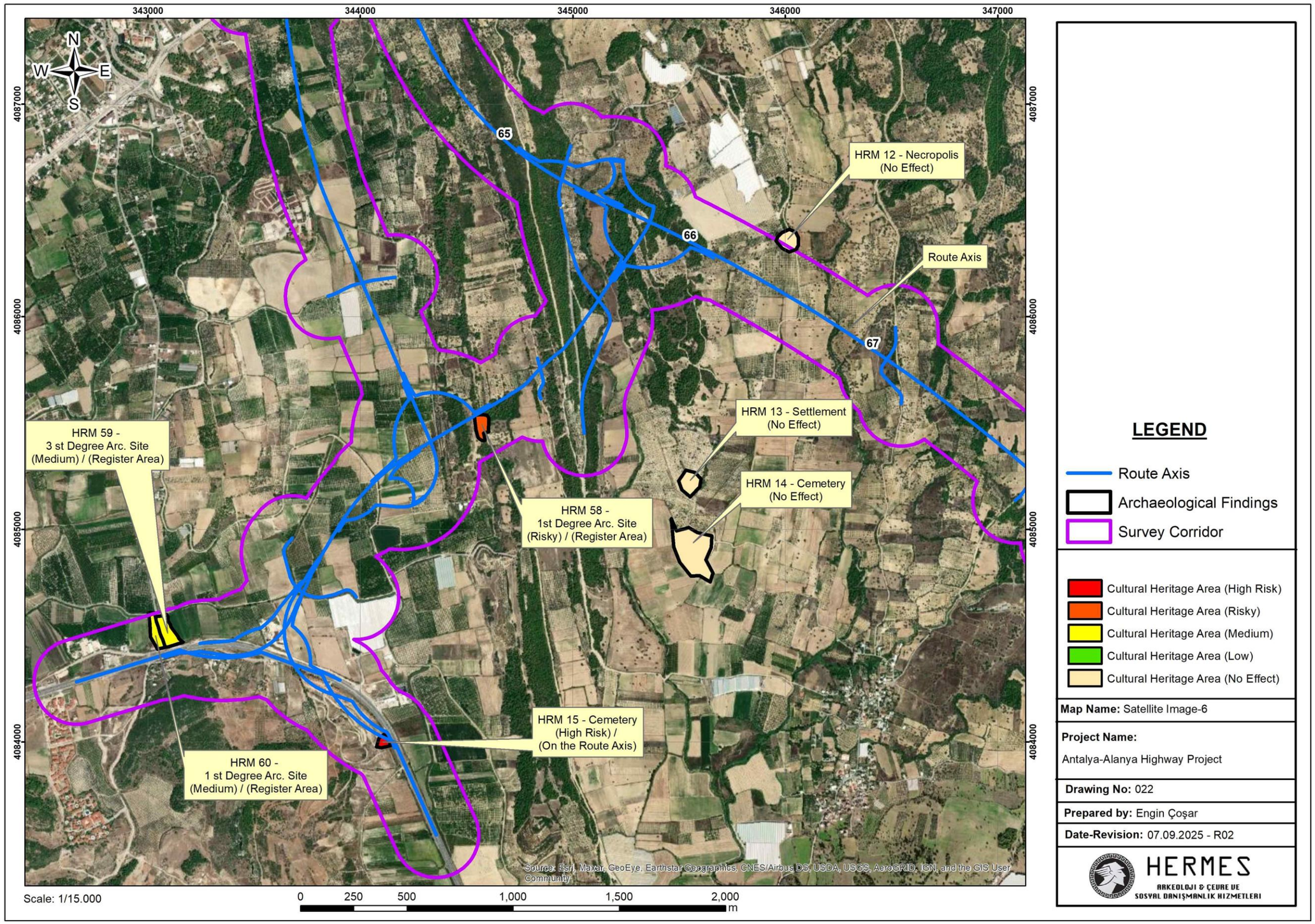

317000
318000
319000
320000
321000
4091000
4090000
4089000
4088000
N
W
E
S
HRM-2-
Flat Settlement / (Low)
HRM-1-Cemetery
(High Risk) /
(On the Route Axis)
Route Axis
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-1
Project Name:
Antalya-Alanya Highway Project
Drawing No: 017
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ

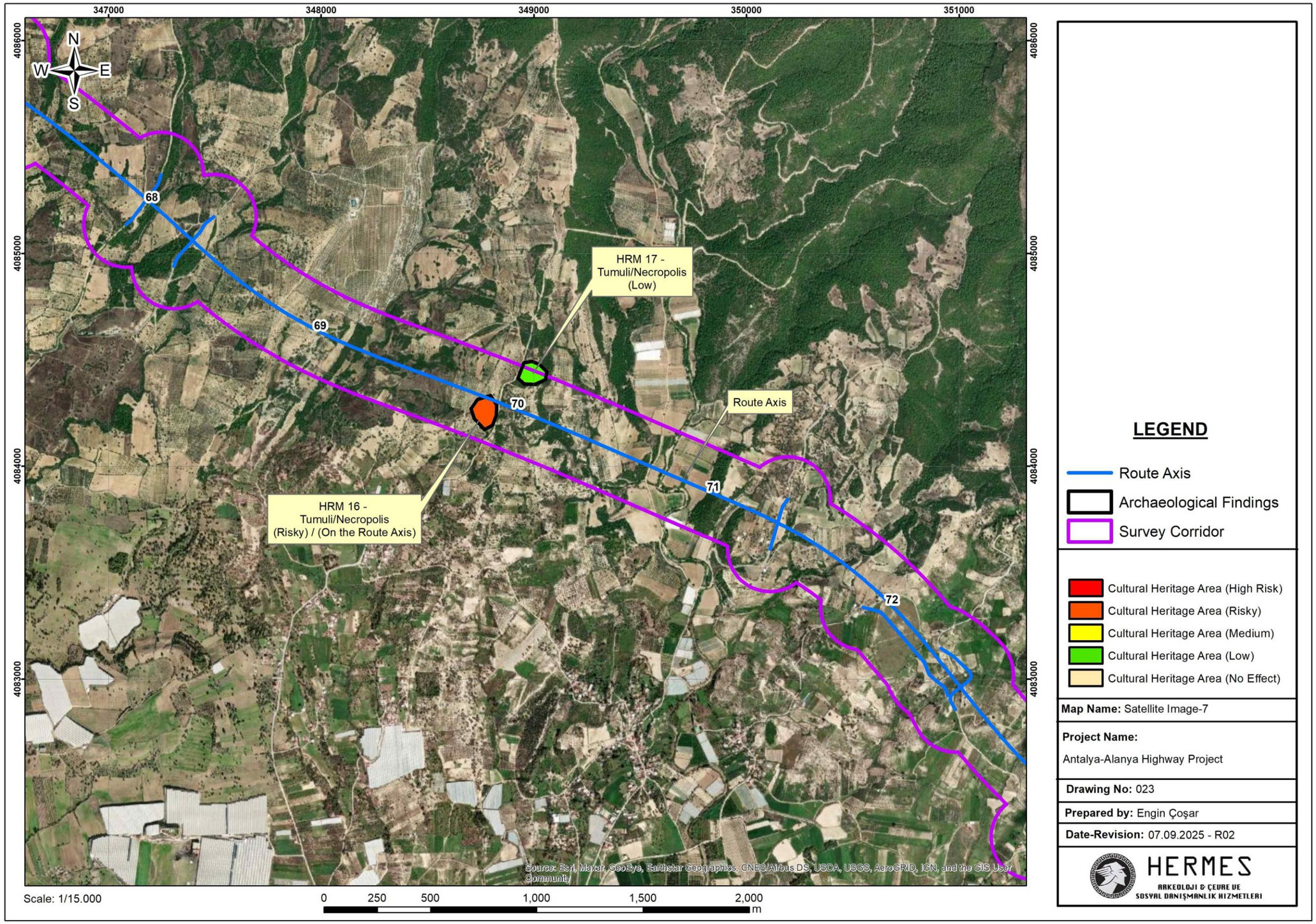

327000
328000
329000
330000
331000
4090000
4089000
4088000
4087000
N
W
E
S
Route Axis
HRM-3-
Pastoral Settlement
(Risky)
HRM 4 -
Settlement
(No Effect)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-2
Project Name:
Antalya-Alanya Highway Project
Drawing No: 018
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJI & ÇEVRE VE
SOSYAL DANIŞMANLIK HIZMETLERI

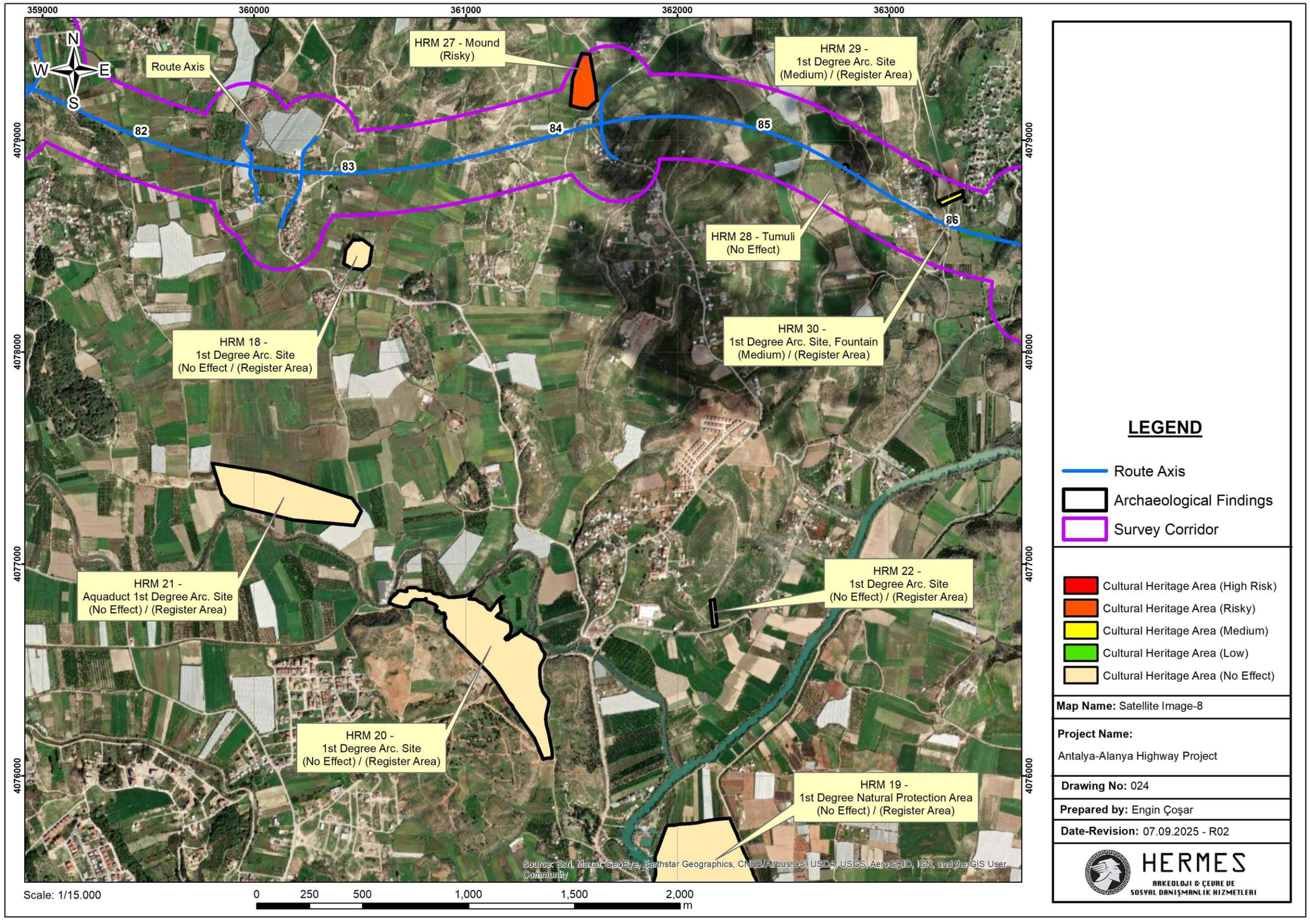

334000
334500
335000
335500
336000
336500
4095000
4094500
4094000
4093500
4093000
4092500
N
W
E
S
51
52
53
54
HRM 7 - Tumuli
(Medium)
HRM 5 - Cemetery
(High Risk) /
(On the Route Axis)
HRM 6 - Building Remain
(Risky)
Route Axis
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/10.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-3
Project Name:
Antalya-Alanya Highway Project
Drawing No: 019
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ

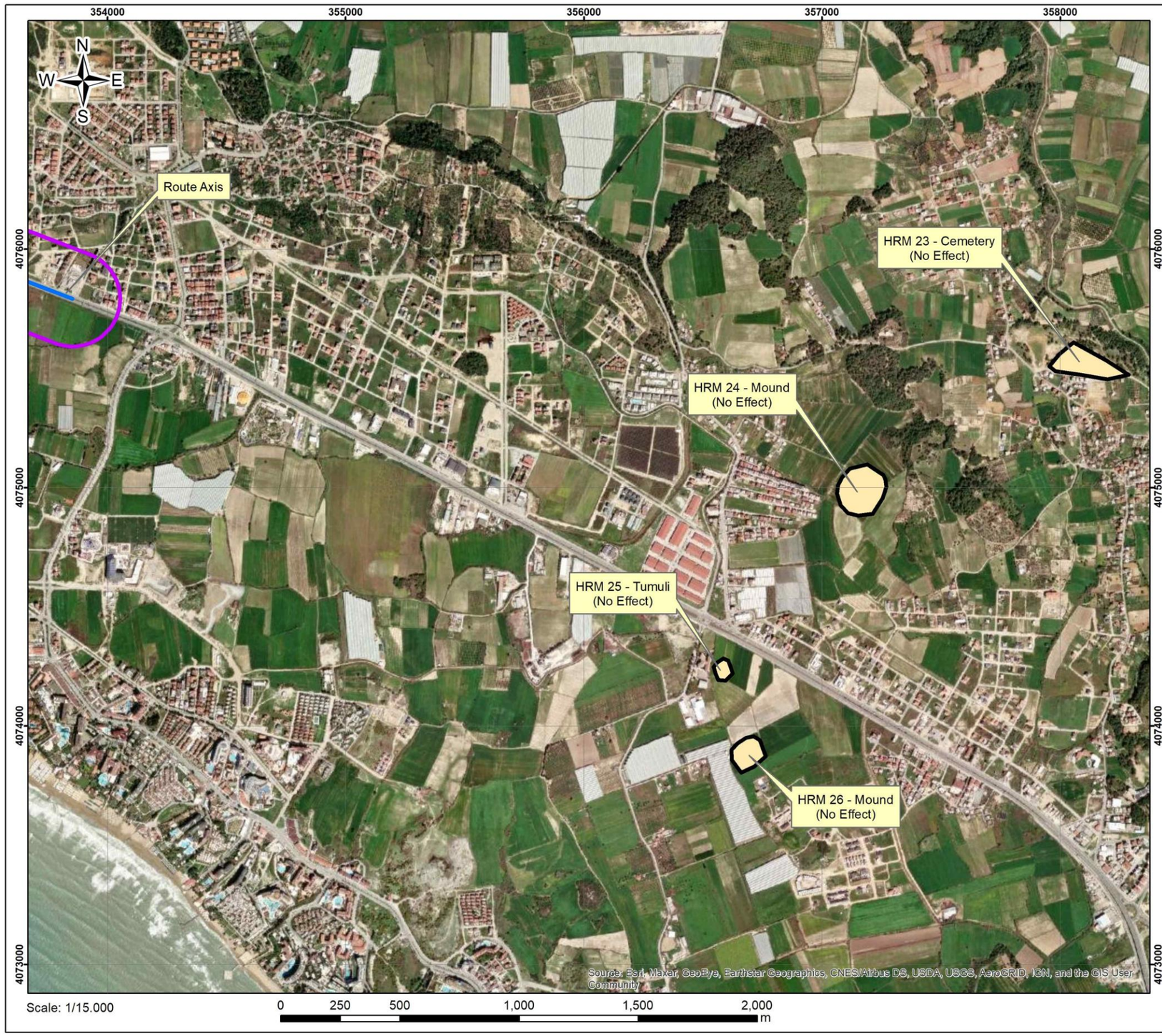

338000
339000
340000
341000
342000
4094000
4093000
4092000
4091000
N
W
E
S
HRM 8 -
Manavgat Arc. Site Border
(No Effect) / (Register Area)
HRM 56 -
1 st Degree Arc. Site
(Medium) / (Register Area)
HRM 9 -
Late Roman Settlement
(Risky)
Route Axis
56
57
58
59
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-4
Project Name:
Antalya-Alanya Highway Project
Drawing No: 020
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ


341000
342000
343000
344000
345000
4091000
4090000
4089000
4088000
N
W
E
S
60
61
62
63
64
HRM 10 -
1st Degree Arc. Site
(Medium) / (Register Area)
HRM 11 - Settlement
(Risky)
Route Axis
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-5
Project Name:
Antalya-Alanya Highway Project
Drawing No: 021
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ


343000
344000
345000
346000
347000
4087000
4086000
4085000
4084000
N
W
E
S
65
66
67
HRM 12 - Necropolis
(No Effect)
Route Axis
HRM 13 - Settlement
(No Effect)
HRM 14 - Cemetery
(No Effect)
HRM 59 -
3 st Degree Arc. Site
(Medium) / (Register Area)
HRM 58 -
1st Degree Arc. Site
(Risky) / (Register Area)
HRM 15 - Cemetery
(High Risk) /
(On the Route Axis)
HRM 60 -
1 st Degree Arc. Site
(Medium) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0
250
500
1,000
1,500
2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-6
Project Name:
Antalya-Alanya Highway Project
Drawing No: 022
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ


347000
348000
349000
350000
351000
4086000
4085000
4084000
4083000
N
W
E
S
68
69
70
71
72
HRM 17 -
Tumuli/Necropolis
(Low)
Route Axis
HRM 16 -
Tumuli/Necropolis
(Risky) / (On the Route Axis)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-7
Project Name:
Antalya-Alanya Highway Project
Drawing No: 023
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ


359000
360000
361000
362000
363000
4079000
4078000
4077000
4076000
N
W
E
S
Route Axis
HRM 27 - Mound
(Risky)
HRM 29 -
1st Degree Arc. Site
(Medium) / (Register Area)
82
83
84
85
86
HRM 28 - Tumuli
(No Effect)
HRM 18 -
1st Degree Arc. Site
(No Effect / (Register Area)
HRM 30 -
1st Degree Arc. Site, Fountain
(Medium) / (Register Area)
HRM 21 -
Aquaduct 1st Degree Arc. Site
(No Effect) / (Register Area)
HRM 22 -
1st Degree Arc. Site
(No Effect) / (Register Area)
HRM 20 -
1st Degree Arc. Site
(No Effect) / (Register Area)
HRM 19 -
1st Degree Natural Protection Area
(No Effect) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-8
Project Name:
Antalya-Alanya Highway Project
Drawing No: 024
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ



LEGEND

- Route Axis
- Archaeological Findings
- Survey Corridor

- Cultural Heritage Area (High Risk)
- Cultural Heritage Area (Risky)
- Cultural Heritage Area (Medium)
- Cultural Heritage Area (Low)
- Cultural Heritage Area (No Effect)

Map Name: Satellite Image-9

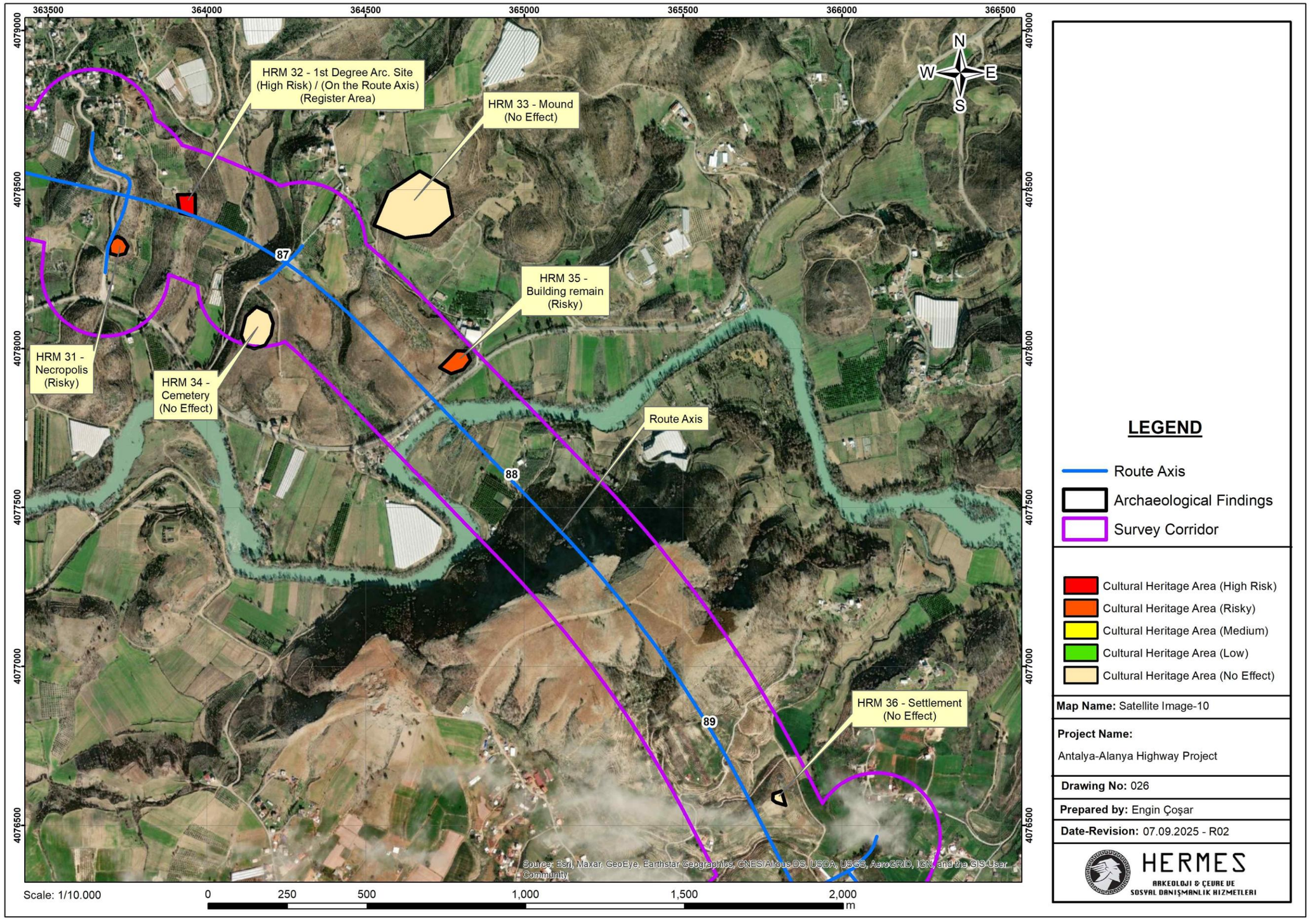
Project Name:
Antalya-Alanya Highway Project

Drawing No: 025

Prepared by: Engin Çoşar

Date-Revision: 07.09.2025 - R02

HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ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365500
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366500
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4078000
4077500
4077000
4076500
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HRM 32 - 1st Degree Arc. Site (High Risk) / (On the Route Axis) (Register Area)
HRM 33 - Mound (No Effect)
HRM 35 - Building remain (Risky)
HRM 31 - Necropolis (Risky)
HRM 34 - Cemetery (No Effect)
Route Axis
HRM 36 - Settlement (No Effect)
87
88
89
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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0
250
500
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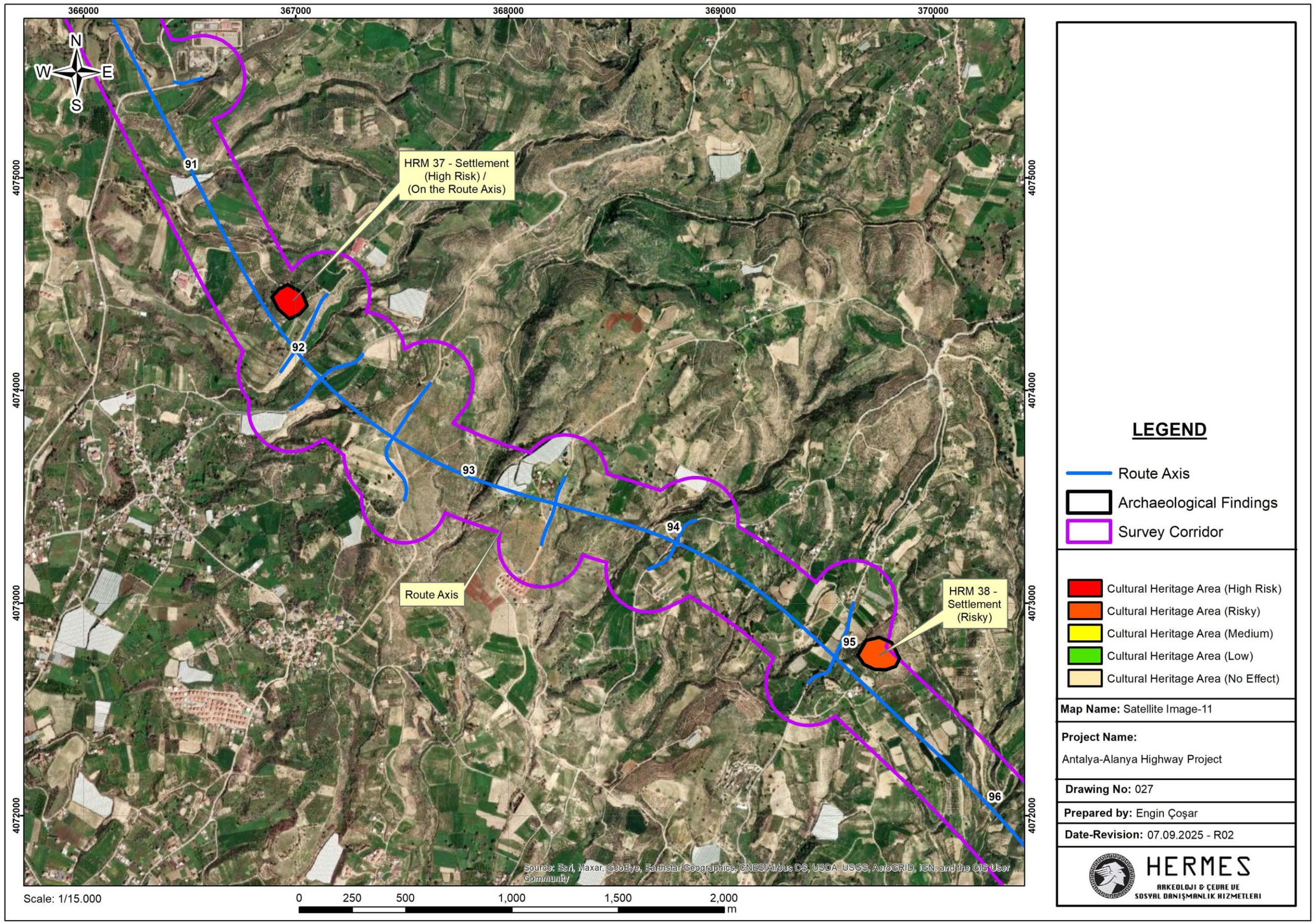
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-10
Project Name:
Antalya-Alanya Highway Project
Drawing No: 026
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ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91
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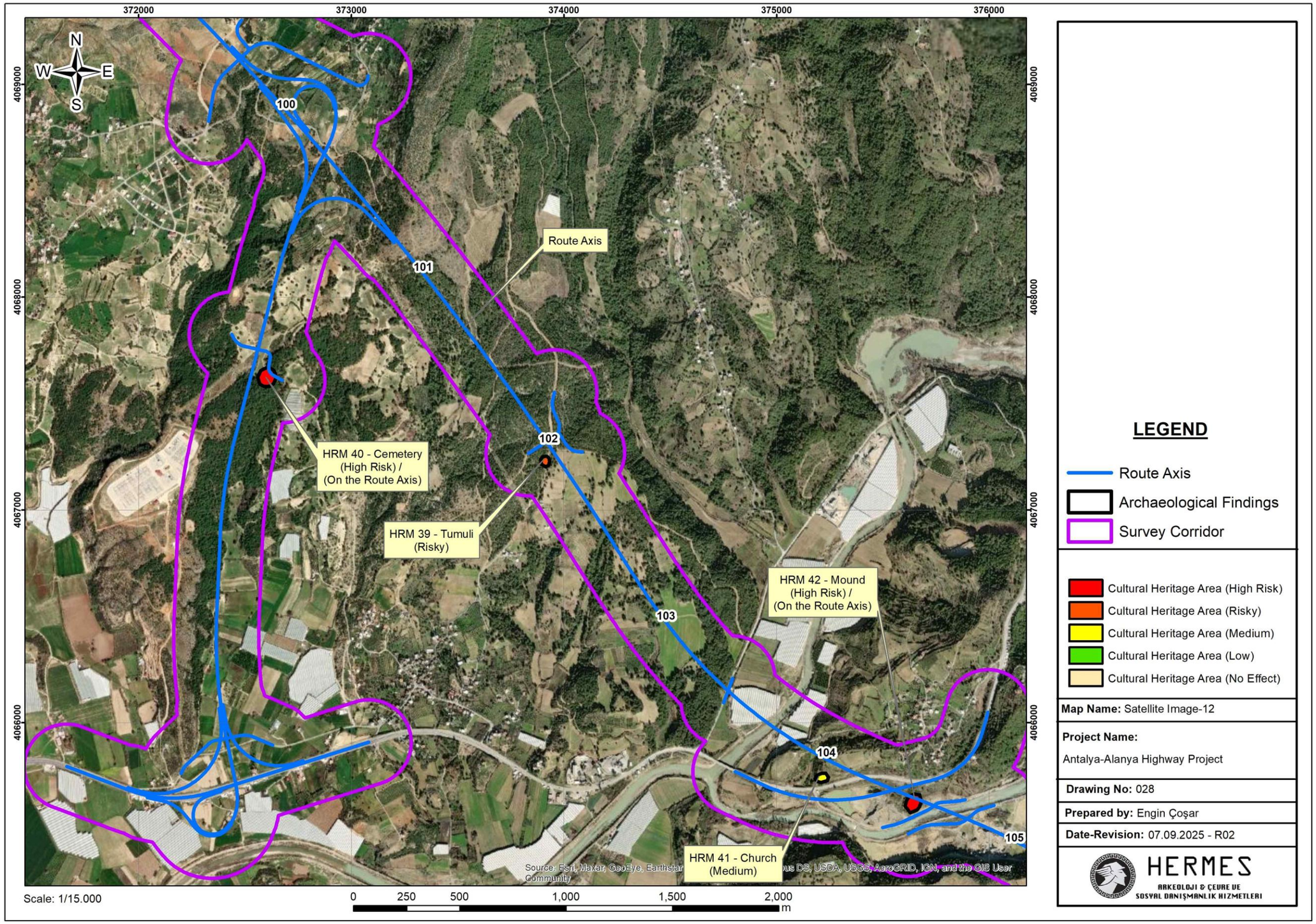
93
94
95
96
HRM 37 - Settlement (High Risk) / (On the Route Axis)
Route Axis
HRM 38 - Settlement (Risky)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-11
Project Name:
Antalya-Alanya Highway Project
Drawing No: 027
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ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373000
374000
375000
376000
4069000
4068000
4067000
4066000
N
W
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100
101
102
103
104
105
Route Axis
HRM 40 - Cemetery
(High Risk) /
(On the Route Axis)
HRM 39 - Tumuli
(Risky)
HRM 42 - Mound
(High Risk) /
(On the Route Axis)
HRM 41 - Church
(Medium)
Source: Esri, Maxar, GeoEye, Earthstar
DS, USDA, USGS, AeroGRID, IGN, and the GIS User
Community
Scale: 1/15.000
0
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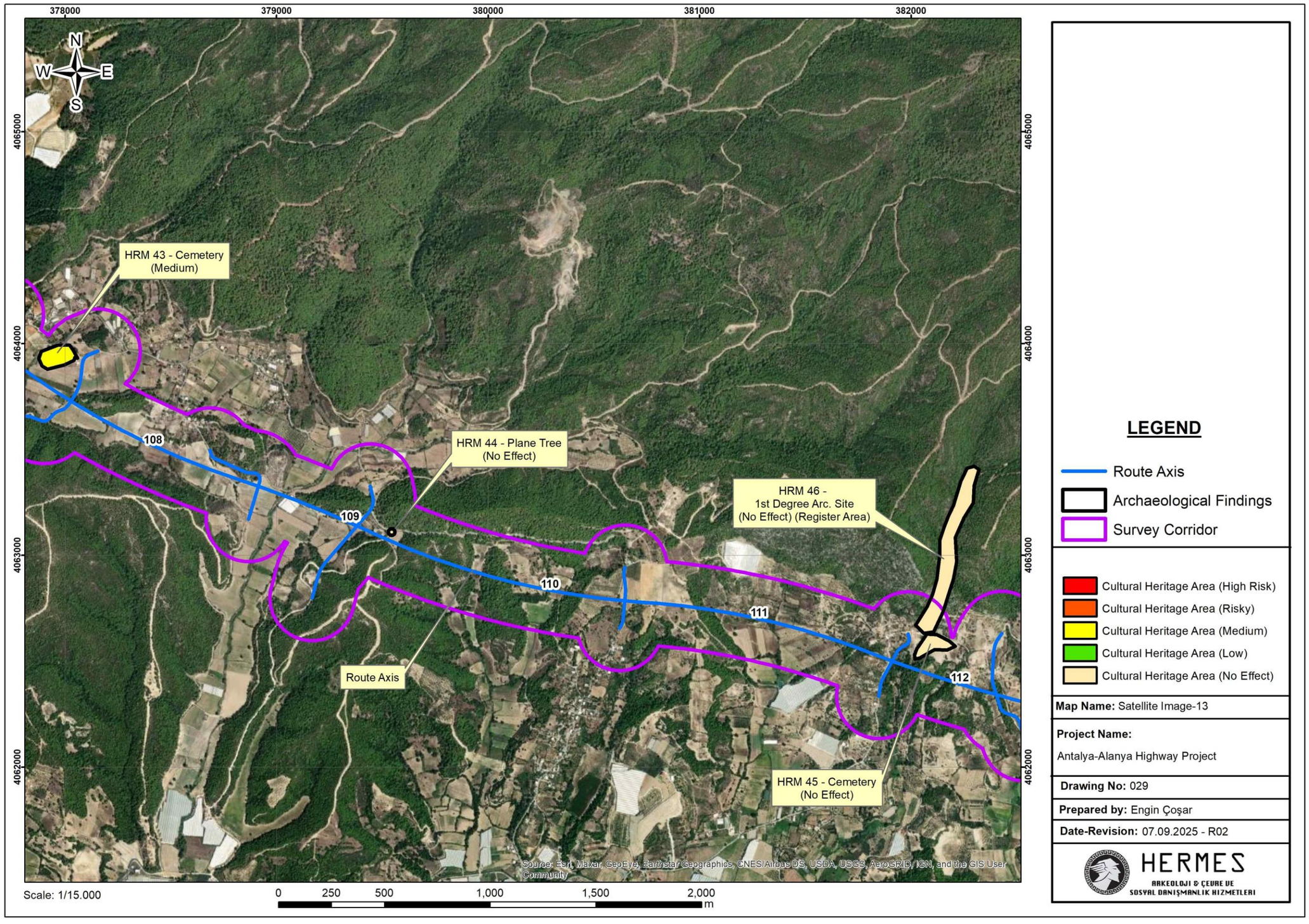
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-12
Project Name:
Antalya-Alanya Highway Project
Drawing No: 028
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ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379000
380000
381000
382000
4065000
4064000
4063000
4062000
N
W
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S
HRM 43 - Cemetery
(Medium)
HRM 44 - Plane Tree
(No Effect)
HRM 46 -
1st Degree Arc. Site
(No Effect) (Register Area)
HRM 45 - Cemetery
(No Effect)
Route Axis
108
109
110
111
112
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0
250
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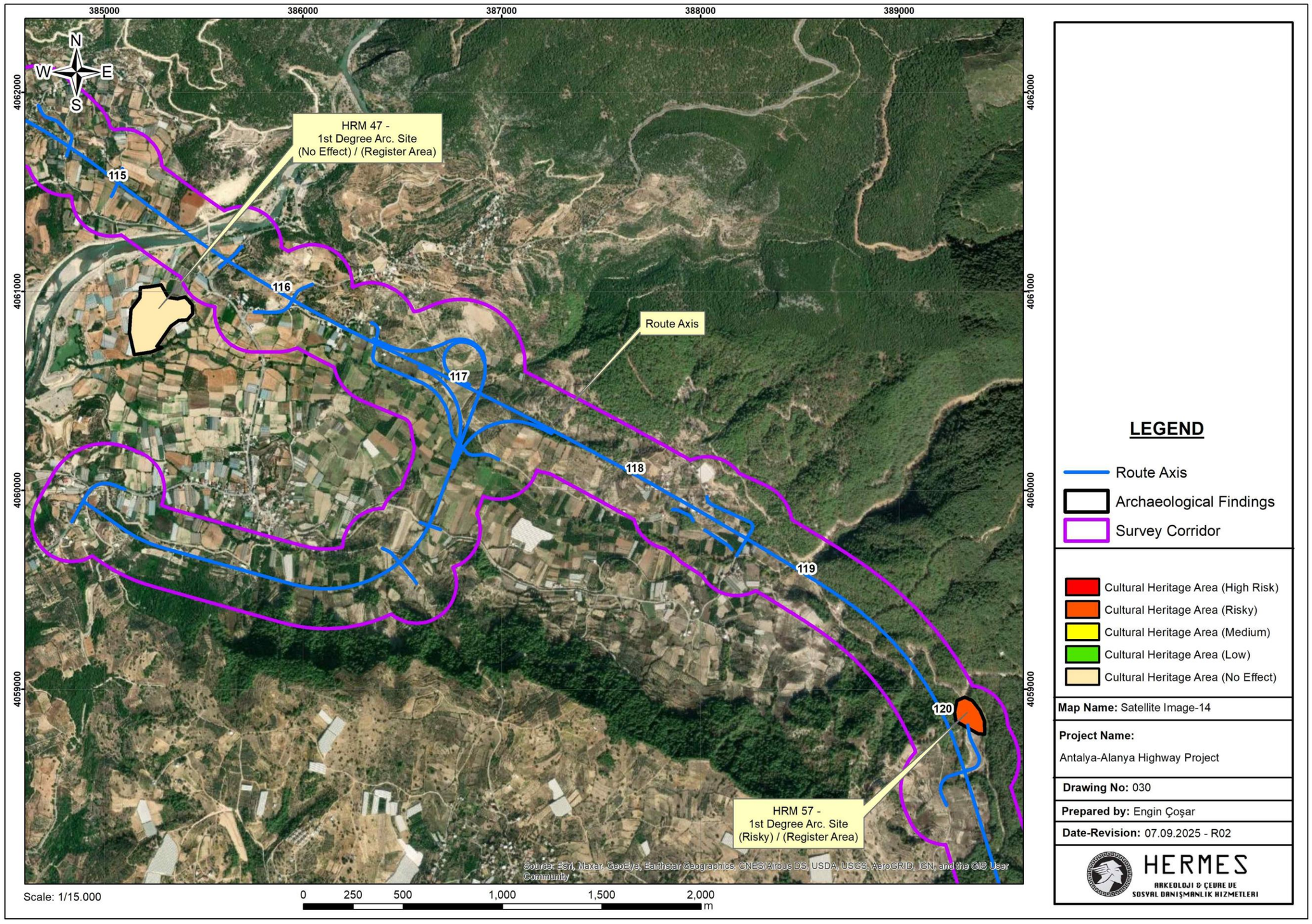
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-13
Project Name:
Antalya-Alanya Highway Project
Drawing No: 029
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ


385000
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389000
4062000
4061000
4060000
4059000
N
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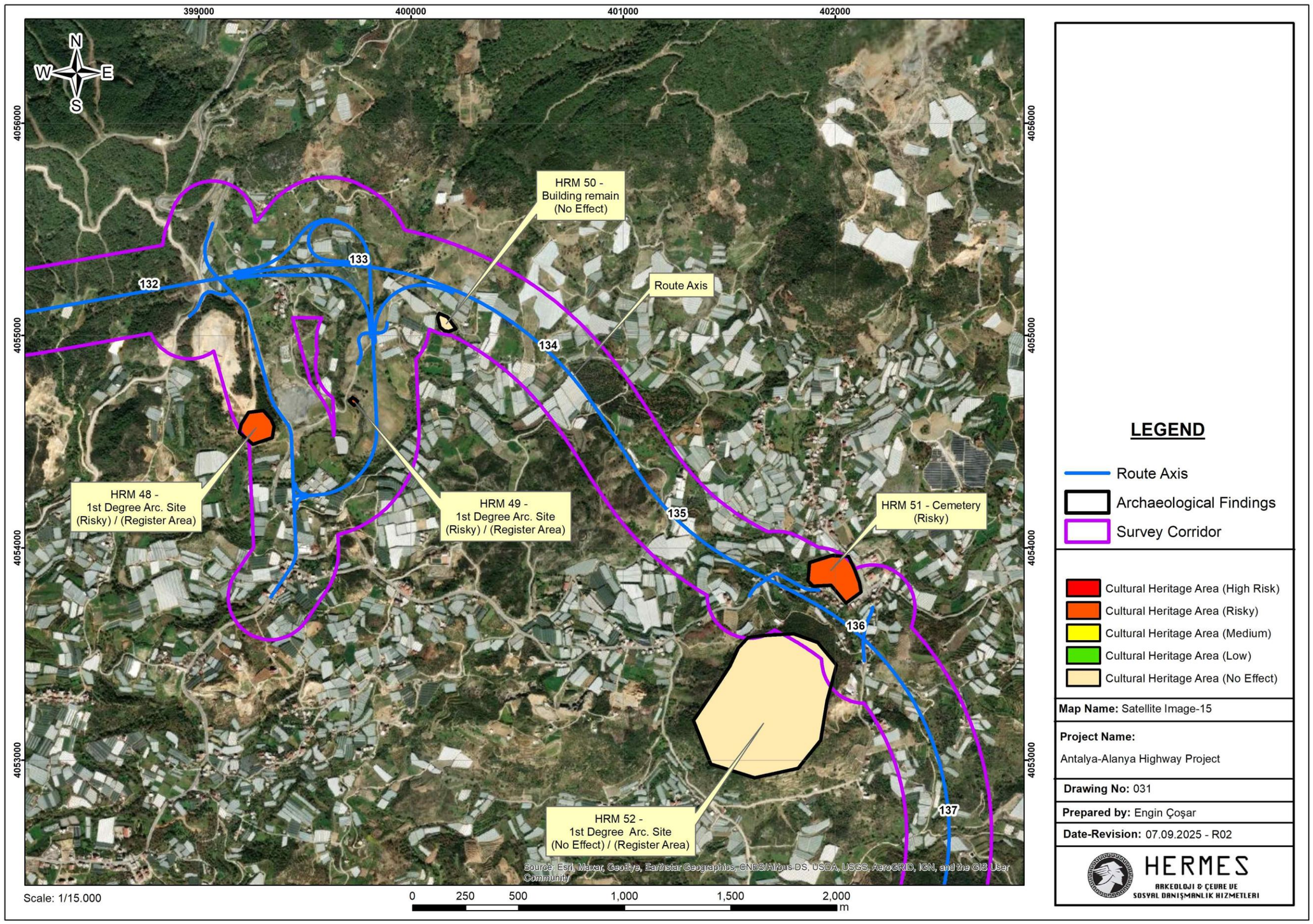
HRM 47 -
1st Degree Arc. Site
(No Effect) / (Register Area)
115
116
117
118
119
120
Route Axis
HRM 57 -
1st Degree Arc. Site
(Risky) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-14
Project Name:
Antalya-Alanya Highway Project
Drawing No: 030
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ


399000
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4053000
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HRM 50 - Building remain (No Effect)
Route Axis
132
133
134
135
136
137
HRM 48 - 1st Degree Arc. Site (Risky) / (Register Area)
HRM 49 - 1st Degree Arc. Site (Risky) / (Register Area)
HRM 51 - Cemetery (Risky)
HRM 52 - 1st Degree Arc. Site (No Effect) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
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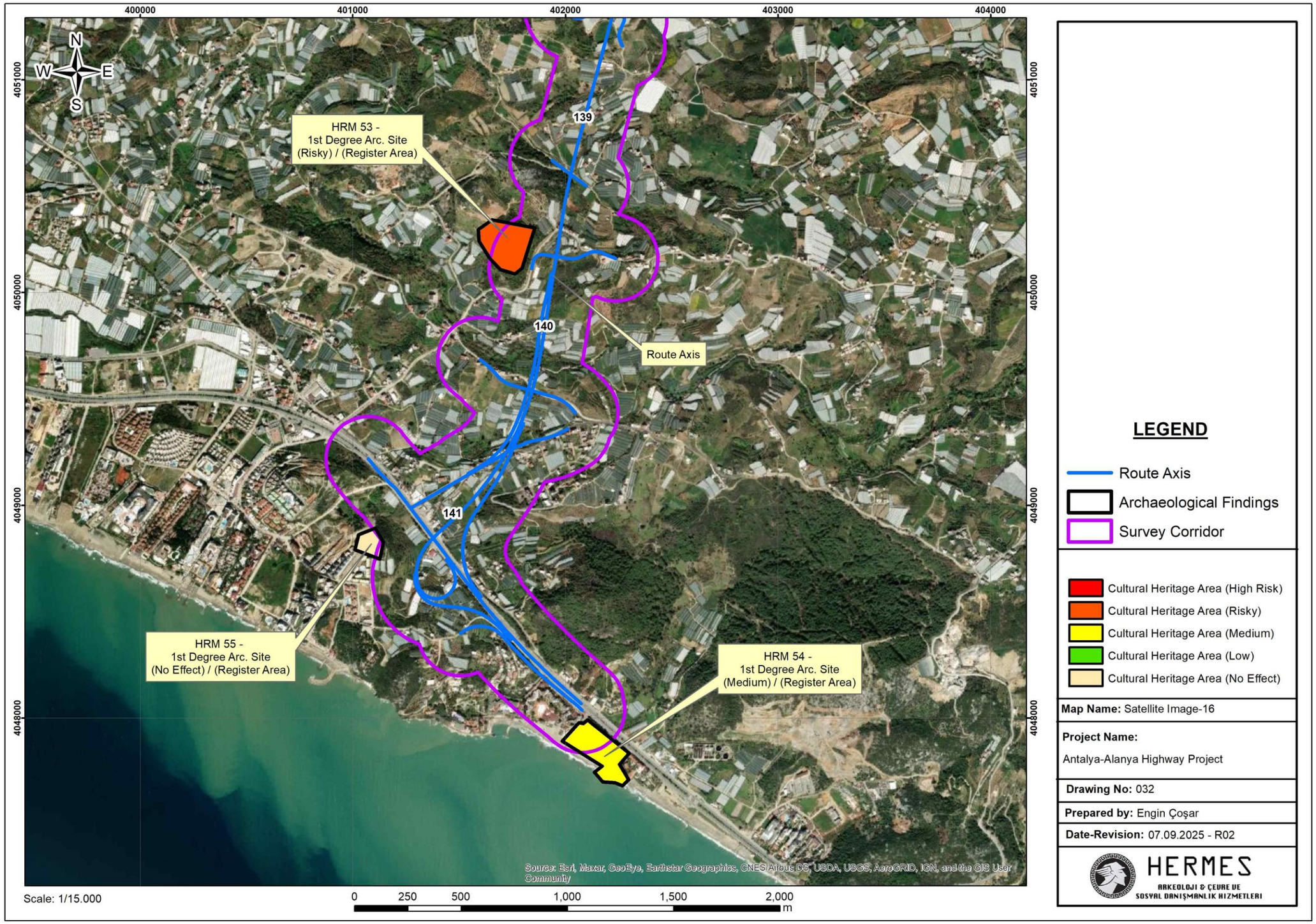
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-15
Project Name:
Antalya-Alanya Highway Project
Drawing No: 031
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJİ & ÇEVRE VE
SOSYAL DANIŞMANLIK HİZMETLERİ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N
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HRM 53 -
1st Degree Arc. Site
(Risky) / (Register Area)
139
140
141
Route Axis
HRM 55 -
1st Degree Arc. Site
(No Effect) / (Register Area)
HRM 54 -
1st Degree Arc. Site
(Medium) / (Register Area)
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Scale: 1/15.000
0 250 500 1,000 1,500 2,000
m
LEGEND
Route Axis
Archaeological Findings
Survey Corridor
Cultural Heritage Area (High Risk)
Cultural Heritage Area (Risky)
Cultural Heritage Area (Medium)
Cultural Heritage Area (Low)
Cultural Heritage Area (No Effect)
Map Name: Satellite Image-16
Project Name:
Antalya-Alanya Highway Project
Drawing No: 032
Prepared by: Engin Çoşar
Date-Revision: 07.09.2025 - R02
HERMES
ARKEOLOJI & ÇEDRE VE
SOSYAL DANIŞMANLIK HIZMETLERI



ANTALYA ALANYA MOTORWAY PROJECT

GRAVE RELOCATION PROCEDURE

Revision LOG			
REV. Date	**Prepared by**	**Quality Checked by**	**Reviewed and Approved by**
02.09.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**
26.09.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**
23.10.2025	**Engin ÇOŞAR Senior Archaeologist**	**Ece ÇOŞAR Environmental Eng.**	**Engin ÇOŞAR Senior Archaeologist**

HERMES
ARKEOLOJI & ÇEVRE VE SOSYAL DANIŞMANLIK HIZMETLERI

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SEPTEMBER/2025

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ABBREVIATIONS

CHMP	Cultural Heritage Management Plan
ICOMOS	International Council of Monuments and Sites
IFA	Institute of Field Archaeologists
No	Number
PROJECT	Antalya Alanya Motorway Project
UNESCO	United Nations Educational, Scientific and Cultural Organization

1. PURPOSE and SCOPE

This procedure defines the legal framework, responsibilities, and step-by-step actions to be followed in the event of grave relocation within the scope of the Project. It applies to all Project activities that may require relocation of graves and is designed to ensure full compliance with Law No. 3998 on the Protection of Cemeteries (1994), Law No. 2863 on the Protection of Cultural and Natural Assets (1983), and other applicable Turkish legislation.

The scope includes:

- Protection of cemeteries as tangible and intangible cultural heritage,
- Engagement with relevant authorities and affected communities,
- Implementation of a transparent and respectful relocation process,
- Monitoring and documentation of all activities.

2. ROLES AND RESPONSIBILITIES

Metropolitan Municipality / Local Municipalities (Cemeteries Directorate):	Primary authority for implementation of grave relocation. In metropolitan municipalities in Türkiye, the management and administration of cemeteries are primarily the responsibility of the Metropolitan Municipality Cemeteries Directorate, which oversees cemetery planning, maintenance, and grave relocation. The District Municipality supports on-site operations and daily management
Provincial Directorate of Environment, Urbanization and Climate Change – Department of Local Administrations:	Oversight authority ensuring compliance with Law No. 3998.
Museum Directorate:	Advisory and supervisory role where cultural heritage values are concerned.
Project Archaeologist:	• Ensures procedures are followed in line with cultural heritage requirements and supervises on-site works. • Leads systematic field investigations for the identification and documentation of both tangible and intangible cultural heritage assets, ensuring inventories and records comply with national legislation and international best practice. • Implements and trains site personnel on the Chance Find Procedure (CFP) and Cultural Heritage Management Plan (CHMP), and coordinates immediate protective measures when unexpected finds occur. • Engages regularly with local communities and relevant authorities (museums, heritage boards, local administrations) to accurately identify and record intangible heritage elements such as rituals, traditional practices and oral histories. • Prepares and submits all archaeological and cultural heritage findings in line with lender requirements and international standards, ensuring that both movable/immovable and intangible assets are

	properly reported and archived.
Community Liaison Officer (CLO):	• Facilitates communication with affected families and ensures cultural sensitivities are respected. • Maintains detailed records of all stakeholder engagement activities (meeting minutes, attendance sheets, feedback logs) in accordance with international lender requirements. • Monitors and reports all complaints related to cultural heritage or community concerns, ensuring that the Project's Grievance Mechanism, the steps of which are detailed in the Stakeholder Engagement Plan, is implemented and accessible to all stakeholders (see ESIA Annex-9 SEP). • Ensures that Free, Prior and Informed Consultation (FPIC) principles are respected when engaging with local communities, especially where Indigenous Peoples or vulnerable groups are involved.
Project Owner:	• Provides logistical and technical support (e.g., machinery, resources) when requested. • Ensures adequate budget allocation and timely provision of resources for cultural heritage management and mitigation activities in line with IFC PS8 and World Bank ESS8. • Oversees compliance with international and national cultural heritage legislation, including the integration of cultural heritage risk management into the overall Environmental & Social Management System (ESMS). • Approves and supports implementation of a Chance Find Procedure and Cultural Heritage Management Plan, ensuring these are reviewed and updated periodically and that contractors are trained in their application.

In metropolitan municipalities in Türkiye, the management and administration of cemeteries are primarily the responsibility of the Metropolitan Municipality Cemeteries Directorate, which oversees cemetery planning, maintenance, and grave relocation. The District Municipality supports on-site operations and daily management, while the District Mufti's Office ensures that all religious rituals and ceremonial procedures are properly observed during grave relocation. The District Governorship coordinates the administrative approvals and ensures that all activities comply with national legislation. Together, these institutions provide a structured framework to manage grave relocation in a manner that respects both tangible and intangible cultural heritage and addresses social sensitivities.

3. LEGAL FRAMEWORK

Law No. 3998 on the Protection of Cemeteries (1994) Ownership (Article 1): Except for the State Cemetery, historical cemeteries under the Directorate General of Foundations, martyrdom cemeteries, and cemeteries with special religious status, ownership of public cemeteries rests with municipalities (in municipal areas) or village legal entities (in villages). Such lands cannot be sold, acquired through prescription, or transferred by possession.

- Protection (Article 2): Cemeteries, martyrdom cemeteries, and graves cannot be altered, damaged, or polluted, nor converted to other uses (parks, gardens, car parks, green areas, etc.). An exception applies only for road construction deemed necessary and approved by the Ministry of Environment, Urbanization and Climate Change.
- Law No. 2863 on the Protection of Cultural and Natural Assets (1983): Provides the overarching framework for protection of cultural heritage, including registered cemeteries and burial areas.

4. PROCEDURE STEPS

The relocation of graves is a highly sensitive process and will be implemented in line with national legal requirements and local practices.

If graves identified during the archaeological baseline study are determined to be of historical significance, the Regional Conservation Board will first be notified.

Through the Board's process, if the graves are confirmed to have historical value, the registration procedure must be completed.

In all cemetery areas where the alignment cannot be modified or where cemeteries are encountered incidentally, and in cases where modern-era cemeteries are affected by construction, the following procedures will be followed.

Whenever work is required in any such area, the identified graves will be first reported by the SPV to General Directorate of Highways (KGM), and KGM will them notify the relevant public authorities, as detailed below.

1- Identification of Need – Determining that a grave must be relocated due to project alignment or other compelling reasons.
2- Submission of Application – Submission of a formal request by the responsible parties (e.g., SPV, General Directorate of Highways, Municipality) to the relevant Metropolitan Municipality Cemetery Directorate.
3- Stakeholder Coordination – Engagement with relevant authorities including health institutions, religious representatives (e.g., imam), and families of the deceased.
4- Notification Stage – Written notifications will be delivered to the families of the deceased whose graves will be relocated.
5- Public Announcement (Mukhtars) – Public notices will be posted for 15 days in the offices of relevant mukhtars, ensuring coverage for all affected communities.
6- Local Newspaper Announcement – A notice will also be published in a local newspaper to ensure wider public awareness.
7- Selection of New Grave Site – The Metropolitan Municipality Cemeteries Directorate, in consultation with relevant authorities and affected families, will identify and approve a suitable new grave location within an officially designated cemetery area.
8- Start of Relocation – Within one week after the posting period, relocation works will commence under municipal supervision, with participation of a medical doctor, imam, and administrative staff.
9- Completion of Relocation – Due to the sensitive nature of the matter, all relocations will be completed **as quickly as possible**. The Metropolitan Municipality will coordinate the process and provide the necessary resources.
10- Support Services – If required, heavy machinery or other technical support may be requested from the Project Owner, and such requests will be met promptly.
11- Documentation and Reporting – All steps will be officially documented, including photographic evidence, grave identification, and new burial location, and reported to the competent authorities.

4.1 Requirements Related to Human Remains

In the event that human remains are encountered during Project activities, the following requirements shall apply in addition to the Chance Find Procedure:

1- Immediate Cessation of Works
- All works in the vicinity of the find will stop immediately.
- The area shall be secured by the Project Archaeologist and marked as a restricted zone.

2- Respectful In Situ Protection
- Human remains shall not be moved, damaged, or removed by Project staff under any circumstances.
- The remains will be left in situ under protection until competent authorities arrive.

3- 3- Notification of Authorities
- The Project Archaeologist shall immediately notify the Museum Directorate, which will dispatch experts to the site.
- If the remains are suspected to be contemporary burials, local law enforcement shall also be informed, in line with national legal requirements.

4- Authority and Oversight
- The Museum Directorate is the competent authority for conducting or overseeing any excavation, exhumation, or handling of archaeological human remains.
- All decisions regarding the treatment, removal, or relocation of remains are subject to the written approval of the Regional Conservation Board.
- If the remains are dated to the modern period, the case may be treated as a criminal matter. In such cases, a judicial investigation and police follow-up will be required, and all actions will be carried out in accordance with the instructions of the Public Prosecutor’s Office.

5- Documentation and Custody
- The Project Archaeologist shall record the location, context, and condition of the remains through photographs, GPS, and official forms.
- A handover form will be completed at the time of transfer to the Museum authorities, ensuring a clear chain of custody.

6- Community Sensitivities
- All works will respect local cultural and religious sensitivities related to burial traditions.
- Engagement with local communities shall be conducted through the Project Archaeologist and Consultant Archaeologist, with sensitivity to intangible heritage values.

No human remains may be disturbed, removed, or transported without the explicit instruction and supervision of the Museum Directorate, and the written approval of the Regional Conservation Board.

4.2 Community Engagement and Cultural Considerations

Cemeteries in Türkiye are both tangible cultural assets and intangible cultural heritage spaces where remembrance, mourning, rituals, and collective identity are preserved. Therefore:

- Engagement with families and communities will be respectful and continuous.
- Cultural and religious sensitivities will be observed at all times.
- All actions will be supervised by the Project Archaeologist and CLO to ensure integration of cultural heritage considerations into the process.

4.3 Monitoring and Documentation

- All notifications, announcements, and relocation activities will be documented.
- A relocation register, including dates, family acknowledgements, and handover forms, will be kept by the Municipality and shared with the Project Owner upon request.
- The Project Archaeologist will record the process through site notes, photographs, and official forms.

4.4 References

Law No. 3998 on the Protection of Cemeteries (1994)

Law No. 2863 on the Protection of Cultural and Natural Assets (1983)

Relevant by-laws and decisions of the Regional Conservation Board.

APPENDIX 1: CONTACT INFORMATION OF RELATED MUSEUM DIRECTORATES AND REGIONAL BOARD DIRECTORATES

Table 1 Museum Contact Information

Name	Phone	Adress
Antalya Archaeology Museum	Tel: 0242 238 56 88/89	Bahçelievler Mahallesi, Konyaaltı Caddesi, No 88, 07050 ANTALYA E-posta: antalyamuzesi@kultur.gov.tr
Side Archaeology Museum	Tel: (0242) 280 23 00	Side, Liman Cd., 07330 Manavgat/Antalya

Table 2 Contact Information of Regional Board Directorates

Name	Phone	Adress
Antalya Cultural Assets Regional Board Directorate	0242) 243 21 60 (0242) 247 87 61 (0242) 244 55 74	Kılıçaslan Mahç Zafer Sk. No: 6 07100 KALEİÇİ / ANTALYA

ANTALYA-ALANYA MOTORWAY PROJECT

Revision No: 0 **Date:** 08.09.2025

BLASTING MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
08.09.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards

BLASTING MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
CLO	Community Liaison Officer
CO	Carbon Monoxide
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ENCON	ENCON Environmental Consultancy Co.
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
GIIP	Good International Industry Practice
HC	Hydrocarbons
HSE	Health, Safety and Environment
H&S	Health and Safety
IFC	International Finance Corporation
IFI	International Financial Institution
KPI	Key Performance Indicator
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
MSDS	Material Safety Data Sheet
NO_x	Nitrogen Oxides (NO_2 and NO)
PM	Particulate Matter
PPE	Personal Protective Equipment
RAMAQ	Regulation on Assessment and Management of Air Quality
RCA	Root Cause Analysis
RENC	Regulation on Environmental Noise Control
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
SO_2	Sulfur Dioxide
VOCs	Volatile Organic Compounds
WHO	World Health Organization

BLASTING MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Blasting Management Plan ("Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in Figure I-I.

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

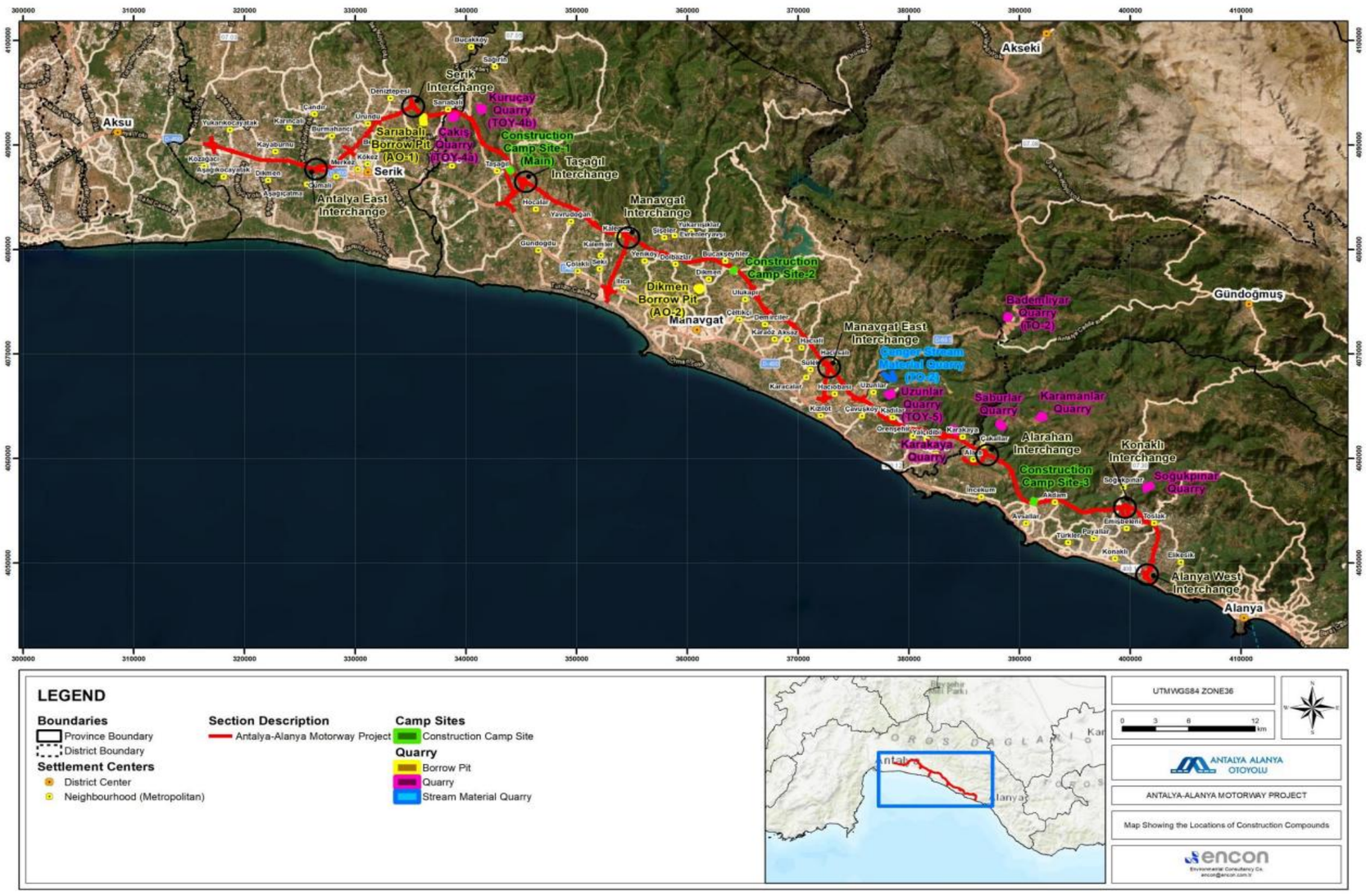

Figure I-I: MapShowing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

I.2 PURPOSE AND SCOPE

This Plan has been prepared by Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Motorway Project ("the Project").

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The purpose of this Plan is to define the principles and procedures for the blasting activities in accordance with applicable national regulations and international standards. The Plan aims to minimize risks to human health, property, and the environment arising from the transportation of explosives from licensed/authorized company and blasting activities during the construction phase.

This Plan outlines actions that should be done to ensure that blasting activities occur in a safe, compliant, and environmentally responsible manner. It also provides guidance on the transportation of explosives, ground vibration, noise, air blast, and community safety. In addition, the management of air and noise-related impacts are thoroughly detailed in the air pollution and emissions management plan and noise and vibration management plan.

The Plan should be implemented by all parties involved in the construction phase, including the Project Sponsor – AAOİAŞ, the Main Contractor (Limak), and all subcontractors. Roles and responsibilities regarding blasting management should be clearly defined. The Plan should be reviewed and updated as necessary to reflect changes in project conditions, design, or legal requirements.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

The Plan has been structured to align with both national and international requirements, including legislation, guidelines, and sectoral standards governing the blasting activities, as well as the management of associated risks such as ground vibration, air blast, noise, and community safety. Blasting operations will be conducted in line with the legislation in force and good industry practices/modern techniques.

II.1 National Requirements

The following Turkish laws and regulations provide the legal basis for managing blasting activities, including use of explosives, vibration and noise control, occupational safety, and community protection:

- Occupational Health and Safety
  - Regulation on Occupational Health and Safety Services – dated 29.12.2012, published in Official Gazette No. 28512.
  - Regulation on Occupational Health and Safety Risk Assessment – dated 29.12.2012, published in Official Gazette No. 28512.

- Regulation on Protection of Workers from Risks of Explosive Atmospheres – dated 30.04.2013, published in Official Gazette No. 28633.

- Explosives and Blasting Regulations
  - Regulation on Equipment and Protective Systems Used in Potentially Explosive Atmospheres - dated 30.06.2016, published in Official Gazette No. 29758.
  - Regulation on Explosives Exempted from Monopoly, Hunting Materials, and Similar Items– Cabinet Decree No. 87/12028, published in Official Gazette No. 19589 on 29.09.1987.
  - Regulations of the General Directorate of Mining Affairs regarding the use of explosives in mining, quarrying, and tunnel construction.

- Noise Control
  - Regulation on Environmental Noise Control - dated 29.12.2012, published in Official Gazette No. 28512

- Air Quality
  - Regulation on Air Quality Assessment and Management- dated 06.06.2008, published in Official Gazette No. 26898

- Waste Management
  - Regulation on Waste Management – dated 02.04.2015, published in Official Gazette No. 29314.
  - Regulation on the Control of Excavated Soil, Construction and Demolition Wastes – dated 18.03.2004, published in Official Gazette No. 25406.

- Fire Protection
  - Regulation on Fire Protection of Buildings – dated 19.12.2007, published in Official Gazette No. 26735.

- Project-Specific
  - Technical Specifications of Highways – issued by the General Directorate of Highways (KGM), latest full update 2013.

II.2 International Standards and Conventions

The following international standards and procedures are applicable to the Project to ensure alignment with national legislation and recognize good industry practices.

AIIB is a multilateral development bank established to promote sustainable economic growth and improve infrastructure connectivity. According to the Articles of Agreement, AIIB aims to invest in infrastructure and productive sectors while fostering regional cooperation through partnerships with other development institutions. To ensure responsible operations, AIIB adheres to policies that address environmental and social impacts, outlined in its Environmental and Social Framework (ESF).

Also, the following international standards and reference frameworks should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)
- Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive environments (Individual Directive 15 within the meaning of Article 16(1) of Directive 89/391/EEC).
- IFC Sector-Specific EHS Guidelines for Hazardous Materials Management
- Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH)
- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)
- International Maritime Dangerous Goods (IMDG) Code
- ICAO Technical Instructions (for air transport)
- Regulations concerning the International Carriage of Dangerous Goods by Rail (RID).

These standards should guide the development of site-specific procedures, monitoring strategies, and corrective actions. In cases where national legislation and international standards diverge, stricter requirements should be adopted.

II.3 Project Standards

The acceptable thresholds are defined in the Air Pollution and Emissions Management Plan and the Noise and Vibration Management Plan to prevent damage to buildings, minimize community disturbance, and avoid health and safety risks. In cases where national limits are either not specified or less stringent, the most stringent international standards shall be applied in line with good industry practice.

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Blasting Management Plan:

- Noise and Vibration Management Plan
- Community Health and Safety Management Plan
- Traffic Management Plan
- Hazardous Material Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Security Management Plan
- Emergency Preparedness and Response Management Plan
- Occupational Health and Safety (OHS) Plan
- Air Pollution and Emissions Management Plan
- Cultural Heritage Management Plan
- Environmental Accident and Spill Response Management Plan
- Excavated Material Management Plan

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the environmental and social impacts of blasting activities during construction phase of the project.

IV. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

- General Manager (SPV)
  - Define and implement overall SPV strategy alignment with shareholder and stakeholder expectations.
  - Ensure the development, revision, and execution of Blasting Management Plan, including other Environmental and Social Management Plans (ESMPs) in accordance with company policies, national - international standards and lender requirements.
  - Ensure the provision of necessary resources and organizational support for the implementation of Blasting Management Plan, and other ESMPs.
  - Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.
  - Support the E&S Manager in preparing, disseminating, and implementing this plan.

- E&S Manager (SPV)
  - Review and ensure the preparation, revision, and implementation of this Blasting Management Plan in accordance with national laws, regulations, company policies, international standards and lender requirements.
  - Ensure the development, revision, and execution of this Blasting Management Plan, including all ESMPs in accordance with company policies and international standards.
  - Monitor the environmental and social performance of EPC and subcontractors to ensure compliance.

- H&S Manager (SPV)
  - Ensure the conditions and obligations specified in the health, safety, community related plans and documents are implemented and adhered to by EPC and subcontractors in accordance with company policies, regulatory obligations, international standards and lender requirements.
  - Contribute to project risk assessments and job hazard analyses and ensure these are updated regularly.
  - Ensure that all construction site activities including blasting activities are carried out safely by EPC and subcontractors.
  - Support EPC and subcontractors in the development and delivery of site-specific H&S training programs.

- Deputy E&S Manager (SPV)
  - Lead the development, implementation, and continuous improvement of the Environmental and Social Management.
  - Review the ESHS documents of subcontractors and suppliers and ensure that they comply with the Project ESHS requirements.
  - Monitor blasting-related permits, subcontractor compliance, and mitigation measures, including the implementation of this Blasting Management Plan.
  - Track the performance (including blasting activities) through Key Performance Indicators (KPIs), reports, audits, and meetings.
  - Oversee E&S related (including blasting-related) incidents and non-compliances, including investigations, corrective/preventive actions, and stakeholder communication.
  - Support E&S Manager (SPV) in executive decision-making by providing timely reports and insights on E&S performance, risks, and emerging trends.

- Lead community engagement strategies in collaboration with the Environmental Engineer and, and Social Chief to ensure effective grievance management and positive relations with project-affected communities.
- Ensure that EPC and subcontractor provide the necessary training through the review of training records and relevant training documents.

- Social Chief (SPV)

  - Supervise and mentor CLOs, ensuring their work aligns with project priorities and stakeholder engagement strategy.
  - Develop and implement work plans and schedules for the CLO team.
  - Oversee the delivery of pre-blast notifications.
  - Ensure local residents are provided with written notice at least 30 days before blasting, followed by additional written reminders.
  - Ensure blasting schedules are shared with grazing area users, residents, and local authorities, including the operator's contact details, the specific blasting locations, and the planned dates and time.
  - Ensure that complaints regarding blasting activities are recorded and managed through Grievance Mechanism channels, and resolved in time.
  - Ensure accurate, timely, and complete reporting of grievance outcomes and inform the E&S Manager about the basting related complaints and coordinate the assessment and solution of grievances with EPC team.

- Environmental Engineer (SPV)

  - Ensure corrective/preventive actions are taken for blasting-related incidents in collaboration with HSE, E&S teams, and subcontractors.
  - Integrate Blasting Management Plan requirements into work plans, method statements, and construction activities.

- Community Liaison Officer (CLO) (SPV)

  - Ensure local residents are provided with written notice at least 30 days before blasting, followed by additional written reminders.
  - Ensure blasting schedules are shared with grazing area users, residents, and local authorities, including the operator's contact details, the specific blasting locations, and the planned dates and time.
  - Track community complaints or grievances related to blasting, ensuring timely resolution via the Grievance Mechanism (GM).
  - Facilitate equitable community engagement and consultations, ensuring vulnerable or sensitive groups are informed about noise, vibration and air quality impacts of blasting operations.

- HSE Specialist (SPV)

  - Support the execution of the safety, health and community safety related plans including this Blasting Management Plan, and ensure site activities (including blasting activities) are carried out safely by EPC contractors and subcontractors in-line with applicable laws, international standards and lender requirements.
  - Conduct regular site inspections (including blasting sites), including pre-blast area checks hazard identification, and risk assessments; follow up on corrective and preventive actions.

- Monitor compliance with blasting safety protocols as well as H&S, ensuring that blasting operations are carried out in line with approved method statements, blasting schedules, and work procedures, with Health & Safety measures fully integrated.

- Project Director (EPC)

  - Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards.
  - Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones.
  - In case of non-compliance regarding to blasting, ensure appropriate corrective and preventive actions are taken in coordination with the E&S Manager and H&S Manager.

- E&S Manager (EPC)

  - Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.
  - Implement environmental and social measures through site practices and method statements.
  - Ensure that all conditions and obligations outlined in the Blasting Management Plan as well as other ESMPs are implemented and adhered to during project activities.
  - Coordinate the assessment and solution of grievances with EPC team about the basting related complaints.

- H&S Manager (EPC)

  - Ensure the safe execution of construction activities in compliance with H&S Plan, legal requirements, international standards, SPV and lender obligations.
  - Prepare, review, and improve H&S Plans by integrating blasting control measures into site-specific risk registers, method statements, and monitoring programs.
  - Supervise and support Contractors/Subcontractors to implement blasting related mitigation measures, and monitor their compliance with H&S and NVMP requirements.
  - Coordinate with SPV H&S Manager and EPC HSE Manager to address blasting-related incidents, risks, and community safety concerns.
  - Ensure that all site personnel receive regular training and toolbox talks covering Blasting Management Plan obligations, and safe working practices.
  - Oversee emergency preparedness and response procedures for blasting incidents (e.g., blast vibration exceedances, community complaints).
  - Conduct investigations of blasting-related incidents or complaints, ensure corrective/preventive actions are taken, and report findings to Project Director and SPV.
  - Promote a safety-first culture by ensuring blasting risks are proactively managed and lessons learned are integrated into continuous improvement.

- Site Doctor (EPC)

  - Provide on-site medical support and emergency response, with focus on blasting-related health issues.
  - Conduct periodic health checks and maintain records to monitor impacts on blasting exposure.
  - Recommend and support preventive measures (e.g., hearing protection, work rotation) in coordination with HSE teams.
  - Deliver awareness sessions and medical input for risk assessments and incident investigations related to blasting.

- Archaeologist (EPC)
    - Conduct archaeological surveys and assessments within the project footprint before and during construction, and implement chance-find procedures with proper reporting.
    - Provide training for construction personnel and subcontractors on cultural heritage awareness, including chance-find protocols and legal obligations.
    - Inform blasting personnel about nearby cultural heritage areas and related protection requirements.

- Biodiversity Specialist (EPC)
    - Monitor and report biodiversity impacts of blasting on sensitive species and habitats.
    - Support implementation of mitigation measures under the Biodiversity and Blasting Management Plans.
    - Train and guide construction teams on protecting species from blasting related impacts.
    - Coordinate corrective actions with the Environmental Engineer and E&S Manager when non-compliances arise.

- H&S Chief (EPC)
    - Supervise daily implementation of HSE requirements on-site, with emphasis on blasting related measures.
    - Monitor contractor and subcontractor compliance with the Blasting Management Plan and report deviations to the HSE Manager.
    - Support incident/complaint investigations related to blasting and oversee corrective actions.
    - Maintain site records on blasting monitoring, inspections, and compliance checks.
    - Coordinate with the SPV HSE team during audits, inspections, and reporting.

- H&S Engineer (EPC)
    - Support the implementation and continuous improvement of the Blasting Management Plan across all site activities including blasting.
    - Provide technical guidance to contractors and subcontractors, maintain the site risk register, and carry out inspections and audits.
    - Lead investigations into accidents or unsafe conditions related to blasting activities, ensuring that findings are documented and corrective measures are applied.
    - Report regularly on H&S compliance, risks, and overall performance to the H&S Manager.
    - Provide technical input and guidance to workers on blasting safety measures.

- H&S Technician (EPC)
    - Assist in blasting hazard identification, risk assessments, and inspections of site conditions under the supervision of senior HSE staff.
    - Support implementation of Blasting Management Plan and HSE measures on-site, ensuring safe work practices.
    - Monitor daily use of PPE and adherence to HSE protocols and by workers and subcontractors.
    - Support toolbox talks, drills, and safety briefings while keeping records updated and accurate.
    - Escalate any observed non-compliance of blasting activities or HSE issues to the HSE Engineer or H&S Manager for timely action.

- H&S Worker (EPC)
    - Perform routine safety checks on construction activities and help enforce basic HSE rules on blasting site.
    - Report unsafe acts, incidents, and near-misses from blasting activities to HSE supervisors promptly.
    - Assist with the placement of safety signage , emergency logistics, and support during drills or evacuations related to blasting activities.
    - Participate in blasting site briefings and help maintain clear communication between workers and HSE staff and subcontractors.

- H&S Trainer and Document Controller (EPC)
    - Deliver HSE inductions, refresher courses, compliance to the Blasting Management Plan and awareness sessions tailored to blasting related risks.
    - Maintain updated training matrices, attendance records, and competency certifications for EPC and subcontractor staff related to Blasting Management Plan obligations.
    - Manage document control for blasting-related materials, ensuring that procedures, permits, and records are up-to-date and traceable.
    - Provide necessary documentation during audits and contribute to the continuous improvement of training content.

- Paramedic (EPC)
    - Provide immediate medical care, stabilize injured personnel, and coordinate medical evacuation when needed in the blasting sites.
    - Assist the site doctor with health checks, maintain records, and monitor the condition of medical supplies.
    - Participate in drills and awareness campaigns related to occupational health and safety and blasting.
    - Report blasting-related risks or recurring issues on the blasting sites to the H&S Manager and Site Doctor.

- Environmental Engineer (EPC):
    - Implement and monitor the Blasting Management Plan on-site, including subcontractor compliance.
    - Conduct routine inspections and measurements of noise and vibration levels to ensure mitigation measures are effective near the blasting sites.
    - Maintain accurate records and databases for noise, vibration and air quality monitoring related to blasting activities, and support reporting for audits or regulatory compliance.
    - Support training, toolbox talks, and inductions related to blasting awareness for site personnel.
    - Participate in investigations of blasting-related incidents and coordinate corrective/preventive actions with HSE and E&S teams.
    - Implement and monitor the Blasting Management Plan on-site, including subcontractor compliance.
    - Conduct routine inspections and measurements of noise, vibration and air quality levels; maintain records and report performance to E&S Manager and relevant stakeholders.
    - Coordinate corrective/preventive actions for blasting-related incidents in collaboration with HSE, E&S teams, and subcontractors.

- Integrate Blasting Management Plan requirements into work plans, method statements, and construction activities.

- Community Liaison Officer (CLO) (EPC)

  - Communicate with project-affected communities about blasting activities, including potential noise, vibration and air quality impacts.
  - Provide local residents written notice at least 30 days before blasting, followed by additional written reminders.
  - Share blasting schedules with grazing area users, residents, and local authorities, including the operator's contact details, the specific blasting locations, and the planned dates and time.
  - Log, track, and follow up on community complaints or grievances related to blasting, ensuring timely resolution via the Grievance Mechanism (GM).
  - Support monitoring and documentation of Blasting Management Plan implementation at site level, including subcontractor activities affecting the community.
  - Facilitate equitable community engagement and consultations, ensuring vulnerable or sensitive groups are informed about noise, vibration and air quality impacts of blasting operations.
  - Coordinate with E&S Manager and other project teams to integrate community feedback into Blasting Management Plan updates and corrective actions.

- Blasting Supervisor (EPC)

  - Follow and supervise this Blasting Management Plan and all blasting related procedures during site activities.
  - Ensure personal compliance (including subcontractor carrying blasting activities) and support the correct implementation of Blasting Management Plan requirements on-site.
  - Ensures that no unauthorized person carries out any work related to the use of explosives.
  - Inspects the blasting area to confirm adequacy of the blast specification.
  - Oversee the operation of blast planning to improve processes and practices.
  - Builds the team's knowledge of safe and effective blasting practices.
  - Ensures compliance with operational plans and work instructions.
  - Conducts regular inspections of worksites to promote HSE practices.
  - Manages the service provided by the blast supplier to ensure contractual compliance.
  - Reports any significant deviations from operational plans to the Project Manager.

V. BLASTING PRELIMINARY DESIGN MODELS

Preliminary design models for blasting provided in the sections below are provided by the ESIA Consultant ENCON, detailed blasting models are provided in the ESIA. The main explosive will be ANFO or its equivalents, initiated preferably with non-electric delay systems.
Within the scope of the "Antalya – Alanya Motorway Project," blasting will be carried in tunnel excavations and tunnels are planned at five different locations.

Quantities of Explosive Materials that may be needed during the Works

The quantities of explosives and accessories potentially required during the blasting excavation works for the Antalya – Alanya Motorway Project have been estimated.

The excavation phase is planned to last approximately 3 years, involving blasting for cuttings, foundations, and tunnels. The estimated excavation volume for cuttings and foundations is 17,500 m³, while the total excavation volume for tunnels is expected to be 14,000 m³. It is assumed that blasting will occur 26 days per month, 312 days per year, totaling 936 blasting days throughout the Project duration.

Based on the proposed blasting designs, the estimated quantities of explosives and accessories needed for cuttings and foundation excavations are provided in Table V-I, while those for tunnel excavations are given in Table V-II.

Table V-I: Estimated quantities of explosive materials and accessories to be required for cutting and foundation excavations

Explosives and Accessories	Daily Requirement	Monthly Requirement	Annual Requirement	Total Requirement (Project Duration)
ANFO / Booster-sensitive emulsion explosive	1000 kg	26,000 kg	312,000 kg	936,000 kg
Cap-sensitive emulsion explosive (dynamite)	9,500 kg	2,470 kg	29,640 kg	88,920 kg
Electronic detonator	50 units	1,300 units	15,600 units	46,800 units
Electric detonator	200 units	5,200 units	62,400 units	187,200 units
Non-electric detonator	190 units	4,940 units	59,280 units	177,840 units
Detonating cord	700 meters	18,200 meters	218,400 meters	655,200 meters

Table V-II: Estimated quantities of explosive materials and accessories required for tunnel excavations

Explosives and Accessories	Daily Requirement	Monthly Requirement	Annual Requirement	Total Requirement (Project Duration)
Cap-sensitive emulsion explosive (dynamite)	4,500 kg	1,170 kg	14,040 kg	42,120 kg
Electronic detonator	1,500 units	390 units	4,680 units	14,040 units
Electric detonator	500 units	130 units	1,560 units	4,680 units
Non-electric detonator	30 units	780 units	9,360 units	28,080 units
Detonating cord	10 meters	260 meters	3,120 meters	9,360 meters

V.1 Risk Assessment

The blasting design specifies the use of 10.82 kg of explosive per delay. For quarry operations, this charge is intended to control vibrations at 15 mm/s for durable structures and 8 mm/s for vibration-sensitive structures, with safe distances of 66.8 meters and 98.8 meters, respectively. For tunnels, cuts, and foundation excavations, the same explosive charge is used to limit vibrations to 10 mm/s for durable structures and 5 mm/s for vibration-sensitive structures, with corresponding safe distances of 86 meters and 132.5 meters.

Blast vibration assessments were carried out to identify areas that may be subject to potential impacts based on their proximity to vibration-sensitive structures. For tunnels (Table V-III), and cuts and foundations (Table V-IV), the vibration limits are set at 10 mm/s for durable structures and 5 mm/s for vibration-sensitive structures such as mosques, cultural heritage sites, and schools. In contrast, for quarries and borrow pits (Table V-V), the allowable limits increase to 15 mm/s for durable structures and 8 mm/s for vibration-sensitive structures.

Table V-III: Blast Vibration assessment for tunnels with vibration of 10mm/s for durable structures and 5 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact
Tunnel 1	Start Km: 54+311	Sarıabalı	158	10.82	3.77	**-6.23**	**-1.23**	**No Impact**
	End Km: 55+378		40	10.82	34.19	**24.19**		**Potential Impact**
	End Km: 55+378	HRM 8*	177	10.82	3.14		**-1.86**	**No Impact**
	Start Km: 54+311	Student Hostel	700	10.82	0.35		**-4.65**	**No Impact**
Tunnel 2	Start Km: 57+366	Çakış	215	10.82	2.30	**-7.70**		**No Impact**
	End Km: 57+985		750	10.82	0.31	**-9.69**		**No Impact**
	Start Km: 57+366	HRM 8*	53	10.82	21.77		**16.77**	**Potential Impact****
Tunnel 3	Start Km: 60+935	Taşağıl	195	10.82	2.69	**-7.31**		**No Impact**
	End Km: 62+477		80	10.82	11.24	**1.24**		**Potential Impact**
	End Km: 62+477	HRM 11*	196	10.82	2.67		**-2.33**	**No Impact**
	End Km: 62+477	Mosque	845	10.82	0.26		**-4.74**	**No Impact**
Tunnel 4	Start Km: 70+131	HRM 16*	163	10.82	3.59		**-1.41**	**No Impact**
	End Km: 70+475		60	10.82	17.84		**12.84**	**Potential Impact****
	End Km: 70+475		60	10.82	17.84		**12.84**	**Potential Impact****
Tunnel 5	Start Km: 88+671	Ulukapı	150	10.82	4.10	**-5.90**		**No Impact**
	End Km: 89+544		110	10.82	6.74	**-3.26**		**No Impact**
	End Km: 89+544	HRM 36*	248	10.82	1.83		**-3.17**	**No Impact**
	End Km: 89+544	Mosque	854	10.82	0.25		**-4.75**	**No Impact**

**See Chapter 13 of ESIA for the details of the locations of Cultural Heritage sites*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table V-VI to address these potential impacts*

Table V-IV: Blast vibration assessment for Quarries and Borrow Pits with vibration of 15mm/s for durable structures and 8 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 15 mm/s for Durable Structures	Exceedence of the limit of 8 mm/s for Vibration Sensitive Structures	Vibration Impact
Sarıabalı (AO-1) Borrow Pit	Km 53+800	Sarıabalı	63	10.82	16.49	**1.49**		**Potential Impact**
		Student Hostel	720	10.82	0.33		**-7.67**	**No Impact**
Çakış (TOY4a) Quarry	Km 56+500	Çakış	180	10.82	3.06	**-11.94**		**No Impact**
		Mosque	570	10.82	0.48		**-7.52**	**No Impact**
Kuruçay (TOY4b) Quarry	Km 58+500	Sağırin	800	10.82	0.28	**-14.72**		**No Impact**
		HRM 8*	720	10.82	0.33		**-7.67**	**No Impact**
Dikmen Borrow Pit	Km 83+000	Sarılar	100	10.82	7.86	**-7.14**		**No Impact**
		HRM 20*	100**	10.82	7.82	**-**	**-0.18**	**No Impact**
		Mosque	770	10.82	0.30		**-7.70**	**No Impact**
Bademliyar (TO2) Quarry	Km 104+750	Güçlüköy	1060	10.82	0.18	**-14.82**		**No Impact**
		School	1060	10.82	0.18		**-7.82**	**No Impact**
Uzunlar (TOY5) Quarry	Km 106+000	Uzunlar	910	10.82	0.23	**-14.77**		**No Impact**
Karakaya Quarry	Km 114+200	Karakaya	460	10.82	0.68	**-14.32**		**No Impact**
		School	620	10.82	0.42		**-7.58**	**No Impact**
Saburlar Quarry	Km 117+000	Saburlar	71	10.82	13.61	**-1.39**		**No Impact**
		Mosque	400	10.82	0.85		**-7.15**	**No Impact**
Karamanlar Quarry	Km 119+500	Karamanlar	366	10.82	0.98	**-14.02**		**No Impact**
Soğukpınar Quarry	Km 134+000	Toslak	326	10.82	1.18	**-13.82**		**No Impact**

**See Chapter 13 of ESIA for the details of the locations of Cultural Heritage sites.*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table V-VI to address these potential impacts*

Table V-V: Blast Vibration Assessment for Cut, and Foundation with vibration of 10mm/s for durable structures and 5 mm/s for vibration sensitive structure

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact
Cut and Foundation	Serik Access Road Km 2+000	Sarıabalı	30	10.82	54.26	**44.26**		**Potential Impact**
		Mosque	820	10.82	0.27		**-4.73**	**No Impact**
	Serik Access Road Km 1+700	HRM 58	10**	10.82	316.41	**-**	**311.41**	**Potential Impact**
	Km 52+500	Deniztepesi	125	10.82	5.49	**-4.51**		**No Impact**
		HRM 5*	5**	10.82	962.52	**-**	**957.52**	**Potential Impact**
	Km 53+500	Sarıabalı	60	10.82	17.84	**7.84**		**Potential Impact**
		Student Hostel	990	10.82	0.20		**-4.80**	**No Impact**
	Km 58+800	HRM 9*	-**	10.82	-	**-**	**-**	**No Impact**
	Km 66+200	Hocalar	91	10.82	9.14	**-0.86**		**No Impact**
	Km 66+500	HRM 12*	332	10.82	1.15		**-3.85**	**No Impact**
	Km 73+500	Yavrudoğan	32	10.82	48.92	**38.92**		**Potential Impact**
	Km 76+500	Kalemler	26	10.82	68.27	**58.27**		**Potential Impact**
		Mosque	235	10.82	1.99		**-3.01**	**No Impact**
	Km 79+000	Yeniköy	110	10.82	6.74	**-3.26**		**No Impact**
	Km 84+000	Yukarıışıklar	62	10.82	16.92	**6.92**		**Potential Impact**
		Mosque	640	10.82	0.40		**-4.60**	**No Impact**
	Km 85+000	Dikmen	65	10.82	15.69	**5.69**		**Potential Impact**
		HRM 27*	166	10.82	3.48		**-1.52**	**No Impact**
		Mosque	290	10.82	1.42		**-3.58**	**No Impact**
	Km 94+500	Karaöz	57	10.82	19.37	**9.37**		**Potential Impact**
	Km 95+500	Aksaz	44	10.82	29.34	**19.34**		**Potential Impact**
		HRM 38*	15**	10.82	165.06	**-**	**160.06**	**Potential Impact**
	Km 97+500	Hacıali	51	10.82	23.15	**13.15**		**Potential Impact**
		School	510	10.82	0.57		**-4.43**	**No Impact**
	Km 100+500	Hacıaisalı	56	10.82	19.93	**9.93**		**Potential Impact**
	Km 104+500	Uzunlar	121	10.82	5.79	**-4.21**		**No Impact**
		HRM 41*	20	10.82	104.02		**99.02**	**Potential Impact**
		Mosque	260	10.82	1.70		**-3.30**	**No Impact**
	Km 105+500	Uzunlar	144	10.82	4.38	**-5.62**		**No Impact**
		School	800	10.82	0.28		**-4.72**	**No Impact**
	Km 112+000	Yalçıdibi	35	10.82	42.37	**32.37**		**Potential Impact**
		HRM 45*	30	10.82	54.26		**49.26**	**Potential Impact**
		Mosque	660	10.82	0.38		**-4.62**	**No Impact**
	Km 116+000	HRM 47*	258	10.82	1.72		**-3.28**	**No Impact**
	Km 116+500	Çakallar	53	10.82	21.77	**11.77**		**Potential Impact**
		School	330	10.82	1.16		**-3.84**	**No Impact**
	Km 118+500	Çakallar	55	10.82	20.51	**10.51**		**Potential Impact**
	Km 120+800	HRM 57*	10**	10.82	316.41	**-**	**311.41**	**Potential Impact**

Blasting Location	KM	Nearest Settlement/Cultural Heritage Sites	Distance to Sensitive Structures (m)	W (kg)	V (mm/s)	Exceedence of the limit of 10 mm/s for Durable Structures	Exceedence of the limit of 5 mm/s for Vibration Sensitive Structures	Vibration Impact
	Km 121+500	Hacılar	587	10.82	0.46	**-9.54**		**No Impact**
		Mosque	876	10.82	0.24		**-4.76**	**No Impact**
	Km 124+000	Avsallar	211	10.82	2.37	**-7.63**		**No Impact**
	Km 126+500	Akdam	30	10.82	54.26	**44.26**		**Potential Impact**
		Mosque	250	10.82	1.81		**-3.19**	**No Impact**
	Km 130+000	Türkler	130	10.82	5.16	**-4.84**		**No Impact**
		Mosque	350	10.82	1.05		**-3.95**	**No Impact**
	Km 133+000	Soğukpınar	39	10.82	35.61	**25.61**		**Potential Impact**
	Km 133+800	HRM 50*	74	10.82	12.74		**7.74**	**Potential Impact****
	Km 136+000	Toslak	65	10.82	15.69	**5.69**		**Potential Impact**
		HRM 51*	100	10.82	7.86		**2.86**	**Potential Impact****
		HRM 52*	106	10.82	7.16		**2.16**	**Potential Impact****
	Km 140+000	Konaklı	27	10.82	64.26	**54.26**		**Potential Impact**
		HRM 53*	26	10.82	68.27		**63.27**	**Potential Impact****
		Mosque	630	10.82	0.41	**-9.59**		**No Impact**
	Km 141+500	Mosque	250	10.82	1.81	**-8.19**		**No Impact**

**See Chapter 13 of ESIA for the details of the locations of Cultural Heritage sites*
*** Site-specific vibration measures for the protection of cultural heritage sites have been detailed in the Table V-VI to address these potential impacts*

To address the environmental impacts of blasting at the specified locations concerning ground vibration, site-specific actions detailed in have been implemented or are planned for the identified cultural heritage sites (HRM 5, HRM 8, HRM 9, HRM 16, HRM 20, HRM 38, HRM 41, HRM 45, HRM 50, HRM 51, HRM 52, HRM 53, HRM 57, and HRM 58), particularly where vibration-sensitive structures are located within 132.5 meters and the potential for threshold exceedance is elevated.

Table V-VI: Site-Specific Vibration Measures for Cultural Heritage

Cultural Heritage Site	Explanation
HRM 5	This area is currently undergoing salvage excavation. Construction activities will only proceed once the archaeological excavation has been fully completed and the necessary approvals have been obtained from the Board, the Municipality, and the Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. Upon permit approval, minimal explosive charges will be used to prevent damage to the site. (Distance to the blasting location 5 m)
HRM 8	This area is a natural protected zone. Therefore, throughout the entire process, we will reduce the maximum charge per delay (kg) and conduct survey and monitoring activities through an external contractor..(Distance to the blasting location 53 m)
HRM 9	This area was not Registered by the Board and construction permit has been obtained. But in case of Chance Find during the construction, Article 4 of Law No. 2863, the work is to be halted, and the Museum Directorate must be notified.
HRM 16	Lowering the maximum Charge per Delay (kg). (Distance to the blasting location 60 m)
HRM 20	This area is not located on the project route, but is located within the Dikmen Quarry. The HRM-20 registered archaeological site is an aqueduct that supplied water to the ancient city of Side. Because the area has been designated a first-degree archaeological site, the opinion of the Antalya Board will be sought before any activity begins. Additionally, a 100-meter buffer zone will be established between the blasting area and the archaeological site to provide protection, and no activity will be carried out within this zone.
HRM 38	The archaeological site lies at the summit of the hill, whereas the designated blasting area is located along the foothill. Given the topographical separation and distance, vibrations are expected to be attenuated. Furthermore, the recent design change led to the determination of the work area by the shoring (IKSA) wall, which established a clear boundary. Within this defined area, preventive measures can be implemented using a small amount of explosives or through mechanical breaking methods to minimize any potential impact. (Distance to the blasting location 15 m)
HRM 41	Lowering the maximum Charge per Delay (kg). (Distance to the blasting location 20 m)
HRM 45	Lowering the maximum Charge per Delay (kg). (Distance to the blasting location 30 m)
HRM 50	Lowering the maximum Charge per Delay (kg). (Distance to the blasting location 70 m)
HRM 51	Lowering the maximum Charge per Delay (kg). (Distance to the blasting location 100 m)
HRM 52	Lowering the maximum Charge per Delay (kg). (Distance to the blasting location 106 m)
HRM 53	Lowering the maximum Charge per Delay (kg). (Distance to the blasting location 29 m)
HRM 57	With the design change, the route was moved outside the archaeological site, reducing potential impacts. A preliminary survey will be done to assess the situation, and measures like reducing explosives use will be applied. (Distance to the blasting location 10 m)
HRM 58	With the design change, the route was moved outside the archaeological site, reducing potential impacts. A preliminary survey will be done to assess the situation, and measures like reducing explosives use will be applied. (Distance to the blasting location 10 m)

For HRM 5, salvage excavation is underway, with construction paused until archaeological work is completed and approvals are secured from the Board, the Municipality, and the Republic of Türkiye Ministry of Environment, Urbanization and Climate Change. HRM 8, located 53 meters from the blasting site within a natural protected area, will involve reduced maximum charge per delay and continuous monitoring by an external contractor. HRM 9 has not been registered by the Board and a construction

permit has been granted for working on this area. In accordance with Article 4 of Law No. 2863, if any archaeological remains are encountered during construction, all activities must be halted immediately and the Museum Directorate must be notified. HRM 16, at 60 meters, will reduce the maximum charge per delay. HRM 20 is a 1st degree archaeological site, and to protect it, a 100-meter buffer zone will be established between the blasting location and the site. This buffer ensures the preservation of the archaeological area while minimizing any potential impact from the blasting activities. For HRM 38, which is already located on a hilltop, the blasting activities are confined to the lower slopes below, and a recent design revision incorporating a shoring wall has clearly defined the work zone. Within this boundary, the use of minimal explosives or mechanical breaking methods will help reduce potential vibration impacts on the site above. HRM 41, HRM 45, HRM 50, HRM 51, HRM 52, and HRM 53, at distances of 20, 30, 70, 100, 106, and 29 meters respectively, will implement tailored reductions in maximum charge per delay based on proximity and sensitivity. For HRM 57 and HRM 58, route changes have moved blasting outside the archaeological sites, though preliminary surveys and reduced explosive use will address residual risks. These measures ensure compliance with ground vibration thresholds (15 mm/s at 66.8 m and 8 mm/s at 98.4 m for quarries; 10 mm/s at 86 m and 5 mm/s at 132.5 m for tunnels and cut-and-formation works) while protecting cultural heritage and nearby settlements.

At the Kuruçay (TOY4b) Quarry and at Km 52+500, Km 85+000, Km 95+500, Km 112+000, Km 136+000, and Km 140+000, the blasting pattern will be selected based on the presence of vulnerable sensitive.

In addition to vulnerable structures, some durable structures located nearby may also experience potential impacts due to flyrock and ground vibrations. The areas potentially affected include the neigborhoods of Sarıabalı, Taşağıl, Yavrudoğan, Kalemler, Yukarıışıklar, Dikmen, Karaöz, Aksaz, Hacıali, Hacıaisalı, Yalçıdibi, Çakallar, Akdam, Soğukpınar, Toslak, and Konaklı.

To reduce potential environmental impacts, it is recommended to use low-charge and delayed blasting techniques in areas close to settlements. Protective nets or coverings should be used to secure blasting zones and minimize the risk of rock throw. In addition monitoring systems for vibration should be installed in high-risk areas, and local communities should be informed prior to blasting activities with appropriate safety measures in place.

Due to the highly variable and often unpredictable geological conditions found within a tunnel the start and end points only have been defined in the blasting plan. The specific details regarding the blasting approach, including the charge per delay and blast pattern, will be determined by a consultant as the work progresses. This tailored risk mitigation strategy is necessary because the content and composition of the rock cannot be fully known in advance. Also, the consultant will conduct a blast attenuation survey to precisely determine how vibrations decrease with distance and the attenuation, ensuring that the impact on nearby receptors is accurately measured and kept within safe limits.

In addition, to enhance the efficiency and safety of blasting and drilling operations, the Project engaged a specialized contractor. In cases where Potential Impact Zones are identified and cannot be mitigated through design modifications or excavation adjustments, the contractor will implement a tailored risk mitigation strategy. This includes modifying the blast pattern and adopting a specialized low-risk blasting approach, such as reducing the charge per delay, to minimize potential hazards while maintaining operational effectiveness. Additionally, the a specialized consultant will be responsible for conducting a blast attenuation survey to determine the distance at which vibration levels decrease to lower magnitudes.

In the absence of mitigation measures, vibration damage and disturbances may occur, particularly in buildings located very close to construction areas based on worst-case estimates. However, it should be noted that all impacts related to the land preparation and construction phase will be intermittent and temporary (short-term and reversible) impacts for at most 3 years.

VI. BLASTING MANAGEMENT APPROACH

Blasting operations, by nature, involve risks that must be carefully managed to prevent harm to people, communities, and the environment. The potential for harm to human life and community safety represents the most severe consequence of inadequate blasting control. Therefore, risk mitigation measures shall prioritize the prevention of injury, protection of community well-being, and safeguarding of sensitive sites above all other considerations.

Blasting operations under the Antalya–Alanya Motorway Project will be conducted in quarries, tunnel sections, and cut-and-fill areas, and will follow a strict safety and environmental control protocol. Explosives will be carried to the site by authorized and licensed company, under the supervision of the Main Contractor, SPV and EPC in accordance with national legislation and international best practices. Blasting-related risks to be managed include but not limited to:

- Fly-rock projection,
- Ground vibration,
- Air overpressure,
- Blasting noise, and
- Dust and particulate emissions.

Dust emissions, while typically secondary, may contribute to temporary increases in PM_{10} and $PM_{2.5}$ levels, especially in dry weather and during surface blasting. Dust control measures will be applied as needed, including wetting of blasting areas and covering of loose materials. To manage these risks effectively, the following key measures will be implemented:

- Definition and enforcement of exclusion zones to prevent unauthorized access,
- Notification to nearby communities and relevant authorities,
- Use of proper charge calculation, blast timing, and detonation sequence design, and
- Post-blast inspections and incident documentation.

As part of the Environmental and Social Impact Assessment (ESIA) process, baseline studies and modelling studies near tunnel portals, quarries, and residential areas were assessed to support impact prediction and mitigation planning.

The Plan will be implemented in close coordination with the mentioned plans in Section III, to ensure comprehensive risk coverage and consistent safeguards.

VII. MITIGATION MEASURES FOR IMPACTS OF BLASTING

The following measures will be implemented throughout the construction phase to ensure the safe procurement, transport and use of explosives along with blasting activities to minimize risks to workers, communities, and the environment.

VII.1 Procurement of Explosives

- Explosives will be sourced only from licensed, authorized suppliers in compliance with Turkish regulations and international standards.
- Supplier will be prequalified based on legal compliance, HSE performance, and community safety record.
- Permits will be obtained from relevant local authority before any blasting works.

VII.2 Transport of Explosives

- Transport from the supplier's licensed facility to the site will be undertaken by licensed/approved operators using designated vehicles that meet regulatory requirements.
- All transport will comply with the Regulation on Transportation of Hazardous Materials by Road and relevant driver certification requirements.
- Vehicles will be inspected for mechanical condition (brakes, electrical systems) before transportation from the supplier and fitted with hard tops.
- Pre-transport checks will confirm suitable vehicle with functional fire extinguishers, route safety, weather conditions, and escort arrangements.
- No smoking, open flames, or unattended vehicles will be allowed during loading/unloading or transit.
- Explosives and detonators will be transported separately, in approved containers, with secure stacking to prevent damage/wetting.
- Within the project area, explosives will only be moved by authorized, trained operators using approved vehicles.
- Delivery logs will be signed upon receipt at the site.
- Only non-sparking materials may be used in contact with the cargo, which must be covered with fire- and water-resistant tarpaulins.
- Vehicles carrying explosives, blasting agents, or related supplies must never enter repair garages or workshops.
- Such vehicles may not be left unattended at any time.

VII.3 Handling and Use of Explosives

- Only trained, licensed blasting personnel will handle explosives.
- The Blasting Engineer and H&S engineer will conduct pre-blast safety checks, including:
  - Placement of safety mats,
  - Establishment of exclusion zones, and
  - Installation of warning signage and barricades.
- Misfire procedures will be implemented, including minimum re-entry wait times and controlled disposal of misfired charges.
- PPE requirements for blast crew (hearing, eye/face, head protection) will be enforced. Respiratory protection equipment will be of the suitable type and filter type based on the hazards that have been exposed.

VII.4 Blasting Operations

- The local gendarmerie and nearby communities will be notified 30 day before blasting and again prior to the blasting.
- An acoustic alert system will be used prior to each blast to ensure that individuals in potentially impacted locations (such as nearby grazing area users or settlements exposed to blasting noise) are warned.
- EPC CLO's will share the blasting schedules with grazing area users, residents, and local authorities, including the operator's contact details, the specific blasting locations, and the planned dates and time through public bulletin boards and verbal announcements through local meetings.
- Blasting operations will be clearly marked on at the entrance of the site with position, time, and date. The explosive warning signs and signals will be known to all personnel.
- Temporary road closures will be established within the exclusion zones.
- If concerns are raised regarding the strength of blasting vibrations, the Contractor or its subcontractors, under the Blasting Supervisors' oversight, will carry out vibration monitoring at different distances from the blast point to record seismic intensity.
- Blasts will only occur under acceptable weather conditions.
- Explosive charges will be optimized accordingly. Detailed records of blasting operations (location, date, the amount of explosives, and the responsible parties) will be kept and blasting related impacts will be closely monitored.
- Modern blasting techniques will be employed to minimize vibration, including the use of millisecond delays with low charge weights, which will be determined based on geological formation and rock density.
- Blasting activities will adhere to the limit values specified in the Air Pollution and Emissions Management Plan and the Noise and Vibration Management Plan. Compliance with regulatory limit values will be monitored to minimize impact in potential sensitive receptors.
- The Project's grievance mechanism will be active for any complaints related to noise/vibration, air quality or any blasting related impacts. Complaints will be thoroughly evaluated, and corrective actions will be implemented as necessary.
- Blasting works will be designed and scheduled to minimize vibration and its adverse effects.
- Blasting will be carried out at designated times in order to prevent disturbance.
- According to the Table V-III, Table V-IV, and Table V-V, grazing areas, settlements, or any cultural heritage sites stated having potential impact shall be inspected by the EPC

Environmental Engineer or CLO and a technical advisor. These inspections shall include photographic documentation of the site (before and after blasting) with a technical report. Based on the inspections, and in case of any damage caused by blasting activities, the incident will be recorded and followed up accordingly.

- Vibrations that could negatively affect nearby buildings, vegetation, or other sensitive structures will be systematically observed and recorded.
- Whenever explosives are applied, a detailed blast plan will be prepared in advance.
- A specialized blasting team will be engaged to ensure safe and efficient operations.
- Before any blast holes are charged, the designated area will be clearly identified using flags, cones, or other highly visible boundary markers.
- All staff engaged in or present around blasting operations will be given thorough instruction and training on relevant safety rules and procedures.
- EPC will safeguard personnel by ensuring regular safety training, appointing competent supervisors, providing protective equipment, maintaining effective communication, and enforcing notification protocols (covering both pre-blast and emergency alerts).
- In case of misfires, access will remain restricted until the charge is located, corrected, and safely re-fired.
- To minimize disturbance to the community, blasts will, where possible, be scheduled during busier times of day rather than quiet periods.
- Overly confined charges, such as those with excessive burden or subdrilling, will be avoided; primers will not be placed in subdrilled sections. If inadequate relief is expected in subsequent rows, one delay period may be skipped between rows.
- Increasing the delay intervals between charges may be considered, particularly for large charge weights at greater distances from structures, though this can lengthen the blast and heighten sensitivity among local residents.
- When sequencing delays within a row, the smallest delay will be assigned to the blast hole closest to the structure of concern, ensuring the detonation progresses away from that structure.
- After blasting, the site will be inspected to ensure no misfires remain and that ground conditions are safe before work resumes.
- During the entire construction phase, regular surveys will be carried out throughout blasting and drilling activities by the contractor, capturing photographic records of all structures adjacent to blasting areas to detect and evaluate any damage that may arise post-blasting. Explosive charges will be optimized accordingly.
- Detailed records of blasting operations will be kept and blasting related impacts will be closely monitored.
- Modern blasting techniques will be employed to minimize vibration, including the use of millisecond delays with low charge weights, which will be determined based on geological formation and rock density.
- The number of blasted holes per shot and total charge amounts per shot will be optimized to comply with the regulatory limit values and minimize fly rock incidents.
- Blasting activities will adhere to the limit values specified in the Regulation on Environmental Noise Control for ground vibrations. Records of air shock and vibration measurements will be maintained, and compliance with regulatory limit values will be monitored to minimize impacts on local residents.
- The Project's grievance mechanism will be active for any complaints related to vibration impacts. Complaints will be thoroughly evaluated, and corrective actions will be implemented as necessary.
- Construction works will be designed and scheduled to minimize vibration and its adverse effects.
- Blasting will be carried out at designated times in order to prevent disturbance.
- Construction machinery and equipment will be operated by taking into account the recommended minimum working distances.

- A specialized blasting team will be engaged to ensure safe and efficient operations.
- In locations where Potential Impact Zones are identified and cannot be mitigated through design or excavation changes, the contractor will implement tailored risk mitigation strategies
- Modifying blast patterns and using low-risk techniques, such as reducing charge per delay, to minimize hazards.
- For HRM 8, the relevant commissions decisions needs to be waited and based on the decision specialized monitoring needs to be done.
- Following blasting, and before re-entry, a check shall be made to ensure that atmosphere is fit for re-occupation and that it is safe to commence working.
- Prior to the blasting operations, the sensitivity of nearby settlements/buildings against noise and vibration will be assessed. Buildings located within 100 meters of major vibration sources will be identified and assessed for vibration sensitivity prior to construction. Structural conditions of buildings located within 100 meters of the motorway alignment will be recorded before and after construction works to assess any possible vibration-induced damage.

- **to Reduce Ground Vibrations**
  - Avoid overly confined charges caused by excessive burden or subdrilling, and do not place the primer in the subdrilling. If a row of blastholes does not have sufficient relief, skip a delay between rows.
  - Increase the delay time between charges, especially when firing large charge weights at significant distances from structures. While effective, this may prolong the blast and heighten public concern.
  - When arranging sequential delays within a row, place the shortest delay in the hole nearest to the structure, ensuring the blast moves away from it.
  - Schedule blasting during busy times of the day (e.g., lunchtime or after school hours) to minimize public sensitivity, and avoid blasting during typically quiet periods whenever possible.

- **to Reduce Airblast**
  - Do not use unconfined explosives. If surface detonating cord is applied, it should be buried; cords with lighter loads require less burial depth.
  - Drill holes with precision to maintain the intended burden, which is especially critical for inclined holes.
  - Reorient or reduce the height of a high free face when it is directed toward nearby populated areas.
  - Avoid blasting during early mornings, late afternoons, or at night when temperature inversions are likely, and refrain from blasting when strong winds blow toward communities.
  - Prevent excessively long delays that may cause a blasthole to lose confinement before detonation.

- **to Reduce Dust and Gases**
  - Wait briefly before re-entering the blast area, particularly if orange-brown nitrogen oxide fumes are visible. Persistent fumes should be investigated and corrected. Common causes of excessive nitrogen oxides include poor blasting agent mixtures, deterioration of agents, using non-water-resistant products in wet holes, or ineffective blasting due to insufficient confinement.
  - Apply dust suppression when needed.

VII.5 Emergency Preparedness

- All staff involved in blasting and hazardous materials management will receive training on emergency procedures, spill response, and safe handling, in line with the Emergency Preparedness and Response Management Plan and the Hazardous Material Management Plan.

VIII. TRAINING

The training program for blasting operations will be structured to identify competency requirements for each role involved, including blasting engineers, shotfirers, safety officers, monitoring staff, and other relevant personnel. These requirements will be defined in accordance with legal obligations, project standards.

All project employees and subcontractor personnel will receive induction training prior to commencing work. This will include hazard awareness related to blasting activities, correct use of PPE, safe working distances and exclusion zones, and emergency response procedures in the event of incidents such as misfires, premature detonations, or fly rock. Personnel with responsibilities for handling, transporting, or using explosives will be provided with detailed instruction on approved handling techniques, and immediate actions to be taken in case of unsafe conditions or explosive residues. This training will also cover coordination with the gendarmerie and compliance with all relevant permits.

Practical exercises will be used where appropriate to ensure competence in using relevant equipment and interpreting results. All training activities will be documented, including trainer and participant names, date, topics covered, and records will be maintained.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of blasting-related mitigation measures outlined in this Plan during the construction phase of the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific blasting conditions, monitoring results, stakeholder concerns, or changes in applicable regulations and good international industry practices.

Monitoring activities will be coordinated by the EPC E&S Manager and their team, in close collaboration with the H&S Manager, blasting supervisors, and the appointed competent blasting engineer. Key responsibilities will include verifying the implementation of site-specific blasting plans, checking compliance with approved blast designs and schedules, and ensuring the consistent application of safety measures for workforce protection, community safety, and environmental safeguarding—particularly for sensitive receptors such as settlements, schools, healthcare facilities, historical sites, and ecologically sensitive habitats.

The performance of contractors and subcontractors in implementing blasting safety and environmental protection measures will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger immediate corrective and preventive action plans. Follow-up assessments will be conducted to verify the effectiveness of implemented measures and to ensure recurrence is prevented.

The Blasting Engineer, together with the EPC Environmental Engineer and EPC's CLO's will assess conditions before, during, and after blast.

If there is a complaint from sensitive receptors (e.g., residents, schools, or hospitals) regarding blasting impacts—such as excessive vibration, noise, dust, or damage—targeted sampling and monitoring will be conducted at the complaint location in accordance with ESIA requirements and applicable blasting regulations.

Monitoring efforts will be guided by the framework provided in Table IX-I, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of measurements, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of blasting impact and mitigation measures, ensuring full compliance with national regulations and Project standards.

Table IX-I: Key Monitoring Activities

Parameter	Monitoring Station / Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Pre-blast warning and public notification	Around the blasting site	Notification of relevant gendarmerie unit and local community prior to blasting operation; public announcements and on-site warnings issued before blast and during the blast	Prior to blasting event	SPV EPC Sub-Contractor
Pre-blast site safety verification (warning signs, exclusion zones)	Blasting site	Visual inspection of warning signage, and exclusion zones	Prior to blasting event	SPV EPC Sub-Contractor
Fly rock risk assessment	Blast site and surrounding exclusion zone	Post-blast inspection	After blast	SPV EPC Sub-Contractor
Integrity of nearby roads, utilities, and structures	Areas within influence zone of blasting	Site inspection and damage assessment	Before and after blast	SPV EPC Sub-Contractor
Statistics on the grievances received on impacts related with blasting operations	The field subject to the complaint	Review of grievance logs	Weekly	SPV EPC
Blasting activities	Location of quarries	Site audit	Daily	SPV EPC Sub-Contractor

*

In cases of non-compliance identified through internal oversight audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and all relevant subcontractors.

All findings related to blasting activities, including exceedance of limit values, non-compliance incidents, or complaints received from surrounding communities, will be documented in accordance with national environmental regulations and Project procedures. In the event of non-compliances—such as significant exceedance of short-term or long-term limit values—AAOİAŞ will ensure that the issue is reported.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X-I: Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Blast notification to community and on-site staff	100% of blasts with timely notifications issued	Prior to each blast	SPV, EPC
Pre-blast site safety verification (warning signs, exclusion zones)	100% compliance prior to each blast	Prior to each blasting event	SPV, EPC
Explosives transport compliance (route safety, regulatory checks)	100% compliance with transport procedures	Before each blast	SPV EPC
Weather condition checks before blasting (wind speed, direction, temperature)	Blasting only under acceptable weather conditions	Prior to each blasting event	SPV, EPC
Statistics on the grievances received on impacts related with blasting operations	Zero unresolved grievances	Upon each grievance	SPV, EPC
Verification of blasting permits	100% valid permits and licenses	Quarterly	SPV EPC

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. Each item below should be documented and reported as outlined in the Plan:

- Blasting-related incidents,
- Exceedances of vibration or air overpressure limits,
- Labor-related incidents, and
- Non-conformities.

Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established management plans. Records to be reviewed during blasting audits will include, but are not limited to:

- Weather condition checks prior to blasting
- Pre-blast safety checklists
- Blast design and execution records, and
- Incident and grievance logs related to blasting impacts.

Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with labor legislation and international standards.

XII. REPORTING

Regular reporting will be conducted to ensure the effective implementation and continuous improvement of blasting management measures throughout the construction phase of the Project. Reporting will address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions will be identified, and any required updates will be incorporated into this Plan. The blasting safety training program will also be revised accordingly to address observed gaps. Regular audits and inspections will be conducted to verify that all blasting activities are undertaken in accordance with the provisions of this Plan, approved blast designs, and relevant permits.

The Quarterly Environmental and Social Monitoring Report will cover at least, but not be limited to, the following items. The report will be prepared by the SPV with input data provided by the EPC to evaluate the Project's performance and compliance with related plans:

- KPIs and performance trends (see Table X.1),
- Current status of key blasting-related monitoring activities (see Table IX.1),
- Relevant blasting-related training activities completed and attendance registers maintained,
- Legal authority audit reports (e.g., blasting permits),
- Site inspection logs, pre-blast checklists, and post-blast inspection findings, and
- If exists, records of grievances related to blasting impacts and associated resolutions.

In addition, the following external reporting will be done:

- All blasting-related incidents, exceedances of vibration or air overpressure limits, labor-related incidents, and non-conformities will be appropriately documented, notified, and reported in accordance with the procedures and terms defined in this Plan accordance with established procedures the terms and conditions by EPC to SPV.
- Incident notification and reporting to relevant Turkish regulatory bodies (e.g., Ministry of Environment, Urbanization and Climate Change, General Directorate of Mining Affairs, local gendarmerie) will be performed in line with applicable legislation and as stipulated in permits and licenses.
- Lenders will be notified of incidents pursuant to the terms and conditions agreed upon in the Finance Agreements through the SPV.

All personnel are encouraged to raise concerns, suggestions, or complaints related to blasting activities through the established grievance mechanism by completing the grievance form. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

QUARRY MANAGEMENT PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
08.09.2025	00	This plan is prepared according to Environmental and Social Due Diligence comments

QUARRY MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
QMP	Quarry Management Plan
CLO	Community Liaison Officer
CO	Carbon Monoxide
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
HC	Hydrocarbons
HSE	Health, Safety and Environment
H&S	Health and Safety
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
PS	Performans Standards
WHO	World Health Organization

QUARRY MANAGEMENT PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Quarry Management Plan ("QMP" or "Plan") has been prepared by Antalya-Alanya Highway Construction Investment and Operation Inc. ("AAOİAŞ" or "SPV") for the Antalya-Alanya Highway Project ("Project") in accordance with national legislation, the Equator Principles ("EP"), the International Finance Corporation ("IFC") Performance Standards ("PSs"), and the international standards that reference the relevant legislative sections. The Plan covers the construction phase of the Project.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor
[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

QUARRY MANAGEMENT PLAN

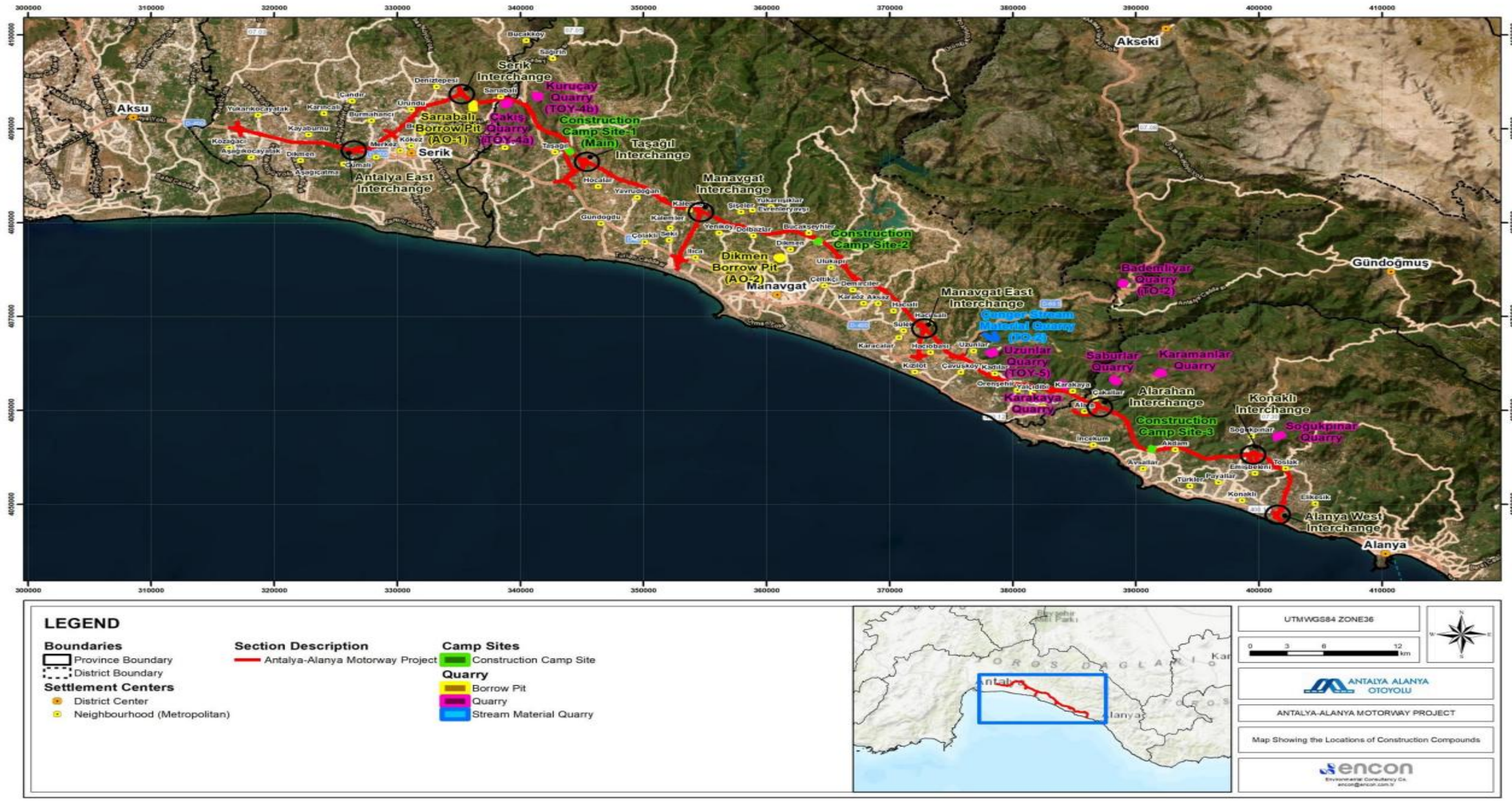

Figure I-1.Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

I.2 Purpose and Scope

The purpose of this Plan;

- Defining country legislation and project standards,
- Defining the duties and responsibilities of the personnel, and
- Identify measures and corporate targets to reduce resource consumption, to avoid or, when avoidance is not possible, minimize and control impacts on the environment resulting from environment and greenhouse gases during the construction phase.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The Plan has been developed to provide further details on the measures to be implemented during the construction phase of the Project to ensure that the actual environmental impacts are consistent with those evaluated in Environmental and Social Impact Assessment (ESIA) and that mitigation measures are applied as intended and effective. The requirements set out in this Plan are applied to all activities during the construction phase of the Project, including those carried out by subcontractors.

This Plan has been developed according to the Turkish regulatory framework, International Finance Corporation (IFC) Performance Standards (PSs) and IFC General and Sector Specific Environmental, Health and Safety (EHS) Guidelines, IFC Environmental, Health, and Safety Guidelines for Railways, IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction and related EU Directives.

The Plan has been developed in alignment with applicable national legislation and relevant international standards, including the requirements of international financial institutions. This plan will provide mitigation alternatives and an impact monitoring schedule in accordance with Turkish and international regulations and standards.

This Plan should be applied by all parties involved in the construction phase, including the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ), the Main Contractor (EPC or Limak), and all subcontractors. Responsibilities for implementation, monitoring, and reporting of resource efficiency related issues should be clearly assigned. Necessary updates to the Plan should be considered in case of changes in project design, construction methodology, or regulatory requirements.

The purpose of this Plan is to set out the strategic approach to manage and mitigate the impacts associated with the extraction of aggregates, gravel, sand and rock required for construction of the Project.

The aggregate, gravel sand and rock material will be supplied from the defined quarries and borrow areas within the quarry and borrow pit areas as well as by winning material during blasting and major excavations within the scope of the Project.

This QMP identifies the risks associated with both the immediate and ultimate extraction needs and provides mitigation strategies to be adopted by the SPV, EPC Contractor and all subcontractor to ensure that the risk is minimised to acceptable levels. The SPV, EPC Contractor and all subcontractor will be responsible to maintain this plan so that it is updated and aligned with the most recent construction design and delivery schedule.

The objectives of the QMP are as follows:

- Ensure adequate operational standards to the correct management of the areas planned to be exploited for rockfill material, aggregates as well as for the other borrow areas (sand, gravel);
- Assess the key environmental and social issues associated with various activities undertaken;
- Detail all the environmental and social safeguard measures to be implemented for the operation of quarry and borrow areas; and
- Verify the effectiveness of mitigation measures.

This Plan applies to all Project activities under the Contractor's supervision, its subcontractors and to all employees. The Contractor is the main responsible for the implementation of this Plan. Subcontractors will be responsible to work in line with all environmental and social management systems (ESMS) of the Contractor. This Plan applies to normal conditions during the construction phase activities and it is a living document, and the responsibilities, procedures and compliance actions should be updated as appropriate.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This section includes policies, standards and requirements of reference for this Plan that are applicable for, but not limited to, construction phase of the Project. Project standards are described in the Project ESIA and are listed below:

- National legislative requirements and all permits, licenses and approvals
- IFC PSs
- Equator Principles (EPs) IV
- Other good international industry practices (GIIP) including ISO 9001:2015 - Quality Management Systems, ISO 14001:2015 – Environmental Management Systems and ISO 45001:2018 - Occupational Health and Safety Management Systems
- International Conventions and Protocols Türkiye is a party to
- The Contractor's Quality Policy, Health, Safety and Environmental Policy and related practices and procedures.

II.1 National Requirements

The following Turkish laws and regulations will be used as the legal basis:

- Environmental Law No. 2872
- Regulation on Decreasing the Ozone Depleting Materials
- Regulation on Reduction of Sulphur Content of Some Fuel Types
- Regulation on Control of Exhaust Gas Emission and Quality of Fuel and Diesel
- Regulation on Monitoring of Greenhouse Gases Emissions
- Groundwater Law, Law No: 167,
- Regulation on Management of Surface Water Quality
- Regulation on the Water for Human Consumption of the Ministry of Health of Turkey, limit values for drinking and utilization waters
- Energy Efficiency Law No. 5627 dated 18/4/2007
- Regulation on the Improvement of the Energy Sources and the Efficiency in the Energy Usage
- Regulation on Assessment and Management of Environmental Noise
- Regulation on Environmental Noise Generation due to Equipment Used in Open Space
- Law on Protection of Soil and Land Use
- Regulation on Safety Data Sheets for Hazardous Substances and Mixtures
- Regulation on Registration, Evaluation, Permitting and Restrictions of Chemicals
- Regulation on the Classification, Labelling and Packaging of Hazardous Substances and Mixtures

II.2 International Standards and Conventions

In addition to national requirements, the following international guidelines frameworks, standards and agreements should be considered to ensure alignment with best practices and financial institution requirements:

To ensure responsible operations, AIIB adheres to policies addressing environmental and social impacts as outlined in its Environmental and Social Framework (“ESF”) document. Updated in June 2024, the ESF reflects AIIB's commitment to international standards and sustainable development practices. The ESF includes the Environmental and Social Policy (ESP), which sets mandatory requirements for all projects, supported by Environmental and Social Standards (“ESSs”).

The United States International Development Finance Corporation (“DFC”) applies its Environmental and Social Policy and Procedures (“ESPP”) to ensure that all investments meet strong environmental and social standards. The ESPP, revised in 2024 after broad stakeholder consultation, guides DFC through the full investment cycle, covering pre-investment reviews, public disclosure of high-risk projects, and post-investment monitoring.

The World Bank manages the environmental and social risks of its projects through the Environmental and Social Framework (ESF). At the core of the ESF are 10 ESS that are applied to borrowers and guide project preparation and implementation. These standards cover the following:

Moreover, the following standards, guidelines and directives should be used to align Project practices with international lender requirements and good practice environmental and social management:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 3: Resource Efficiency and Pollution Prevention
  - Performance Standard 4: Community Health, Safety, and Security
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC EHS Guidelines for Toll Roads (2007)
- IFC Guidance Notes (2012)

- Equator Principles IV (2020)
- EU Ambient Air Quality Directive (2008/50/EC)
- European Landscape Convention (entered into force in 2000, ratified by Türkiye in 2003)
- European Union Road Safety Policy Guidelines and Directives
- World Health Organization (WHO) Ambient Air Quality Guidelines (2005 and 2021)

These references should be used to guide the implementation, monitoring, and performance evaluation of air pollution and emissions control measures on-site throughout the construction phase.

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Quarry Management Plan:

- Solid Waste Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Spill Response Management Plan
- Community Health and Safety Management Plan
- Traffic Management Plan
- Hazardous Material Management Plan
- Blasting Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Training Management Plan
- Excavated Material Management Plan
- Noise and Vibration Management Plan
- Air Pollution and Emission Management Plan
- Water Quality, Wastewater And Storm Water Management Plan
- Occupational Health and Safety Plan
- Soil Management and Erosion Control Plan

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

IV. ROLES AND RESPONSIBILITIES

Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş. (SPV) as the Project Sponsor and Limak (EPC) as the main contractor of the Project will be responsible for the following:

General Manager (SPV)

- Define and implement overall SPV strategy alignment with shareholder and stakeholder expectations.
- Ensure the development, revision, and execution of Quarry Management Plan, including other Environmental and Social Management Plans (ESMPs) in accordance with company policies, national - international standards and lender requirements.
- Ensure the provision of necessary resources and organizational support for the implementation of Quarry Management Plan, and other ESMPs.
- Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.
- Support the E&S Manager in preparing, disseminating, and implementing this plan.

E&S Manager (SPV)

- Review and ensure the preparation, revision, and implementation of the Quarry Management Plan in accordance with national laws, regulations, company policies, international standards and lender requirements.
- Ensure the development, revision, and execution of this Quarry Management Plan, including all ESMPs in accordance with company policies and international standards.
- Monitor the environmental and social performance of EPC and subcontractors to ensure compliance.
- Coordinate the assessment and solution of grievances with EPC team regarding quarry and borrow related complaints.

H&S Manager (SPV)

- Ensure the conditions and obligations specified in the health, safety, community related plans and documents are implemented and adhered to by EPC and subcontractors in accordance with company policies, regulatory obligations, international standards and lender requirements.
- Contribute to project risk assessments and job hazard analyses and ensure these are updated regularly.
- Support EPC and subcontractors in the development and delivery of site-specific H&S training programs.
- Ensure that all site personnel receive regular training and toolbox talks covering Quarry Management Plan obligations, and safe working practices.
- Coordinate with SPV H&S Manager and EPC HSE Manager to address quarry and borrow related incidents, risks, and community safety concerns.

Deputy E&S Manager (SPV)

- Lead the development, implementation, and continuous improvement of the Environmental and Social Management.
- Review the ESHS documents of subcontractors and suppliers and ensure that they comply with the Project ESHS requirements.
- Monitor quarry and borrow related permits, subcontractor compliance, and mitigation measures, including the implementation of this Quarry Management Plan.

- Track the performance (including quarry activities) through Key Performance Indicators (KPIs), reports, audits, and meetings.
- Oversee E&S related incidents and non-compliances, including investigations, corrective/preventive actions, and stakeholder communication.
- Support E&S Manager (SPV) in executive decision-making by providing timely reports and insights on E&S performance, risks, and emerging trends.
- Lead community engagement strategies in collaboration with the Environmental Engineer and, and Social Chief to ensure effective grievance management and positive relations with project-affected communities.
- Ensure that EPC and subcontractor provide the necessary training through the review of training records and relevant training documents.

Social Chief (SPV)

- Supervise and mentor CLOs, ensuring their work aligns with project priorities and stakeholder engagement strategy.
- Develop and implement work plans and schedules for the CLO team.
- Ensure that complaints regarding quarry and borrow activities are recorded and managed through Grievance Mechanism channels, and resolved in time.
- Ensure accurate, timely, and complete reporting of grievance outcomes and inform the E&S Manager about the basting related complaints and coordinate the assessment and solution of grievances with EPC team.

Environmental Engineer (SPV)

- Ensure corrective/preventive actions are taken for quarry and blasting operations related incidents in collaboration with HSE, E&S teams, and subcontractors.
- Integrate Quarry Management Plan requirements into work plans, method statements, and construction activities.

Community Liaison Officer (CLO) (SPV and EPC)

- Communicate with project-affected communities about quarry and borrow activities, including potential noise, dust, vibration, and traffic impacts.
- Log, track, and follow up on community complaints or grievances related to quarry operations, ensuring timely resolution via the Grievance Mechanism (GM).
- Support monitoring and documentation of Quarry Management Plan implementation at site level, including subcontractor activities affecting the community.
- Coordinate with E&S Manager and other project teams to integrate community feedback into Quarry Management Plan updates and corrective actions.

HSE Specialist (SPV)

- Support the execution of the safety, health and community safety related plans including this Blasting Management Plan, and ensure site activities (including quarry and borrow operations) are carried out safely by EPC contractors and subcontractors in-line with applicable laws, international standards and lender requirements.
- Conduct regular site inspections (including quarry and borrow sites), hazard identification, and risk assessments; follow up on corrective and preventive actions.
- Ensuring that quarry operations are carried out in line with approved method statements, quarry schedules, and work procedures, with Health & Safety measures fully integrated.

Project Director (EPC)

- Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards.
- Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones.
- In case of non-compliance regarding to quarry and borrow operations, ensure appropriate corrective and preventive actions are taken in coordination with the E&S Manager and H&S Manager.

E&S Manager (EPC)

- Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.
- Implement environmental and social measures through site practices and method statements.
- Ensure that all conditions and obligations outlined in the Quarry Management Plan as well as other ESMPs are implemented and adhered to during project activities.
- Coordinate the assessment and solution of grievances with EPC team regarding quarry and borrow related complaints.

H&S Manager (EPC)

- Ensure the safe execution of construction activities in compliance with H&S Plan, legal requirements, international standards, SPV and lender obligations.
- Prepare, review, and improve H&S Plans by integrating quarry and borrow control measures into site-specific risk registers, method statements, and monitoring programs.
- Supervise and support Contractors/Subcontractors to implement quarry and borrow related mitigation measures, and monitor their compliance with H&S requirements.
- Coordinate with SPV H&S Manager and EPC HSE Manager to address quarry and borrow related incidents, risks, and community safety concerns.
- Ensure that all site personnel receive regular training and toolbox talks covering Quarry Management Plan obligations, and safe working practices.
- Oversee emergency preparedness and response procedures for quarry and borrow related incidents (e.g., slope stability risks, dust, noise and vibration exceedances, community complaints).
- Conduct investigations of quarry and borrow related incidents or complaints, ensure corrective/preventive actions are taken, and report findings to Project Director and SPV.
- Promote a safety-first culture by ensuring quarry and borrow risks are proactively managed and lessons learned are integrated into continuous improvement.

Site Doctor (EPC)

- Provide on-site medical support and emergency response, with focus on quarry and borrow related health issues.
- Conduct periodic health checks and maintain records to monitor impacts on dust, noise, or vibration exposure.
- Recommend and support preventive measures (e.g., hearing protection, work rotation, dust mask) in coordination with HSE teams.
- Deliver awareness sessions and medical input for risk assessments and incident investigations related to quarry and borrow operations.

Archaeologist (EPC)

- Conduct archaeological surveys and assessments within the project footprint before and during construction, and implement chance-find procedures with proper reporting.
- Provide training for construction personnel and subcontractors on cultural heritage awareness, including chance-find protocols and legal obligations.
  Inform quarry and borrow personnel about nearby cultural heritage areas and related protection requirements.

Biodiversity Specialist (EPC)

- Monitor and report biodiversity impacts of quarry and borrow operations on sensitive species and habitats.
- Support implementation of mitigation measures under the Biodiversity and Blasting Management Plans.
- Coordinate corrective actions with the Environmental Engineer and E&S Manager when non-compliances arise.

H&S Chief (EPC)

- Supervise daily implementation of HSE requirements on-site, with emphasis on quarry and borrow related measures.
- Monitor contractor and subcontractor compliance with the Quarry Management Plan and report deviations to the HSE Manager.
- Support incident/complaint investigations related to quarry acitivities and oversee corrective actions.
- Maintain site records on quarry and borrow monitoring, inspections, and compliance checks.
- Coordinate with the SPV HSE team during audits, inspections, and reporting.

H&S Engineer (EPC)

- Support the implementation and continuous improvement of the Quarry Management Plan across all site activities including blasting.
- Provide technical guidance to contractors and subcontractors, maintain the site risk register, and carry out inspections and audits.
- Lead investigations into accidents or unsafe conditions related to quarry and borrow activities, ensuring that findings are documented and corrective measures are applied.
- Report regularly on H&S compliance, risks, and overall performance to the H&S Manager.
- Provide technical input and guidance to workers on quarry and borrow safety measures.

H&S Technician (EPC)

- Assist in blasting hazard identification, risk assessments, and inspections of site conditions under the supervision of senior HSE staff.
- Support implementation of Quarry Management Plan and HSE measures on-site, ensuring safe work practices.
- Monitor daily use of PPE and adherence to HSE protocols and by workers and subcontractors.
- Support toolbox talks, drills, and safety briefings while keeping records updated and accurate.

- Escalate any observed non-compliance of quarry and borrow operations or HSE issues to the HSE Engineer or H&S Manager for timely action.

Paramedic (EPC)

- Provide immediate medical care, stabilize injured personnel, and coordinate medical evacuation when needed in the quarry and borrow sites.
- Assist the site doctor with health checks, maintain records, and monitor the condition of medical supplies.
- Participate in drills and awareness campaigns related to occupational health and safety and quarry and borrow operations.
- Report quarry and borrow related risks or recurring issues to the H&S Manager and Site Doctor.

Environmental Engineer (EPC):

- Implement and monitor the Quarry Management Plan on-site, including subcontractor compliance.
- Conduct routine inspections and measurements of noise, dust, and vibration levels to ensure mitigation measures are effective.
- Maintain accurate records and databases for monitoring related to quarry activities, and support reporting for audits or regulatory compliance.
- Support training, toolbox talks, and inductions related to quarry awareness for site personnel.
- Participate in investigations of quarry-related incidents and coordinate corrective/preventive actions with HSE and E&S teams.
- Integrate Quarry Management Plan requirements into work plans, method statements, and construction activities.

V. IMPACT PREVENTION PLANS, PROCEDURES AND PROGRAMS

V.1 General Description of Quarry and Borrow Sites

Construction works require aggregates, concrete, steel, aluminum, cement, bitumen, cables, etc. Concrete will be required for the construction of bridges, retaining walls, culverts and other engineering structures. Aggregate material for concrete production will be sourced from licensed quarries. After extraction, the aggregate will be crushed, screened and washed as necessary. Concrete types/grades to be used in the Project will include the following:

- Precast prestressed beam concrete
- Post-tensioned prestressed beam concrete
- Reinforced Concrete
- Flat concrete

Within the scope of the ESIA, seven quarries and borrow pits were assessed; however, under the current planning, four quarries will be prioritized for use. All quarries, including those planned for material extraction as well as those assessed during the ESIA impact assessment, are presented in Figure I-1.

The amount of material that will be needed for the construction activities are given in the below Table V.1.

Table V.1 Materials Needed for the Construction Activities

Source	Location	Material Type	Description of the Site / Plant	Concrete Aggregate (m^3)	Subbase – Plant Mix Base Aggregate (m^3)	Hot Bituminous Mixture (m^3)	Total Quantity (m^3)
Çakış (TOY4a) Quarry	56+500	Crystallized limestone, marble	Concrete Plant-1	241.870,03			**1.878.435,94**
			Concrete Plant-2	304.899,03			
			Concrete Plant-3	205.743,75			
			Mechanical Plant-1		800.525,05		
			Asphalt Plant-1			325.398,08	
Uzunlar (TOY5) Quarry	105+000	Crystallized limestone, marble	Mechanical Plant-2		695.577,54		**695.577,54**
Çenger Stream Material Quarry	105+000	Stream Material	Concrete Plant-4	158.552,65			**537.569,52**
			Concrete Plant-4a	104.838,11			
			Concrete Plant-5	274.178,77			
Karamanlar Quarry	123+000	Crystallized limestone, marble	Concrete Plant-6	315.393,23			**1.947.983,95**
			Mechanical Plant-3		938.660,04		
			Asphalt Plant-2			298.010,66	
			Asphalt Plant-3			395.920,03	
TOTAL				**1.605.475,56**	**2.434.762,63**	**1.019.328,76**	**5.059.566,95**

The activities with potential environmental risk in the field of quarry and borrow areas are:

- Site clearance
- Commissioning of machineries and equipment
- Excavation, blasting and quarrying
- Transportation of materials from / to quarry (rock fill material, aggregates, rip rap material) and borrow areas (sand, gravel, laterite clay)
- Vehicles moving along access roads
- Dust and gas dissipation from transportation activities
- Activities of re-cultivation of sites

V.2 Risk Assessment of Quarry and Borrow Sites

EPC Contractor will prepare a risk assessment that will be conducted to identify the project activities which might present a hazard or risk relating to extraction of quarry material and aggregates and assess the potential impacts which may arise.

The following tasks should be undertaken to analyse and evaluate risks and identify potential impacts during the preparation of risk assessment:

- Identify all activities and sub-activities associated with construction of the Project;

- Assess the likely impact of the activity on the environment, safety and security of workers and the public, and social/cultural aspects of the Project setting;
- Determine the possible consequences if each impact were to occur;
- Assess the likelihood of each impact occurring in the absence of any controls;
- Consider the severity of impact/s;
- Document current and future mitigation measures that need to be implemented to bring the level of risk down to an acceptable level; and
- Re-evaluate to determine the residual risks once the mitigation measures have been implemented.

Quarry and Borrow operations will cause environmental, social, health and safety impacts. Possible impacts of quarry and borrow sites are in terms of:

- ***Traffic and route issues*** originating from the proposed access and haulage routes between the quarry/borrow area and the destination for the extracted material.
- ***Generation of waste and spoil material*** to be extracted from the quarry and borrow operations, and disposal of such waste materials.
- ***Landscape and visual impacts*** of quarry activities on the surrounding area.
- ***Environmental pollution*** originated from any contamination to the ground in blasting or drainage activities such as soil, air and water pollution.
- ***Vegetation removal*** will be required due to ground works for quarry and borrow operations.
- ***Impact on community health and safety*** originating from construction hazard, traffic, environmental pollution (air, noise, water, soil).

V.3 General Principles and Measures

This Plan provides a range of measures which will be used to minimise the risks associated with aggregate extraction during Project construction. The EPC Contractor will draw on these measures to develop a tailored approach to mitigation of impacts. Some general principles and approaches, described in this section, will also be applied.

The EPC Contractor will minimise the impact of construction material extraction from the stream on the environment and people by siting them in lower impact areas wherever possible.

Major extraction issues that shall be investigated further by the EPC Contractor, in consultation with the SPV, shall include:

- Extractive material requirements for project construction – material types and volumes.
- The suitability of rock aggregate extracted from the tunnel and any other project excavation, and estimation of the volume of this suitable material.
- Extraction site options – review the suitability of the selected riverbed extraction sites, as well as other alternative extraction sites, taking into consideration operational issues and environmental and social impacts such as:
    - slope stability,
    - isolation from regular flooding accessibility; and
    - location

- Any government permits and/or landholder / community permission required, and agreed final site land use.

Stream areas shall be located and material shall be extracted from those areas so as not to destabilise the riverbed and banks.

The mitigation / management procedures noted in this section provides the approach to managing the potential aggregate extraction impacts during construction. The EPC Contractor will commit to implementing the identified mitigation / management procedures in order to avoid impacts on the local community and the environment.

The mitigation / management procedures were identified within the ESIA as being appropriate for the environmental impacts resulting from the anticipated construction activities, including aggregate extraction. Should extraction impacts arise from site activities, following the implementation of the procedures defined in this Plan, the EPC Contractor will review the need for additional measures to be taken and update this QMP accordingly.

V.4 Quarry and Borrow Management Procedures

Supervision

For the operation of quarry and borrow areas the EPC Contractor will appoint a Quarry and Borrow Pit Supervisor.

Before starting any operation or construction activity at the quarries and borrow areas the EPC Contractor will ensure that all technical data is prepared, and necessary permits are in place.

The Quarry and Borrow Pit Supervisor will be appointed as a full-time employee to oversee control of stages, slopes, earth fills, sides of trenches. Also, to monitor the local condition on regular basis, the works will be stopped when signs of geological movement are noticed.

During the operation of quarry, if the site is encountered with ground water seepage or any other water seepage, the site should be provided well established drainage with collection and pumping of water with required number of pumps.

Blasting Activities

No blasting shall be carried out without consent of the SPV. Precautions shall be taken to preserve the material outside the lines of excavation in an undisturbed condition.

The blasting activities at the quarry will be carried out in accordance with Blasting Management Plan. Blasts should be notified by public posting on the billboards, on the roads accessing to the Quarries. To avoid disturbance on the community actions defined in the Community Health and Safety Management Plan will be taken. For the safe handling of explosives, measures defined in the Hazardous Materials and Hazardous Waste Management Plan will be implemented.

VI. MITIGATION MEASURES FOR IMPACTS OF QUARRY ACTIVITIES

EPC Contractor will implement mitigation measures defined in Environmental and Social Management Plan and are given in the below management plans as well as in this Plan.

- Solid Waste Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Spill Response Management Plan
- Community Health and Safety Management Plan
- Traffic Management Plan
- Hazardous Material Management Plan
- Blasting Management Plan
- Demolition Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Training Management Plan
- Excavated Material Management Plan
- Noise and Vibration Management Plan
- Air Pollution and Emission Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Occupational Health and Safety Plan
- Soil Management and Erosion Control Plan

A list of mitigation measures with nomenclature relevant to the issues identified in this Plan is provided under the following headings.

Health and Safety

- Appoint a full-time Quarry Supervisor to monitor slopes, excavations, and geological stability; stop works if instability or risks are observed.
- Implement safe blasting procedures: area clearance, explosive storage and handling, transport, loading, countdown, shot, post-blast security, storage.
- Erect fencing and signage around excavation faces and settling basins to prevent unauthorized access.
- Monitor water quality before discharge; ensure effluent treatment is applied where necessary.
- Ensure hazardous materials, fuels, lubricants, and explosives are stored in approved, bunded facilities, away from sensitive areas.
- Implement long-term rehabilitation to prevent post-construction risks (e.g., erosion, slope failure).
- Only trained personnel are authorized to operate tools/machinery.
- Daily pre-use checks for tools/machinery will be logged
- A competent person must inspect excavations daily and after any weather event.

Traffic Management

- Define and use designated access and haulage routes between quarries/borrow pits and material destinations.
- Conduct extraction, stockpiling, and transport activities in line with approved method statements.
- Implement community safety measures related to site traffic (speed control, designated routes, signage).

- Restrict access to active quarry/borrow areas to trained personnel only, with proper safety measures.

Community Health and Safety

- Negotiate site access with landowners; reinstate land to pre-project condition if access roads are not retained.
- Implement community safety measures: fencing, restricted access to extraction sites, and safe traffic arrangements.

Planning & Site Management

- Prepare a dedicated Quarry and Borrow Areas Management Plan prior to construction.
- Ensure Quarry Management Plan includes: site extent, methods, haulage routes, extraction/waste volumes, disposal and rehabilitation.
- Apply standard environmental and social procedures to quarry and borrow areas as applied to all worksites.
- Prepare Method Statements for each extraction site, including risk assessment, site details, extraction methods and waste management, permits, and rehabilitation approach.
- Obtain all necessary permits prior to extraction.
- Inspect and approve each extraction site and crushing facility before use.
- Survey and mark extraction boundaries, access points, drains, and sediment basins before commencement.
- Complete all site preparation and environmental controls before extraction starts.
- Provide site induction/walkthrough for staff to ensure strict adherence to extraction requirements.
- Carry out site preparation (vegetation clearance, safety measures) by Construction/E&S teams prior to works.

Ecological Protection

- Prevent destabilization of riverbeds and banks during extraction.
- Extraction activities shall not take place during breeding and spawning seasons; monitor ecological areas.
- Manage noise and vibration impacts on ecology in accordance with ecological controls.
- Revegetation shall start at the earliest opportunity with local/native species.
- Plant grasses or erosion control material on embankments to control erosion and restore vegetation cover.

Erosion, Sediment and Soil Management

- Control extraction in alluvial areas to minimize suspended sediment and hazards.
- Stockpiling only in designated areas, outside flood zones and at least 20 m from watercourses.
- Limit extraction to approved volumes and designated areas.
- Stockpile and reuse topsoil for site rehabilitation; apply benches/terraces on slopes.
- Stabilize and re-vegetate overburden; spread organic debris to promote revegetation.
- Sequence construction to minimize exposed surfaces at any one time.
- Minimize vegetation removal and rehabilitate disturbed areas immediately after use.

Visual & Landscape Impact / Rehabilitation

- Minimize quarry size and visual impact through slope restoration, debris filling, and re-vegetation.
- Implement long-term rehabilitation measures to avoid health/safety hazards and environmental pollution.
- Ensure borrow areas are restored with stable slopes, drainage, vegetation, and avoidance of stagnant water.
- Distribute extraction over multiple sites rather than concentrating at a single source.
- Conduct full site restoration after works.

Air Emissions & Dust Control

- Implement dust suppression measures (e.g., water spraying on haul roads, covering stockpiles).
- Ensure trucks and machinery are well maintained to minimize exhaust emissions.

VII. TRAINING

The trainings to be organised will cover the Project activities during the construction phase. As a result of the general trainings to be held, the level of the trainings to be organized on the basis of the job description will be determined and the basic procedures for the execution and documentation of these trainings will be evaluated.

It will be ensured that all personnel involved in construction activities, specifically operators of construction machinery, including subcontractors and vendors, are adequately trained and informed on the requirements of the QMP. Training will be provided by E&S Team during construction phase. Until the construction phase is completed, refresher trainings will also be held at least once a year and in line with the requests and demands of the employees. The training will cover the following:

- Environmental and regulatory responsibilities specific to quarry and borrow areas management,
- Roles and responsibilities for the activities that will be carried out for quarry and borrow area management,
- Waste management hierarchy principles.

VIII. MONITORING

The monitoring of the activities on quarry and borrow areas defined for the project construction works will ensure that the measures and the procedures are implemented and are working. The level of air pollution and the level of the acoustic/vibration emissions caused by the quarry and borrow area operation activities will be monitored, such that if there are exceedances, mitigation measures are promptly implemented. The risk assessment will be updated, if necessary.

Monitoring activities will be coordinated by E&S Manager and his/her team, in close collaboration with the H&S Manager and his/her team. Key responsibilities will include verifying the implementation of dust suppression practices, monitoring equipment and vehicle emissions, evaluating the maintenance status of construction machinery, and ensuring the consistent application of mitigation measures near sensitive receptors such as residential areas, schools, and healthcare facilities.

The performance of contractors and subcontractors in implementing resource efficiency management requirements will be reviewed through environmental audits, site supervision reports, and field observations. Any identified non-conformities will trigger timely corrective and preventive action

plans. Monitoring will also include follow-up assessments to confirm the effectiveness of implemented measures and to ensure recurrence is prevented.

In addition to internal monitoring, inspections may be carried out by relevant public institutions, including the Ministry of Environment, Urbanization and Climate Change, in accordance with Turkish legislation. The frequency and scope of these inspections will be determined by the authorities and may include review of monitoring data, on-site emission control practices, and documentation of compliance.

Monitoring efforts will be guided by the framework provided in Table VIII.1, which outlines the parameters to be monitored, the corresponding monitoring locations, frequency of measurements, and responsible parties. These monitoring activities will be essential for evaluating the effectiveness of air quality and emissions mitigation measures and ensuring full compliance with national regulations and Project standards.

The methods implemented to monitor the quarry and borrow sites include:

- Visual monitoring (inspection on site provided by the E&S team).
- Measurement on site (the procedures and the monitoring points for the measurements of the acoustic/vibration and air pollution levels are defined in the Air Emissions and Dust Control Management Plan, Noise and Vibration Control Plan)
- Control over technical functionality of the machinery/equipment.

Table VIII.1 Key Monitoring Activities

Parameter	Monitoring Station/ Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Effective implementation of QMP during material extraction works	Quarries and borrow areas	Documentation and site audit	Daily	-SPV -EPC
Permit requirements	Quarries and borrow areas	Documentation and site audit	Daily	-SPV -EPC
Location of stockpiles to waterways and road	Quarries and borrow areas	Site audit	Daily	-SPV -EPC
Dust and particulate matter	Quarries and borrow areas, Sensitive receptors close to Quarries and borrow areas	Site measurements	Quarterly or Upon Grievance, at the frequency specified in the Environmental Permit	-SPV -EPC -Accredited laboratories
-Mining method applied -Blasting activities -Production amount (m^3/day) -Slope stability -Borders of the camp sites -Management of waste rock	Quarries and borrow areas	Site audit	Daily	SPV
-List of hazardous materials/chemicals supplied, stored and used (inc. information on type and amount/volume) -Type (i.e. municipal, packaging, waste oil, etc.) and amount of wastes produced/disposed of -Waste management/disposal agreements done with licensed companies -Waste Management Plans -Temporary Waste Storage Areas	Quarries and borrow areas	-Site audit -Document review	Monthly	-SPV -EPC -Sub-Contractor
Environmental Noise (dBA)	Sensitive receptors close to Quarries and borrow areas	Site measurements (24 hour)	Quarterly or Upon Grievance	-SPV -EPC -Accredited laboratories
Ground vibration value	Sensitive receptors close to Quarries and borrow areas	-Measurement with vibrometer	Quarterly or Upon Grievance	-SPV -EPC -Sub-Contractor
-Use of PPEs -Health and safety signs -Fire safety equipment/systems	Quarries and borrow areas	-Site audit -Visual observation	Daily	-SPV -EPC

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Main Contractor (Limak) and relevant subcontractors.

IX. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table IX.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Zero non-compliance during blasting activities	100% compliance	Per blasting event	SPV
Noise and vibration levels at sensitive receptors (dB, mm/s)	Within legal limits and international standards	Quarterly / During blasting	SPV
Dust (PM_{10}/$PM_{2.5}$) concentration at site boundary	Within national/IFC guideline values	Quarterly	SPV
Stability of quarry slopes and benches (visual inspection & geotechnical monitoring)	No slope failure or unsafe conditions	Daily	SPV
Community grievances related to quarry operations	Zero unresolved grievances; continuous improvement in response time	Monthly	SPV
Number of worker trainings on quarry safety, blasting, and environmental management	100% of planned trainings delivered	Monthly	SPV

X. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the ESMMP. All labour-related incidents and non-conformities should be documented and reported as outlined in the Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan.

Results of the monitoring will be reported to responsible parties to ensure that the Project activities comply with the national legislation and international standards. Depending on the monitoring results, the Plan will be reviewed and updated by Project E&S and H&S Managers.

The internal audit will address:

- The correct implementation of this Plan;
- The correct and timely implementation of an auditing and review system;
- Each of the point indicated in the table in Section 8 (Monitoring Activities) and Section 9 (KPIs) of this Plan.

Evidence and results of the inspection and audit activities are included in the audit reports and in the “Non-Conformity and Preventive/Corrective actions” records. Project Management reviews result of audits and inspections and the progress of the Preventive/Corrective actions and takes additional appropriate actions if necessary.

These audits and the associated records should be managed in compliance with the Project’s established human resources and labour-related procedures.

Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with labour legislation and international standards.

XI. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of resource efficiency management activities throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions should be identified and the required updates should be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections should be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Evidence of the implementation of the actions/measures and related results are collected through inspection and auditing activities as detailed in Section X “Audit and Review” of this Plan; these evidences are described in the audit reports.

Contractors are responsible to collect the statistics (including all types of training delivered to employees, incident records, grievance records, their own subcontractor selection processes, etc.) on a monthly basis and report to the Contractor. If any subcontractor is involved, it is responsible for duly implementing requirements included in this Plan under the Contractor supervision.

The results and supporting evidence of these monitoring activities (e.g., measurements, logs, and photos) should be documented in detail within appropriate reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

All personnel are encouraged to raise concerns, suggestions, or complaints related to air quality management through the established grievance mechanism by completing the grievance form. The communication channels available for submitting grievances are outlined in the Stakeholder Engagement Plan.

Throughout the construction phase of the Project, this Plan will be reviewed by the E&S manager, based on the results of audits.

ANTALYA ALANYA MOTORWAY	**ANTALYA-ALANYA MOTORWAY PROJECT**
Revision No: 0	**Date:** 08.09.2025
DEMOLITION MANAGEMENT PLAN	

REVISION STATUS		
Revision Date	**Rev. No**	**Description**
08.09.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards

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LIST OF ABBREVIATIONS

AAOİAŞ – Antalya–Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
ACM – Asbestos-Containing Material
AFR – Accident Frequency Rate
CAPA – Corrective and Preventive Action
C&D Waste – Construction and Demolition Waste
ÇGGK – Çevresel Gürültü Kontrol Yönetmeliği (Environmental Noise Control Regulation)
COD – Chemical Oxygen Demand
DMP – Demolition Management Plan
EHS – Environmental, Health, and Safety
EIA/ESIA – Environmental (and Social) Impact Assessment
EMS/ESMS – Environmental (and Social) Management System
EPC – Engineering, Procurement, and Construction (Contractor)
GIIP – Good International Industry Practice
HSE – Health, Safety, and Environment
HKDY – Hava Kalitesi Değerlendirme ve Yönetimi Yönetmeliği (Air Quality Regulation)
IFC – International Finance Corporation
KPI – Key Performance Indicator
LCmax – Maximum C-weighted Sound Level
LOTO – Lock Out / Tag Out
LTIFR – Lost Time Injury Frequency Rate
MoEU – Ministry of Environment, Urbanization and Climate Change (Türkiye)
OHS – Occupational Health and Safety
PPE – Personal Protective Equipment
PPV – Peak Particle Velocity
PS1–PS8 – IFC Performance Standards (PS1: Assessment & Management of E&S Risks; PS2: Labor & Working Conditions; PS3: Resource Efficiency & Pollution Prevention; PS4: Community Health, Safety & Security; PS5: Land Acquisition & Resettlement; PS6: Biodiversity; PS7: Indigenous Peoples; PS8: Cultural Heritage)
RAP – Resettlement Action Plan
SEP – Stakeholder Engagement Plan
SPV – Special Purpose Vehicle (Project Company, AAOİAŞ)
TSP – Total Suspended Particles
TSS – Total Suspended Solids
UATF – Ulusal Atık Taşıma Formu (National Waste Transport Form)
WHO – World Health Organization
WBG – World Bank Group

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project ("The Project"), has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. ("AAOİAŞ" or the "Project Sponsor") with a Build, Operate and Transfer ("BOT") contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as Project Sponsor in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or "EPC").

The Project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in Figure I-1.

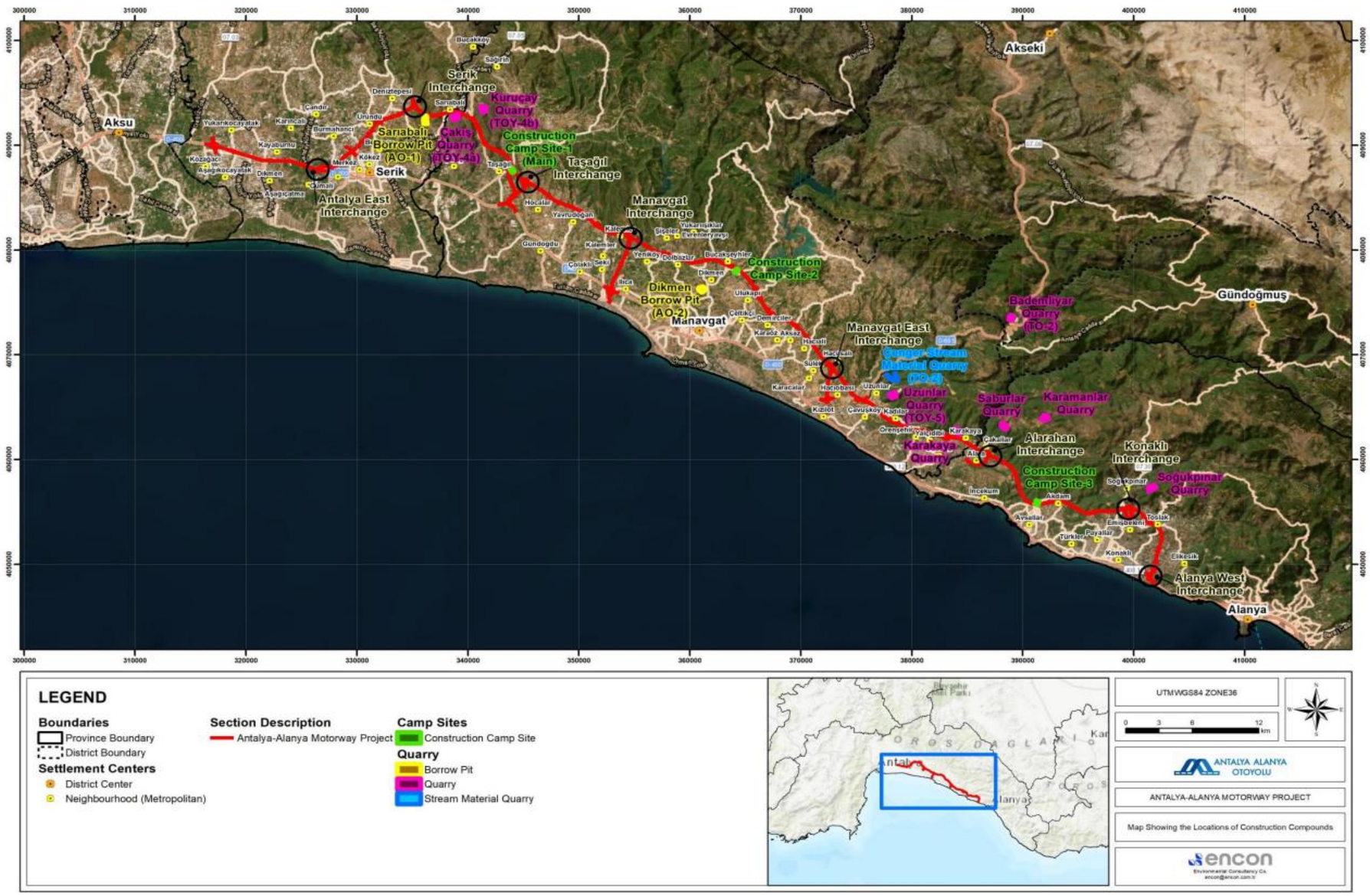

Figure I-1.Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

II. PURPOSE and SCOPE

The Project is anticipated to deliver benefits including relieving congestion on the Akdeniz Region's existing road network and building capacity for future traffic, providing better access to employment, markets, education, healthcare and cultural and tourism facilities and improved emergency response times, and creating social and local economic benefits through job creation and local and regional development.

Facilities to be constructed for use during operation include toll collection areas, service areas and a maintenance and operations area. During construction, temporary facilities required including three temporary construction camps with facilities, borrow pits/quarries (11 identified sites according to the draft Environmental and Social Impact Assessment (ESIA), June 2025), and storage sites (22 identified).

This Demolition Management Plan ("the Plan" or "DMP") has been prepared for the Antalya-Alanya Motorway Project ("the Project").

This Plan should be applied by all parties involved in the construction phase, including the Project Sponsor, EPC and all subcontractors. Necessary updates to the Plan should be considered in case of any changes to work location, construction and demolition methodology, or regulatory requirements.

The purpose of this Plan:

- Defining country legislation and Project standards,
- Defining the duties and responsibilities of the personnel, and
- Identify and outline mitigation, control, and monitoring measures to minimize adverse environmental and social impacts during the demolition activities.

The Demolition Management plan covers assigning roles and responsibilities for a safe, compliant, and traceable demolition process, and sets out procedures for risk assessment, permitting, stakeholder communication, work execution, waste and hazardous material management, training, monitoring, and reporting issues.

This management plan is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

The Plan has been developed in alignment with applicable national legislation and relevant international standards, including the requirements of international financial institutions. It outlines actions that should be done to manage possible negative impacts on the environment and social issues during the demolition activities.

III. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Plan has been developed to align with both Turkish legislation and international standards for environmental and social issues management. The references below should be used to guide the implementation and ensure that the Plan meets all required obligations during the demolition works.

1.1. National Requirements

The following primary regulations form the legal basis for demolition activities in Türkiye:

- Environmental Law No. 2872
- Turkish Zoning Law No. 3194
- Construction Supervision Law No. 4708
- Public Health Law No. 1593
- Misdemeanours Law No. 5326
- Regulation on the Assessment and Management of Air Quality
- Regulation on the Assessment and Management of Environmental Noise
- Water Pollution Control Regulation
- Regulation on the Protection of Groundwater against Pollution and Deterioration
- Waste Management Regulation
- Regulation on the Control of Excavation Soil, Construction and Demolition Wastes
- Regulation on the Control of Soil Pollution and Sites Contaminated by Point Sources
- Regulation on the Control of Pollution Caused by Hazardous Substances in Water and its Environment
- Regulation on Health and Safety Precautions in Work with Asbestos

Compliance with these regulations is mandatory, and ongoing monitoring and reporting should be conducted to verify adherence throughout the construction phase.

1.2. International Standards and Conventions

- IFC Performance Standards
  - ✓ Performance Standard 1: Environmental and Social Management System,
  - ✓ Performance Standard 3: Resource Efficiency and Pollution Prevention,
  - ✓ Performance Standard 4: Community Health and Safety,
  - ✓ Performance Standard 5: Land Acquisition and Involuntary Resettlement,
- IFC Environmental, Health and Safety (EHS) General Guidelines (2007)
- Equator Principles IV (2020)
- World Bank Group General EHS Guidelines (2007)

These references will be used to guide the implementation, monitoring, and performance evaluation of demolition practices across the construction phase of the Project, ensuring compliance with international environmental, occupational standards, and social principles.

IV. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and should be implemented in coordination with the Demolition Management Plan. The Plan is designed to integrate closely with the Resettlement Action Plan ("RAP"), the Stakeholder Engagement Plan ("SEP") and project-specific plans as listed below.

- Occupational Health and Safety Management Plan
- Community Health and Safety Management Plan
- Subcontractor Management Plan
- Solid Waste Management Plan
- Water Quality, Wastewater and Storm Water Management Plan
- Hazardous Materials Management Plan
- Traffic Management Plan
- Environmental Accident and Spill Response Management Plan
- Security Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Noise and Vibration Management
- Air Pollution and Emissions Management Plan
- Excavated Material Management Plan
- Solid Waste Management Plan
- Hazardous Material Management Plan
- Soil Management and Erosion Control Plan
- Emergency Preparedness and Response Plan
- Community Management Plan
- Occupational Health and Safety Management Plan

V. ROLES AND RESPONSIBILITES

The organizational structure presented in Figure IV.1 outlines the key management roles and reporting lines for the construction phase of the Project. This structure defines the hierarchical distribution of responsibilities and facilitates coordination among various departments involved in the execution of environmental and social management plans. Each role within this structure should ensure that assigned tasks are executed in line with the Project's ESMS requirements and that inter-departmental coordination is maintained effectively.

In support of this structure, this part is provided to outline the roles and responsibilities specifically related to the implementation, monitoring, and reporting requirements of this Plan. This part of the Plan clarifies the functional duties of each party involved in ensuring the effective execution of the measures described herein and reinforces accountability across all relevant units.

SPV General Manager:

- Promote a culture of social responsibility across the SPV and its stakeholders.
- Ensure the provision of necessary resources and organizational support for the implementation of all plans.
- Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases.
- Support the E&S and H&S Manager in preparing, disseminating, and implementing this plan.In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the EPC and SPV's E&S and H&S Manager and other responsible parties.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, environmental and social compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including SPV, stakeholders and investors.

SPV E&S Manager

- Review and ensure the preparation, revision, and implementation of all plans in accordance with national laws, regulations, company policies, international standards and lender requirements.
- Ensure and monitor that EPC and subcontractors correctly implement site practices and management plans.
- Provide technical support to EPC and subcontractors for the implementation of the Plan.
- Collaborate with internal teams (e.g., H&S, Legal, Procurement) to integrate E&S criteria into project operations and contracts. Monitor the environmental and social performance of EPC and subcontractors to ensure compliance.
- Prepare and submit E&S compliance and performance reports to internal and external stakeholders, including lenders and regulators.
- Support stakeholder engagement activities and consultations with local communities.
- Engage with regulatory authorities, auditors, and NGOs on E&S compliance and performance matters.
- Lead the implementation of corrective actions and incident prevention measures.

SPV Health and Safety Manager

Duties of the SPV H&S Manager are as follows:

- Ensure the preparation, revision, and implementation of the health and safety-related plans and documents in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.

- Collaborate with internal teams (e.g., E&S, Legal, Procurement) to integrate E&S criteria into project operations and contracts. Monitor the environmental and social performance of EPC and subcontractors to ensure compliance.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Conduct a comprehensive accident and incident investigation process.
- Provide technical support to EPC and subcontractors for the proper implementation of the health and safety plans.
- Ensure the accurate records of inspections, incidents, safety meetings, and training records
- Engage with regulatory authorities on inspections, audits, and compliance verification.

EPC Project Director

The EPC Project Director has the overall responsibility and accountability for the Project including delivery of the construction activities in line with applicable national and international standards. He/She ensures relevant activities are carried out in accordance with the Plan.

- Ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements.
- Promote a culture of environmental and social responsibility across the EPC and its stakeholders.
- Define and implement the overall business strategy and direction of the EPC in alignment with SPV and stakeholder expectations.
- Support the E&S and H&S Manager in preparing, disseminating, and implementing this plan.In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the SPV and other responsible parties.
- Make executive decisions on project budgeting, resource allocation including employee, and capital management to support project execution and sustainability, H&S compliance.
- Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to all stakeholders, including EPC, stakeholders and other related parties.
- Approval of project management plans (HSE, E&S, QA/QC, etc.) in line with company policies, legal frameworks, international standards, SPV and lender requirements.
- Coordinate with regulatory authorities, community representatives, and auditors as required.
- Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters.

EPC E&S Manager

- Coordinate the preparation, revision, and implementation of the Plan with H&S Manager in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards

and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.

- Ensure the demolished material is assessed and managed by waste recycling and reuses good practices.
- Ensure all activities are managed safely, especially the assessment, removal, and disposal of asbestos (if any)
- Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting.
- Implement environmental and social measures through site practices and method statements.
- Ensure that all conditions and obligations outlined in the environmental and social management plans are implemented and adhered to during project activities.
- Ensure employees and contractors fulfil the requirements and relevant training of the environmental and social management plans.
- Collaborate with internal teams (e.g., H&S, Legal, Procurement) to integrate E&S criteria into subconractor contracts.
- Ensure the environmental and social management plans are communicated and implemented by Contractors/Subcontractors.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Monitor compliance of Contractors/Subcontractors with environmental and social management plans requirements.
- Supervise the Environmental Engineers, Biodiversity Specialist, Archaeologist, CLOs and oversee monitoring site practices and management plans.
- Ensure the development and follow-up of corrective/improvement actions.
- Conduct comprehensive investigations of accidents and incidents and promote continuous improvement via lessons learned.

EPC H&S Manager

- Coordinate the preparation, revision, and implementation of the Plan with E&S Manager in accordance with the Project ESIA and EIA, SPV's corporate policies, regulatory obligations, international standards and lender requirements and are implemented by EPC and subcontractors through appropriate method statements and site practices.
- Ensure all activities are managed safely, especially the assessment, removal, and disposal of asbestos (if any)
- Collaborate with internal teams (e.g., E&S, Legal, Procurement) to integrate E&S criteria into subconractor contracts.
- Ensure that all construction site activities are carried out safely by EPC and subcontractors.
- Ensure root causes are identified, documented, and that corrective actions are implemented and verified.
- Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements.
- Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites.
- Conduct and lead a comprehensive accident and incident investigation process. Analyse trends from incidents and near-misses to identify systemic issues and develop long-term preventive strategies.

- Provide technical support to EPC and subcontractors for the proper implementation of the Project's plans.
- Ensure the accurate records of inspections, incidents, safety meetings, and training records.
- Ensure the corrective actions process is followed up on by all parties strictly.
- Report on H&S performance, non-compliance, and corrective actions to the EPC Project Director.
- Engage with regulatory authorities on inspections, audits, and compliance verification.

VI. DEMOLITION ACTIVITIES MANAGEMENT APPROACH

Demolition works inherently involve cross-cutting risks and multiple interfaces, which require close alignment with other project management plans, procedures, and regulatory obligations.

The DMP is directly connected to the Resettlement Action Plan (RAP), since the removal of structures is tied to physical and economic displacement. Demolition cannot commence until resettlement entitlements are delivered, all necessary permits and legal requirements are obtained and community notifications are completed. Similarly, grievance handling for demolition-related issues is fully integrated with the Stakeholder Engagement Plan (SEP).

On the technical side, demolition waste management and documentation are implemented in alignment with the Solid Waste Management Plan, while asbestos and other hazardous substances are managed through the Hazardous Materials Management Plan. Employee and community health and safety is another critical interface during the demolition activities. The DMP operates in full alignment with the Occupational Health & Safety Plan, ensuring PPE usage, training, competence certification, and incident reporting are consistently enforced. The Method Statement of Demolition Works and risk assessment are prepared by the EPC Contractor, before work execution. Training requirements, including toolbox talks, asbestos awareness, and emergency drills, are coordinated with all relevant Project plans, ensuring that thresholds, mitigation measures and corrective measures are consistent across the Project. Community safety considerations are embedded through the Community Health, Safety & Management Plan and Traffic Management Plan, covering access control, fencing, traffic rerouting, and emergency communication with local stakeholders. Additional safeguards are provided by the Security Management Plan and the Emergency Response Plan, which detail security arrangements, evacuation protocols, and coordination with local authorities.

Environmental safeguards are supported by the relevant plans to ensure inert demolished material reuse opportunity and soil/water protection. Potential discoveries of cultural or archaeological significance are handled in strict coordination with the Cultural Heritage Management Plan and Chance Finds Procedure. Last but not least, the DMP also intersects with Human Resources and Labor Management and Subcontractor Management Plan, which ensure that labor conditions, subcontractor selection, and contractor oversight meet both national requirements and lender expectations.

Through these linkages, the DMP functions as a cross-sectoral tool within the ESMS, guaranteeing that demolition activities are carried out safely, lawfully, and in a manner consistent with the Project's environmental and social commitments.

VII. MITIGATION MEASURES FOR DEMOLITION WORKS RELATED RISKS AND IMPACTS

The following measures will be implemented across all Project sites to prevent or minimize demolition activities risks and ensure fair, safe, and compliant workforce, environmental and social impact management throughout the activities.

Screening of Possible Demolition Site

Demolishing sites are assessed and determined according to the road route, which is identified in the Project ESIA study.

Residential Structures

304 houses are identified for demolition, including permanent residences, prefabricated homes, seasonal houses, and abandoned/ruined buildings.

Greenhouses

831 greenhouses are affected, mostly used for tomato, cucumber, pepper, banana, and tropical fruit cultivation.

Business Structures

37 enterprises will be demolished, ranging from retail shops, workshops, and markets to marble workshops, farms, packaging/storage facilities, and local roadside vendors.

Non-Residential Structures

Ancillary structures such as fences, walls, coops, wells, and sheds will also be demolished.

Before the Commencement of Demolition Activities

Key stages of the project will be carried out as described in the relevant part of the Plan. Work will generally follow the sequence as indicated below.

Receive Handover of Site and sign off services

Residential Structures

- Households will not be displaced until compensation agreements are signed and alternative housing or rental support is secured.
- Demolition sequencing will follow the resettlement schedule, ensuring families have physically vacated before structures are dismantled.

Greenhouses

- Demolition will be carefully aligned with compensation for lost assets and livelihoods. In some cases, farmers will be allowed to harvest crops before structures are dismantled.
- Where possible, recoverable materials (plastic sheeting, metal frames, pumps) will be salvaged by owners prior to demolition, with support from the Contractor.

Business Structures

- Each business operator will be given sufficient time to relocate equipment, machinery, and stock. Demolition will only proceed after resettlement measures (e.g., financial compensation, livelihood restoration programs) are finalized.

Non-Residential Structures

- Ancillary structures such as fences, walls, coops, wells, and sheds will also be demolished. Compensation will be provided to owners as per RAP, and demolition will only occur once they have removed any salvageable materials.

The Project Expropriation, in coordination with E&S Manger, will inform the construction team regarding the status of structures to be demolished. Site mobilization activities will begin only when the Land Entry Permit is signed by the land owner. Job-specific risk assessment and method of statement, permit to work will be prepared by the Construction Team and E&S and H&S Department.

Site Mobilization and Site Induction

The construction team will arrange the necessary machinery and equipment to be ready at the site. A site induction is to be held before any work commences on site. The site induction includes the following:

- Induction of the Plan and other plans to the site execution team.
- Induction into the related parties and communication channel, and parties' responsibilities
- General HSE requirements for work execution according to the Project plans.
- Scope of the current work and requirements for the next step

Demarcate the site and define Exclusion Zones

The Demolition Site ("Site") will be fenced or barricaded with hard/soft barriers. Other areas of the Site may be demarcated as hazard removal areas, exclusion or Drop Zones. The access gate will be closed during demolition works and manned during load out.

Site notices to be displayed in a prominent position are:

- Unauthorized entry prohibited
- Warning Demolition in Progress
- Mandatory PPE information signage
- Emergency Contact Number

During the Commencement of Demolishing Activities

Site Investigation

An investigation of the structures to be demolished and the surrounding environment has been undertaken with the EPC H&S and E&S Manager and the Construction Team. The investigation are broken up into three (3) sections: 'Investigation of Structures', 'Investigation of Site', and 'Investigation of Services' as below.

Investigation of Structures

Description of Structures

Height of Structures and Distance to Boundaries

Investigation of Site

Description of Site

All neighboring building types and the situation during demolition activities. Neighboring issues will be considered during the review initial Method of Statement, planning control measures and any additional physical or chemical risk parameters.

Utilities and Underground Structures

The demolition area will control any mechanical or electrical services and identify responsible parties for deenergizing the structures. Before any demolition activities commence, all existing utility connections (electricity, water, wastewater, stormwater, telecommunications, natural gas, irrigation lines) within the demolition footprint shall be identified, documented, and safely disconnected. Coordination with relevant utility providers and local authorities is mandatory to prevent accidents, unplanned service interruptions, or environmental releases.

Hazardous Chemicals / Dangerous Goods Storage or Dumps

Any major hazardous chemicals or dangerous goods (e.g. munitions, chemical storage systems, underground storage tanks, compressed gas cylinders, fire retardant cylinders, medical gases, dumps of noxious or toxic or hazardous substances, etc.) will be identified.

- **Management of Asbestos / Asbestos-Containing Material**

One of the critical issues, which is contaminated with asbestos or asbestos-containing material management process will be addressed under this stage of the Plan.

This section sets project-wide requirements for identifying, removing, transporting, and disposing of asbestos-containing materials ("ACM") in line with Turkish legislation, EU 2009/148/EC Exposure to Asbestos at Work, IFC PS1/PS3, and Good International Industry Practice (GIIP).

In 2013, the extraction, processing, sale, and import of all types of asbestos, the import and sale of all kinds of asbestos-containing products, and the production and processing of asbestos products or products containing added asbestos were prohibited with the Turkish Regulation on Health and Safety Measures in Work with Asbestos. However, existing structures which were built before 2013 might contain ACM. If the suspicious material or component is identified during site investigation, a competent third-party asbestos management company will be informed by H&S Manager to conduct a detailed site investigation, according to local regulations requirements. At this stage, after the site investigation, the third-party company can collect samples for analysis, or they will notify the EPC Contractor via an "Asbestos Free" certificate. If the suspicious material contains asbestos, a third-party competent removal company with a certified Asbestos Expert will be assigned by the EPC according to the Turkish Regulation on Health and Safety Measures in Work with Asbestos.

All wastes will be managed by the related Project's plan and local regulatory requirements.

All site is cleaned by a third-party asbestos removal competent company, and the last check is conducted by a certified Asbestos Expert via visual check and air quality measurements. The "Asbestos Free Certificate" will be prepared by the certified Asbestos Expert. The "Asbestos Free Certificate" will be submitted to the Construction team by the H&S Manager to proceed to demolition activities.

Install Environmental Controls

EPC will endeavor to do everything reasonably practicable to make what is by nature a noisy and disruptive process as quiet and dust free as possible. A summary of the key environmental methods that will be used on site include:

- **Dust Control**

Demolition of brick and concrete can generate excessive amounts of dust. However, the Project have site site-specific Air Pollution and Emissions Management Plan including dust control measures. All measures will be followed up on during activities.

- **Noise and Vibration Management**

Vibration on this site will emanate from the excavator-mounted hydraulic hammers used in the process of breaking down the concrete and brick structure. The Project have site site-specific Noise and Vibration Management Plan with control measures. All measures will be followed up on during activities. The demolition activities will be conducted during the daytime for noise and vibration control.

- **Traffic Management**

The Project has a site-specific Traffic Management Plan and all control measures will be implemented during the demolition activities.

- Providing traffic controllers to control pedestrian and vehicular traffic
- Ensure trucks are covered prior to leaving the site
- Providing drivers information on access, routes and site conditions and sensitive receivers

Soft strip structure

The structures will be stripped-out by hand and appropriate hand tolls where required, prior to mechanical stripping in appropriate areas. No heavy machines will be placed if the structure owner requests the reuse of the component. The owner will be allowed to strip the soft component.

Bounded material such as non-loading bearing walls, partitions, and doors that may not be removed by machines will be removed by a combination of hand, picks, crow bars, and other associated tools, and stockpiled in the building or a secure area of site for load out by machines.

Mechanical Demolition

Before the start of the mechanical demolition, all hazardous materials and materials containing hazardous chemicals, such as fluorescent lamps, in the buildings will be collected and disposed of in accordance with the project-specific plans.

A watcher will work with plant and equipment operators at all times.

Water will be maintained at the face of demolition for dust suppression where required.

During demolition the floor area under the excavators and the bay area's being demolished will be closed off with warnings signs. No plant or personnel will be allowed in these areas.

Remove rubble and rubbish from the site

Waste Control

The Project have site site-specific Solid Waste Management Plan and all requirements will be followed up during activities.

- The demolition of 304 residential buildings is expected to generate approximately 182,400 tons of construction and demolition (C&D) waste.
- The demolition of 37 business structures is expected to generate approximately 22,200 tons of waste.
- The demolition of greenhouses is expected to generate approximately 83,100 tons of plastic waste.
- Given the expected 287,700 tons of construction and demolition waste from residential, greenhouse, and business structures, all construction and demolition wastes will be temporarily stored in designated storage areas and subsequently disposed of or recycled in compliance with applicable legislation and regulations.

The expected waste type is listed below table. The Waste EWC Code is listed under The Solid Waste Management Plan.

Waste Stream	Possible waste sources
Concrete & Masonry	Concrete, bricks, tiles
Metals	Rebars, steel frames, aluminum greenhouse structures
Wood	Doors, windows, timber beams
Glass	Greenhouse panels, windows
Plastic	Greenhouse covers, PVC pipes, packaging
Soil & Stones	Excavated soil, rubble
Hazardous Asbestos Waste	Roofing sheets, insulation, floor tiles
Hazardous Chemicals & Paints	Paints, solvents, pesticide residues from farms
Mixed Construction and Demolition Waste	Unsuitable residuals after segregation

Completion Status of Demolition Works

The Construction team will inform the E&S and H&S Manager to conduct a site inspection after all waste and debris have been removed from the demolition site.

VIII. TRAINING

The employees of the AAOİAŞ, Limak and subcontractors will require to attend the new-hire induction training that includes environmental and social awareness and compliance training to be aligned with Project ESIA and ESMS.

Regular internal and external (when necessary) trainings will be given to ensure that the mitigation measures indicated in this Plan are applied during the construction phase of the Project for all involved parties. Regular internal inspections will be conducted to ensure that the mitigation measures indicated in this Plan are applied during the construction phase of the Project.

Training is a cornerstone of the Demolition Management Plan, ensuring that all workers, supervisors, and subcontractors possess the necessary knowledge, skills, and awareness to perform demolition activities safely, effectively, and in compliance with national legislation, IFC Performance Standards, ESIA commitments and Project's plans. A structured training program will build competence in occupational health and safety, environmental protection, community health and safety, and emergency preparedness.

IX. MONITORING

A structured internal monitoring program will be implemented to assess the effectiveness of the mitigation measures outlined in this Plan during the demolition activities on the Project. The scope and frequency of monitoring activities will be periodically reviewed and revised where necessary, based on site-specific conditions, observed risks or incidents, stakeholder concerns, or changes in applicable national regulations and international standards.

Monitoring activities will be coordinated by the Corporate Communication, in close collaboration with the Environmental, Occupational Health and Safety (OHS), and Construction Management teams. Key responsibilities will include verifying the implementation of control measures, ensuring the visibility and condition of safety signage, reviewing traffic safety and demolition measures around construction zones and emergency response readiness near sensitive receptors such as residential areas, schools, and healthcare facilities.

Monitoring efforts will be guided by the framework provided in **Error! Reference source not found.**, which outlines key parameters to be monitored, relevant locations, monitoring methods, frequency, and responsible parties. These monitoring activities are essential for evaluating the effectiveness of demolition mitigation efforts and ensuring full compliance with applicable regulations and Project standards.

Key Monitoring Activities

Parameter	Monitoring Location	Monitoring Method	Monitoring Frequency	Responsible Parties
Number of Site Induction Conducted	Project personnel and contractor workers receiving training	Review of training records	Every demolition work Quarterly	EPC AAOİAŞ,
Compliance with Plan Implementation	Availability of relevant records in the system	Review of documented compliance with Plan procedures	Every demolition work Quarterly	EPC AAOİAŞ,
Number of Complaints Related to the Demolition Activities	Records kept under the Grievance Mechanism Procedure	Review of grievance registration and resolution logs	Every demolition work Quarterly	EPC AAOİAŞ,
Waste amount from demolition activities	Records keeping	Review of records	Every demolition work Quarterly	EPC AAOİAŞ,

In cases of non-compliance identified through internal oversight or external audits, AAOİAŞ will ensure that corrective and preventive measures are promptly implemented in coordination with the Contractor (Limak) and relevant subcontractors.

All demolition activities related findings will be documented in accordance with national environmental regulations and Project procedures. In the event of serious violations AAOİAŞ will ensure that the issue is reported to the competent authorities and that appropriate technical, procedural, and contractual actions are taken.

X. KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X.1 Key Performance Indicators – Construction Phase KPIs

Monitoring Parameter / Performance Indicator	Target	Frequency	Responsible Party
Number of trainings conducted	All personnel to receive training	Quarterly	AAOİAŞ, EPC
Non-conformities with standards	0	Monthly	AAOİAŞ, EPC

XI. AUDIT AND REVIEW

The implementation of this Plan should be regularly monitored and reviewed in accordance with the Environmental and Social Management and Monitoring Plan (ESMMP). All incidents and non-conformities related to community health and safety should be documented and reported as outlined in this Plan. Contractors and subcontractors should be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records should be managed in compliance with the Project's established plans and procedures. Records to be reviewed during community health and safety audits will include, but are not limited to, the External and Internal Grievance and Suggestion Tracking Databases, records of community health and safety training sessions, non-conformity and incident records, emergency drill evaluations, and site-specific environmental and social monitoring data such as dust, noise, or vibration measurement reports. Observations and deficiencies identified during audits should be recorded in formal audit reports, and all findings requiring improvement should be registered under Corrective Actions. Project management should review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary.

XII. REPORTING

Regular reporting should be conducted to ensure the effective implementation and continuous improvement of community health and safety management activities throughout the construction phase of the Project. Reporting should be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions should be identified and the required updates should be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections should be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.

Reports should be prepared using data gathered through community health and safety monitoring activities defined under this Plan. The results and supporting evidence of these monitoring activities (e.g., observations, grievance logs, community engagement records, and photos) should be documented in detail within appropriate reporting formats. This section of the Plan outlines the instructions and requirements for implementing these reporting activities.

Reporting activities under this Plan mainly relate to community grievances, implementation of awareness and training programs, performance of emergency response drills, monitoring of blasting activities and road safety measures near populated areas, and access control around high-risk construction zones. In the event of significant community health and safety incidents (e.g., injuries, unauthorized site access, unannounced blasting), an incident report including root cause analysis (RCA), mitigation and compensation measures should be submitted to the relevant authorities in accordance with Turkish legislation and Project procedures.

All data, together with the results of inspections and audits, should be summarized in the dedicated community health and safety chapter of the Environmental and Social Monitoring Report prepared on a quarterly basis. This report will include any non-compliances identified, corrective actions taken, and any recommended time-bound corrective measures. These should be supported with documentary evidence such as photographs, checklists, and field logs.

All personnel are encouraged to raise concerns, suggestions, or complaints related to community health and safety through the established grievance mechanism by completing the grievance form or using designated communication channels. Public grievances regarding safety, access, noise, blasting, or other community-related risks should also be addressed and followed up accordingly. The available communication channels for submitting grievances are outlined in the Stakeholder Engagement Plan.

Throughout the construction phase of the Project, this Plan will be reviewed by the E&S Manager, based on the results of audits and any community health and safety incidents or changes in site activities. Updates to the Plan will be agreed upon between the H&S Manager and the E&S Manager.

ANTALYA ALANYA MOTORWAY	**ANTALYA-ALANYA MOTORWAY PROJECT**
Revision No: 0	**Date:** 08.09.2025

ENVIRONMENTAL and SOCIAL MANAGEMENT and MONITORING PLAN

REVISION STATUS		
Revision Date	**Rev. No**	**Explanation**
08.09.2025	00	This plan is prepared according to TS EN ISO/IEC 9001:2015, TS EN ISO/IEC ISO 14001:2015, TS EN ISO/IEC 45001:2018 and IFC Performance Standards

ENVIRONMENTAL and SOCIAL MANAGEMENT and MONITORING PLAN

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.
AQECP	Air Quality and Emissions Control Plan
CLO	Community Liaison Officer
CO	Carbon Monoxide
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
ENCON	ENCON Environmental Consultancy Co.
EPC	Engineering, Procurement and Construction (Limak İnşaat Şanayi ve Tic. A.Ş.)
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
EU	European Union
GM	Grievance Mechanism
HC	Hydrocarbons
HSE	Health, Safety and Environment
H&S	Health and Safety
IFC	International Finance Corporation
KPIs	Key Performance Indicators
Limak	Limak İnşaat Şanayi ve Tic. A.Ş.
NO_x	Nitrogen Oxides (NO_2 and NO)
PM	Particulate Matter
RAMAQ	Regulation on Assessment and Management of Air Quality
RCA	Root Cause Analysis
SPV	Special Purpose Vehicle (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.)
SO_2	Sulfur Dioxide
VOCs	Volatile Organic Compounds
WHO	World Health Organization

ANTALYA ALANYA MOTORWAY	**ANTALYA-ALANYA MOTORWAY PROJECT**
Revision No: 0	**Date:** 08.09.2025

ENVIRONMENTAL and SOCIAL MANAGEMENT and MONITORING PLAN

I. INTRODUCTION

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). Following the tendering process, KGM has awarded Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ,SPV or the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. Accordingly, AAOİAŞ will be referred as
Project Sponsor[1] in the scope of this report. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor (or EPC).

The project is designed to connect the districts of Serik and Alanya via the Manavgat district of Antalya province. The Project will enhance the existing transportation network services with its surrounding provinces: Burdur, Muğla, Konya, Isparta, Karaman and Mersin. Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM. Based on these studies, the route was optimized, incorporating engineering practices and addressing environmental and social considerations, particularly issues of involuntary and economic resettlement, before being finalized. According to the most current design, the total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads[2].

This Environmental and Social Management and Monitoring Plan (ESMMP or The Plan) was prepared by AAOİAŞ as a part of Project ESIA Package which is a management tool to be used by SPV, EPC Contractor and its sub-contractors & suppliers to implement the Environmental & Social (E&S) mitigation measures identified in the ESIA report during construction phases.

I.1 Project Description

The Project starts at Serik Interchange (Km: 52+000) and then proceeds eastward, following the corridor at the foothills of the Taurus Mountains within the boundaries of Serik and Manavgat districts, ending at north of Konaklı neighborhood of Alanya District (Km: 136+000). From this point onwards, the route turns southward with a 2x2 lane connection road and connects to the D400 state road at the Alanya West Interchange. As of April 2025, the current Project design includes a total of 117.8 kilometers of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads.

The map showing the construction components and road route within the scope of the Project's construction activities is provided in *Figure I-1.*

[1] The BOT Contract uses the term "Appointed Company" to refer Project Sponsor

[2] It should be noted that the environmental and social baseline characterization, maps and scoping assessments provided in this report are based on the most current design

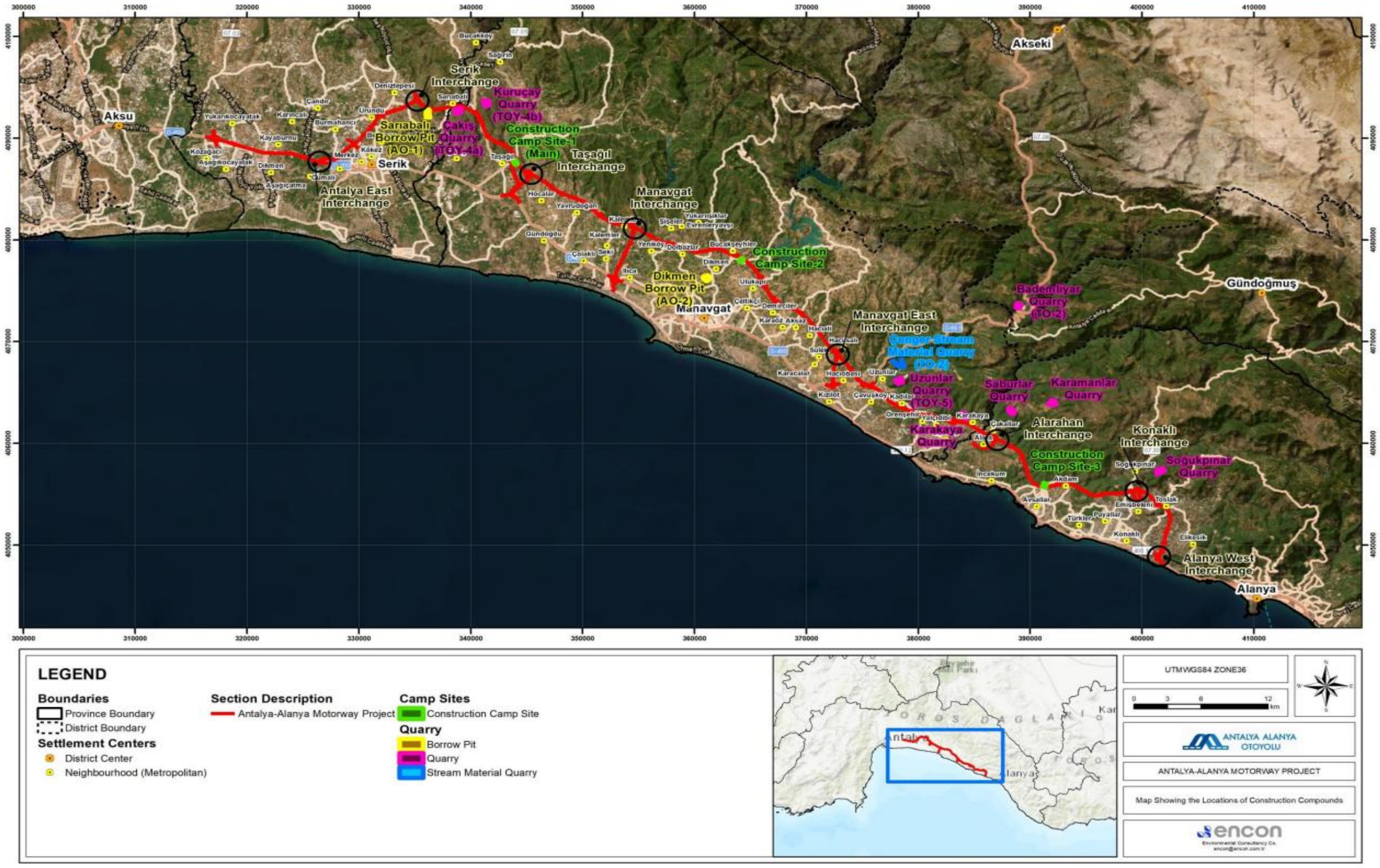


Figure I-1.. Map Showing the Locations of Construction Compounds

Other structures to be built as part of the project are as follows:

- 16 viaducts,
- 22 bridges,
- 305 culverts,
- 25 interchanges,
- 56 overpasses,
- 43 underpasses, and
- 5 tunnels.

I.2 Purpose and Scope

The purpose of this Plan is to ensure continuous and effective implementation of the mitigation measures set by the Project management plans and to provide an environmental and social monitoring program to achieve Project goals.

ESMMP will be supported by several management plans, which are a set of stand-alone documents that will evolve during the lifetime of the Project to encompass the construction of the motorway and will be integrated into the overall SPV's Environmental and Quality Management Systems.

The ESMMP includes:

- A summary of mitigation and enhancement measures to be implemented;
- Roles and responsibilities of the Project Sponsor, contractors, and E&S management teams;
- Environmental and social monitoring indicators, frequencies, and methods;

This ESMMP is a living document developed with the best available information and will be reviewed and revised as necessary due to the nature of the construction and progress.

I.3 Legislative Framework and Reference Standards

The Plan aims to ensure that all project activities are conducted in compliance with:

- Applicable Turkish national environmental and social legislation,
- Applicable International Standards,
- The International Finance Corporation (IFC) Performance Standards,
- Project-specific commitments outlined in the Environmental and Social Impact Assessment (ESIA) and associated management plans

II. ENVIRONMENTAL and SOCIAL MANAGEMENT SYSTEM

The main elements of an Environmental and Social Management System (ESMS) are provided in Figure II-1and comprise the following four phases, also described in below.



Figure II-1. Main Elements of the ESMS

Planning: Establishing the objectives and processes necessary to deliver results in accordance with the Project Guideline for Environmental Management.

Doing: Implementing the processes through defining mitigation measures and assigning responsibilities for undertaking or implementing such mitigation measures, typically through suites of Management Plans.

Checking: Monitoring and measuring these processes against the policy, objectives and targets, legal and other requirements (such as IFC), and reporting of the results.

Acting: Taking actions to continually improve the performance of the ESMS through the training of personnel and auditing of results.

An ESMS will include:

- Policy Statements – which describes Project's E&S objectives which will guide the Project in achieving E&S performance
- Process for Risk Identification – which, in addition to the ESIA, shall include a defined process for evaluating and managing environmental and social risks through the life of the Project;
- Management Programs – for environmental and social performance execution which are, in part, detailed below;
- Organisation Capacity/Competency – demonstrated through clear division of responsibility

and vetting of individual roles holding responsibility and accountability for environmental and social performance execution;

- Documentation such as ESIA, Stakeholder Engagement Plan (SEP), Resettlement Action Plan (RAP), Emergency Preparedness and Response Plan (EPRP), and ESMMP address how potential Environmental, Social, Health and Safety (ESHS) risks will be managed during the Project lifecycle;
- Monitoring and Review System – which will detail the process by which the Project will monitor and measure the effectiveness of the management program, including compliance with any regulatory requirements, legal requirements and/or contractual obligations.

An ESMS will provide a systematic structure and approach to enable the effective implementation and management of environmental & social risks, impacts, opportunities and related compliance. Effective management of environmental & social issues will consider, implement and address the following fundamental components as part of the robust ESMS:

- Project-specific policies related to the environmental and social considerations,
- Project-based E&S Objectives, Targets & Programme,
- Applicable E&S legal requirements and other compliance obligations (such as those required by lenders);
- E&S professionals, who have the experience, competence, and training necessary to assess and manage environmental impacts and risks, and carry out environmental & social management functions including the preparation of Project or activity-specific plans and procedures that incorporate the technical requirements presented in this document;
- Prioritisation of management programmes/ strategies with the objective of achieving an overall reduction of risk to human wellbeing and the environment, focusing on the prevention of irreversible and/or significant impacts;
- Favouring strategies (where possible) that eliminate the cause of the impact at its source, for example, by selecting less hazardous materials or processes that avoid the need for environmental controls;
- When impact avoidance is not feasible, incorporating controls to reduce or minimise the possibility and/or magnitude of undesired consequences, for example, with the application of pollution controls to reduce the levels of emitted contaminants;
- Preparing workers, informing, and cooperating with nearby communities and relevant stakeholders to respond to emergencies, and accidents, including providing technical and financial resources to control such events effectively and safely,
- Improving environmental performance (i.e., for continual improvement) through a combination of ongoing monitoring of facility performance and effective accountability;
- Performance ranges will be refined on a regular basis as more data becomes available, in turn enabling more accurate strategy development and benchmarking. As such, the ESMS documents will be treated as living documents, to be updated within a continuous process of improvement.

To ensure that the Project is implemented in compliance with the Project Requirements, Regulations and Standards, the following policies have been developed:

- Integrated Management Systems Policy,
- OHS Policy,
- Corporate Equality Policy,
- Zero Tolerance Policy
- Human Resources Policy,

The above-mentioned policies, to be included in the SPV´s ESMS, will establish the framework for the Project's environmental, social, health and safety management processes as further developed and defined within this ESMMP.

II.1 Managing Changes to Project Activities

Changes in the Project may occur due to unanticipated situations. Adaptive changes may also occur during the course of the project life cycle. SPV will implement a formal procedure to manage changes in the Project that will apply to all project activities.

A Change Management Plan has been prepared for the Project. As is typical for such a large infrastructure project, it is expected that there will be changes required to the design aspects of the Project. Many changes will be of a purely technical nature with little/no ESIA-relevance (e.g., incline of a ramp, or concrete specifications), and many other changes are expected to fall within the areas and issues already covered by the ESIA, ESMMP and Resettlement Action Plan (RAP) (e.g., change in areas of property expropriated from already-affected landowners, layout of facilities at the rest areas).

The objective of the plan is to ensure that the impact of changes on the health and safety of personnel, the environment, plant and equipment are identified and assessed prior to changes being implemented.

II.2 Roles and Responsibilities

Table II-1 is provided to outline the roles and responsibilities specifically related to the implementation, monitoring, and reporting requirements of ESMPs. The table clarifies the functional duties of each party involved in ensuring the effective execution of the measures described herein and reinforces accountability across all relevant units.

Table II-1. Roles and Responsibilities

Roles	Responsibilities
General Manager (SPV)	○ Define and implement the overall business strategy and direction of the SPV in alignment with shareholder and stakeholder expectations. ○ Ensure the development, revision, and execution of project-specific

Roles	Responsibilities
	management plans, including the Environmental and Social Management Plan (ESMP) in accordance with company policies and international standards. ○ Ensure the provision of necessary resources and organizational support for the implementation of all SPV plans, including E&S and H&S. ○ Oversee the day-to-day operations of the SPV to ensure project milestones and deliverables are achieved efficiently and sustainably. ○ Supervise and coordinate EPC contractors and subcontractors to ensure proper execution of construction, commissioning, and operational phases. ○ Ensure that managerial decisions are made regarding the implementation of all SPV policies and plans by EPCs and subcontractors. ○ Ensure the preparation, dissemination, and implementation of the Environmental and Social Management Plan, and that it is communicated clearly to all EPC contractors and subcontractors. ○ Supervise and ensure contractor/subcontractor compliance with E&S and H&S plans and standards. ○ In case of non-compliance, ensure correct and preventive actions are taken in collaboration with the EPC, SPV's E&S Manager, and H&S Manager. ○ Coordinate internal intervention and emergency response procedures in case of environmental, social, or safety-related incidents. ○ Make executive decisions on project budgeting, resource allocation, and capital management to support project execution and sustainability, H&S and E&S compliance. ○ Ensure sufficient funding and personnel are dedicated to environmental, social, and H&S obligations under the project's contractual and regulatory frameworks. ○ Ensure the monitoring environmental, social and financial performance, reporting, and risk exposure of the SPV, ensuring transparency and accountability to stakeholders and investors. ○ Promote a culture of environmental and social responsibility across the SPV and its stakeholders. ○ Ensure that all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements. ○ Liaise with legal counsel to manage the SPV's legal framework, mitigate

Roles	Responsibilities
	risks, and fulfil all contractual obligations. ○ Provide timely updates, reports, and presentations on the SPV's performance, risks, compliance status, and community engagement efforts. ○ Foster positive relationships with government agencies, financial institutions, civil society, and project-affected communities. ○ Lead the development and execution of the exit strategy or asset disposal plan upon project maturity or completion. ○ Oversee the financial and legal wind-down of the SPV in accordance with regulatory and shareholder requirements.
E&S Manager (SPV)	○ Review and ensure the preparation, revision, and implementation of E&S Management Plans in accordance with national laws, regulations, company policies, international standards and lender requirements. ○ Develop and manage the overall E&S management system and project-specific sub-plans. ○ Review and update the E&S Management Plan in coordination with the EPC's E&S Manager and construction teams. ○ Ensure that environmental, and community safety measures are implemented through method statements and site practices. ○ Ensure that all construction site activities are carried out safely by EPC and subcontractors. ○ Ensure that EPC and subcontractors correctly implement site practices. ○ Provide technical support to EPC and subcontractors for the implementation of E&S Plans. ○ Collaborate with internal teams (e.g., H&S, Legal, Procurement) to integrate E&S criteria into project operations and contracts. ○ Monitor the environmental and social performance of EPC and subcontractors to ensure compliance. ○ Monitor EPC and subcontractor adherence to the requirements of the E&S Management Plan. ○ Monitor EPC and subcontractor adherence to the requirements of the E&S Management Plan. ○ Ensure EPC and subcontractors maintain accurate records, including those of corrective and preventive actions.

Roles	Responsibilities
	○ Supervise the E&S Deputy Manager oversee the implementation of monitoring systems. ○ Ensure that EPC and subcontractors provide required E&S training. ○ Review and validate training records and related documentation. ○ Ensure effective investigation and documentation of environmental and social incidents. ○ Lead or support the implementation of corrective actions and incident prevention measures. ○ Coordinate emergency preparedness and community safety procedures. ○ Prepare and submit E&S compliance and performance reports to internal and external stakeholders, including lenders and regulators. ○ Maintain documentation related to site compliance, audits, training, and grievances. ○ Support stakeholder engagement activities and consultations with local communities. ○ Oversee the Grievance Mechanism (GM) and ensure timely resolution of community and worker complaints. ○ Engage with regulatory authorities, auditors, and NGOs on E&S compliance and performance matters ○ Coordinate obtaining environmental related permits
H&S Manager (SPV)	○ Ensure the preparation, revision, and implementation of the health, safety, community related plans and documents in accordance with company policies, regulatory obligations, international standards and lender requirements. ○ Ensure the conditions and obligations specified in the health, safety, community related plans and documents are implemented and adhered to by EPC and subcontractors in accordance with company policies, regulatory obligations, international standards and lender requirements. ○ Contribute to project risk assessments and job hazard analyses (JHAs) and ensure these are updated regularly. ○ Ensure that all construction site activities are carried out safely by EPC and subcontractors. ○ Ensure that safety, health, and community safety measures are implemented by EPC and subcontractors through appropriate method

Roles	Responsibilities
	statements and site practices. ○ Ensure that physical site boundaries are clearly defined and maintained by EPC and subcontractors to control site access and protect public safety. ○ Provide technical support to EPC and subcontractors for the proper implementation of the safety, health, and community safety related plans. ○ Supervise the integration of safety controls into daily work permits, toolboxes, and field activities. ○ Monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements. ○ Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites. ○ Track and analyze safety performance metrics (e.g., LTIs, near misses, TRIR) and recommend corrective measures. ○ Participate in and oversee comprehensive investigations of accidents and incidents. ○ Ensure root causes are identified, documented, and that corrective actions are implemented and verified. ○ Ensure timely and appropriate resolution of complaints related to public health and safety. ○ Support EPC and subcontractors in the development and delivery of site-specific H&S training programs. ○ Ensure safety inductions, toolbox talks, and job-specific training are conducted and recorded. ○ Maintain accurate records of inspections, incidents, safety meetings, and corrective actions. ○ Report on H&S performance, non-compliance, and corrective actions to Project General Manager and external stakeholders. ○ Coordinate with health and safety teams to align safety measures with broader site and community risk controls. ○ Engage with regulatory authorities on inspections, audits, and compliance verification.
Expropriation Manager (SPV)	○ Implement the Resettlement Action Plan (RAP) or equivalent frameworks in alignment with national regulations and international standards.

Roles	Responsibilities
	○ Identify affected lands, properties, and stakeholders in collaboration with survey, legal, and engineering teams. ○ Coordinate with government bodies and legal authorities for expropriation procedures and approvals. ○ Engage with landowners, occupants, and project-affected communities to explain project scope, land requirements, compensation processes, and grievance redress mechanisms. ○ Mediate and resolve disputes related to land ownership, valuation, or resettlement with tact and legal support where necessary. ○ Coordinate resettlement efforts where required, including livelihood restoration programs. ○ Maintain detailed documentation of compensation agreements, payments, and relocations. ○ Ensure expropriation processes comply with national laws, international standarts, lender requirements, and the SPV's internal policies. ○ Collaborate with E&S teams to ensure that land acquisition activities do not lead to violations of environmental or social management plans. ○ Track and report progress of land acquisition and resettlement activities to senior management and external stakeholders. ○ Provide input for audits, investor updates, and compliance reviews related to expropriation. ○ Identify and mitigate risks related to delayed acquisition, legal disputes, or community opposition. ○ Implement contingency plans to avoid disruption to project timelines due to expropriation issues.
Deputy E&S Manager (SPV)	○ Lead the development, implementation, and continuous improvement of the Environmental and Social Management. ○ Implement all project activities comply with local laws, environmental regulations, corporate governance policies, and international best practices and lender requirements. ○ Provide strategic leadership and oversight to the E&S team, including Managers, Specialists, Engineers, and Community Liaison Officers, ensuring effective coordination and resource allocation. ○ Ensure EPC contractors and subcontractors consistently comply with E&S requirements through monitoring, audits, corrective actions and training

Roles	Responsibilities
	programs. ○ Oversee incident and non-compliance management, including investigations, corrective/preventive measures, and stakeholder communication. ○ Serve as the principal liaison for all environmental and social matters with government regulators, financial institutions, communities, NGOs, and other stakeholders. ○ Promote a culture of environmental and social responsibility across the SPV and its stakeholders, driving continuous improvement and risk mitigation. ○ Support executive decision-making by providing timely reports and insights on E&S performance, risks, and emerging trends. ○ Lead community engagement strategies in collaboration with the Environmental Engineer, Agricultural Expert, Social Chief and CLOs to ensure effective grievance management and positive relations with project-affected communities. ○ Ensure E&S considerations are integrated into project planning, budgeting, and closure activities, including restoration and post-construction monitoring. ○ Support the environmental and community safety measures are implemented through site practices and method statements by the EPC and subcontractors. ○ Ensure that the EPC and subcontractors carry out site practices correctly. ○ Ensure that EPC and subcontractors maintain relevant records. ○ Ensure that EPC and subcontractors maintain records of corrective and preventive actions. ○ Ensure that Management Plans are prepared, revised, and implemented in accordance with company policies. ○ Ensure that EPC and subcontractor provide the necessary training through the review of training records and relevant training documents. ○ Conduct comprehensive investigations in case of accidents and incidents. ○ Manage waste within the entire project footprint and area of influence, prioritizing the designated areas to be used under the scope of the Project. ○ Coordinate environmental and social monitoring programs
Social Chief	○ Supervise and mentor CLOs, ensuring their work aligns with project

Roles	Responsibilities
(SPV)	priorities and stakeholder engagement strategy. o Develop and implement work plans and schedules for the CLO team. o Ensure consistent messaging, processes, and reporting methods across all field teams. o Conduct regular team meetings to review community issues, grievances, engagement outcomes, and field updates. o Lead the implementation of the Stakeholder Engagement Plan (SEP) and ensure it reflects community realities. o Oversee the planning and execution of community consultations, public meetings, and disclosure activities. o Ensure that engagement activities are inclusive of vulnerable and marginalized groups. o Build and maintain positive, trust-based relationships with local communities, leaders, and institutions. o Supervise the effective functioning of the grievance redress mechanism (GRM) at community and project levels. o Ensure all grievances are recorded, processed, and resolved in a timely and transparent manner. o Analyse grievance trends and escalate systemic issues to the E&S Manager. o Contribute to the continuous improvement of the GRM process based on community feedback and internal review. o Monitor the performance of social engagement activities and their compliance with SEP objectives. o Ensure accurate, timely, and complete reporting of CLO activities, stakeholder interactions, and grievance outcomes. o Review and validate weekly/monthly reports from CLOs and prepare consolidated updates for senior management. o Ensure all engagement activities meet national regulations and international standards (e.g., IFC PS, EBRD PR, Equator Principles). o Identify training needs and deliver or coordinate training for CLOs on stakeholder engagement, conflict resolution, o and field documentation.

Roles	Responsibilities
	○ Promote professional development and capacity building within the social team. ○ Train subcontractors and relevant staff on community interaction protocols and grievance management. ○ Contribute to the development, review, and periodic updating of the SEP and related social management plans. ○ Ensure CLOs support the implementation and documentation of these plans at the field level. ○ Support the integration of lessons learned into updated plans and engagement strategies. ○ Coordinate with the E&S Manager, E&S Specialists, H&S, legal, and construction teams to address community-related ○ impacts. ○ Support alignment between community concerns and project execution through proactive communication with ○ technical departments. ○ Contribute social performance inputs to reports for lenders, regulators, and corporate leadership.
Agricultural Expert (SPV)	○ Assess project impacts on agricultural land, productivity, and rural livelihoods in coordination with the expropriation and E&S teams. ○ Support the development and implementation of livelihood restoration strategies for project-affected farmers and agricultural households. ○ Conduct field visits to gather agricultural baseline data, monitor changes, and evaluate effectiveness of mitigation measures. ○ Provide technical input to social risk assessments, Resettlement Action Plans (RAPs), and Livelihood Restoration Plans (LRPs). ○ Engage with local agricultural institutions, cooperatives, and extension services to coordinate support and training programs. ○ Participate in community consultations with a focus on agricultural concerns and provide input into grievance resolution related to land use, crop loss, or livelihood impacts. ○ Help identify and implement sustainable farming initiatives and compensation strategies aligned with local practices and market trends. ○ Monitor and report on agricultural livelihood indicators, ensuring alignment

Roles	Responsibilities
	with project and lender requirements. ○ Contribute to the review and update of relevant social and livelihood management plans. ○ Support the Social Chief and Community Liaison Officers in field-level implementation, training, and stakeholder engagement related to agricultural matters.
Expropriation Engineer (SPV)	○ Review and validate cadastral maps, land parcel data, and expropriation plans in coordination with the design and survey teams. ○ Prepare and update technical drawings, parcel-level expropriation maps, and cross-sections for engineering verification. ○ Ensure that technical documentation aligns with the project's legal, spatial requirements, international standards and lenders requirements for expropriation. ○ Support the preparation of expropriation folders with complete technical details for each parcel. ○ Conduct field inspections and site verifications to confirm parcel boundaries, existing structures, crops, and utilities. ○ Record and document physical conditions of affected properties, including GPS coordinates and photographic evidence. ○ Collaborate with surveyors, property evaluators, and legal experts during field visits and technical assessments. ○ Maintain a database of technical information related to affected parcels, expropriation status, and engineering reviews. ○ Prepare technical summaries, verification reports, and progress updates for the Expropriation Manager. ○ Assist in tracking parcel-by-parcel technical clearance and report on delays or technical discrepancies. ○ Support interactions with landowners during technical inspections, mapping explanations, and asset identification. ○ Coordinate with municipal engineers, cadastral offices, and other public institutions to resolve technical inconsistencies. ○ Assist the legal and valuation teams by providing technical input for asset valuation and compensation processes. ○ Ensure all engineering-related activities comply with national laws, environmental and social standards, international standards, lender

Roles	Responsibilities
	requirements and project guidelines. ○ Support the preparation of technical annexes for land acquisition reports, grievance responses, and audit documentation. ○ Provide support during audits by lenders or regulatory agencies on technical matters related to expropriation.
Urban Planner (SPV)	○ Conduct land use assessments and spatial analysis to support expropriation, resettlement planning, and infrastructure alignment. ○ Identify and evaluate potential resettlement areas in collaboration with the social and engineering teams, ensuring suitability in terms of accessibility, services, and community integration. ○ Prepare or review layout plans for resettlement sites or impacted urban areas in compliance with national and local planning standards. ○ Support the preparation of expropriation and land-use strategy documents that align with municipal and regional development plans. ○ Ensure that project land acquisition activities are consistent with zoning, land classification, and regulatory requirements. ○ Liaise with urban planning authorities and municipalities to facilitate approvals, permits, and community development. ○ Work with the Legal and Expropriation teams to resolve spatial planning disputes or challenges related to land classification. ○ Participate in field visits, stakeholder consultations, and public meetings to present planning proposals and gather community feedback. ○ Prepare maps, presentations, and reports to communicate spatial strategies and resettlement layouts to stakeholders.
Surveying Engineer (SPV)	○ Plan, coordinate, and supervise all surveying activities related to the project, including topographic, cadastral, and engineering surveys. ○ Review and validate survey data, maps, and drawings prepared by EPC contractors or subcontractors to ensure accuracy and compliance with project requirements. ○ Support the expropriation process by verifying parcel boundaries, land ownership, and physical asset inventories. ○ Ensure that all survey activities are conducted using appropriate instruments (e.g., GPS, total station, drones) and are aligned with national and international standards. ○ Coordinate with design, engineering, and legal teams to resolve

Roles	Responsibilities
	discrepancies in land measurements, maps, and legal documentation. ○ Maintain an up-to-date geospatial database of all surveyed areas and assets affected by the project. ○ Participate in site inspections and field verifications alongside Expropriation Engineers, CLOs, and property evaluators. ○ Provide technical inputs for land acquisition documentation, grievance resolution, and community consultation processes. ○ Ensure survey documentation is archived properly and is accessible for audits, regulatory reviews, and internal controls. ○ Supervise EPC and subcontractor survey teams to ensure the implementation of safe and efficient survey operations within the project area. ○ Liaise with relevant public institutions (e.g., cadastral offices, municipalities) for official validation of survey outputs when required. ○ Contribute to the preparation of maps, cross-sections, and spatial plans for environmental, social, and engineering applications.
Surveyor (SPV)	○ Conduct detailed topographic and cadastral surveys of affected land parcels and assets using appropriate tools and technologies. (e.g., total stations, GPS, drones) ○ Mark land boundaries in coordination with landowners, communities, and relevant authorities to support clear delineation for expropriation. ○ Assist in preparing and verifying land acquisition maps, parcel boundaries, and infrastructure alignments based on project design and engineering data. ○ Support inventory of physical assets (buildings, trees, irrigation systems, crops, etc.) for compensation assessment purposes. ○ Ensure coordination between survey data and GIS systems, and assist in maintaining an up-to-date spatial database of all expropriation-related parcels and assets. ○ Work closely with the Expropriation, Legal, Social, and Civil Engineering teams to ensure consistency and technical accuracy in documentation. ○ Participate in site verification visits with stakeholders, ensuring transparency and consensus during boundary marking and inventory. ○ Provide survey data and documentation required for legal registration, compensation, and permitting processes.

Roles	Responsibilities
	○ Ensure the safe, efficient use and maintenance of all surveying equipment. ○ Maintain clear records and archives of field data, survey results, and maps in compliance with company and regulatory standards.
HSE Specialist (SPV)	○ Support the execution of the safety, health and community safety related plans, and ensure site activities are carried out safely by EPC contractors and subcontractors in-line with applicable laws, international standards and lender requirements. ○ Conduct regular site inspections, hazard identification, and risk assessments; follow up on corrective and preventive actions. ○ Monitor compliance with safety protocols and ensure H&S measures are integrated into method statements and work procedures. ○ Maintain H&S documentation, including safety permits, incident records, and training logs, etc. ○ Participate in accident and incident investigations, ensuring findings are documented and lessons are communicated across teams. ○ Support H&S training delivery for all relevant site personnel and review contractor training records for adequacy. ○ Ensure the construction site is properly demarcated and safety signage and barriers are in place and maintained. ○ Assist in resolving complaints related to occupational health, site safety, and community safety in coordination with relevant teams. ○ Contribute to the review and update of safety plans and procedures based on field experience and audit findings. ○ Provide technical guidance to contractors and subcontractors to improve health and safety performance. ○ Implement the integration of safety controls into daily work permits, toolboxes, and field activities. ○ Assist to H&S manager to monitor the compliance of EPC and subcontractors with the safety, health, and community safety related plans, and applicable laws, international standards and lender requirements. ○ Conduct regular inspections, audits, and hazard identification walkthroughs on construction sites. ○ Prepare safety performance metrics (e.g., LTIs, near misses, TRIR) and recommend corrective measures. ○ Participate in and oversee comprehensive investigations of accidents and

Roles	Responsibilities
	incidents. ○ Implement corrective actions and conduct root causes analysis. ○ Prepare documentation of remedial and corrective actions. ○ Conduct safety inductions, toolbox talks, and job-specific training are conducted and recorded. ○ Engage with regulatory authorities on inspections, audits, and compliance verification.
Project Director (EPC)	○ Define and oversee the implementation of the overall EPC execution strategy in alignment with contract objectives and company standards. ○ Lead interdisciplinary project teams, coordinating EPC functions to achieve key milestones. ○ Make strategic decisions regarding project resourcing, budget allocation, and the efficient use of materials and personnel. ○ Ensure all project personnel are fully informed of and compliant with project plans and standards. ○ Coordinate internal management intervention in case of emergencies. ○ Ensure the preparation, revision, and implementation of project management plans (HSE, E&S, QA/QC, etc.) in line with company policies, legal frameworks, international standards, SPV and lender requirements. ○ Communicate all relevant plans clearly to subcontractors and monitor their performance. ○ Approve and monitor regular site inspections and safety reviews. ○ Track project KPIs, timelines, and budgets to ensure performance objectives are met. ○ Ensure that all employees comply with the obligations specified in the project's management plans during activities. ○ In case of non-compliance, ensure appropriate corrective and preventive actions are taken in coordination with the E&S Manager and H&S Manager ○ Ensure all personnel receive necessary training in health, safety, environment, and social performance. ○ Approve training plans and assess their implementation across EPC and subcontractor teams. ○ Serve as the primary EPC representative to the SPV, client, and key

Roles	Responsibilities
	stakeholders. ○ Maintain communication channels with project owners, subcontractors, and vendors to ensure alignment and compliance. ○ Coordinate with regulatory authorities, community representatives, and auditors as required. ○ Address stakeholder concerns proactively and transparently, particularly those related to safety, environmental, and social matters. ○ Oversee risk management and mitigation strategies related to technical, health, safety, community safety, environmental, and social aspects. ○ Ensure quality management systems are applied consistently across project phases. ○ Supervise the preparation and approval of documentation related to claims, variations, and commercial issues. ○ Monitor third-party inspections, audits, and due diligence efforts. ○ Supervise and coordinate subcontractors to ensure proper execution of construction phases.
E&S Manager (EPC)	○ Ensure the preparation, revision, and implementation of E&S Management Plans in accordance with company policies, international standards, and lender requirements. ○ Review and update the environmental and social management plans in coordination with relevant contractor specialists and construction teams. ○ Facilitate coordination with the SPV's E&S Manager for compliance audits and reporting. ○ Implement environmental and social measures through site practices and method statements. ○ Ensure that all conditions and obligations outlined in the environmental and social management plans are implemented and adhered to during project activities. ○ Ensure employees and contractors in fulfilling the requirements and relevant trainings of the environmental and social management plans. ○ Ensure the environmental and social management plans are communicated and implemented by Contractors/Subcontractors. ○ Monitor compliance of Contractors/Subcontractors with environmental and social management plans requirements.

Roles	Responsibilities
	○ Ensure implementation of safety measures such as traffic regulation and utility protection. ○ Ensure site boundaries are properly defined and monitored. ○ Participate in regulatory inspections and third-party assessments. ○ Integrate E&S KPIs into contractor evaluations and performance reviews. ○ Ensure all site personnel receive appropriate E&S training. ○ Oversee subcontractor E&S onboarding and refresher sessions. ○ Promote toolbox talks and informal training to reinforce E&S awareness. ○ Monitor E&S performance of subcontractors and ensure compliance. ○ Supervise the Environmental Engineers, Biodiversity Specialist, Archaeologist, CLOs and oversee monitoring systems. ○ Ensure the development and follow-up of corrective/improvement actions. ○ Lead E&S performance reporting to the Project Director ○ Promote continuous improvement via lessons learned and incident analysis. ○ Conduct comprehensive investigations of accidents and incidents. ○ Ensure prompt resolution of complaints related to environmental and social issues. ○ Enforce behaviour protocols related to community safety. ○ Establish emergency preparedness and response procedures for E&S incidents. ○ Ensure inclusive practices by integrating gender, vulnerability, and social inclusion principles into site-level practices.
H&S Manager (EPC)	○ Ensure the safe execution of all construction site activities in accordance with project standards, procedures, legal requirements, international standards, lender and SPV requirements. ○ Ensure the preparation, revision, and continuous improvement of Health & Safety Management Plans in accordance with EPC and SPV policies. ○ Ensure the implementation and compliance of the conditions and obligations specified in the H&S Plan during project activities. ○ Support all employees in fulfilling the conditions and obligations of this

Roles	Responsibilities
	health and safety plans during project activities. o Provide technical support to Contractors/Subcontractors for the implementation of health and safety plans. o Monitor the compliance of Contractors/Subcontractors with the requirements of the health and safety plans and report non-conformities. o Maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project. o Implement health, safety and community safety measures through site practices and method statements. o Ensure that construction site boundaries are well-defined, adequately marked, and routinely monitored for safety. o Ensure the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site. o Oversee the implementation of safety measures including traffic management, safe work zones, and protection of aboveground and underground utilities. o Coordinate emergency preparedness and response procedures, including drills and communication protocols, in collaboration with relevant departments. o Ensure toolbox talks, safety briefings, and daily pre-task planning meetings to reinforce safety culture and awareness on site. o Ensure that all personnel on-site, including contractors and subcontractors, receive regular and adequate safety training aligned with the obligations of the H&S Plan. o Ensure that this Plan is understood by all employees and Contractor/Subcontractor staff through regular training programs that include the obligations of this Plan. o Review and validate training records and related documentation from Contractor/Subcontractor. o Conduct and lead comprehensive investigations in the event of accidents, incidents, or near misses, ensuring findings are documented and corrective actions are implemented. o Ensure the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks. o Analyse trends from incidents and near-misses to identify systemic issues

Roles	Responsibilities
	and develop long-term preventive strategies. ○ Ensure prompt and structured resolution of complaints related to public health, safety, and security. ○ Prepare regular reports to Project Director summarizing H&S performance, compliance status, and key risks. ○ Foster a safety-first culture by promoting active participation, feedback, and ownership of safety responsibilities at all levels of the workforce.
Site Doctor (EPC)	○ Provide on-site medical care, first aid, and emergency response to site personnel. ○ Monitor the health status of workers through routine check-ups and assessments. ○ Maintain accurate and confidential health records and incident logs. ○ Identify and manage occupational health risks and recommend preventive measures. ○ Ensure availability and readiness of medical equipment, first aid kits, and emergency protocols. ○ Conduct health awareness sessions and support mental health and wellness programs. ○ Coordinate with H&S teams to implement hygiene, sanitation, and disease control measures. ○ Ensure compliance with local occupational health laws and project-specific health standards. ○ Collaborate with external hospitals or clinics for referrals and medical emergencies. ○ Participate in site inspections and contribute to health-related sections of HSE audits. ○ Provide medical input to risk assessments, method statements, and H&S Plans. ○ Support COVID-19 or other outbreak response procedures as needed. ○ Detect occupational injuries and illnesses and prepare relevant prevention plans. ○ Track of all health records of all employees including occupational injuries and illnesses.

Roles	Responsibilities
Archaeologist (EPC)	○ Conduct archaeological surveys and assessments within the project footprint prior to and during construction activities. ○ Monitor excavation and earthworks to identify and document any archaeological or cultural heritage findings. ○ Implement and support the continuous update of the Cultural Heritage Management Plan (CHMP) in compliance with national laws, project policies, international standards and SPV&Lender requirements. ○ Supervise the application of chance-find procedures across all construction areas and ensure proper documentation, preservation, or relocation of discovered artifacts. ○ Liaise with national and local cultural heritage authorities to secure necessary permits and approvals, and report findings as required. ○ Train construction personnel and subcontractors on cultural heritage awareness, including chance-find protocols and legal obligations. ○ Collaborate with Environmental, Social, and H&S teams to integrate cultural heritage considerations into broader site management and daily operations. ○ Participate in stakeholder engagement processes where cultural heritage concerns arise. ○ Coordinate with external experts or labs for advanced assessment and preservation strategies, when needed. ○ Maintain accurate records of archaeological work, including GPS data, photos, catalogues, and reports. ○ Promote community awareness and sensitivity toward cultural heritage protection where applicable. ○ Review contractor method statements and work plans to confirm inclusion of archaeological mitigation measures.
Biodiversity Specialist (EPC)	○ Conduct baseline biodiversity assessments to understand and document existing habitats, species, and ecosystem conditions in and around the project footprint. ○ Monitor biodiversity risks during construction activities, ensuring sensitive habitats, critical species, and ecological corridors are not adversely affected. ○ Ensure compliance with national environmental legislation and international biodiversity standards. ○ Implement Biodiversity Action Plan (BAP) and Biodiversity Management

Roles	Responsibilities
	Plan (BMP) and associated mitigation measures in coordination with the Environmental Engineer and E&S Manager. o Implement ecological mitigation measures (e.g., habitat restoration, species relocation, buffer zones) by contractors and subcontractors. o Train construction and environmental teams on biodiversity protection requirements and promote awareness of key species and habitats on-site. o Monitor biodiversity indicators and report findings in line with project performance monitoring systems and environmental management plans. o Ensure corrective actions are taken promptly when biodiversity-related non-compliances are observed. o Liaise with local environmental authorities, consultants, and NGOs on biodiversity matters as required. o Support environmental inspections and audits related to biodiversity performance. o Maintain biodiversity records and contribute to periodic reports and updates to the E&S Manager and Project Director. o Assist with community awareness activities related to biodiversity conservation in collaboration with the Community Liaison Officer when relevant. o Ensure integration of biodiversity considerations into site planning, construction methods, and landscape rehabilitation. o Review contractor/subcontractor method statements and work plans to confirm inclusion of biodiversity mitigation measures.
H&S Chief (EPC)	o Implement the safe execution of all construction site activities in accordance with project standards, procedures, legal requirements, international standards, lender and SPV requirements. o Implement the preparation, revision, and continuous improvement of Health & Safety Management Plans in accordance with EPC and SPV policies. o Perform the implementation and compliance of the conditions and obligations specified in the H&S Plan during project activities. o Support all employees in fulfilling the conditions and obligations of this health and safety plans during project activities. o Provide technical support to Contractor. o Monitor the compliance of Contractors/Subcontractors with the

Roles	Responsibilities
	requirements of the health and safety plans and report non-conformities.rs/Subcontractors for the implementation of health and safety plans. ○ Maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project. ○ Implement health, safety and community safety measures through site practices and method statements. ○ Implement that construction site boundaries are well-defined, adequately marked, and routinely monitored for safety. ○ Ensure the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site. ○ Perform the implementation of safety measures including traffic management, safe work zones, and protection of aboveground and underground utilities. ○ Perform emergency preparedness and response procedures, including drills and communication protocols, in collaboration with relevant departments. ○ Ensure toolbox talks, safety briefings, and daily pre-task planning meetings to reinforce safety culture and awareness on site. ○ Ensure that all personnel on-site, including contractors and subcontractors, receive regular and adequate safety training aligned with the obligations of the H&S plans. ○ Ensure that H&S plans are understood by all employees and Contractor/Subcontractor staff through regular training programs that include the obligations of H&S plans. ○ Review and validate training records and related documentation from Contractor/Subcontractor. ○ Review and validate training records and related documentation from Contractor/Subcontractor. ○ Conduct and lead comprehensive investigations in the event of accidents, incidents, or near misses, ensuring findings are documented and corrective actions are implemented. ○ Ensure the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks. ○ Follow prompt and structured resolution of complaints related to public health, safety, and security.

Roles	Responsibilities
	○ Prepare regular reports to H&S manager summarizing H&S performance, compliance status, and key risks. ○ Foster a safety-first culture by promoting active participation, feedback, and ownership of safety responsibilities at all levels of the workforce.
H&S Engineer (EPC)	○ Implement the safe execution of all construction site activities in accordance with project standards, procedures, legal requirements, international standards, lender and SPV requirements. ○ Implement the preparation, revision, and continuous improvement of Health & Safety Management Plans in accordance with EPC and SPV policies. ○ Perform the implementation and compliance of the conditions and obligations specified in the H&S Plan during project activities. ○ Support all employees in fulfilling the conditions and obligations of this health and safety plans during project activities. ○ Provide technical support to Contractors/Subcontractors for the implementation of health and safety plans. ○ Monitor the compliance of Contractors/Subcontractors with the requirements of the health and safety plans and report non-conformities. ○ Maintain a site-specific risk register and ensure hazards are identified, assessed, and mitigated throughout the lifecycle of the project. ○ Implement health, safety and community safety measures through site practices and method statements. ○ Implement that construction site boundaries are well-defined, adequately marked, and routinely monitored for safety. ○ Ensure the enforcement of behaviour protocols and community health and safety guidelines on and around the construction site. ○ Perform the implementation of safety measures including traffic management, safe work zones, and protection of aboveground and underground utilities. ○ Perform emergency preparedness and response procedures, including drills and communication protocols, in collaboration with relevant departments. ○ Ensure toolbox talks, safety briefings, and daily pre-task planning meetings to reinforce safety culture and awareness on site. ○ Ensure that all personnel on-site, including contractors and subcontractors, receive regular and adequate safety training aligned with the obligations of

Roles	Responsibilities
	the H&S plans. ○ Ensure that H&S plans are understood by all employees and Contractor/Subcontractor staff through regular training programs that include the obligations of H&S plans. ○ Review and validate training records and related documentation from Contractor/Subcontractor ○ Conduct and lead comprehensive investigations in the event of accidents, incidents, or near misses, ensuring findings are documented and corrective actions are implemented. ○ Ensure the development and follow-up of corrective and/or improvement actions to address safety-related gaps or risks. ○ Follow prompt and structured resolution of complaints related to public health, safety, and security. ○ Prepare regular reports to H&S manager summarizing H&S performance, compliance status, and key risks. ○ Foster a safety-first culture by promoting active participation, feedback, and ownership of safety responsibilities at all levels of the workforce.
HSE Technician (EPC)	○ Support the implementation of the Health, Safety, and Environmental (HSE) Management Plans on-site. ○ Conduct field-level hazard identification and risk assessments under the supervision of the HSE Engineer or H&S Manager. ○ Assist in the inspection of site conditions, equipment, and practices to ensure compliance with HSE protocols. ○ Monitor proper use of PPE by workers and subcontractors and ensure daily compliance. ○ Assist in the documentation of incidents, near-misses, and unsafe acts/conditions. ○ Support the organization of safety toolbox talks and drills, and participate in site safety briefings. ○ Assist in maintaining updated HSE records, permits to work, and site-specific risk registers. ○ Coordinate with site teams to ensure safe work zones and adherence to safety signage and barriers. ○ Escalate HSE issues and observations to senior HSE personnel for timely

Roles	Responsibilities
	corrective actions. ○ Promote a proactive safety culture through daily site presence and informal engagement with workers.
HSE Worker (EPC)	○ Perform routine safety checks and observations on construction activities to support accident prevention. ○ Support field-level enforcement of basic HSE requirements such as PPE usage, housekeeping, and emergency access. ○ Report unsafe behaviours, near-misses, or incidents to the HSE Technician or Engineer. ○ Assist with basic safety logistics such as placement of safety signs, first aid kits, and fire extinguishers. ○ Provide assistance during emergency drills and real-time evacuations if needed. ○ Participate in on-site HSE briefings and serve as a communication link between labour teams and HSE staff. ○ Support the distribution and collection of HSE materials, permits, and records. ○ Assist in controlling site entry for compliance with safety rules (e.g., helmet, vest, ID badge). ○ Support spill response and clean-up efforts as guided by supervisors
HSE Trainer and Document Controller (EPC)	○ Develop and deliver HSE training modules tailored to job roles and risk levels in collaboration with the HSE Manager. ○ Maintain training matrices, attendance records, and competency certifications for all EPC and subcontractor staff. ○ Organize safety induction programs for new employees and visitors. ○ Organize refresher trainings, emergency drills, and awareness campaigns (e.g., heat stress, confined space). ○ Ensure that all training materials, method statements, and HSE procedures are up-to-date and properly archived. ○ Manage document control systems related to HSE plans, permits, inspection reports, and safety data sheets. ○ Ensure traceability of document revisions and compliance with audit requirements.

Roles	Responsibilities
	○ Support internal and external audits by providing required HSE documentation and evidence. ○ Contribute to the improvement of training content based on site observations and lessons learned.
Paramedic (EPC)	○ Provide immediate emergency medical care, stabilize patients, and coordinate medical evacuation when necessary. ○ Assist the Site Doctor in conducting health checks, maintaining patient records, and supporting follow-up treatments. ○ Monitor the stock and condition of emergency medical supplies, medicines, and first aid kits. ○ Respond to health-related incidents, accidents, or illnesses on-site and record incident details accurately. ○ Participate in health and safety drills and emergency response exercises. ○ Support hygiene monitoring and health awareness campaigns. ○ Maintain clean, safe, and operational medical facilities and first aid stations. ○ Contribute to incident investigations involving health or medical issues. ○ Report health risks or trends to the Site Doctor and H&S Manager.
Environmental Engineer (SPV and EPC)	○ Implement the monitoring and recording of this Plan's execution (including implementation by Subcontractors). ○ Ensure project activities comply with national environmental legislation, permits, international standards and lender requirements. ○ Implement and monitor the Environmental & Social Management Plans and its site-specific sub-plans to ensure compliance with national legislation, international standards, and lender requirements. ○ Conduct routine environmental inspections and ensure that all site activities by contractors and subcontractors are carried out in accordance with approved method statements and mitigation measures. ○ Implement environmental monitoring programs. ○ Maintain up-to-date environmental records and databases; support preparation of reports for regulatory or lender audits. ○ Manage waste within the entire project footprint and area of influence, prioritizing designated areas to be used under the scope of the Project.

Roles	Responsibilities
	○ Monitor contractor and subcontractor adherence to approved waste storage, segregation, and disposal practices. ○ Provide regular training to site personnel during the construction phase. ○ Ensure that necessary training on environmental management is provided and that all personnel receive the required training. ○ Support toolbox talks and induction sessions to raise site-level environmental awareness. ○ Conduct regular internal audits and report non-conformities. ○ Ensure that non-conformities are recorded and immediately addressed. ○ Participate in the development and follow-up of corrective and/or improvement actions. ○ Support investigation of environmental incidents and assist in root cause analysis and follow-up reporting. ○ Report the implementation performance of this Plan. ○ Support the review and update of this Plan. ○ Ensure lessons learned and field experiences are incorporated into plan revisions and training updates. ○ Collaborate with the H&S and Social teams to address cross-cutting issues. ○ Coordinate with subcontractors to ensure implementation of project-specific environmental measures. ○ Liaise with external laboratories, consultants, or regulators as needed for environmental monitoring or reporting. ○ Support obtaining environmental related permits ○ Ensure all environmental permits are obtained, renewed, and complied with throughout the project lifecycle. ○ Contribute to the periodic review and revision of environmental plans based on site experience, regulatory changes, and stakeholder feedback. ○ Prepare and submit environmental performance reports to the E&S Manager and relevant stakeholders. ○ Coordinate with construction teams to integrate environmental requirements into work plans. ○ Ensure appropriate waste management practices are applied across the

Roles	Responsibilities
	site, including segregation, storage, transportation, and disposal in designated and approved facilities. o Conduct internal audits and inspections; identify non-conformities and follow up on corrective and preventive actions.
Community Liaison Officer (CLO) (SPV and EPC)	o Inform the public about the Project's scope, progress, and potential impacts. o Organize and facilitate regular community meetings, focus groups, and engagement forums o Maintain open lines of communication with project-affected persons (PAPs), community leaders, and local institutions. o Develop and distribute communication materials tailored to various community audiences. o Ensure that all internal and external complaints, including those under the SEP, are managed in accordance with the Grievance Mechanism (GM). o Log, track, and follow up on grievances and appeals in a timely and respectful manner. o Facilitate resolution of community disputes or concerns related to project activities. o Assess how vulnerable or marginalized groups may be affected by the Project. o Propose mitigation measures or tailored engagement approaches for at-risk or underrepresented populations. o Ensure equitable participation in consultation processes, particularly for women, youth, elders, and people with disabilities. o Support the monitoring and recording of the implementation of the social related issues, including activities carried out by subcontractors. o Support the evaluation of the SEP's implementation performance and community feedback o Contribute to regular internal audits and the reporting of non-conformities. o Ensure that relevant non-conformities are recorded and addressed immediately. o Participate in the development of corrective and/or improvement actions and support their follow-up. o Support the periodic review and update of the SEP and related procedures

Roles	Responsibilities
	in coordination with the E&S Manager. ○ Provide input to lessons learned from engagement outcomes and grievance trends. ○ Maintain up-to-date records of all stakeholder meetings, grievances, resolutions, and community commitments. ○ Submit routine reports to the Social Chief and/or E&S Manager summarizing community feedback, grievance status, and engagement Milestones. ○ Ensure confidentiality and proper data handling, especially for sensitive community issues.
All Personnel (including Contractor/Subcontractor Personnel)	○ Follow this Plan and all related Plans and Procedures, and carry out all activities in accordance with the requirements of this Plan. ○ In case of any non-compliance related to the implementation of this Plan, report it first to the CLO and the E&S Manager. ○ Participate in relevant trainings. ○ Ensure self-sufficiency in the implementation of this Plan. ○ Fulfil and ensure the implementation of the requirements of this Plan

II.3 Training and Awareness

One of the most important mechanisms for the enhancement of the Project's ESHS performance will be the continued implementation of a programme of ESHS training for all project personnel including SPV, EPC Contractor, subcontractors and supplier personnel. All personnel will be given ESHS induction and awareness training aimed at achieving 'buy-in' by workers. Key project personnel whose management roles or job responsibilities/activities may have an impact on the ESHS will also receive specific issue training as appropriate (e.g. in waste management, fuel handling etc). ESHS training will be provided at each stage of the Project, from the initial establishment facilities through to construction.

A key message in each of the ESHS training programmes will be the means, methods, and mechanisms to be employed in the monitoring and audit of ESHS management. The priority afforded to ESHS issues will be highlighted both through the content of the training courses and through the day-to-day scrutiny provided by ESHS teams.

Following general topics shall be covered by the training and awareness program of the project as a minimum:

- Environmental and Social Sustainability Policy, objectives and goals;
- Code of Conduct;

- Gender-Based Violence and Harassment;
- Land Acquisition; Land entry and exit requirements;
- ESHS organization and responsibilities;
- Project E&S impacts and risk;
- HSE Site Rules;
- Potential risk to worker's health and safety;
- Knowledge of materials, equipment and tools;
- General safety requirements;
- Firs aid;
- Personal protective equipment (PPE) requirements, wearing and use;
- Precautions to prevent exposure to key hazards;
- Basic hygiene requirements;
- Safe driving and transportation;
- Prohibited substances and activities;
- Pollution prevention;
- Waste management;
- Working in the vicinity of heavy machinery;
- Coordination of activities;
- Individuals' responsibilities;
- Environmental DO's and DON'Ts;
- Incident reporting;
- Accident/incident management;
- Communication;
- Emergency preparedness and response;
- Community relations;
- RAP implementation;
- Stakeholder Engagement Plan; and
- Grievance Mechanism.

II.3.1. Subcontractor Training Program

EPC Contractor will be responsible for ensuring that all construction personnel are aware of their ESHS responsibilities. Subcontractors will develop and implement an ESHS training programme to the satisfaction of the EPC Contractor.

The ESHS training program will ensure that all site personnel:

- fully understand the ESHS requirements of the Project and how they will be implemented and monitored on-site;
- fully understand the potential impacts of the Project, the mitigation measures that have been adopted to address those impacts and how and where to apply these measures;
- fully understand the ESHS sensitivities of the areas through which the motorway and other facilities will be constructed;
- fully understand the procedures to be followed in the event of a non-compliance with the ESHS requirements;
- fully understand the procedures for responding to the media, unauthorised visitors to the site, and enquiries from the public;
- know how to deal with unforeseen ESHS incidents; and
- are aware of the roles of the contractor staff with respect to ESHS issues

In addition to the induction program, EPC Contractor will ensure that all construction personnel attend regular site-specific ‘tool-box’ training sessions on ESHS issues throughout the term of the contract. This will include updates on specific local issues such as seasonal constraints, valuable crops or archaeological sites.

II.4 Documentation

The ESHS management activities will be documented and tracked to effectively manage the ESHS performance of the Project. Non-compliance observations, decisions on identified issues, solutions, corrective, and preventive actions taken and the results of these actions will be documented.

II.5 Checking and Corrective Action

Inspection and monitoring of the ESHS effects of construction activities will enable the effectiveness of ESHS mitigation to be evaluated; it will also allow ESHS problems to be identified and responded to at an early stage.

EPC Contractor will be responsible for the implementation of an appropriate inspection and monitoring programme to the satisfaction of SPV during construction phase. This will enable both parties to ensure the works are being carried out in accordance with the requirements of the ESMMP and ESIA and to identify and implement any possible improvements.

In addition, any monitoring requirements specified by regulatory authorities will be fully complied with by EPC Contractor and its subcontractors and suppliers.

EPC Contractor will be required to undertake appropriate pre-construction survey activities to ascertain the following:

- Land acquisition and land permit status of the Project site;
- Pre-construction quality of temporary and permanent access roads;
- The presence, status and extent of ecological resources;
- Location and suitability of existing licensed quarries, stockyards, and dumpsites; and
- Infrastructure surveys for buildings to be conducted by EPC (through independent experts) for all buildings that could be potentially affected by the project i.e., due to vibration and construction activities prior to land entry.

Monitoring results should be compared against relevant standards, permit requirements, required thresholds, received complaints, audit findings.

Both SPV and EPC Contractor will be required to demonstrate how the requirements of the ESMMP and ESIA are being complied with. This will include a programme of inspections and audits by both SPV and EPC Contractor. Site inspections and more formal audits by the SPV's ESHS Inspectors will be undertaken using pre-prepared audit protocols that reflect the requirements of the ESMMP and the ESIA.

Where issues of non-compliance are identified by either SPV or EPC Contractor's representative, they will be immediately reported to SPV, and corrective action will be identified by the SPV and representative in conjunction with the EPC Contractor.

II.5.1 Non-Conformity and Corrective Actions

All non-conformances identified during audits, inspections and monitoring activities will be recorded and followed up as non-conformity. Clear processes for actions stated in the SPV. ESMS Handbook will be followed.

Non-conformances are instances where Project compliance obligations (such as a legal requirement, or ESMS requirement) are not being fulfilled, or cannot be evidenced. Examples of non-conformity include, but are not limited to:

- Breach of an environmental and social standard;
- Commencement of works without an approved risk assessment and method statement that covers environmental issues and land permits identified herein;
- No review of risk assessment and method statements following any significant changes in requirements that could adversely impact the environment and people;
- Appointment of a waste transport/disposal service provider that is not appropriately licensed;
- Failure to comply with waste storage/disposal requirements as identified by risk assessment and/or method statement;
- Failure to comply with chemical storage and/or handling requirements;
- Un-containable or uncontrollable spills of fuels or chemicals;
- Undertaken works outside the scope defined within the risk assessment and method statement;
- Discharge of untreated, contaminated wastewater to the environment; and
- Nonconformity on labour requirements including presence of child/forced labour; lack of work permits and social security and overtimes below legal requirements.

Each non-conformance and near miss will be recorded utilizing a developed reporting process. All non- conformances and near misses shall include the following information:

- Location and description of the non-conformance and the criteria/requirement that has been breached;
- The proposed corrective action including who holds responsibility for undertaking this action;
- The proposed preventative action to ensure against reoccurrence of the non-compliance;
- Any required monitoring and follow-up; and
- Key performance indicators and a deadline for the successful completion of the corrective and preventive action.

II.5.2 Emergency Response

An Emergency Preparedness and Response Plan (EPRP) has been prepared and will be implemented, including requirements for coordination with the applicable external agencies (i.e., emergency services), impacted stakeholders and statutory authorities in the instance that an ESHS incident occurs.

The Emergency Preparedness and Response Plan consider:

- Internal and external roles and responsibilities;
- Emergency response plan contact information;
- Implementation of the EPRP including emergency procedures for different emergency scenarios;
- Drills that will be conducted;
- Training and competence of employees within the scope of emergency management;
- Information on assembly areas and emergency evacuation plans;
- Monitoring, verification and evaluation; and
- Institutions to visit in case of emergency

II.5.3 Management and Reporting of Incidents

The SPV will prepare an annual report to the public on environmental, health and safety performance and implementation of the action plans and grievance procedure.

In addition, the SPV will commit to the following external reporting:

- Incident Notification and Reporting:

  All environmental and social incidents will be appropriately documented, notified and reported in accordance with established procedures.

  Incident notification and reporting to relevant Turkish regulatory bodies will be performed in line with applicable legislation in force and as stipulated in permits and licenses.

  The SPV will notify the Lenders of incidents pursuant to the terms and conditions agreed upon in the Finance Agreements.

II.5.4 Stakeholder Engagement and Grievance Mechanism

A Stakeholder Engagement Plan has been prepared for the project, including a Grievance Mechanism (GM) both for project workers (internal GM) and for the public (external GM).

The SEP includes, among others, procedures for the stakeholder engagement activities:

- Stakeholder identification and analysis;
- Disclosure and dissemination of information;
- Consultation and participation;
- External and internal grievance mechanism; and
- Ongoing reporting to affected communities.

II.5.5 ESMS Communication

The ESMS will establish, implement, and maintain processes needed for internal and external communication relevant to environmental and social performance of the Project.

Associated processes will establish:

- What will be communicated;
- When it will be communicated;
- With whom to communicate; and
- How to communicate.

When establishing communication processes relevant to the ESMS, particular note will be made to compliance obligations, including any reporting requirements to the statutory environmental authority.

II.5.6 Data Management and Record Keeping

The implementation of the ESMS will generate data that will be required to be managed. The appropriate management of records is a requirement of any successful ESMS and can be used to track progress, review effectiveness and demonstrate compliance.

The ESMS relevant to both the construction, commissioning and operational phases should include the collation of the records including (but not limited to) the following:

- Environmental and social induction and training records;
- Relevant records of competence/qualifications;
- Accident investigation reports;
- Grievance register;
- Internal audits reports (including close-out);
- Non-conformance reports;
- Incident reports;
- Environmental & social inspection & audit reports (including corrective action reports);
- Environmental & social monitoring results;

- Environmental & social risk assessments and method statements;
- Equipment & social inspections/certifications;
- Independent audit reports for lenders (including corrective action reports); and
- Emergency events

II.5.7 Review of ESMS

Project ESMS documentation will be 'living' and will need to be reviewed and updated in relation to changes in project circumstances, activities, environmental sensitivities, and future requirements defined by respective regulatory authorities and Project Lenders.

The ESMS should be regularly reviewed according to any changes in construction, commissioning, or operational activities, new (applicable) regulation and in response to results from monitoring, audits and inspection. Reviews should be undertaken at a frequency to ensure the adequacy of the ESMS and to ensure that all potentially significant adverse impacts are identified and that associated control measures are appropriate to the Project.

III. Monitoring Action Plan

This section defines the monitoring parameters, monitoring frequency, and responsible parties for the mitigation measures detailed in the ESIA for the construction phase of the Project (see Table III-1).

III.1 Monitoring - ESMS

Table III-1. Monitoring Table for Environmental and Social Management System (ESMS)

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C1	C1.1. Policy and ESMP	-Project-specific Environment and Social Policy -Organizational Structure (number and CVs of the personnel employed under the Environmental and Social Interaction Department) -Periodical ESMP Performance Review and Monitoring Reports -Number of non-compliant situations -Project-specific Emergency Preparedness and Response Plan -Existence and validity of the legal environmental and health and safety permits -Number and scope of trainings, number of participants, training hours per employee, training materials, trainings provided to sub-contractors, etc. -Measures taken to ensure compliance of sub-contracts with ESMP measures	Project office	Document review	Monthly	SPV

III.2 Monitoring - Land Use and Property

Table III-2. Monitoring Table for Land Use and Property

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C2	C2.1. Forest lands	-Forestry permits/applications -Afforestation protocols made with the Ministry of Agriculture and Forestry -Area of lost forestland (in hectare) -Number of the trees cut -Records on forest fires (if any)	Project office	Document review	Weekly	SPV
	C2.2. Agricultural lands	-List of expropriated agricultural parcels (inc. information on area and characteristics of the land plot) -Site allocation documents for expropriated lands; bilateral agreements, commitment and consent letters for non-expropriated lands	Project office	Document review	Weekly	SPV
		-Grievances received in the subjects of crossing of the expropriation borders, start of activities on non-expropriated lands, etc.	Project office	Review of grievance logs	Weekly	SPV
		-Number of cut trees	Project office	-Review of design documents -Site audit -Review of grievance logs	Weekly	-SPV -EPC
	C2.3. Pasturelands	-Area and number of pasturelands for which land use permits taken	Project office	Document review	Weekly	SPV
	C2.4. State-owned lands	-Area and number of state-owned lands for which land use permits taken	Project office	Document review	Weekly	SPV

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
	C.2.5. Privately-owned lands	-List and number of expropriated private parcels (inc. information on area and characteristics of the land plot) -Site allocation documents for expropriated lands; bilateral agreements, commitment and consent letters for non-expropriated lands	Project office	Document review	Weekly	SPV
		-Number of grievances received in the subjects of crossing of the expropriation borders, start of activities on non-expropriated lands, etc.	Project office	Review of grievance logs		SPV

III.3 Monitoring - Topography and Soils

Table III-3. Monitoring Table for Topography and Soils

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C3	C3.1. Top soil management	-Grievances received in the subjects of crossing of the expropriation borders, start of activities on non-expropriated lands, etc.	-Expropriation boundaries	Site audit	Weekly	SPV
	C3.2. Earthworks	-Excavation and fill volumes (m^3) -Volume of reused materials (m^3) -Conditions at the storage sites - Inspection of dump sites and quarries	Excavated material storage sites (Km 52+544, Km 59+580, Km 61+500, Km 64+160, Km 71+800, Km 74+360, Km 76+240, Km 78+790, Km 86+340, Km 87+800, Km 95+410 , Km 95+410, Km 98+290, Km 100+000, Km 107+850, Km 110+820, Km 113+050, Km 123+000, Km 124+250, Km 127+000, Km 130+400, Km 132+720)	Site audit	Daily	-SPV -EPC -Sub-Contractor
		-Grievance	All active construction and camp areas, dump sites	Number of grievances received regarding to excavated material management, will be recorded.	Weekly	-SPV -EPC

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
	C3.3. Erosion	-Erosion control measures taken (drainage channels, barriers, settling structures, etc.) -Area of exposed lands at each camp sites (m^2)	Locations of exposed lands within the expropriation corridor	Site audit	Daily	-SPV -EPC -Sub-Contractor
	C3.4. Quarry	-Mining method applied -Blasting activities -Production amount (m^3/day) -Slope stability -Borders of the camp sites -Management of waste rock	Location of quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)	Site audit	Daily	-SPV -EPC -Sub-Contractor
	C3.5. Soil quality	-Number of spill/leakage incidents and corrective measures taken	-Camp Sites (Km 64+500, Km 87+800, Km 124+300) -Road construction sites -Quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)	Site audit	Daily	-SPV -EPC -Sub-Contractor

III.4 Monitoring - Waste management and Hazardous Material

Table III-4. Monitoring Table for Waste management and Hazardous Material

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C4	C4.1. Waste management	-Type (i.e. municipal, packaging, waste oil, etc.) and amount of wastes produced/disposed of	Camp Site-1 (Main) at Km 64+400, Camp Site-2 at Km 87+500, and Camp Site-3 at Km 124+300. Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300.	-Site audit -Document review	Monthly	-SPV -EPC -Sub-Contractor
		- Validity and completeness of waste management/disposal agreements with licensed companies			Before every waste transfer	
		- Review and implementation consistency of Waste Management Plans			Yearly	
		- Inspection and condition of Temporary Waste Storage Areas			Monthly	
		-Site practices on waste management (e.g. general housekeeping rules, source separation practice, containers, containment structures, etc.)	Camp Site-1 (Main) at Km 64+400, Camp Site-2 at Km 87+500, and Camp Site-3 at Km 124+300	Visual inspection	Daily	-SPV -EPC -Sub-Contractor

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
	C4.2. Hazardous Material	-List of hazardous materials/chemicals supplied, stored and used (inc. information on type and amount/volume)	Camp Site-1 (Main) at Km 64+400, Camp Site-2 at Km 87+500, and Camp Site-3 at Km 124+300. Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300.	-Site audit -Document review	Monthly	-SPV -EPC -Sub-Contractor
		Soil contamination risk from hazardous substances (e.g., fuel	Project area and sensitive receiving environments (e.g., soil, surface water)	Visual inspection for signs of leakage or spills; inspection of storage and handling practices; SDS and training record review	Daily	SPV EPC Subcontractors
		General site practices related to hazardous materials management	Entire construction corridor	Field observations on container integrity, spill kits, PPE use, and storage conformity	Weekly	SPV EPC Subcontractors
		Environmental enforcement actions and non-compliance records	Project area	Review of regulatory audit reports, notifications, and enforcement communications	Monthly	SPV EPC Subcontractors

III.5 Monitoring – Water Resources

Table III-5. Monitoring Table for Water Resources

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C5	C5.1. Water quality	Annex-5, Table 2 of the Regulation on the Surface Water Quality Regulation	-Receiving water bodies for treated wastewater discharges (Kaymazboğazı Stream)	-Water quality sampling, , laboratory analyses	Quarterly	-SPV -EPC - Acridities Laboratory
		Baseline monitoring surface and ground water quality measurement (Table 5, the Annex.5 of Regulation on Surface Water Quality, and IFC EHS Guideline Environmental Waste water and Ambient Water Quality)	ESIA baseline sampling points	Laboratory analyses	Annualy	-SPV -EPC
		Water supply point for humanitarian usage	Water quality sampling, laboratory analyses	Laboratory analyses	Quarterly	-SPV, -EPC, -Community Health Laboratory
	C5.2. Groundwater	- Groundwater usage permit - Water usage amount	Groundwater usage locations	-Water quality sampling, , laboratory analyses	Monthly	-SPV, -EPC,
	C5.3. Water supply	-Sources and amount of water supply -Water supply permits	All water usage areas (camp sites, concrete batching plants, dust suppression, etc.)	-Document review	Monthly	-SPV -EPC -Acridities Laboratory
		suppliers' water availability and capacity	Project office	Document review	Monthly	-SPV -EPC

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
	C5.5. Wastewater management	-Environmental permits for package domestic wastewater treatment plant discharges -Wastewater disposal agreements/channel connection permits to be done with municipalities -Capacity of package domestic wastewater treatment plant - Waste water treatment plant maintenance and inspection records	Package domestic wastewater treatment plants (Km 59+400, Km 64+500, Km 87+800, Km 124+300)	-Document review	Quarterly	-SPV, -EPC,
		Quality of treated wastewater from the discharge of package domestic wastewater treatment plants (Water Pollution Control Regulation (Table 21.1))	Camp Sites(Km 59+400, Km 64+500, Km 87+800, Km 124+300)	Water quality sampling, laboratory analyses	*In the period to be specified in the environmental permit	SPV, EPC, Accredited Laboratories
		Wastewater management practices at concrete plants	- -Concrete Plant locations (Km 55+450,00, Km 59+400,00, Km 80+400,00, Km 87+700,00, Km 89+700,00, KM 99+200,00, Km 123+900,00)	-Site audit -Document review	Weekly	-SPV -EPC
		(WWTP) Maintenance	WWTPs (Camp Sites(Km 64+500, Km 87+800, Km 124+300))	as per the Plan relevant part	Daily, weekly, annually	AAOİAŞ, EPC

III.6 Monitoring - Ecology and Biodiversity

Table III-6. Monitoring Table for Ecology and Biodiversity

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C6	C6.1.Terrestrial Flora	*Pyrus serikensis* species	Maquis and rocky habitats around flora sampling points 11 (X: 344079,Y: 4087799) and 36 (X: 339991,Y: 4090218)	-Site survey	Annual (timing to be determined by experts)	-SPV
		Endemic plant species	At the flora sampling point 11 (X: 344079,Y: 4087799) for *Sideritis congesta,* sampling point 11 (X: 344079,Y: 4087799) and 25 (X: 394464,Y: 4055587) for *Phlomis leucophracta*, sampling point 25 (X: 394464,Y: 4055587for *Phlomis lycia*, sampling point 28 (X: 335259,Y: 4093731) for *Phlomis nissolii*			
		Maquis, Arboreal Matorral and Thermo-mediterranean Scrub	Maquis habitats along the motorway, especially at the maquis assessed as critical.		One-off (timing to be determined by experts)	

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
	C.6.2. Terrestrial Fauna	*Lyciasalamandra atifi*	Coniferous forest habitats in the AoI at the elevation between 200-500m	-Site survey	Annual (timing to be determined by experts)	-SPV
		Lacerta pamphylica	Coniferous forest habitats in the AoI			
		Myotis capaccinii	Rocky areas, caves and flight corridors within the AoI, especially at the location of quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)			
		Rhinolophus mehelyi				
		Animal passes	Culvert locations along the motorway, Culverts are strategically positioned along the motorway, providing adequate passage for wildlife crossing.		-	
	C.6.3 Aquatic Flora/Fauna	*Alburnus baliki, Capoeta antalyensis, Oxynoemacheilus eregliensis, Pseudophoxinus fahrettini*	Locations where the motorway crosses surface running waters, at aquatic sampling points	Site survey	Annual (timing to be determined by experts)	-SPV

III.7 Monitoring – Air Quality

Table III-7. Monitoring Table for Air Quality

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C7	C7.1. Dust and gaseous emissions	-PM10 -PM2.5 -Settled dust -NOx, SOX, VOC	Sensitive Receptors considering all Project components including: Camp Site-1 (Main) at Km 64+400, Camp Site-2 at Km 87+500, and Camp Site-3 at Km 124+300. Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300. Bademliyar Quarry, Güçlüköy, Gençler, Taşkesiği Uzunlar, Hacıobası Districts, Saburlar, D-7 and Motorway Route -Villages where vehicles will pass while transporting materials (Bademliyar Quarry, Güçlüköy, Gençler, Taşkesiği Uzunlar, Hacıobası Districts, Saburlar, D-7 Locations)	-Site measurements	Quarterly or Upon Grievance	-SPV -EPC -Accredited laboratories
			-Hacıali Neighbourhood (Sensitive Receptor)	-Site measurements	Monthly and Upon grievance	

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
		-Number of water trucks -Frequency of road watering	-Camp Sites, road construction sites, quarries, stabilized roads	-Document review	Daily or more frequently	-SPV -EPC -Sub-Contractor
		-Grievances received on impacts related with dust, air emissions	Project office	-Review of grievance logs	Weekly	-SPV -EPC
	C 7.2 Emissions	-Exhaust emissions	-Project office	- Maintenance records	Annually	SPV
	C.7.3. Weather conditions and humidity	Weather conditions and humidity	High-risk area due to flammable material storage and close to the forest area	Weather forecast report checking	Daily during summer period	AAOİAŞ, EPC
	C.7.4. Roads surface integrity and any damage	Roads surface integrity and any damage	Vehicles	Measurement	Annually	EPC Environmental Eng.

III.8 Monitoring – Climate Change

Table III-8. Monitoring Table for Climate Change

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C8	C8.1 Emissions	-GHG emissions due to fuel consumption	-Project office	-Document review	Quarterly	SPV
		-Environmental permits for concrete plants, asphalt plants	-Project office	-Document review	Quarterly	SPV
		-Exhaust emissions	-Project office	- Maintenance records	Quarterly	SPV
	C8.2 Physical Risks	-Extreme Rainfall, Overflow and Floods -Wildfires -Cold Waves and Snowfall - Heatwaves	-Project office -On site	-Visual review	Daily	SPV
	C8.3 Transition Risks	-Policy and Legal Risks -Technology Risks -Market Risks -Reputational Risks	-Project office	-Document Review	Quarterly	SPV

III.9 Monitoring – Environmental Noise and Vibration

Table III-9. Monitoring Table for Environmental Noise and Vibration

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C9	C9.1. Environmental Noise	Environmental Noise (dBA)	Sensitive Receptors considering all Project components including: Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300.	-Site measurements (24 hour)	Quarterly/ Monthly and upon grievance (depending on the intensity of construction work and the sensitivity of location)	-SPV -EPC -Sub-Contractor -Accredited laboratories
			Sarıabalı District (Sensitive Receptor)		Quarterly/ Monthly and upon grievance (depending on the intensity of construction work)	
		Number of non-conformance records related to noise emission management	Project construction and operation areas	Review and control of non-conformance logs	Quarterly	Environmental Eng. (SPV) and Environmental Eng. (EPC)
		Statistics on the grievances received on impacts related with noise generation	Project office	-Review of grievance logs	Weekly	CLO - SPV and EPC

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
	C9.2. Vibration	Ground vibration value	Sensitive Receptors considering all Project components including: Borrow pits : Sarıabalı (AO-1) Borrow Pit at Km 53+800 and the Dikmen Borrow Pit at Km 83+000. Quarries: Çakış (TOY4a) Quarry at Km 56+500, the Kuruçay (TOY4b) Quarry at Km 58+500, the Bademliyar (TO2) Quarry at Km 104+750, the Uzunlar (TOY5) Quarry at Km 106+000, the Karakaya Quarry at Km 114+200, the Saburlar Quarry at Km 117+000, the Karamanlar Quarry at Km 119+500, and the Soğukpınar Quarry at Km 134+000. Asphalt plants: Asphalt Plant-1 at Km 59+400, Asphalt Plant-2 at Km 87+700, and Asphalt Plant-3 at Km 124+300. Concrete plants include Concrete Plant-1 at Km 55+450, Concrete Plant-2 at Km 59+400, Concrete Plant-3 at Km 80+400, Concrete Plant-4 at Km 87+700, Concrete Plant-4a at Km 89+700, Concrete Plant-5 at Km 99+200, and Concrete Plant-6 at Km 124+300. Mechanical plants: Mechanical Plant-1 at Km 59+400, Mechanical Plant-2 at Km 87+700, and Mechanical Plant-3 at Km 124+300.	-Measurement with vibrometer	Quarterly or Upon Grievance	-SPV -EPC -Sub-Contractor
		Number of non-conformance records related to vibration management	Project construction areas	Review and control of non-conformance logs	Quarterly	Environmental Eng. (SPV) and Environmental Eng. (EPC)
		Statistics on the grievances received on impacts related with blasting operations	Project office	-Review of grievance logs	Weekly	-SPV -EPC
	C.9.3. Noise and Vibration Training	Number of training sessions conducted	Project personnel and contractor workers	Tracking and recording training delivery	Quarterly	EPC E&S Manager / SPV Deputy E&S Manager

III.10 Monitoring – Cultural Heritage

Table III-10. Monitoring Table for Cultural Heritage

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C10	C10.1. Chance finds	-Employment data on cultural heritage expert/archaeologist -Number of chance finds procedure operated	Road construction sites	-Document review -Site audit	Weekly	SPV
	C10.2. Protected sites	Actions taken in accordance with the decisions of Conservations Boards (e.g. planning of bridges, embankments, etc.; number of georadar studies conducted, test or salvage excavations conducted, etc.)	Road construction sites	-Document review -Site audit	Quarterly	-SPV -EPC

III.11 Monitoring – Socio Economy

Table III-11. Monitoring Table for Socio Economy

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C11	C11.1. Employment	Employment statistics (direct and contracted workers, local/non-local/foreign)	Project office	-Document review	Monthly	SPV
		Employment agreements	Project office	-Document review	During the recruitment process	-SPV -EPC
	C11.2. Expropriation	-Agreement level for expropriation works -Number of court cases	Project office	-Document review	Monthly	SPV
	C11.3. Social responsibility/volunteer activities	Number and scope of social responsibility/volunteer projects/activities conducted	Project office	-Document review	Quarterly	SPV
	C11.4. Local Infrastructure	Local infrastructure (e.g. roads) relocated/maintained/improved	Project office	-Document review	Monthly	SPV
	C11.5. Land use restrictions	Locations and dimensions for culverts and underpasses that provide access to agricultural and/or pasturelands	Project office	-Document review -Site audit	Weekly	SPV

III.12 Monitoring - Health and Safety/Labour and Working Conditions

Table III-12. Monitoring Table for Health and Safety/Labour and Working Conditions

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C12	C12.1. Occupational Health and Safety/Labour and Working Conditions	-Number of work incidents/accidents/near misses -Number of personnel who are infected with an infectious disease -Source and quality of drinking water	-Project office -Camp Sites(Km 64+500, Km 87+800, Km 124+300)	-Document review	Weekly	-SPV -EPC
		-Use of PPEs -Health and safety signs -Fire safety equipment/systems -Accommodation conditions	-Camp Sites(Km 64+500, Km 87+800, Km 124+300) -Road construction sites - Quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)	-Site audit -Visual observation	Daily	-SPV -EPC
		Number of health and safety trainings provided	-Project office -Camp Sites(Km 64+500, Km 87+800, Km 124+300)	-Document review	Monthly	-SPV -EPC
		-Number of drills conducted	Project office	-Document review	Semi-annual	-SPV -EPC
		-Grievance mechanisms for Project personnel -Grievances received from Project personnel	Project office	-Document review	Weekly	-SPV
		Number of trainings conducted related to traffic	Construction camp and administrative offices	Tracking the number of Project personnel and contractor workers who have received training	Quarterly	-SPV -EPC

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
	C12.2. Community Health and Safety	-Employment data on the security personnel	-Project office -Camp Sites (Km 64+500, Km 87+800, Km 124+300)	-Document review	Weekly	-SPV -EPC
		-Trainings provided to security personnel			Quarterly	
		- Grievances received and replied to regarding the acts of security personnel			Weekly	
		Number of complaints received on traffic	Public relations records and grievance system	Logging and monitoring of grievances as per the Grievance Mechanism Procedure	Weekly	-SPV -EPC
		Certificates of operators and drivers	Relevant department	Certificates will be ensured by the relevant department	During the recruitment process	-SPV -EPC
		Number of Trainings, participants, Conducted	Project personnel and contractor workers receiving training	Review of training records	Monthly	-SPV -EPC

III.13 Monitoring - Visual Aesthetics

Table III-13. Monitoring Table for Visual Aesthetics

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C13	C13.1. Visual Disturbance	-Visual barriers	-Camp Sites(Km 64+500, Km 87+800, Km 124+300) Quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000) -The settlements that are classified as the fully visible (Aşağıçatma, Çakallar, Kayaburnu, Kızılot, Kökez, Merkez (Serik), Sarılar, Soğukpınar, Sülek, Üründü, Uzunlar)	-Site audit -Review of grievance logs	Monthly	SPV

III.14 Monitoring - Public Consultation

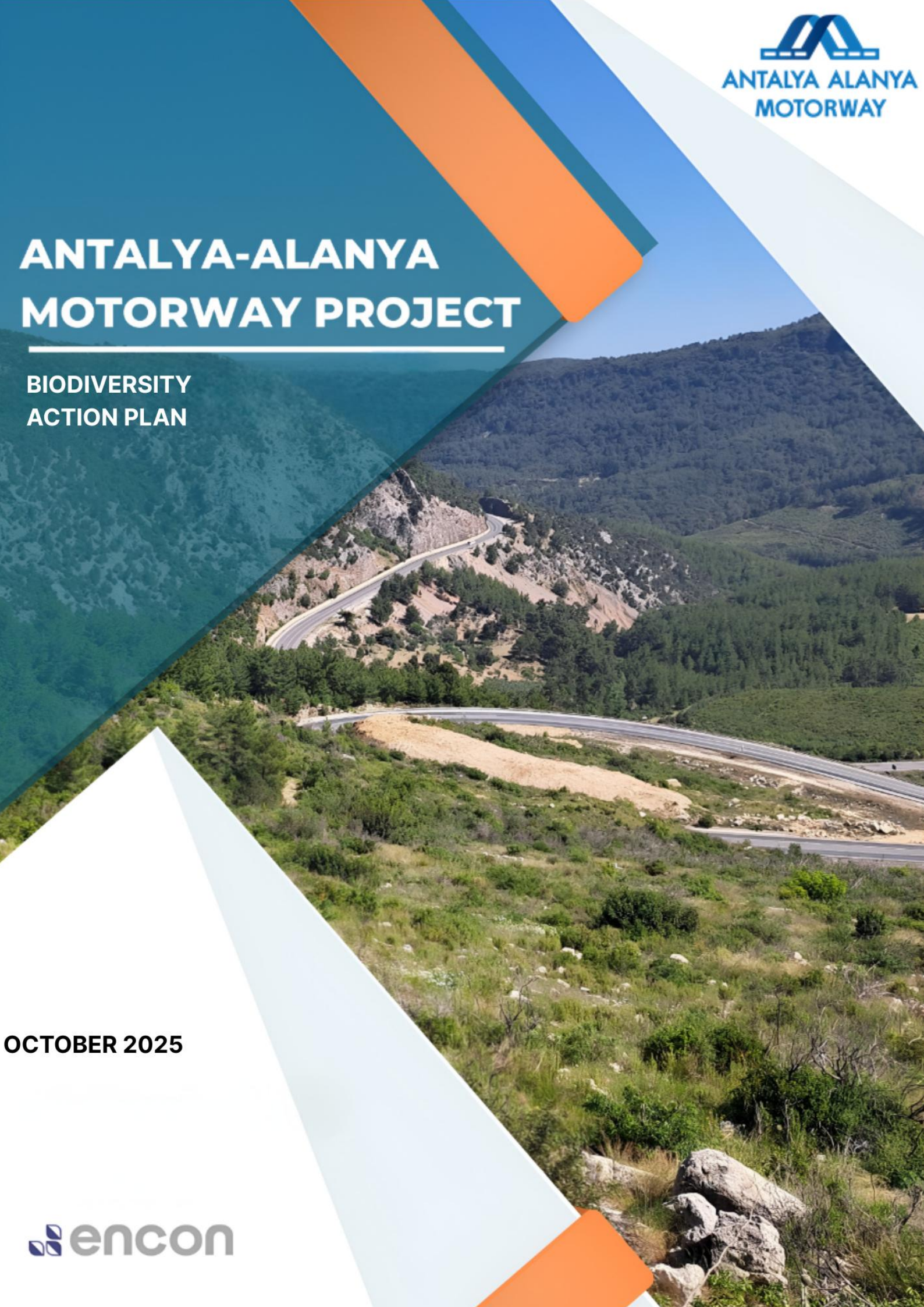
Table III-14. Monitoring Table for Public Consultation

No	Sub-topic	Monitoring Parameter	Monitoring Station/Location	Monitoring Method	Monitoring Frequency	Responsibility*
C14	C14.1. Stakeholder Engagement	-Implementation of Stakeholder Engagement Plan -Number of stakeholder engagement activities/events conducted -Presence and functionality of Project web-site	Project office	-Document review	Weekly	-SPV - EPC
	C14.2. Grievance Mechanism	-Statistics on the grievances received and solved	Project office	-Document review -Media screen	Monthly	SPV

ANTALYA ALANYA MOTORWAY

ANTALYA-ALANYA MOTORWAY PROJECT

BIODIVERSITY ACTION PLAN



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LIST OF ABBREVIATIONS

AFAD	Disaster and Emergency Management Presidency
AoI	Area of Influence
AZE	Alliance for Zero Extinction
CEKUL	Foundation for the Protection and Promotion of the Environment and Cultural Heritage
CIMER	Presidency's Communication Center
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DSI	General Directorate of State Hydraulic Works
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EFPIs	Equator Principles Financial Institutions
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Programme
ENCON	ENCON Environmental Consultancy Co.
ESF	Environmental and Social Framework
ESHS	Environmental, Social Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Monitoring Report
ESMS	Environmental and Social Management System
EU	European Union
EUAS	General Directorate of Electricity Generation Corporation
GBV	Gender-Based Violence
GHG	Green House Gas
GIIP	Good international Industry Practice
GIS	Geographical Information System
GP	Good Practices
GRM	Grievance Redress Mechanism
IAPCR	Industrial Air Pollution Control Regulation
IBA	Important Bird Area
IFC	International Finance Corporation
ILO	International Labor Organization
IPA	Important Plant Area
IPCC	Intergovernmental Panel on Climate Change
ISKUR	General Directorate of Turkish Employment Agency

IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
KGM	General Directorate of Highways
LACRP	Land Acquisition, Compensation, and Resettlement Plan
LARPF	Land Acquisition and Resettlement Policy Framework
LRP	Livelihood Restoration Plan
MoAF	Ministry of Agriculture and Forestry
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoLSS	Ministry of Labor and Social Security
MTA	General Directorate of Mineral Research and Exploration
NGOs	Non-Governmental Organizations
O&M	Operations and Maintenance
OHS	Occupational Health and Safety
OP	Operational Policies
PAP	Project Affected Person
PIF	Project Introduction File
PIU	Project Implementation Unit
PM_{10}	Particulate matters with aerodynamic diameter smaller than 10µm
$PM_{2.5}$	Particles with aerodynamic diameter smaller than 2.5µm
PMU	Project Management Unit
PS	Performance Standard
RP	Resettlement Plan
RAP	Resettlement Action Plan
SAoI	Social Area of Influence
SCM	Stakeholder Consultation Meeting
SEA/SH	Sexual Exploitation and Abuse / Sexual Harassment
SEP	Stakeholder Engagement Plan
SEPA	Special Environmental Protection Areas
TEIAS	General Directorate of Electricity Transmission Company
The Project	Antalya-Alanya Motorway Project
TURKSTAT	Turkish Statistical Institute, TUİK
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
US EPA	United States Environmental Protection Agency
WB	World Bank
WBG	World Bank Group

EXECUTIVE SUMMARY

This Biodiversity Action Plan (BAP) has been prepared to support Antalya-Alanya Motorway Project (referred to as "the Project") and offers a detailed framework to mitigate potential ecological impacts associated with the highway's construction and operation. The BAP aims to ensure the Project's compliance with the international biodiversity standards, especially IFC Performance Standard 6 (PS6).

The BAP employs an adaptive management strategy, incorporating long-term monitoring to evaluate the effectiveness of mitigation measures and address any unforeseen challenges. Monitoring programs will assess habitat quality, species populations, and ecosystem changes during both the construction and post-construction phases, with annual reports detailing progress and outcomes. Stakeholder engagement is a key component of the BAP, with planned collaboration with local communities, conservation NGOs, and academic institutions. These partnerships are designed to raise awareness, strengthen conservation efforts, and ensure the long-term sustainability of the measures implemented.

The project area encompasses a variety of sensitive and diverse habitats, including rocky cliffs, Mediterranean scrublands, wetlands, and agricultural landscapes. These habitats host a wide range of flora and fauna, including endemic, migratory, and threatened species. Notably, this includes flora species like *Pyrus serikensis* and fauna species *Lyciasalamandra atifi*, which are endemic to the region. The BAP provides detailed action plans aimed at minimizing potential impacts on these species and habitats, with an emphasis on reducing disturbances, preserving connectivity, and improving habitat conditions. Pre-construction surveys have established the baseline ecological data, highlighting important habitats and species distributions. Mitigation strategies involve avoiding critical habitats and implementing construction activity restrictions during sensitive periods, such as animal hibernation, breeding, or migration. Prior to construction, an expert (Biodiversity Specialist) will evaluate whether any sensitive situations are present in the construction area. Based on these findings, decisions will be made regarding the necessity of imposing restrictions. Habitat restoration initiatives will focus on replanting native vegetation, stabilizing soil, and rehabilitating impacted areas to restore ecological integrity.

By balancing developmental goals with ecological considerations, the Antalya-Alanya Motorway Project reaffirms its commitment to biodiversity conservation. This BAP not only ensures adherence to environmental standards but also serves as a model for integrating conservation into infrastructure development projects in ecologically sensitive areas.

This BAP incorporates a Biodiversity Monitoring and Evaluation Programme developed in accordance with IFC PS6 and GN6. This programmes primary purpose is to systematically monitor the condition of key biodiversity components, assess the effectiveness of BAP measures integrated into project activities, and evaluate their performance in mitigating human-induced impacts. A Biodiversity Monitoring and Evaluation Plan (BMEP) will be developed at a later timeframe.

INTRODUCTION

I.1. Purpose of the BAP

The Biodiversity Action Plan prepared based on the analysis of the outcomes from the Project's Critical Habitat Assessment (CHA) and. It consolidates the biodiversity and ecosystem service mitigation measures for specific biodiversity features identified in the CHA for the Project.

Based on the findings of the ESIA and CHA, Critical Habitats have been identified. The residual impacts during the construction phase are considered negligible or minor once the mitigation hierarchy is fully implemented. The primary goal of this BAP is to provide detailed justification for the on-site restoration activities (included within the mitigation hierarchy) aimed at achieving non-significant residual impacts on CH, as well as to propose additional or complementary measures designed to achieve a net gain for certain CH features.

The main objectives of the BAP are as follows:

- Identification of biodiversity values
- Development of mitigation measures
- Establishment of a monitoring framework
- Impact net loss calculations
- Stakeholder engagement

Biodiversity Action Plans (BAPs) are dynamic documents that should include agreed timelines for regular reviews and updates, reflecting new information, project progress, and evolving conservation contexts. The BAP will be updated as needed with respect to critical habitats, *Pyrus serikensis* and *Lyciasalamandra atifi*, and/or on a semi-annual basis if no updates are required.
If project mitigation measures are included in the ESIA or Biodiversity Management Plan (BMP), these should be referenced within the BAP. Unlike the BMP, which is primarily an operational document for site managers and contractors, the BAP typically covers actions for off-site areas, such as offsets and additional activities, and engages external partners, including implementing organizations, reviewers, or advisors. The BAP may also be supplemented by other documents, like an Offset Management Plan or Biodiversity Monitoring and Evaluation Plan (BMEP), which will be referenced once developed. Depending on the project's scale and nature, an initial BAP may outline a strategy and timeline for identifying actions aimed at achieving a net biodiversity gain.

Limitations

During the Lender's review of the CHA/ESIA and the current BAP, further revisions were made to the BAP based on the findings from these documents regarding Critical Habitat triggers and the additional mitigation measures outlined.

I.2. Scope of the BAP

The BAP aims to identify opportunities for no net loss or net gain through the following studies:

- **Confirmation of the insignificance of residual impacts on Critical Habitat features:** Based on the updated ESIA report, avoidance, minimization, mitigation, and restoration measures have been identified for these features to ensure residual impacts are non-significant. To support the understanding and detail of the mitigation hierarchy, particularly

regarding on-site replanting of CH species to achieve no net loss, habitat mapping was conducted. This map, created using satellite/aerial imagery, identifies the habitats within the expropriation corridor. The results of the mapping will help estimate the amount of habitats that need to be restored.

- **Identification of Biodiversity Offsets: Proposed compensation/offsets include:**

  i. Restoration/recovery offsets outside the project's expropriation corridor (not applicable here as all restoration can take place within the corridor).
  ii. Offsets through habitat restoration/recreation within the road RoW as compensation for permanent habitat losses, to meet NNL (for PBFs) and NG objectives (for CH).
  iii. Identification of Complementary Measures: Also referred to as Additional Conservation Actions (ACA), these are not primarily focused on achieving NNL or NG objectives but may contribute to NG, even though they are difficult to quantify or measure in practice.

I.3. Associated Documents

The Biodiversity Action Plan (BAP) for the project is closely connected to several key documents that serve as both the foundation for its development and the means to ensure its successful implementation. These documents work together to manage biodiversity conservation, environmental protection, and social impact mitigation throughout the project's lifecycle. Below is a summary of these important documents:

- Environmental and Social Impact Assessment (ESIA) Report
- Biodiversity Management Plan (BMP)
- Critical Habitat Assessment (CHA)
- Relevant Baseline Studies

RELEVANT STANDARTS AND GUIDELINES

This chapter describes the institutional framework in Türkiye and identifies the national environmental legislation, international agreements and protocols and international environmental and social standards including European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy and Performance Requirements (PRs) and International Finance Corporation's (IFC) Policy and related Performance Standards (PSs) on Environmental and Social Sustainability that would be applicable to the Project.

The ecology assessment has considered relevant Turkish (national) legislation, applicable standards and guidelines for international finance, and international agreements to which Türkiye is a signatory.

Internationally accepted criteria are considered while choosing sampling points in the study area together with the species characteristic and habitat needs. This were done by overlaying the Project Area with the distribution of species of conservation concern; with sites identified as globally important for migratory species (e.g. IBAs, RAMSAR sites), national parks, protected areas, and key biodiversity areas.

I.4. International Agreements

In evaluating the threat/protection status of species; CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), Bern Convention, and IUCN (International Union for Conservation of Nature) Red List Database were used. Additionally, hunting status of all fauna elements was determined according to 2024-2025 Decision of the Central Hunting Commission (CHC) of Türkiye.

Species covered in CITES are given under three different appendices according to their conservation status. Appendix I cover the species, which are under the threat of extinction. Trade in the specimens of these species is not allowed except extraordinary circumstances. Appendix II includes species, which are not threatened with extinction, but trade in specimens is restricted in order to prevent utilization incompatible with their survival. Appendix III includes species, for which other parties of CITES is applied for assistance in controlling trade and which are conserved at least in one country.

Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention) provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Türkiye became a contracting party in 1994.

BERN Convention aims at conserving and promoting biodiversity, developing national policies for the conservation of wild flora and fauna and their natural habitats, protection of the wild flora and fauna from the planned development and pollution, developing trainings for protection practices, promoting and coordinating the research made regarding this subject. It has been signed by 26 member states of the European Council (as well as Türkiye) with the aim of conserving the wildlife in Europe. Species that are protected under the Bern Convention are classified according to the following categories:

- Appendix I: Strictly protected flora species
- Appendix II: Strictly protected fauna species
- Appendix III: Protected fauna species

All the nations, which are party to the BERN Convention, have signed the Convention on Biological Diversity as well. These parties are responsible from ensuring sustainable use of resources in line with their national development trends and conserving threatened species.

To determine the threatening status of species IUCN classifications are also used, which are used in Turkish classification as well. IUCN Red List is published to highlight those species that are facing a risk of extinction. A species may be listed in IUCN Red List after studies on its population decrease. Thus, since IUCN List is based on research (annual updates are being made for species lists of countries), many countries attach more importance to species taking place in IUCN list than species taking place in Bern List.

As an environmental treaty of the United Nations, CMS provides a global platform for conserving and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range.

As the only global convention specializing in the conservation of migratory species, their habitats, and migration routes, CMS complements and co-operates with a number of other international organizations, NGOs, and partners in the media as well as in the corporate sector.

Migratory species threatened with extinction are listed in Appendix I of the Convention. CMS Parties strive to strictly protect these animals, conserve or restore the places where they live, mitigate obstacles to migration, and control other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species.

Migratory species that need or would significantly benefit from international cooperation are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional agreements.

I.5. Turkish Legal Requirements

It is the responsibility of the Ministry of Agriculture and Forestry (MoAF), together with the MoEUCC and their affiliated organizations to formulate policies concerning the conservation of biodiversity in Türkiye designate and manage protected areas, to develop and implement plans and programmes, to carry out activities in this scope and to provide coordination among all relevant institutions.

The affiliated organizations of the MoAF are the Special Environmental Protection Agency, the General Directorate of Forestry, the General Directorate of the State Meteorological Service, and the General Directorate of State Hydraulic Works. The provincial organization of the MoAF consists of the Provincial Directorates of Agriculture and Forestry, as well as the regional directorates of the affiliated organizations.

The MoAF’s unit with primary authority and responsibility for the conservation and sustainable use of biological diversity is the General Directorate of Nature Conservation and National Parks, which is also the CBD focal point. The General Directorate of Nature Conservation and National Parks is the principal unit responsible for the management of protected areas designated under the National Parks Law, for the conservation of wildlife and for the regulation and supervision of terrestrial hunting.

The Central Hunting Commission (CHC) is established under the Terrestrial Hunting Law and includes members from MoAF and General Directorate of Nature Conservation and National Parks, Directorate of Hunting and Wildlife, universities, Ministry of Food, Agriculture and Livestock, non-governmental organizations, hunting associations and Gendarmerie General Command. CHC prepares a resolution every year and this resolution is published in the official gazette. The recent resolution covers the hunting season for 2024-2025. These resolutions define hunting periods, limits (in terms of number of individuals that can be hunted and dates for hunting), areas where hunting is banned, as well as the

species that can and cannot be hunted. Thus, CHC resolutions provide some measure of regulation over the exploitation of wildlife within Türkiye. In this regard, according to 2024 and 2025 Resolutions of the CHC appendixes are as follows:

- Appendix I; Includes game animals which are protected by the CHC
- Appendix II; Includes game animals which are allowed to be hunted in seasons predefined by CHC

The legislation listed in Chapter II, provide some areas protection status based on the presence of significant biological diversity, local endemics of importance, and threatened species. These designations include Natural Protected Sites, National Parks, Nature Protection Areas, Wildlife Protection and Development Sites and Specially Protected Areas.

Activities in such designated areas are also covered various regulations, but these areas are not specifically provided a protection status. In Türkiye, there is no conservation status for habitats as defined by a specific vegetation as there is provided in European Union (EU) countries where the EU Habitats Directive applies. In Türkiye, there is no specific habitat compensation requirement. There is only a policy regarding forested areas, which aims to replant at least as much of the forest area that is lost due to development activities.

I.6. Standards and Guidelines for International Requirements

The Project is committed to implementing the IFC Performance Standards (PS) in order to manage social and environmental risks and impacts. IFC PS6 covers areas of biodiversity conservation, ecosystem services and sustainable management of living resources, which are all fundamental to achieve sustainable development. The objectives of PS6 are outlined as follows:

- To protect and conserve biodiversity.
- To maintain the benefits from ecosystem services; and
- To promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.

The requirements of PS6 are applied to projects: (i) located in modified, natural, and critical habitats; (ii) that potentially impact on or are dependent on ecosystem services over which the client has direct management control or significant influence; or (iii) that include the production of living natural resources (e.g. agriculture, animal husbandry, fisheries and forestry) based on the risks and impacts identification process.

Ecosystem Services Review

Ecosystem Services Review (ESR) was prepared in relation to the IFC Biodiversity Conservation and Sustainable Management of Living Natural Resources Guidance Note 6 requirements to determine ecosystem services to The Project.

The overall aim of the ecosystem service concept is to bring a holistic approach to environmental decision-making by valuing the environment in terms of the benefits people obtain from ecosystems. It is practical and pragmatic, focusing on goals that provide greatest environmental benefit at least cost to society and the natural environment with the aim of avoiding taking decisions with unintended secondary consequences that may be costly, increase risk or be detrimental to ecosystems and human well-being. The evaluation of the effects, both desirable and undesirable, of approaches to

landscape management on the delivery of ecosystem services allow for a broader assessment of the true costs and benefits of actions and policies.
In addition, when the projects may affect ecosystem services of relevance to local people, Affected Communities attached to biodiversity and ecosystem services will participate in the determination of priority ecosystem services in accordance with the stakeholder engagement process which is one of the key means to understanding impacts on biodiversity and identifying appropriate responses to such impacts as defined in IFC Performance Standard.

I.7. Critical Habitat Assessment Process

Critical habitats are areas with high biological diversity value. Their identification is based on the following key criteria:

- i) Habitats supporting Critically Endangered and/or Endangered species.
- ii) Habitats of significance for endemic and/or range-restricted species.
- iii) Habitats that support globally important populations of migratory species and/or are crucial for migratory corridors.
- iv) Highly threatened and/or unique ecosystems.
- v) Areas associated with key evolutionary processes.

These criteria are essential for determining critical habitats and ensuring their protection and conservation within the scope of ecosystem assessments and environmental management planning.

The criteria for critical habitats are defined according to IFC PS6, 2012, as follows:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species
- Criterion 2: Endemic and/or restricted-range species
- Criterion 3: Migratory and/or congregation species
- Criterion 4: Highly threatened and/or unique ecosystems
- Criterion 5: Key evolutionary processes

Projects located in areas with high biological diversity value, recognized at the national and/or international level, may require a critical habitat assessment. These areas include:

- IUCN Protected Area Categories: Ia (Strict Nature Reserves), Ib (Wilderness Areas), and II (National Parks).
- Key Biodiversity Areas (KBA) and Important Bird and Biodiversity Areas (IBA).

A critical habitat assessment is essential for ensuring that project activities do not negatively impact these ecologically significant areas, and that conservation measures are integrated into project planning and implementation.

I.8. Mitigation Hierarchy

According to IFC PS6, the project is required to fully implement the mitigation hierarchy (Figure 0.1). To apply this hierarchy in line with Performance Standard 6, an evaluation of the project's Area of Influence within the existing landscape -along with any related facilities- can help guide the identification, screening, and design of alternatives as part of the avoidance process. Mitigation

measures should be developed or reviewed by qualified biodiversity and engineering experts to ensure their optimization in accordance with the hierarchy.

In cases where significant residual impacts on biodiversity remain, and only after the previous steps of the mitigation hierarchy have been thoroughly assessed and, where feasible, applied, the client may consider using biodiversity offsets as compensation.

Avoidance	Actions taken to prevent the irreversible loss of biodiversity or essential ecosystem services. This may involve alternatives such as site selection, design modifications, and scheduling changes.
Minimization	Efforts to reduce or limit the duration, intensity, and/or extent of impacts that cannot be avoided. Alternatives include physical controls, operational adjustments, and abatement measures.
Restoration	When biodiversity or ecosystem services have been impacted, remediation involves efforts such as rehabilitation and restoration. Alternatives may include re-establishing habitats, restoring biodiversity values, and revitalizing ecosystem services.
Offset	Measures taken to compensate for any residual impacts that cannot be avoided, minimized, or remedied on-site. This can include restoration offsets and averted loss offsets.

Figure 0.1 Mitigation Hierarchy

I.9. No Net Loss and Loss-Gain Assesment

Biodiversity Net Gain (BNG) is a metric used to assess the impact of a development project on biodiversity. The goal is to ensure that, as a result of the development process, biodiversity achieves a net positive outcome compared to its initial state. If biodiversity is lost, it is considered a net loss.

The principle of biodiversity balance is based on achieving no net loss of biodiversity. This means that the biodiversity gains from conservation efforts must offset the biodiversity losses caused by a specific project. In this approach:

- No Net Loss occurs when the biodiversity gains from conservation activities are equal to the biodiversity losses caused by the project, ensuring no overall decline in species, population sizes, or habitat conditions.
- Net Loss refers to a situation where biodiversity and its components are in a worse state than before the project.
- Net Gain occurs when the biodiversity benefits surpass the biodiversity losses, leading to an overall improvement in biodiversity.

This BNG framework is crucial for sustainable development and ecological compensation strategies, ensuring that biodiversity conservation are integrated into project planning and implementation.

PROJECT DESCRIPTION

Antalya-Alanya Motorway Project (the Project) is one of the two sub-projects that constitute the Afyonkarahisar-Alanya Motorway Project and is designed to connect Serik and Alanya districts through Manavgat district of Antalya province (Figure 0.1). The Project will enhance the existing transportation network services with surrounding provinces (Burdur, Muğla, Konya, Isparta, Karaman and Mersin). Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM.

According to the current design (as of July, 2024), total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

Table 1 provides the approximate distances of the Motorway according to the current design.

Table 1. Information of the Motorway

Start Location	End Location	Main Road (Motorway)	Access Roads	Total
Km 52+000	Km 136+000	84+000	33+800	117+800

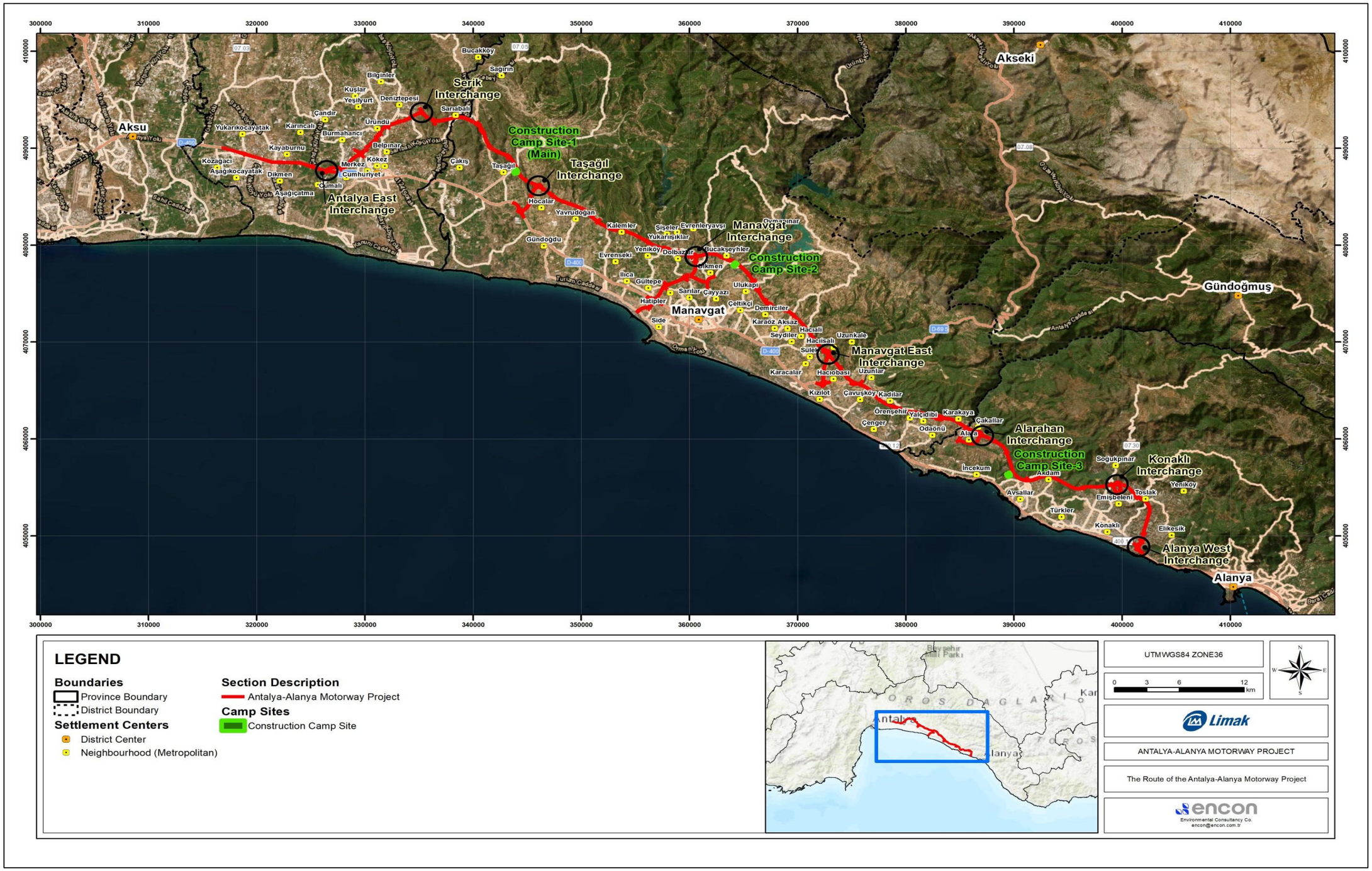

Figure 0.1. The Route of the Antalya-Alanya Motorway Project

FINDINGS OF BIODIVERSITY BASELINE

I.10. Protected Areas

Internationally recognized areas are situated in the vicinity of the Project Area, which spans the provinces of Antalya and Mersin. These include Key Biodiversity Areas (KBAs) and Important Bird Areas (IBAs), both of which are identified as critical for supporting biodiversity. A total of 16 internationally recognized areas have been identified; however, no RAMSAR sites are located within or near the Project Area. Studies have shown that parts of the Antalya Plains (designated as both a KBA and IBA) and Kızılot (KBA) fall within the boundaries of the Project Area.

The Project Area also overlaps with a portion of the Belek Special Environmental Protected Area. Designation criteria of SEPAs are based on the relevant Biodiversity Protocols of the Barcelona Convention, Bern Convention, Ramsar Convention and the Convention of Biodiversity commitments for endangered species, etc.

Another nationally protected area that intersects with the Project Area is Köprüçay Basin Natural Protected Area.

I.11. Natural and Modified Habitats

As part of the ESIA, the extent of both natural and modified habitats was evaluated. The Critical Habitat Assessment utilized the relevant Ecologically Appropriate Area for Analysis (EAAA) for the different habitats and species considered.

Modified habitat corresponded to terrestrial habitat types including:

- J1 - Buildings of cities, towns and villages
- V1 - Arable land and market gardens

Natural habitat corresponded to terrestrial habitat types (though as already described, in various states of degradation) including:

- C2 - Surface running waters
- G1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix
- S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub
- S6 - Garrigue
- T1.4 - Mediterranean and Macaronesian riparian forest
- T3 - Coniferous forest

The results identified that habitats within the expropriation corridor and its wider area (400 m buffer) corresponded mostly to modified habitat, whereas patches of natural habitat types composed the rest.

The areas and percentages of EUNIS habitat types within the project study area are given in Table 2. Maps showing the habitat types in the project area are given in Figures 1 to 2.

Table 2. EUNIS Habitat Types within the Project Study Area

EUNIS Habitat Code	EUNIS Habitat Type	Antalya-Alanya Motorway Project		
		Area (m2)	Area (ha)	Percent (%)
Natural Habitats				
C2	Surface running waters	366,990	37	0.5
S5	Maquis, arborescent matorral and thermo-Mediterranean scrub	3,471,732	347	5.1
S6	Garrigue	4,468,176	447	6.5
S7.211	Aegean Sarcopoterium phrygana	1,711,883	171	2.5
T3	Coniferous forest	10,920,452	1,092	15.9
T14	Mediterranean and Macaronesian riparian forest	938,560	94	1.4
Total Natural habitats		**21,510,803**	**2,188**	**31.8**
Modified Habitats				
J2.1	Scattered residential buildings	3,652,374	365	5.3
J2.3	Rural industrial and commercial sites still in active use	1,547,256	155	2.3
J4.2	Disused road, rail and other constructed hard-surfaced areas	1,037,945	104	1.5
V1	Arable land and market gardens	16,700,514	1,670	24.4
V1	Arable land and market gardens (Greenhouse)	8,967,905	897	13.1
V12	Mixed crops of market gardens and horticulture	14,777,540	1,478	21.6
Total Modified Habitats		**46,683,534**	**4669**	**68.2**
TOTAL		**68,561,327**	**6,856**	**100**

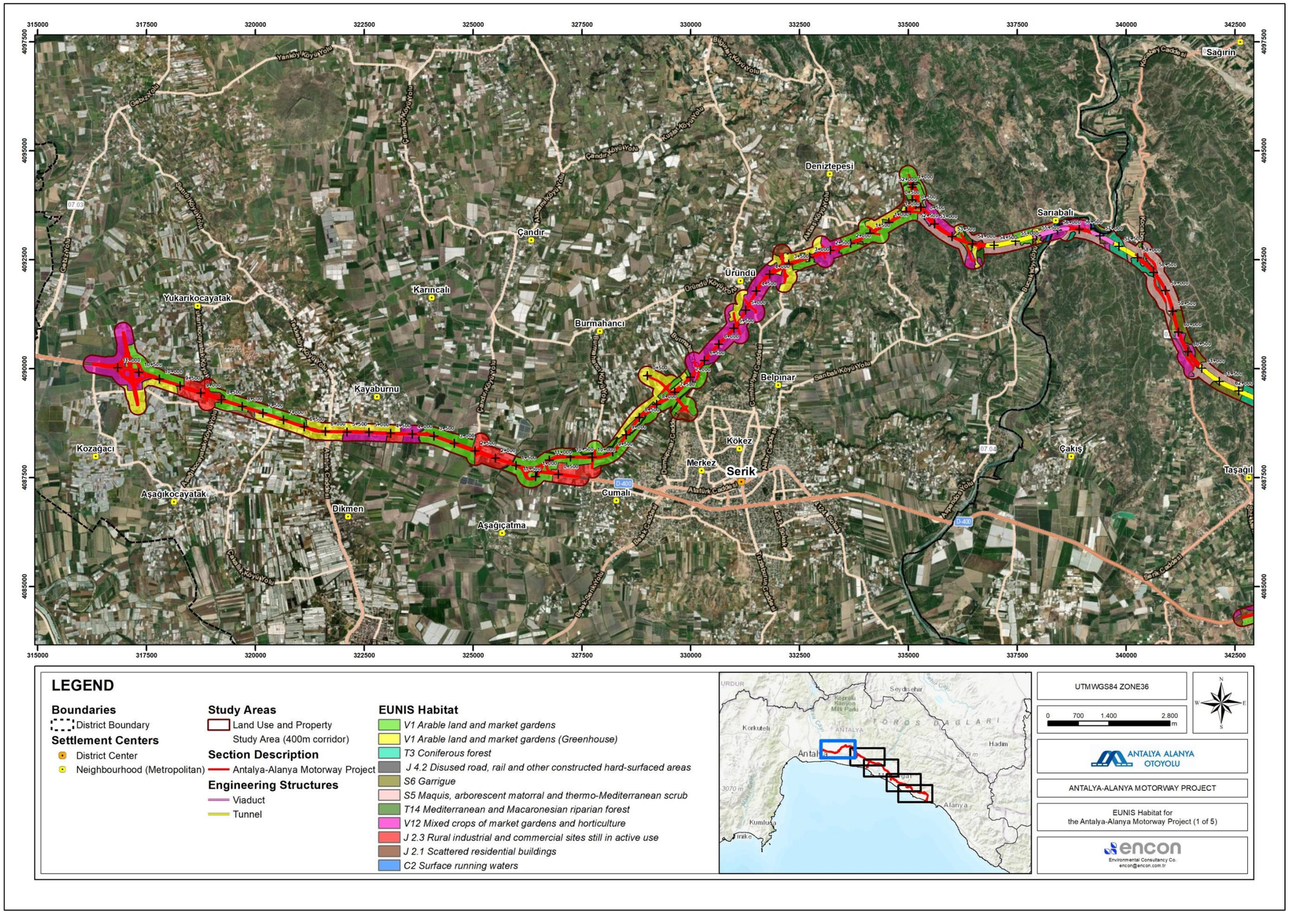

Figure 0.1. EUNIS Habitat Types within the Project Area (Part 1 of 5)

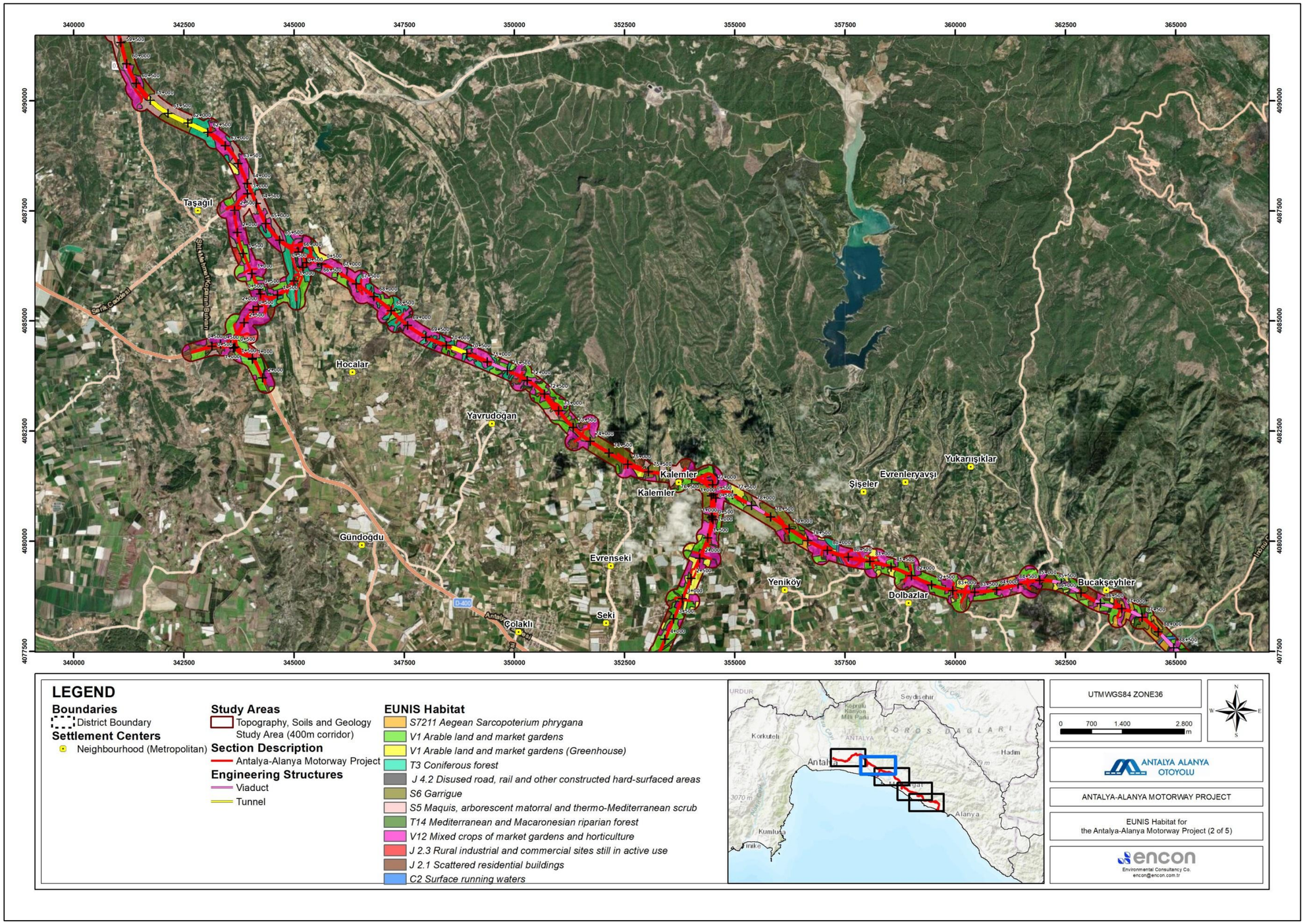

Figure 0.2. EUNIS Habitat Types within the Project Area (Part 2 of 5)

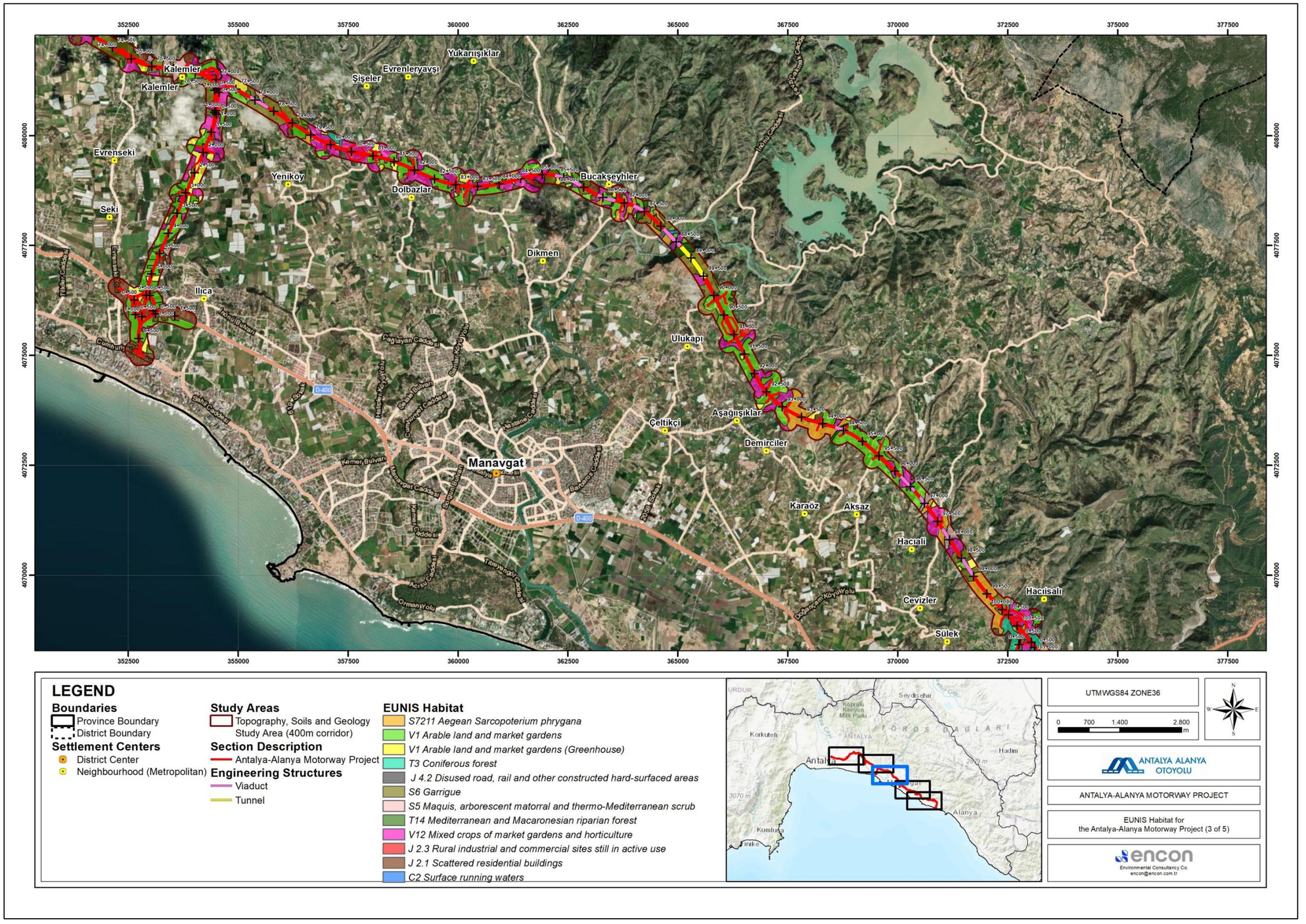

Figure 0.3. EUNIS Habitat Types within the Project Area (Part 3 of 5)

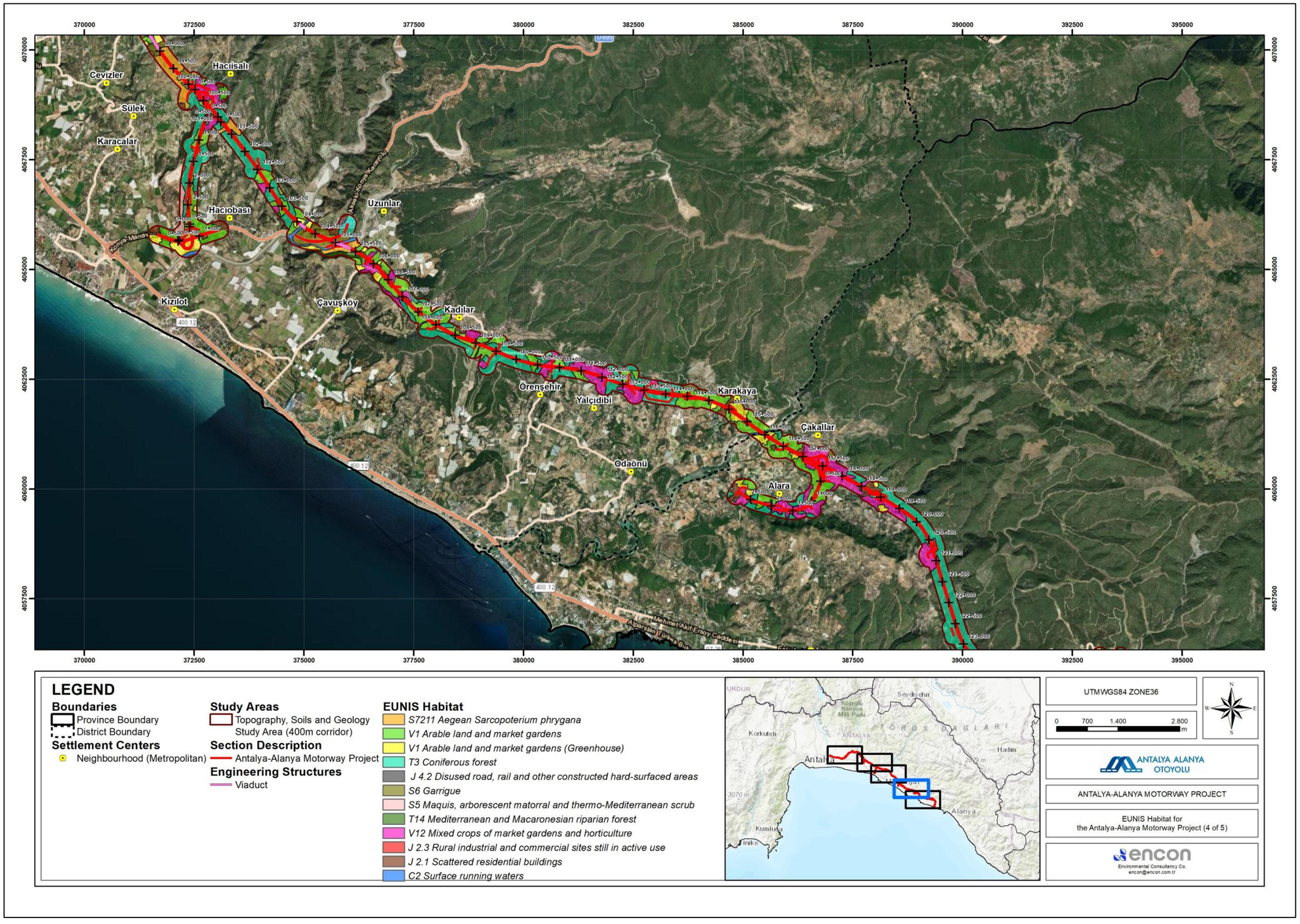

Figure 0.4. EUNIS Habitat Types within the Project Area (Part 4 of 5)

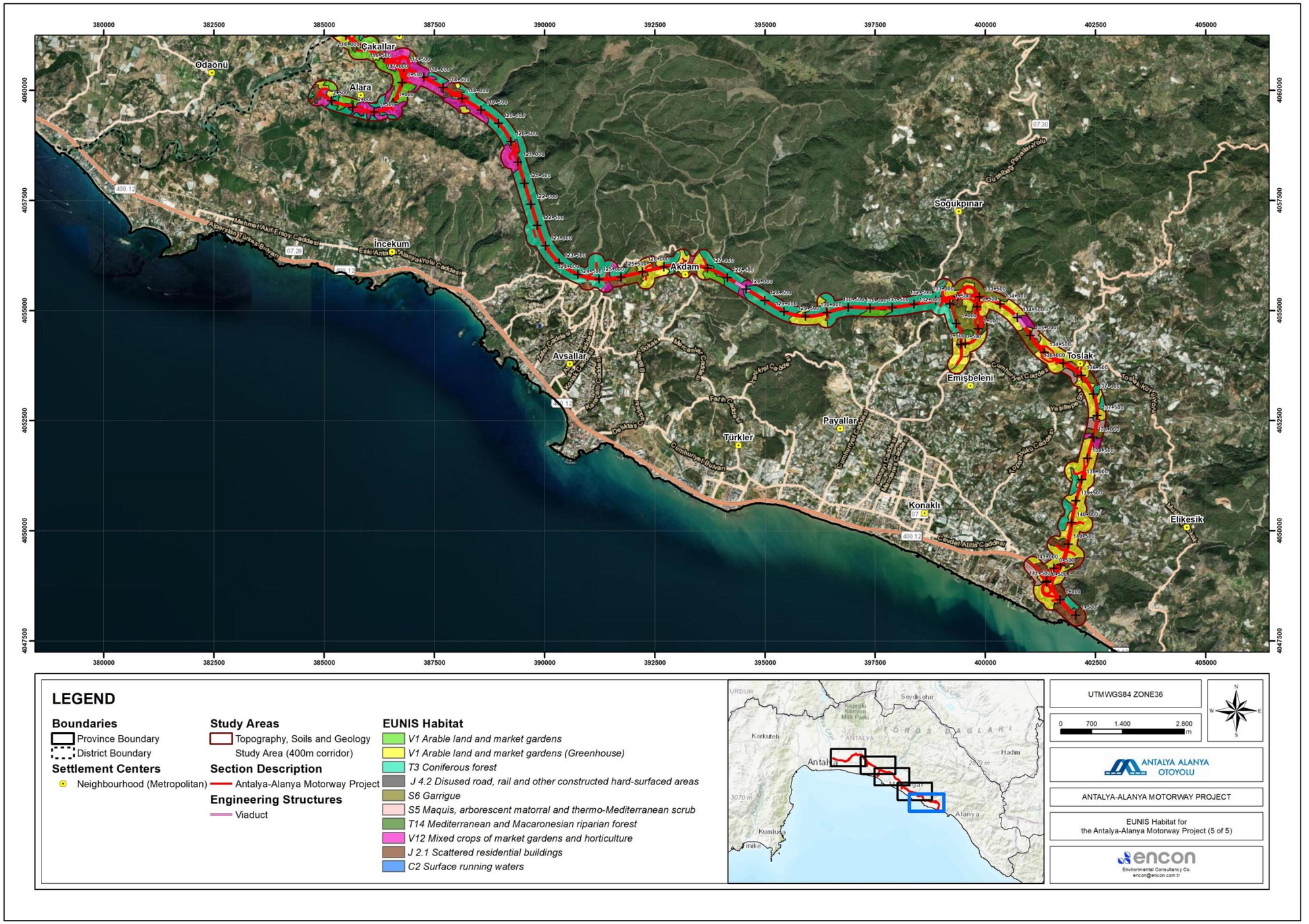

Figure 0.5. EUNIS Habitat Types within the Project Area (Part 5 of 5)

I.12. Flora and Fauna Species

Flora

As a result of the field study, a total of 221 plant species belonging to 60 families were identified within the project area. Among these, seven species (*Eryngium kotschyi*, *Phlomis leucophracta*, *Phlomis lycia*, *Phlomis monocephala*, *Phlomis nissolii*, *Pyrus serikensis*, and *Sideritis congesta*) are endemic to Türkiye. Only one species, *Pyrus serikensis* (Endangered - EN), is classified as threatened according to IUCN criteria. No other plant species in the area are considered threatened.

Amphibians

As a result of literature and field studies, five amphibian species have been recorded. One of which, *Lyciasalamandra atifi* (Endangered - EN), is classified as threatened. The primary reason for *Lyciasalamandra atifi* being classified as EN by the IUCN is its specific habitat, climatic, and hydrological requirements. Despite this, monitoring studies conducted during the spring, the optimal season for observing the species, did not detect its presence in the area.

Reptiles

A total of 25 species belonging to 14 families from the Testudines and Squamata orders were identified in the project area and ecological impact areas. Of these, only *Testudo graeca* (Vulnerable - VU) is classified as threatened according to IUCN criteria. However, this species has a wide distribution across Türkiye in various habitats, and its population within the project area does not meet critical habitat assessment criteria. Among the reptiles, there are four endemic lizard species (*Ablepharus anatolicus*, *Anatololacerta ibrahimi*, *Lacerta pamphylica*, and *Blanus aporus*). Among these endemic species, *Lacerta pamphylica* has a relatively narrower and more localized distribution. The project area lies within the distribution range of *Lacerta pamphylica*.

Birds

Based on observations in the project area and literature studies, it was determined that a total of 124 bird species belonging to 33 families from nine orders live in the project area and ecological impact areas. Among them, *Neophron percnopterus* (Endangered - EN) and *Streptopelia turtur* (Vulnerable - VU) are listed as threatened.

Mammals

According to the studies carried out in the project area and ecological impact areas, it was determined that there was a possibility of a total of 46 mammal species belonging to 17 families from five orders. Bats represent the largest group among both small and large mammal species in the area. Two bat species, *Rhinolophus mehelyi* and *Myotis capaccinii* (both Vulnerable - VU), are classified as threatened. However, bat monitoring did not detect either species within the project area.

Fishes

In the field studies conducted for the project, 29 fish species from seven families were identified. Among these, five species are classified as threatened (Critically Endangered - CR, Endangered - EN, and Vulnerable - VU). These include one CR species (*Anguilla anguilla*), two VU species (*Cyprinus carpio* and *Capoeta antalyensis*), and two EN species (*Alburnus baliki* and *Pseudophoxinus fahrettini*). Since the rivers in the project area discharge into the sea, the catadromous species *Anguilla anguilla* (European eel) inhabits these waters.

Table 3 Baseline Information for Biodiversity

Available Baseline Information for Biodiversity (ESIA, BAP, BMP, CHA)				
1 Protected Areas / Internationally Recognized Areas		The project footprint is located with one KBA/IBA and one SEPA. However, these intersections are only within modified habitats of these protected areas.		
2 Habitat	2.1 Natural Habitat	A high portion of the Project Area is located in natural habitat.		
	2.2 Critical Habitat	Mediterranean maquis habitat has been identified as Critical Habitat, with triggering species being *Pyrus serikensis*.		
	2.3 Ecosystem Services	The project area contains ecosystem services such as farming.		
3 Species	3.1 Flora	Several endemic and rare species identified, including a species that triggers Critical Habitat criteria.		
	3.2 Fauna and Bats	2 Vulnerable (VU) bats have been identified during field surveys.		
Information on Biodiversity Risks/Impacts (from ESIA report)				
Impact Type	**Construction**	**Operation**	**Residual for Construction**	**Residual for Operation**
Impact on Protected Areas / Internationally Recognized Areas	Low	Low	Low	Low
Impact on Natural Habitat	Medium	Medium	Low	Low
Impact on Critical Habitat	Medium	Medium	Medium	Medium
Impact on flora	Low-Medium and Medium (*Pyrus Serikensis*)	Low and Medium (*Pyrus Serikensis*)	Low and Medium (*Pyrus Serikensis*)	Low
Impact on fauna	Low (amphibians, reptiles birds, fishes) and, Medium (mammals (bats), *Lyciasalamandra atifi*)	Low (amphibian, reptiles, birds, fishes) and, Medium (mammals (bats))	Low (reptiles, birds, freshwater species) and Medium (*Lyciasalamandra atifi*)	Low

BIODIVERSITY AND CRITICAL HABITAT FEATURES

I.13. Selection Criteria for Habitats and Species of Conservation Concern

Based on the evaluations conducted during the Ecological Assessment and monitoring studies carried out within the scope of the Project, as well as the analyses undertaken as part of the Biodiversity Action Plan (BAP), habitats and species of high priority and conservation significance were identified in this section.

To achieve the targeted outcomes, one of the key objectives of the BAP was to focus on species and habitats requiring specialized management strategies and mitigation measures. Earlier sections of this report outlined various national and international criteria used to assess the conservation status and threat levels of habitats and species. Accordingly, all biodiversity assessments were carried out in alignment with one or more of these criteria, as applicable to their respective contexts.

I.14. Critical Habitat Features

Based on the findings of the Critical Habitat Assessment carried out for the Project, the following features have been identified as meeting the criteria to be classified as Critical Habitat.

- *Pyrus serikensis* is in “Endangered – EN” category according to IUCN and found primarily within the maquis ecosystem surrounding the project area, with known populations located near the Serik district, thus meeting critical habitat assessment criteria. Consequently, maquis areas along the project route where *Pyrus serikensis* inhabits have been designated as critical habitats.
- Amphibian species *Lyciasalamandra atifi* is in “Endangered – EN” category according to IUCN and meeting critical habitat assessment criteria. However, this species typically inhabits higher elevations and was not observed in the project area.
- Considering the overall distribution ranges of all endemic reptile species, there is no critical habitat within the project area as defined by critical habitat assessment criteria.
- No bird species meets critical habitat assessment criteria based on their population status. Considering the population densities of migratory bird species present in the area, it has been determined that their populations are not at a level that meets critical habitat assessment criteria. Consequently, no critical habitat has been designated for birds within the project area.
- Since the global population densities of the bat species are unknown and no significant populations were observed in the area, they do not meet critical habitat assessment criteria.
- Since no freshwater fish species meet the critical habitat assessment criteria, no critical habitat has been designated.

Table 4. Critical Habitat Assessment Results

Criteria	Species / habitat triggered
Criterion 1: Critically endangered and/or endangered species	Maquis, arboreal matorral, and thermo-mediterranean scrub (EUNIS code S5) • *Pyrus serikensis*

Critical, natural and modified habitats in the study area are shown in **Error! Reference source not found.**.

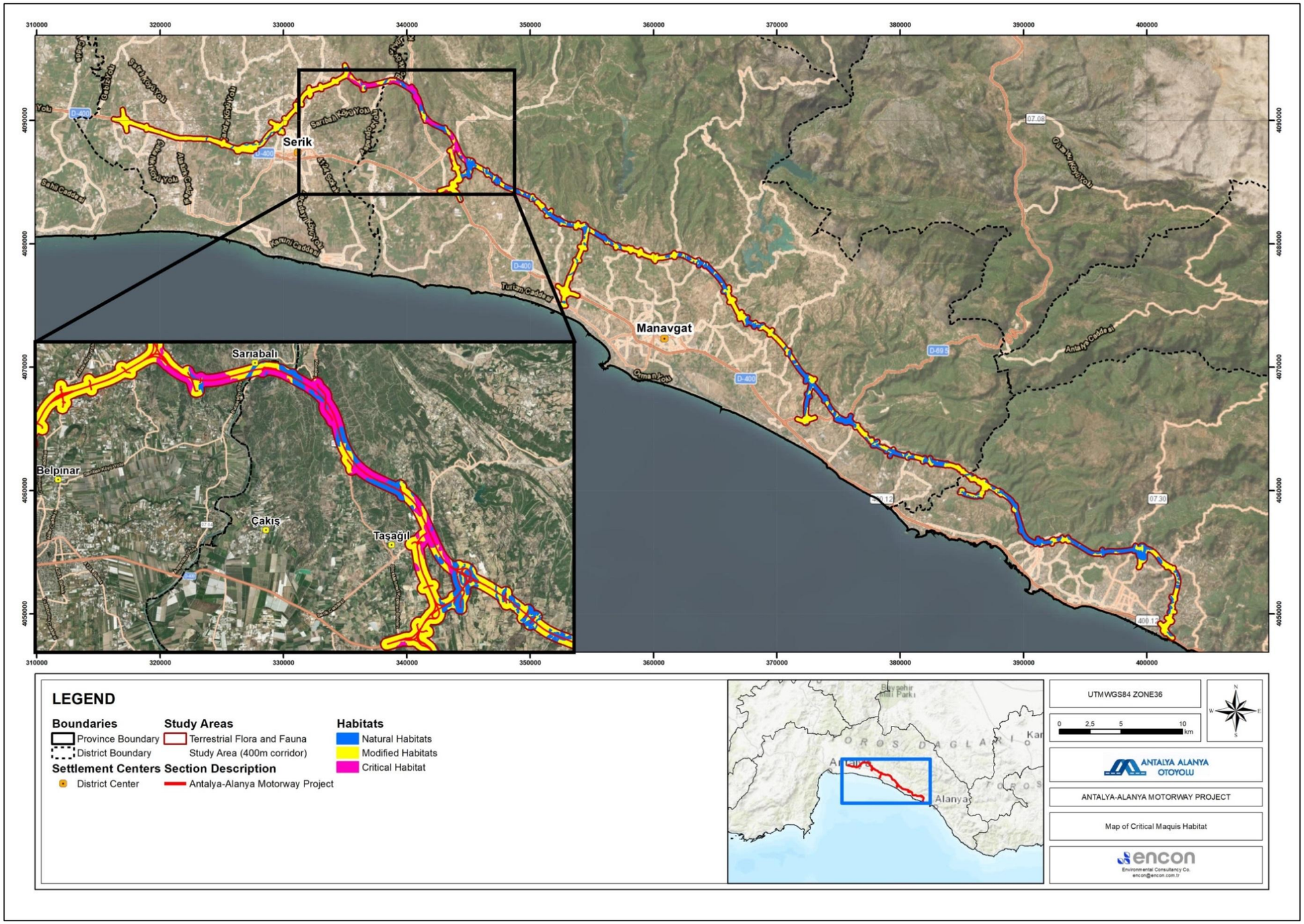

Figure 0.1. Critical, Natural and Modified Habitats in the Study Area

I.15. Habitats and Species of Conservation Importance

As a result of the comprehensive assessments conducted during the biodiversity studies, the selection criteria for priority habitats and species to be addressed in the biodiversity conservation action plans - developed as part of this document- were defined as follows.

Species of conservation concern, for the purposes of this assessment, are defined according to the following criteria:

- Species classified as Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) on the IUCN Red List;
- Species that are globally, nationally, or regionally threatened;
- Endemic species to the area;
- Species listed under Resolution No. 6 of the Bern Convention;
- Range-restricted species;
- Migratory species for which the local population represents more than 1% of the global population.

It is important to note that, as Turkey is not a member state of the European Union, Priority Biodiversity Features and Critical Habitat (CH) associated with the EU Habitats and Birds Directives are not applicable in this context.

The subsections below present the species of conservation concern identified as potentially occurring within the Study Area, based on the outcomes of the Environmental and Social Impact Assessment (ESIA) and according to the criteria outlined above.

Habitat types and species identified as having high priority and conservation importance listed in Table 5. The conservation of these species required specific actions to be implemented within the scope of the Project.

Table 5. Priority habitats and species of conservation importance

Biodiversity Component		Status
Habitats	Critical Habitats S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub	Natural habitats that qualify as Critical Habitat.
	Natural Habitats G1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix T3 - Coniferous forest T14 - Mediterranean and Macaronesian riparian forest S7.211 - Aegean *Sarcopoterium phrygana* S6 - Garrigue C2 - Surface running waters	Natural habitats that do not qualify as Critical Habitat.
Species	*Pyrus serikensis*	Regional endemic, threatened population
	Lyciasalamandra atifi	EN category in the IUCN Red List, regional endemic

IMPACT ASSESSMENT

The construction and operation of the Motorway Project will involve a wide range of activities that have the potential to affect the ecology. Impacts of project activities can be further divided into the target group of terrestrial and aquatic biological elements. Important impacts of motorway construction and operation activities on the biological environment are mainly habitat fragmentation. Habitat fragmentation can be described as splitting natural habitats and ecosystems into smaller, more isolated patches. The process of fragmentation is connected to many different factors, of which the direct loss and isolation of natural habitat are the most important.

I.16. Potential Impacts on Biodiversity

I.16.1. Construction Impacts

For the construction phase of the Project, the primary impact will be the loss of, and degradation to, terrestrial habitats and direct loss of flora and fauna species, from the construction footprint and supportive infrastructures (e.g. access roads, storage areas). These activities will also result in disturbance to more mobile fauna species, and may alter, or be a barrier to, their regular movement patterns. Most of these impacts will be permanent, however all areas of temporary vegetation loss will be restored with native species. Construction activities may also impact the freshwater habitats as vegetation clearance will result in exposed soil with potential for erosion by runoff and sedimentation.

Habitat Loss

The project area is primarily characterized by maquis vegetation and agricultural lands, interspersed with isolated patches of degraded forest habitat. The construction of the highway is not expected to have a significant impact on biodiversity within agricultural zones. However, certain sections of maquis vegetation may undergo changes in their natural structure, and the use of natural forest areas for soil deposition could have adverse effects on local biodiversity. To mitigate these potential impacts, post-construction rehabilitation efforts will be undertaken to restore the natural features of affected habitats. With the implementation of appropriate conservation measures, the project is not expected to result in permanent habitat loss for plant species.

Habitat Fragmentation

One of the key ecological concerns in highway development is habitat fragmentation. Ensuring connectivity between both sides of the road is essential to support wildlife movement and maintain genetic diversity. While ecological overpasses are commonly used to address this issue, the specific characteristics of the project area reduce the necessity for additional structures. Due to the region’s topography and the presence of rivers, the highway design includes 16 viaducts, 22 bridges, and 305 culverts, which are anticipated to provide sufficient connectivity for fauna. Moreover, the highway follows a low-elevation route (10–160 m) parallel to the Mediterranean coast, where no north-south migratory species have been recorded. The southern side of the highway also lacks continuous habitats, further diminishing the risk of significant habitat fragmentation. Therefore wildlife passages like ecological bridge is not assigned as the mitigation measure since the fragmentation due to the Motorway alignment is not the case.

Water Pollution

Disturbance to the vegetation cover and natural environment of the region will lead to the degradation or destruction of habitats. Highway construction activities are expected to impact river ecosystems through excavation, blasting, the installation of artificial structures, channel straightening, and

alterations to floodplain dynamics. In particular, construction and excavation in coastal sections of waterways can negatively affect aquatic organisms, water-dependent habitats, and associated fauna species. Pollution and increased turbidity during construction are likely to occur. Without appropriate mitigation measures, such contamination could lead to a gradual decline or loss of basin ecosystems and the degradation of natural biosynthetic reservoirs.

Noise and Dust Pollution

Construction activities will generate dust, noise, and vibrations, which may temporarily disturb native mammalian species and flora. However, these impacts are not expected to have long-term effects on the local fauna. Following the completion of construction, the composition and presence of fauna species in the area are anticipated to gradually return to their original state over time.

Table 6 Summary of Construction Impacts

Impact Type	Project Activity associated with the potential impact
Loss and degradation of terrestrial habitat, plant species and habitat for fauna species	Clearing of vegetation for project construction activities and project components Construction or upgrading of access roads Dust and noise pollution due to construction activities
Loss of or disturbance to fauna species	Clearance of vegetation for project infrastructure
Barriers to movement for mobile fauna	Construction of motorway and access roads

I.16.2. Operational Impacts

The operation of the motorway can lead to habitat fragmentation and barrier effects. By dividing previously continuous habitats, the motorway restricts the natural movement of terrestrial species and reduces ecological connectivity between populations. This can affect gene flow, access to resources, and long-term species viability.

Wildlife-vehicle collisions are another important operational impact. The movement of mammals, reptiles, amphibians, and birds across the motorway exposes them to a higher risk of mortality. Over time, such collisions can significantly affect population sizes, particularly for species with low reproductive rates or already small populations.

Continuous traffic generates noise, vibration, and artificial light. These disturbances can influence the behavior and distribution of sensitive species. For example, animals may avoid feeding or breeding near the road corridor, which reduces the quality of nearby habitats.

Motorway operation also introduces pollutants into the surrounding environment. Runoff from the road surface can carry oils, heavy metals, tire particles, and other contaminants into adjacent soils and waterways. This type of pollution can degrade both terrestrial and aquatic habitats and reduce habitat suitability for native species.

The verges and disturbed areas along the motorway are highly vulnerable to colonization by invasive species. These species can spread along the corridor, displacing native plants and altering habitat structure. Once established, they are often difficult to control and may require active management.

Hydrological systems may also be affected by motorway drainage structures. Altered water flows can change wetland conditions, disrupt riparian habitats, and impact aquatic species that depend on stable hydrology. In some cases, these changes can contribute to habitat drying or flooding.

Finally, the motorway can encourage secondary development in the surrounding area. Improved access often results in urban expansion, agricultural intensification, or industrial activity, which in turn increases pressure on natural habitats and biodiversity.

Table 7 Summary of Operational Impacts

Impact Type	Project Activity associated with the potential impact
Habitat fragmentation and reduced connectivity	Physical presence of the motorway corridor and associated fencing
Wildlife-vehicle collisions	Continuous traffic movement during operation
Disturbance from noise, light, and vibration	Vehicle movement, headlights, night
Pollution and runoff (oil, heavy metals, tire particles, spills)	Road surface wear, vehicle emissions, and drainage discharge
Spread of invasive speceis	Verge maintenance, soil disturance, and vehicle-mediated seed dispersal
Altered hydrology affectiong wetlands and riparian habitats	Operation of drainage systems and stormwater management infrastructure

BIODIVERSITY NET LOSS AND NET GAIN

Biodiversity Net Gain (BNG) is a metric used to assess the impact of a development project on biodiversity. The goal is to ensure that, as a result of the development process, biodiversity achieves a net positive outcome compared to its initial state. If biodiversity is lost, it is considered a net loss.

The principle of biodiversity balance is based on achieving no net loss of biodiversity. This means that the biodiversity gains from conservation efforts must offset the biodiversity losses caused by a specific project. In this approach:

- No Net Loss occurs when the biodiversity gains from conservation activities are equal to the biodiversity losses caused by the project, ensuring no overall decline in species, population sizes, or habitat conditions.
- Net Loss refers to a situation where biodiversity and its components are in a worse state than before the project.
- Net Gain occurs when the biodiversity benefits surpass the biodiversity losses, leading to an overall improvement in biodiversity.

This BNG framework is crucial for sustainable development and ecological compensation strategies, ensuring that biodiversity conservation are integrated into project planning and implementation.

Based on the data obtained from field studies, the net loss-gain assessment for the project was conducted following the criteria outlined in **Error! Reference source not found.**.

After calculating the net loss and gain along the motorway route, the Business and Biodiversity Offsets Program (BBOP) was established. Within the BBOP framework, the assessment determined whether the project would result in "no net loss" or "net gain" of biodiversity. The program includes compensatory actions designed to offset the Project's impact on biodiversity.

The mitigation measures aim to achieve no net loss, or preferably a net gain, by improving:

- Species composition,
- Habitat structure,
- Ecosystem function,
- Cultural values and human use associated with biodiversity.

To implement these measures effectively, the project developer must allocate resources for biodiversity monitoring and conservation actions.

The calculation of Biodiversity Net Gain (BNG) and No Net Loss is outlined below. The key terminology used in this assessment includes:

- **Baseline Biodiversity Value:** The biodiversity value of the area before any intervention.
- **Post-Development Biodiversity Value:** The biodiversity value after project completion and the implementation of compensatory measures.
- **Biodiversity Unit (BU):** A biodiversity metric measured based on the size, quality, and ecological significance of the habitat.
- **Biodiversity Net Gain (BNG) Percentage:** The ratio of net change compared to the baseline biodiversity value.

These metrics are used to assess whether the project results in a net gain, net loss, or no net loss of biodiversity, guiding the necessary mitigation and compensation strategies.

Establish the Baseline Biodiversity Value

To determine the baseline biodiversity value of the area, a habitat assessment study must be conducted. This evaluation includes the following key factors:

- **Habitat Area (ha): The total area covered by different habitat types within the project site.**
- **Habitat Distinctiveness: The ecological significance of the habitat (low, medium, high).**
- **Habitat Condition: The current health status of the habitat (poor, moderate, good).**
- **Strategic Importance: Whether the habitat is located within a priority conservation area.**

This habitat assessment provides the necessary baseline data to calculate Biodiversity Net Gain (BNG) or Net Loss and informs the appropriate mitigation and conservation strategies for the project.

The baseline biodiversity unit (BB) is calculated using the following formula:

$$\text{Baseline BB} = \sum(\text{Habitat Area} \times \text{Distinctiveness Score} \times \text{Condition Score} \times \text{Strategic Importance Score})$$

Distinctiveness Score represents the ecological importance and rarity of a habitat. The distinctiveness score for habitats is categorized based on their ecological value and species diversity. These categories are typically used in biodiversity assessment frameworks, such as DEFRA Biodiversity Metric 4.0, to quantify habitat importance.

Distinctiveness is categorized into low, medium, and high and assigned scores, as detailed inTable 8.

Table 8. Discriminant Score Determination Scale

Distinctiveness Category	Description	Score
Very Low	Common, species-poor habitats (e.g., urban areas, improved grasslands)	2
Low	Common but more structured habitats (e.g., scrublands, hedgerows)	4
Medium	Semi-natural habitats with moderate species diversity (e.g., wetlands, woodlands)	6

High	Rare, high-value habitats (e.g., ancient forests, peatlands)	8
Very High	Priority or irreplaceable habitats (e.g., primary rainforests, coral reefs)	10

If an area consists of multiple habitat types, the average distinctiveness score can be calculated as follows:

$$\text{Average Distinctiveness Score} = \frac{\sum(\text{Habitat Area} \times \text{Distinctiveness Score})}{\sum\text{Total Habitat Area}}$$

The Condition Score represents the quality and ecological integrity of a habitat. It is based on factors such as vegetation structure, species diversity, habitat connectivity, and presence of invasive species. Condition scores are typically assigned based on field assessments using predefined ecological criteria.

Condition is usually categorized into three levels: Poor, Moderate, and Good, with corresponding scores. Below is an example scoring system:

Table 9. Condition Score Determination Scale

Condition Category	Description	Score
Poor	Degraded habitat, low species diversity, presence of invasive species, or habitat fragmentation.	1
Moderate	Partially degraded but recoverable habitat, moderate species diversity, some ecological function maintained.	2
Good	High-quality habitat, high species diversity, strong ecological function, and minimal disturbance.	3

Assessing Condition Score for a Specific Habitat

To assess habitat condition, field studies are conducted based on specific evaluation criteria. The commonly used factors include:

- Vegetation structure and species diversity: The presence of key native species and overall diversity levels.
- Presence of invasive species: The extent of non-native species that disrupt ecological integrity.
- Soil and water quality: Indicators of erosion, pollution, or habitat degradation.
- Habitat fragmentation and connectivity: The level of isolation from similar habitat types.
- Ecological function: The habitat's capacity to support species and maintain ecosystem processes.

In some countries, specific habitat condition assessment guidelines exist for each habitat type, typically provided by environmental agencies. However, such standardized guidelines are not currently available in Türkiye. Therefore, expert consultation has been deemed necessary for habitat condition assessments in this study.

For an area containing multiple habitat types, the average condition score is calculated as:

$$\text{Average Condition Score} = \frac{\sum(\text{Habitat Area} \times \text{Condition Score})}{\sum \text{Total Habitat Area}}$$

The Strategic Importance Score determines whether a habitat has conservation priority. This score is based on factors such as:

- Location of the habitat: Whether it is within a protected area or an ecologically significant region.
- Policy significance: Alignment with national and regional conservation goals.
- Biodiversity strategies: Contribution to biodiversity action plans and ecological networks.

Habitats with strategic importance are those that support national or regional conservation targets and play a key role in ecosystem integrity and species protection. Strategic importance is usually categorized into three levels, with corresponding scores (Table 9).

Table 10. Strategic Importance Score Determination Scale

Strategic Importance Category	Description	Score
Low	Habitat is not in a conservation priority area.	1
Medium	Habitat is within a locally important area for biodiversity but not in a national or international priority area.	1.5
High	Habitat is within a designated national or international conservation area (e.g., Natura 2000, Ramsar sites, national parks, wildlife reserves).	2

To assign the correct score, check whether the habitat falls within an area of strategic conservation importance. This can be done by:

Reviewing conservation maps and databases: Check national, regional, and international conservation site designations.

Checking local and national policies: Some areas are identified as key biodiversity sites even if they lack formal international designation.

Consulting environmental agencies and experts: Organizations like IUCN, DEFRA (UK), or local environmental bodies may provide classification guidelines.

If the site contains multiple habitat types, calculate the average strategic importance score using the formula:

$$\text{Average Strategic Importance Score} = \frac{\sum(\text{Habitat Area} \times \text{Strategic Importance Score})}{\sum \text{Total Habitat Area}}$$

Assess the Post-Development Biodiversity Value

- Calculate the biodiversity value after development and habitat creation/enhancement using the same formula.
- If new habitats are created, estimate their value based on expected quality after a certain number of years.

Calculate Net Change in Biodiversity

$$\text{Net Change} = \text{Post Development BU} - \text{Baseline BU}$$

- If the result is positive, there is a Biodiversity Net Gain.
- If the result is negative, there is a Biodiversity Net Loss.

Calculate Biodiversity Net Gain Percentage

$$\text{BNG} = \left(\frac{\text{Net Change in BU}}{\text{Baseline BU}}\right) * 100$$

A positive percentage indicates a gain, while a negative percentage indicates a loss.

Methods to Reduce Biodiversity Net Loss

The steps to prevent net loss and to compensate in case net loss occurs can be summarized as follows:

Avoid High-Value Habitat Destruction: Prioritize development on low-value habitats.

Mitigation Measures: Reduce harm to existing biodiversity through careful planning.

On-Site Habitat Creation & Enhancement: Improve the quality of remaining or new habitats.

Off-Site Compensation (Biodiversity Offsetting): If biodiversity loss cannot be avoided on-site, compensate by creating habitats elsewhere.

If net biodiversity loss is identified through the calculations, the Biodiversity Impact Mitigation Hierarchy must be applied to manage and minimize the potential impacts of the project. This hierarchy includes the following steps:

- Avoidance (Prevention) – Identifying ways to avoid significant biodiversity impacts during the project planning stage.
- Minimization – Implementing measures to reduce the severity of impacts through design modifications and operational controls.
- Restoration (Rehabilitation & Enhancement) – Improving or restoring degraded habitats to compensate for project-related biodiversity losses.
- Offset (Compensation) – When residual impacts cannot be fully mitigated, implementing biodiversity offset measures to achieve no net loss or a net gain in biodiversity.

The first three steps of the Impact Mitigation Hierarchy should be integrated into:

- Project Design,
- Environmental and Social Impact Assessment (ESIA),
- Biodiversity Action Planning (BAP) processes.

Additionally, in cases where net habitat loss is inevitable, appropriate offset measures should be defined to compensate for residual biodiversity impacts and ensure compliance with the Biodiversity Net Gain (BNG) approach.

I.17. Net Loss of Biodiversity by Natural Habitats

Along the project route, a 117.8 kilometer long expropriation corridor will be established, including construction sites, quarries, concrete plants, asphalt plants, and other facilities. The main road will span 84 km with a width of 39.5 m, while the 33.8 km of connection roads will have a width of 29 m. These sections will be covered with asphalt and concrete, and the primary biodiversity loss will result from this land conversion. Additionally, habitat loss in the designated expropriation corridor has been taken into account.

In order to accurately quantify habitat loss resulting from the direct impacts of construction activities, certain structures and areas were excluded from the final loss calculations. These include infrastructure such as viaducts, and tunnels that do not cause habitat fragmentation, as well as temporarily affected areas such as campsites that are scheduled for rehabilitation.

A buffer zone averaging 77.5 m in width and 117.8 km in length will be rehabilitated or left for natural vegetation regeneration on both sides of the road. This buffer zone will provide opportunities for biodiversity enhancement, helping to offset net loss.

In the net gain/loss calculation, each habitat has been evaluated individually. Net losses of each natural habitat type are given in Table 11

Table 11. Net Loss of Natural Habitats Within Study Area

Habitat	Total Study Area (ha)	Net Loss (ha)	% of Loss by Total Study Area
C2 Surface running waters	37	1.22	3.3
S5 Maquis, arborescent matorral and thermo-Mediterranean scrub	88	13.43	15.3
S5 Maquis, arborescent matorral and thermo-Mediterranean scrub *(Critical Habitat)*	259	58.76	22.7
S6 Garrigue	447	132.95	29.7
S7.211 Aegean *Sarcopoterium phrygana*	171	37.37	21.9
T3 Coniferous forest	1,092	317.40	29.1
T1.4 Mediterranean and Macaronesian riparian forest	94	17.96	19.1
Total	**2,188**	**579.09**	**26.5**

I.18. Calculation of Biodiversity Net Gain

Since approximately 60% of the motorway route passes through low-biodiversity agricultural areas, the buffer zones in these sections are expected to contribute to an increase in biodiversity value. The natural habitats within these areas and their respective coverage and determined habitat assessment scores are provided in Table 12.

Table 12. Habitat Types, Covered Areas and Habitat Assessment Scores in the Project Area

Habitat Type	Total Study Area (ha)	Habitat Assessment Score		
		Distinctiveness	Condition	Strategic

				Importance
C2 Surface running waters	37	6	2	1
S5 Maquis, arborescent matorral and thermo-Mediterranean scrub	347	6	2	1
S6 Garrigue	447	6	3	1
S7.211 Aegean *Sarcopoterium phrygana*	171	6	3	1
T3 Coniferous forest	1092	6	3	1
T1.4 Mediterranean and Macaronesian riparian forest	94	6	3	1

Based on the evaluation of all habitats within the Project Area, net biodiversity gain and loss calculations have been conducted. In this context, the initial biodiversity value and the post-development biodiversity value, reflecting the impact of the project on habitats, have been calculated. The net gain/loss ratio and percentage were determined as follows:

Initial (Baseline) Biodiversity Unit = 6.9
Post-Development Biodiversity Unit = 5.5
Net Change = -1.2
Biodiversity Net Gain Percentage (BNG) = -18%

The results indicate that the construction of the motorway will have negative impacts on biodiversity, leading to a net loss. Therefore, to mitigate this net loss, the biodiversity impact mitigation hierarchy must be applied, following the principles of avoidance, minimization, restoration, and offsetting to manage the Project's potential impacts on biodiversity.

The first three steps of the impact mitigation hierarchy—Project Design, Environmental and Social Impact Assessment (ESIA), Biodiversity Management Plan (BMP) and Biodiversity Action Planning (BAP)—should be incorporated into the project planning process. Additionally, offset measures should be identified for each habitat type affected by net loss to compensate for the negative impacts on biodiversity.

The main offset mitigation of five trees planted for every tree cut have not been implemented to these calculations. These data will be added in the future when the soil analysis assessments concludes at the potential designated planting area of 750 ha. The analysis is expected to finish around the 4th quarter of 2025. With the results the trees that can be planted will be available then.

I.19. Net Gain Strategy for Natural Habitats

The maquis habitats within the Project area have been identified as Critical Habitat (CH) in accordance with the criteria outlined in IFC Performance Standard 6 (PS6). This classification is based on the high rate of plant endemism and the presence of habitat features supporting locally rare and conservation-sensitive species. As such, any potential impacts on these habitats must be managed with a commitment to achieving a net gain in biodiversity values.

To address potential adverse effects and align with IFC PS6 requirements, the following strategic approach has been developed:

Application of the Mitigation Hierarchy

Project planning and implementation must adhere to the mitigation hierarchy:

- Avoidance of habitat disturbance wherever possible

- Minimization of unavoidable impacts through design optimization
- Restoration of temporarily impacted maquis habitats
- Compensation for residual impacts to achieve a measurable net gain

Monitoring and Reporting

- Restoration activities will be periodically assessed for compliance with IFC PS6 and national biodiversity strategies and action plans.
- Monitoring data will be compiled into annual biodiversity reports and submitted to relevant regulatory and oversight bodies.

The action plans below detail the measures and actions necessary for the restoration of natural and critical habitats.

The area calculated for planting conifer trees and native species (mainly maquis/garrigue) found in other natural habitats, in sections suitable for planting on a total area of 3 meters on the right and left sides of the road, has been taken into account for net gain.

Additionally, the 9-hectare maquis planting area (primarily *Pyrus serikensis*) has been included in the net gain calculation.

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The restoration and compensation measures identified, including replanting of native maquis and garrigue species along the road corridor and the establishment of a dedicated 9-hectare maquis planting area with emphasis on *Pyrus serikensis*, have been calculated to provide an overall net gain of 44.89 ha.

Through careful design, phased implementation, and long-term ecological monitoring, the Biodiversity Action Plan provides sufficient detail to demonstrate that the Project will deliver measurable No Net Loss and Net Gain outcomes for Critical Habitat and Natural Habitat. This ensures compliance with IFC PS6 requirements while contributing to the long-term conservation of biodiversity values within and around the Project area.

I.20. Mitigation and Restoration Measures

A range of good practice mitigation actions were included in the Proect's ESIA and Biodiversity Management Plan, and within the scope of this Biodiversity Action Plan.

Construction and operation impacts are assessed in great details within the BMP document and briefly mentioned in the scope of this BAP. While BAP focuses on long term mitigations, for the sake of consistency a summary of BMP mitigation actions are given in the Table 13.

Most actions are focused on minimisation through controls on clearance or degradation of vegetation and disturbance of fauna. Restoration of habitats using native

Table 13 Summary of Mitigation Measures given in Biodiversity Management Plan

Impact Area	Key Mitigation Actions	Monitoring Focus
Habitat fragmentation & wildlife movement	Maintain connectivity with wildlife crossings, culverts, and corridors; restrict off-road driving; manage traffic speed.	Use of crossings, wildlife-vehicle collisions, access control.
Loss of habitats & flora degradation	Limit clearing to approved footprint; conduct pre-clearance surveys; store and reuse topsoil; restore sites with native species; implement 5:1 tree replacement.	Area cleared vs. approved design, restoration success, tree planting survival.
Noise and vibration	Restrict blasting and high-noise activities to daytime; avoid night works where possible; apply noise barriers if needed.	Noise levels, number of night works, species disturbance records.
Light pollution	Use downward-shielded and low-intensity lighting; restrict lighting to essential areas; avoid lighting near sensitive fauna habitats.	Wildlife incidents linked to lighting, compliance with lighting design.
Dust generation	Reduce vehicle speeds; apply road irrigation and dust suppression; raise worker awareness.	Visual dust levels, complaints from nearby communities.
Invasive species	Clean machinery before entering site; monitor for invasive plants; control and eradicate if detected.	IAS presence/absence, cleaning records.
Fauna disturbance & mortality	Pre-clearance surveys for nests, burrows, and breeding sites; relocate fauna if needed; avoid tree cutting during breeding season; ban hunting/fishing by staff.	Number of fauna incidents, nests affected, compliance with breeding-season restrictions.
Pollution & waste	Secure waste storage; prevent wastewater discharge into habitats; control accidental spills promptly.	Waste management compliance, water quality in aquatic habitats.
Critical maquis habitats	Map and avoid critical areas; restrict construction during sensitive periods; reuse topsoil and rocks for restoration; restore with native vegetation.	Habitat area mapped/restored, compliance with timing restrictions, vegetation cover success.
Trigger species (e.g., Pyrus serikensis, endemic plants)	Identify and map individuals pre-construction; translocate where needed; preserve topsoil with seeds; restore with native species.	Number of individuals mapped, translocated, and survival rates of restored plants.
Herpetofauna (Lyciasalamandra, turtles, reptiles)	Survey and relocate individuals; avoid construction in hibernation periods; create corridors; apply dust/noise controls.	Individuals relocated, corridor functionality, noise/dust thresholds.
Bats	Survey roosts and hibernation sites; protect roosting trees and caves; avoid disturbance during hibernation; minimize light and noise near roosts.	Roost protection, compliance with timing restrictions, lighting levels.
Freshwater fishes	Survey rivers; restrict works during spawning season; avoid riverbed disruption; apply pollution and sediment controls.	Water quality parameters, disturbance records, spawning season compliance.

HABITATS AND SPECIES ACTION PLANS

This section presents the proposed actions from the perspective of biodiversity conservation. Conservation objectives and measures have been developed for each priority biodiversity feature, or groups of features, to support the systematic application of the mitigation hierarchy: avoid, reduce (minimise), remedy (restore), and offset. The mitigation hierarchy is illustrated in Figure 0.1. This approach enables careful management of ecological risks and promotes optimal outcomes for both the Project and local communities, while safeguarding the health, functionality, and integrity of the ecosystem.

The conservation actions have been established with the aim of achieving 'no net loss' to biodiversity in accordance with IFC PS6 (IFC, 2012a). IFC PS6 requires evidence that the mitigation hierarchy has been applied, that avoidance is prioritised, and that offsets are measurable and only applied as a last resort where residual impacts are unavoidable.

The conservation objectives and actions have been identified and developed based on:

- The legal, policy, regulatory and third party requirements;
- The international and national standards, guidance and best practice

I.21. Action Plan for Critical Habitats

The maquis habitat, a defining component of the Mediterranean ecosystem, occupies approximately 5% of the proposed highway route. These habitats are particularly susceptible to anthropogenic pressures due to their limited extent and fragmented distribution. Within these areas, seven endemic plant species have been identified, and the vegetation supports a diverse native fauna. A portion of the maquis habitat will be affected by road construction, soil deposition, and the establishment of worksite areas. To minimize ecological impacts, it is essential to prevent further disturbance and degradation in the remaining sections. Restoration efforts should be undertaken in areas where habitat has been degraded, aiming to reestablish original ecological conditions.

The maquis habitats within the Project area have been identified as Critical Habitat (CH) in accordance with the criteria outlined in IFC Performance Standard 6 (PS6). This classification is based on the high rate of plant endemism and the presence of habitat features supporting locally rare and conservation-sensitive species. As such, any potential impacts on these habitats must be managed with a commitment to achieving a net gain in biodiversity values.

Given the presence of the critically important species *Pyrus serikensis* within these habitats, all related activities under this action plan must be aligned and coordinated with relevant conservation and management plans.

Objectives of the Action Plan

- To minimize the loss and degradation of maquis habitats resulting from project activities.
- To ensure the provision of suitable living condition and maintain habitat connectivity for endemic and other ecologically critical plant species.
- To implement effective post-construction habitat restoration measures and support the long-term sustainability of ecosystem services.

Habitat Protection

- Prior to the commencement of construction, areas with dense maquis habitats will be mapped in detail. The construction phase of the project will be carried out at separate locations and within a defined timeline in line with the construction work programme. Therefore, detailed mapping activities will be conducted for each construction activity individually, based on both the scheduled dates and the progress of the expropriation process.
- Construction activities will be scheduled to avoid critical periods such as flowering, breeding, and hibernation seasons of key species.
- Unnecessary land use will be avoided, and the extent of disturbed areas will be minimized accordingly.

Reducing Habitat Fragmentation

- Corridors will be establishedto connect fragmented maquis habitats and facilitate wildlife movement The construction phase of the project will be carried out at separate locations and within a defined timeline in line with the construction work programme. Therefore, detailed mapping activities will be conducted for each construction activity individually, based on both the scheduled dates and the progress of the expropriation process.
- Infrastructure will be adapted to include features such as underpasses and culverts to ensure the safe passage of animals.

Habitat Restoration

- Topsoil removed during construction will be carefully stored to preserve seed banks and later reused in the restoration of disturbed areas.
- Rocks and stones displaced during construction will be repositioned in a way that does not disturb the natural habitat, to support habitat restoration. .
- Invasive species will be systematically removed where feasible and for the purpose of habitat conservation , reintroduction processes for native species may be carried out

Preservation of Ecosystem Services

- Sedimentation barriers and proper drainage systems will be installed in construction zones to mitigate erosion and slope reduction measures will also be implemented
- Restoration activities will aim to enhance the capacity of these habitats to sequester carbon and regulate water resources.

Monitoring and Evaluation

- Continuous monitoring will be conducted on maquis habitats, endemic plant species, and indicator species such as Pyrus serikensis.
- Annual monitoring reports will be prepared and shared with relevant stakeholders, and necessary revisions to the action plan will be made based on findings.
- Local communities will be actively involved in habitat restoration and monitoring efforts.
- Restoration activities will be periodically assessed for compliance with IFC PS6 and national biodiversity strategies and action plans.
- Monitoring data will be compiled into annual biodiversity reports and submitted to relevant regulatory and oversight bodies.

Stakeholder Engagement and Awareness

- Construction personnel will receive training focused on habitat conservation and the significance of key species.
- Community outreach sessions will be held to provide information and ensure transparency regarding the project's environmental impact and mitigation strategies.

I.21.1. Compensatory Measures and Restoration for Net Gain

To meet the net gain target, the following compensatory actions will be undertaken:

- Restoration and Replanting Activities: As an offset strategy, it is recommended to carry out planting activities consisting of native species in the region in order to compensate the loss of habitats that have previously destroyed due to fires in the region and will be degraded due to the construction of the Motorway.
- Native maquis species, particularly *Pyrus serikensis*, will be propagated and replanted to support habitat regeneration and structural diversity.
- CSR-Linked Biodiversity Support:. Within the scope of the Project Company's policies, the project will contribute to supporting necessary biodiversity enhancement programs aimed at habitat conservation
- Offsite Restoration: Where on-site restoration is not feasible, habitat compensation will occur in ecologically equivalent non-project areas within the same biogeographic region, ensuring ecological compatibility.
- Long-Term Monitoring: The compensation site will be monitored for the duration of the project using key biological indicators such as:
    - Species richness and diversity
    - Vegetation cover
    - Soil quality and structure
    - Compensation Area Ratio: The size of the compensation area will be at least 110% of the impacted area to ensure ecological equivalence and support a net gain outcome.

Considering the loss of natural habitats that will occur during the project works, the biodiversity offset studies to be carried out for the critical and natural habitats.

I.22. Action Plan for *Pyrus serikensis*

Pyrus serikensis (Serik pear) is an endemic species categorized as Endangered (EN) on the IUCN Red List. Within the Project's Area of Influence, it is primarily associated with Mediterranedn maquis habitats, with critical populations identified near the Serik district. Based on the CHA, the species meets IFC PS6 Critical Habitat Criterion 1 (concentrations of globally endangered species).

Due to its restricted distribution, high conservation value, and the impracticality of translocation, conservation interventions will focus on in-situ habitat protection, restoration, and ex-situ propagation as part of the Project's biodiversity offset strategy.

Objectives of the Action Plan

The Action plan aims to ensure the long-term viability of *Pyrus serikensis* populations by:

- Preserving and enhancing the natural seed bank through effective topsoil management
- Restoring and maintaining maquis habitats that support the species.
- Implementing a propagation and planting program to offset habitat loss
- Establishing a long-term monitoring and adaptive management framework.

Habitat Identification and Protection

- Conservation measures targeting maquis habitats will be implemented to indirectly safeguard endemic plant species.
- Restoring disturbed areas with native species following the completion of construction activities.

Topsoil Management

- Topsoil containing native seeds and beneficial microorganisms will be carefully excavated and stored during construction works.
- This preserved topsoil will be reapplied during the restoration phase to facilitate natural seed dispersal and support the regeneration of endemic plant species.

Restoration Activities

- Restoration efforts will be made of this species within their original habitat.

Restoration / Recreation of Habitats Supporting *Pyrus serikensis*

- Due to biodiversity disturbance, planting of native maquis species biodiversity offset is proposed.
- Replanting of the native Serik pear tree (*Pyrus serikensis*) is planned within a designated 9-hectare area. This measure is proposed in consideration of the estimated 58 hectares of maquis habitat expected to be affected by the implementation of the project.
- This action requires long-term maintenance.
- The measure will require continuous monitoring and maintenance for the life of the project. Also this may lead to increased costs.

- In addition, whether the designated area is public or privately owned may cause issues regarding permits.

Monitoring and Reporting

- Regular monitoring will be conducted to evaluate the population health and trends of *Pyrus serikensis* as well as the overall quality of their habitats.
- Monitoring outcomes will be compiled into annual reports and disseminated to relevant stakeholders. The restoration plan will be revised as needed based on monitoring findings.

Stakeholder Engagement and Awareness

- Restoration activities will be supported through collaboration with local communities and subject-matter experts.
- Raising initiatives will be undertaken to inform stakeholders about the ecological importance of conserving *Pyrus serikensis*.

I.23. Action Plan for *Lyciasalamandra atifi*

Lyciasalamandra atifi, an endemic terrestrial salamander species which is endangered according to IUCN, occurs in fragmented populations along the Taurus Mountains, between Alanya and Serik, at elevations ranging from 190 to 1,400 meters. While the species was not observed during field surveys conducted within the Project Area, the presence of potentially suitable habitats suggests occurrence of the species in the vicinity of the Project Area is possible.

Pre-construction surveys are required to confirm the presence of the species and this Action Plan will be implemented accordingly based on the findings.

Objectives of the Action Plan

- To reduce direct impacts on wildlife populations and their habitats.
- To prevent disturbances during active periods.
- To rehabilitate degraded habitats and implement post-construction monitoring of population dynamics.

Habitat Identification and Pre-Construction Surveys

- Comprehensive surveys will be conducted within maquis habitats to identify active populations and critical habitat areas.

Construction Phase Measures

- A biodiversity specalist will be engaged to supervise construction activities and implement immediate mitigation strategies as required.
- Dust suppression techniques will be applied along access routes, and noise barriers will be installed to minimize environmental stress.
- In situations where avoidance is not feasible, individuals will be safely translocated to ecologically similar habitats, ensuring minimal stress and a high likelihood of survival.

Habitat Connectivity and Protection

- Existing native vegetation essential for shelter, nesting, and foraging will be conserved.

Post-Construction Activities

- Areas affected by construction will be rehabilitated using native plant species,
- Annual monitoring program will be implemented over a three-year period to assess population trends and habitat recovery If the relevant consultant's assessment does not provide sufficient basis for a conclusion regarding population trends and habitat recovery, an additional evaluation may be conducted.

Stakeholder Engagement and Awareness

- Targeted training will be provided to construction personnel on the ecological requirements and conservation strategies.
- Outreach campaigns will be carried out to raise awareness among local communities regarding the species ecological role and the importance of its conservation.

I.24. Offset Strategy

Biodiversity offsets and/or other forms of compensation are required to ensure overall NG of CH and NNL for NH, in line with IFC PS6. Offsets are the last part of mitigation hierarchy and are recommended when the previous steps (avoidance, minimisation, restoration) have been implemented and residual impacts remain. Offsets can include off-site habitat restoration and actions that increase a species' survival or productivity, and/or measures to stop the ongoing degradation and loss of biodiversity in existing designated sites or sites proposed for designation. Additional conservation actions and other support enabling conservation are also considered in this BAP.

The identification and development of offset actions in the BAP follows IFC Guidance Note 6. The offsets are targeted to sensitive biodiversity values with residual impacts after the implementation of the previous steps of mitigation hierarchy.

The offset principles followed in this BAP includes:

- Adherence to the mitigation hierarchy: A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the mitigation hierarchy;
- Limits to what can be offset: There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected;
- Landscape Context: A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach;
- NNL: A biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes that can reasonably be expected to result in NNL and preferably a NG of biodiversity;
- Additional conservation outcomes: A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations;
- Stakeholder participation: In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring;
- Long-term outcomes: The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity;
- Transparency: The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner; and,
- Science and traditional knowledge: The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

Biodiversity offsets are more likely to be feasible in context with clear institutional arrangements, good governance, and management responsibility. This provides a good basis for long lasting implementation conservation actions.

Following the application of the mitigation hierarchy, residual impacts to Natural Habitats and Critical Habitats have been assessed. Habitat losses have been presented in Table 11.

The impacts of the Project to habitats were calculated in section Net Loss of Biodiversity by Natural Habitats. It's been assessed that no significant residual impacts remains after the

avoidance/minimization/restoration measures have been implemented. Therefore according to IFC PS6, NNL is not required for natural habitats. The reasons are presented below:

Limited Spatial Extent of Habitat Loss

The habitats within the Project footprint represent small proportions of the wider regional distribution. Maquis, garrigue, and coniferous forests especially are widespread across Antalya Province, and riparion corridors along major streams extend well beyond the Project Area. The proportions of these habitats directly affected by construction and operation activities are therefore minor relative to their availability in the wider landscape, reducing the permanent ecological fragmentation.

Low Level of Secondary Impacts

The air quality modelling prepared for the Project indicates that predicted concentrations of PM10, PM 2.5 and other pollutants during both construction and operation phases remain below national and IFC guideline threshold by a significant margin at the nearest natural habitats. This demonstrates that edge effects from dust, and emissions are negligible, and will not significantly degrade habitat quality.

Mitigation and Habitat Recovery Measures

A suite of measures have been identified and will be implemented, including:

- Topsoil conservation and reuse to support natural regeneration of natural habitats.
- Where necessary active replanting with native species to accelerate recovery and stabilize soils.
- Habitat connectivity measures such as avoiding unnecessary fragmentation
- Pollution prevention controls
- Long-term ecological monitoring with adaptive management to address invasive species and ensure habitat recovery trajectories.

Ecological Resilience of Affected Habitat Types

The ecological characteristics of these Mediterranean habitats (all of them but especially maquis, garrigue, and phrygana) make them inherently resilient to disturbance. They are adapted to natural drivers such as grazing, fire, and drought, and exhibit strong regenerative capacity when topsoil and seed banks are preserved. As such, even temporary disturbances can be expected to regenerate to functional habitat conditions within a relatively short period following construction. The resilience of these habitats has been demonstrated over time, as they have repeatedly regenerated following frequent fires characteristic of the Mediterranean region, where such disturbances form a natural stage in their ecological succession cycle.

Much of the surrounding landscape remains continuous natural vegetation, and the motorway alignment with the protection areas consists of only modified habitats. Therefore, considering the relative scale of habitat disturbance in the regional context, the low levels of secondary effects confirmed by air quality modelling, the strong regenerative capacity of Mediterranean habitats, and the robust package of mitigation and recovery measures, the impacts on natural habitats are assessed as not significant after mitigation. Therefore under IFC PS6, NNL is not a requirement for these habitats.

However the Project Sponsor has their own ambitions to deliver NNL/NG for biodiversity.

I.24.1. Offset 1: Plantation on Roadside

This offset has been designed as a proactive biodiversity measure that contributes toward achieving No Net Loss (NNL) or, where feasible, Net Gain (NG) for both Natural Habitat (NH) and Critical Habitat (CH) at the leisure of the SPV. The plantation will be established along 117.5 km of the motorway corridor, with a designated planting strip of approximately 1.5 meters on each side, resulting in an

estimated 44.9 hectares of restored or newly created habitat. The species selection will prioritize native coniferous and maquis vegetation characteristic of the region, ensuring ecological appropriateness and long-term sustainability. Beyond the direct habitat compensation, this offset is expected to provide multiple ecological functions, including stabilizing soils, reducing edge effects from road operation, enhancing ecological connectivity. By integrating this offset into the operational footprint, the project also demonstrates good practice in mainstreaming biodiversity considerations into infrastructure development. Regular monitoring of survival rates, species composition, and habitat functionality will ensure that the plantation delivers its intended ecological benefits and remains adaptive to changing conditions over time.

Proposed action within the offset involves a combination activities targeted at introducing native species to degraded areas as rehabilitation, including:

- Select native coniferous and maquis species consistent with local habitat composition and ecological requirements.
- Prepare roadside planting areas by stabilizing soils, removing invasive species, and improving substrate where necessary.
- Implement plantation along both sides of the motorway across 117.5 km, ensuring a minimum 1.5 m width planting strip.
- Use appropriate planting density and spacing to maximize survival and mimic natural vegetation structure.
- Establish a watering and maintenance regime during the establishment phase to ensure sapling survival.
- Monitor sapling survival rates annually and replant where mortality exceeds threshold levels
- Conduct periodic vegetation surveys to assess species composition, habitat quality, and ecological functionality.
- Manage roadside vegetation adaptively, including pruning, replacement, and protection against pests or grazing.
- Incorporate measures to enhance ecological connectivity, such as planting near underpasses or culverts.
- Maintain detailed records of planting areas, species used, and monitoring results to support adaptive management and reporting.

Key Performance Indicators (KPIs):

- Minimum of 20 hectares of degraded land restored with native vegetation.
- At least 70% survival rate of planted or naturally regenerating saplings after three years.
- Progressive increase in native species richness, with a target of 70% similarity to reference maquis communities within 10 years.
- Reduction of invasive plant cover to below 5% of total restored area within five years.
- Demonstrated improvement in ecological connectivity, measured by the presence of indicator species (e.g., pollinators, reptiles, small mammals) in monitoring surveys

I.24.2. Offset 2: 9 ha Protection Area for *Pyrus serikensis*

This offset has been specifically developed to achieve a Net Gain for Critical Habitat (CH) by safeguarding populations of the endangered endemic species, *Pyrus serikensis*. Recognized for its restricted distribution and declining population trends, *Pyrus serikensis* faces ongoing threats from habitat loss and anthropogenic pressures. A 2009 survey conducted by the Ministry of Environment and Forestry recorded 1,097 individuals within the Belek Special Environmental Protection Area (SEPA), although comprehensive global population data remain unavailable. This number is considered to be significantly lower in present. To address this, a 9-hectare protection area has been proposed, aiming to conserve existing individuals, enhance recruitment, and facilitate natural regeneration.

Feasibility of this offset is supported by the availability of suitable habitat within the designated protection area, the species' known ecological requirements, and prior experience with in-situ conservation measures for Mediterranean endemic flora. Management actions will include exclusion of construction and grazing activities, active monitoring of plant health and reproduction, removal of invasive species, and protection of soil and seed banks to maximize recruitment potential. By securing and managing this area, the project ensures a long-term contribution to the survival and population stability of *Pyrus serikensis*.

The number of trees that can be planted depens to the grid system that will be applied, but it is expected to be able to plant between 1500 – 2000 individuals. Seed germination to sapling establishment is expected to happen 1-3 years under favorable conditions, while sapling to juvenile stage is expected to be 3-5 years. Juvenile to reproductive adult (able to flower and produce seeds) is expected to be 8-15 years on average.

The designated area will be given in detail in the Biodiversity Monitoring and Evaluation Plan (BMEP) that will be prepared in the future.

Key Performance Indicators (KPIs):

- Protection and legal demarcation of 9 hectares of habitat dedicated to *Pyrus serikensis*.
- 90% of known individuals within the area secured and protected from disturbance.
- Annual monitoring showing no net loss of individuals and at least a 5% increase in population through natural regeneration or recruitment over five years.
- Seed bank preservation and soil protection measures fully implemented, with restoration of disturbed microhabitats within the area.
- Survival rate of translocated or planted individuals ≥90% over five years.
- Documentation of invasive species control with coverage reduced to <5% of the protection area within five years.

I.24.3. Offset 3: Integrated Afforestation and Habitat Restoration in Manavgat

Afforestation will be carried out in a 5:1 ratio on a 1000 hectare area, appointed by the Ministry of Forestry. The afforestation plan follows a 5:1 planting ratio for tree loss, equating to the planting of approximately 1.4 million native saplings to replace the estimated ~280000 trees removed. Considering sapling planting will be ~1660 sapling/ha, approximately 845 ha area is sufficient to achieve these numbers. This ratio is in accordance with Ministry of Forestrys afforestation circulars. The remaining areas will mainly focus on non-tree habitats (e.g. maquis and garrigue). The Project Sponsor will pay the cost and the afforestation itself and management will be carried out by the Ministry of Forestry, as part of their protocol. The protocol will be signed within monitoring period, prior to Q2 of 2026 and the necessary documents will be presented accordingly.

Species selection will focus on cut trees for 5:1 planting, and native vegetation for the habitats. Planting density will be considered to be less in maquis and garrigue habitats, and planting will be done in mosaic to ensure native vegetation can restore itself. By planting trees with shrubs and allowing natural regeneration, the site is expected to develop over time into a structurally and functionally diverse ecosystem. This approach enables the restoration of ecological functions characteristic of natural forest habitats while simultaneously providing habitat features typical of maquis and garrigue communities, as explained above.

This mixed approach ensures that offsets are not limited to tree cover alone but also deliver multi-layered habitats that support a wider range of biodiversity (e.g. garrigue is sometimes a degraded stage of maquis, depending on site conditions). Considering that these habitats has a natural succession phase in their lifetimes, it's possible that areas initially restored as tree plantations will

develop garrigue or maquis understory. Therefore it's possible to achieve greater restoration for these shrubland habitats.

As explained in the beginning of this Offset Strategy, it's been assessed that no significant residual impacts remains after the avoidance/minimization/restoration measures have been implemented. Therefore according to IFC PS6, NNL is not required for natural habitats. Therefore these offset strategies are recommended to achieve 5:1 plantation, NG for Critical Habitat, and to ensure the survival and prosperity of endangered endemic *Pyrus serikensis* species. These offsets have been deemed sufficient to deliver NG for Critical Habitat in accordance with IFC PS6.

A risk factor of 2:1 has been determined to be considered for the offsetting of Critical Habitat. Therefore a potential habitat offset gain target has been identified. The remaining area after the afforestation is 155 ha. This is sufficient to deliver a net gain in Critical Habitat with a 2:1 risk factor multiplier. After this offsetting approximately 40 ha remains, this area will be used as a contingecy replanting area.

Table 14 Potential Habitat Offset Gain Target for Critical Habitat

Habitat	Habitat Loss (ha)	Potential Habitat Offset Gain Target (ha)
S5 Maquis, arborescent matorral and thermo-Mediterranean scrub	58.76	117.52

This will be negotiated with the Ministry of Forestry to get clearence that this habitat restoration will be achieved within the scope of the relevant afforestation of 1000 ha area.

The N:1 ratio of tree planting with Ministry of Forestry is a common afforestation method in Türkiye, and has been encorporated in many different projects over time.

Key Performance Indicators (KPIs)

- Tree replacement ratio achieved: Five native trees planted for every tree removed, verified through planting records.
- Total area afforested: At least 1000 hectares established and maintained for natural and critical habitats that were effected by the project.
- Afforestration Protocol: Protocol in place with Ministry of Forestry by Q2 of 2026.

- Species composition: Minimum 70% of planted individuals from native species directly reflecting those lost due to project impacts.
- Survival rate of planted trees: At least 70% survival after three years, maintained through replanting if needed.
- Success rate of habitat plantation: At least 70% success in restored Maquis habitat.
- Habitat losses compensated: At least 1.3:1 ratio of success in restored habitats.
- Signing of the afforestation plan with the relevant Ministry within Q2 of 2026.
- Soil preparation and suitability: Completion of soil analysis and implementation of recommended soil improvement measures prior to planting.
- Habitat quality: Restoration of ecological functions comparable to reference sites, assessed through species diversity and ground cover within 10–15 years.
- Connectivity enhancement: Evidence that afforestation areas contribute to ecological corridors, confirmed through species monitoring such as birds, insects, or small mammals.
- Long-term management: Monitoring and adaptive management reports produced annually for the first 10 years, then at five-year intervals.

In the event of these KPIs not being met, additional corrective actions will be undertaken such as supplementary planting to meet tree ratios and survival targets; securing additional land to expand afforestation; replacing non-native or failed species with natives; applying soil amendments and improved maintenance. Monitoring frequency will be increased and adaptive management applied until targets are met.

I.25. Road Map for BAP Update and Offset Development

This section includes a reoad map for the nex steps needed to finalise the BAP and to further develop the feasibility study for the offsets listed above.

I.25.1. Additional Biodiversity Surveys at the Project Site

Additional pre-construction and monitoring surveys will be used to improve the baseline information, especially for *Lyciasalamandra atifi*.

I.25.2. Update of BAP

It is currently planned to update the BAP to incorporate the offset strategies and additional biodiversity surveys being conducted.

I.26. BAP Implementation

I.26.1. Roles and Responsibilities

This section outlines the capacity for implementing the Biodiversity Action Plan (BAP) and the corresponding measures to be undertaken. To ensure the effective execution of the action plans, the Project Owner will designate qualified personnel who will be responsible for addressing and managing biodiversity-related matters.

Engineering, Procurement, and Construction Contractor

The Engineering, Procurement, and Construction (EPC) Contractor is responsible for carrying out construction activities and implementing the mitigation and enhancement measures outlined in the Biodiversity Action Plan (BAP). The roles and responsibilities of the EPC Contractor include:

- Implementing the BAP on-site, ensuring that biodiversity protection and mitigation measures are effectively applied throughout the construction phase.
- Conducting and managing ecological surveys and monitoring activities to evaluate the effectiveness of mitigation measures.
- Applying best construction practices identified during pre-construction ecological assessments to minimize impacts on biodiversity—for example, restricting construction activities during sensitive periods such as breeding seasons.
- Maintaining close communication with the Biodiversity Consultant (BC) to ensure accurate reporting and tracking of all biodiversity management activities.

Biodiversity Specialist

The Biodiversity Specialist plays a critical role in ensuring that biodiversity management practices are effectively implemented during the construction phase. Serving as an on-site ecological advisor, the Biodiversity Specialist bridges the gap between ecological requirements and construction activities. Key responsibilities include:

- *Supervision of Daily Operations:* Overseeing construction activities to ensure that the provisions of the BAP are correctly applied, with particular focus on wildlife protection and habitat restoration measures.

- *Regular Site Inspections:* Conducting frequent inspections to verify that mitigation measures—such as erosion control systems and wildlife corridors—are properly installed and maintained.
- *Monitoring Support:* Assisting in biodiversity monitoring efforts, including species surveys and habitat restoration assessments, to evaluate the success of mitigation strategies.
- Reporting and Recommendations: Preparing detailed progress reports and providing informed recommendations to third party biodiversity consultant for any necessary adjustments to the BAP based on on-site observations.

Third Party Biodiversity Consultant and/or Expert

Third party Biodiversity Consultant and/or Expert (BC) who will be assigned throughout the implementation of the Project, who is affiliated with the Engineering, Procurement, and Construction (EPC) Contractor, will provide technical expertise in biodiversity conservation and environmental protection. Their key responsibilities include:

- Conducting environmental impact assessments on habitats and species through field surveys and consultation with local ecological experts.
- Developing and refining biodiversity management action plans, including species-specific mitigation measures, habitat restoration strategies, and pollution control protocols.
- Supporting biodiversity monitoring activities by ensuring that scientific data is accurately collected, analyzed, and applied to improve mitigation strategies.

Regulatory Authorities and Local Authorities

Governmental bodies will play a critical role in supervising and enforcing the implementation of the BAP, including:

- Ministry of Environment, Urbanization, and Climate Change (MoEUCC): Responsible for monitoring project compliance with national environmental legislation, the MoEUCC will provide overarching regulatory oversight and guidance throughout the project lifecycle.
- Local Government and Environmental Agencies: Regional authorities will ensure the project aligns with local environmental regulations and may offer additional recommendations for biodiversity protection, leveraging site-specific knowledge and expertise.

Stakeholders and Community Representatives

Stakeholders—including local communities, conservation organizations, and non-governmental organizations (NGOs)—will actively contribute to the success of the BAP. Their involvement includes:

- Participating in consultation processes during key phases of the project to ensure that local concerns, knowledge, and suggestions are integrated into planning and implementation.
- Engaging in biodiversity conservation programs, such as native vegetation planting and wildlife monitoring initiatives.
- Providing feedback on the effectiveness of mitigation measures and overall implementation of the BAP, supporting adaptive management by contributing local perspectives and observations.

Special Purpose Vehicle Company (SPV)

SPV will hold the primary responsibility for planning, financing, and ensuring the implementation of biodiversity offset measures, particularly those that extend beyond the project footprint. These responsibilities are critical to achieving No Net Loss (NNL) or Net Gain (NG) objectives as required under the BAP. The SPV will coordinate with the EPC Contractor, Biodiversity Specialist, Biodiversity Consultant, regulatory authorities, and local stakeholders to ensure effective delivery of offset measures. Key responsibilities include:

- Coordinating the implementation of the BAP and communicating offset requirements to all relevant Project personnel and contractors.
- Identifying, securing, and managing appropriate offset sites, including establishing long-term management arrangements and partnerships with conservation organizations or local communities or relevant government authorities.
- Allocating sufficient financial and human resources for the design, implementation, and monitoring of offsets.
- If necessary, overseeing the development of detailed offset management plans, ensuring that monitoring covers survival rates, habitat conditions, and ecological indicators to evaluate offset effectiveness.
- Engaging stakeholders such as local communities, NGOs, and conservation groups in offset planning and implementation, ensuring their knowledge and participation contribute to long-term success.
- Preparing transparent reports for regulators, lenders, and stakeholders on the progress and effectiveness of offsets, demonstrating compliance with national regulations and international standards.
- Taking adaptive management actions if offsets are not achieving their intended outcomes, ensuring that NNL/NG commitments are met throughout the project lifecycle.

I.26.2. Monitoring and Reporting

A summary Biodiversity Monitoring and Evaluation Programme (BME Programme) has been developed at this stage to evaluate the effectiveness of the mitigation and enhancement measures implemented throughout the Project, given in Table 15. A comprehensive Biodiversity Monitoring and Evaluation Plan (BMEP) will be prepared by Q2 2026. The BME Programme focused on monitoring the condition and ecological health of affected habitats, assessing the success of restoration activities, and tracking the impacts on species populations.

The results of biodiversity monitoring activities and the progress of mitigation measures will be communicated to stakeholders on a regular basis, ensuring transparency and enabling ongoing feedback and adaptive management

The Project will also consider sharing biodiversity data, such as those collected during surveys with the Global Biodiversity Information Facility (as recommended by Equator Principles 4).

I.26.3. Mitigation Measures

One of the objectives of the BAP was the formulation of specific actions to be implemented for biodiversity conservation, following the identification of priority habitats and species. Each action plan developed in this chapter outlined a set of measures specifying what needed to be done and within what time frame.

The BAP actions were designed to be adaptive and open-ended, allowing for updates and improvements based on ongoing research and the evolving nature of the Project. The mitigation hierarchy was strictly followed, ensuring that all necessary avoidance, minimization, and mitigation measures were implemented. Where required, additional offsets beyond those defined in this document were also considered throughout the life cycle of the Project.

I.26.4. Budget Considerations

The actual budget will be developed separately by the Project Company. List of themain cost categories identified for the biodiversity studies and implementation of plans is iven below in

Cost category	Comments
Biodiversity mitigation measures during construction	The cost for biodiversity mitigation measures will be included in the EPC Contract. These measures are described in the ESIA and other biodiversity documents (BMP, CHA, and this BAP). The EPC Contractor will detail these mitigation measures in a Construction Environmental Management Plan
Additional surveys	Additional pre-construction, and construction surveys
BAP and BMP updates	As these documents stated as to be living documents, some additional updates are likely to be required in the future
Offset implementation	These cost will be estimated once the offset actions have been confirmed

BIODIVERSITY MONITORING AND EVALUATION PROGRAMME (BME Programme)

The primary objective of the Biodiversity Monitoring and Evaluation Programme (BME Programme) is to assess the status of biodiversity components and evaluate the integration of Biodiversity Action Plan (BAP) measures into project activities and their interaction with human-induced impacts. Ongoing monitoring of BAP implementation is essential to ensure the effectiveness of defined actions and the achievement of conservation goals. Monitoring should be conducted throughout both the construction and post-construction phases to track biodiversity trends and enable timely mitigation in response to unforeseen impacts. During project construction and operation, monitoring will ensure compliance with all relevant legislation, contract requirements, and effective implementation of BAP actions.

All biodiversity monitoring activities will be carried out under the responsibility of the biodiversity specialist assigned by the EPC contractor, in coordination with an independent third-party biodiversity consultant and/or experts.

A detailed Biodiversity Monitoring and Evaluation Plan (BMEP) will be developed by Q2 2026 to define methodologies, indicators, responsibilities, and reporting mechanism for long-term biodiversity monitoring.

Serving as a practical reference for project stakeholders, the monitoring plan in Table 15 summarized essential actions and supports strategic planning, execution, and adaptive management across all phases of the project.

Table 15 Biodiversity Monitoring and Evaluation Programme Summary

Habitat / Species	Monitoring Parameter/ Performance Indicator	Monitoring Location	Monitoring Action	Time Period	Monitoring Frequency
Habitat Recreation and Restoration Areas	Evaluate the status of recreation areas	At the edge of the Motorway alignment and the 9 ha of recreation for *Pyrus serikensis*	Monitoring of the success of planting and recreation areas	Throughout the implementation period of the project	Monitoring of plant populations and recreation recovery annually
S5 - Maquis, Arboreal Matorral, and Thermo-mediterranean Scrub	Evaluate the status of restored habitat areas that may harbor critical habitat trigger species	Maquis habitats along the motorway	Regular habitat monitoring, including flora and fauna surveys should be conducted.	Between February and May	Regular habitat monitoring, including flora and fauna surveys; prepare annual reports
Pyrus serikensis	Evaluate the status of the population and its habitat; Presence and abundance of species	Critical Maquis habitats within the Area of Influence	Monitoring the species population status within the AoI	Between April and September	Regular monitoring of plant populations and habitat recovery anually
Lyciasalamandra atifi	Evaluate the status of the population and its habitat; Presence of species	Maquis and shrub habitats near the Project Area	Monitoring the species presence within the AoI	Between February and June	Habitat and species monitoring during construction; post-construction monitoring for 3 years

ANTALYA ALANYA MOTORWAY PROJECT

AIR QUALITY MODELING REPORT

HACETTEPE UNIVERSITY

DEPARTMENT OF ENVIRONMENTAL ENGINEERING



Prof. Dr. GÜLEN GÜLLÜ

MAY 2025

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LIST OF SYMBOLS AND ABBREVIATIONS

Abbreviation	Description
AADT	Annual Average Daily Traffic
EV	Electric Vehicle
HHV	Heavy Heavy Vehicle
LHV	Light Heavy Vehicle
PCU	Passenger Car Unit
PM_{10}	Particulate Matter ≤10 μm
VKT	Vehicle Kilometers Traveled
VOC	Volatile Organic Compounds
GLC	Ground-Level Concentration
SKHKKY	Sanayi Kaynaklı Hava Kirliliğinin Kontrolü Yönetmeliği (Industrial Air Pollution Control Regulation)

1. INTRODUCTION

This report has been prepared using the AERMOD distribution model to examine the distribution of the emissions of the Antalya-Alanya Motorway Project (the Project) and the contribution values of the other facilities within the impact area to the regional air pollution and their distribution in the impact area of the Project.

With the air quality modeling study, the air pollution contribution value (HKKK) and air quality values within the facility's impact area were calculated and compared with the relevant limit values. The results obtained from the modeling studies were evaluated in accordance with the Industrial Air Pollution Control Regulation (SKHKKY), which entered into force on 03.07.2009.

The following part of the report gives information about the national legislation determining the limit values of the emissions arising from the project's construction phase in the external environment. Emission data obtained from the environmental impact assessment reports of the facilities in the project's impact area are summarized in the following sections. The method and model inputs used in the modeling are given in Chapter 3 of the report. Chapter 4 includes the results of the modeling studies within the specified framework of the Industrial Air Pollution Control Regulation (SKHKKY) (Official Gazette, Industrial Air Pollution Control Regulation, 2009) and an overall assessment of their possible effects on local air quality.

1.1 Legal Status

Improvements in air management policies in Turkey gained momentum with Turkey's acceptance of the European Union (EU) Integrated Environment Strategy. Accordingly, Turkey's legislation has fully complied with the EU Air Quality Framework Directive (and related directives).

The regulations in force in Turkey regarding emissions and air quality from highway projects and mining facilities are listed below:

- Air Quality Assessment and Management Regulation (HKDYY), published in the Official Gazette dated 06 June 2008 and numbered 26898;
- Industrial Air Pollution Control Regulation (SKHKKY) published in the Official Gazette No. 27277 dated 03 July 2009 (Official Gazette, Industrial Air Pollution Control Regulation, 2009); (SKHKKY)

As a result of the Air Quality Assessment and Management Regulation (HKDYY) being published in the Official Gazette No. 26898 on 06.06.2008, the Air Quality Protection Regulation (HKKY) was repealed. The HKDYY aims to improve ambient air quality and provide the limit value determined on a targeted date. Therefore, the regulation defines two types of limit values: transition period limit values and target limit values for gaseous pollutants and particulate matter. The values used in the evaluation study and the dates they were put into practice are shown in Table 1.

With SKHKKY, to control the emissions in the form of soot, smoke, dust, gas, steam, and aerosol emitted into the atmosphere as a result of the activities of industry and power generation facilities; to protect people and their environment from the dangers arising from pollution in the air-receiving environment; to eliminate the adverse effects that cause significant damage to the public and neighborhood relations due to air pollution in the background and to determine the procedures and principles to prevent the emergence of these effects are aimed.

Particulate matter (PM) is the primary pollutant emitted into the atmosphere during the construction phase of the project, primarily due to excavation, material handling, and other mechanical activities. In contrast, nitrogen oxides (NO_x), volatile organic compounds (VOCs), and carbon monoxide (CO) are mainly associated with traffic emissions that occur during the operational phase once the project becomes active. Limit values to be provided in outdoor air are defined in Table 2.2 of SKHKKY Annex-2; these limit values are given in Table 1.

Table 1. Limit Values Specified in the Industrial Air Pollution Control Regulation

Pollutant	Average Duration	Limit Value (µg/m^3)	Date to Reach Limit Value
SO_2	Hourly (for the protection of human health)	350 (cannot be exceeded more than 24 times in a year)	1.1.2019
	24 hour (for the protection of human health)	125 (cannot be exceeded more than 3 times in a year)	1.1.2019
	UVS	60	1.1.2014
	Annual and winter period (for the protection of the ecosystem)	20	1.1.2014
NO_2	Hourly (for the protection of human health)	200 (cannot be exceeded more than 18 times in a year)	1.1.2024
	Yearly (for the protection of human health)	40	1.1.2024
NO_x	Yearly (for the preservation of vegetation)	30	1.1.2014
PM_{10}	24 hour (for the protection of human health)	50 (cannot be exceeded more than 35 times in a year)	1.1.2019
	Yearly (for the protection of human health)	40	1.1.2019
Settled Dust	Daily average (Short-Term Limit – KVS)	390 mg/m²·day	1.1.2014
	Annual average (Long-Term Limit – UVS)	210 mg/m²·day	1.1.2014
$PM_{2.5}$	Yearly	20	1.1.2020

	(for the protection of human health- EU Directive)		
CO	Maximum daily 8-hour average (for the protection of human health)	10,000	1.1.2017

2. DATA USED IN THE STUDY

In this section, the data used in the modeling study are defined.

2.1 Meteorological Data Set

The long-term meteorological data required for this modeling study were obtained from official observation stations located near the project area. Hourly surface data were taken from the Manavgat Meteorology Station, and upper air data were sourced from the Isparta rawinsonde station (17240) to support dispersion modeling using the AERMOD model.

To determine the representative meteorological year, wind speed and wind direction measurements from the 1960–2024 period at the Manavgat station were analyzed. The full wind direction frequency distribution over this long-term period is shown in Figure 1.

In order to compare recent wind trends, data from the last ten years (2015–2024) were also evaluated. The total number of wind events per direction for this period is presented in Figure 2, and detailed yearly values are shown in Table 2, which also lists the four most dominant wind directions.

Upon analysis, the dominant wind directions in the last ten years were found to be NNW, NW, N, and SSW, which also correspond to the most frequent directions over the entire 1960–2024 period. Among the ten individual years examined, the year 2022 was found to most closely match the long-term and recent wind direction distributions in both magnitude and rank order.

Therefore, 2022 was selected as the representative meteorological year for AERMOD dispersion modeling. The wind rose diagram illustrating the total number of wind events in 2022 is presented in Figure 3. This selection ensures that the modeled meteorological conditions reflect the typical wind behavior in the project region and complies with standard model input selection criteria.

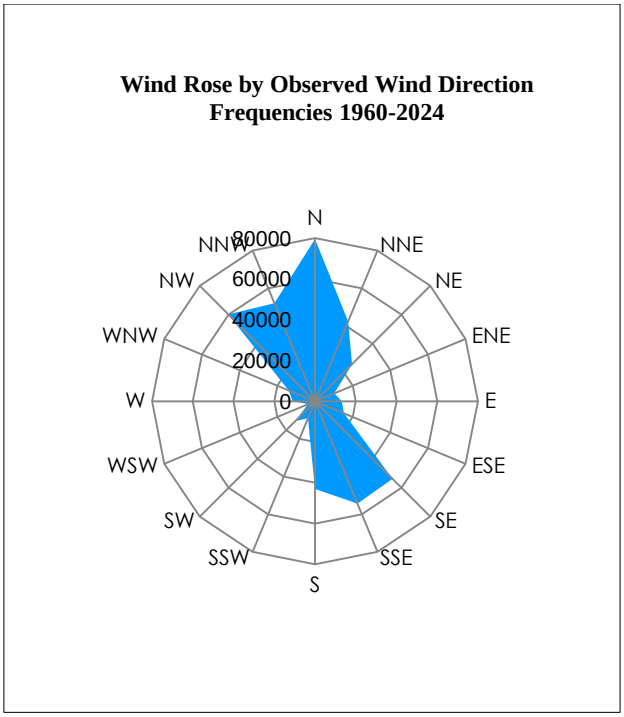

Figure 1. Manavgat Meteorology Station 1960-2024 Wind Rose Diagram

Table 2. Manavgat Meteorology Station 1960-2024, Last 10 Years and Last 10 Years Total Wind Direction

Direction/Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	1960-2024	Last ten years
N	1083	1096	631	587	672	758	714	1098	1294	1179	79565	9112
NNE	479	435	354	340	464	422	780	714	657	498	42411	5143
NE	221	226	218	209	254	232	308	286	258	176	25681	2388
ENE	162	129	178	224	223	210	218	210	172	133	10241	1859
E	179	176	229	260	289	276	288	263	213	163	13137	2336
ESE	247	251	315	344	390	364	427	350	269	234	15329	3191
SE	508	526	1090	1116	1138	1213	676	791	696	728	53824	8482
SSW	974	972	705	775	704	693	673	965	857	815	54362	8133
S	538	526	367	455	428	401	506	457	481	400	43031	4559
SSW	285	324	141	197	242	191	296	303	298	217	9015	2494
SW	144	125	111	128	117	116	174	148	126	108	13803	1297
WSW	115	105	129	128	118	112	137	105	86	68	3653	1103
W	131	106	330	374	302	277	274	171	91	65	10916	2121
WNW	262	230	953	1114	1097	1002	605	439	212	157	14028	6071
NW	998	958	1229	1479	1398	1516	1265	1003	674	448	60221	10968
NNW	1759	1692	919	944	903	990	792	1162	1169	856	52045	11186

Highest
Second Highest
Third Highest
Fourth Highest

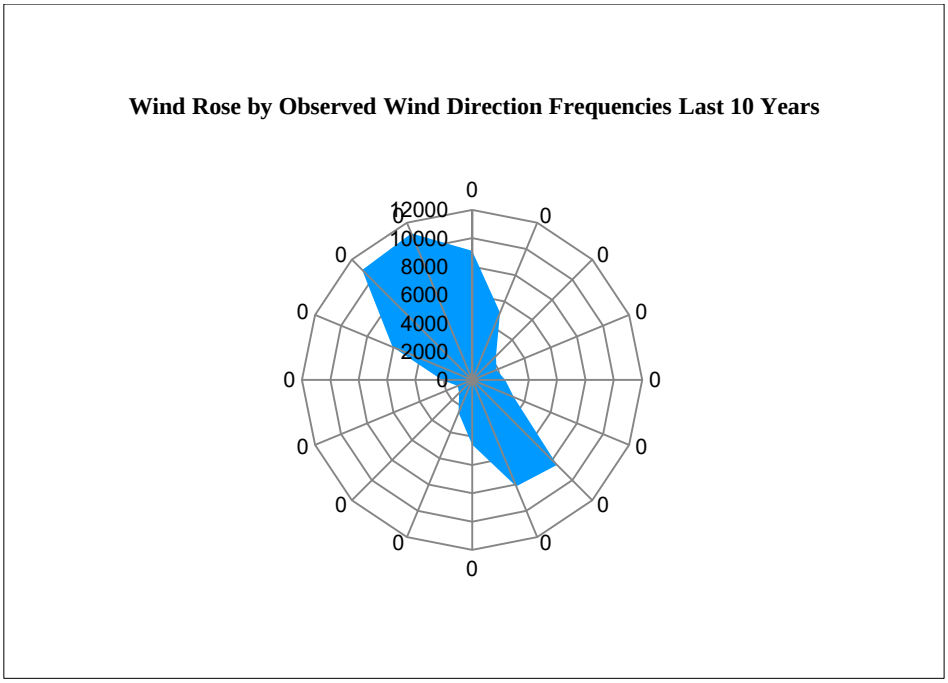

Figure 2. Manavgat Meteorology Station Total Number of Winds, Wind Diagram for the Last 10 Years

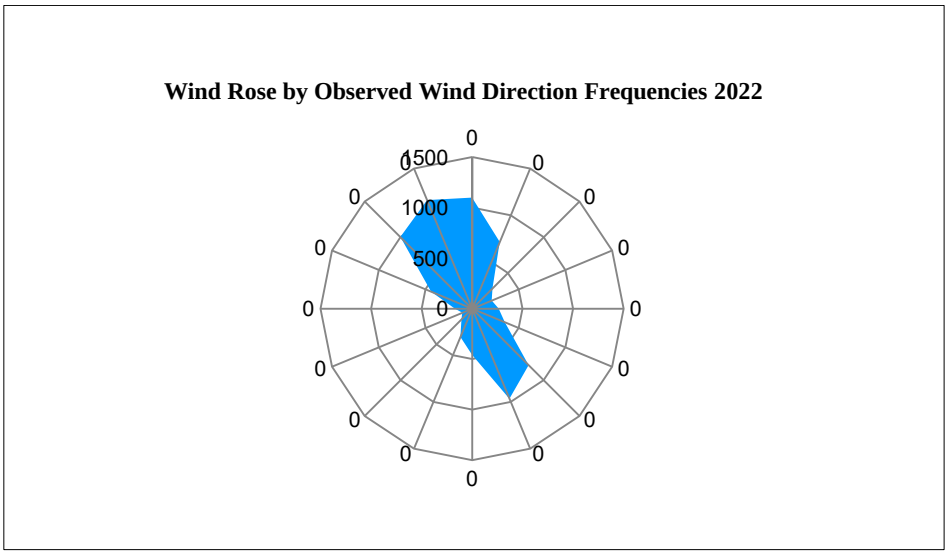

Figure 3. Manavgat Meteorology Station Total Winds in 2022 Wind Diagram

2.2 Emissions

In this section, the emissions expected to arise from both the construction and operational phases of the planned project, as well as the measures to be taken to minimize these emissions, are summarized. The AERMOD dispersion modeling system operates with a maximum modeling radius of 50 kilometers. Since the spatial extent of the project exceeds this limit, it has been modeled in two separate sections.. In the remainder of this report, these are referred to as Section 1 and Section 2. Section 1 corresponds to the segment between kilometers 52 and 97 of the planned motorway, while Section 2 covers the segment between kilometers 97 and 142.

2.2.1 Construction Phase Emission Calculations

Dust emissions are expected to occur during the construction and operational phases of the project. For the calculation of these emissions, the "Emission Estimation Technique Manual for Mining (Version 3.1)," prepared for the Australian National Pollutant Inventory, was utilized.

This internationally accepted methodology was adopted as a specific national set of emission factors for these types of activities is not available in Türkiye. This approach aligns with common practice in Turkish environmental impact assessments, where internationally recognized factors are used when local data is not sufficiently representative of specific activity types.

The referenced Australian manual was specifically chosen for two key reasons. First, it is founded on the globally recognized U.S. EPA AP-42 standard, drawing most of its emission factors directly from this source. Second, and importantly, it enhances this baseline by validating and improving upon the factors with actual field measurements. This makes it a robust and highly applicable source, consistent with international best practices for modeling construction-related operations. The emission factors used in the calculations are provided in Table 3.

In the scope of this study, emission estimations include excavation and filling operations associated with road construction, as well as emissions originating from the quarries, concrete plants, mechanical plants, and asphalt plants that are planned to operate along the project route. These sources represent material extraction, processing, and handling activities during both the construction and operational phases. Details of the facilities included in the modeling study, including their locations, types, and operational capacities, are provided in Table 4.

All emission calculations were initially conducted for PM_{10}, which is the primary pollutant associated with mechanical construction activities. In addition to PM_{10} emissions, $PM_{2.5}$ emissions from the construction phase were also modeled in this study. Since specific $PM_{2.5}$ emission factors are generally not available for all construction activities, a representative fraction of PM_{10} emissions was used to estimate $PM_{2.5}$ levels. Based on internationally recognized emission guidance documents, it was assumed that 15% of the total PM_{10} emissions originate as $PM_{2.5}$. This assumption aligns with several key references, including the U.S. EPA's AP-42 (Section 13.2.1 – Paved and Unpaved Roads), the EMEP/EEA Air Pollutant Emission Inventory Guidebook (2019) – "1.A.5 Construction and demolition. Accordingly, $PM_{2.5}$ emission rates were derived by multiplying the calculated PM_{10} values by 0.15, and these values were incorporated into the construction phase dispersion modeling.

Table 3 Default Emission Factors for Various Operations at Mines

Activity	PM_{10} Default Emission Factor	TPM Default Emission Factor	Unit
Excavators/Shovels/Front-end loaders (on overburden).	0.012	0.025	kg/t
Excavators/Shovels/ Front-end loaders (on coal).	0.014	0.029	kg/t
Scrapers (removing topsoil)	0.0073	0.029	kg/t
Material loading-unloading	0.0043	0.012	kg/t
Blasting	$0.00114 \times A^{1.5}$	$0.00022 \times A^{1.5}$	kg/blast
Wheel generated dust from unpaved roads at industrial sites	1.25	4.23	kg/VKT
Wind Erosion	0.2	0.4	kg/ha/hour
Primary crusher	0.02		kg/t

Reference: Australian Government, EET for mining, version 3.1, Table 2

A=blasting area,m^2

Table 4 Facility and Plant Information Included in Modeling Study

Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m^2)	Area / Capacity Information / Operation Period
Antalya	Serik	Sarıabalı	Sarıabalı Borrow Pit (AO-1)	249,000	375 m^3/hour 36 months
Antalya	Serik	Sarıabalı	Concrete Plant-1	13,946	140 m^3/hour 36 months

Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)	Area / Capacity Information / Operation Period
Antalya	Manavgat	Çakış	Çakış (TOY4a) Quarry	250,000	375 m^3/hour 36 months
Antalya	Manavgat	Taşağıl	Kuruçay (TOY4b) Quarry	243,000	375 m^3/hour 36 months
Antalya	Manavgat	Taşağıl	Concrete Plant-2	66,450	140 m^3/hour 36 months
Antalya	Manavgat	Taşağıl	Mechanical Plant-1		550 tonnes/hour 16 months
Antalya	Manavgat	Taşağıl	Asphalt Plant-1		240 tonnes/hour 16 months
Antalya	Manavgat	Yeniköy	Concrete Plant-3	15,000	140 m^3/hour 36 months
Antalya	Manavgat	Sarılar	Dikmen Quarry	245,000	375 m^3/hour 36 months
Antalya	Manavgat	Bucakşeyhler	Concrete Plant-4	42,371	140 m^3/hour 36 months
Antalya	Manavgat	Bucakşeyhler	Mechanical Plant-2		550 tonnes/hour 16 months
Antalya	Manavgat	Bucakşeyhler	Asphalt Plant-2		240 tonnes/hour 16 months
Antalya	Manavgat	Ulukapı	Concrete Plant-4a	11,665	140 m^3/hour 36 months
Antalya	Manavgat	Sülek	Concrete Plant-5	11,977	140 m^3/hour 36 months
Antalya	Manavgat	Gençler	Bademliyar (TO2) Quarry	179,000	375 m^3/hour 36 months

Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)	Area / Capacity Information / Operation Period
Antalya	Manavgat	Uzunlar	Çenger Stream Material Quarry	190,000	375 m^3/hour 36 months
Antalya	Manavgat	Uzunlar	Uzunlar (TOY5) Quarry	247,000	375 m^3/hour 16 months
Antalya	Manavgat	Karakaya	Karakaya Quarry	250,000	375 m^3/hour 16 months
Antalya	Alanya	Saburlar	Saburlar Quarry	250,000	375 m^3/hour 16 months
Antalya	Alanya	Karamanlar	Karamanlar Quarry	250,000	375 m^3/hour 16 months
Antalya	Alanya	İncekum	Concrete Plant-6	85,000	140 m^3/hour 36 months
Antalya	Alanya	İncekum	Mechanical Plant-3		550 tonnes/hour 16 months
Antalya	Alanya	İncekum	Asphalt Plant-3		550 tonnes/hour 16 months
Antalya	Alanya	Soğukpınar	Soğukpınar Quarry	251,000	375 m^3/hour 16 months

2.2.1.1. Motorway Construction Emissions-PM10

In this study, the emission calculations were based on the year 2026, during which the highest material production volumes were planned according to the construction schedule. A daily working duration of 20 hours was assumed to represent two active shifts, and this was directly used in estimating hourly emissions.

In 2026, which represents the peak construction year, the material quantities planned for excavation and filling activities were as follows:

Section 1: 11,051,751,74 m³ of cut excavation, 10,441,398.15 m³ of fill, and 1,111,699.72 m³ of stripping topsoil.

Section 2: 11,214,274.79 m³ of cut excavation, 8,330,618.89 m³ of fill, and 674,380.30 m³ of stripping topsoil.

Section1:

Hourly Production-Topsoil = 1,111,699.72 m³/year x 1year/365days /20 hours x 2 ton/m³ = 304.58 tons/hour.

Hourly Production-Cut Excavation = 11.051.751,74 m³/year x 1year/365days /20 hours x 2 ton/m³ = 3,027.88 tons/hour.

Total material mass = 22.604.849,61 m³/year x 1year/365days /20 hours x 2 ton/m³ = 6,193.11 tons/hour.

a) Estimated dust emissions during excavation operations-topsoil:

Uncontrolled = 304.58 tons/hour x 0.0073 kg/t = 2.223 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.223 kg/h x %50 = 1.112 kg/h

b) Estimated dust emissions during excavation operations:

Uncontrolled = 3,027.88 tons/hour x 0.012 kg/t = 36.33 kg/h

Controlled = Uncontrolled x Control Efficiency = 36.33 kg/h x %50 = 18.17 kg/h

c) Estimated dust emissions during loading-unloading operations:

Uncontrolled = 6,193.11 tons/hour x 0.0043 kg/t = 26.63 kg/h

Controlled = Uncontrolled x Control Efficiency = 26.63 kg/h x %50 = 13.32 kg/h

d) The amount of dust that may occur during the storage of overburden:

Uncontrolled = 0.2 kg/ha/h x 20 ha = 4 kg/h

Controlled = Uncontrolled x Control Efficiency = 2 kg/h x %50 = 2 kg/h

Section2:

Hourly Production-Topsoil = 674.380,30 m³/year x 1year/365days /20 hours x 2 ton/m³ = 184.76 tons/hour.

Hourly Production-Cut Excavation = 11.214.274,79 m³/year x 1year/365days /20 hours x 2 ton/m³ = 3,072.40 tons/hour.

Total material mass = 20.219.273,98 m³/year x 1year/365days /20 hours x 2 ton/m³ = 5,539.53 tons/hour.

a) Estimated dust emissions during excavation operations-topsoil:

Uncontrolled = 184.76 tons/hour x 0.0073 kg/t = 1.349 kg/h

Controlled = Uncontrolled x Control Efficiency = 1.349 kg/h x %50 = 0.674 kg/h

b) Estimated dust emissions during excavation operations:

Uncontrolled = 3,072.4 tons/hour x 0.012 kg/t = 36.87 kg/h

Controlled = Uncontrolled x Control Efficiency = 36.87 kg/h x %50 = 18.43 kg/h

c) Estimated dust emissions during loading-unloading operations:

Uncontrolled = 5,539.53 tons/hour x 0.0043 kg/t = 23.82 kg/h

Controlled = Uncontrolled x Control Efficiency = 23.82 kg/h x %50 = 11.91 kg/h

d) The amount of dust that may occur during the storage of overburden:

Uncontrolled = 0.2 kg/ha/h x 20 ha = 4 kg/h

Controlled = Uncontrolled x Control Efficiency = 2 kg/h x %50 = 2 kg/h

In the scope of the Antalya–Alanya Motorway Project, controlled blasting operations are planned to be carried out at tunnel portals, cut slopes, and foundation excavation areas where hard and unweathered rock units are encountered. Due to the lack of precise temporal and spatial data regarding blasting events (i.e., no fixed blasting schedule or exact locations are defined in the design documents), blasting emissions have been modeled separately from other continuous sources such as traffic and crushing-screening activities. This approach is consistent with international modeling practices for short-term, intermittent, and spatially

uncertain emission sources. In the modeling study, a total of 14 different blasting scenarios were simulated—seven scenarios for each of the two sections defined in the project area. These scenarios reflect various possible combinations of blasting location and meteorological conditions. Among them, only the maximum GLC value obtained across all scenarios was considered in the final evaluation, in order to reflect the most conservative impact assessment.

To simulate a worst-case but technically realistic scenario, emissions from a single representative blasting event have been distributed across multiple potential blasting zones. This allows for a comprehensive understanding of their possible cumulative impact, regardless of where and when the actual blasting occurs.

The particulate matter emissions (PM ≤ 10 μm) from a typical controlled blasting operation were estimated using the following empirical equation based on surface area:

Emission Factor (PM ≤ 10 μm):$E=0.000114\times A^{1.5}$

Where:

A: Blasting surface area (m^2)

E: Emission per blasting event (kg)

Blasting Surface Area Calculation:Burden×Spacing×Number of Holes

=2.7 m×3.3 m×150 =1336

$E=0.000114\times(1336)^{1.5}\approx 0.000114\times 1336\approx 5.56$ kg per blast

Emission Rate per Unit Area:

Assuming the dust disperses within 10 seconds, the emission rate is:

5.56 kg/blasting x / (10 s x 1336 m^2) x 1000 gr/ kg = 0.4162 g/s.m^2 olacaktır.

2.2.1.2. Facility-Based Emission Calculations-PM10

The operation period of the mentioned mine is 5 years and 20% of the production is waste. This overburden will be taken and then will be stored for use in rehabilitation work In the scope of the emission inventory prepared for this study, facility-based calculations were performed using detailed input parameters such as production capacity, material density, operational duration, and activity-specific emission factors. The estimations include both

overburden-related operations (excavation, loading, unloading, storage, and transportation) and emissions from facilities such as concrete batching plants, mechanical stabilization plants, asphalt plants, and quarries.

Each facility was assessed individually or grouped depending on the similarity of operational capacity and process type. Specifically:

Facilities operating with identical capacity and function were calculated using a single representative scenario to avoid redundancy. Facilities with different capacities or emission characteristics were evaluated separately using distinct emission factors and activity parameters.

2.2.1.2.1. Quarry-Based Emission Calculation

Within the scope of the emission assessment, the following quarry sites were included in the modeling study: Çakış Quarry, Dikmen Quarry, Bademliyar Quarry, Uzunlar Quarry, Karakaya Quarry, Saburlar Quarry, Karamanlar Quarry, and Soğukpınar Quarry.

For each of these quarry operations, the total operational period has been assumed to be 36 months. It is also assumed that 20% of the extracted material constitutes overburden or waste, which will be excavated and stored for later use in site rehabilitation activities.

As the maximum production rate within the scope of the project is 375 m^3/hour and the material density is 1.65 tons/m^3, the total mass flow rate is calculated as 618.8 tons/hour.

The amount of waste/overburden to be produced in a year: [618.8 tons/h] x [0.2] = 123.8 tons/hour

Considering that overburdened land will be purchased during one year of work in the operation area;

Number of Shifts = 2

Monthly Working Time = 25 days/month

1. Dust Amount That May Occur During Overburden Operations

a) The amount of dust that may occur during the excavate of overburden:

Uncontrolled = 123.8 tons/hour x 0.012 kg/t = 1.486 kg/h

Controlled = Uncontrolled x Control Efficiency = 1.486 kg/h x %50 = 0.743 kg/h

b) The amount of dust emission that may occur during the loading of overburden into trucks:

Uncontrolled = 123.8 tons/hour x 0.0043 kg/t = 0.532 kg/h

Controlled = Uncontrolled x Control Efficiency = 0.532 kg/h x %50 = 0.266 kg/h

c) The amount of dust that may occur during the transportation of overburden:

The daily amount of overburden will be around 1238 tons. This material will be transported using 40-ton capacity dump trucks**.** A total of 31 round trips will be required per day to transport. The overburdened storage area is located at a distance of up to 100 meters. 200 meters will be traveled each time (round trip).

VKT= 31 trips/day x 1day/10 hour x 0.200 km/trip = 0.62 km/h

Uncontrolled = 1.25 kg/VKT x 0.62 = 1.55 kg/h

Controlled = Uncontrolled x Control Efficiency = 1.55 kg/h x %50 = 0.78 kg/h

d) The amount of dust that may occur during the discharge of overburden to the storage area:

Uncontrolled = 123.8 tons/hour x 0.0043 kg/t = 0.532 kg/h

Controlled = Uncontrolled x Control Efficiency = 0.532 kg/h x %50 = 0.266 kg/h

e) The amount of dust that may occur during the storage of overburden:

Uncontrolled = 0.2kg/ha/h x 1 ha = 0.20 kg/h

Controlled = Uncontrolled x Control Efficiency = 0.20 kg/h x %50 = 0.10 kg/h

2. Calculation of Dust to be Formed within the Scope of Quarry Activities:

Production of 495.04 tons/h in total (618.8 tons/h x 80%) per year in the quarry area is planned.

The material to be dismantled by the blasting method will be loaded on trucks and transported. This is the amount of dust that will occur during the work to be carried out in the quarry;

a) Amount of dust that may occur during blasting operations:

Emission = $0.000114 \times A^{1,5} = 0.000114 \times 500^{1,5} = 1.275$ kg/blasting

A= Total Area of Blasting = 500 m^2

Assuming that the dust is damped within 10 seconds in each blast and it will be done in an area of 500 m^2;

1.275 kg/blast x 1 blast/ (10 sec x 500m^2) x 1000 gr/kg = 0.255 g/s.m^2.

b) Amount of dust that may occur during excavate:

Uncontrolled = 495.04 tons/hour x 0.014 kg/t = 6.931 kg/h

Controlled = Uncontrolled x Control Efficiency = 6.931 kg/h x %50 = 3.465 kg/h

c) Amount of dust that may occur during loading:

Uncontrolled = 495.04 tons/hour x 0.0043 kg/t = 2.128 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.128 kg/h x %50 = 1.064 kg/h

d) The amount of dust that may occur during the movements of the vehicles inside the query:

The daily amount of ore will be around 4950 tons. The daily amount of overburden will be around 1238 tons. This material will be transported using 40-ton capacity dump trucks. A total of 124 round trips will be required per day to transport. If we take half of this 100-meter distance in the quarry area, we get the average distance during the years of production. 200 meters will be covered each time (round trip).

VKT= 124 trips/day x 1day/10 hour x 0.2 km/trip = 2.48 km/h

Uncontrolled = 1.25 kg/VKT x 2.48 = 3.1 kg/h

Controlled = Uncontrolled x Control Efficiency = 3.1 kg/h x %50 = 1.55 kg/h

2.2.1.2.2. Borrow Pit Operations

The Çenger Stream Material Quarry and Sarıabalı Borrow Pit are included within the scope of the project. The Sarıabalı Borrow Pit has a production capacity of 375 m³/hour. The planned operational period for this site is 36 months.

The material to be extracted from the Sarıabalı Borrow Pit consists entirely of soft, unconsolidated soil and sediment, and is therefore classified entirely as overburden.

Given a maximum production rate of 375 m³/hour and a material density of 1.75 tons/m³, the total mass flow rate is calculated as 656.3 tons/hour.

a) Dust Amount That May Occur During Overburden Operations

The amount of dust that may occur during the excavate of overburden:

Uncontrolled = 656.3 tons/hour x 0.012 kg/t = 7.877 kg/h

Controlled = Uncontrolled x Control Efficiency = 7.877 kg/h x %50 = 3.939 kg/h

b) The amount of dust emission that may occur during the loading of overburden into trucks:

Uncontrolled = 656.3 tons/hour x 0.0043 kg/t = 2.822 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.822 kg/h x %50 = 1.441 kg/h

c) The amount of dust that may occur during the transportation of overburden:

The daily amount of overburden will be around 6563 tons. This material will be transported using 40-ton capacity dump trucks. A total of 164 round trips will be required per day to transport. The overburdened storage area is located at a distance of up to 300 meters. 600 meters will be traveled each time (round trip).

VKT= 164 trips/day x 1day/10 hour x 0.600 km/trip = 0.984 km/h

Uncontrolled = 1.25 kg/VKT x 0.984km/h = 1.23 kg/h

Controlled = Uncontrolled x Control Efficiency = 1.23 kg/h x %50 = 0.62 kg/h

d) The amount of dust that may occur during the discharge of overburden to the storage area:

Uncontrolled = 656.3 tons/hour x 0.0043 kg/t = 2.822 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.822 kg/h x %50 = 1.441 kg/h

e) The amount of dust that may occur during the storage of overburden:

Uncontrolled = 0.2kg/ha/h x 1 ha = 0.20 kg/h

Controlled = Uncontrolled x Control Efficiency = 0.20 kg/h x %50 = 0.10 kg/h

2.2.1.2.3. Concrete Plant Operations

Concrete production activities within the scope of the project are carried out at several batching plants with varying capacities. Among these, facilities operating at a capacity of 140 m^3/hour represent the standard configuration and have been grouped together for emission estimation purposes. The following concrete plants fall into this category:

Concrete Plant-1 (Sarıabalı, Serik)

Concrete Plant-2 (Taşağıl, Manavgat)

Concrete Plant-3 (Yeniköy, Manavgat)

Concrete Plant-4 (Bucakşeyhler, Manavgat)

Concrete Plant-4a (Ulukapı, Manavgat)

Concrete Plant-5 (Sülek, Manavgat)

Concrete Plant-6 (İncekum, Alanya)

The emission calculations for concrete plants with a production capacity of 140 m³/hour are presented below.

a) Dust Emissions from the Transport of Raw Materials to the Concrete Plant

The hourly material input is approximately 315 tons (based on 140 m³/h × 2.25 ton/m³). A 40-ton truck will make approximately 8 trips per hour.

VKT = 8 trips/hour × 0.2 km/trip × 2 (round trip) = 3.2 km/h

Uncontrolled Emission = 1.25 kg/VKT × 3.2 = 4 kg/h

Controlled Emission (50%) = 2 kg/h

b) Dust Emissions from the Discharge of Aggregate into the Bunker

Uncontrolled Emission = 315 tons/hour × 0.0043 kg/ton = 1.35 kg/h

Controlled Emission (50%) = 0.68 kg/h

c) Dust Emissions from Loading Material Leaving the Plant

Assuming dry material is loaded,

Uncontrolled Emission = 315 tons/hour × 0.0043 kg/ton = 1.35 kg/h

Controlled Emission (50%) = 0.68 kg/h

d) Dust Emissions from the Transport of Final Product (Ready-Mix Concrete)

The hourly material input is approximately 315 tons (based on 140 m³/h × 2.25 ton/m³). A 40-ton truck will make approximately 8 trips per hour.

VKT = 8 trips/hour × 0.2 km/trip × 2 (round trip) = 3.2 VKT/h

Uncontrolled Emission = 1.25 kg/VKT × 3.2 VKT/h = 4 kg/h

Controlled Emission (50%) = 2 kg/h

2.2.1.2.4. Asphalt Plant Operations

Asphalt production within the scope of the project is conducted at multiple asphalt plants with differing capacities and operational periods. In the emission inventory, asphalt plants

were grouped based on their hourly production capacity and operating duration, as these factors directly affect the magnitude of emissions.

Grouped Asphalt Plant Capacities

Group A – 240 tonnes/hour (16 months):

Asphalt Plant-1 (Taşağıl, Manavgat)

Asphalt Plant-2 (Bucakşeyhler, Manavgat)

Group B – 550 tonnes/hour (16 months):

Asphalt Plant-3 (İncekum, Alanya)

Group A – 240 tons/hour Asphalt Plants

The mechanical stabilization facilities in this group are designed to operate at 240 tons/hour, for 10 hours per day.

The mechanical stabilization facility to be established will have a capacity of 240 tons/hour.

The facility will operate 10 hours a day.

Therefore,

1-The Amount of Dust That May Occur During Discharge:

Uncontrolled = 240 tons/hour x 0.0043 kg/t = 1.032 kg/h

Controlled = Uncontrolled x Control Efficiency = 1.032 kg/h x %50 = 0.516 kg/h

2-The Amount of Dust That May Be Occurred During the Movements of the Vehicles:

1 truck of 40 tons will make a total of 6 trips in 1 a hour for transportation.

VKT= 6 trips/h x x 0.200 km/trip = 1.2 km/h

Uncontrolled = 1.25 kg/VKT x 1.2 = 1.5 kg/h

Controlled = Uncontrolled x Control Efficiency = 1.5 kg/h x %50 = 0.75 kg/h

Group B – 550 tons/hour Asphalt Plant

This facility is designed to operate at 550 tons/hour, also for 10 hours per day.

Therefore,

1-The Amount of Dust That May Occur During Loading:

Uncontrolled = 550 tons/hour x 0.0043 kg/t = 2.365 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.365 kg/h x %50 = 1.183 kg/h

2-The Amount of Dust That May Be Occurred During the Movements of the Vehicles:

1 truck of 40 tons will make a total of 14 trips in 1 a hour for transportation.

VKT= 14 trips/h x x 0.200 km/trip = 0.2km/h

Uncontrolled = 1.25 kg/VKT x 0.2 = 2.8 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.8 kg/h x %50 = 1.4 kg/h

2.2.1.2.5. Mechanical Plant Operations

Mechanical stabilization activities within the scope of the project are carried out at several plants operating at an identical production capacity of 550 tonnes/hour. Due to their uniform characteristics in both capacity and operational period, these facilities were grouped together for emission estimation purposes and evaluated using a single representative calculation scenario.

The following mechanical plants fall into this category:

Mechanical Plant-1 (Taşağıl, Manavgat)

Mechanical Plant-2 (Bucakşeyhler, Manavgat)

Mechanical Plant-3 (İncekum, Alanya)

Each facility is planned to operate for 16 months, with an average of 10 working hours per day.

Therefore,

1-The Amount of Dust That May Occur During Loading:

Uncontrolled = 550 tons/hour x 0.0043 kg/t = 2.365 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.365 kg/h x %50 = 1.183 kg/h

2-The Amount of Dust That May Be Occurred During the Movements of the Vehicles:

1 truck of 40 tons will make a total of 14 trips in 1 a hour for transportation.

VKT= 14 trips/h x x 0.200 km/trip = 0.2km/h

Uncontrolled = 1.25 kg/VKT x 0.2 = 2.8 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.8 kg/h x %50 = 1.4 kg/h

2.2.1.3. Motorway Construction Emissions-TPM

In this study, the emission calculations were based on the year 2026, during which the highest material production volumes were planned according to the construction schedule. A daily working duration of 20 hours was assumed to represent two active shifts, and this was directly used in estimating hourly emissions.

In 2026, which represents the peak construction year, the material quantities planned for excavation and filling activities were as follows:

Section 1: 11,051,751,74 m³ of cut excavation, 10,441,398.15 m³ of fill, and 1,111,699.72 m³ of stripping topsoil.

Section 2: 11,214,274.79 m³ of cut excavation, 8,330,618.89 m³ of fill, and 674,380.30 m³ of stripping topsoil.

Section1:

Hourly Production-Topsoil = 1,111,699.72 m³/year x 1year/365days /20 hours x 2 ton/m³ = 304.58 tons/hour.

Hourly Production-Cut Excavation = 11.051.751,74 m³/year x 1year/365days /20 hours x 2 ton/m³ = 3,027.88 tons/hour.

Total material mass = 22.604.849,61 m³/year x 1year/365days /20 hours x 2 ton/m³ = 6,193.11 tons/hour.

a) Estimated dust emissions during excavation operations-topsoil:

Uncontrolled = 304.58 tons/hour x 0.029 kg/t = 8.833 kg/h

Controlled = Uncontrolled x Control Efficiency = 8.833 kg/h x %50 = 4.417 kg/h

b) Estimated dust emissions during excavation operations:

Uncontrolled = 3,027.88 tons/hour x 0.025 kg/t = 75.70 kg/h

Controlled = Uncontrolled x Control Efficiency = 75.70 kg/h x %50 = 37.85 kg/h

c) Estimated dust emissions during loading-unloading operations:

Uncontrolled = 6,193.11 tons/hour x 0.012 kg/t = 74.32 kg/h

Controlled = Uncontrolled x Control Efficiency = 74.32 kg/h x %50 = 37.16 kg/h

d) The amount of dust that may occur during the storage of overburden:

Uncontrolled = 0.4 kg/ha/h x 20 ha = 8 kg/h

Controlled = Uncontrolled x Control Efficiency = 8 kg/h x %50 = 4 kg/h

Section2:

Hourly Production-Topsoil = 674.380,30 m³/year x 1year/365days /20 hours x 2 ton/m³ = 184.76 tons/hour.

Hourly Production-Cut Excavation = 11.214.274,79 m³/year x 1year/365days /20 hours x 2 ton/m³ = 3,072.40 tons/hour.

Total material mass = 20.219.273,98 m³/year x 1year/365days /20 hours x 2 ton/m³ = 5,539.53 tons/hour.

a) Estimated dust emissions during excavation operations-topsoil:

Uncontrolled = 184.76 tons/hour x 0.029 kg/t = 5.358 kg/h

Controlled = Uncontrolled x Control Efficiency = 5.358 kg/h x %50 = 2.679 kg/h

b) Estimated dust emissions during excavation operations:

Uncontrolled = 3,072.4 tons/hour x 0.025 kg/t = 76.81 kg/h

Controlled = Uncontrolled x Control Efficiency = 76.81 kg/h x %50 = 38.41 kg/h

c) Estimated dust emissions during loading-unloading operations:

Uncontrolled = 5,539.53 tons/hour x 0.012 kg/t = 66.47 kg/h

Controlled = Uncontrolled x Control Efficiency = 23.82 kg/h x %50 = 33.23 kg/h

d) The amount of dust that may occur during the storage of overburden:

Uncontrolled = 0.4 kg/ha/h x 20 ha = 8 kg/h

Controlled = Uncontrolled x Control Efficiency = 2 kg/h x %50 = 4 kg/h

2.2.1.4. Facility-Based Emission Calculations-TPM

The operation period of the mentioned mine is 5 years and 20% of the production is waste. This overburden will be taken and then will be stored for use in rehabilitation work In the scope of the emission inventory prepared for this study, facility-based calculations were performed using detailed input parameters such as production capacity, material density, operational duration, and activity-specific emission factors. The estimations include both overburden-related operations (excavation, loading, unloading, storage, and transportation) and emissions from facilities such as concrete batching plants, mechanical stabilization plants, asphalt plants, and quarries.

Each facility was assessed individually or grouped depending on the similarity of operational capacity and process type. Specifically:

Facilities operating with identical capacity and function were calculated using a single representative scenario to avoid redundancy. Facilities with different capacities or emission characteristics were evaluated separately using distinct emission factors and activity parameters.

2.2.1.4.1. Quarry-Based Emission Calculation

Within the scope of the emission assessment, the following quarry sites were included in the modeling study: Çakış Quarry, Dikmen Quarry, Bademliyar Quarry, Uzunlar Quarry, Karakaya Quarry, Saburlar Quarry, Karamanlar Quarry, and Soğukpınar Quarry.

For each of these quarry operations, the total operational period has been assumed to be 36 months. It is also assumed that 20% of the extracted material constitutes overburden or waste, which will be excavated and stored for later use in site rehabilitation activities.

As the maximum production rate within the scope of the project is 375 m^3/hour and the material density is 1.65 tons/m^3, the total mass flow rate is calculated as 618.8 tons/hour.

The amount of waste/overburden to be produced in a year: [618.8 tons/h] x [0.2] = 123.8 tons/hour

Considering that overburdened land will be purchased during one year of work in the operation area;

Number of Shifts = 2

Monthly Working Time = 25 days/month

Daily Working Time = 10 hours/day

3. Dust Amount That May Occur During Overburden Operations

f) The amount of dust that may occur during the excavate of overburden:

Uncontrolled = 123.8 tons/hour x 0.025 kg/t = 3.095 kg/h

Controlled = Uncontrolled x Control Efficiency = 3.095 kg/h x %50 = 1.548 kg/h

g) The amount of dust emission that may occur during the loading of overburden into trucks:

Uncontrolled = 123.8 tons/hour x 0.012 kg/t = 1.486 kg/h

Controlled = Uncontrolled x Control Efficiency = 1.486 kg/h x %50 = 0.743 kg/h

h) The amount of dust that may occur during the transportation of overburden:

The daily amount of overburden will be around 1238 tons. This material will be transported using 40-ton capacity dump trucks. A total of 31 round trips will be required per day to transport. The overburdened storage area is located at a distance of up to 100 meters. 200 meters will be traveled each time (round trip).

VKT= 31 trips/day x 1day/10 hour x 0.200 km/trip = 0.62 km/h

Uncontrolled = 4.23 kg/VKT x 0.62 = 2.623 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.623 kg/h x %50 = 1.312 kg/h

i) The amount of dust that may occur during the discharge of overburden to the storage area:

Uncontrolled = 123.8 tons/hour x 0.012 kg/t = 1.486 kg/h

Controlled = Uncontrolled x Control Efficiency = 1.486 kg/h x %50 = 0.743 kg/h

The amount of dust that may occur during the storage of overburden:

Uncontrolled = 0.4 kg/ha/h x 1 ha = 0.40 kg/h

Controlled = Uncontrolled x Control Efficiency = 0.40 kg/h x %50 = 0.20 kg/h

4. Calculation of Dust to be Formed within the Scope of Quarry Activities:

Production of 495.04 tons/h in total (618.8 tons/h x 80%) per year in the quarry area is planned.

The material to be dismantled by the blasting method will be loaded on trucks and transported. This is the amount of dust that will occur during the work to be carried out in the quarry;

e) Amount of dust that may occur during blasting operations:

Emission = 0,00022 $\times A^{1,5}$ = 0,000114 $\times 500^{1,5}$ = 2.460 kg/blasting

A= Total Area of Blasting = 500 m^2

Assuming that the dust is damped within 10 seconds in each blast and it will be done in an area of 500 m^2;

2.460 kg/blast x 1 blast/ (10 sec x 500m^2) x 1000 gr/kg = 0.492 g/s.m2.

f) Amount of dust that may occur during excavate:

Uncontrolled = 495.04 tons/hour x 0.029 kg/t = 14.356 kg/h

Controlled = Uncontrolled x Control Efficiency = 14.356 kg/h x %50 = 7.178 kg/h

g) Amount of dust that may occur during loading:

Uncontrolled = 495.04 tons/hour x 0.012 kg/t = 5.940 kg/h

Controlled = Uncontrolled x Control Efficiency = 5.940 kg/h x %50 = 2.970 kg/h

h) The amount of dust that may occur during the movements of the vehicles inside the query:

The daily amount of ore will be around 4950 tons. The daily amount of overburden will be around 1238 tons. This material will be transported using 40-ton capacity dump trucks. A total of 124 round trips will be required per day to transport. If we take half of this 100-meter distance in the quarry area, we get the average distance during the years of production. 200 meters will be covered each time (round trip).

VKT= 124 trips/day x 1day/10 hour x 0.2 km/trip = 2.48 km/h

Uncontrolled = 4.23 kg/VKT x 2.48 km/h = 10.49 kg/h

Controlled = Uncontrolled x Control Efficiency = 10.49 kg/h x %50 = 5.25 kg/h

2.2.1.4.2. Borrow Pit Operations

The Çenger Stream Material Quarry and Sarıabalı Borrow Pit are included within the scope of the project. The Sarıabalı Borrow Pit has a production capacity of 375 m³/hour. The planned operational period for this site is 36 months.

The material to be extracted from the Sarıabalı Borrow Pit consists entirely of soft, unconsolidated soil and sediment, and is therefore classified entirely as overburden.

Given a maximum production rate of 375 m³/hour and a material density of 1.75 tons/m³, the total mass flow rate is calculated as 656.3 tons/hour.

f) Dust Amount That May Occur During Overburden Operations

The amount of dust that may occur during the excavate of overburden:

Uncontrolled = 656.3 tons/hour x 0.025 kg/t = 16.41 kg/h

Controlled = Uncontrolled x Control Efficiency = 16.41 kg/h x %50 = 8.205 kg/h

g) The amount of dust emission that may occur during the loading of overburden into trucks:

Uncontrolled = 656.3 tons/hour x 0.012 kg/t = 7.876 kg/h

Controlled = Uncontrolled x Control Efficiency = 7.876 kg/h x %50 = 3.938 kg/h

h) The amount of dust that may occur during the transportation of overburden:

The daily amount of overburden will be around 6563 tons. This material will be transported using 40-ton capacity dump trucks. A total of 164 round trips will be required per day to transport. The overburdened storage area is located at a distance of up to 300 meters. 600 meters will be traveled each time (round trip).

VKT= 164 trips/day x 1day/10 hour x 0.600 km/trip = 0.984 km/h

Uncontrolled = 4.23 kg/VKT x 0.984 km/h = 4.162 kg/h

Controlled = Uncontrolled x Control Efficiency = 4.162 kg/h x %50 = 2.081 kg/h

i) The amount of dust that may occur during the discharge of overburden to the storage area:

Uncontrolled = 656.3 tons/hour x 0.012 kg/t = 7.876 kg/h

Controlled = Uncontrolled x Control Efficiency = 7.876 kg/h x %50 = 3.938 kg/h

The amount of dust that may occur during the storage of overburden:

Uncontrolled = 0.4 kg/ha/h x 1 ha = 0.40 kg/h

Controlled = Uncontrolled x Control Efficiency = 0.40 kg/h x %50 = 0.20 kg/h

2.2.1.4.3. Concrete Plant Operations

Concrete production activities within the scope of the project are carried out at several batching plants with varying capacities. Among these, facilities operating at a capacity of 140 m³/hour represent the standard configuration and have been grouped together for emission estimation purposes. The following concrete plants fall into this category:

Concrete Plant-1 (Sarıabalı, Serik)

Concrete Plant-2 (Taşağıl, Manavgat)

Concrete Plant-3 (Yeniköy, Manavgat)

Concrete Plant-4 (Bucakşeyhler, Manavgat)

Concrete Plant-4a (Ulukapı, Manavgat)

Concrete Plant-5 (Sülek, Manavgat)

Concrete Plant-6 (İncekum, Alanya)

The emission calculations for concrete plants with a production capacity of 140 m³/hour are presented below.

a) Dust Emissions from the Transport of Raw Materials to the Concrete Plant

The hourly material input is approximately 315 tons (based on 140 m³/h × 2.25 ton/m³). A 40-ton truck will make approximately 8 trips per hour.

VKT = 8 trips/hour × 0.2 km/trip × 2 (round trip) = 3.2 km/h

Uncontrolled Emission = 4.23 kg/VKT × 3.2 = 13.536 kg/h

Controlled Emission (50%) = 6.768 kg/h

b) Dust Emissions from the Discharge of Aggregate into the Bunker

Uncontrolled Emission = 315 tons/hour × 0.012 kg/ton = 3.78 kg/h

Controlled Emission (50%) = 1.89 kg/h

c) Dust Emissions from Loading Material Leaving the Plant

Uncontrolled Emission = 315 tons/hour × 0.012 kg/ton = 3.78 kg/h

Controlled Emission (50%) = 1.89 kg/h

d) Dust Emissions from the Transport of Final Product (Ready-Mix Concrete)

The hourly material input is approximately 315 tons (based on 140 m^3/h × 2.25 ton/m^3). A 40-ton truck will make approximately 8 trips per hour.

VKT = 8 trips/hour × 0.2 km/trip × 2 (round trip) = 3.2 VKT/h

Uncontrolled Emission = 4.23 kg/VKT × 3.2 VKT/h = 13.536 kg/h

Controlled Emission (50%) = 6.768 kg/h

2.2.1.4.4. Asphalt Plant Operations

Asphalt production within the scope of the project is conducted at multiple asphalt plants with differing capacities and operational periods. In the emission inventory, asphalt plants were grouped based on their hourly production capacity and operating duration, as these factors directly affect the magnitude of emissions.

Grouped Asphalt Plant Capacities

Group A – 240 tonnes/hour (16 months):

Asphalt Plant-1 (Taşağıl, Manavgat)

Asphalt Plant-2 (Bucakşeyhler, Manavgat)

Group B – 550 tonnes/hour (16 months):

Asphalt Plant-3 (İncekum, Alanya)

Group A – 240 tons/hour Asphalt Plants

The mechanical stabilization facilities in this group are designed to operate at 240 tons/hour, for 10 hours per day.

The mechanical stabilization facility to be established will have a capacity of 240 tons/hour.

The facility will operate 10 hours a day.

Therefore,

1-The Amount of Dust That May Occur During Discharge:

Uncontrolled = 240 tons/hour x 0.012 kg/t = 2.88 kg/h

Controlled = Uncontrolled x Control Efficiency = 2.88 kg/h x %50 = 1.44 kg/h

2-The Amount of Dust That May Be Occurred During the Movements of the Vehicles:

1 truck of 40 tons will make a total of 6 trips in 1 a hour for transportation.

VKT= 6 trips/h x x 0.200 km/trip = 1.2 km/h

Uncontrolled = 4.23 kg/VKT x 1.2 = 5.076 kg/h

Controlled = Uncontrolled x Control Efficiency = 5.076 kg/h x %50 = 2.538 kg/h

Group B – 550 tons/hour Asphalt Plant

This facility is designed to operate at 550 tons/hour, also for 10 hours per day.

Therefore,

1-The Amount of Dust That May Occur During Loading:

Uncontrolled = 550 tons/hour x 0.012 kg/t = 6.6 kg/h

Controlled = Uncontrolled x Control Efficiency = 6.6 kg/h x %50 = 3.3 kg/h

2-The Amount of Dust That May Be Occurred During the Movements of the Vehicles:

VKT= 14 trips/h x 0.200 km/trip = 2.8 km/h

Uncontrolled = 4.23 kg/VKT x 2.8 = 11.84 kg/h

Controlled = Uncontrolled x Control Efficiency = 11.84 kg/h x %50 = 5.92 kg/h

2.2.1.4.5. Mechanical Plant Operations

Mechanical stabilization activities within the scope of the project are carried out at several plants operating at an identical production capacity of 550 tonnes/hour. Due to their uniform characteristics in both capacity and operational period, these facilities were grouped together for emission estimation purposes and evaluated using a single representative calculation scenario.

The following mechanical plants fall into this category:

Mechanical Plant-1 (Taşağıl, Manavgat)

Mechanical Plant-2 (Bucakşeyhler, Manavgat)

Mechanical Plant-3 (İncekum, Alanya)

Each facility is planned to operate for 16 months, with an average of 10 working hours per day.

Therefore,

1-The Amount of Dust That May Occur During Loading:

Uncontrolled = 550 tons/hour x 0.012 kg/t = 6.6 kg/h

Controlled = Uncontrolled x Control Efficiency = 6.6 kg/h x %50 = 3.3 kg/h

2-The Amount of Dust That May Be Occurred During the Movements of the Vehicles:

1 truck of 40 tons will make a total of 14 trips in 1 a hour for transportation.

VKT= 14 trips/h x 0.200 km/trip = 2.8 km/h

Uncontrolled = 4.23 kg/VKT x 2.8 = 11.84 kg/h

Controlled = Uncontrolled x Control Efficiency = 11.84 kg/h x %50 = 5.92 kg/h

2.2.1.5. Exhaust emissions from construction machinery

In this study, the estimation of exhaust emissions from construction machinery was carried out using a methodology based on engine power (kW), Tier 4 emission standards (g/kWh), and category-specific load factors (LF). This method provides a more realistic emission profile for heavy-duty non-road mobile machinery typically used in large-scale highway construction.

For each equipment type, the following parameters were determined:

- Emission factors (for CO, NO_x, and PM) were matched based on the machine's power class according to U.S. EPA Tier 4 Final emission standards, as outlined in the Code of Federal Regulations (40 CFR Part 1039 – Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines).
- Load factors (LF) were assigned based on equipment function and operational characteristics, referencing Australian *National Pollutant Inventory (NPI)* guidance.

The emission factor assignment is illustrated in the table below.

Table 5 Emission Calculations of Construction Machinery

Machine Type	Piece[1]	Power (kW)[2]	Tier 4 CO (g/kWh)[3]	Tier 4 NOx (g/kWh)[4]	Load Factor (LF)[5]	CO(g/s) (1x2x3x20hours *5/86400hour/second)	NOx (g/s) (1x2x4x20hours* 5/86400hour/second)

DUMP TRUCK	140	300	3.5	0.4	0.5	17.01389	1.944444
CATERPILLAR D9T BULLDOZER	14	310	3.5	0.4	0.55	1.933912	0.221019
HİDROMEK HMK220LC3 CRAWLER EXCAVATOR	3	124	5	0.4	0.55	0.236806	0.018944
HİDROMEK HMK220LC3TX CRAWLER EXCAVATOR	12	124	5	0.4	0.55	0.947222	0.075778
HİDROMEK HMK370LCHD CRAWLER EXCAVATOR	5	212	3.5	0.4	0.55	0.472338	0.053981
CATERPILLAR 349D2L CRAWLER EXCAVATOR	31	320	3.5	0.4	0.55	4.42037	0.505185
CATERPILLAR 966L LOADER	20	225	3.5	0.4	0.5	1.822917	0.208333
CAT 14M GRADER	5	205	3.5	0.4	0.5	0.41522	0.047454
CATERPILLAR CS64B SOIL COMPACTOR	14	112	5	0.4	0.5	0.907407	0.072593
HAMM HD140VV DOUBLE DRUM COMPACTOR	10	114	5	0.4	0.5	0.659722	0.052778
HAMM GRW18 WHEELED ROLLER	10	140	3.5	0.4	0.5	0.56713	0.064815
MERCEDES 4142K 8X4 DOĞAN TANKER 22M3 WATER TRUCK	7	260	3.5	0.4	0.5	0.737269	0.084259
ATLAS COPCO L2D JUMBO	12	160	3.5	0.4	0.5	0.777778	0.088889
ATLAS COPCO T40-11 ROCK DRILLER	12	175	3.5	0.4	0.5	0.850694	0.097222
MERCEDES 4142B 8X4 IMER LT12XL7H TRANSMİXER	50	265	3.5	0.4	0.5	5.367477	0.613426
MERCEDES 4142P 8X4 PUTZMEISTER BSF47516H MOBILE CONCRETE PUMP	7	350	3.5	0.4	0.5	0.992477	0.113426
PUTZMEISTER BSA2110HP0 FIXED CONCRETE PUMP	16	210	3.5	0.4	0.5	1.361111	0.155556
TITAN IS26 4X4 SHOTCRETE MACHINE	12	200	3.5	0.4	0.5	0.972222	0.111111
INJECTION MACHINE	12	110	5	0.4	0.5	0.763889	0.061111
VOGELE SUP1900-3	5	180	3.5	0.4	0.5	0.364583	0.041667

ASPHALT PAVER							
VOGELE SUP2100-3 ASPHALT PAVER	7	200	3.5	0.4	0.5	0.56713	0.064815
MERCEDES 3332B 6X4 ASFALT DISTRIBUTOR	2	240	3.5	0.4	0.5	0.194444	0.022222
MAN TGS33.360 6X4 EFFER 95TLF65/45 MOBILE CRANE	20	265	3.5	0.4	0.55	2.36169	0.269907
MANITOU GT1440 TELEHANDLER	12	74	5	0.4	0.5	0.513889	0.041111
MEKA K140 FIXET CONCRETE BATCHING PLANT	7	300	3.5	0.4	0.85	1.446181	0.165278
BENNINGHOVEN ECO3000U/240 ASPHALT PLANT	3	310	3.5	0.4	0.85	0.640451	0.073194
3" flygt (3,7 kW) - PUMP	21	3.7	8	0.4	0.8	0.115111	0.005756
550 T/H MECHANICAL PLANT	3	250	3.5	0.4	0.85	0.516493	0.059028

Additionally, for the purpose of dispersion modeling:

It was assumed that 50% of total NO_x emissions are converted to NO_2 in the atmosphere, in accordance with common regulatory modeling conventions.

The total emission rates of CO and NO_2 are equally split between two sections for each pollutant.

2.2.2 Operational Phase Emission Calculations

In this section, the emissions that will arise from the operational phase of the planned project the measures to be taken to keep these emissions to a minimum are summarized. The AERMOD modeling program works with a maximum radius of 50 km. Since the project exceeds these limits, it has been modeled as two parts. In the remainder of the report, these parts are called section1 and section2.

NO_2, CO, $PM_{10,}$ and VOC emissions will occur due to the traffic on the motorway. These emissions are calculated according to the emissions taken from the EMEP/EEA1.A.3.b.i-iv Road transport guidebook and given in between Table 9 and Table 13 for various types of

vehicles. Although the project is located in Türkiye, it is common practice in environmental impact assessments conducted within Türkiye to adopt internationally recognized emission factors—particularly when local factors are overly generalized or not sufficiently representative of specific activity types. In this context, the Australian emission factors were preferred due to their applicability to construction-related operations and their consistency with internationally accepted modeling practices. The number of vehicles expected to pass through the motorway is given in according to the vehicle types. Considering the worst-case scenario, the data of 2040, where the number of vehicles was the highest, was used in the model study. Dust emissions are not modeled in this section as they are considerably lower than the construction phase. Although no modeling was conducted for dust emissions during the operational phase, it should be emphasized that significant particulate matter emissions are not expected under normal operating conditions. The operational phase consists primarily of vehicle movement on fully paved road surfaces, which generate only minimal levels of fugitive dust compared to the unpaved surfaces and intensive soil handling activities of the construction phase.

Within the scope of this study, sulfur dioxide (SO_2) emissions were not included in the dispersion modeling. This decision is based on the fact that the only considered source category is exhaust emissions from road traffic, where modern vehicles (complying with Euro V and later standards) predominantly use ultra-low sulfur diesel fuel (<10 ppm sulfur content). According to the EMEP/EEA Emission Inventory Guidebook, SO_2 emissions from such vehicles are negligible, and therefore do not significantly contribute to ambient SO_2 concentrations.

Emissions are calculated according to the number of vehicles and vehicle types, using the emission as mentioned above factors in the next section.

Table 6 Traffic Projection for Antalya Alanya Motorway Project (Annual Average Daily Traffic)-2028-2034

Type	2028	2029	2030	2031	2032	2033	2034
Car	13937	17406	20614	22047	23278	24473	25792
S-TR	4375	5453	6445	6880	7251	7610	8007
BUS	738	876	939	989	1040	1088	1141
Truck	3314	3932	4215	4443	4669	4886	5125

Other	2643	3135	3361	3542	3723	3896	4086
Total AADT PCU	25007	30802	35574	37902	39961	41952	44151

Table 7 Traffic Projection for Antalya Alanya Motorway Project (Annual Average Daily Traffic)-2035-2040

Type	2035	2036	2037	2038	2039	2040
Car	27188	28730	30230	31886	33639	35574
S-TR	8427	8891	9342	9841	10369	10952
BUS	1197	1259	1318	1383	1451	1526
Truck	5376	5652	5917	6209	6516	6854
Other	4286	4507	4718	4951	5196	5465
Total AADT PCU	46474	49039	51525	54269	57170	60372

In the scope of the air quality dispersion modeling, 2040 was selected as the target year for traffic-related emissions. Vehicle population data (in PCU – Passenger Car Unit) were projected across five categories: cars, small trucks (S-TR), buses, trucks, and other vehicles, with a total AADT of 60,372 PCU. In order to estimate future exhaust emissions accurately for this projected vehicle activity level, it was necessary to define a realistic distribution of vehicle types and fuel types expected in 2040.

The projected 2040 fleet composition and propulsion-type distribution used in the emissions modeling is based on a policy-aligned and evidence-based scenario. While not reflecting an official government forecast, it draws on empirical trends, strategic decarbonization goals, and realistic technological trajectories.

Türkiye's official climate roadmap targets carbon neutrality by 2053. In line with this, SHURA's strategic transport assessments (2023–2024) anticipate that 50% of the passenger car fleet will be electric by 2035. However, in this modeling study, a more conservative assumption of 40% EV share was adopted for 2040. This decision reflects a cautious approach that accounts for potential delays in consumer adoption, infrastructure deployment,

cost parity, and macroeconomic factors. Similarly, for urban buses, a 60% EV share is assumed, based on the progress already being made in electrifying public transport in major Turkish cities and in line with the European Commission's recommendation for 100% zero-emission urban buses by 2035.

Petrol-fueled vehicles are currently a major part of Türkiye's vehicle fleet. According to TÜİK statistics from 2022 to 2023, petrol cars represent approximately 30–35% of the fleet. Petrol-powered vehicles are expected to remain in use due to lower upfront costs, widespread fuel availability, and the ongoing production of internal combustion engine vehicles. This assumption is also supported by TÜİK's most recent 2025 data: as of April, petrol vehicles accounted for 48.1% of new car registrations and 33.6% of the entire registered passenger car stock (16.58 million vehicles), confirming the continuing relevance of petrol-fueled cars in both sales and national fleet composition. For this reason, a petrol share of 35% was assigned to the passenger car category in 2040, particularly representing aging and mid-range segments that are expected to persist within the national fleet.

Diesel vehicles are especially dominant in commercial transportation. As of 2022, diesel vehicles constituted approximately 34.7% of the Turkish vehicle fleet. They continue to be widely used due to high fuel efficiency, durability, and their suitability for heavy-duty and long-distance applications. In this scenario, diesel shares are assumed to be 20% for passenger cars, 65% for light commercial vehicles (S-TR), 90% for trucks, 40% for buses, and 95% for off-road utility vehicles such as agricultural and construction machinery. These assumptions are consistent with decarbonization scenarios developed by organizations such as the International Council on Clean Transportation (ICCT) and the International Energy Agency (IEA), both of which report slower electrification trends in high-torque and logistics sectors, especially in developing countries.

LPG vehicles have historically held a significant market share in Türkiye, due to advantages such as lower cost per kilometer, widespread infrastructure, and favorable taxation policies. While the share of LPG-fueled vehicles is expected to decline due to the electrification of the fleet and the gradual phase-out of dual-fuel vehicles, a residual 5% LPG share is retained in the 2040 scenario for passenger cars. This value reflects a realistic projection, acknowledging legacy vehicles and continued LPG usage in price-sensitive consumer segments.

The specific values used in the modeling are presented in Table 7. These category-specific distributions do not represent predictions, but rather plausible and scientifically defensible

planning scenarios that reflect Türkiye's stated net-zero goals and known market limitations. They aim to balance policy ambition with technical and economic feasibility. The scenario also considers that there is no official 2040 propulsion-type distribution published by the Turkish government, and as such, modeling exercises must rely on the best available knowledge and sources. To that end, this scenario integrates national statistical data (TÜİK, EMRA), long-term climate strategies (MoEUCC 2022), and international sectoral benchmarks (SHURA, ICCT, IEA).

Table 8 Projected 2040 Vehicle Fleet Composition and Fuel Type Distribution by Category

Vehicle Type	2040 Total	EV	%EV	Petrol	%Petrol	Diesel	%Diesel	LPG	%LPG
Car	35,574	14,230	40.0	12,451	35.0	7,115	20.0	1,779	5.0%
S-TR	10,952	2,190	20.0%	1,643	15.0	7,119	65.0	—	—
Bus	1,526	916	60.0	—	—	610	40.0	—	—
Truck	6,854	685	10.0	—	—	6,169	90.0	—	—
Other	5,465	273	5.0	—	—	5,192	95.0	—	—

Table 9 Emission Factors for Car[1]

Pollutant /Fuel Type	Emission Factor- Car (LV) (g/km)						
	Petrol Small	Petrol Medium	Petrol Large	Diesel Small	Diesel Medium	Diesel Large	LPG
CO	1.6025	1.36	1.1538	0.0522	0.1962	0.1962	2.3617
NO_2	0.1281	0.1428	0.1369	1.9513	4.6739	4.9949	0.4589
$PM10^2$	0.0016	0.0016	0.0016	0.0076	0.0486	0.0486	0.0018
VOC	0.3003	0.3281	0.2943	0.0325	0.0558	0.0675	0.6121

1-EMEP/EEA Road Transport Table 3-17– Average of all technologies

2- EMEP/EEA Road Transport Table 3-18– Average of all technologies

Table 10 Emission Factors for Light Commercial Vehicle[1]

Pollutant /Fuel Type	Emission Factor- Light Commercial Vehicle (LHV) (g/km)	
	Petrol	Diesel
CO	5.83	0.4047
NO_2	0.4813	0.9794
$PM10^2$	0.0026	0.0792
VOC	0.5838	0.3269

1-EMEP/EEA Road Transport Table 3-19 – Average of all technologies

2- EMEP/EEA Road Transport Table 3-20 – Average of all technologies

Table 11 Emission Factors for Buses[1]

Pollutant	Emission Factor- Buses (g/km)
	Urban Buses Standard
CO	1.8028
NO2	7.048
$PM10^2$	0.2132
VOC	1.6488

1-EMEP/EEA Road Transport Table 3-23 – Average of all technologies

2- EMEP/EEA Road Transport Table 3-24 – Average of all technologies

Table 12 Emission Factors for Trucks[1]

Pollutant /Fuel Type	Emission Factor- Trucks (HHV) (g/km)		
	Petrol >3.5 t	Diesel <=7.5 t	Diesel 7.5 - 16 t
CO	59.5	0.477	0.6635
NO_2	6.60	2.1404	3.5965
$PM10^2$	0.000	0.0753	0.0952
VOC	5.2717	0.3901	0.3913

1-EMEP/EEA Road Transport Table 3-21 – Average of all technologies

2- EMEP/EEA Road Transport Table 3-22 – Average of all technologies

Table 13 Emission Factors for Trucks-Trailer[1]

Pollutant /Fuel Type	Emission Factor- Trucks-Trailer (HHV) (g/km)	
	Diesel 16 - 32 t	Diesel >32 t
CO	0.8463	1.0143
NO_2	4.9068	5.8605
$PM10^2$	0.1313	0.1563
VOC	0.8929	0.8563

1-EMEP/EEA Road Transport Table 3-21 – Average of all technologies

2- EMEP/EEA Road Transport Table 3-22 – Average of all technologies

2.2.2.1. Emissions of Car type vehicles

In the previous modeling framework, simplified assumptions were made regarding the distribution of fuel types among passenger cars. However, in the current study, vehicle category-specific assumptions were made using 2040 projections based on electrification and alternative fuel trends in Türkiye.

For passenger cars, the following fuel distribution was applied based on 2040 projections:

Electric Vehicles (EV): 40.0%

Petrol: 35.0%

Diesel: 20.0%

LPG: 5.0%

The daily total vehicle count and corresponding vehicle subcategories used in emission factor calculations are presented in Table 14, while the resulting emission rates are provided in Table 15. To prepare model inputs for traffic-related emissions during the operational phase, pollutant-specific emission rates were calculated for different vehicle categories based on projected annual traffic data and relevant emission factors. These values were converted into a per-second emission rate and normalized using a representative spatial factor to make them compatible with the dispersion model's area source input format. This approach ensures consistent and realistic representation of line-based emissions within the modeling domain.

Table 14. Daily Total Vehicle Count- Car

Daily Total Vehicle Count - Car						
Petrol Small (%20)	**Petrol Medium (%10)**	**Petrol Large (%10)**	**Diesel Small (%10)**	**Diesel Medium (%10)**	**Diesel Large (%10)**	**LPG (%30)**
6225	3113	3113	2372	2372	2372	1779

Table 15. Emission Rate for Car

Pollutant	**Car -Emission Rate (g/s-km)- Emission Factor (g/km) x Daily Total Vehicle Count x (day/86400 s)**						
	Petrol Small	**Petrol Medium**	**Petrol Large**	**Diesel Small**	**Diesel Medium**	**Diesel Large**	**LPG**
CO	0.1155	0.0490	0.0416	0.0014	0.0054	0.0054	0.0486
NO_2	0.0092	0.0051	0.0049	0.0536	0.1283	0.1371	0.0094
PM_{10}	0.0001	0.0001	0.0001	0.0002	0.0013	0.0013	0.0000
VOC	0.0216	0.0118	0.0106	0.0009	0.0015	0.0019	0.0126

2.2.2.2. Emissions of Light Commercial Vehicles

For light commercial vehicles (S-TR), fuel type assumptions were updated based on 2040 projections:

Electric: 20.0%

Petrol: 15.0%

Diesel: 65.0%.

The number of vehicles calculated according to the assumptions made is shown in Table 16 for the first and second sections. Table 17 gives the emission values calculated according to the number of vehicles and different fuel types.

Table 16. Daily Total Vehicle Count- LHV

Daily Total Vehicle Count- LHV		
Petrol (%15)	**EV(%20)**	**Diesel (%65)**
1643	2190	7119

Table 17. Emission Rate for LHV

Pollutant	**LHV -Emission Rate (g/s-km)- Emission Factor (g/km) x Daily Total Vehicle Count x (day/86400 s)**	
	Petrol	**Diesel**
CO	0.1109	0.0333
NO_2	0.0092	0.0807
PM_{10}	0.0000	0.0065
VOC	0.0111	0.0269

2.2.2.3. Emissions of Buses

For buses, the 2040 vehicle fleet includes:

Electric Buses: 60.0%

Diesel Buses: 40.0%

Table 19 gives the emission values calculated according to the number of vehicles and different fuel types.

Table 18. Daily Total Vehicle Count - Buses

Daily Total Vehicle Count – Buses EV	Daily Total Vehicle Count – Buses Diesel
916	610

Table 19. Emission Rate for Buses

Pollutant	Buses-Emission Rate (g/s-km)- Emission Factor (g/km) x Daily Total Vehicle Count x (day/86400 s)
	Urban Buses Standard
CO	0.0127
NO_2	0.0498
PM_{10}	0.0067
VOC	0.0015

2.2.2.4. Emissions Of Trucks

In the 2040 vehicle projection data used for this study, freight vehicles are categorized under two distinct labels: “Truck” and “Other.” These categories were handled separately in the emission modeling to ensure accuracy in applying weight-specific emission factors.

The “Truck” category refers to light and medium-duty freight vehicles with a gross vehicle weight of 7.5 tons or less. These typically include local delivery vehicles, service trucks, and smaller freight haulers. The “Other” category represents heavy-duty vehicles over 7.5 tons, including long-haul trucks, construction vehicles, and other high-capacity freight carriers.

Fuel Type Distribution by Category

Based on 2040 projections for Türkiye’s road fleet:

Truck category (≤7.5 t):

Electric: 10%

Diesel: 90%

Other category (>7.5 t):

Electric: 5%

Diesel: 95%

The number of vehicles calculated according to the assumptions made is shown in Table 20. Table 21 gives the emission values calculated according to the number of vehicles and different fuel types.

Table 20. Daily Total Vehicle Count - Trucks

Daily Total Vehicle Count - Trucks		
Petrol >3.5 t (%30)	**Diesel <=7.5 t (%70)**	**Diesel 7.5 - 16 t (%100)**
1851	4318	5192

Table 21. Emission Rate for Trucks

Pollutant	Trucks -Emission Rate (g/s-km)- Emission Factor (g/km) x Daily Total Vehicle Count x (day/86400 s)-		
	Petrol >3.5 t	**Diesel <=7.5 t**	**Diesel 7.5 - 16 t**
CO	0.00354	0.00013	0.00022
NO^2	0.00039	0.00025	0.00043
PM_{10}	0.00000	0.00001	0.00001
VOC	0.00031	0.00005	0.00005

3. METHOD

3.1 Methods Used in Modeling Studies

The latest AERMOD dispersion model (version 19191) published by the US-EPA was used in the modeling studies. The AERMOD model is internationally accepted and is used by many researchers, inspection, and authority bodies worldwide to estimate pollutant concentrations. (Langner and Kleemm, 2011).

The BREEZE (Trinity Consultants, version 7.7) graphical modeling interface was used to organize the modeling work. The model is one of the most advanced computer models that can predict hourly, daily and annual Ground Level Concentration (GLC) values based on real-time data that changes over time. The model includes many different emission model calculations ranging from isolated chimneys to fugitive pollutants (point, volume area), anconsidersaccount aerodynamic waves, turbulence, and similar events that pollutants can experience from sources in any industrial area.

The AERMOD model works in a mesh system defined by the user, and the calculations are made for the corner points of each receiving environment element that makes up the mesh system. The network system in which the AERMOD model is used can be defined as polar or cartesian, and more detailed calculations can be made at these points by determining discrete receiving points outside the network system. "Atmospheric Boundary Layer" is used as a stability model in diffusion calculations. The model also considers rough terrain. The AERMOD model uses the following four different data types:

- Hourly meteorological data of the nearest ground observation station such as wind direction, wind speed, temperature, cloud cover, and height,
- Meteorological sounding dataset representing upper atmosphere conditions, including the wind profile exponent and the potential vertical temperature difference observed at every 10 mb pressure change from ground level to 6000 m altitude.
- The coordinates and height and land use classes of each element in the network system defined as the receiving environment, as well as the Bowen ratio, roughness coefficient, and albedo value,
- Source data including source coordinates, source height, diameter, pollutant velocity, temperature, and flow rate determined by a user-defined starting point.

The model outputs are in a structure that will allow the preparation of distribution maps for the entire study area. Thus, it is possible to evaluate the region's air quality under different scenarios (ee.g., other treatment conditions, different sulfur contents, various pollutant sources, or changing seasonal conditions).

The modeling study, which enables the estimation of the concentrations of gaseous and dusty pollutants in the ambient air through mathematical calculations, consists of the following steps:

- The “Distribution Region” of the resources is determined.
- This distribution area is divided into 250 m × 250 m squares; latitude, longitude, and altitude information are provided. The vertices of the squares are the vertices.
- Coordinates and height information of sensitive receptors in the distribution region is defined in the model.
- Hourly ground and upper atmosphere meteorological data for a representative year are provided.

After transferring the processes listed above to the program, hourly, daily and annual ground-level content, ration values of pollutants in the ambient air can be estimated by running the modeling program. The model inputs used in this study are given in Chapter 2.

Using the EPA AERMET computer program (AERMOD Meteorological Pre-Processor) AERMET, the surface meteorological data taken from the stations determined as the most suitable year and the upper layers weather data taken from the rawinsonde stations were combined as a surface and upper air entry file to be used in AERMOD. The AERMET program is used as the meteorological preprocessor for AERMOD. AERMET is designed to combine surface and atmospheric weather data from field measurements and the National Meteorological Service for use in the AERMOD program. For example, site-specific parameters such as surface roughness coefficient, Bowen ratio, and albedo are defined at this stage. The wind rose obtained from the surface meteorological measurements carried out in the field of the selected years is given in Figure 4.

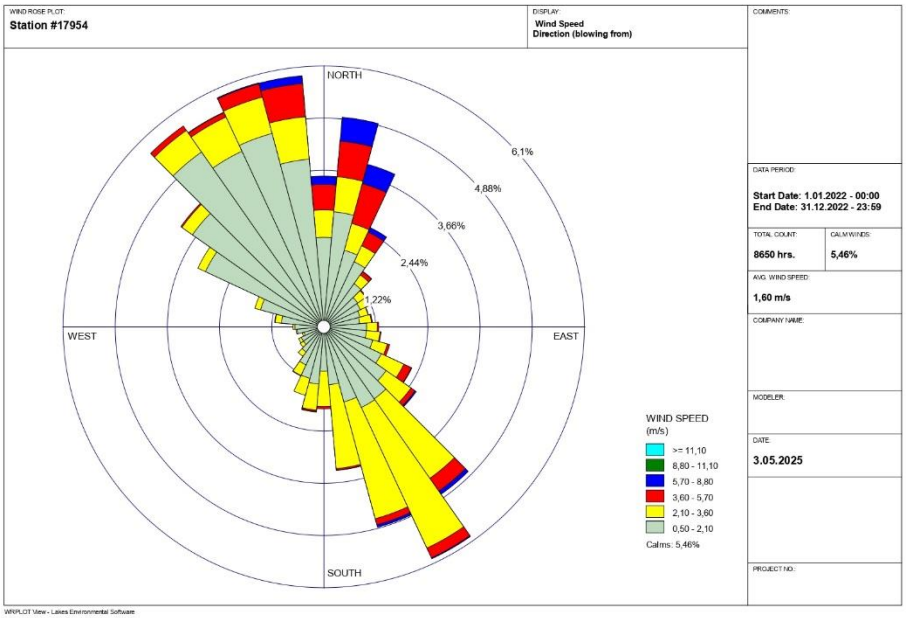

Figure 4. Wind Rose of Manavgat Meteorology Station-2022

3.2 Receiving Environment System

As mentioned above, for the AERMOD model, the working area must be defined, and this area must be separated into the receiving environment elements.

The grid area defined as the study area for this study was determined by reference to the domain specified in SKHKKY for the modeling study. In accordance with the Regulation on the Control of Industrial Air Pollution (SKHKKY), the “facility impact area” is defined as the area within a radius equivalent to 50 times the stack height from the emission source, or, for sources with an effective emission height less than 30 meters, as a 2 km × 2 km square area centered on the source. For area sources with a surface distribution greater than 0.04 km², the impact area is also defined as a square with a 2 km edge length, centered on the source.

In line with this definition, the receptor grid was established at 250-meter intervals and extended 1 km on either side (north–south) of the modeled corridor. This spatial setup ensures appropriate coverage of the facility impact area and allows pollutant dispersion to be evaluated in compliance with both national and international standards. The model study used the grid system shown in Figure 5 and Figure 6, which covers the impact area of all facilities at 250 m intervals. Passive air quality measurements were conducted in various residential

areas across the project impact zone to assess background concentrations of particulate matter and gaseous pollutants. The results of these PM_{10} and $PM_{2.5}$ passive sampling measurements are presented in Table 22, which includes data from 19 different residential locations. In addition to PM, VOCs and NO_2 levels were monitored at selected residential points to provide a broader understanding of ambient air quality. The results of these measurements are summarized in Table 24.

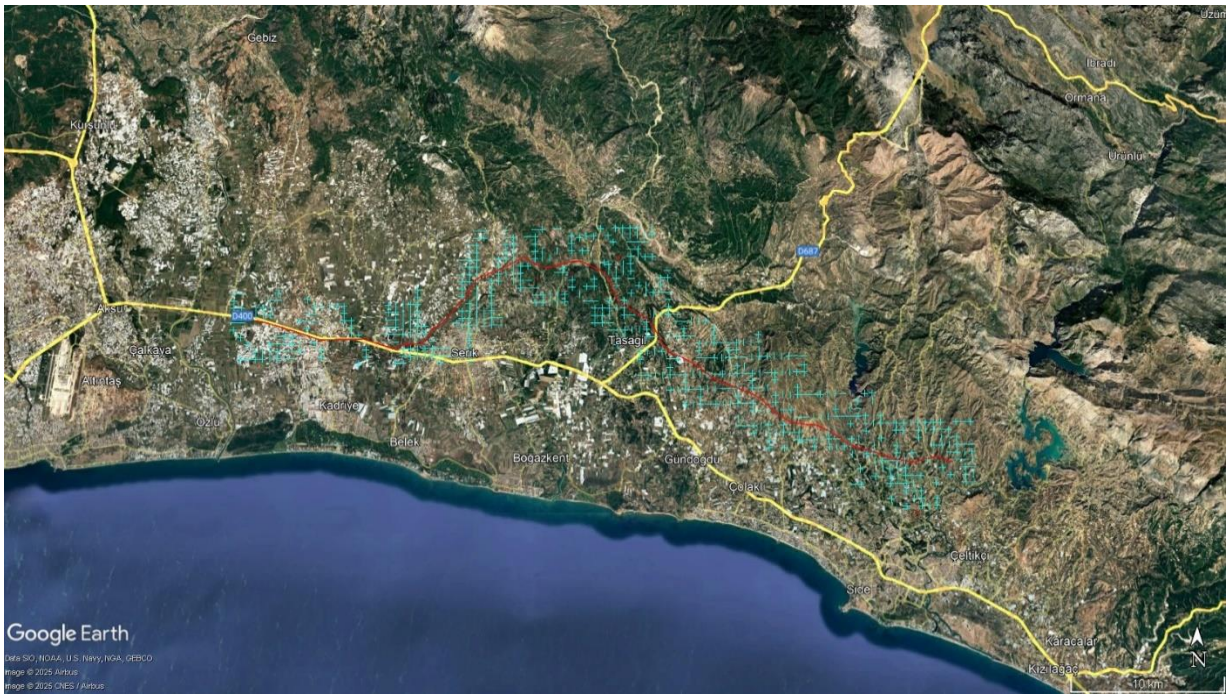

Figure 5. Grid System Used in Model Study-Section1

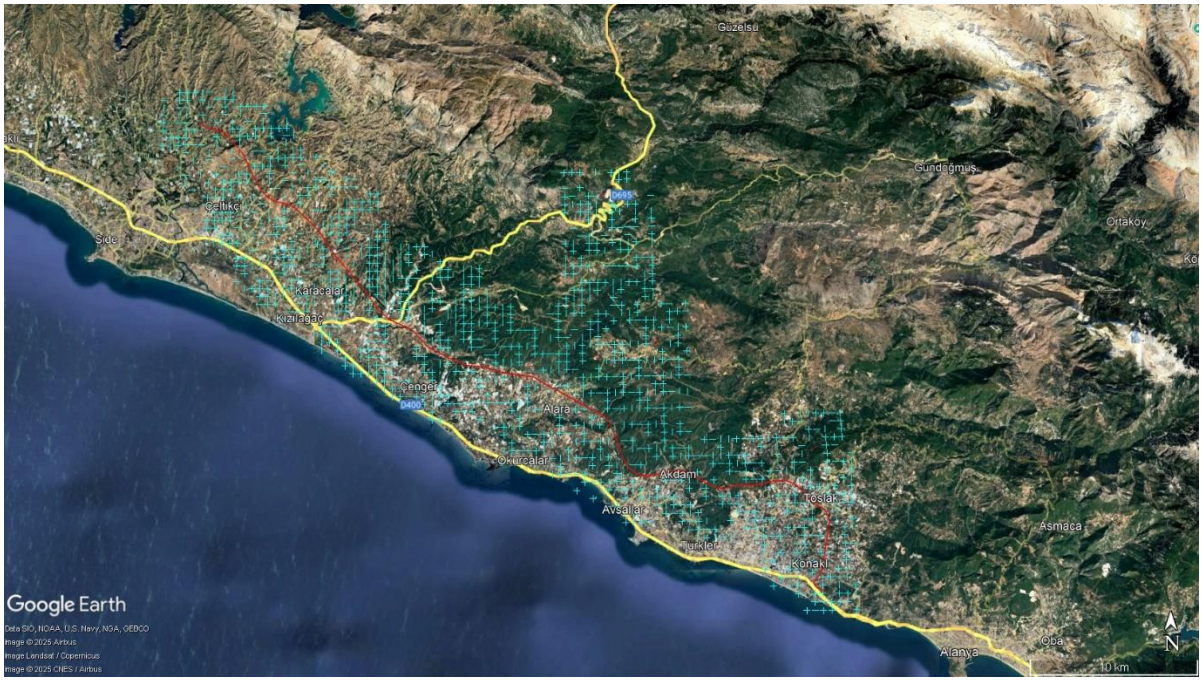

Figure 6 Grid System Used in Model Study-Section2

Table 22. Passive Sampling Results of PM_{10} and $PM_{2.5}$ in Residential Areas

District	Coordinates	PM_{10} Results (µg/m³)	$PM_{2.5}$ Results (µg/m³)
Akdam	393414/4055623	19.6	15.8
Avsallar	389720/4055765	< 6.0	< 6.0
Bademliyor	389655/4072729	10.7	9.27
Bucakşeyhler	363395/4078780	< 6.0	< 6.0
Çakallar	386572/4060940	12	9.99
Deniz Tepesi	334640/4094389	19.4	13.6
Emişbeleni	399364/4055198	12.2	11.8
Hacıali	370544/4070725	45.9	30.5
Hacıobası	373104/4065985	8.54	6.17
Kalemler	353691/4080989	14	12.2
Karakaya	385356/4061872	11.2	10.4
Konaklı	401287/4049717	15.1	13.1
Köprüçay	339819/4095932	17.40	11.6
Sağırin	341974/4097230	< 6.0	< 6.0
Sarılar	360448/4076493	12.3	11.8
Sarıobalı	337884/4093014	16.5	10.2
Serik	330608/4089427	29.2	7.84
Sülek	371900/4068786	7.09	6.17
Taşağıl	343326/4087476	11.3	8.18
Ulukapı	365551/4075913	20.4	16.7
Uzunlar	376876/4066570	16.8	12.2

Table 23. Passive Sampling Results of Settled Dust in Residential Areas

District	Coordinates	Settled Dust Results ($mg/m^2.day$)
Akdam	393414/4055623	12.33
Avsallar	389720/4055765	32.07
Bademliyor	389655/4072729	54.84
Bucakşeyhler	363395/4078780	31.31
Çakallar	386572/4060940	60.53
Deniz Tepesi	334640/4094389	12.33
Emişbeleni	399364/4055198	56.55
Hacıali	370544/4070725	92.98
Hacıobası	373104/4065985	45.35
Kalemler	353691/4080989	65.28
Karakaya	385356/4061872	56.17
Konaklı	401287/4049717	73.06
Köprüçay	339819/4095932	72.3
Sağırin	341974/4097230	29.6
Sarılar	360448/4076493	64.71
Sarıobalı	337884/4093014	73.06
Serik	330608/4089427	74.38
Sülek	371900/4068786	42.13
Taşağıl	343326/4087476	55.41
Ulukapı	365551/4075913	73.62
Uzunlar	376876/4066570	72.49

Table 24. Passive Sampling Results of VOC and NO_2 in Residential Areas

District	Coordinates	VOCs Results (mg/L)	NO_2 Results (µg/m³)
Hacıobası	373104/4065985	2	<4.24
Konaklı	401287/4049717	2	<4.24
Sarılar	360448/4076493	1	<4.24
Serik	330608/4089427	1	<4.24
Taşağıl	343326/4087476	1	<4.24

3.3 Modeling Studies

Modeling studies were conducted under multiple scenarios to evaluate the dispersion and ground-level concentrations of various pollutants originating from both the construction and operation phases of the highway project. Each scenario represents a specific section and pollutant type, as described below:

Construction Phase:

Scenario 1: PM_{10} emissions generated during the construction phase of the section1, including emissions from blasting activities, material handling in quarries, and operations in other related facilities (e.g., concrete, asphalt, and mechanical plants) located along this section.

Scenario 2: PM_{10} emissions generated during the construction phase of the section2, including emissions from blasting activities, material handling in quarries, and operations in other related facilities (e.g., concrete, asphalt, and mechanical plants) located along this section.

Scenario 17: Settled dust emissions generated during the construction phase of the section1, including emissions from blasting activities, material handling in quarries, and operations in other related facilities (e.g., concrete, asphalt, and mechanical plants) located along this section.

Scenario 18: Settled dust emissions generated during the construction phase of the section2, including emissions from blasting activities, material handling in quarries, and operations in other related facilities (e.g., concrete, asphalt, and mechanical plants) located along this section.

Scenario 3: $PM_{2.5}$ emissions generated during the construction phase of the section1, including emissions from blasting activities, material handling in quarries, and operations in other related facilities (e.g., concrete, asphalt, and mechanical plants) located along this section.

Scenario 4: $PM_{2.5}$ emissions generated during the construction phase of the section2, including emissions from blasting activities, material handling in quarries, and operations in other related facilities (e.g., concrete, asphalt, and mechanical plants) located along this section.

Scenario 11: PM_{10} emissions generated exclusively from controlled blasting activities conducted within Section 1 of the project area. A total of seven distinct blasting scenarios

were simulated within this section to account for spatial and meteorological variability. The maximum ground-level concentration obtained across all simulations was selected for impact assessment to represent the worst-case condition.

Scenario 12: PM_{10} emissions generated exclusively from controlled blasting activities conducted within Section 2 of the project area. Similar to Section 1, seven different blasting configurations were modeled, and the highest resulting concentration among these scenarios was used in the final evaluation to ensure a conservative approach in assessing potential air quality impacts.

Scenario 13: NO_2 emissions from construction machinery operating along the 1st section during the construction phase.

Scenario 14: CO emissions from construction machinery operating along the 1st section during the construction phase.

Scenario 15: NO_2 emissions from construction machinery operating along the 2nd section during the construction phase.

Scenario 16 : CO emissions from construction machinery operating along the 2nd section during the construction phase.

Operation Phase:

Scenario 5:NO_2 emissions from vehicular traffic along the 1st section during the operation phase.

Scenario 6:CO emissions from vehicular traffic along the 1st section during the operation phase.

Scenario 7:VOC emissions from vehicular traffic along the 1st section during the operation phase.

Scenario 8: NO_2 emissions from vehicular traffic along the 2nd section during the operation phase.

Scenario 9 :CO emissions from vehicular traffic along the 2nd section during the operation phase.

Scenario 10: VOC emissions from vehicular traffic along the 2nd section during the operation phase.

3.4 Information Entered in the Modeling Study

Emission inputs and other parameters determined according to different scenarios in modeling studies are summarized in Table 25.

Table 25 Information Entered in Modeling Study

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
Scenario-1 (PM_{10} –Construction-Section1)	Sarıabalı Borrow Pit Excavation and Loading of Materials	AREA	AREA1	1.494	46871.6	0.0000318743
	Sarıabalı Borrow Pit Transportation of Materials	LINE AREA	ARLN4	0.1722	300.3 m	0.0000521305
	Sarıabalı Borrow Pit Discharge + Storage	AREA	AREA2	0.428	10000	0.0000428
	Concrete-1 Loading and Discharge of Materials	AREA	AREA3	0.378	1428.4	0.00026463872
	Concrete-2 Loading and Discharge of Materials	AREA	AREA10	0.378	1428.4	0.00026463872
	Mechanical-1 Discharge of Materials	AREA	AREA11	0.329	1428.4	0.0002303337
	Asphalt-1 Discharge of Materials	AREA	AREA12	0.143	1428.4	0.00010011465
	Concrete-3 Loading and Discharge of Materials	AREA	AREA13	0.378	1428.4	0.00026463872

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Concrete-1 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN5	1.111	100.3 m	0.00100649532
	Concrete-2.Asphalt1. Mechanical1 Transportation of Materials	LINE AREA	ARLN12	1.806	100.3 m	0.0016361211
	Concrete-3 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN13	1.111	100.3 m	0.00100649532
	Cakıs TOY4-a Excavation and Loading of Materials	AREA	AREA4	1.538	24970.5	0.00006159259
	Kurucay TOY4-b Excavation and Loading of Materials	AREA	AREA6	1.538	24970.5	0.00006159259
	Dikmen Excavation and Loading of Materials	AREA	AREA8	1.538	24970.5	0.00006159259
	Cakıs TOY4-a Blasting	OPEN PIT	OPIT1	-	500	0.255
	Kurucay TOY4-b Blasting	OPEN PIT	OPIT2	-	500	0.255
	Dikmen Blasting	OPEN PIT	OPIT3	-	500	0.255
	Cakıs TOY4-a Transportation of Overburden	LINE AREA	ARLN6	0.217	200.9 m	0.00009819916

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Kurucay TOY4-b Transportation of Overburden	LINE AREA	ARLN8	0.217	200.9 m	0.00009819916
	Dikmen Transportation of Overburden	LINE AREA	ARLN10	0.217	200.9 m	0.00009819916
	Cakıs TOY4-a Discharge + Storage	AREA	AREA5	0.1017	10000	0.00001017
	Kurucay TOY4-b Discharge + Storage	AREA	AREA7	0.1017	10000	0.00001017
	Dikmen Discharge + Storage	AREA	AREA9	0.1017	10000	0.00001017
	Cakıs TOY4-a Transportation of Material	LINE AREA	ARLN7	0.4306	200.2 m	0.00019552103
	Kurucay TOY4-b Transportation of Material	LINE AREA	ARLN9	0.4306	200.2 m	0.00019552103
	Dikmen Transportation of Material	LINE AREA	ARLN11	0.4306	200.2 m	0.00019552103
	motorway-section1	LINE AREA	ARLN2	13.3081	55906.1 m	0.00000661232
Scenario-2 (PM_{10} –Construction-Section2)	Cenger Stream Transportation of Materials	LINE AREA	ARLN18	0.1722	300.3 m	0.0000521305
	Concrete-4 Loading and Discharge of Materials	AREA	AREA14	0.378	1428.4	0.00026463872

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Mechanical-2 Discharge of Materials	AREA	AREA15	0.329	1428.4	0.0002303337
	Asphalt-2 Discharge of Materials	AREA	AREA16	0.143	1428.4	0.00010011465
	Concrete-4a Loading and Discharge of Materials	AREA	AREA17	0.378	1428.4	0.00026463872
	Concrete-5 Loading and Discharge of Materials	AREA	AREA18	0.378	1428.4	0.00026463872
	Concrete-4.Asphalt2. Mechanical2 Transportation of Materials	LINE AREA	ARLN14	1.806	100.3 m	0.0016361211
	Concrete-4a Inbound and Outbound Transportation of Materials	LINE AREA	ARLN15	1.111	100.3 m	0.00100649532
	Concrete-5 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN16	1.111	100.3 m	0.00100649532
	Concrete-6.Asphalt3. Mechanical3 Transportation of Materials	LINE AREA	ARLN17	3.333	100.3 m	0.00301948595
	Uzunlar Transportation of Overburden	LINE AREA	ARLN20	0.217	200.9 m	0.00009819916
	Bademliyar Transportation of Overburden	LINE AREA	ARLN22	0.217	200.9 m	0.00009819916

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Karamanlar Transportation of Overburden	LINE AREA	ARLN24	0.217	200.9 m	0.00009819916
	Saburlar Transportation of Overburden	LINE AREA	ARLN26	0.217	200.9 m	0.00009819916
	Karakaya Transportation of Overburden	LINE AREA	ARLN28	0.217	200.9 m	0.00009819916
	Sogukpınar Transportation of Overburden	LINE AREA	ARLN30	0.217	200.9 m	0.00009819916
	Uzunlar Transportation of Material	LINE AREA	ARLN19	0.4306	200.2 m	0.00019552103
	Bademliyar Transportation of Material	LINE AREA	ARLN21	0.4306	200.2 m	0.00019552103
	Karamanlar Transportation of Material	LINE AREA	ARLN23	0.4306	200.2 m	0.00019552103
	Saburlar Transportation of Material	LINE AREA	ARLN25	0.4306	200.2 m	0.00019552103
	Karakaya Transportation of Material	LINE AREA	ARLN27	0.4306	200.2 m	0.00019552103
	Sogukpınar Transportation of Material	LINE AREA	ARLN29	0.4306	200.2 m	0.00019552103
	Concrete-4 Loading and Discharge of Materials	AREA	AREA19	0.378	1428.4	0.00026463872
	Mechanical-2 Discharge of Materials	AREA	AREA20	0.329	1428.4	0.0002303337

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Asphalt-2 Discharge of Materials	AREA	AREA21	0.329	1428.4	0.0002303337
	Cenger Stream Excavation and Loading of Materials	AREA	AREA22	1.494	46871.6	0.0000318743
	Cenger Stream Discharge + Storage	AREA	AREA23	0.428	10000	0.0000428
	Uzunlar Discharge + Storage	AREA	AREA24	0.1017	10000	0.00001017
	Uzunlar Excavation and Loading of Materials	AREA	AREA25	1.538	24970.5	0.00006159259
	Uzunlar Blasting	OPEN PIT	OPIT4	-	500	0.255
	Bademliyar Excavation and Loading of Materials	AREA	AREA26	1.538	24970.5	0.00006159259
	Bademliyar Discharge + Storage	AREA	AREA27	0.1017	10000	0.00001017
	Bademliyar Blasting	OPEN PIT	OPIT5	-	500	0.255
	Karamanlar Excavation and Loading of Materials	AREA	AREA28	1.538	24970.5	0.00006159259
	Karamanlar Discharge + Storage	AREA	AREA29	0.1017	10000	0.00001017
	Karamanlar Blasting	OPEN PIT	OPIT6	-	500	0.255

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Saburlar Excavation and Loading of Materials	AREA	AREA30	1.538	24970.5	0.00006159259
	Saburlar Blasting	OPEN PIT	OPIT7	-	500	0.255
	Saburlar Discharge + Storage	AREA	AREA31	0.1017	10000	0.00001017
	Karakaya Excavation and Loading of Materials	AREA	AREA32	1.538	24970.5	0.00006159259
	Karakaya Blasting	OPEN PIT	OPIT8	-	500	0.255
	Karakaya Discharge + Storage	AREA	AREA33	0.1017	10000	0.00001017
	Sogukpınar Blasting	OPEN PIT	OPIT9	-	500	0.255
	Sogukpınar Excavation and Loading of Materials	AREA	AREA34	1.538	24970.5	0.00006159259
	Sogukpınar Discharge + Storage	AREA	AREA35	0.1017	10000	0.00001017
	Highway-section2	LINE AREA	ARLN3	11.3774	56169.8 m	0.00000562649
Scenario-17 (Settled Dust – Construction-Section1)	Sarıabalı Borrow Pit Excavation and Loading of Materials	AREA	AREA1	3.373	46871.6	0.00007196253
	Sarıabalı Borrow Pit Transportation of	LINE AREA	ARLN4	0.578	300.3 m	0.00017497925

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Materials					
	Sarıabalı Borrow Pit Discharge + Storage	AREA	AREA2	1.149	10000	0.0001149
	Concrete-1 Loading and Discharge of Materials	AREA	AREA3	1.05	1428.4	0.00073510756
	Concrete-2 Loading and Discharge of Materials	AREA	AREA10	1.05	1428.4	0.00073510756
	Mechanical-1 Discharge of Materials	AREA	AREA11	0.917	1428.4	0.00064199394
	Asphalt-1 Discharge of Materials	AREA	AREA12	0.4	1428.4	0.00028004098
	Concrete-3 Loading and Discharge of Materials	AREA	AREA13	1.05	1428.4	0.00073510756
	Concrete-1 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN5	3.76	100.3 m	0.00340632078
	Concrete-2.Asphalt1. Mechanical1 Transportation of Materials	LINE AREA	ARLN12	6.111	100.3 m	0.00553617721
	Concrete-3 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN13	3.76	100.3 m	0.00340632078

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Cakıs TOY4-a Excavation and Loading of Materials	AREA	AREA4	3.455	24970.5	0.00013836306
	Kurucay TOY4-b Excavation and Loading of Materials	AREA	AREA6	3.455	24970.5	0.00013836306
	Dikmen Excavation and Loading of Materials	AREA	AREA8	3.455	24970.5	0.00013836306
	Cakıs TOY4-a Blasting	OPEN PIT	OPIT1	-	500	0.492
	Kurucay TOY4-b Blasting	OPEN PIT	OPIT2	-	500	0.492
	Dikmen Blasting	OPEN PIT	OPIT3	-	500	0.492
	Cakıs TOY4-a Transportation of Overburden	LINE AREA	ARLN6	0.3644	200.9 m	0.00016490219
	Kurucay TOY4-b Transportation of Overburden	LINE AREA	ARLN8	0.3644	200.9 m	0.00016490219
	Dikmen Transportation of Overburden	LINE AREA	ARLN10	0.3644	200.9 m	0.00016490219
	Cakıs TOY4-a Discharge + Storage	AREA	AREA5	0.42	10000	0.000042
	Kurucay TOY4-b Discharge + Storage	AREA	AREA7	0.42	10000	0.000042

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Dikmen Discharge + Storage	AREA	AREA9	0.42	10000	0.000042
	Cakıs TOY4-a Transportation of Material	LINE AREA	ARLN7	1.4583	200.2 m	0.00066216517
	Kurucay TOY4-b Transportation of Material	LINE AREA	ARLN9	1.4583	200.2 m	0.00066216517
	Dikmen Transportation of Material	LINE AREA	ARLN11	1.4583	200.2 m	0.00066216517
	motorway-section1	LINE AREA	ARLN2	33.49	55906.1 m	0.00005445817
Scenario-18 (Settled Dust – Construction-Section2)	Cenger Stream Transportation of Materials	LINE AREA	ARLN18	0.578	300.3 m	0.00017497925
	Concrete-4 Loading and Discharge of Materials	AREA	AREA14	1.05	1428.4	0.00073510756
	Mechanical-2 Discharge of Materials	AREA	AREA15	0.917	1428.4	0.00064199394
	Asphalt-2 Discharge of Materials	AREA	AREA16	0.4	1428.4	0.00028004098
	Concrete-4a Loading and Discharge of Materials	AREA	AREA17	1.05	1428.4	0.00073510756
	Concrete-5 Loading and Discharge of Materials	AREA	AREA18	1.05	1428.4	0.00073510756

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Concrete-4.Asphalt2. Mechanical2 Transportation of Materials	LINE AREA	ARLN14	6.111	100.3 m	0.00553617721
	Concrete-4a Inbound and Outbound Transportation of Materials	LINE AREA	ARLN15	3.76	100.3 m	0.00340632078
	Concrete-5 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN16	3.76	100.3 m	0.00340632078
	Concrete-6.Asphalt3. Mechanical3 Transportation of Materials	LINE AREA	ARLN17	9.485	100.3 m	0.00859280655
	Uzunlar Transportation of Overburden	LINE AREA	ARLN20	0.3644	200.9 m	0.00016490219
	Bademliyar Transportation of Overburden	LINE AREA	ARLN22	0.3644	200.9 m	0.00016490219
	Karamanlar Transportation of Overburden	LINE AREA	ARLN24	0.3644	200.9 m	0.00016490219
	Saburlar Transportation of Overburden	LINE AREA	ARLN26	0.3644	200.9 m	0.00016490219
	Karakaya Transportation of Overburden	LINE AREA	ARLN28	0.3644	200.9 m	0.00016490219
	Sogukpınar Transportation of Overburden	LINE AREA	ARLN30	0.3644	200.9 m	0.00016490219

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Uzunlar Transportation of Material	LINE AREA	ARLN19	1.4583	200.2 m	0.00066216517
	Bademliyar Transportation of Material	LINE AREA	ARLN21	1.4583	200.2 m	0.00066216517
	Karamanlar Transportation of Material	LINE AREA	ARLN23	1.4583	200.2 m	0.00066216517
	Saburlar Transportation of Material	LINE AREA	ARLN25	1.4583	200.2 m	0.00066216517
	Karakaya Transportation of Material	LINE AREA	ARLN27	1.4583	200.2 m	0.00066216517
	Sogukpınar Transportation of Material	LINE AREA	ARLN29	1.4583	200.2 m	0.00066216517
	Concrete-4 Loading and Discharge of Materials	AREA	AREA19	1.05	1428.4	0.00073510756
	Mechanical-2 Discharge of Materials	AREA	AREA20	0.917	1428.4	0.00064199394
	Asphalt-2 Discharge of Materials	AREA	AREA21	0.917	1428.4	0.00064199394
	Cenger Stream Excavation and Loading of Materials	AREA	AREA22	3.373	46871.6	0.00007196253
	Cenger Stream Discharge + Storage	AREA	AREA23	1.149	10000	0.0001149
	Uzunlar Discharge + Storage	AREA	AREA24	0.42	10000	0.000042
	Uzunlar Excavation and Loading of	AREA	AREA25	3.455	24970.5	0.00013836306

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Materials					
	Uzunlar Blasting	OPEN PIT	OPIT4	-	500	0.492
	Bademliyar Excavation and Loading of Materials	AREA	AREA26	3.455	24970.5	0.00013836306
	Bademliyar Discharge + Storage	AREA	AREA27	0.42	10000	0.000042
	Bademliyar Blasting	OPEN PIT	OPIT5		500	0.492
	Karamanlar Excavation and Loading of Materials	AREA	AREA28	3.455	24970.5	0.00013836306
	Karamanlar Discharge + Storage	AREA	AREA29	0.42	10000	0.000042
	Karamanlar Blasting	OPEN PIT	OPIT6		500	0.492
	Saburlar Excavation and Loading of Materials	AREA	AREA30	3.455	24970.5	0.00013836306
	Saburlar Blasting	OPEN PIT	OPIT7		500	0.492
	Saburlar Discharge + Storage	AREA	AREA31	0.42	10000	0.000042
	Karakaya Excavation and Loading of Materials	AREA	AREA32	3.455	24970.5	0.00013836306

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Karakaya Blasting	OPEN PIT	OPIT8		500	0.492
	Karakaya Discharge + Storage	AREA	AREA33	0.42	10000	0.000042
	Sogukpınar Blasting	OPEN PIT	OPIT9		500	0.492
	Sogukpınar Excavation and Loading of Materials	AREA	AREA34	3.455	24970.5	0.00013836306
	Sogukpınar Discharge + Storage	AREA	AREA35	0.42	10000	0.000042
	Highway-section2	LINE AREA	ARLN3	27.91	56169.8 m	0.0000138024
Scenario-3 ($PM_{2.5}$ –Construction-Section1)	Sarıabalı Borrow Pit Excavation and Loading of Materials	AREA	AREA1	0.2241	46871.6	0.00000478115
	Sarıabalı Borrow Pit Transportation of Materials	LINE AREA	ARLN4	0.0258	300.3 m	0.00000781049
	Sarıabalı Borrow Pit Discharge + Storage	AREA	AREA2	0.0642	10000	0.00000642
	Concrete-1 Loading and Discharge of Materials	AREA	AREA3	0.0567	1428.4	0.00003969581
	Concrete-2 Loading and Discharge of Materials	AREA	AREA10	0.0567	1428.4	0.00003969581

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Mechanical-1 Discharge of Materials	AREA	AREA11	0.0494	1428.4	0.00003458506
	Asphalt-1 Discharge of Materials	AREA	AREA12	0.0215	1428.4	0.0000150522
	Concrete-3 Loading and Discharge of Materials	AREA	AREA13	0.0567	1428.4	0.00003969581
	Concrete-1 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN5	0.1667	100.3 m	0.00015101959
	Concrete-2.Asphalt1. Mechanical1 Transportation of Materials	LINE AREA	ARLN12	0.2709	100.3 m	0.00024541817
	Concrete-3 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN13	0.1667	100.3 m	0.00015101959
	Cakıs TOY4-a Excavation and Loading of Materials	AREA	AREA4	0.2307	24970.5	0.00000923889
	Kurucay TOY4-b Excavation and Loading of Materials	AREA	AREA6	0.2307	24970.5	0.00000923889
	Dikmen Excavation and Loading of Materials	AREA	AREA8	0.2307	24970.5	0.00000923889
	Cakıs TOY4-a Blasting	OPEN PIT	OPIT1	-	500	0.0383

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Kurucay TOY4-b Blasting	OPEN PIT	OPIT2	-	500	0.0383
	Dikmen Blasting	OPEN PIT	OPIT3	-	500	0.0383
	Cakıs TOY4-a Transportation of Overburden	LINE AREA	ARLN6	0.0326	200.9 m	0.0000147525
	Kurucay TOY4-b Transportation of Overburden	LINE AREA	ARLN8	0.0326	200.9 m	0.0000147525
	Dikmen Transportation of Overburden	LINE AREA	ARLN10	0.0326	200.9 m	0.0000147525
	Cakıs TOY4-a Discharge + Storage	AREA	AREA5	0.0153	10000	0.00000153
	Kurucay TOY4-b Discharge + Storage	AREA	AREA7	0.0153	10000	0.00000153
	Dikmen Discharge + Storage	AREA	AREA9	0.0153	10000	0.00000153
	Cakıs TOY4-a Transportation of Material	LINE AREA	ARLN7	0.0646	200.2 m	0.0000293327
	Kurucay TOY4-b Transportation of Material	LINE AREA	ARLN9	0.0646	200.2 m	0.0000293327
	Dikmen Transportation of Material	LINE AREA	ARLN11	0.0646	200.2 m	0.0000293327
	motorway-section1	LINE AREA	ARLN2	1.9962	55906.1 m	0.00000099184

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
Scenario-4 ($PM_{2.5}$ –Construction-Section2)	Cenger Stream Transportation of Materials	LINE AREA	ARLN18	0.0258	300.3 m	0.00000781049
	Concrete-4 Loading and Discharge of Materials	AREA	AREA14	0.0567	1428.4	0.00003969581
	Mechanical-2 Discharge of Materials	AREA	AREA15	0.0494	1428.4	0.00003458506
	Asphalt-2 Discharge of Materials	AREA	AREA16	0.0215	1428.4	0.0000150522
	Concrete-4a Loading and Discharge of Materials	AREA	AREA17	0.0567	1428.4	0.00003969581
	Concrete-5 Loading and Discharge of Materials	AREA	AREA18	0.0567	1428.4	0.00003969581
	Concrete-4.Asphalt2. Mechanical2 Transportation of Materials	LINE AREA	ARLN14	0.2709	100.3 m	0.00024541817
	Concrete-4a Inbound and Outbound Transportation of Materials	LINE AREA	ARLN15	0.1667	100.3 m	0.00015101959
	Concrete-5 Inbound and Outbound Transportation of Materials	LINE AREA	ARLN16	0.1667	100.3 m	0.00015101959
	Concrete-6.Asphalt3. Mechanical3 Transportation of Materials	LINE AREA	ARLN17	0.3125	100.3 m	0.00028310512

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Uzunlar Transportation of Overburden	LINE AREA	ARLN20	0.0326	200.9 m	0.0000147525
	Bademliyar Transportation of Overburden	LINE AREA	ARLN22	0.0326	200.9 m	0.0000147525
	Karamanlar Transportation of Overburden	LINE AREA	ARLN24	0.0326	200.9 m	0.0000147525
	Saburlar Transportation of Overburden	LINE AREA	ARLN26	0.0326	200.9 m	0.0000147525
	Karakaya Transportation of Overburden	LINE AREA	ARLN28	0.0326	200.9 m	0.0000147525
	Sogukpınar Transportation of Overburden	LINE AREA	ARLN30	0.0326	200.9 m	0.0000147525
	Uzunlar Transportation of Material	LINE AREA	ARLN19	0.0326	200.2 m	0.0000147525
	Bademliyar Transportation of Material	LINE AREA	ARLN21	0.0646	200.2 m	0.0000293327
	Karamanlar Transportation of Material	LINE AREA	ARLN23	0.0646	200.2 m	0.0000293327
	Saburlar Transportation of Material	LINE AREA	ARLN25	0.0646	200.2 m	0.0000293327
	Karakaya Transportation of Material	LINE AREA	ARLN27	0.0646	200.2 m	0.0000293327
	Sogukpınar Transportation of Material	LINE AREA	ARLN29	0.0646	200.2 m	0.0000293327

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	Concrete-4 Loading and Discharge of Materials	AREA	AREA19	0.0567	1428.4	0.00003969581
	Mechanical-2 Discharge of Materials	AREA	AREA20	0.0494	1428.4	0.00003458506
	Asphalt-2 Discharge of Materials	AREA	AREA21	0.0494	1428.4	0.00003458506
	Cenger Stream Excavation and Loading of Materials	AREA	AREA22	0.2241	46871.6	0.00000478115
	Cenger Stream Discharge + Storage	AREA	AREA23	0.0642	10000	0.00000642
	Uzunlar Discharge + Storage	AREA	AREA24	0.0153	10000	0.00000153
	Uzunlar Excavation and Loading of Materials	AREA	AREA25	0.2307	24970.5	0.00000923889
	Uzunlar Blasting	OPEN PIT	OPIT4	-	500	0.0383
	Bademliyar Excavation and Loading of Materials	AREA	AREA26	0.2307	24970.5	0.00000923889
	Bademliyar Discharge + Storage	AREA	AREA27	0.0153	10000	0.00000153
	Bademliyar Blasting	OPEN PIT	OPIT5	-	500	0.0383
	Karamanlar Excavation and Loading	AREA	AREA28	0.2307	24970.5	0.00000923889

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
	of Materials					
	Karamanlar Discharge + Storage	AREA	AREA29		10000	
	Karamanlar Blasting	OPEN PIT	OPIT6	-	500	0.0383
	Saburlar Excavation and Loading of Materials	AREA	AREA30	0.0153	24970.5	0.00000153
	Saburlar Blasting	OPEN PIT	OPIT7	-	500	0.0383
	Saburlar Discharge + Storage	AREA	AREA31	0.0153	10000	0.00000153
	Karakaya Excavation and Loading of Materials	AREA	AREA32	0.2307	24970.5	0.00000923889
	Karakaya Blasting	OPEN PIT	OPIT8	-	500	0.0383
	Karakaya Discharge + Storage	AREA	AREA33	0.0153	10000	0.00000153
	Sogukpınar Blasting	OPEN PIT	OPIT9	-	500	0.0383
	Sogukpınar Excavation and Loading of Materials	AREA	AREA34	0.2307	24970.5	0.00000923889
	Sogukpınar Discharge + Storage	AREA	AREA35	0.0153	10000	0.00000153
	Highway-section2	LINE AREA	ARLN3	1.7062	56169.8 m	0.00000084377

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
Scenario-5 (NO_2 –Operational-Section1)	motorway-section1	LINE AREA	ARLN2	0.0897	55906.1 m	0.0000000446
Scenario-6 (CO –Operational-Section1)	motorway-section1	LINE AREA	ARLN2	0.0786	55906.1 m	0.00000003906
Scenario-7 (VOC –Operational-Section1)	motorway-section1	LINE AREA	ARLN2	0.0185	55906.1 m	0.00000000921
Scenario-8 (NO_2 –Operational-Section1)	Highway-section2	LINE AREA	ARLN3	0.0902	56169.8	0.0000000446
Scenario-9 (CO –Operational-Section1)	Highway-section2	LINE AREA	ARLN3	0.0789	56169.8	0.00000003906
Scenario-10 (VOC –Operational-Section1)	Highway-section2	LINE AREA	ARLN3	0.0186	56169.8	0.00000000921

Scenarios	Source Abbreviations	Source Type	Example Source Abbreviations	Mass Flow (g/sec)	Annual Working Area (m^2)	Mass Flow Rate Entered into the Model (g/sec.m^2)
Scenario-11 (PM_{10} –Blasting-Section1)	Blasting4	OPEN PIT	OPIT4	-	1335.9	0.4167
Scenario-12 (PM_{10} –Blasting-Section2)	Blasting3	OPEN PIT	OPIT3	-	1335.9	0.4167
Scenario-13 (NO_2 –Construction-Section1)	motorway-section1	LINE AREA	ARLN2	1.332	55906.1 m	0.00000066182
Scenario-14 (CO –Construction-Section1)	motorway-section1	LINE AREA	ARLN2	23.97	55906.1 m	0.00001190985
Scenario-15 (NO_2 –Construction-Section2)	Highway-section2	LINE AREA	ARLN3	1.332	56169.8	0.00000065872
Scenario-14 (CO –Construction-Section2)	Highway-section2	LINE AREA	ARLN3	23.97	56169.8	0.00001185395

4. RESULTS

Modeling studies were carried out for PM_{10} and $PM_{2.5}$ parameter for construction phase. For the pollutant, modeling studies were carried out under scenarios and the possible effects of pollutant sources on local air quality were examined in accordance with each scenario. The values obtained as a result of the modeling are given below. Modeling studies were carried out for NO_2, VOC, CO parameters, and each pollutant under 2 different scenarios (section 1, section 2) and the possible effects of pollutant sources on local air quality were examined in accordance with each scenario for construction and operational phases. The values obtained as a result of the modeling are given below for each pollutant.

Detailed emission model entries are given in Table 25, and the results of the modeling study are shown in Annex-1. This section presents and discusses summaries of modeling study results and explanatory findings.

4.1. PM_{10} Concentrations at Ground Level

According to the defined scenarios, the Ground-Level Concentration (GLC) values of PM_{10} near the existing facilities were calculated and are presented in Table 26. Additionally, the spatial distributions of modeled PM_{10} concentrations under all scenarios are illustrated in Figure 7 to Figure 10.

In accordance with the Regulation on the Control of Industrial Air Pollution (SKHKKY), the daily limit value for PM_{10} is 50 μg/m³, which must not be exceeded more than 35 times per calendar year, and the annual average concentration must remain below 40 μg/m³. These thresholds are fully aligned with the European Union Ambient Air Quality Directive (2008/50/EC). Additionally, the International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) Guidelines (2007) recommend a more protective annual average limit of 20 μg/m³, reflecting international health-based standards for long-term particulate matter exposure.

In Scenario 1, the maximum daily PM_{10} concentration reached 413.31 μg/m³ with 30 exceedances, which is within the allowable exceedance frequency specified by all relevant standards—namely, SKHKKY, the EU Ambient Air Quality Directive (2008/50/EC). The annual average concentration was calculated as 20.56 μg/m³, remaining below the SKHKKY and EU annual limit of 40 μg/m³, but very close to the IFC's more conservative annual threshold of 20 μg/m³.

In Scenario 2, the maximum daily PM_{10} concentration was 968.81 µg/m³ with 33 exceedances, also remaining within the permissible exceedance count under SKHKKY and EU legislation, both of which allow up to 35 exceedances per calendar year for daily values exceeding 50 µg/m³. The corresponding annual average was 23.20 µg/m³, which complies with the 40 µg/m³ annual limits set by SKHKKY and the EU, yet surpasses the IFC's recommended annual limit.

In conclusion, all modeled PM_{10} concentrations remain within the permissible thresholds defined by the Regulation on the Control of Industrial Air Pollution (SKHKKY) and the EU Ambient Air Quality Directive (2008/50/EC), in terms of both the allowable number of daily exceedances (maximum 35 days/year) and the annual average limit (40 µg/m³). Although some annual concentrations slightly exceed the IFC's more conservative guideline of 20 µg/m³, the modeling results indicate compliance with applicable national and EU standards. Therefore, emissions expected under the current construction scenarios are not anticipated to cause a significant deterioration in ambient air quality in the surrounding area.

In Scenario 11 (Blasting – Section 1), the maximum daily PM_{10} concentration reached 456.72 µg/m³ with 17 exceedances, while the annual average was 5.64 µg/m³. In Scenario 12 (Blasting – Section 2), the daily maximum was 1614.84 µg/m³ with 17 exceedances, and the annual average was 11.49 µg/m³. Despite temporary increases during blasting operations, all results remain well within the acceptable regulatory limits, including the IFC annual guideline value. These findings reflect the short-duration and intermittent nature of blasting emissions, which do not lead to a sustained impact on long-term air quality.

Table 26. Results of ground-level PM_{10} concentrations observed in different scenarios

Scenario	**Highest Pollutant Results**		
	PM10		
	Highest Daily Concentration (µg/m³)	**Number of Exceedances**	**Highest Annual Concentration (µg/m³)**
Scenario 1 (Construction-Section1)	413.31 (337884, 4093014)	30	20.56 (360491, 4077639)
Scenario 2 (Construction-Section2)	968.81 (391106, 4054935)	33	23.20 (391106, 4054935)
Scenario 11 (Blasting-Section1)	456.72 (335487, 4092726)	17	5.64 (3334987, 4094226)

Scenario	Highest Pollutant Results		
	PM10		
	Highest Daily Concentration ($\mu g/m^3$)	Number of Exceedances	Highest Annual Concentration ($\mu g/m^3$)
Scenario 12 (Blasting-Section2)	1614.84 (383419, 4061430)	17	11.49 (380419, 4063430)
SKHHKY Limit Values	50	Max 35 exceedances/year	40
EU Directive Limit Values	50	Max 35 exceedances/year	40
IFC Limit Values	50		20

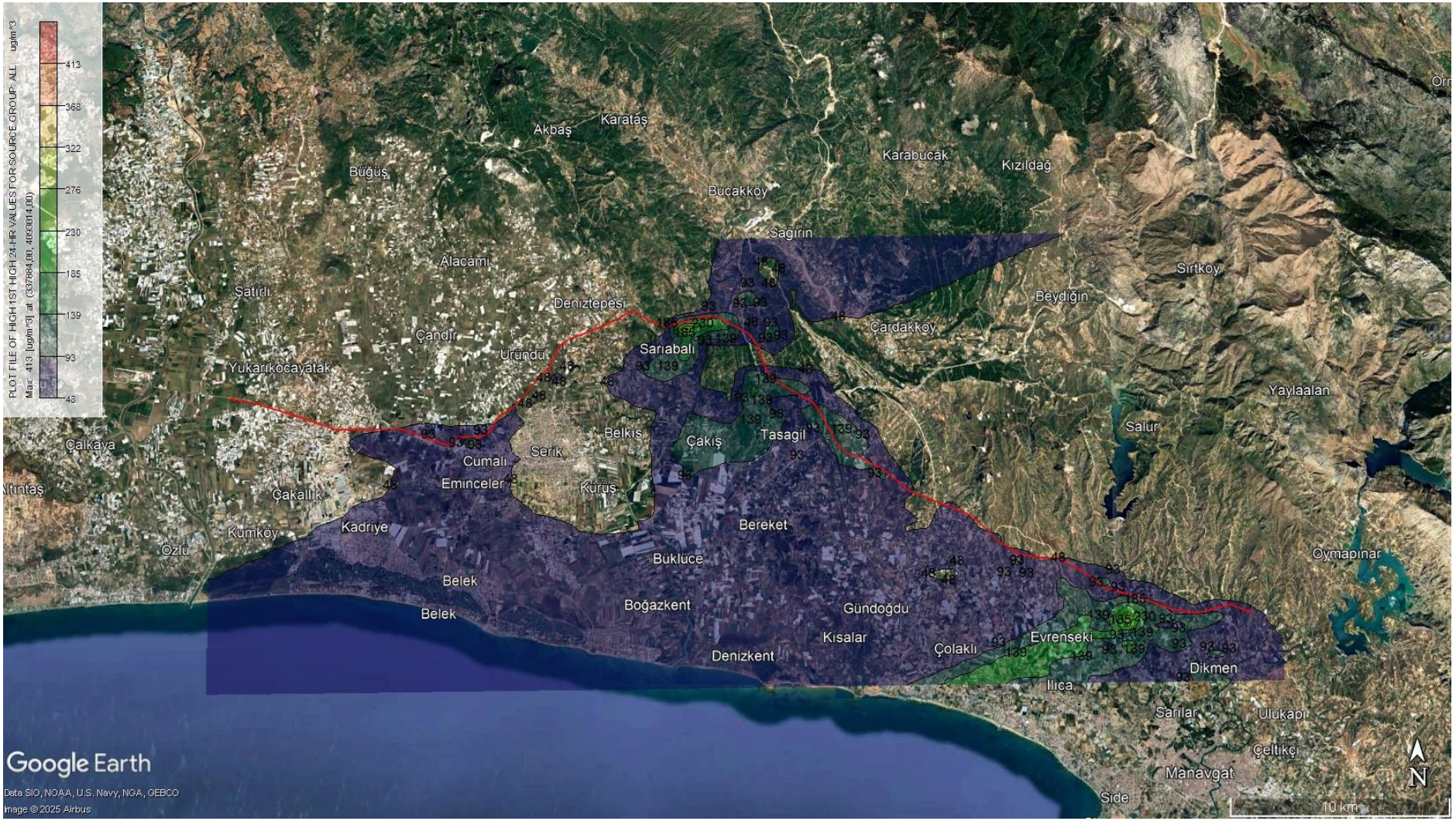

Figure 7. Maximum daily PM_{10} emission distribution- Section1-Construction ($\mu g/m^3$)

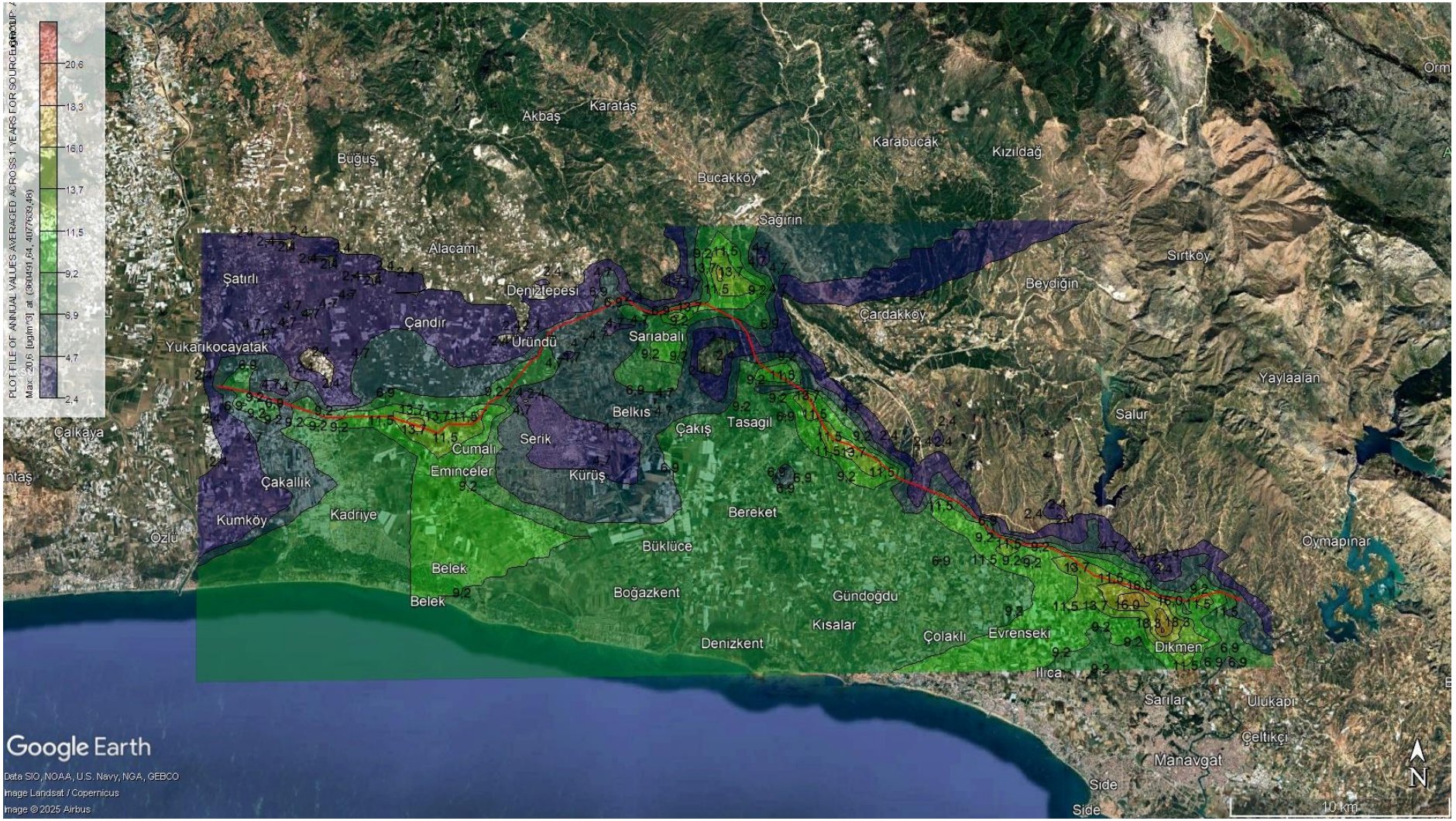

Figure 8. Maximum annual PM_{10} emission distribution-Section1 -Construction ($\mu g/m^3$)

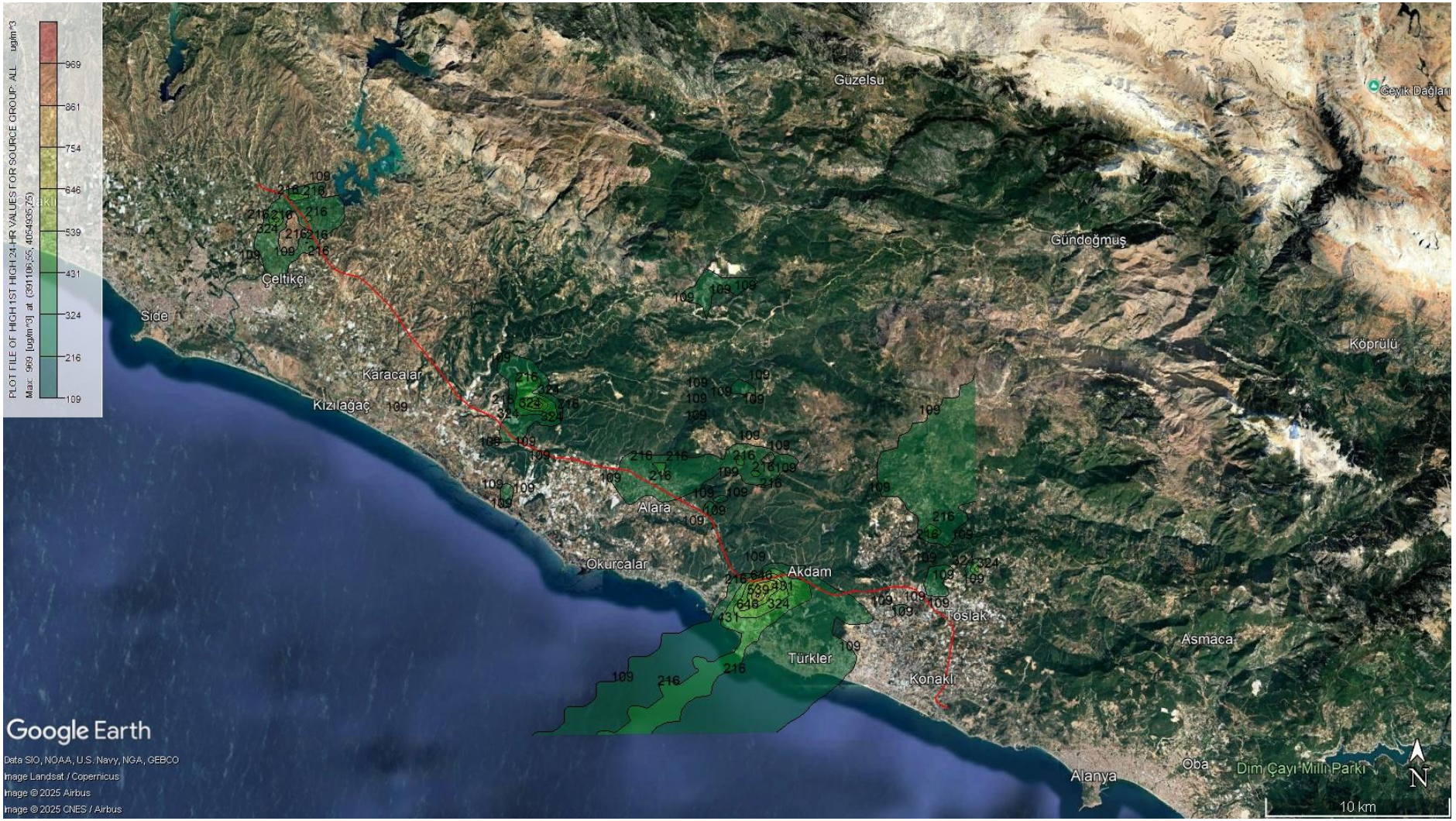

Figure 9. Maximum daily PM_{10} emission distribution- Section2 -Construction ($\mu g/m^3$)

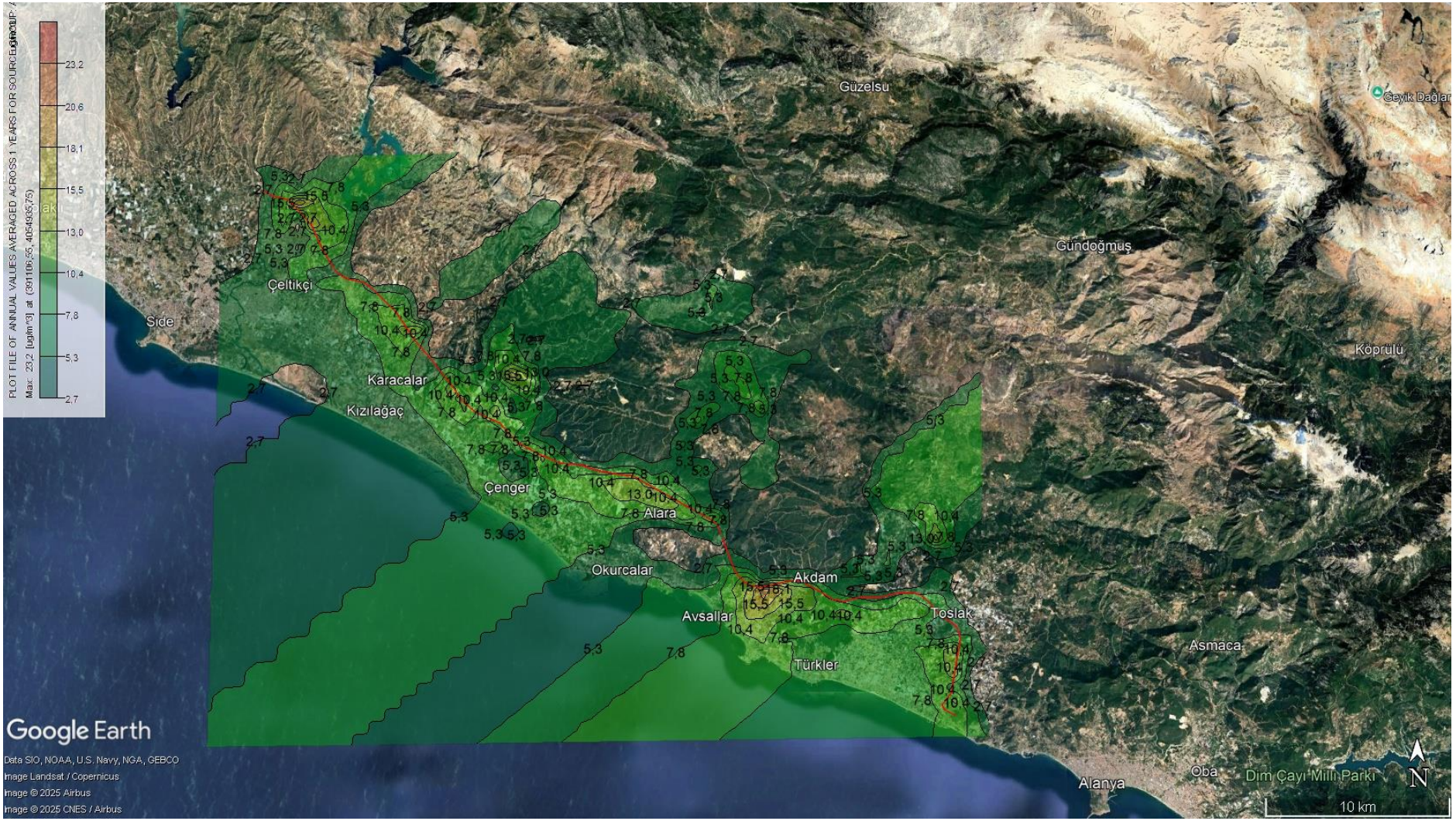

Figure 10. Maximum annual PM_{10} emission distribution-Section2-Construction ($\mu g/m^3$)

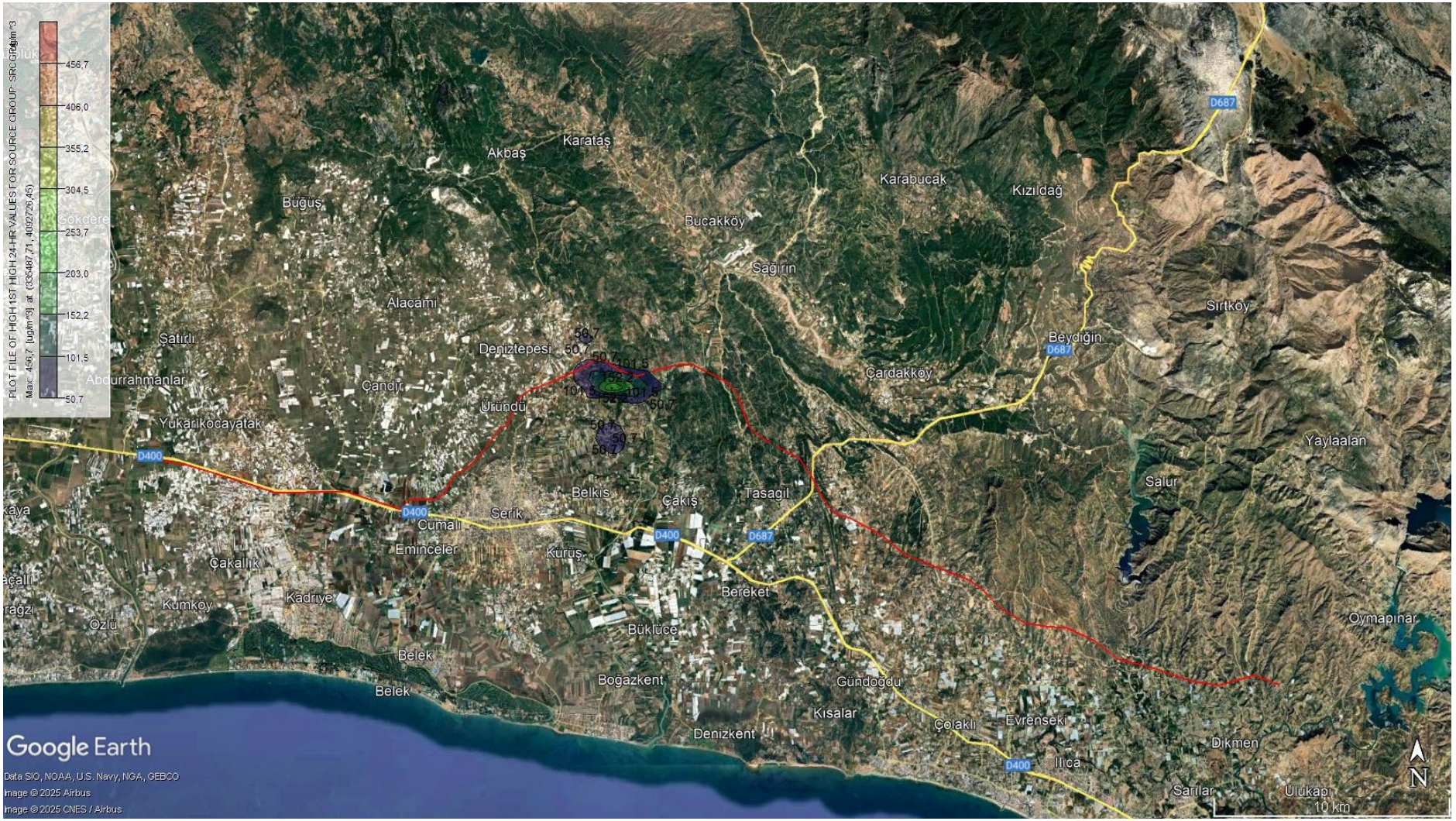

Figure 11. Maximum daily PM_{10} emission distribution- Section1-Blasting ($\mu g/m^3$)

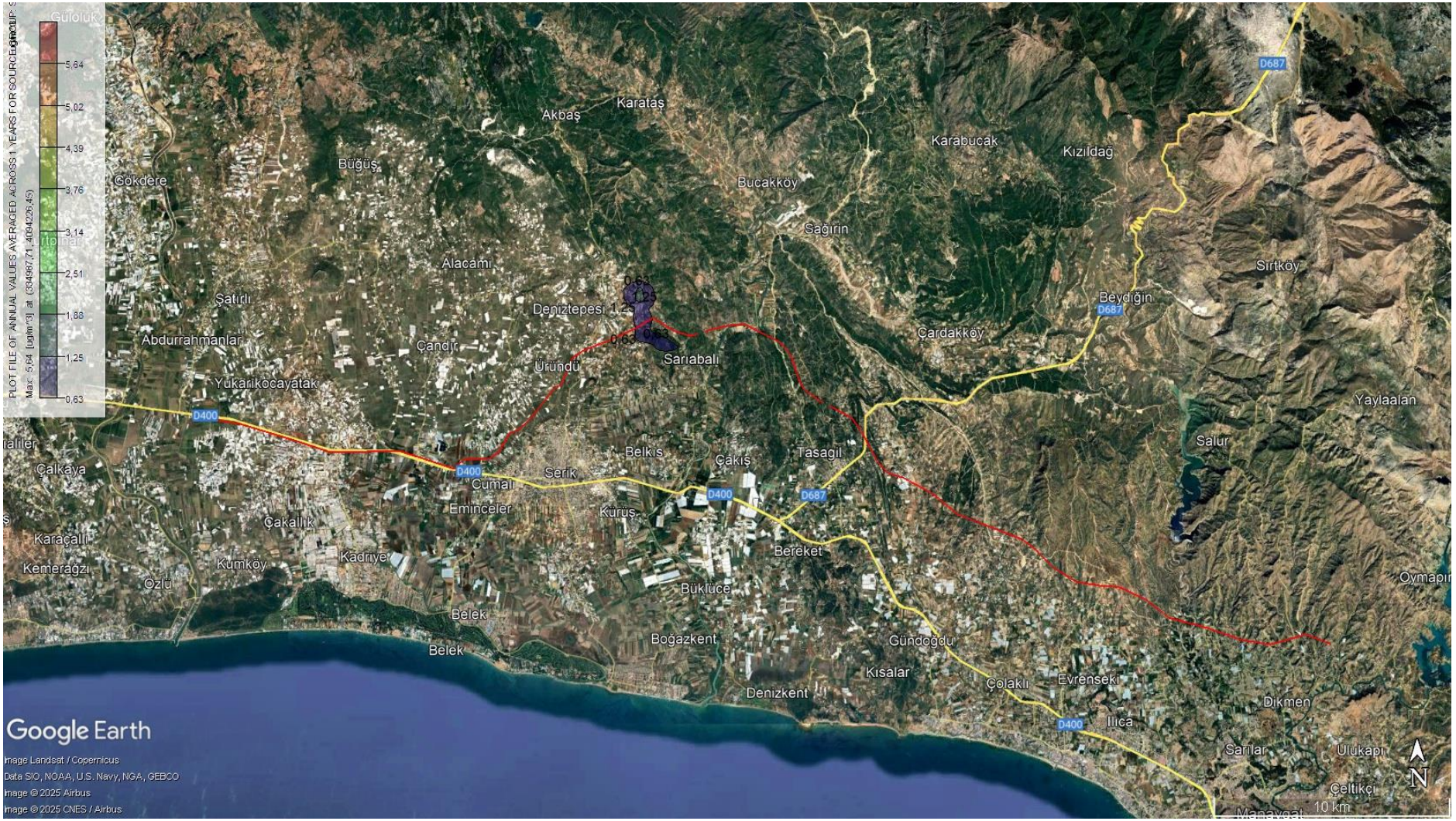

Figure 12. Maximum annual PM_{10} emission distribution-Section1-Blasting ($\mu g/m^3$)

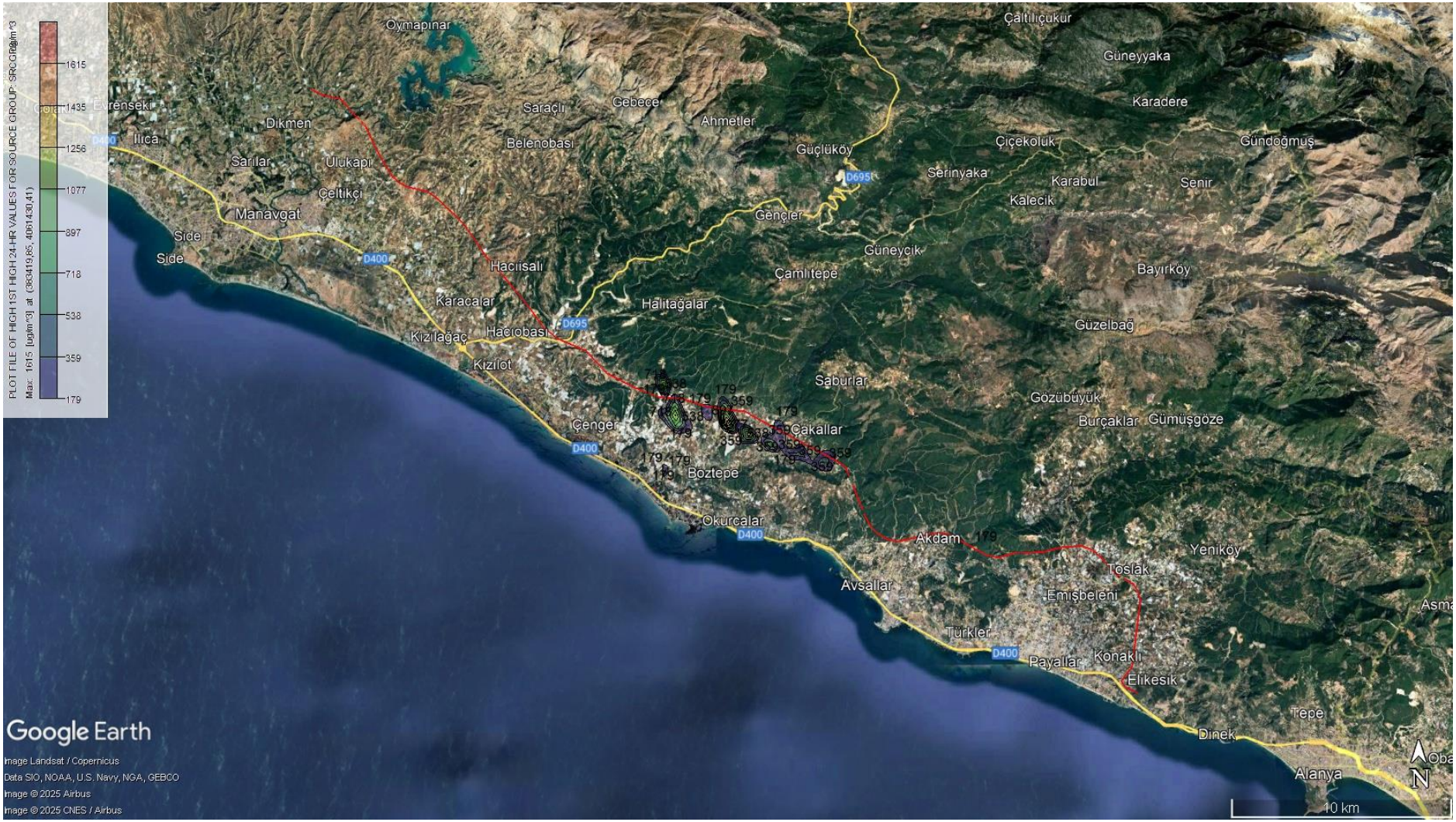

Figure 13. Maximum daily PM_{10} emission distribution- Section2-Blasting ($\mu g/m^3$)

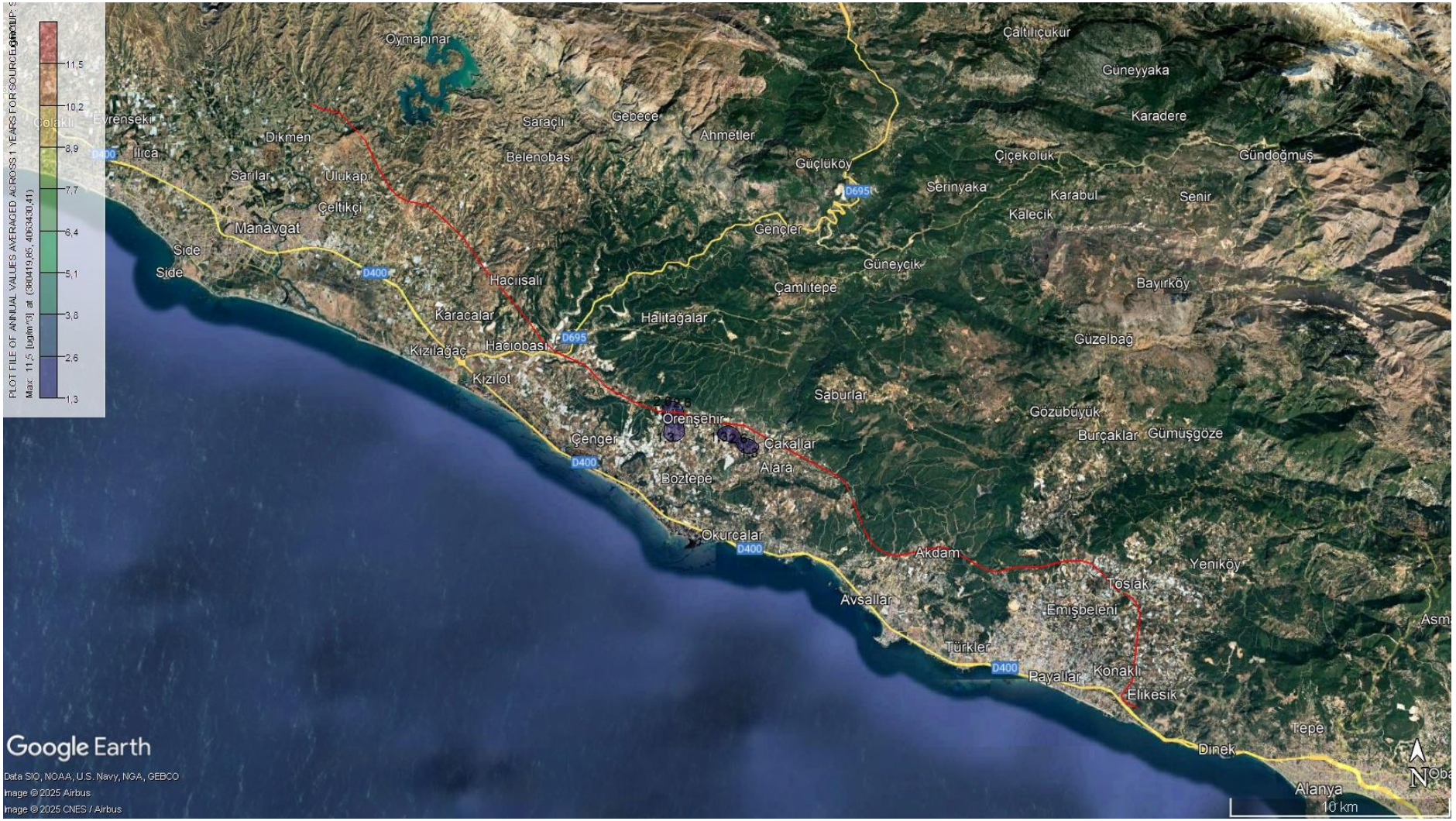

Figure 14. Maximum annual PM_{10} emission distribution-Section2-Blasting ($\mu g/m^3$)

In this study, the cumulative effects of the project on ambient PM_{10} concentrations were evaluated by summing the measured background values and the maximum daily model results for each location. The results are presented in Table 27.

The highest cumulative PM_{10} concentration was observed in Sarıobalı, with a value of 429.81 µg/m³, of which 413.31 µg/m³ was attributed to project-related emissions. Despite the elevated daily concentration, the number of modeled exceedances at this site remained within the legal limit (33 days/year) as defined by SKHKKY and EU standards.

Other notable locations include:

- Akdam: 266.49 µg/m³ cumulative, 19 exceedances – compliant.
- Karakaya: 185.64 µg/m³ cumulative, 11 exceedances – compliant.
- Köprüçay: 111.38 µg/m³ cumulative, 26 exceedances – compliant.
- Ulukapı: 58.10 µg/m³ cumulative, 3 exceedances – compliant.

In contrast, locations such as Serik (37.17 µg/m³, 0 exceedances), Sülek (30.65 µg/m³, 0 exceedances), and Deniz Tepesi (57.45 µg/m³, 2 exceedances) reported low cumulative concentrations and minimal exceedance frequency, indicating limited project-related impact.

However, Hacıali represents a critical location where the number of daily PM_{10} exceedances is projected to reach 248 days/year, significantly surpassing both national and international thresholds. Importantly, the pre-project background concentration in this location was already high at 45.9 µg/m³, near the legal daily limit. This indicates that Hacıali is subject to pre-existing air quality stress, and additional emissions from construction activities further intensify exceedance frequency.

To address this concern, the following site-specific mitigation measures are recommended:

- Limit high-dust construction activities during stagnant meteorological conditions or inversion episodes;
- Implement water spraying, soil stabilizers, and road paving to control fugitive dust;
- Ensure all material-transporting trucks are covered;
- Install wind fences or vegetative barriers between emission sources and sensitive receptors;
- Relocate intense dust-generating operations away from Hacıali where feasible;

- Establish continuous real-time PM_{10} monitoring in or near Hacıali to enable responsive emission management.

Overall, the results show that while localized and temporary exceedances of daily PM_{10} limits occur—particularly in sensitive locations like Hacıali—the majority of modeled locations remain within SKHKKY, EU, and IFC limits for either short- or long-term exposure. With effective and targeted mitigation measures, the project is not expected to result in sustained degradation of ambient air quality, particularly considering the temporary and episodic nature of construction-phase emissions.

Table 27. Cumulative Impact Assessment with Maximum PM10 GLC Values Measurement Points

District	PM_{10} Results ($\mu g/m^3$)	Scenario 1-2 Max Daily Result ($\mu g/m^3$)	Effect of the project on the air quality of the region scenario 1-2 total pollution values ($\mu g/m^3$)	Number of Exceedances
Akdam	19.6	246.89	266.49	19
Avsallar	< 6.0	80.24	86.24	8
Bademliyar	10.7	133.74	144.44	4
Bucakşeyhler	< 6.0	78.79	84.79	3
Çakallar	12	90.93	102.93	6
Deniz Tepesi	19.4	38.05	57.45	2
Emişbeleni	12.2	51.49	63.69	8
Hacıali	45.9	48.05	93.95	248
Hacıobası	8.54	51.78	60.32	4
Kalemler	14	68.25	82.25	6
Karakaya	11.2	174.44	185.64	11
Konaklı	15.1	55.47	70.57	6
Köprüçay	17.40	93.98	111.38	26
Sağırin	< 6.0	50.65	56.65	2
Sarılar	12.3	75.15	87.45	17
Sarıobalı	16.5	413.31	429.81	33
Serik	29.2	7.97	37.17	0
Sülek	7.09	23.56	30.65	0
Taşağıl	11.3	71.11	82.41	8

District	PM_{10} Results (µg/m³)	Scenario 1-2 Max Daily Result (µg/m^3)	Effect of the project on the air quality of the region scenario 1-2 total pollution values (µg/m^3)	Number of Exceedances
Ulukapı	20.4	37.70	58.1	3
Uzunlar	16.8	40.21	57.01	3

4.2.Settled Dust Concentrations at Ground Level

Additionally, settled (deposited) dust emissions were also evaluated for the construction-phase scenarios (Scenario 17 and 18) to assess the potential for particulate accumulation at ground level. According to the modeling results presented in Table 28, the maximum daily settled dust concentration reached 203.53 mg/m^{2}day in Section 1 and 324.66 mg/m^{2}day in Section 2. The corresponding maximum annual average concentrations were calculated as 24.82 mg/m^{2}day and 25.35 mg/m^{2}day, respectively. Additionally, the spatial distributions of modeled PM_{10} concentrations under all scenarios are illustrated in Figure 15 to Figure 18.

All modeled values remain well below the national SKHKKY limit values of 390 mg/m^{2}day for daily and 210 mg/m^{2}day for annual settled dust concentrations. These results indicate that, although visible particulate deposition may occur near active construction zones, the overall impact of settled dust remains within permissible regulatory thresholds, supporting the conclusion that the project is unlikely to cause excessive ground-level dust accumulation under the modeled conditions.

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Table 28. Results of ground-level Settled dust concentrations observed in different scenarios

Scenario	Highest Pollutant Results	
	Settled Dust	
	Highest Daily Concentration (mg/m^{2}day)	Highest Annual Concentration (mg/m^{2}day)
Scenario 17 (Construction-Section1)	203.53 (337884, 4093014)	24.82 (335987, 4093226)

Scenario	Highest Pollutant Results	
	Settled Dust	
	Highest Daily Concentration (mg/m^2day)	Highest Annual Concentration (mg/m^2day)
Scenario 18 (Construction-Section2)	324.66 (365419, 4075930)	25.35 (377919, 4066430)
SKHHKY Limit Values	390	210



Figure 15. Maximum daily settled dust emission distribution- Section1-Construction (mg/m^{2}day)



Figure 16. Maximum annual settled dust emission distribution-Section1 -Construction (mg/m^{2}day)

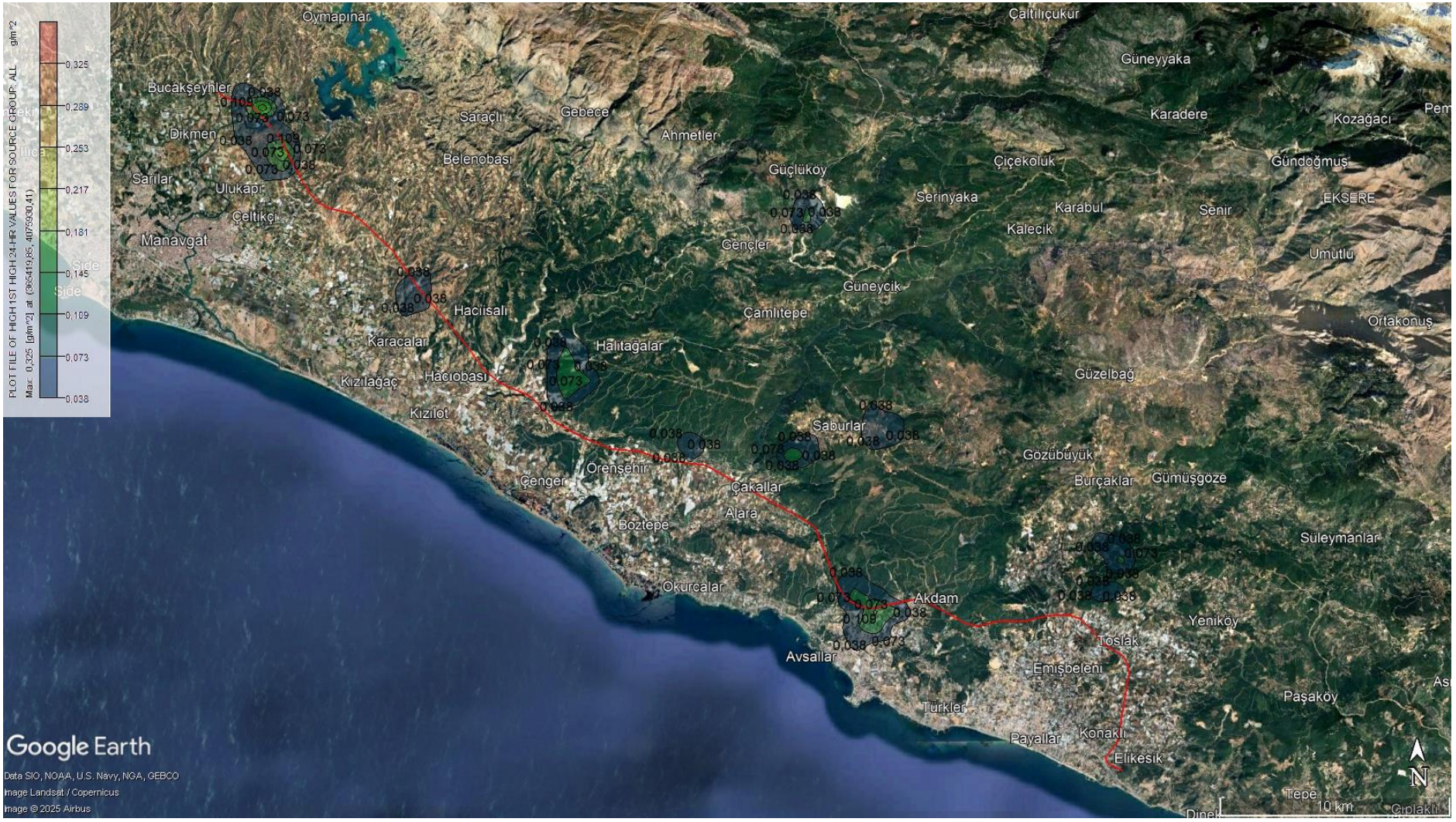

Figure 17. Maximum daily settled dust emission distribution- Section2 -Construction (mg/m^{2}day)



Figure 18. Maximum annual settled dust emission distribution-Section2-Construction (mg/m^{2}day)

In this study, the cumulative impact of the project on settled dust concentrations was also evaluated for each monitoring location under Scenarios 17 and 18, as presented in Table 29. The results reveal spatial variability in deposition levels, reflecting the proximity to active construction areas and unpaved haul roads.

The highest cumulative settled dust concentration was observed in Sarıobalı, with a total of 276.59 mg/m^{2}day, followed by Ulukapı (218.19 mg/m^{2}day) and Hacıali (112.48 mg/m^{2}day). These locations are either directly adjacent to intense earthmoving operations or located downwind of major activity centers. Although the daily maximum settled dust concentrations at individual receptor points in Sarıobalı (203.53 µg/m³) and Ulukapı (144.57 mg/m^{2}day) remain well below the SKHKKY daily limit of 390 mg/m^{2}day.

Even in the most affected settlements, such as Sarıobalı, Ulukapı, and Hacıali, cumulative concentrations remained below regulatory thresholds, indicating that construction-related settled dust emissions are not expected to cause long-term air quality degradation or regulatory non-compliance. These results confirm that, under the modeled scenarios, the project complies with national standards for settled dust, and that the anticipated impacts are localized, temporary, and manageable with routine dust suppression measures.

Table 29. Cumulative Impact Assessment with Maximum Settled Dust GLC Values Measurement Points

District	Settled Dust Results (mg/m^2day)	Scenario 17-18 Max Daily Result (mg/m^2day)	Effect of the project on the air quality of the region scenario 17-18 total pollution values (mg/m^2day)
Akdam	12.33	20.80	33.13
Avsallar	32.07	22.00	54.07
Bademliyar	54.84	35.68	90.52
Bucakşeyhler	31.31	4.09	35.40
Çakallar	60.53	15.74	76.27
Deniz Tepesi	12.33	12.66	24.99
Emişbeleni	56.55	15.82	72.37
Hacıali	92.98	19.50	112.48
Hacıobası	45.35	5.34	50.69
Kalemler	65.28	4.50	69.78
Karakaya	56.17	20.23	76.40
Konaklı	73.06	11.46	84.52
Köprüçay	72.3	6.45	78.75
Sağırin	29.6	3.77	33.37
Sarılar	64.71	44.29	109.00
Sarıobalı	73.06	203.53	276.59
Serik	74.38	2.04	76.42
Sülek	42.13	13.16	55.29
Taşağıl	55.41	5.45	60.86
Ulukapı	73.62	144.57	218.19
Uzunlar	72.49	17.15	89.64

4.3.$PM_{2.5}$ Concentrations at Ground Level

According to the defined scenarios, the GLC values of $PM_{2.5}$ near the existing facilities were calculated and are presented in. Additionally, the spatial distributions of modeled $PM_{2.5}$ concentrations under all scenarios are illustrated in Figure 19and Figure 22.

In accordance with the EU Directive (2008/50/EC), the annual average concentration of $PM_{2.5}$ must not exceed 25 µg/m³. The IFC EHS Guidelines recommend a more protective annual average limit of 10 µg/m³.

As shown in Table 30:

- In Scenario 3 (Construction – Section 1), the highest annual $PM_{2.5}$ concentration was 3.95 µg/m³, observed at coordinates (353991, 4082139), which is significantly below both EU and IFC thresholds.
- In Scenario 4 (Construction – Section 2), the highest annual value was 3.70 µg/m³, observed at coordinates (371919, 4070430), also well below the applicable limits. According to the modeling results, the project's annual average impacts are well below all legal limits. However, depending on intensive construction activities and meteorological conditions, it has been calculated that temporary increases in 24-hour $PM_{2.5}$ concentrations may occur at certain localized points within the project's area of influence.
- Under worst-case modeling scenarios, these peaks are predicted to reach 62.03 µg/m³ and 142.58 µg/m³ for the different construction scenarios. Both of these levels significantly exceed the World Health Organization's (WHO) 24-hour health-based guideline of 15 µg/m³.
- These increases, which are expected to be instantaneous and temporary in nature, will be managed through the strict implementation of dust control. Through these measures, the impacts of construction-related emissions on the environment and human health will be effectively minimized.

Table 30. Results of ground-level $PM_{2.5}$ concentrations observed in different scenarios

Scenario	Highest Pollutant Results	
	PM2.5	
	Highest Daily Concentration (µg/m³)	Highest Annual Concentration (µg/m³)
Scenario 3	62.03	3.95

Scenario	Highest Pollutant Results	
	PM2.5	
	Highest Daily Concentration (µg/m^3)	Highest Annual Concentration (µg/m^3)
(Construction-Section1)	(337884, 4093014)	(353991, 4082139)
Scenario 4 **(Construction-Section2)**	142.58 (379419, 4065930)	3.70 (371919, 4070430)
EU Directive Limit Values		25
IFC Limit Values		10

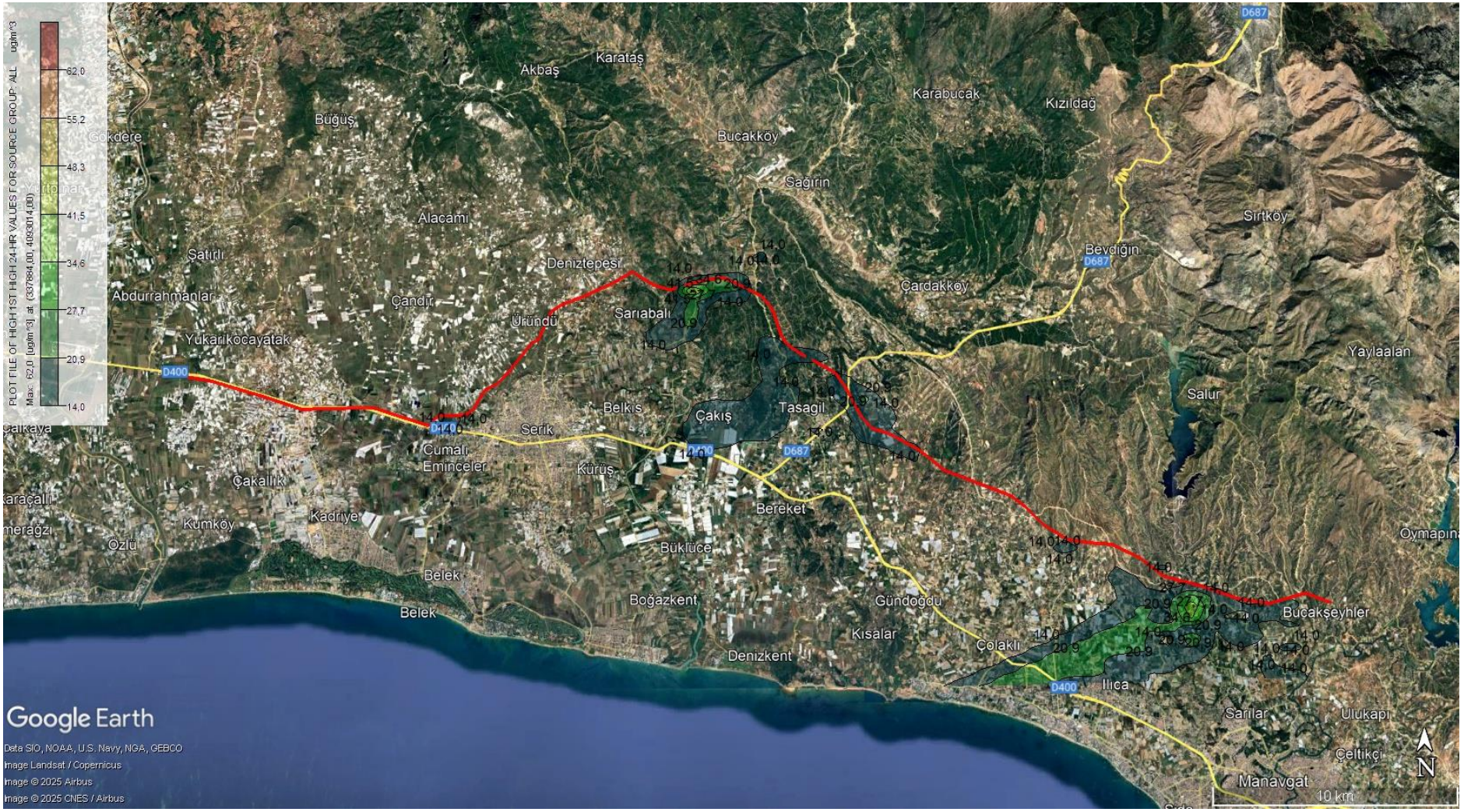

Figure 19 Maximum Daily $PM_{2.5}$ emission distribution-Section1 ($\mu g/m^3$)

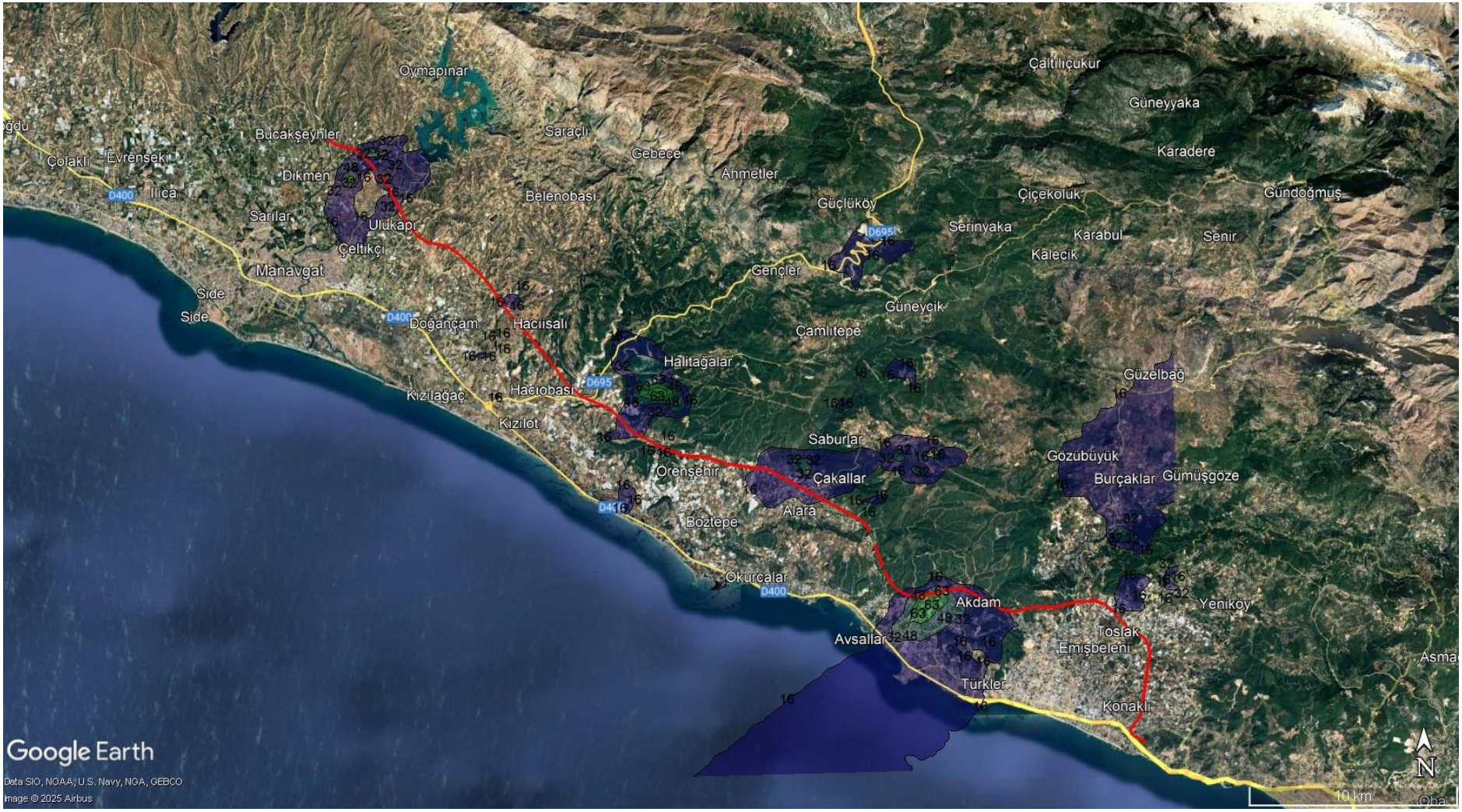

Figure 20 Maximum daily $PM_{2.5}$ emission distribution-Section2 ($\mu g/m^3$)

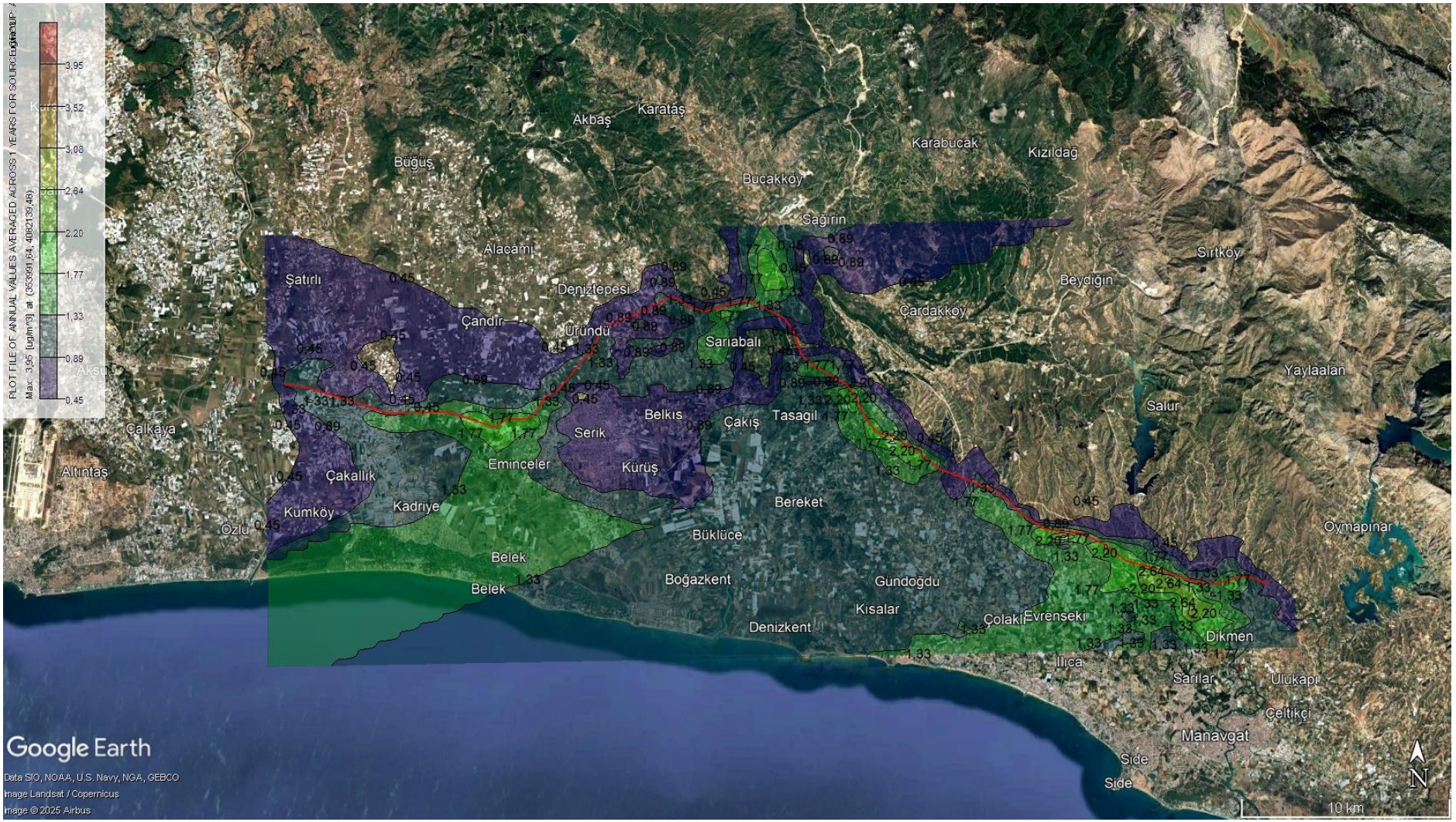

Figure 21. Maximum annual $PM_{2.5}$ emission distribution-Section1 ($\mu g/m^3$)



Figure 22. Maximum annual $PM_{2.5}$ emission distribution-Section2 ($\mu g/m^3$)

In this study, the cumulative effects of the project on ambient PM2.5 concentrations were assessed by summing the measured background values and the maximum annual model results (Scenario 3–4) for each monitoring location. The results are presented in Table 27.

According to the results, most locations remain below the EU annual limit value of 25 µg/m³ for $PM_{2.5}$, and also below the more protective IFC annual guideline of 10 µg/m³. However, one location—Hacıali—exceeds both thresholds primarily due to already high background concentrations. The highest cumulative $PM_{2.5}$ concentration was recorded in Hacıali, with 32.22 µg/m³, where the background concentration alone was 30.5 µg/m³—already exceeding both the EU and IFC limits prior to project implementation.

Other notable locations include:

- Ulukapı: 17.14 µg/m³ (background: 16.7 µg/m³, project: 0.44 µg/m³)
- Akdam: 17.35 µg/m³ (background: 15.8 µg/m³, project: 1.55 µg/m³)
- Deniz Tepesi: 14.47 µg/m³ (background: 13.6 µg/m³, project: 0.87 µg/m³)

By contrast, several locations such as Bucakşeyhler (1.29 µg/m³), Sağırin (0.98 µg/m³), and Sülek (6.69 µg/m³) remain well below both EU and IFC thresholds, confirming the limited dispersion of fine particulate matter from construction-phase activities in those areas.

The most significant short-term impact is predicted at the Sarıobalı monitoring point, where the project's maximum daily contribution is modeled to be 62.04 µg/m³. When combined with the background concentration, the cumulative daily $PM_{2.5}$ level at this location could reach 72.24 µg/m³. Other locations with notable project-related daily increases include Karakaya (project contribution: 28.44 µg/m³) and Akdam (project contribution: 27.24 µg/m³).

Table 31. Cumulative Impact Assessment with Maximum PM2.5 GLC Values Measurement Points

District	Baseline Measurements $PM_{2.5}$ Results (µg/m³)	Scenario 3-4 Max Daily Result (µg/m³)	Scenario 3-4 Max Anuual Result (µg/m³)	Cumulative Results (µg/m³)-Daily	Cumulative Results (µg/m³)-Annual
Akdam	15.8	27.24	1.55	43.04	17.35
Avsallar	< 6.0	11.66	1.56	17.66	7.56
Bademliyar	9.27	20.07	0.61	29.34	9.88
Bucakşeyhler	< 6.0	10.77	1.29	16.77	1.29
Çakallar	9.99	13.53	0.82	23.52	10.81
Deniz Tepesi	13.6	5.7	0.87	19.3	14.47
Emişbeleni	11.8	6.66	1.2	18.46	13
Hacıali	30.5	7.42	1.72	37.92	32.22
Hacıobası	6.17	7.77	0.99	13.94	7.16
Kalemler	12.2	10.25	1.52	22.45	13.72
Karakaya	10.4	28.44	0.98	38.84	11.38
Konaklı	13.1	7.9	1.57	21	14.67
Köprüçay	11.6	14.74	1.71	26.34	13.31
Sağırin	< 6.0	12.85	0.98	6.98	0.98
Sarılar	11.8	11.34	1.73	23.14	13.53
Sarıobalı	10.2	62.04	2.98	72.24	13.18
Serik	7.84	1.08	0.13	8.92	7.97
Sülek	6.17	3.25	0.52	9.42	6.69
Taşağıl	8.18	12.45	1.27	20.63	9.45
Ulukapı	16.7	5.4	0.44	22.1	17.14
Uzunlar	12.2	6.03	1.05	18.23	13.25

4.4. NO_2 Concentrations at Ground Level

The GLC values of NO_2 for the determined scenarios are shown in Table 32. NO_2 distributions according to the determined scenarios are shown between Figure 23 and Figure 30.

According to Table 32:

Scenario 5 (Operational – Section 1): The maximum hourly NO_2 concentration was 11.81 µg/m³, and the maximum annual concentration was 0.36 µg/m³. No exceedances of the hourly limit

occurred. These values are significantly below the hourly limit of 200 µg/m³ (maximum 18 exceedances per year) and the annual limit of 40 µg/m³, as defined by SKHKKY, EU Directive, and IFC EHS Guidelines.

Scenario 8 (Operational – Section 2):The highest hourly concentration was 8.54 µg/m³, and the annual value was 0.22 µg/m³, both of which are well within all applicable regulatory thresholds.

Scenario 13 (Construction – Section 1):Due to emissions from construction machinery, the maximum hourly concentration reached 175.32 µg/m³, while the annual average was 5.41 µg/m³. These values remain within the 200 µg/m³ hourly limit and the 40 µg/m³ annual threshold defined by IFC, EU, and SKHKKY.

Scenario 15 (Construction – Section 2):The highest hourly NO_2 concentration was 126.10 µg/m³, and the annual mean was 3.28 µg/m³. No exceedances of the hourly limit occurred, and the annual value is also compliant with the relevant standards.

All modeled NO_2 concentrations are well below the regulatory thresholds established by SKHKKY, EU, and IFC, both in terms of hourly peaks and annual averages. Therefore, NO_2 emissions associated with construction and operational activities of the project are not expected to cause any adverse air quality or health impacts in the surrounding environment.

Table 32. Results of ground-level NO_2 concentrations observed in different scenarios

Scenario	Highest Results NO_2		
	Maximum Hourly Concentration (µg/m³)	**Number of Exceedances**	**Maximum Annual Concentration (µg/m³)**
Scenario 5 (Operational-Section1)	11.81 (356991, 4080639)	0	0.36 (349491, 4084639)
Scenario 8 (Operational-Section2)	8.54 (378919, 4062930)	0	0.22 (401919, 4049430)
Scenario 13 (Construction-Section1)	175.32 (356991, 4080639)	0	5.41 (349491, 4084639)

Scenario 15 (Construction -Section2)	126.10 (378919, 4062930)	0	3.28 (401919, 4049430)
IFC Limit Values	200	-	40
EU Directive Limit Values	200	Not exceeded more than 18 times in a year	40
SKHHKY Limit Value	200	Not exceeded more than 18 times in a year	40



Figure 23. Maximum hourly NO_2 emission distribution Section 1-Operational ($\mu g/m^3$)



Figure 24. Maximum annual NO_2 emission distribution Section 1- Operational ($\mu g/m^3$)

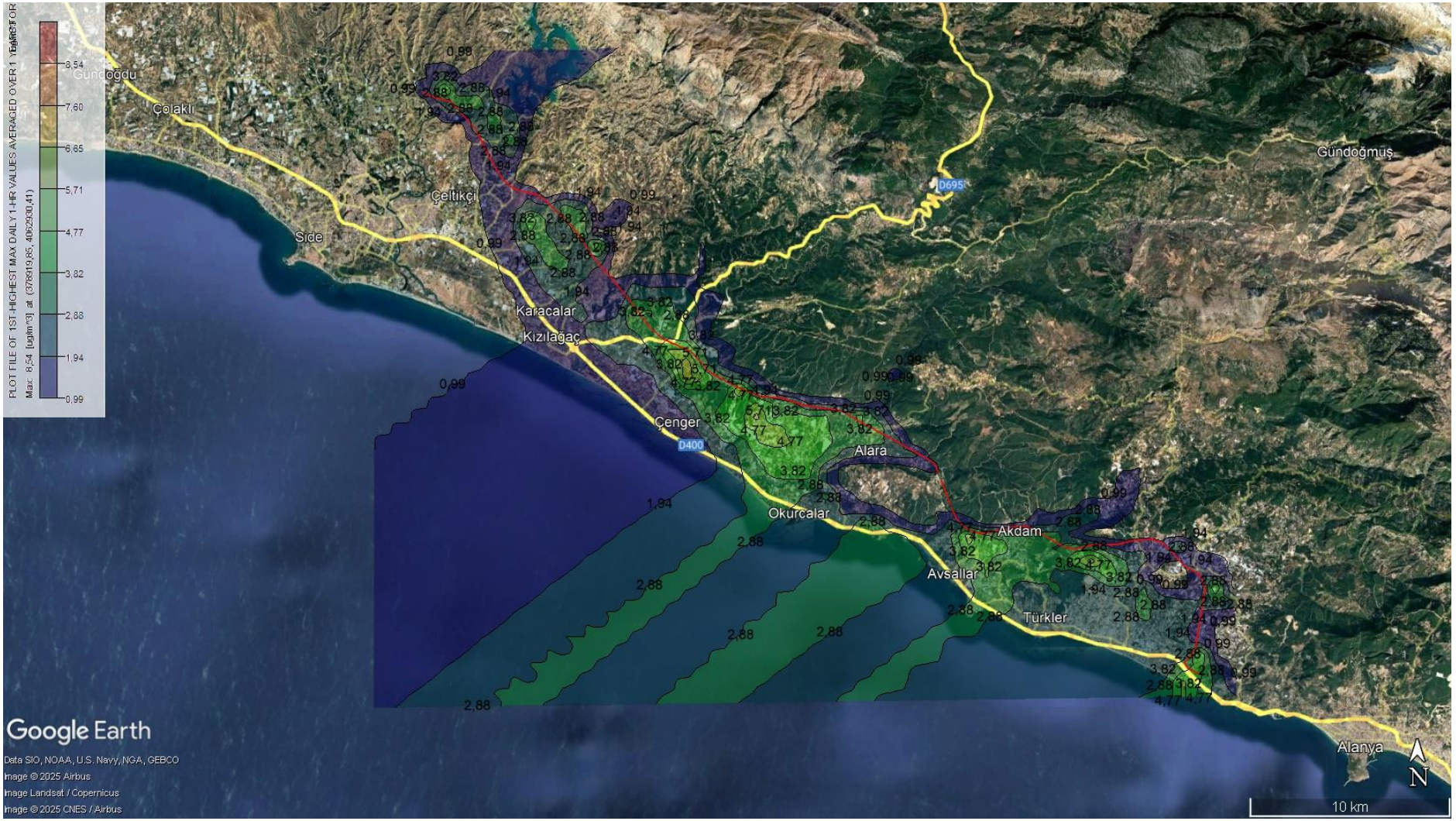

Figure 25. Maximum hourly NO_2 emission distribution Section 2- Operational ($\mu g/m^3$)



Figure 26. Maximum annual NO_2 emission distribution Section 2- Operational ($\mu g/m^3$)

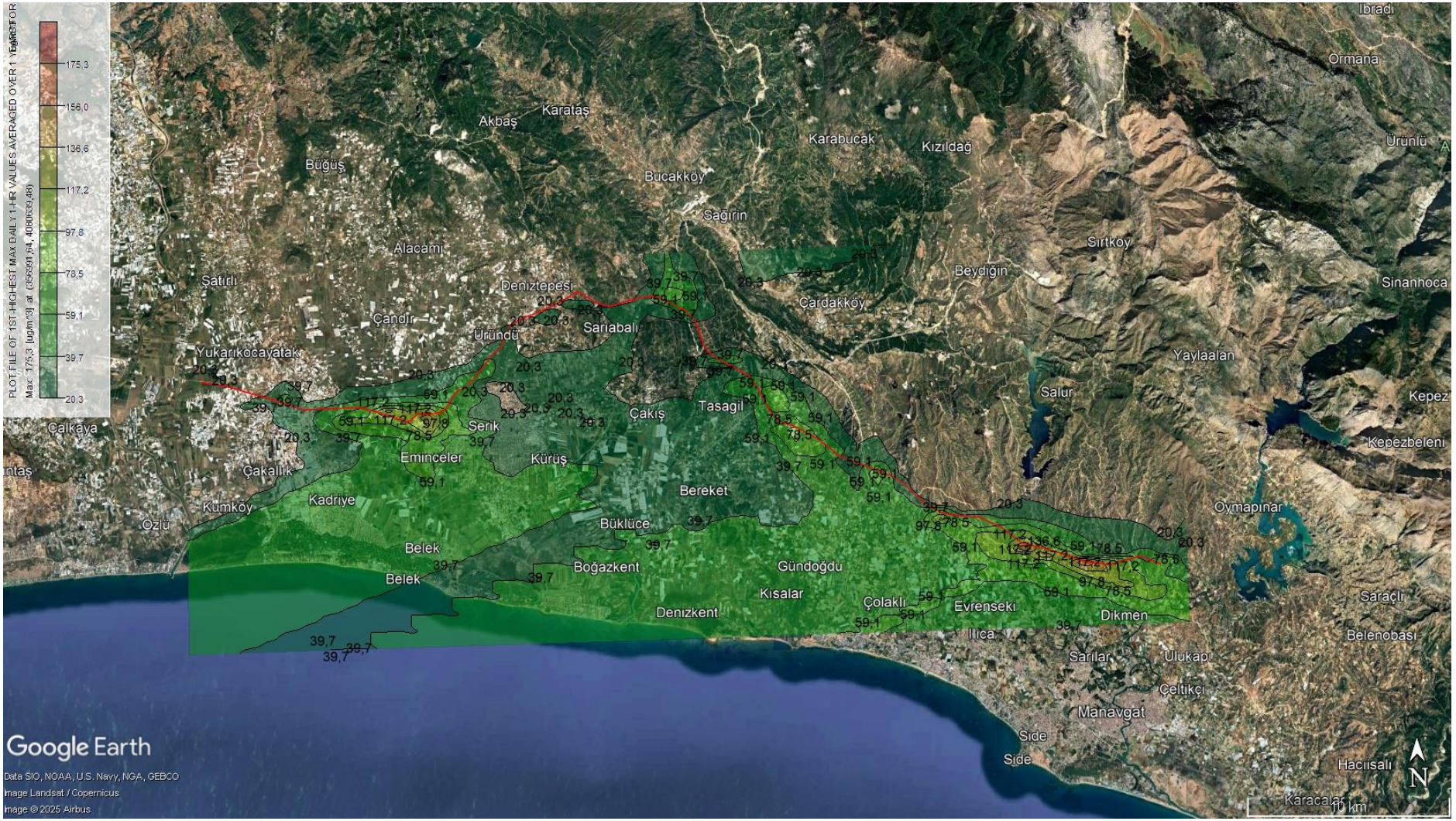

Figure 27. Maximum hourly NO_2 emission distribution Section 1- Construction ($\mu g/m^3$)

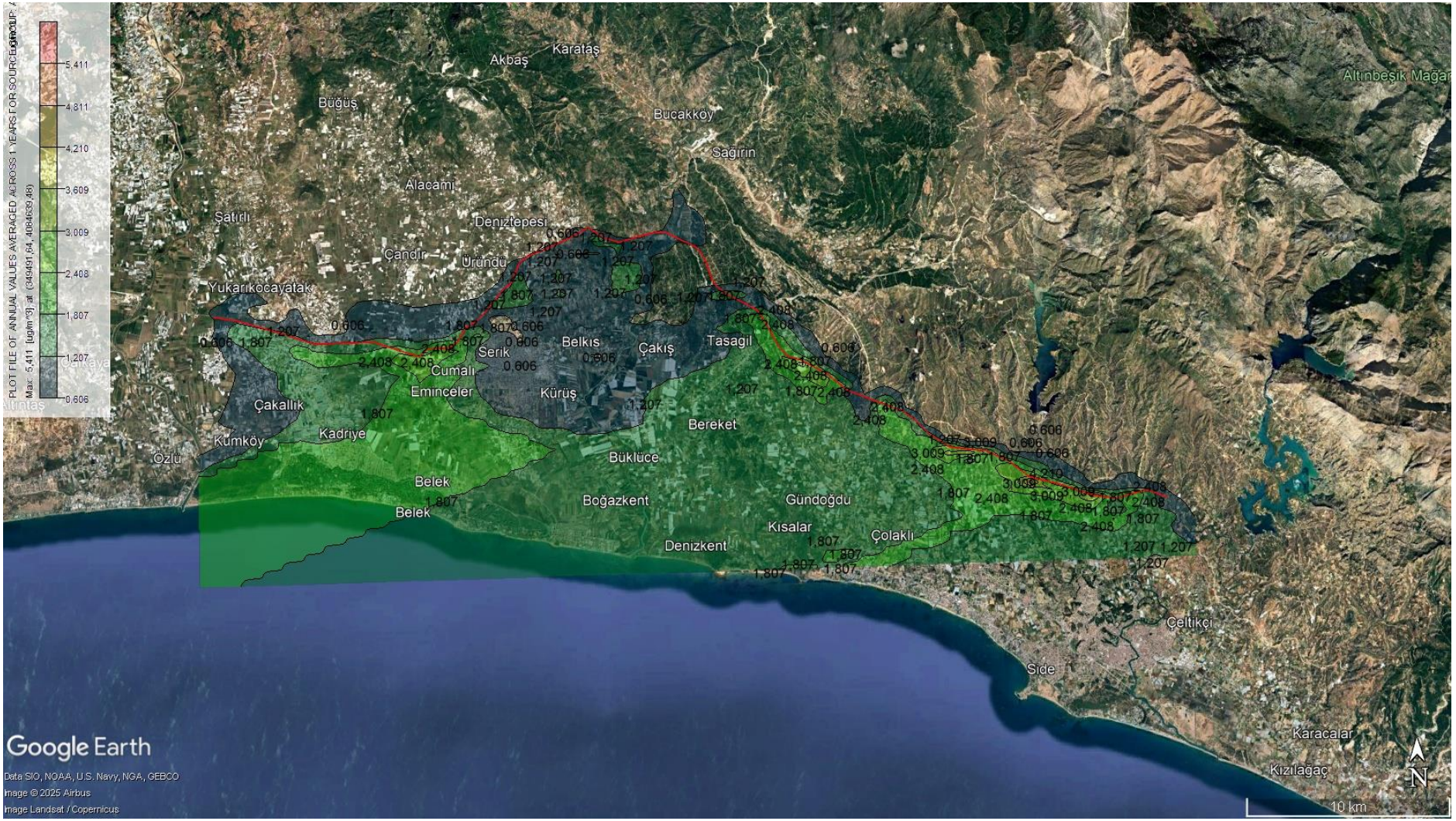

Figure 28. Maximum annual NO_2 emission distribution Section 1- Construction ($\mu g/m^3$)



Figure 29. Maximum hourly NO_2 emission distribution Section 2- Construction ($\mu g/m^3$)

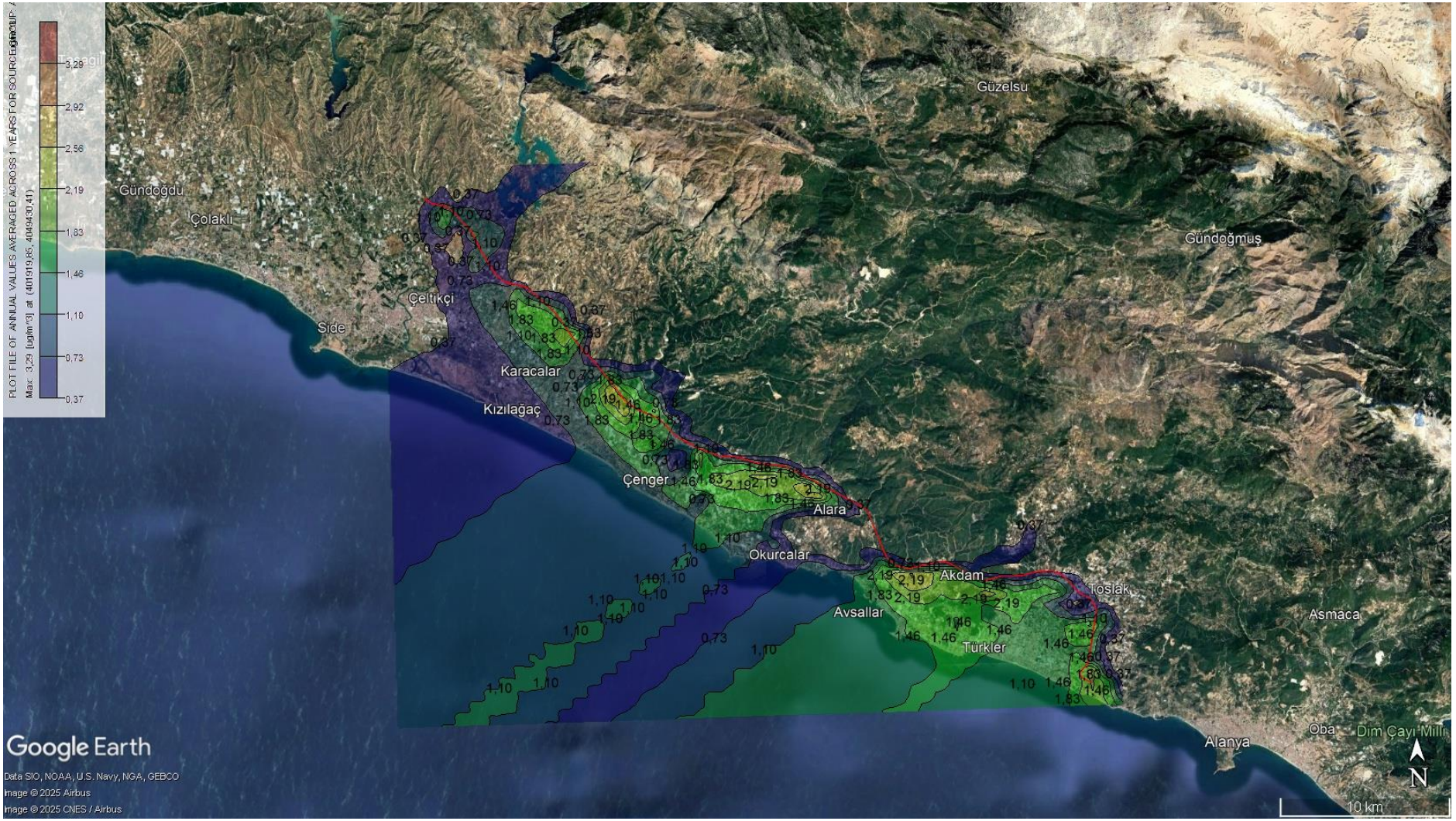

Figure 30. Maximum annual NO_2 emission distribution Section 2- Construction ($\mu g/m^3$)

In addition, as previously noted, background air quality measurements representing various locations across the region were conducted. Based on these measurements, the cumulative NO_2 concentrations were calculated by summing the maximum hourly model results with the measured background values. The results are presented in In both the operational and construction phases, cumulative NO_2 concentrations—calculated by summing background levels with modeled emissions—remain compliant with regulatory thresholds defined by SKHKKY, EU, and IFC. Therefore, the project is not anticipated to cause any air quality standard exceedances related to NO_2 concentrations at the evaluated receptor points.

Table 33 and Table 34 corresponding to the operational and construction phases of the project, respectively.

As shown in In both the operational and construction phases, cumulative NO_2 concentrations—calculated by summing background levels with modeled emissions—remain compliant with regulatory thresholds defined by SKHKKY, EU, and IFC. Therefore, the project is not anticipated to cause any air quality standard exceedances related to NO_2 concentrations at the evaluated receptor points.

Table 33, cumulative NO_2 concentrations at all measured points remain well below the SKHKKY hourly limit value of 200 µg/m³. Furthermore, no exceedances of the hourly threshold were recorded at any of the locations included in this assessment. According to SKHKKY, the hourly limit value may be exceeded no more than 18 times per year; since all values remain far below this limit, full compliance is demonstrated.

Table 34 presents the results for the construction phase, considering modeled emissions from non-road mobile construction machinery. Cumulative concentrations at all locations also remain below the 200 µg/m³ regulatory threshold. The highest value was observed in Taşağıl, with a concentration of 44.55 µg/m³. No exceedances were recorded at any of the receptor points.

In both the operational and construction phases, cumulative NO_2 concentrations—calculated by summing background levels with modeled emissions—remain compliant with regulatory thresholds defined by SKHKKY, EU, and IFC. Therefore, the project is not anticipated to cause any air quality standard exceedances related to NO_2 concentrations at the evaluated receptor points.

Table 33. Impact Assessment with Maximum NO_2 GLC Values-Measurement Points Operational Phase

District	NO_2 Results (µg/m³)	Scenario 5-8 Max Hourly Result (µg/m³)	Effect of the project on the air quality of the region scenario	Number of Exceedances

			5-8 total pollution values (µg/m³)	
Hacıobası	<4.24	2.15	6.39	0
Konaklı	<4.24	2.12	6.36	0
Sarılar	<4.24	0.26	4.50	0
Serik	<4.24	0.71	4.95	0
Taşağıl	<4.24	2.72	6.96	0

Table 34 Impact Assessment with Maximum NO_2 GLC Values-Measurement Points Construction Phase

District	NO_2 Results (µg/m³)	Scenario 13-15 Max Hourly Result (µg/m³)	Effect of the project on the air quality of the region scenario 13-15 total pollution values (µg/m³)	Number of Exceedances
Hacıobası	<4.24	31.79	36.03	0
Konaklı	<4.24	31.28	35.52	0
Sarılar	<4.24	3.83	8.07	0
Serik	<4.24	10.51	14.75	0
Taşağıl	<4.24	40.31	44.55	0

4.5. CO Concentrations at Ground Level

The GLC values of CO for the determined scenarios are shown in Table 35. CO distributions according to the determined scenarios are shown in Figure 31 and Figure 34.

According to Table 35, the maximum 8-hour average CO concentration in Scenario 6 (Operational – Section 1) was calculated as 3.55 µg/m³, and in Scenario 9 (Operational – Section 2), the corresponding value was 2.21 µg/m³. Both values are significantly lower than the regulatory limit of 10,000 µg/m³, defined identically by SKHKKY, the EU Ambient Air Quality Directive, and the IFC Environmental, Health and Safety Guidelines for the protection of human health.

In Scenario 14 (Construction – Section 1), the maximum 8-hour average CO concentration reached 1082.06 µg/m³, while in Scenario 16 (Construction – Section 2), it was 670.32 µg/m³. Despite being higher than the operational values due to construction machinery emissions, these concentrations are still well below the 10,000 µg/m³ threshold.

No exceedances of the regulatory limit were recorded in any scenario. Therefore, the modeled CO concentrations for both the operational and construction phases are considered to be fully compliant with national and international air quality standards.

Given the substantial margin between the modeled results and the applicable limit values, CO emissions are not expected to cause any adverse effects on ambient air quality or public health at any of the evaluated receptor locations.

Table 35. Results of ground-level CO concentrations observed in different scenarios

Scenario	Coordinates		CO
	X	Y	Highest Daily 8-Hour Average (µg/m³)
Scenario 6 (Operational-Section1)	349491	4084639	3.55
Scenario 9 (Operational-Section2)	378919	4062930	2.21
Scenario 14 (Construction-Section1)	349491	4084639	1082.06
Scenario 16 (Construction -Section2)	378919	4062930	670.32
SKHKKY Limit Values			10,000
IFC Limit Values			10,000
EU Directives Limit Values			10,000



Figure 31. Maximum 8-hour CO emission distribution Section 1- Operational ($\mu g/m^3$)

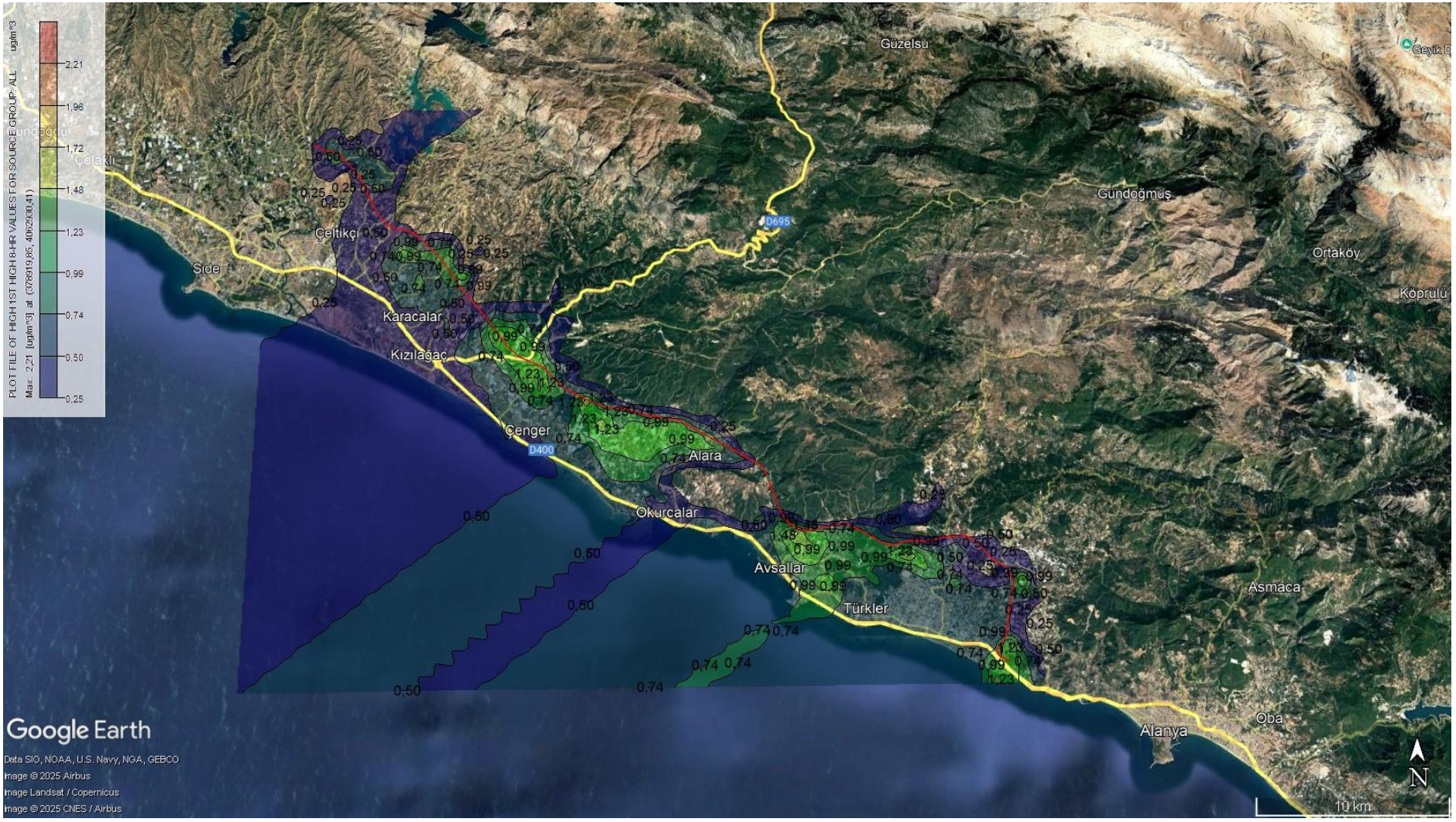

Figure 32. Maximum 8-hour CO emission distribution Section 2- Operational (µg/m^3)

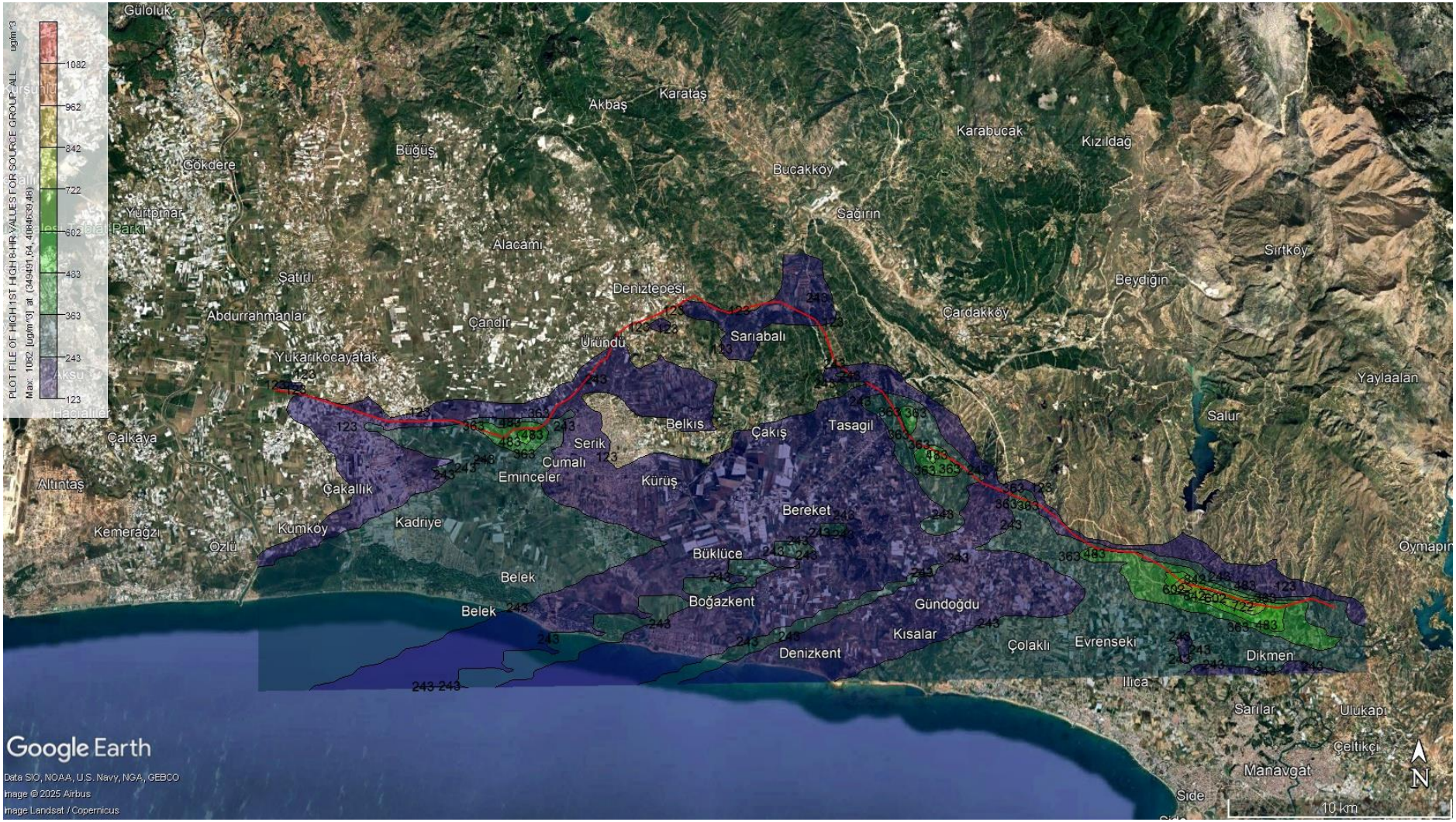

Figure 33. Maximum 8-hour CO emission distribution Section 1- Construction ($\mu g/m^3$)

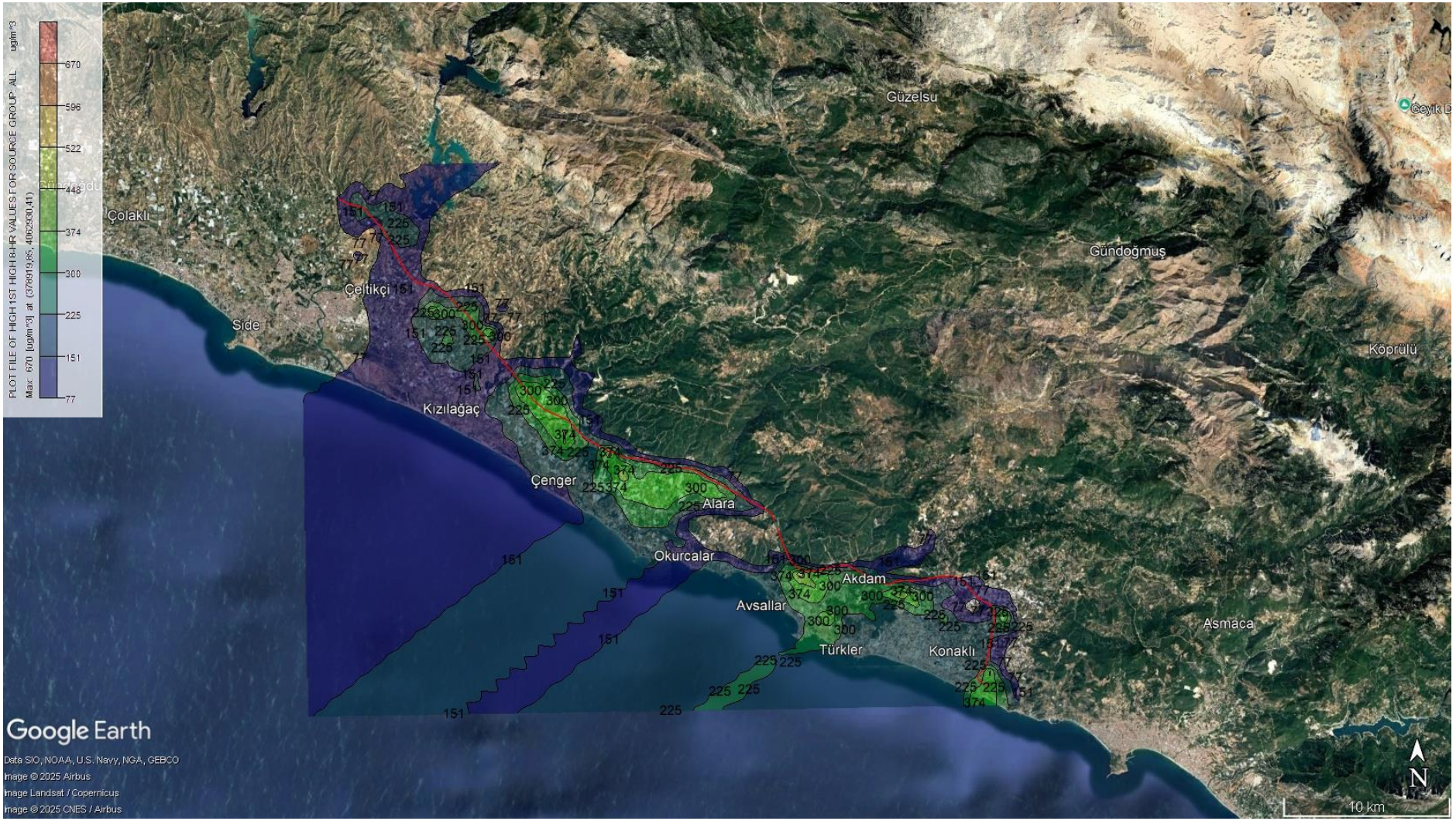

Figure 34. Maximum 8-hour CO emission distribution Section 2- Construction ($\mu g/m^3$)

4.6. Ground Level VOC Concentrations

According to Table 29, the maximum hourly VOC concentration for Scenario 7 (Operational – Section 1) was calculated as 2.43 µg/m³, while the maximum daily concentration was 0.35 µg/m³. Both values are substantially below the regulatory limit values defined in SKHKKY (280 µg/m³ hourly and 70 µg/m³ daily).

For Scenario 10 (Operational – Section 2), the maximum hourly concentration was 1.76 µg/m³, and the maximum daily concentration was 0.22 µg/m³. Again, these results are well within acceptable limits. VOC distributions according to the determined scenarios are shown between Figure 35 and Figure 38.

In conclusion, the modeled VOC concentrations for both sections remain significantly lower than the regulatory thresholds, and thus VOC emissions from the project are not expected to pose any adverse environmental or public health impacts.

Table 36. Ground-level TVOC concentration results observed in different scenarios

Scenario	**Highest Results VOC**	
	Maximum Hourly Concentration (µg/m³)	**Maximum Daily Concentration (µg/m³)**
Scenario 7 (Operational-Section1)	2.43 (356991, 4080639)	0.35 (349491, 4084639)
Scenario 10 (Operational-Section2)	1.76 (378919, 4062930)	0.22 (390419, 4055430)
Limit Values	280	70

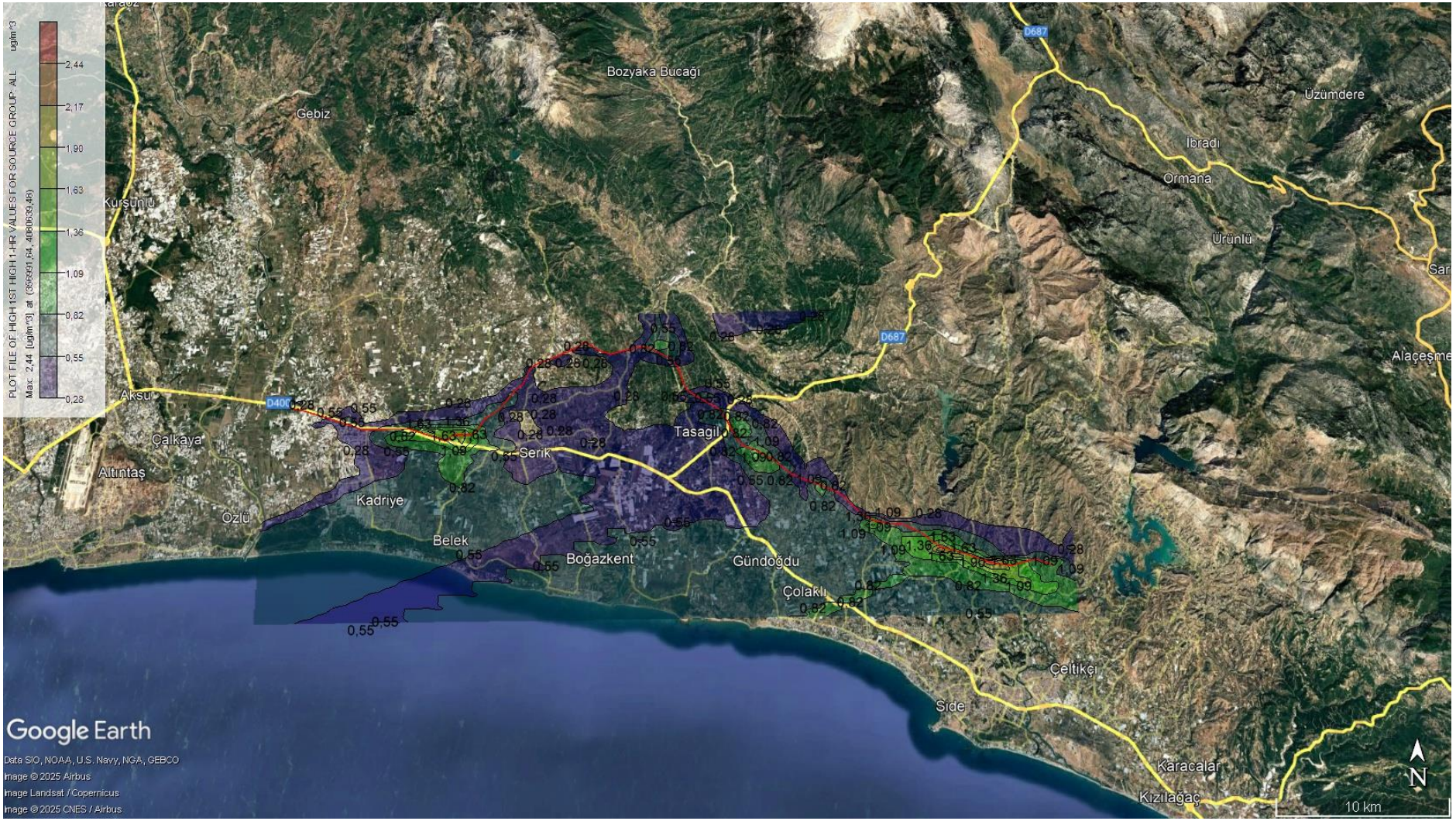

Figure 35. Maximum hourly VOC emission distribution Section 1 (µg/m^3)



Figure 36. Maximum daily VOC emission distribution Section 1(µg/m^3)

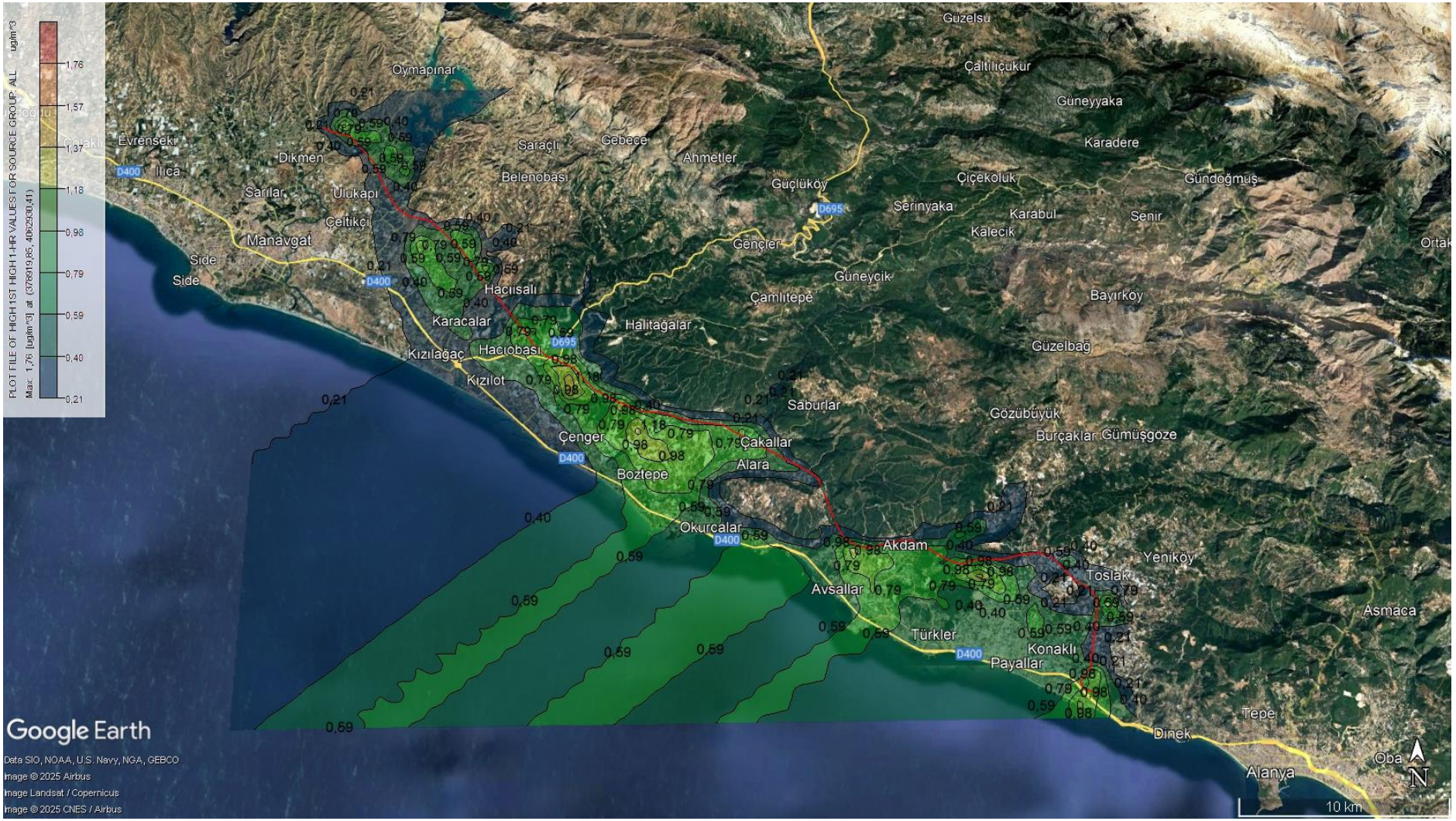

Figure 37. Maximum hourly VOC emission distribution Section 2 (µg/m^3)

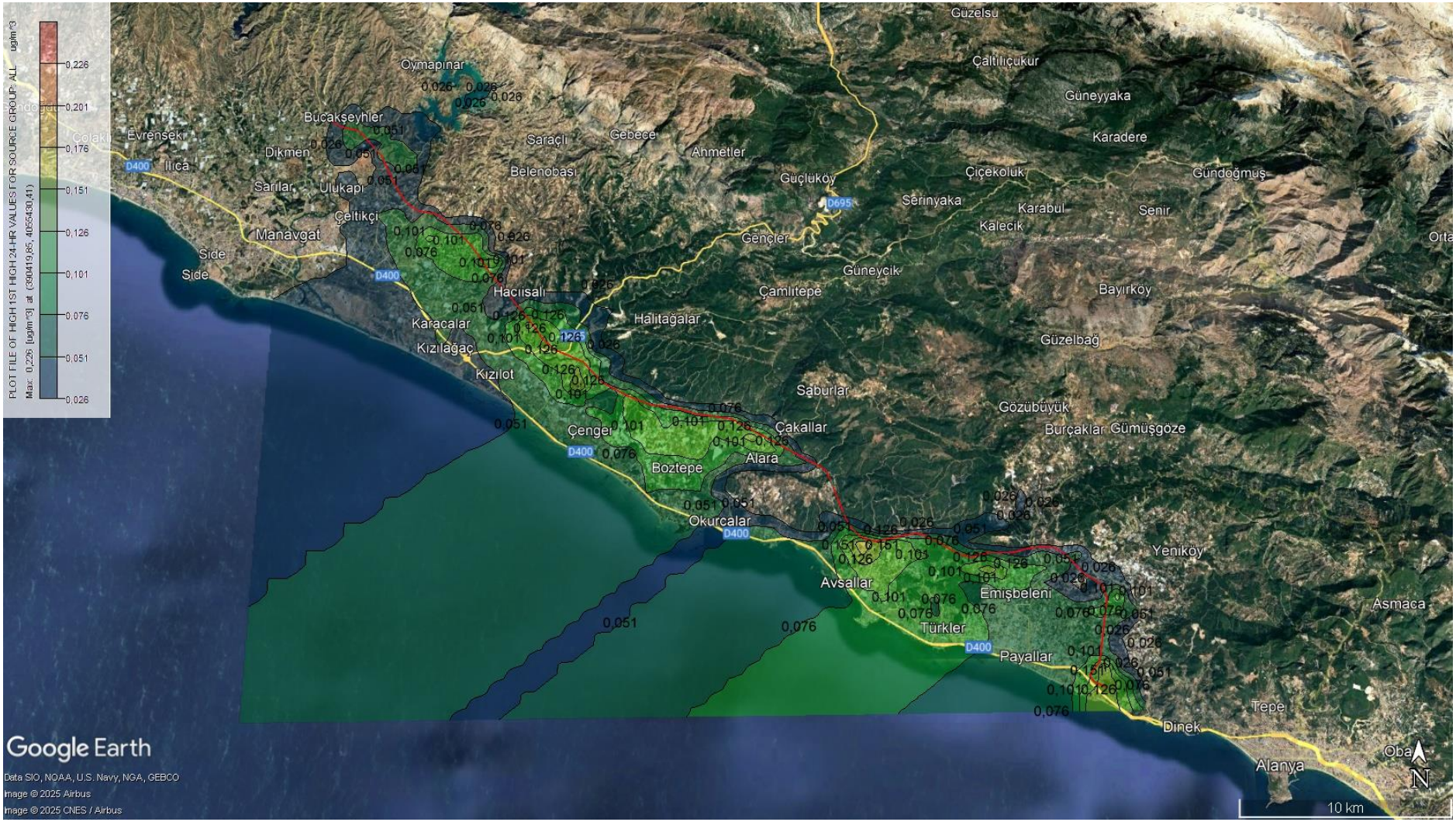

Figure 38. Maximum daily VOC emission distribution Section 2(µg/m^3)

5. CONCLUSIONS AND RECOMMENDATIONS

In this study, air quality modeling was carried out to evaluate the short- and long-term effects of emissions arising from both the construction and operation phases of the Antalya-Alanya Motorway Project. The dispersion of PM_{10}, $PM_{2.5}$, NO_2, CO, and VOC pollutants was assessed using the AERMOD dispersion model under ten different scenarios.

During the construction phase, the highest modeled PM_{10} daily concentrations reached 1219.87 μg/m³ in Section 2 and 559.07 μg/m³ in Section 1. Despite high short-term values in certain localized areas, the number of daily exceedances (34 and 33 respectively) remained within the acceptable limit defined by SKHKKY (≤35 days/year), and annual concentrations were significantly below the 40 μg/m³ threshold. Therefore, the dust emissions from construction-related activities are temporary and localized, and compliance with regulatory limits is maintained.

For $PM_{2.5}$, the highest annual modeled values were 2.71 μg/m³ (Section 1) and 3.34 μg/m³ (Section 2), well below the regulatory threshold of 20 μg/m³. The cumulative effects were also evaluated by combining background measurements with modeled project-related contributions. In all locations, the cumulative annual concentrations remained under the legal limit, except in Hacıali, where the background concentration was already 30.5 μg/m³, and the project's contribution of 1.72 μg/m³ caused the total to rise to 32.22 μg/m³, exceeding the threshold. This indicates a pre-existing air quality hotspot that warrants attention.

In addition to ambient particulate concentrations, settled dust emissions were also evaluated during the construction phase to assess ground-level particulate deposition. The maximum daily settled dust concentration was calculated as 203.53 mg/m^{2}day in Scenario 17 (Construction – Section 1) and 324.66 mg/m^{2}day in Scenario 18 (Construction – Section 2). Corresponding maximum annual average concentrations were 24.82 mg/m^{2}day and mg/m^{2}day μg/m³**,** respectively. All modeled values remained well below the SKHKKY regulatory thresholds of 390 mg/m^{2}day for daily and 210 mg/m^{2}day for annual settled dust concentrations. These results indicate that, under both construction scenarios, settled dust levels do not pose a risk of long-term accumulation or regulatory exceedance**.**

For NO_2, modeled hourly concentrations during the construction phase were 5.93 μg/m³ (Section 1) and 10.34 μg/m³ (Section 2), while annual values remained well below 10 μg/m³. These are significantly lower than the SKHKKY limits of 200 μg/m³ (hourly) and 40 μg/m³ (annual), indicating full compliance. During operation, NO_2 concentrations were even lower, with maximum

hourly values of 6.84 μg/m³ and 7.95 μg/m³, and annual concentrations of 3.12 μg/m³ and 2.69 μg/m³ in Sections 1 and 2, respectively.

For CO, the maximum 8-hour average concentration during construction was 1082.06 μg/m³ (Section 1), while during operation, the corresponding values were 3.55 μg/m³ (Section 1) and 2.21 μg/m³ (Section 2). All values are significantly lower than the SKHKKY 8-hour limit of 10,000 μg/m³, indicating that CO emissions from both phases of the project are negligible in terms of health impact.

VOC emissions were also evaluated, even though no specific EU or IFC guideline values are available. The highest VOC concentrations were 1.05 μg/m³ (Construction - Section 1) and 0.52 μg/m³ (Operation - Section 2). These values are very low and are not expected to pose any adverse effects on ambient air quality or human health.

Overall, the modeled pollutant concentrations resulting from project-related traffic and construction activities comply with both national and international air quality standards. The emission contributions of the project are minor compared to regulatory thresholds, especially in the operational phase. Although high localized PM_{10} values were identified during construction, these are short-lived and do not contribute to annual exceedances. The only notable concern is in areas with elevated background concentrations, such as Hacıali, which should be monitored in the future.

Based on the modeling results and considering the temporary nature of the construction phase impacts, the following recommendations are made:

- Dust suppression measures (e.g., water spraying, truck covering, limiting work during dry/windy periods) should be strictly implemented, especially in high PM_{10} areas.
- Continuous air quality monitoring is advised in background-exceeding locations such as Hacıali to track cumulative impacts.

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ANNEXS

NOISE ASSESSMENT FOR ANTALYA-ALANYA MOTORWAY PROJECT

May 2025

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1 ANTALYA-ALANYA MOTORWAY (AAM) NOISE ASSESSMENT

1.1 Introduction

Sound is the vibrations of the material environment that the human ear can perceive. Sound has three components: subtlety-thickness, loudness-magnitude and timbre. Noise is defined as physically irregular, physiologically unpleasant and disturbing sound. Noise pollution is caused by various noise sources such as construction equipment, road vehicles, construction machinery, etc.

Although noise is a type of pollution that varies according to the individual, it has been proven that short or long-term exposure above a certain level has many negative effects on human health. These effects can be classified as physiological effects, psychological effects or illness/discomfort. Depending on the level and duration of exposure, noise can cause temporary or permanent effects and diseases on human health. In order to prevent such problems, it is of great importance to reduce the noise level reaching the receiver. An increase in the level of noise exposure or the presence of continuous noise can cause great losses in the quality of life and human health.

In the international literature, the concept of 'environmental noise' is generally defined as the total noise of sources in the external environment of buildings, which does not cause hearing loss unless it has a long exposure time and level, but causes various health problems in the medium and long term. The most common source of environmental noise and the one that disturbs people the most is motorized transportation traffic.

Within the scope of this report, the studies on the determination of the impacts of possible noise that may arise from the planned AAM construction site, construction activities and operation, and the action plans carried out in accordance with the regulation on the routes where the limit values specified in the Environmental Noise Assessment and Management Regulation are exceeded are explained.

Noise pollution and issues related to the control and prevention of noise pollution are regulated by the Environmental Noise Directive in the European Union ""**Environmental Noise Directive** Directive 2002/49/EC relating to the assessment and management of environmental noise (the Environmental Noise Directive – **END**) , and the Regulation on Environmental Noise Control (RENC) published in the Official Gazette dated November 30, 2022 and numbered 29536 under the Environmental Law in Türkiye. The regulation is in compliance with the END regulation. The limit values within the scope of this report are also taken from the values in the Environmental Noise Control Regulation.

Within the scope of the Project, existing noise levels assessment and noise modeling studies were carried out by Hidrotek Mimarlık Mühendislik Tic. Ltd. Sti.

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1.2 Purpose of the Project

Within the scope of this working, noise maps have been prepared for the Antalya-Alanya Motorway (AAM) route in order to determine the potential noise impacts that may occur at the construction sites, during the construction of the motorway and in the future with the opening of the motorway to traffic. The results of the modeling were evaluated according to the “the Regulation on Environmental Noise Control Regulation” (**RENC**).

In this section, noise assessments from the construction and operation of the Antalya-Alanya Motorway project are discussed.

In order to estimate a more comprehensive scenario, a working area was established for all project sites (see Figure 3.1 and Figure 3.2). Mitigation measures for transportation noise from the AAM project have been analyzed based on the anticipated operational conditions. Noise impacts have been assessed in accordance with the **RENC**.

The noise modeling analysis allows the prediction of possible future impacts for the motorway and its surroundings in the project area.

The aim of this working is to predict and model the noise from the construction site, during construction and motorway operation with the following specific objectives:

- Establishment of action plans to reduce noise levels in the identified area to acceptable levels
- Noise modeling of the noise levels generated by vehicles during the operation period of the motorway and creation of noise maps
- Assessment of whether noise levels in any area exceed the criteria specified in the relevant noise regulations and guidelines
- Determining the locations, lengths and heights of noise barriers that will be needed to reduce environmental noise to desired levels

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2 NOISE REGULATIONS

2.1 National Noise Regulations

This section deals with the assessment of environmental noise during the construction site and operation phase of the project according to the national noise regulations.

In Türkiye, environmental noise pollution and issues related to the control and prevention of such pollution are regulated by the Environmental Noise Control Regulation (**RENC**) published in the Official Gazette dated November 30, 2022 and numbered 29536 under the Environmental Law.

In order to ensure that the necessary measures are taken to prevent the deterioration of the physical and mental health of persons exposed to environmental noise and to be implemented gradually; determination of the levels of exposure to environmental noise by using assessment methods, noise maps, acoustic reports and environmental noise level assessment reports to be prepared, informing the public about environmental noise and its effects, preparing action plans for the prevention and mitigation of noise based on the results of noise maps, acoustic reports and environmental noise level assessment reports; to determine the procedures and principles regarding the preparation of action plans for the prevention and mitigation of noise and the implementation of these plans, especially where environmental noise exposure levels may cause harmful effects on human health and where it is necessary to protect environmental noise quality.

Noise models were developed using SoundPLAN V 9.1 (64 Bit) commercial modeling software. The calculations for the roadway are also recommended by the RENC and the European Commission Directive for the assessment of environmental noise generated by sources such as motorways, viaducts and tunnels.

The calculation method determined by RNEC;

For motorway:

Guide du bruit des transports terrestres, fascicule prevision des niveaux sonores CETUR 1980" (Road transport noise guide, estimation of sound levels CETUR 1980) referred to in the French Standard **NMPB Road 96** - XPS31-133 for motorway

Or

CNOSSO-EU Road (2015 or 2021

For industrial facilities;;

TS ISO 9613-2 **2024-01** Acoustics - Attenuation of Sound as it Propagates Outside - Part 2: General Calculation Method

Or

CNOSSOS _EU Industry (2015 or 2021)

And as the calculation height

The calculation height was taken as 4 m since the determination point on the facade most exposed to noise must be 4 +/- 0.2 m (between 3.8 m and 4.2 m) above the ground.

Emission values given in the "Guide du bruit des transports terrestres, fascicule prevision des niveaux sonores CETUR 1980" (Road transport noise guide, estimation of sound levels CETUR 1980) referred to in the French Standard **NMPB Road 96** - XPS31-133 for motorway.

For the construction site and construction phase, **TS ISO 9613 - 2: 2024-01** Acoustics - Attenuation of Sound as it Propagates Outside - Part 2: General Calculation Method was used.

Noise Criteria for Highways

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The limit values for traffic noise from highways in the RENC are given in Table 2.1 of the regulation.

Noise criteria for construction sites

The limit values for construction site noise in the RENC are given in Table 2.1 in the said regulation.

Table 2.1 Environmental Noise Limit Values according to the Environmental Noise Law, Türkiye (Leq dB(A))

Noise Source	Measured Parameter	Environmental Noise Level		
		Day	Evening	Night
Industrial Facilities, transportation	$LA_{eq,5min}$	65 dB(A)	60 dB(A)	55dB(A)
Workplaces	$LA_{eq,5min}$	Background + 5 dB(A)		Background + 3 dB(A)
In case of multiple workplaces	$LA_{eq,5min}$	Background + 7 dB(A)		Background + 5 dB(A)

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2.2 International noise regulations

IFC (International Finance Corporation) Assessment

IFC noise criteria are defined in the General Environmental Health and Safety (ÇSG) Guidelines - Noise. These limit values are based on the World Health Organization Guidelines and are given in Table 2.2.

Table 2.2 Environmental Noise Limit Values according to IFC

Receiving environment	Hourly LAeg (dB(A))	
	Day 07:00-22:00	Night 22:00-07:00
Residental, corporate and educational areas	55	45
Idustrial, commercial areas	70	70

According to IFC requirements, noise levels should not exceed the values given in Table 2.2 or cause an increase of more than 3 dB over the nearest off-site receiving environment background noise levels. The IFC ÇSG Guidance also describes measures to reduce noise levels to avoid exceeding limit values and recommendations for monitoring to detect noise levels. The IFC noise level guidance treats the receiving environment as two categories and does not distinguish between noise sources. Therefore, the guideline does not explicitly state the limit values to be complied with for highway projects. This guideline provides recommendations to prevent, reduce and control noise, but does not specify any limit values. When the European Union Directives are examined, according to the Environmental Noise Directive 2002/49/EC, Member States are required to appoint competent authorities to draw strategic noise maps for main roads, main airports, railways and assembly points using harmonized noise indicators and to have noise maps drawn. The EU Environmental Noise Directive does not specify limit values and it is recommended that Member States set these standards on a national basis.

According to this directive, Member States are expected to use the L_{gag} and L_{night} noise indicators for the assessment of environmental noise.

Severity Criteria

The significance of impacts on noise has been determined as high, medium and low depending on the sensitivity of receptors and the degree of impact. The magnitude of impacts on noise is determined using the criteria described in Chapter 4 ("ESIA Methodology") and the sensitivity criteria for the impact assessment are given in Table 2.3.

Table 2.3 Buyers' Sensitivity Criteria

Ecosystem Component	Sensitivity Level		
	High (3)	Moderate (2)	Low (1)
Humans	Education, culture and health areas as well as summer, camping areas and residential areas.	Areas where commercial buildings and workplaces are densely located and where residences are not concentrated	Industrial areas

The magnitude of impacts has been determined based on the increase in baseline noise levels at the motorway, construction site and nearby settlements during the motorway construction period as a result of the realization of the Project. Impact magnitudes are defined as low, medium and high for increases in baseline noise levels of 3-6 dB(A), 6-9 dB(A) and more than 9 dB(A) respectively (Table 2.4).

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In addition, regardless of baseline levels, the magnitude of impact was considered high when the results of the model run exceeded the limit value in the relevant legislation. According to IFC requirements, noise levels should not exceed limit values or cause an increase of more than 3-6 dB(A) over the nearest off-site receiving environment background noise levels. Therefore, an increase in noise level of 3-6 dB(A) is considered acceptable and the impact is defined as negligible.

Table 2.4 Effect Size Criteria

Magnitude of Impact	Increase in Baseline Noise Level (L_{den} dBA)
Low	3-6 dBA
Moderate	6-9 dBA
High	>9 dBA or exceeding the limit values according to the model result

3 WORKING AREA

The Project working area is shown in Figure 3.1 and Figure 3.2. The project area is the Mediterranean Region; the construction sites in the Project working area are shown in Table 3.1.

Table 3.1 Working areas

Sarıabalı Borrow Pit
Çakış Quarry (TOY4a)
Kuruçay Quarry (TOY4b)
Dikmen Borrow Pit
Bademliyar Quarry (TO2)
Çenger Stream Material Quarry
Uzunlar Quarry (TOY5)
Karakaya Quarry
Saburlar Quarry
Karamanlar Quarry
Soğukpınar Quarry
Concrete Plant -1
Concrete Plant -2 / Mechanical Plen
Construction Site -1
Construction Site -2
Concrete Plant -4 / Mechanical Plen
Concrete Plant -4a
Concrete Plant -5
Construction Site -3 / Concrete Plant
Concrete Plant -3

During the noise impact assessment phase, a calculation area of approximately 3 km wide from the construction sites and 1 km to the left and right for the motorway on the project route and virtual receptors for the noise measurement points were defined.

To facilitate the design, planning and assessment of this noise calculation area, the project area was analyzed separately for construction sites, construction phase and noise levels after the opening of the motorway.

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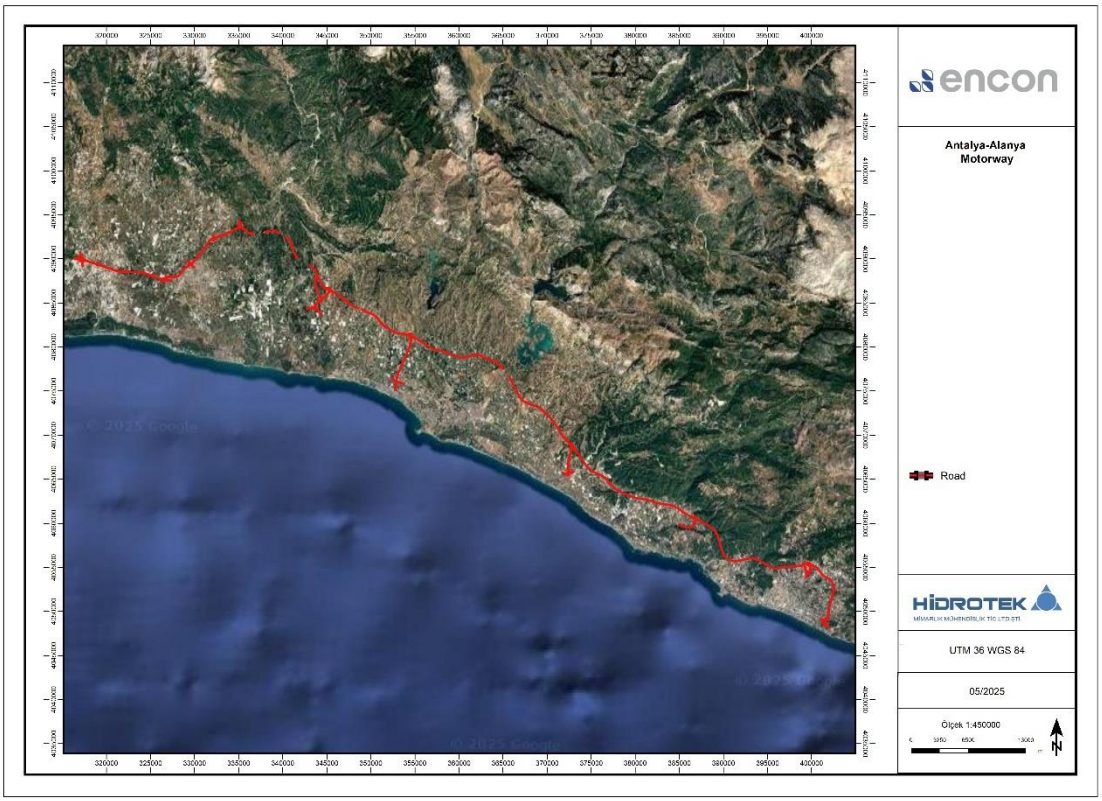

Figure 3.1 AAM route and construction sites

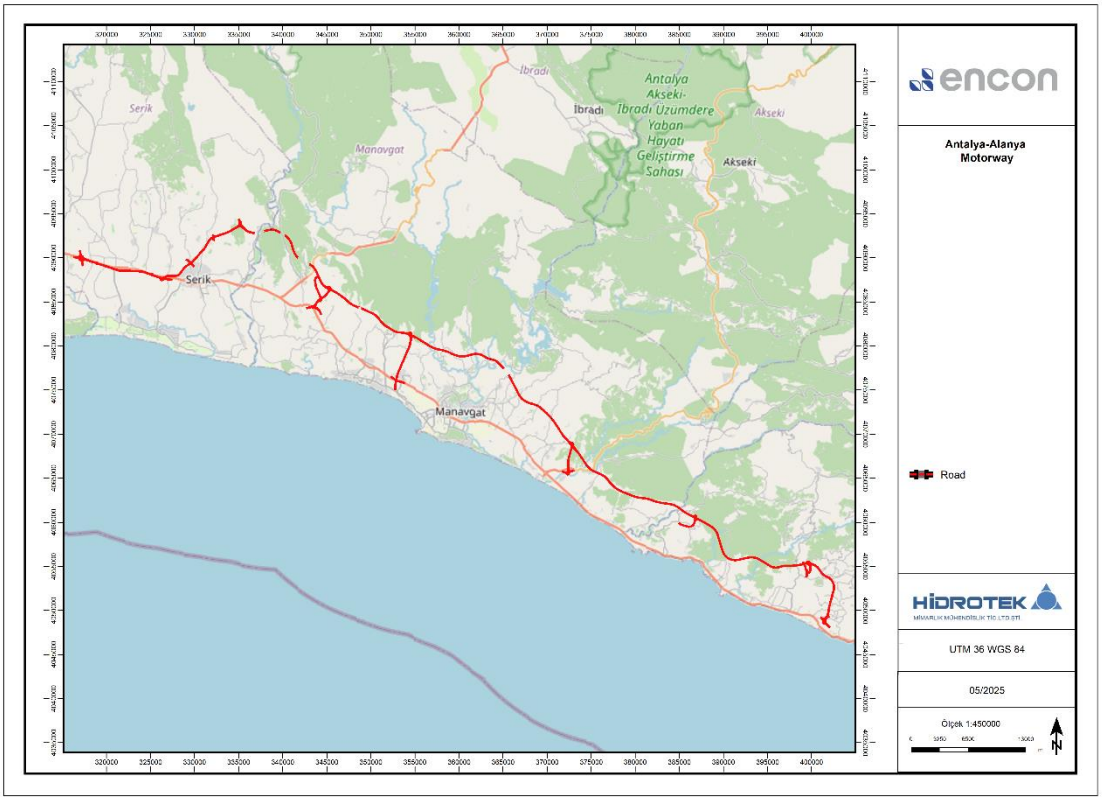

Figure 3.2 AAM route and construction sites

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The number of vehicles in Table 3.2 and Table 3.3 are the estimated traffic data for the year 2040 and modeling was performed according to these data.

Table 3.2 AAM 2040 Estimated Hourly Vehicle Traffic Data

Hourly	Day	Evening	Night
Light vehicle (<3.5 tons)	3,150	780	330
Light vehicle (>3.5 tons)	1,050	420	270
Total	4,200	1,200	600

**NOTE: Daytime: 07.00 to 19.00 Evening: 19.00-23.00 Night : 23.00-07.00*

Table 3.3 AAM 2040 Forecast Daily Traffic Data

Daily	Day	Evening	Night
Light vehicle (<3.5 tons)	37,800	3,120	2,640
Light vehicle (>3.5 tons)	12,600	1,680	2,160
Total	50,400	4,800	4,800

The machinery and equipment that will work on road construction will work 20 hours a day in 2 shifts.

The machinery and equipment that will work at the construction sites specified in Table 3.4 will work 10 hours a day in 2 shifts.

Table 3.4 construction sites

Nearest Neighborhood	Description of the Site / Plant
Sarıabalı	Sarıabalı Borrow Pit (AO-1)
Sarıabalı	Concrete Plant-1
Çakış	Çakış (TOY4a) Quarry
Taşağıl	Kuruçay (TOY4b) Quarry
Taşağıl	Concrete Plant-2
	Mechanical Plant-1
	Asphalt Plant-1
Taşağıl	Construction Camp Site-1 (Main)
Yeniköy	Concrete Plant-3
Sarılar	Dikmen Borrow Pit
Bucakşeyhler	Construction Camp Site-2
Bucakşeyhler	Concrete Plant-4
	Mechanical Plant-2
	Asphalt Plant-2
Ulukapı	Concrete Plant-4a

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Sülek	Concrete Plant-5
Gençler	Bademliyar (TO2) Quarry
Uzunlar	Çenger Stream Material Quarry
Uzunlar	Uzunlar (TOY5) Quarry
Karakaya	Karakaya Quarry
Saburlar	Saburlar Quarry
Karamanlar	Karamanlar Quarry
İncekum	Construction Camp Site-3
	Concrete Plant-6
	Mechanical Plant-3
	Asphalt Plant-3
Soğukpınar	Soğukpınar Quarry

The list of machinery and equipment to be used in construction sites and road construction during the motorway construction is given in Table 3.5~~. It is assumed that these machinery and equipment will operate during the daytime and at 50% capacity.~~ It is unrealistic to assume that all construction machinery and equipment planned to operate at the project site will run at full capacity. The primary reasons are the insufficient number of personnel and the physical impracticality of operating two different types of machinery in the same place at the same time due to workflow constraints. For this reason, a 50% operating percentage was used in the modeling.

Table 3.5 Machinery Park

Type of Machinery	Number of Machinery	Sound Power Level dB(A)*
Excavator	51	105
Grader	5	100
Bulldozer	14	120
Jumbo	12	120
Telehandler	12	104
Mobile Crane	20	104
Trans mixer	50	115
Shotcrete Machine	12	99
Loader	20	105
Mobile Concrete Pump	7	99
Fixed Concrete Pump	16	99
Water Truck	7	104
Drum Compactor	10	115
Asphalt Paver	12	100

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Type of Machinery	Number of Machinery	Sound Power Level dB(A)*
Asphalt Distributor	2	104
Soil Compactor	14	115
Roller	10	90
Dump Truck	140	104
Rock Driller	12	120
Injection Machine	12	105
Concrete Batching Plant	7	100
Benninnghoven Asphalt Plant	3	100
Flygt Pump	21	75
Mechanical Plant	3	110
Total	**472**	**126,47****

*** Sound power levels are taken from the SoundPLAN library. Source:Bearbeitung: RWTÜV Anlagentechnik GmbH, Essen im Auftrag des Landesumweltamtes NRW, Essen 2000**
**** Total sound power level**

The sound power levels of the machines that will operate on construction sites and road construction have been calculated according to the formula provided in Table 3.6.

Table 3.6 Total Sound Power Level Calculation

$$Leq = \sum_{İ=1}^{n} 10*\log[1/n*(10^{Li/10}+.....+10^{Li/10})$$

n: Total Quantity
Li: Sound Power Level
Leq: Total Sound Power Level

Since the project route passes through various regions, building heights within the project area vary. While most buildings are 1 to 2 storeys high, public housing areas within the project area include buildings up to 5 storeys. Terrain modeling of the region is presented in Figure 3.3 and Figure 3.4.

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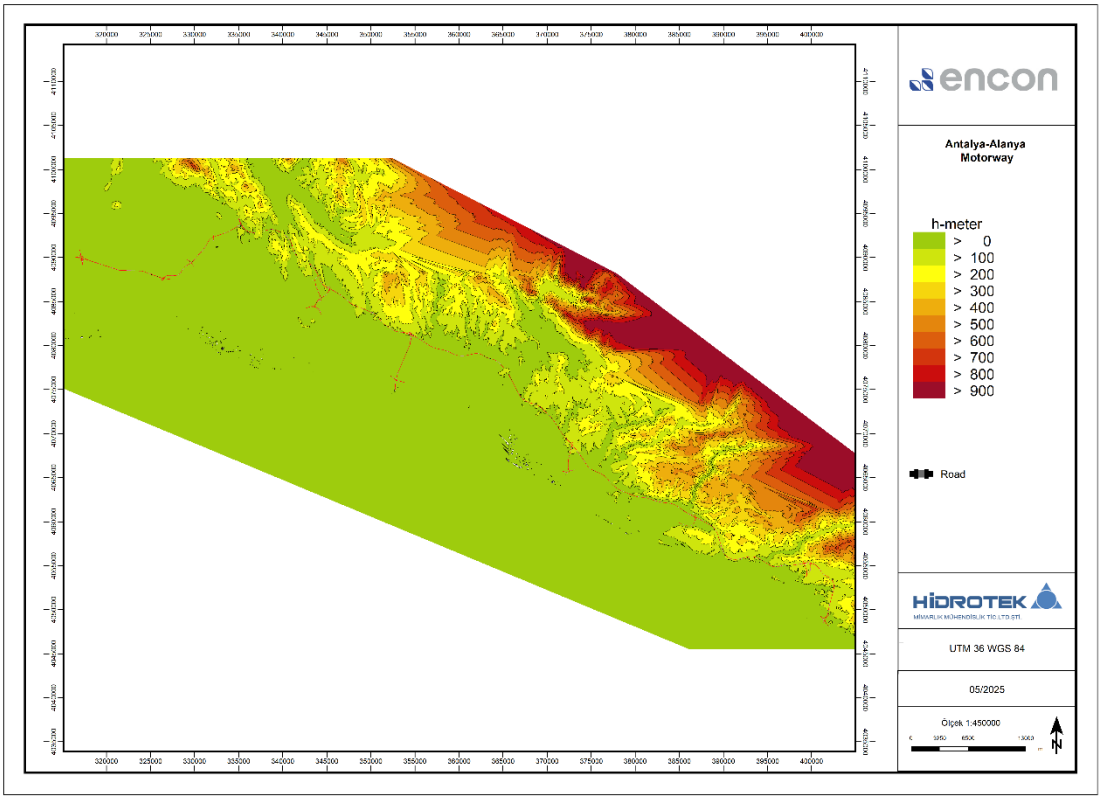

Figure 3.3 AAM land model

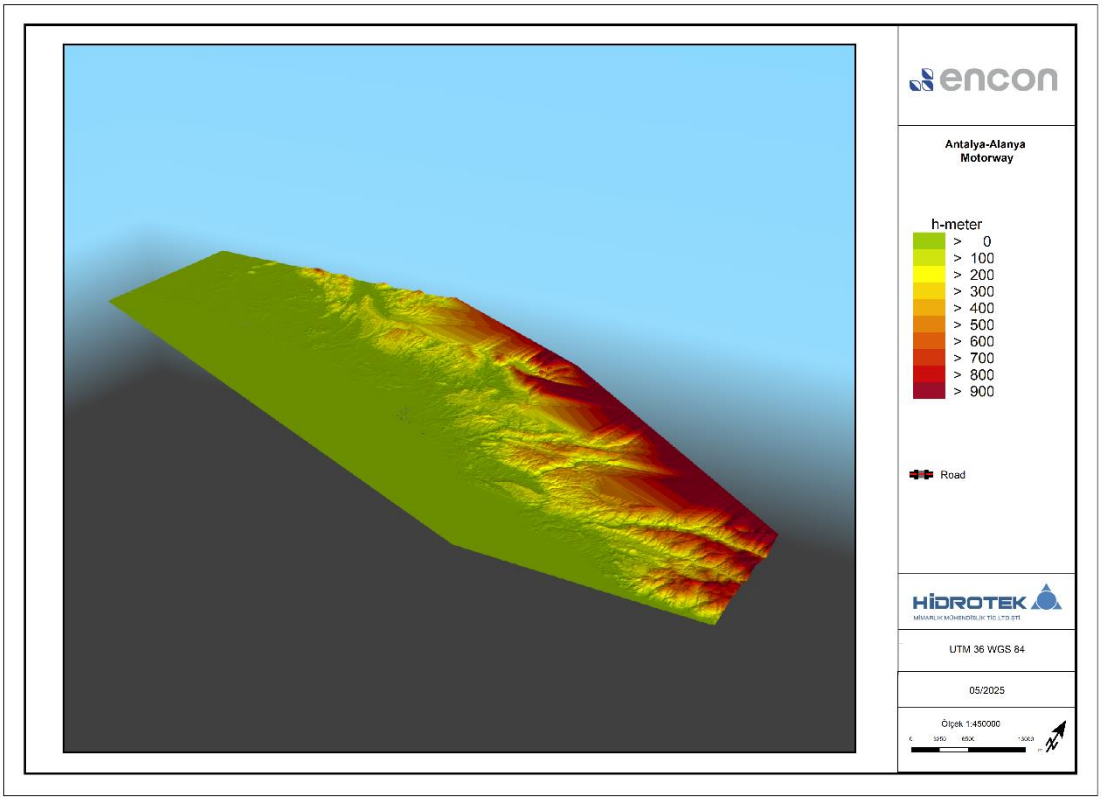

Figure 3.4 AAM Land model 3D

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4 NOISE ASSESSMENT AND METHODOLOGIES

The main source of noise pollution in urban areas is traffic noise. The sounds emitted by the engines, aerodynamic structure and exhaust systems of cars, trucks, buses and motorcycles are the main causes of noise pollution.

In order to preserve the peace of the environment and the mental and physical health of people, it is important to comply with the noise regulation criteria. The main purpose of this working is stated in the first article of the regulation on which the working is based: "The purpose of this Regulation is to ensure that necessary measures are taken to ensure that the peace and tranquility, physical and mental health of the community is not impaired as a result of exposure to environmental noise. This regulation also aims to inform the public about the negative effects of environmental noise, to prepare an action plan for the prevention and reduction of high-level noise and to determine the levels of exposure to environmental noise according to reports and noise maps". Noise levels are compared with the road traffic noise limit values in Table 2.1.

4.1 Traffic Noise Assessment

Traffic noise modeling was carried out by taking into consideration the noise regulations in Türkiye and the European Union. Noise map calculations were performed according to the Noise Map Preparation Guide published by the Ministry of Environment and Urbanization. Calculations were made according to NMPB Road 96 (Road noise mapping method) and ISO 9613-2':2024-1 (Industrial noise mapping method) with grid sizes of 10 meters x 10 meters at a height of 4 meters above the ground. Noise measurements were made at some points to determine the background noise in the field. Virtual measurement points were created for these points and the noise levels at these points were calculated by modeling. The difference between the measured noise level and the calculated noise level is given in Table 5.1, 5.2, 5.3 and Table 5.2 AAM noise modeling results and comparison table (for 1st measurement values

	RENC						IFC					
	L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated	Calculated	L_{eq} Day	L_{eq} Night	Calculated	Calculated	L_{eq} Day	L_{eq} Evening
	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day	L_{eq} Evening	L_{eq} Night	(07:00-22:00)	(22:00-07:00)	L_{eq} Day	L_{eq} Night	(07:00–19:00)	(19:00-23:00)
				(07:00–19:00)	(19:00-23:00)	(23:00-07:00)			(07:00-22:00)	(22:00-07:00)		
te	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
	56.3	52.4	51.6	43.7	44.5	43.3	55.6	51.4	43.6	43.9	0.2	0.7
	58.3	56.5	41.9	52.1	52.9	51.6	57.9	48.7	52.0	52.3	0.9	1.6
	57.2	54.2	53.9	30.7	28.8	27.5	56.8	53.6	30.1	28.2	0.0	0.0
	64.4	62.3	61.5	33.0	32.7	31.5	63.8	62.1	32.7	32.2	0.0	0.0
	59.8	59	52.2	56.2	57.0	55.8	59.8	52.2	56.1	56.5	1.6	2.1
	68.7	66.2	62.7	37.4	37.2	36.0	68.5	62.4	37.0	36.6	0.0	0.0
	55.9	50.3	50.2	49.0	49.8	48.5	55.3	50.2	48.9	49.2	0.8	2.8
	62.9	60.6	60.1	31.1	20.9	19.7	62.6	59.8	29.9	20.3	0.0	0.0
	57.9	50.5	50	42.4	42.6	41.3	57.2	49.8	42.1	42.0	0.1	0.7
	70.7	64.6	64.3	-	-	-	70.1	64	-	-	-	-
	62.4	56.2	53.6	71.8	72.6	71.3	61.5	53.2	71.7	72.0	9.9	16.5
	65.5	63.7	62	39.8	14.9	13.6	65.1	62.5	38.6	14.3	0.0	0.0
	70.3	56.3	55	38.0	34.0	32.7	69.3	55.6	37.1	33.4	0.0	0.0
	57.6	52.7	45.7	40.7	41.5	40.3	57.1	45.6	40.6	40.9	0.1	0.3

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	63.9	58.6	58.5	22.3	9.8	8.5	63.2	58.8	21.1	9.2	0.0	0.0
	71.8	56.9	55.5	33.4	-	-	70.9	55.3	32.1		0.0	-
	60.2	59.8	59.4	44.3	32.2	31.0	60.4	59	43.2	31.6	0.1	0.0
	79.1	68.5	56.4	49.4	49.8	48.5	78.3	56.5	49.2	49.2	0.0	0.1
	73.1	45.6	43.9	33.6	28.7	27.5	72.2	43.5	32.7	28.1	0.0	0.1
	63.9	55.2	54.8	44.7	45.4	44.2	63.1	54.8	44.6	44.9	0.1	0.4
	64.4	63	60.4	42.5	43.3	42.1	64.3	60.2	42.4	42.7	0.0	0.0

Logarithmic difference

Table 5.3.

SoundPLAN V 9.1 (64 Bit) noise modeling software based on NMPB Road 96 Standard. In the modeling studies, the limit values were compared with the limit values of the RENC (Table 2.1).

For the annual average speed values, the highest limit values given under the relevant heading in the Turkish Traffic Legislation were taken into consideration. Light vehicle speeds of 130 km/hour and heavy vehicle speeds of 100 km/hour were considered.

Terrain heights, city plan and road layout were entered into the modeling system. ,

The limit values for highways in the RENC are specified in Annex-20221130-1-1 Annex Table - 1, and are determined separately for different times of the day - all day (L_{gag}) (00:00-00.00) daytime (L_{day}) (07:00-19:00), evening ($L_{evening}$) (19:00-23:00) and night (L_{night}) (23:00-07:00). Therefore, the calculation results are given as L_{day}, $L_{evening}$ and L_{night}. In addition, calculations were made for the time periods LD (07:00-22:00) for daytime and LN (22:00-07:00) for nighttime, which are available in EU regulations. Therefore, the calculation results are given in tables as L_{day}, $L_{evening}$, L_{Night}, LD and LN

Calculations and noise maps for each of the time periods are provided in the report.

The road traffic methodology requires hourly light and heavy vehicle traffic data, road surface pavement type and average vehicle speeds.
In the modeling, the ground absorption coefficient (G) factor is taken as 0.6 and all screening, topography and distance propagation factors are considered.

The road surface is considered as smooth-mastic asphalt. The topographic structure of the Project site is given in Figure 3.3 and Figure 3.4.

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Traffic flow data are given in Table 3.2 and Table 3.3. In this table, cars represent light vehicles; buses, trucks, trailers, tractor trailers and semi-trailers represent heavy vehicles. The total values of the traffic flow data used in the noise modeling program were converted into vehicles/hour by using Table 3.2 and Table 3.3 and divided into daily, daytime, evening and night time periods. In the calculations, the worst case modeling was done for the year 2040.

4.2 Assessment of Noise Levels of Construction Sites and Construction Activities

Construction site noise assessments were carried out by taking into consideration the noise regulations in Türkiye and the European Union. Noise map calculations were performed according to the Noise Map Preparation Guidelines published by the Ministry of Environment, Urbanization and Climate Change. ISO 9613-2 : 2024-1 (Industrial noise mapping method) with a grid size of 10 meters x 10 meters at a height of 4 meters above the ground. Noise measurements were made at some points in the site to determine the background noise. Virtual measurement points were created for these measured points and noise levels at these points were calculated by modeling. The measured noise level, the calculated noise level and the comparison between these two levels are given in Table 5.5, 5.6, 5.7 and Table 5.8 Construction site and motorway construction noise modeling results and comparison table.

Site and construction activity noise modeling was performed using SoundPLAN V 9.1 (64 Bit) noise modeling software based on ISO 9613-2:2024-1 Standard. In the modeling studies, the limit values were compared with the limit values of the RENC (Table 2.1) and background noise.

The noise levels of the vehicles in the machine park in the modeling were calculated assuming that the construction site and construction activities will take place between 7.00 am and 19.00 pm and will operate at 50% capacity. Noise maps showing the noise levels resulting from the operation and construction of the Project are provided in the report.

Land elevations, city plan and road layout were entered into the modeling system.

The limit values for new roads in the RENC are given in Table 2.1 and are set separately for different times of the day - all day (L_{gag}) (00:00-24.00), daytime (L_{day}) (07:00-19:00), evening ($L_{evening}$) (19:00-23:00) and night (L_{Night}) (23:00-07:00). In addition, the calculation was made for the time periods LD (07:00-22:00) for daytime and LN (22:00-07:00) for nighttime, which are available in the EU regulations. For this reason, the calculation results are given in tables as L_{gag}, L_{day}, $L_{evening}$, L_{Night}, LDN, LD and LN.

Calculations and noise maps for each of the time intervals are provided in the report.

In the modeling, the ground absorption coefficient (G) factor was taken as 0.6 and all screening, topography and distance propagation factors were evaluated.

4.3 IFC (International Finance Corporation) Assessment

IFC noise criteria are defined in the General Environmental Health and Safety (EHS) Guidelines - Noise. These limit values are based on the World Health Organization Guidelines and are given in Table 2.2.

The EU Environmental Noise Directive does not specify limit values and it is recommended that member states set these standards on a national basis. According to this directive, Member States are expected to use the L_{gag} and L_{night} noise indicators for the assessment of environmental noise.

Importance Criteria

The significance of impacts on noise has been determined as high, medium and low depending on the sensitivity of receptors and the degree of impact. The magnitude of impacts on

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noise is determined using the criteria described in Chapter 4 ("ESIA Methodology") and the sensitivity criteria for the impact assessment are given in Table 2.3.

The magnitude of impacts has been determined based on the increase in baseline noise levels at the motorway, construction site and nearby settlements during the motorway construction period as a result of the realization of the Project. Impact magnitudes are defined as low, medium and high for increases in baseline noise levels of 3-6 dB(A), 6-9 dB(A) and more than 9 dB(A) respectively (Table 2.4).

In addition, regardless of baseline levels, the magnitude of impact was considered high where the results of the model run exceeded the limit value in the relevant legislation. According to IFC requirements, noise levels should not exceed limit values or cause an increase of more than 3-6 dB(A) over the nearest off-site receiving environment background noise levels. Therefore, an increase in noise level of 3 - 6 dB(A) is considered acceptable and the impact is defined as negligible.

4.4 Impact Assessment

In the assessment of potential noise impacts, the calculated daytime, evening and nighttime traffic noise levels were compared with the RENC limit values (Table 2.1 and Table 2.3) and international standards (Table 2.2) according to the type of building use. In addition, the calculated construction site noise levels were compared with the limit values given in the regulation for construction site noise.

The calculated noise levels were compared with the existing background noise levels in order to decide on the mitigation measures required to reduce the noise levels.

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5 MODELLING RESULTS

5.1 Situation Assessment for Construction Sites and Motorway Construction Route:

In the noise modeling, land use areas were taken into consideration and it was declared that construction site activities would take place during the daytime (07.00 am to 19.00 pm) and calculations were made according to this time period. The impact level was determined by comparing the modeling results with the limit values determined in the RENC. The site plans of the locations of the construction site and motorway construction activities are shown in Figure 5.1 on Google Earth. Noise distribution maps for L_{gag} (24-hour exposure) and L_{day} (07.00 to 19.00) are shown in Figure 5.2 - Figure 5.27, and LDN (24-hour exposure) and LD (06.00 to 22.00) are shown in Figure 5.30- Figure 5.49.



Figure 5.1 Construction Sites, Quarries and Motorway Route Map Sheets

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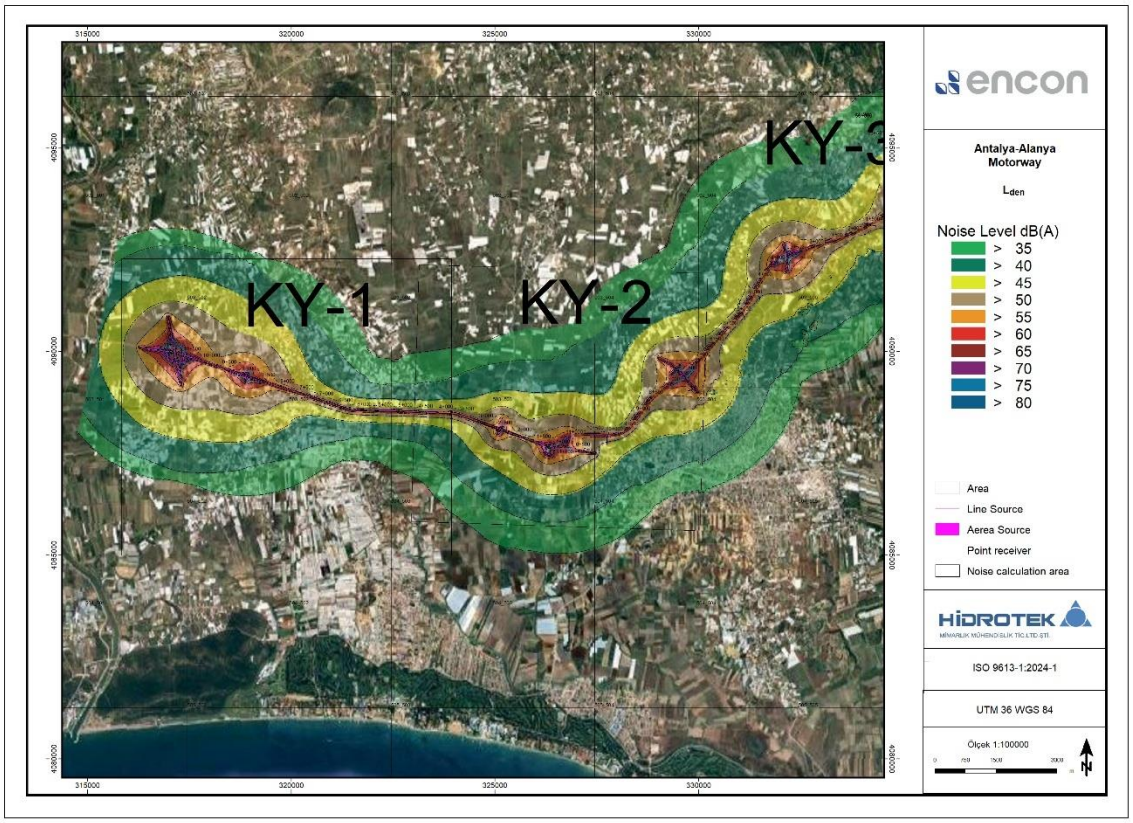

Figure 5.2 S-1 (11+000/1+500) L_{den} Noise Map for Construction Sites, Quarries and Motorway Route

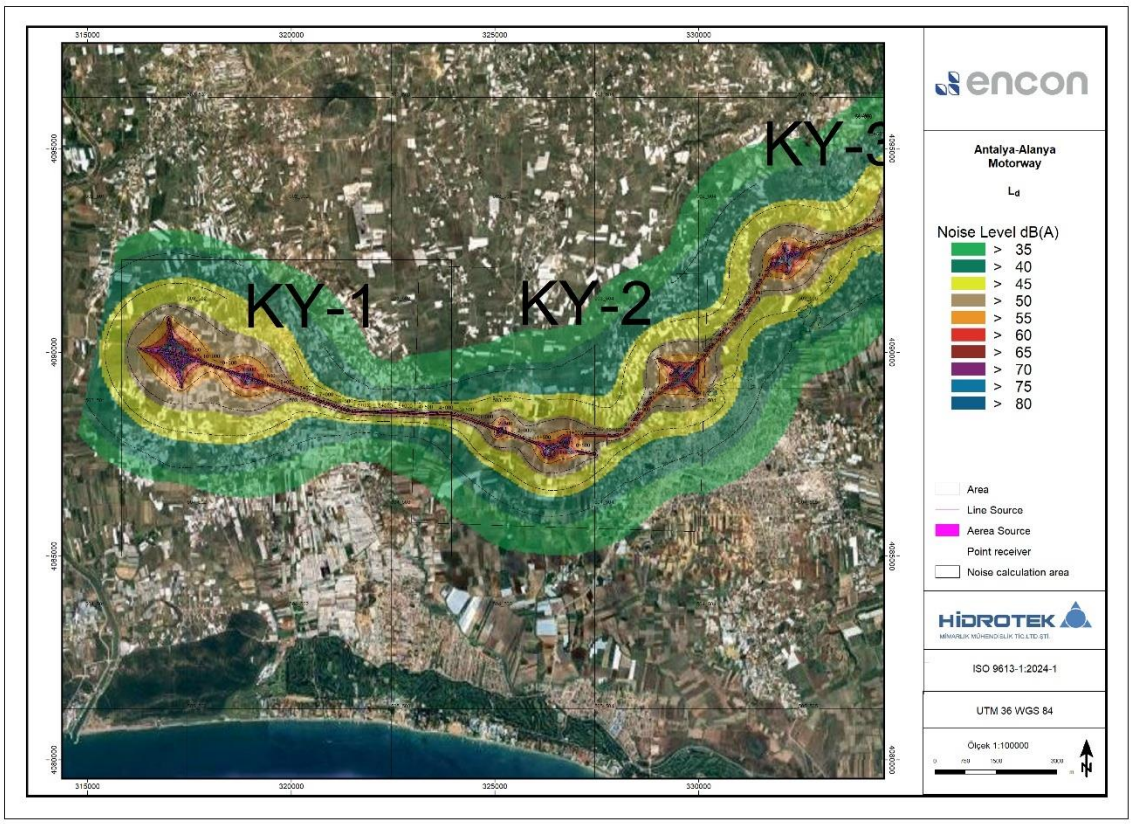

Figure 5.3 S-1 (11+000/1+500) L_d Noise Map for Construction Sites, Quarries and Motorway Route

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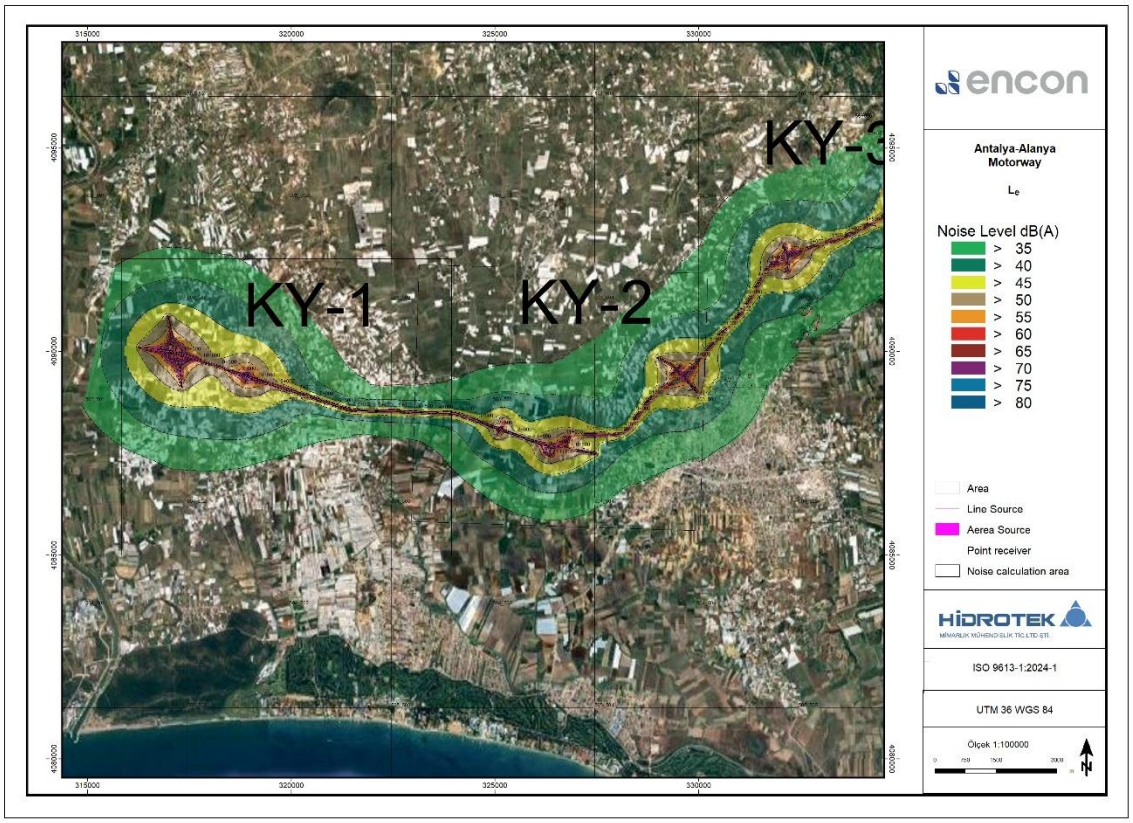

Figure 5.4 S-1 (11+000/1+500) L_e Noise Map for Construction Sites, Quarries and Motorway Route

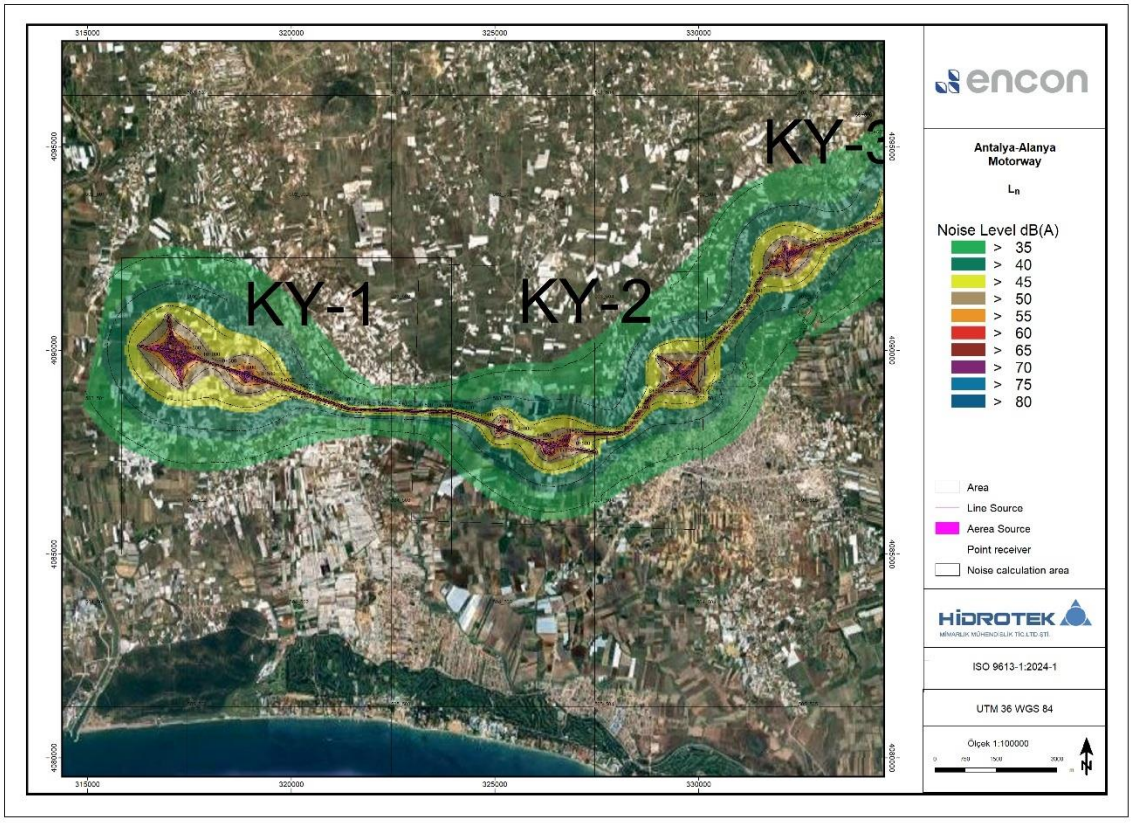

Figure 5.5 S-1 (11+000/1+500) L_n Noise Map for Construction Sites, Quarries and Motorway Route

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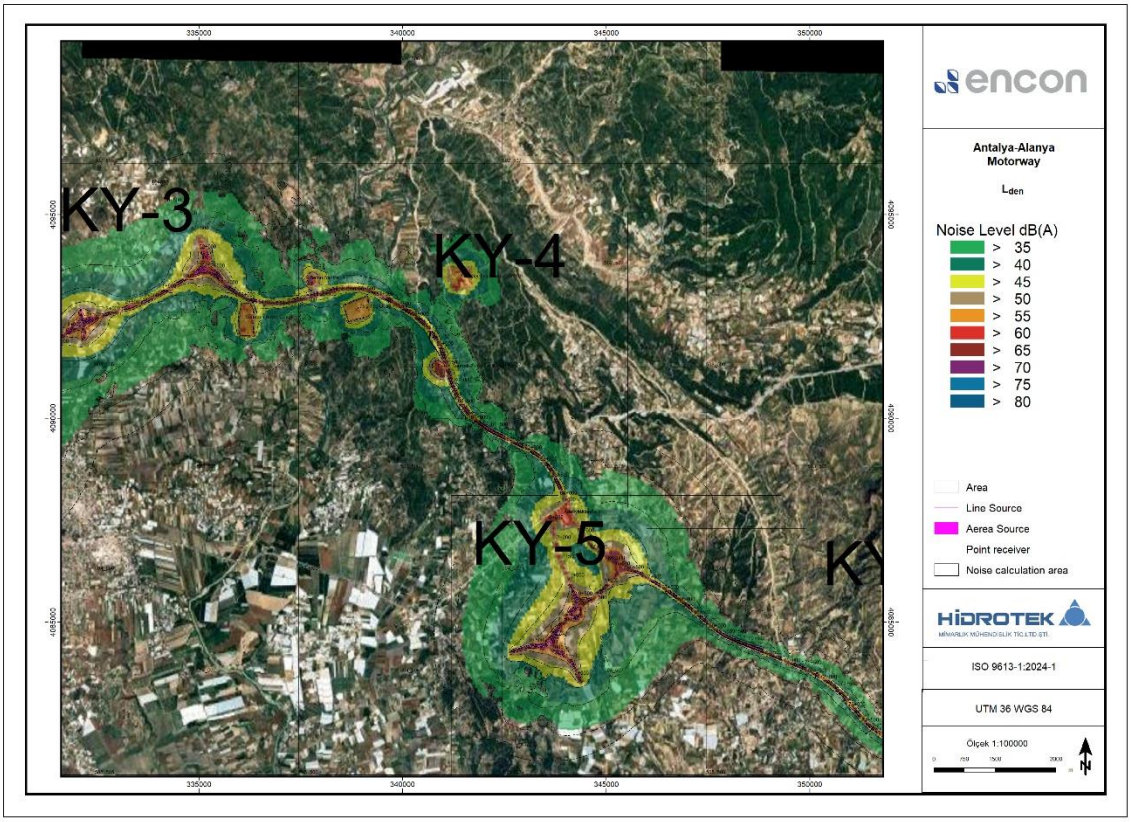

Figure 5.6 S-2 (4+500/74+000) Construction Sites, Quarries and Motorway Construction L_{den} Noise Map

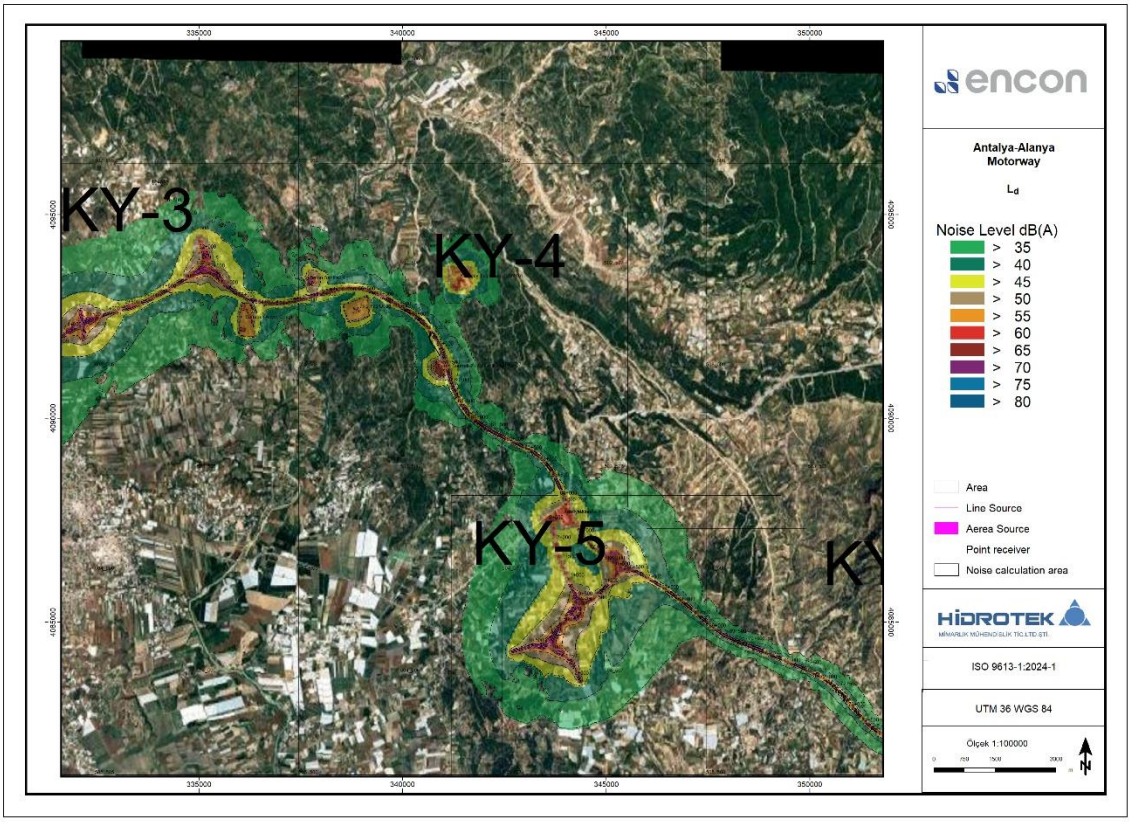

Figure 5.7 S-2 (4+500/74+000) Construction Sites, Quarries and Motorway Construction L_d Noise Map

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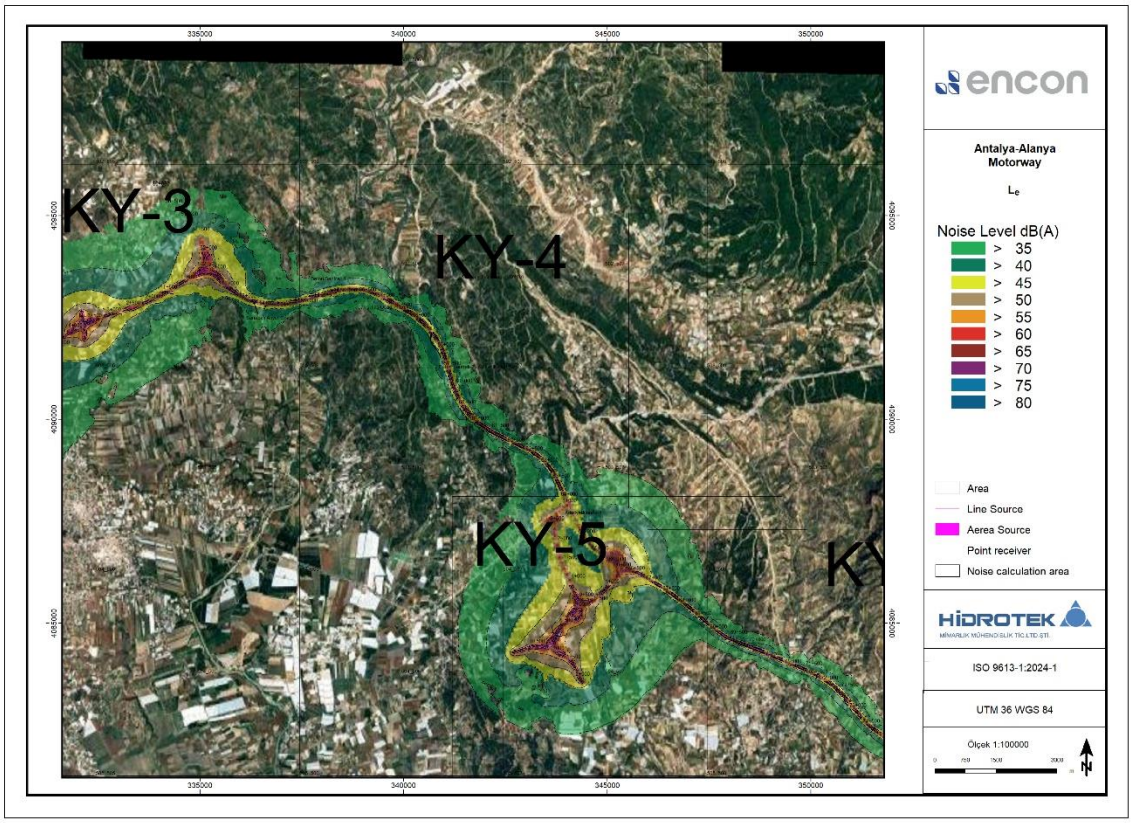

Figure 5.8 S-2 (4+500/74+000) Construction Sites, Quarries and Motorway Construction L_e Noise Map

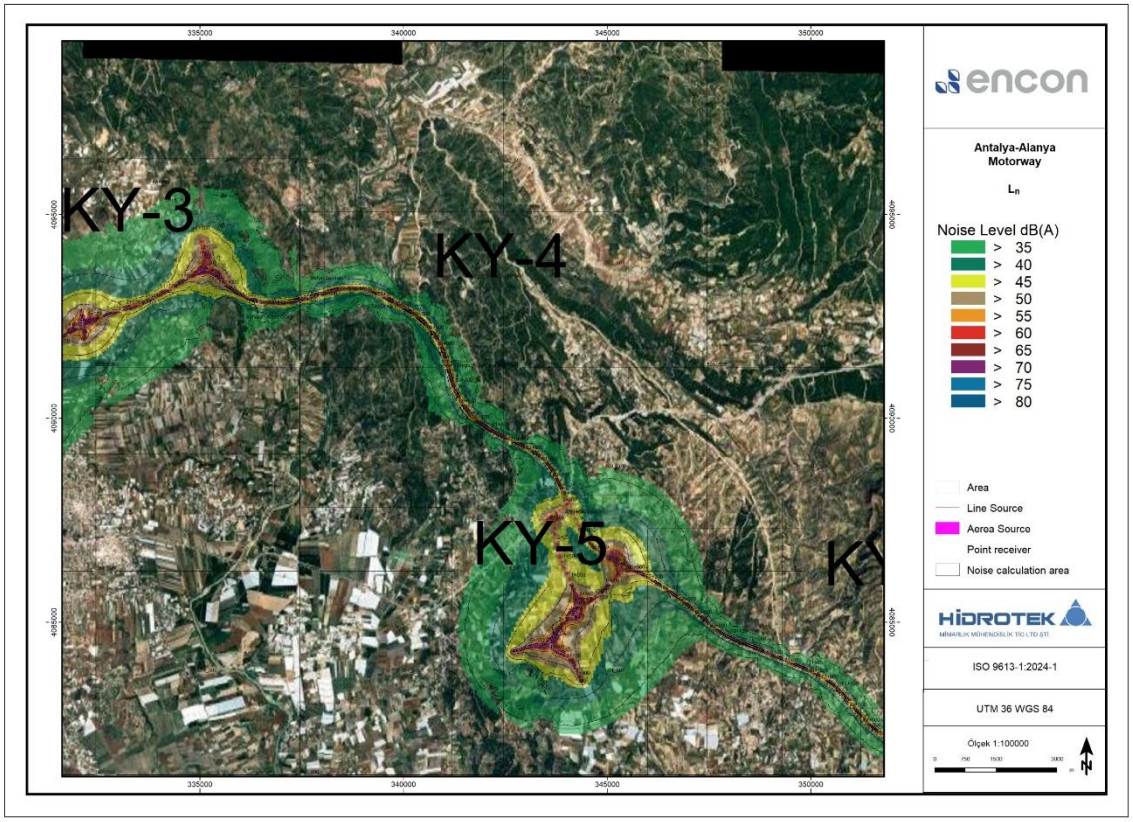

Figure 5.9 S-2 (4+500/74+000) Construction Sites, Quarries and Motorway Construction L_n Noise Map

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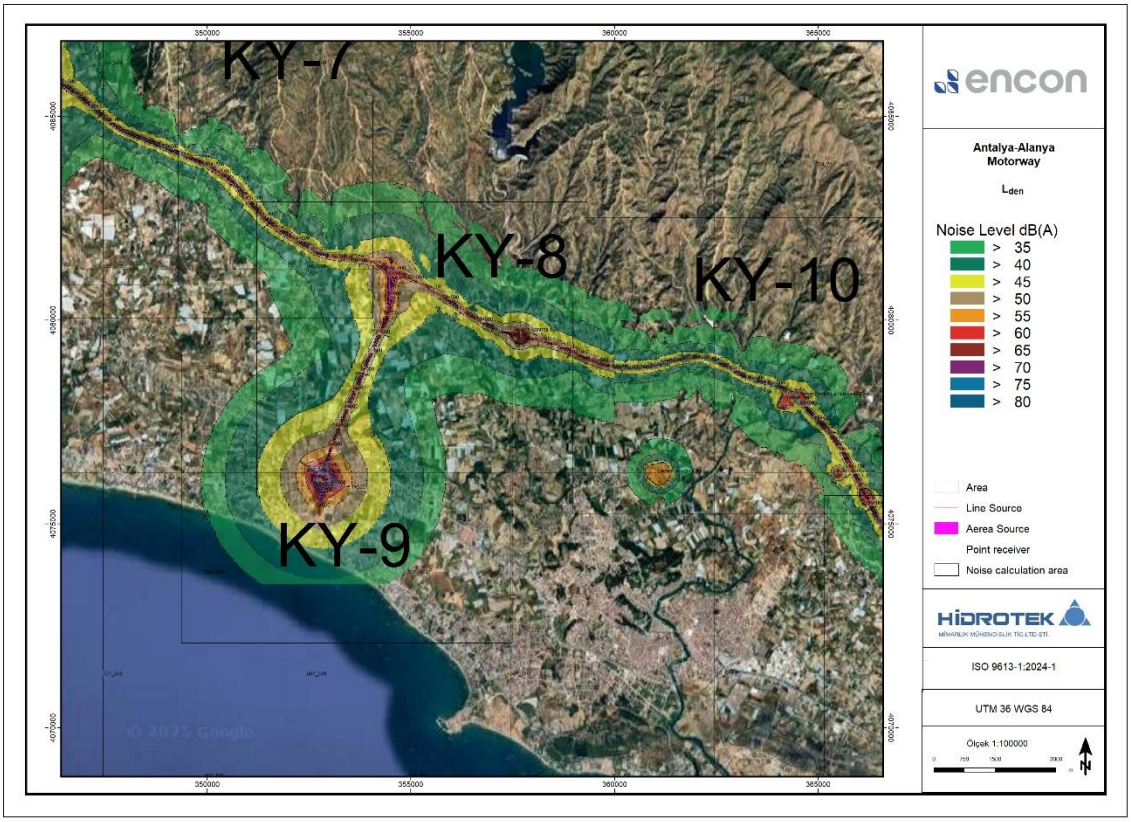

Figure 5.10 S-3 (67+500/91+500) Construction Sites, Quarries and Motorway Construction L_{den} Noise Map

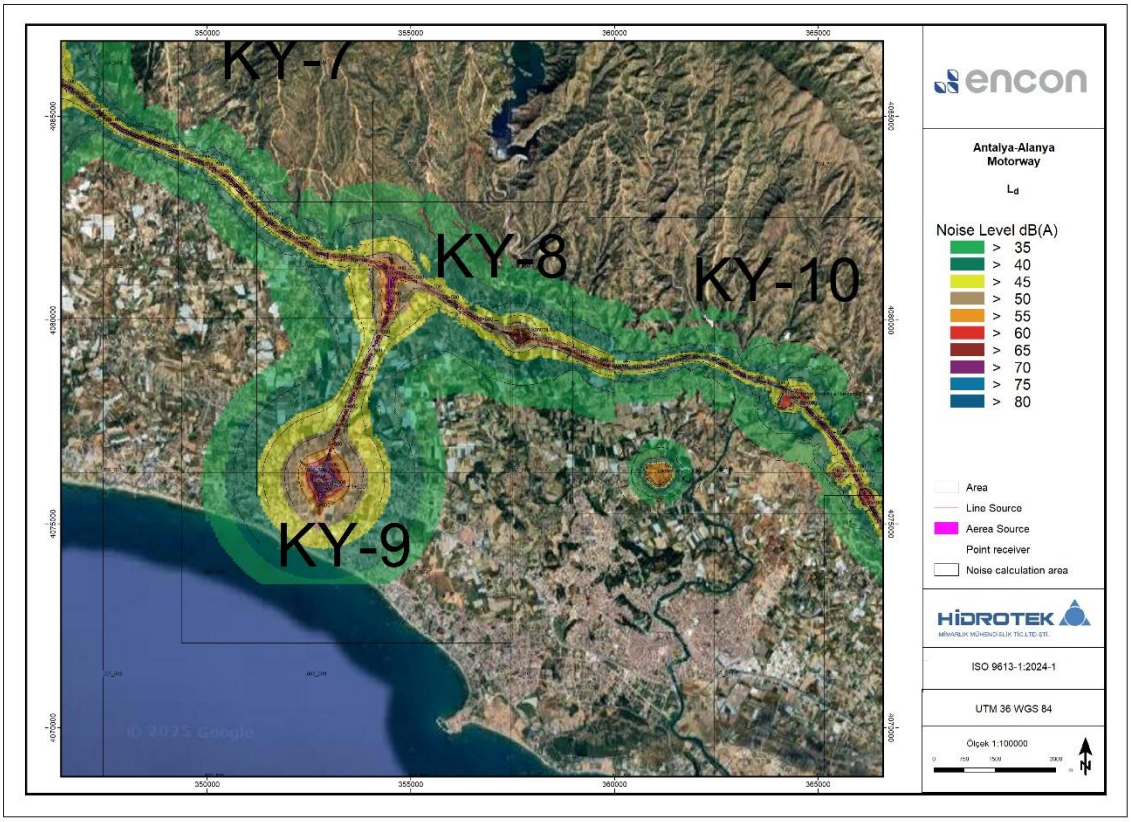

Figure 5.11 S-3 (67+500/91+500) Construction Sites, Quarries and Motorway Construction L_d Noise Map

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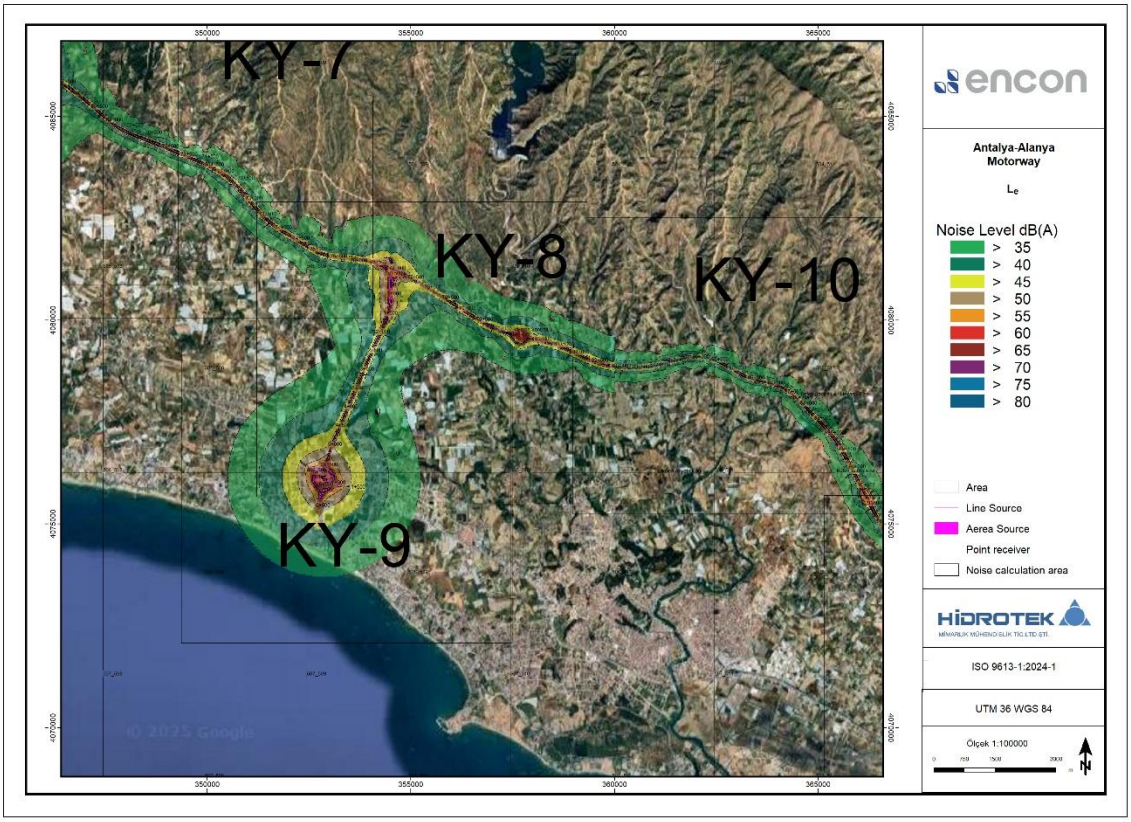

Figure 5.12 S-3 (67+500/91+500) Construction Sites, Quarries and Motorway Construction L_e Noise Map

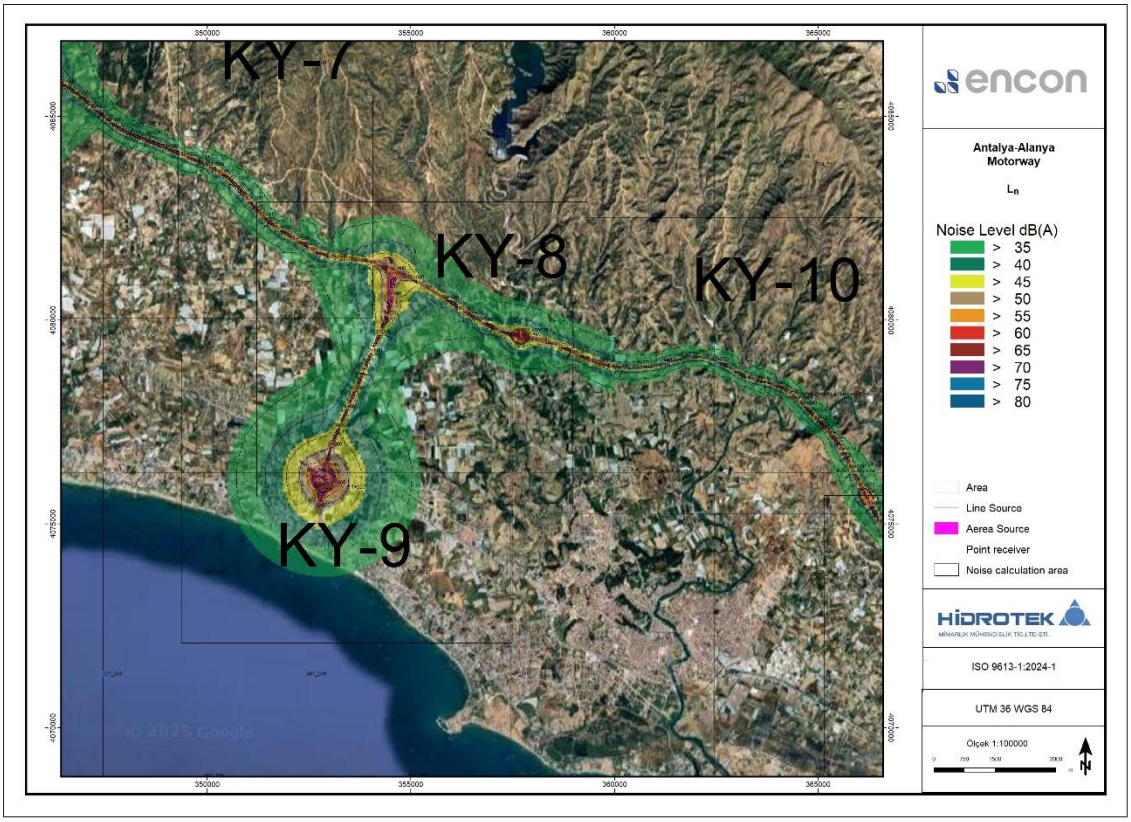

Figure 5.13 S-3 (67+500/91+500) Construction Sites, Quarries and Motorway Construction L_n Noise Map

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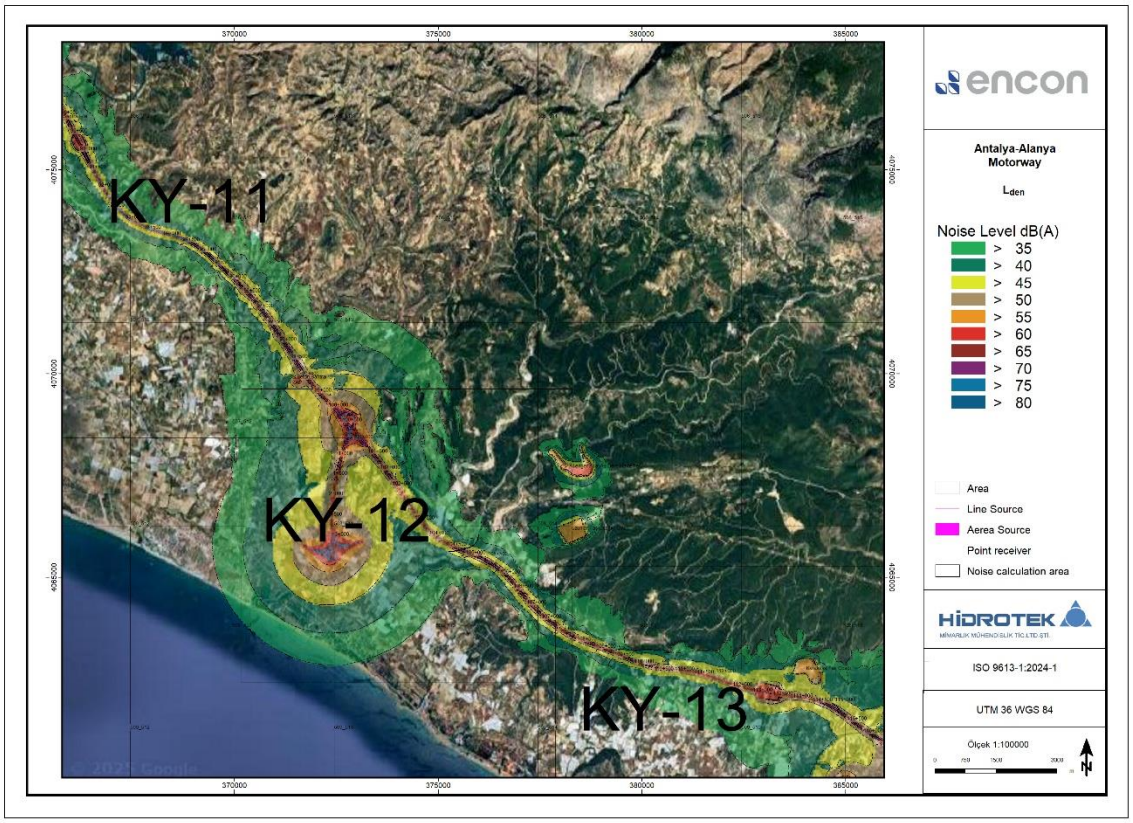

Figure 5.14 S-4 (90+500/116+500) Construction Sites, Quarries and Motorway Construction L_{den} Noise Map

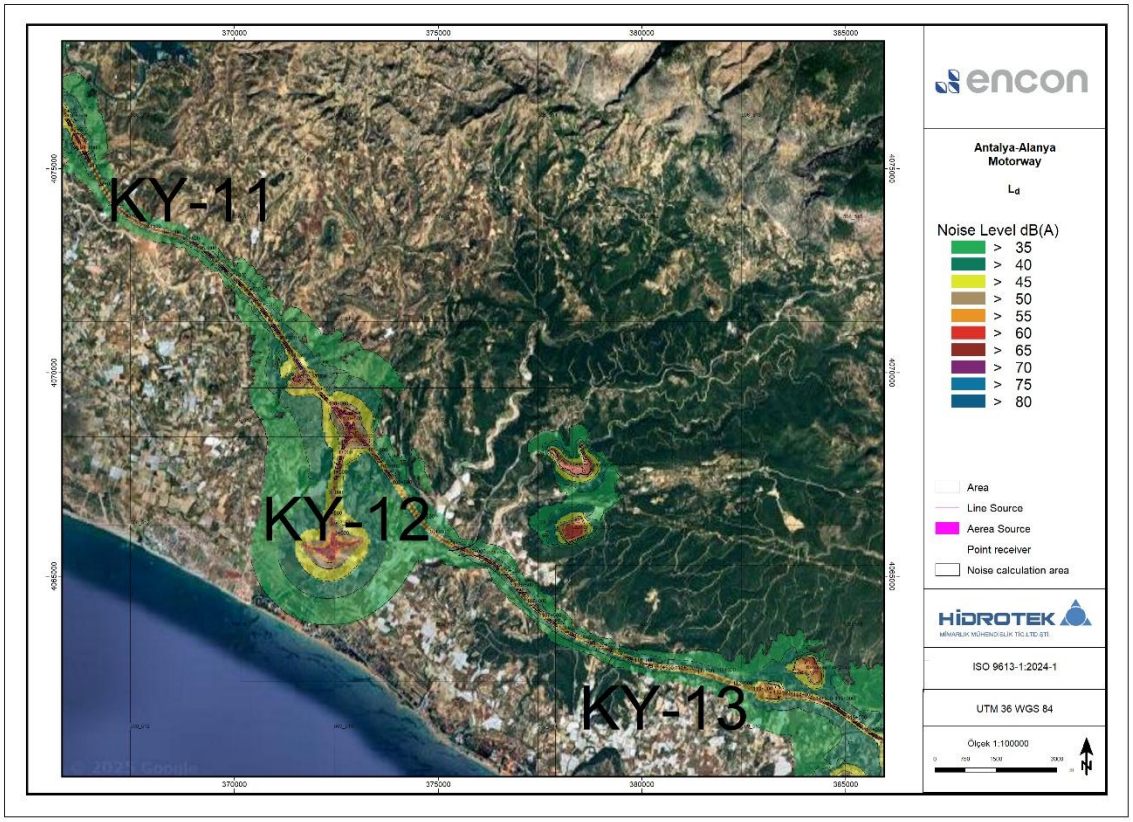

Figure 5.15 S-4 (90+500/116+500) Construction Sites, Quarries and Motorway Construction L_d Noise Map

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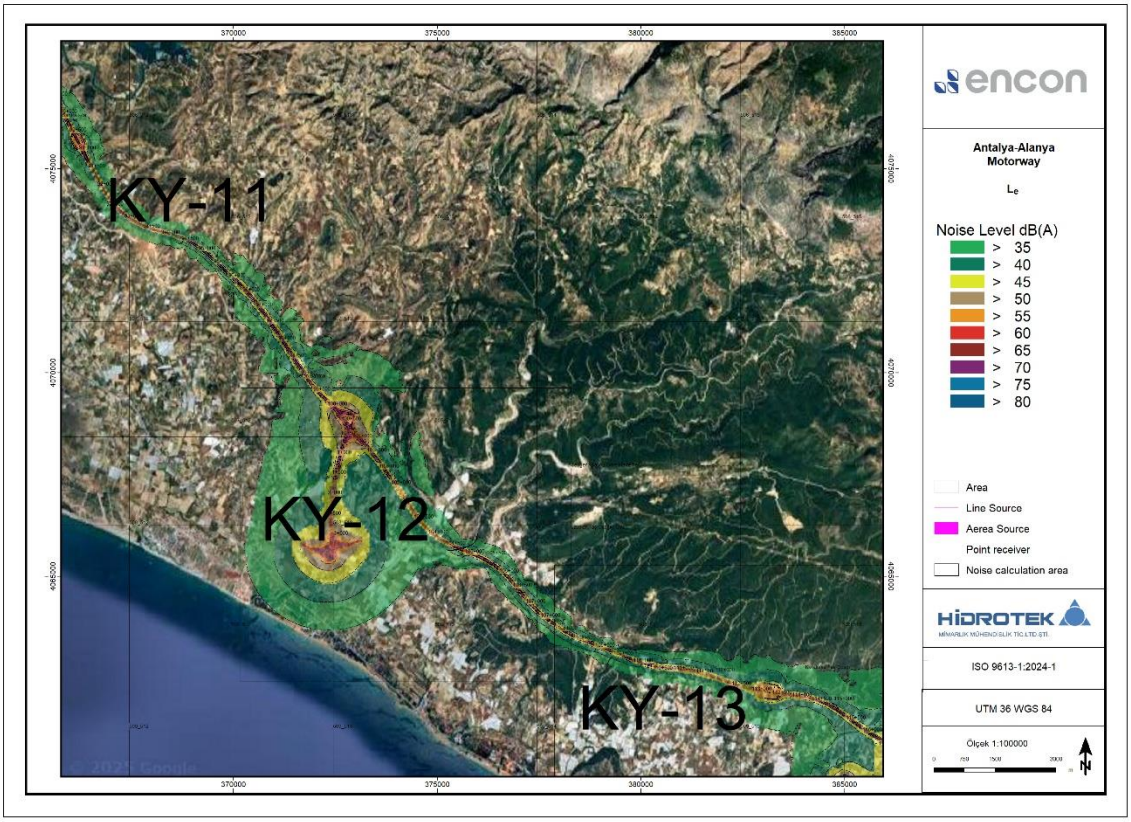

Figure 5.16 S-4 (90+500/116+500) Construction Sites, Quarries and Motorway Construction L_e Noise Map

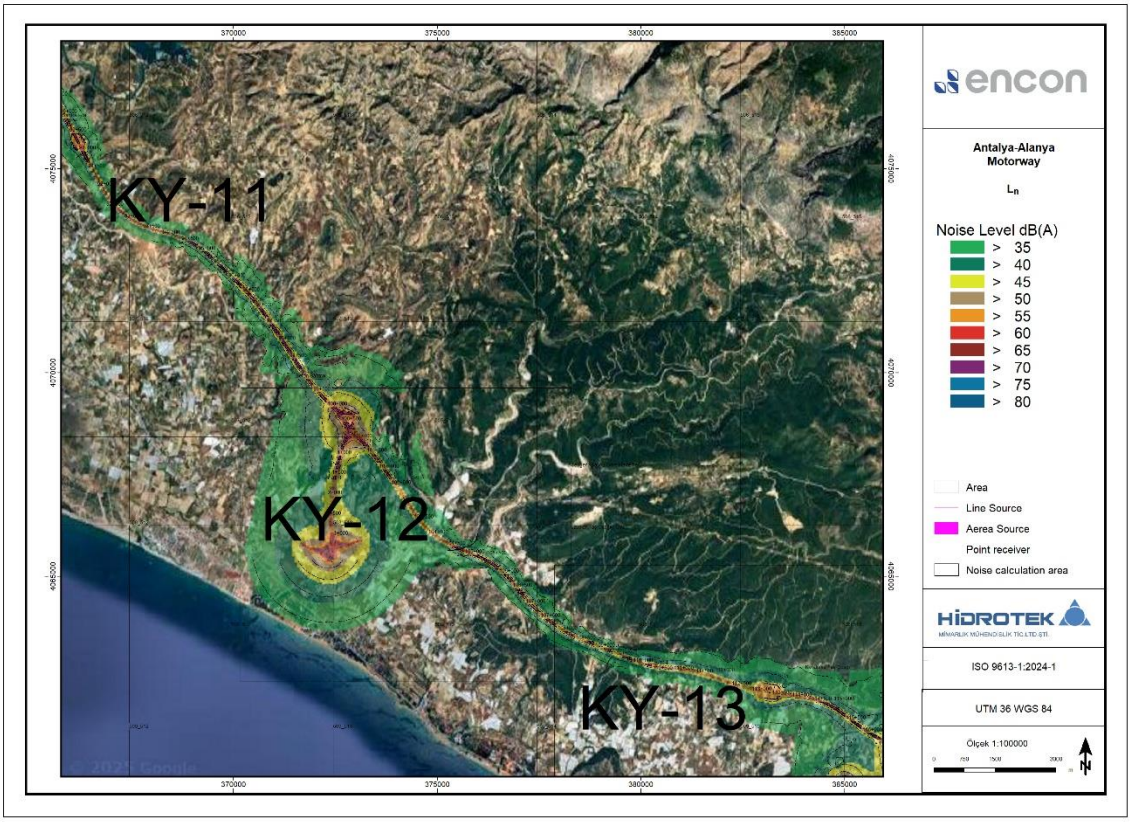

Figure 5.17 S-4 (90+500/116+500) Construction Sites, Quarries and Motorway Construction L_n Noise Map

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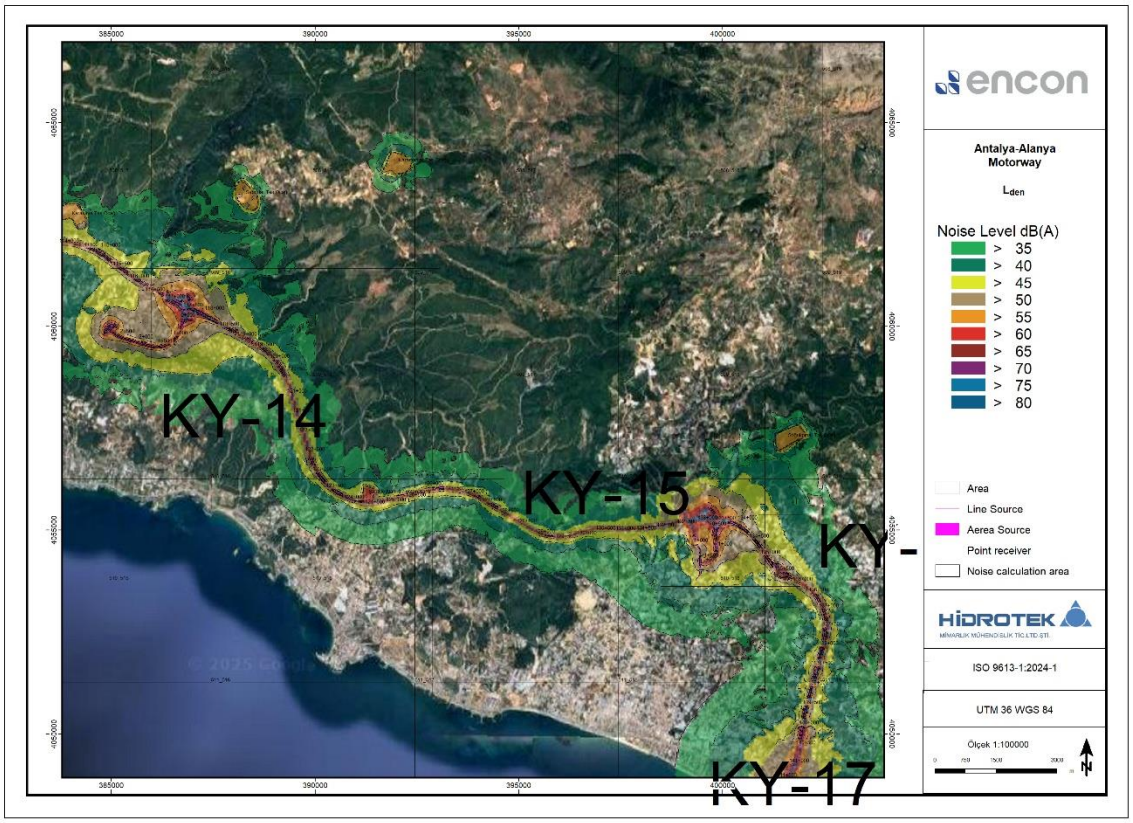

Figure 5.18 S-5 (114+000/141+000) L_{den} Noise Map for Construction Sites, Quarries and Motorway Route

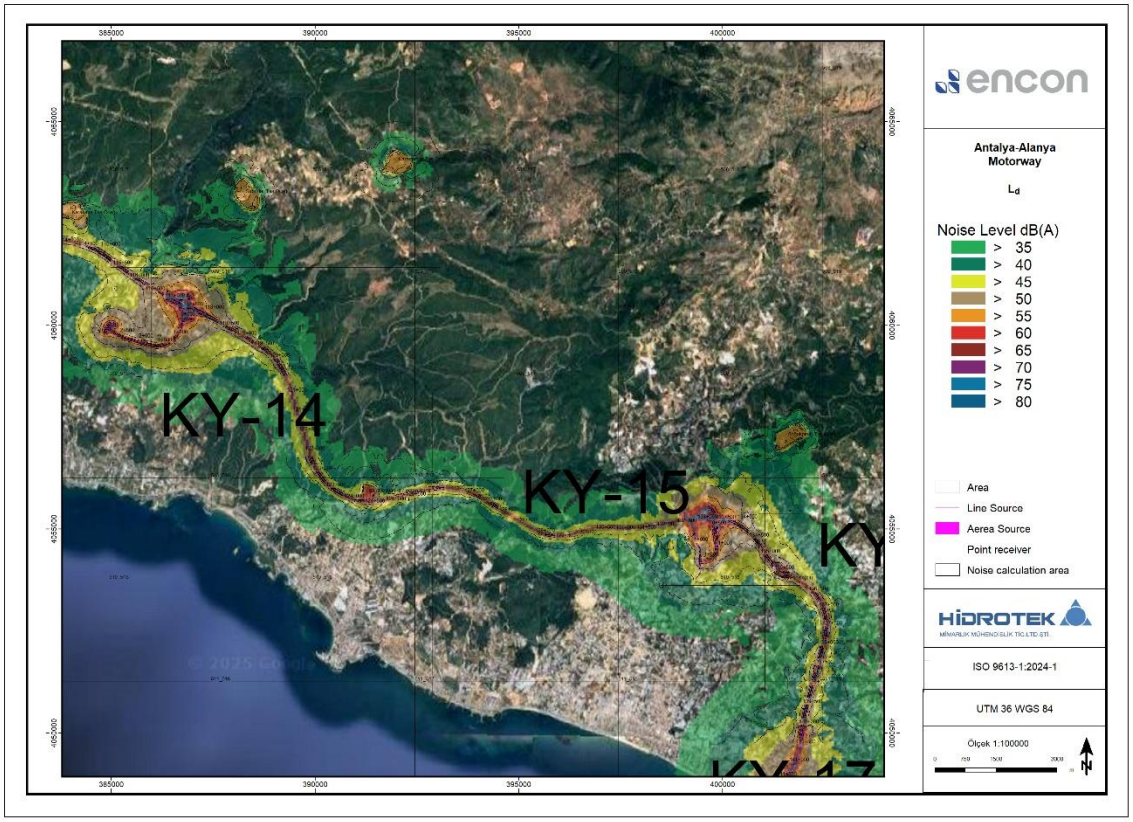

Figure 5.19 S-5 (114+000/141+000) L_d Noise Map for Construction Sites, Quarries and Motorway Route

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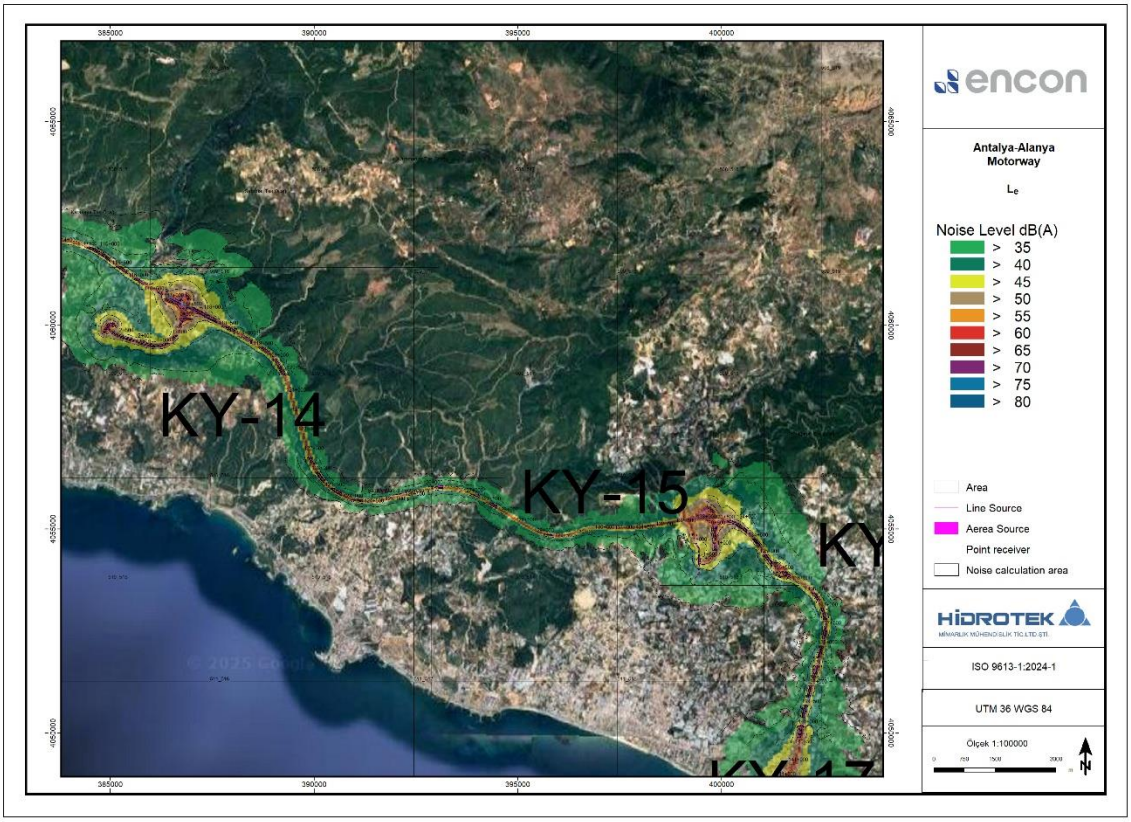

Figure 5.20 S-5 (114+000/141+000) L_e Noise Map for Construction Sites, Quarries and Motorway Route

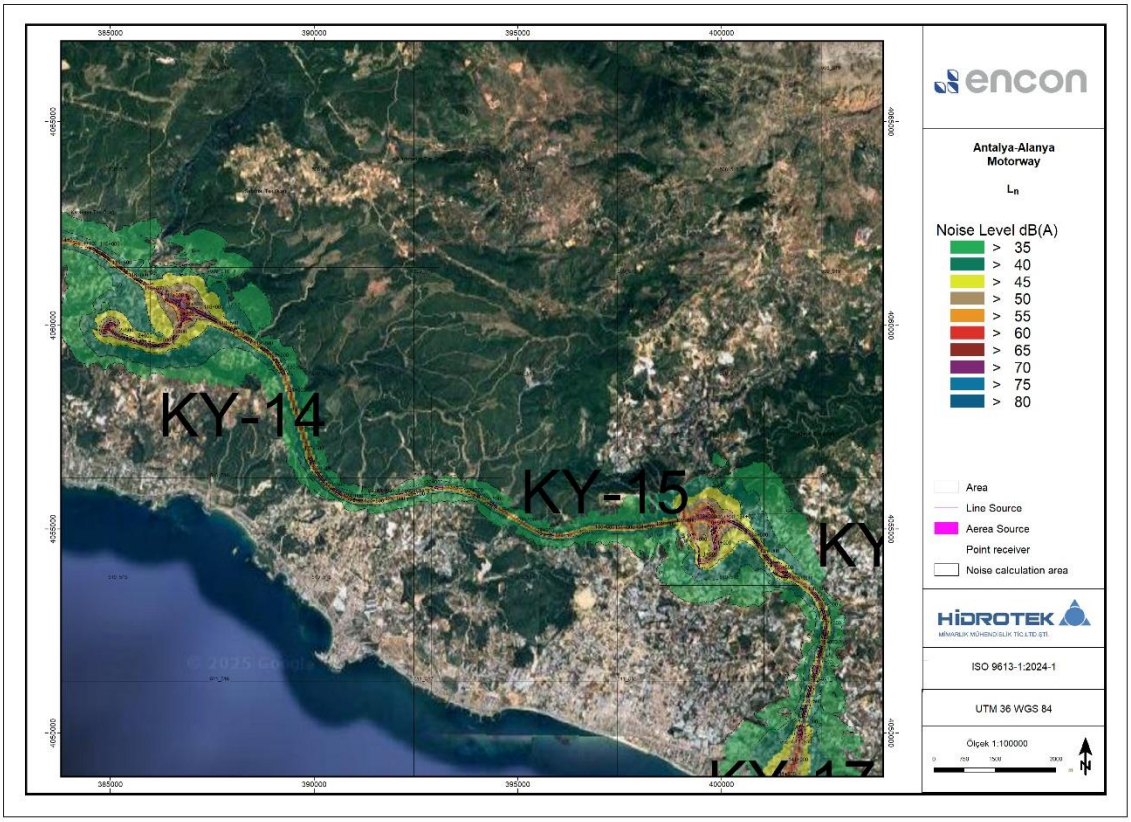

Figure 5.21 S-5 (114+000/141+000) L_n Noise Map for Construction Sites, Quarries and Motorway Route

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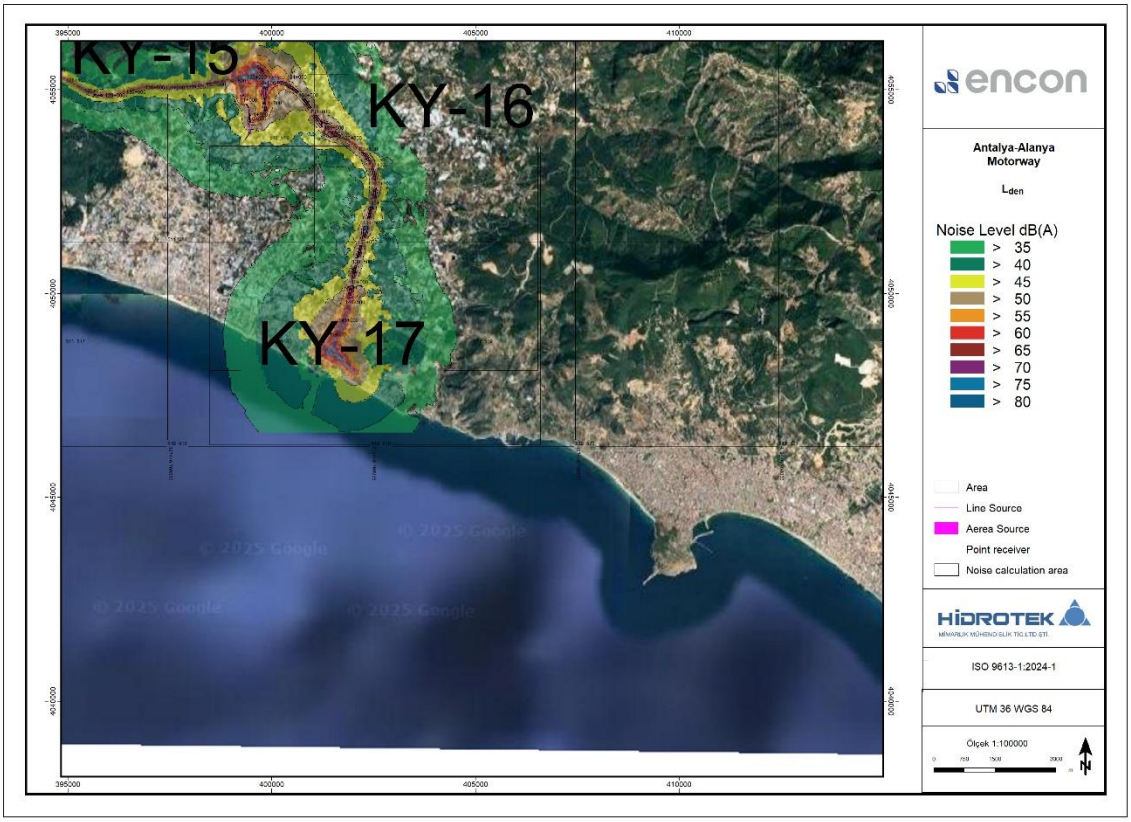

Figure 5.22 S-6 (128+500/141+500) L_{den} Noise Map for Construction Sites, Quarries and Motorway Route

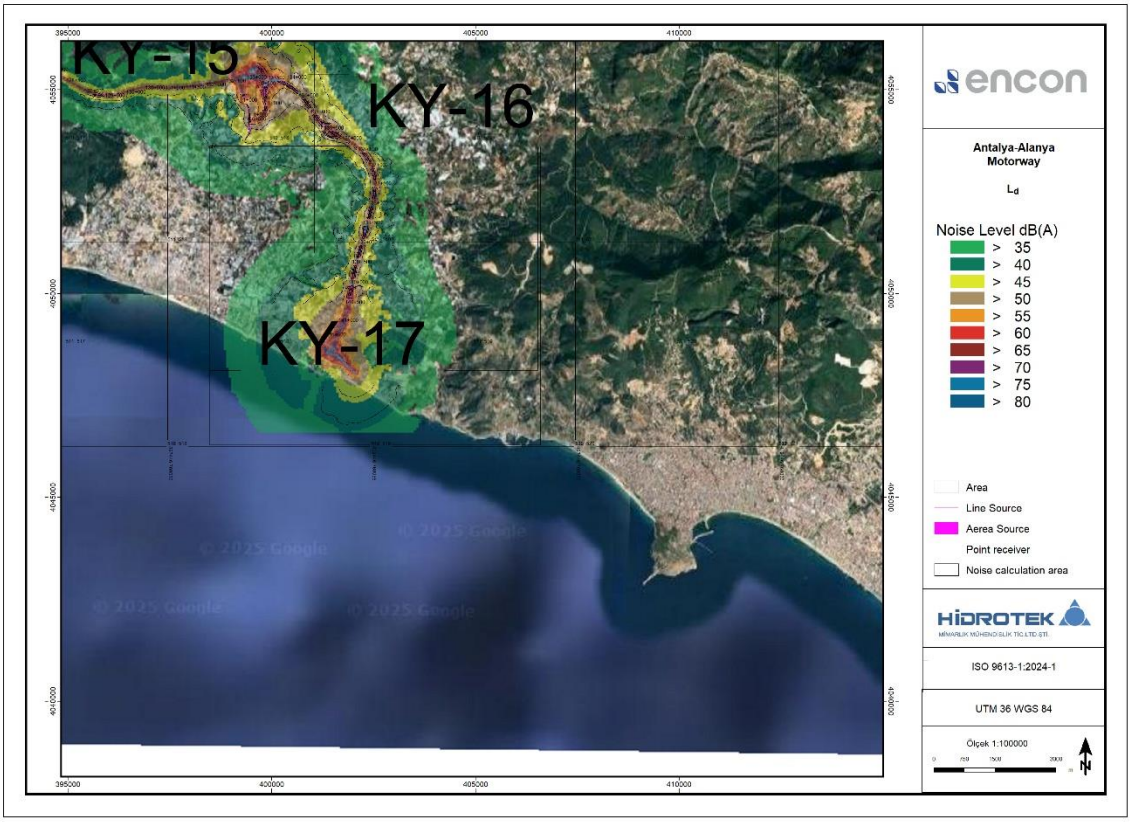

Figure 5.23 S-6 (128+500/141+500) L_d Noise Map for Construction Sites, Quarries and Motorway Route

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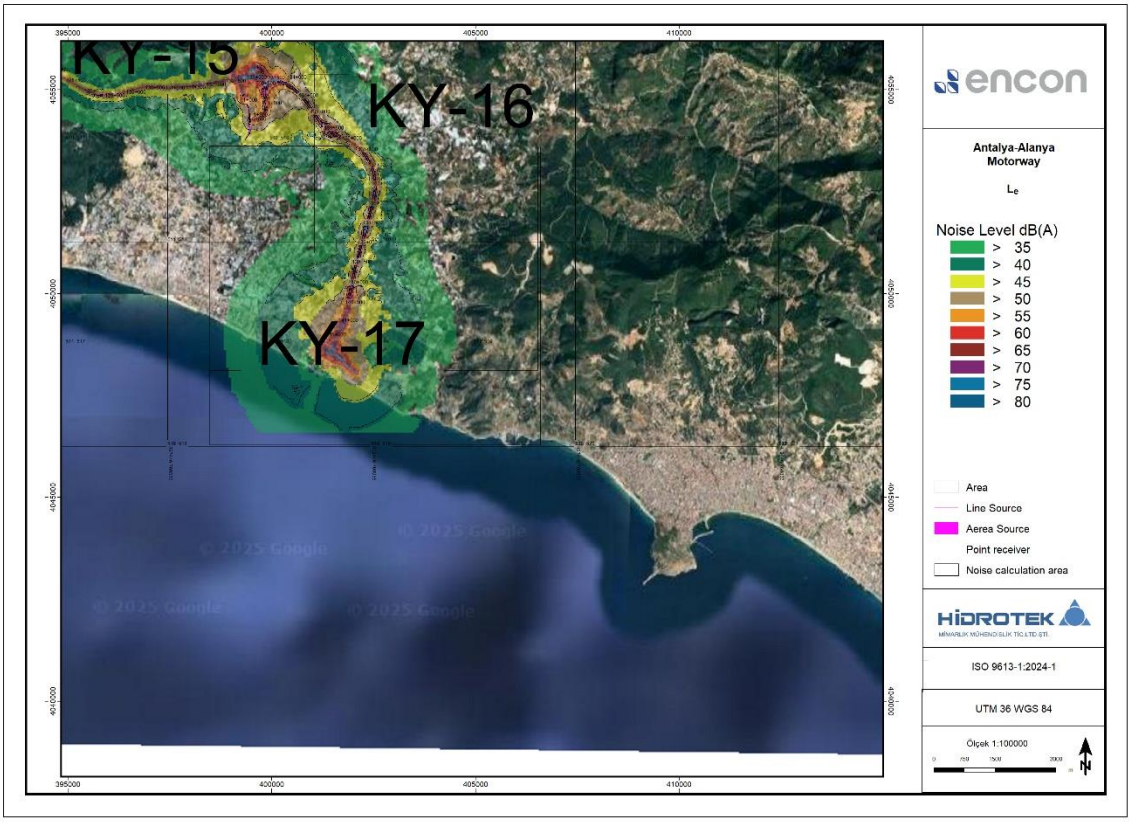

Figure 5.24 S-6 (128+500/141+500) L_e Noise Map for Construction Sites, Quarries and Motorway Route

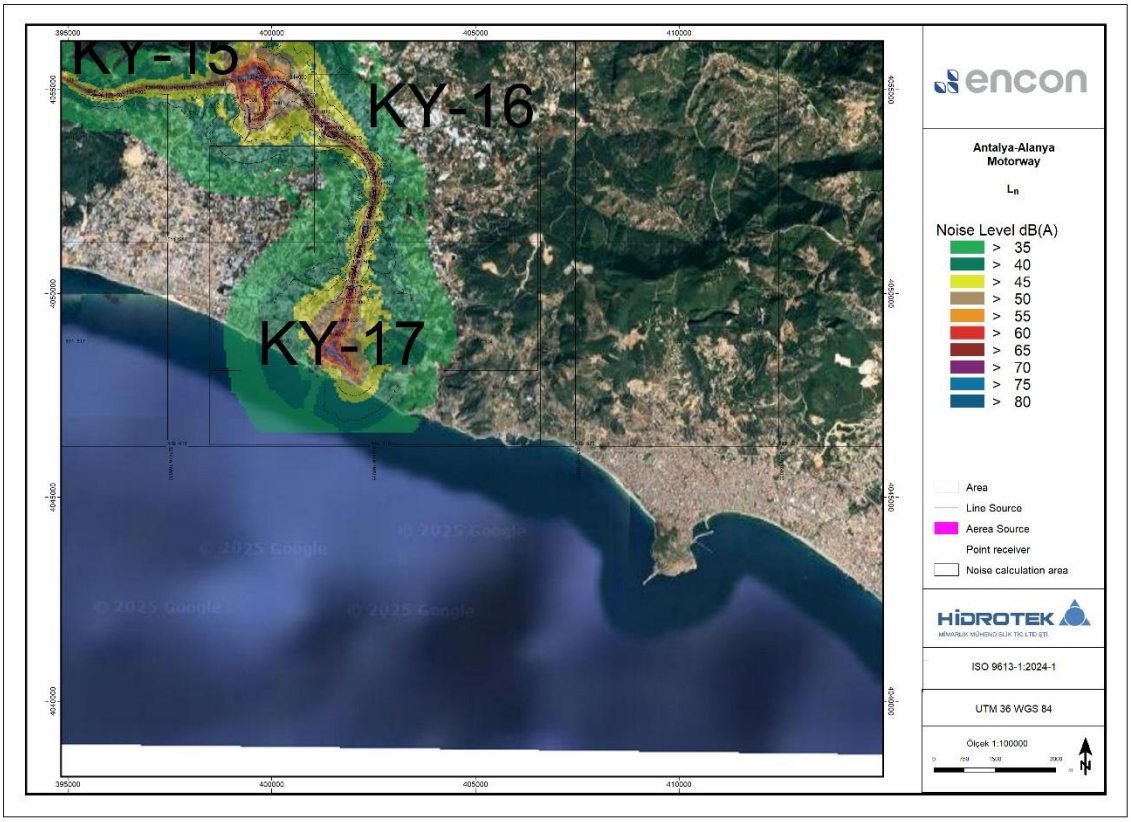

Figure 5.25 S-6 (128+500/141+500) L_n Noise Map for Construction Sites, Quarries and Motorway Route

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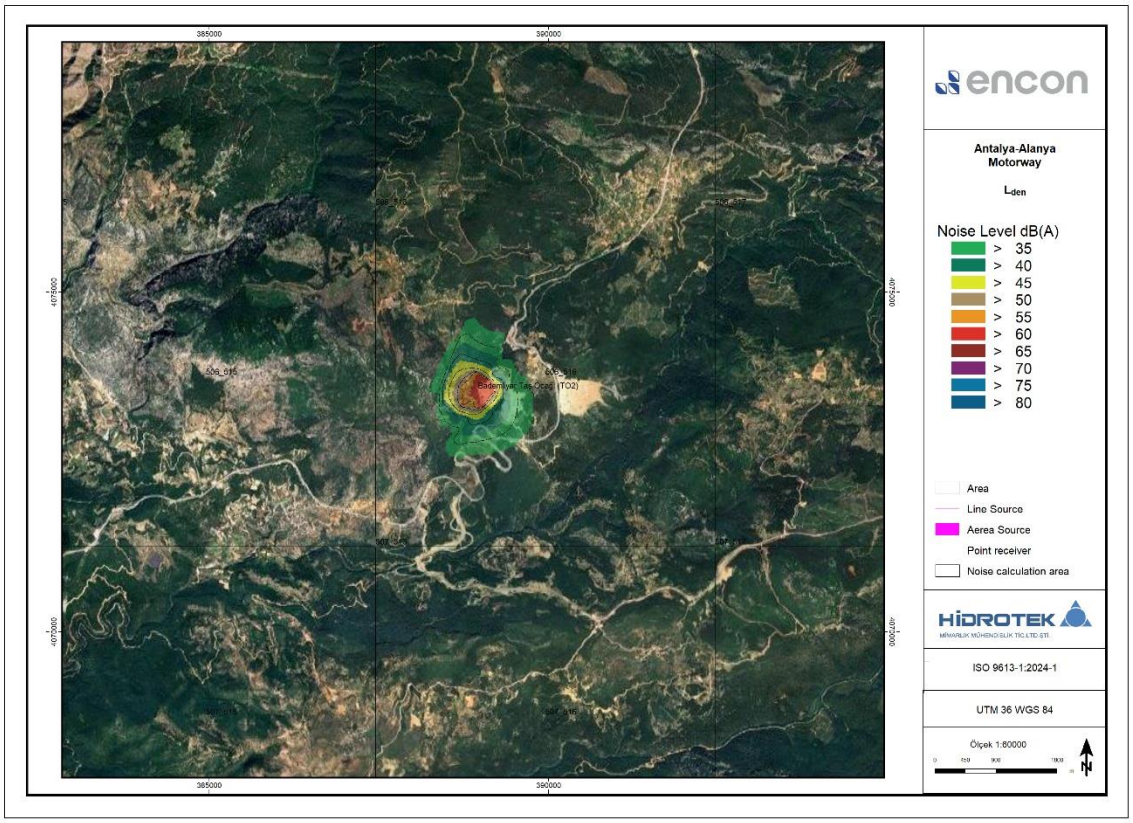

Figure 5.26 S-7 (Bademliyar) L_{den} Noise Map for Construction Sites, Quarries and Motorway Route

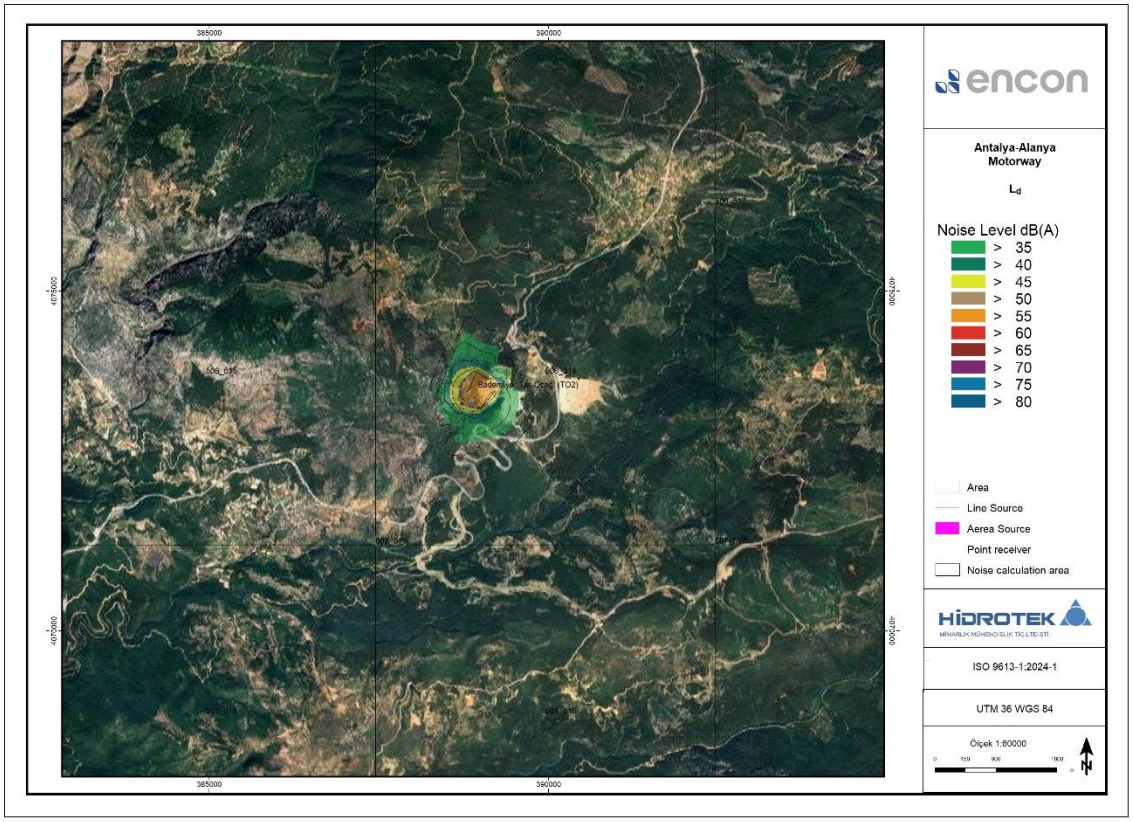

Figure 5.27 S-7 (Bademliyar) L_d Noise Map for Construction Sites, Quarries and Motorway Route

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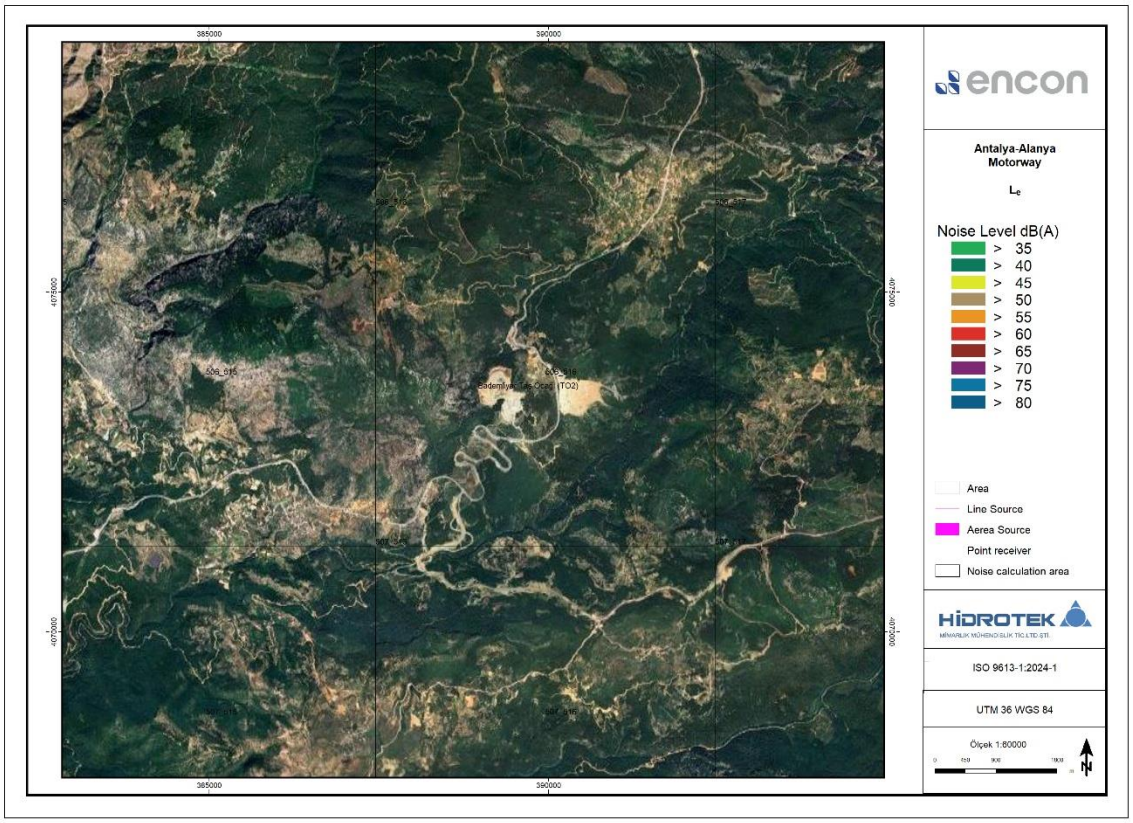

Figure 5.28 S-7 (Bademliyar) L_e Noise Map for Construction Sites, Quarries and Motorway Route

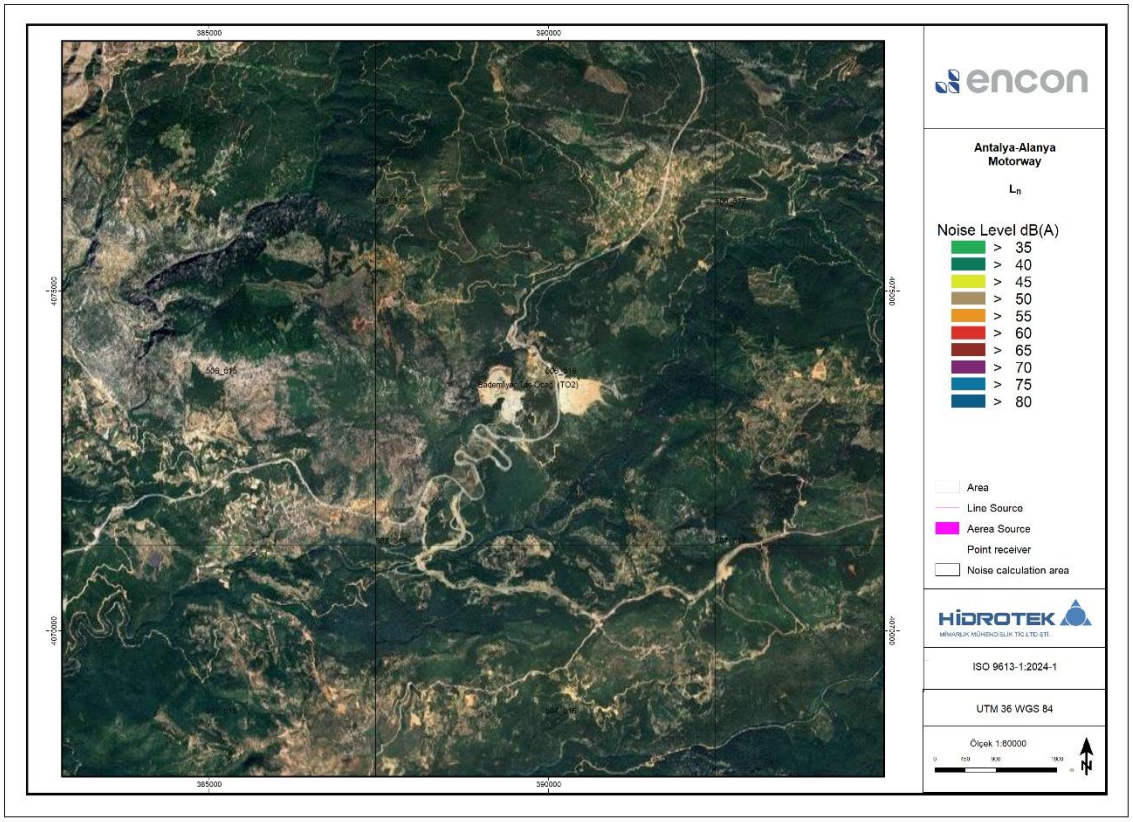

Figure 5.29 S-7 (Bademliyar) L_n Noise Map for Construction Sites, Quarries and Motorway Route

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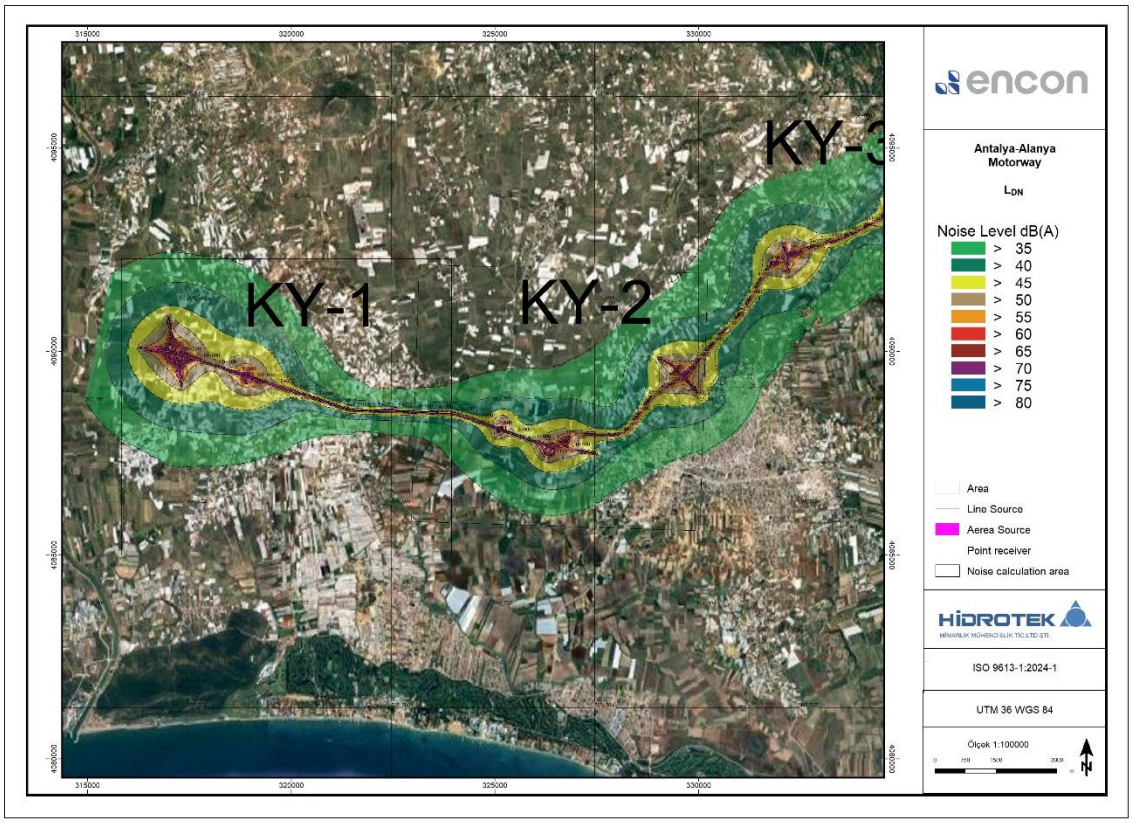

Figure 5.30 S-1 (11+500/1+500) L_{DN} Noise Map for Construction Sites, Quarries and Motorway Route

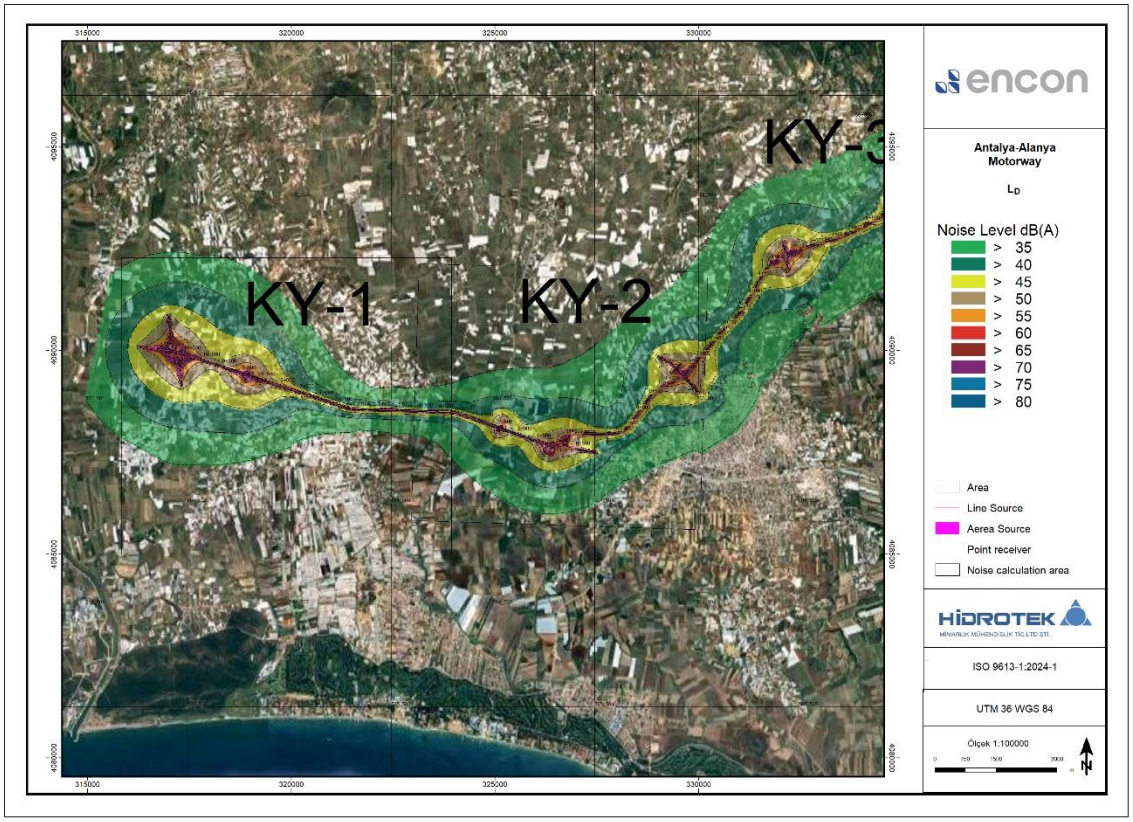

Figure 5.31 S-1 (11+500/1+500) L_D Noise Map for Construction Sites, Quarries and Motorway Route

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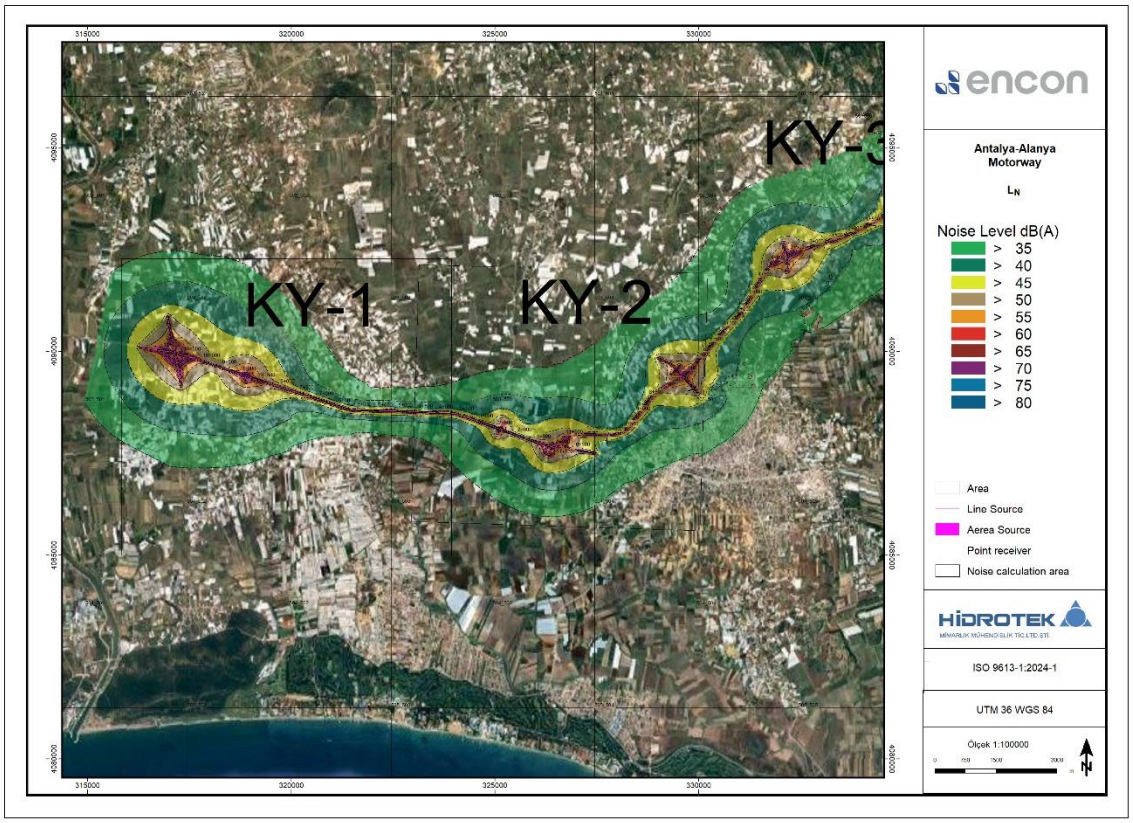

Figure 5.32 S-1 (11+500/1+500) L_N Noise Map for Construction Sites, Quarries and Motorway Route

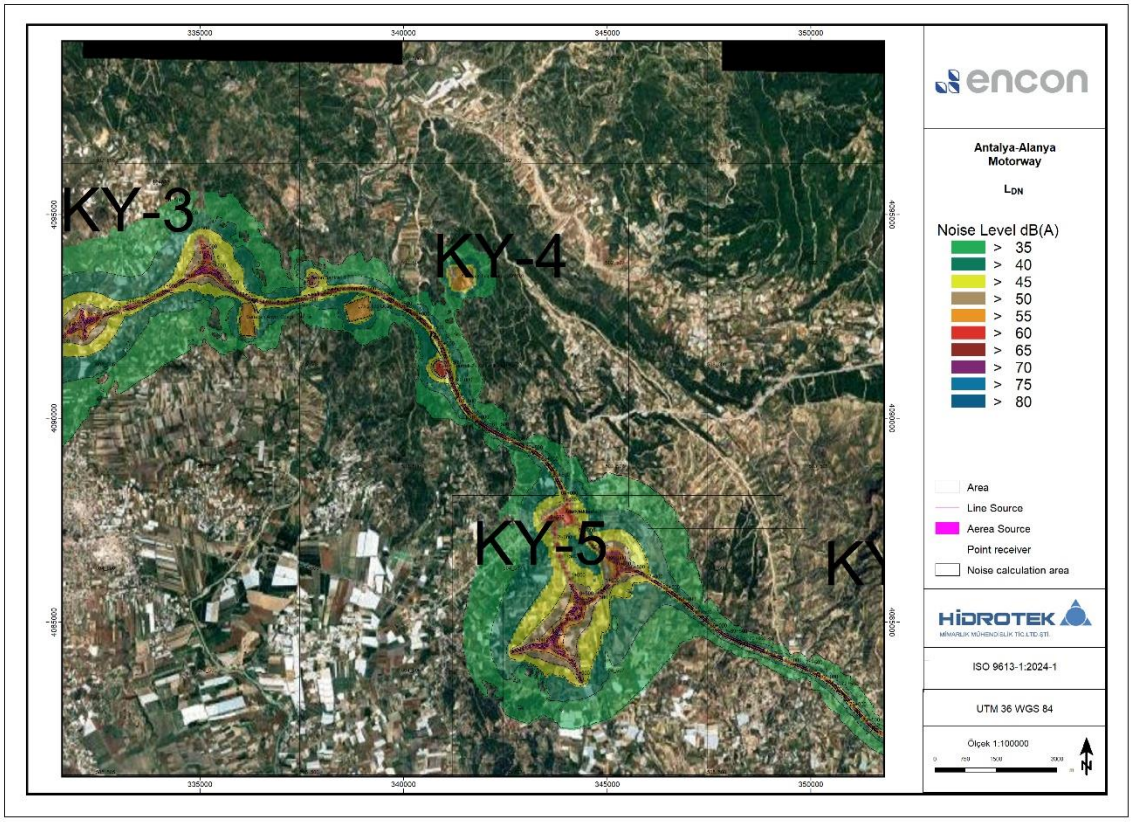

Figure 5.33 S-2 (4+500/74+500) L_{DN} Noise Map for Construction Sites, Quarries and Motorway Route

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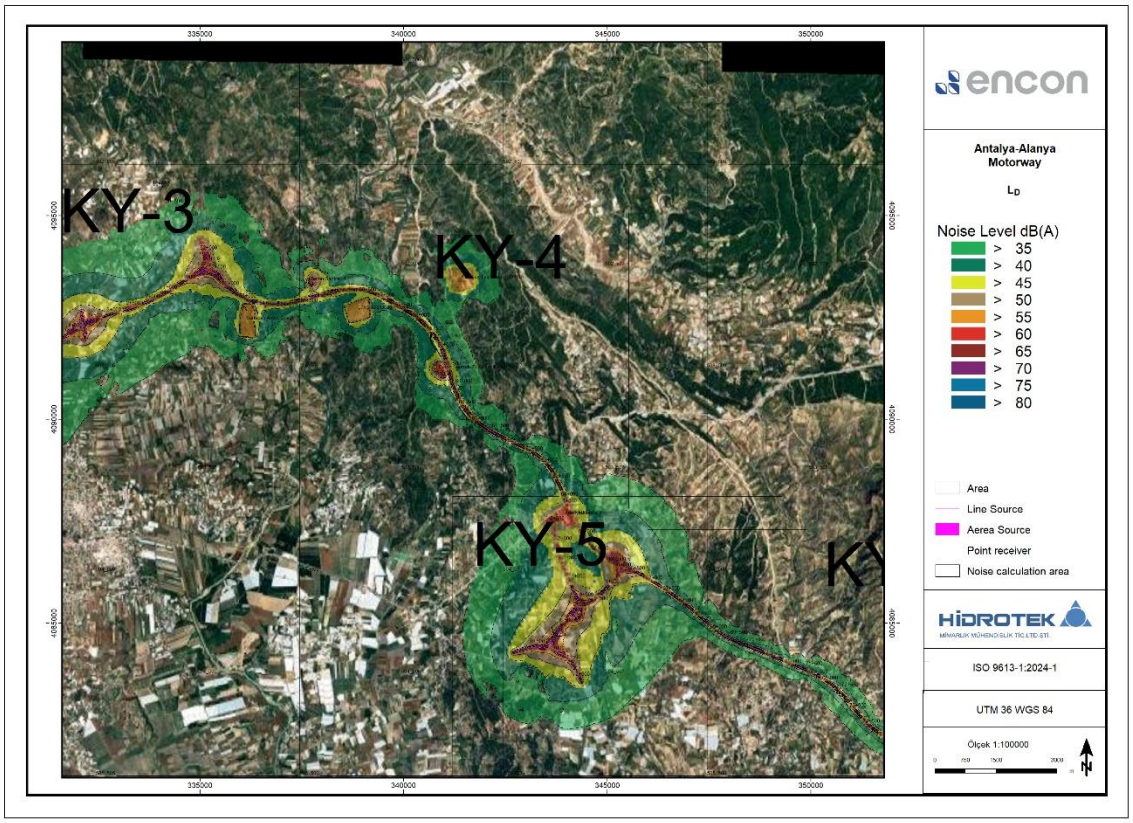

Figure 5.34 S-2 (4+500/74+500) L_D Noise Map for Construction Sites, Quarries and Motorway Route

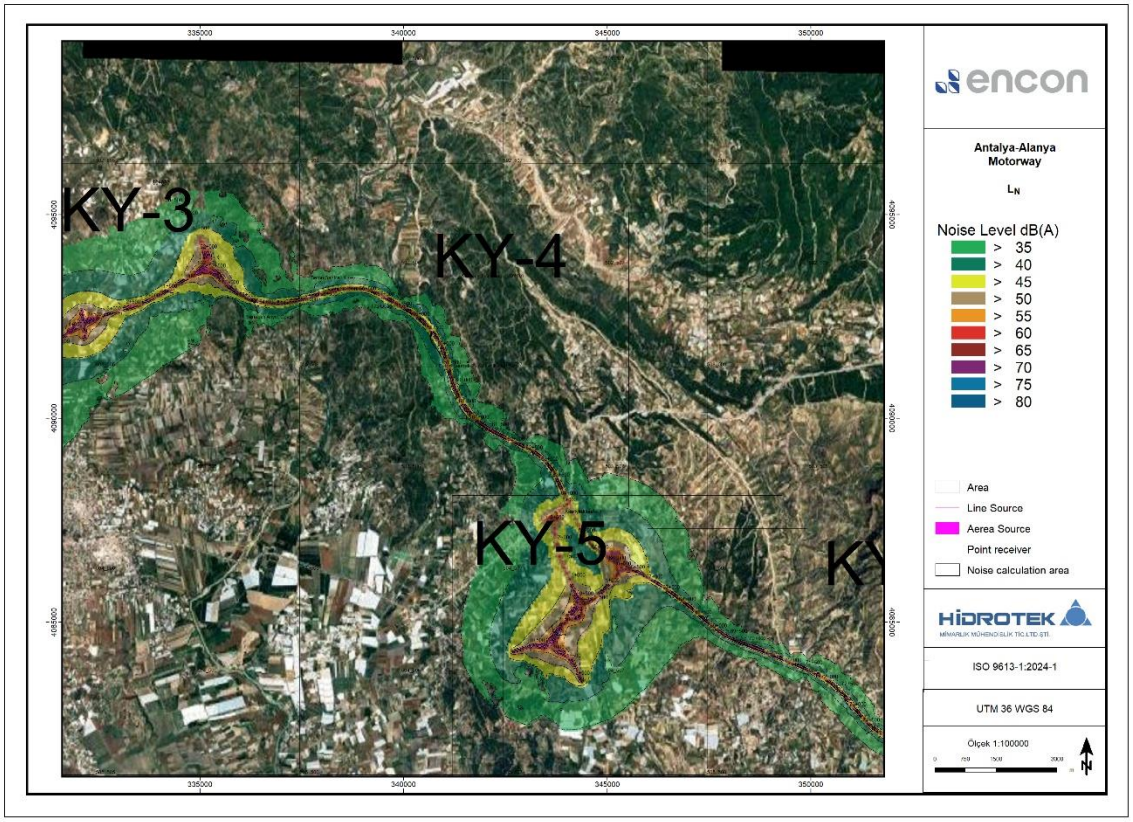

Figure 5.35 S-2 (4+500/74+500) L_N Noise Map for Construction Sites, Quarries and Motorway Route

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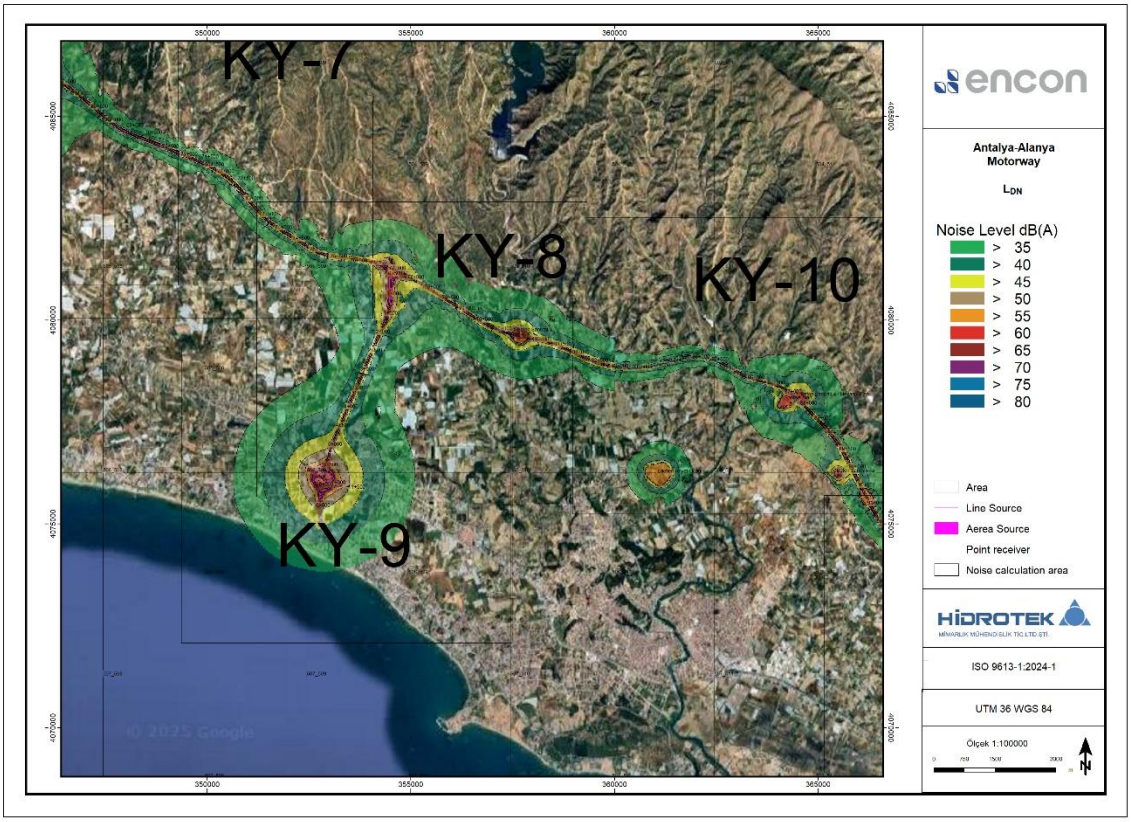

Figure 5.36 S-3 (67+500/91+500) L_{DN} Noise Map for Construction Sites, Quarries and Motorway Route

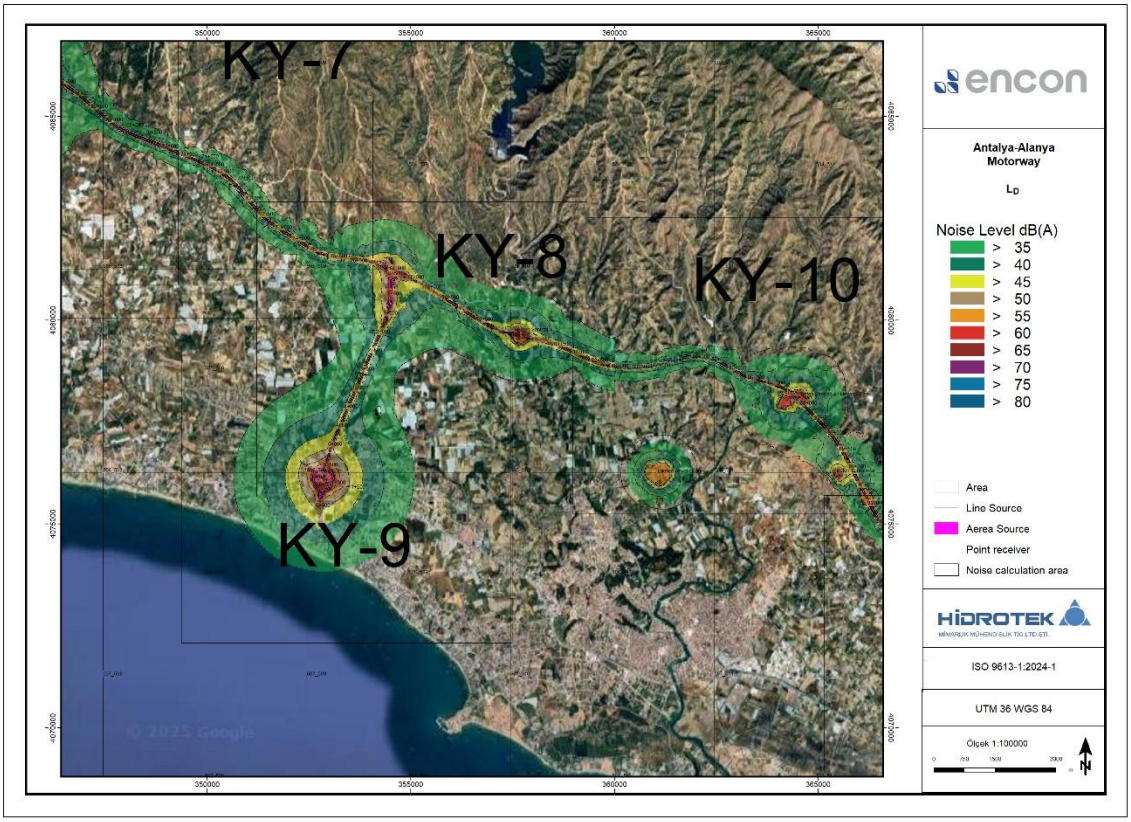

Figure 5.37 S-3 (67+500/91+500) L_{D} Noise Map for Construction Sites, Quarries and Motorway Route

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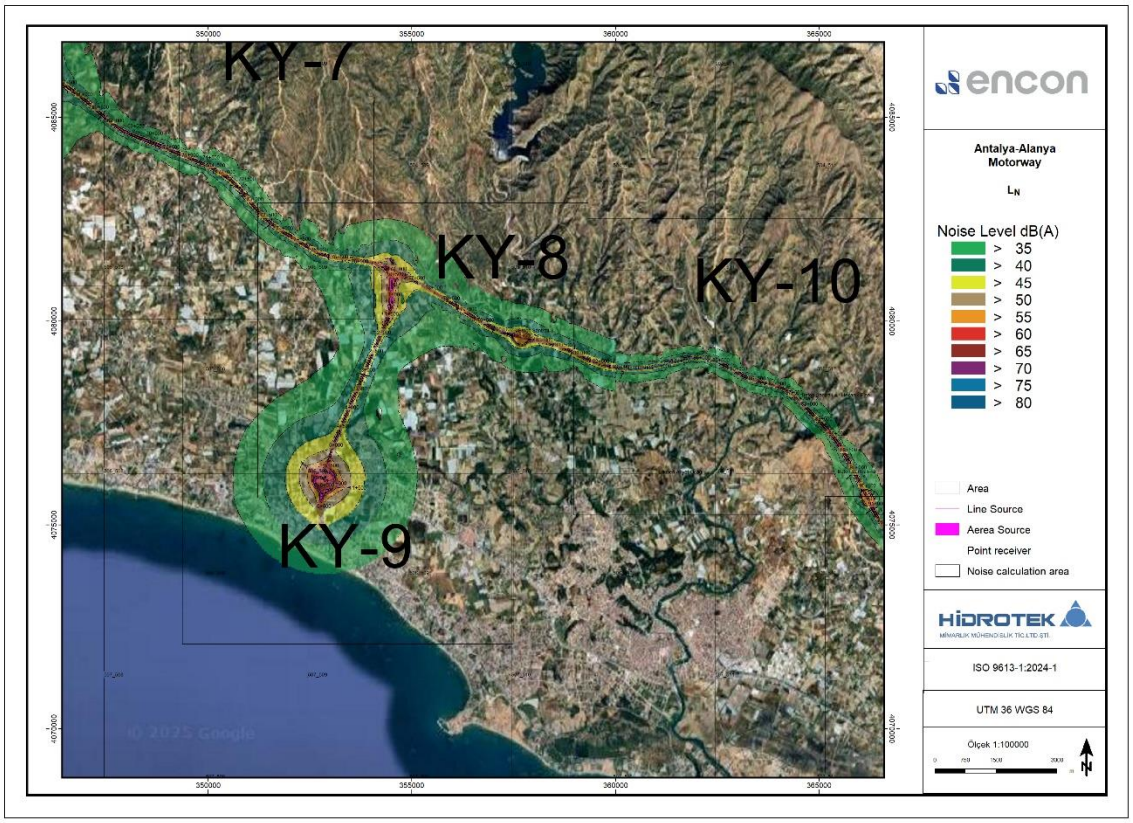

Figure 5.38 S-3 (67+500/91+500) L_N Noise Map for Construction Sites, Quarries and Motorway Route

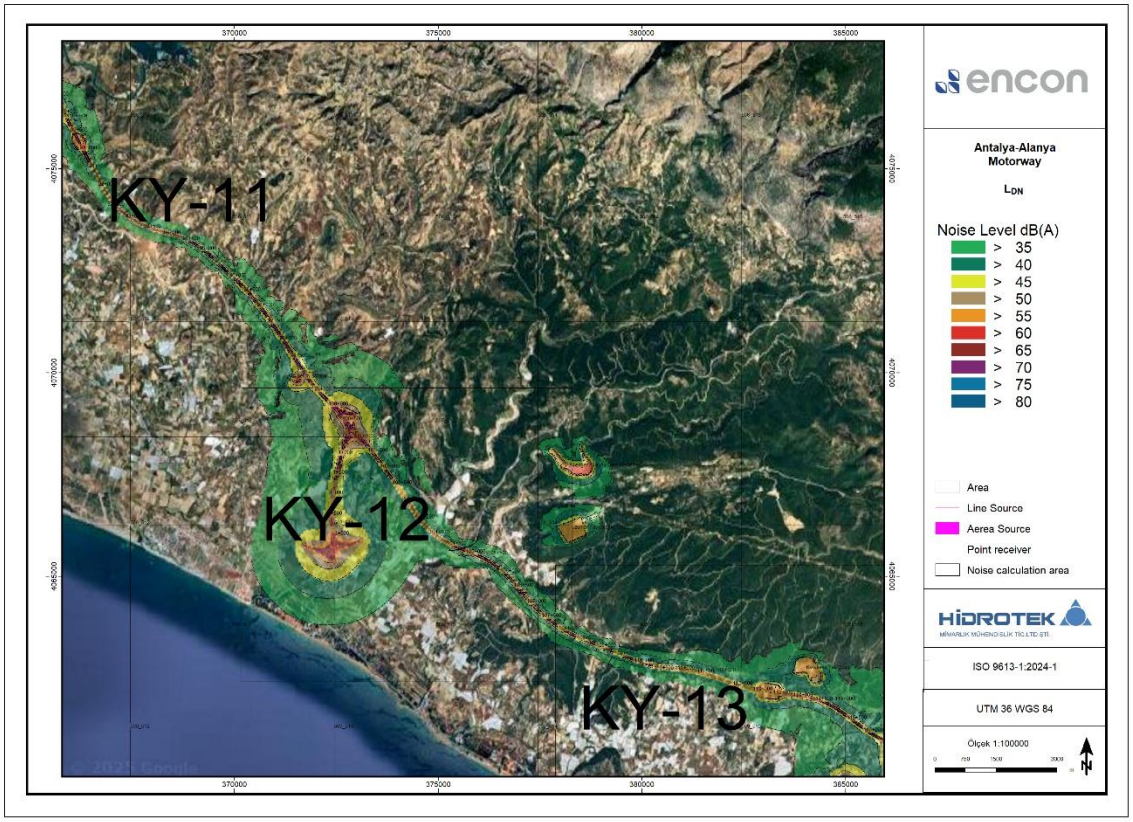

Figure 5.39 S-4 (90+000/116+500) L_{DN} Noise Map for Construction Sites, Quarries and Motorway Route

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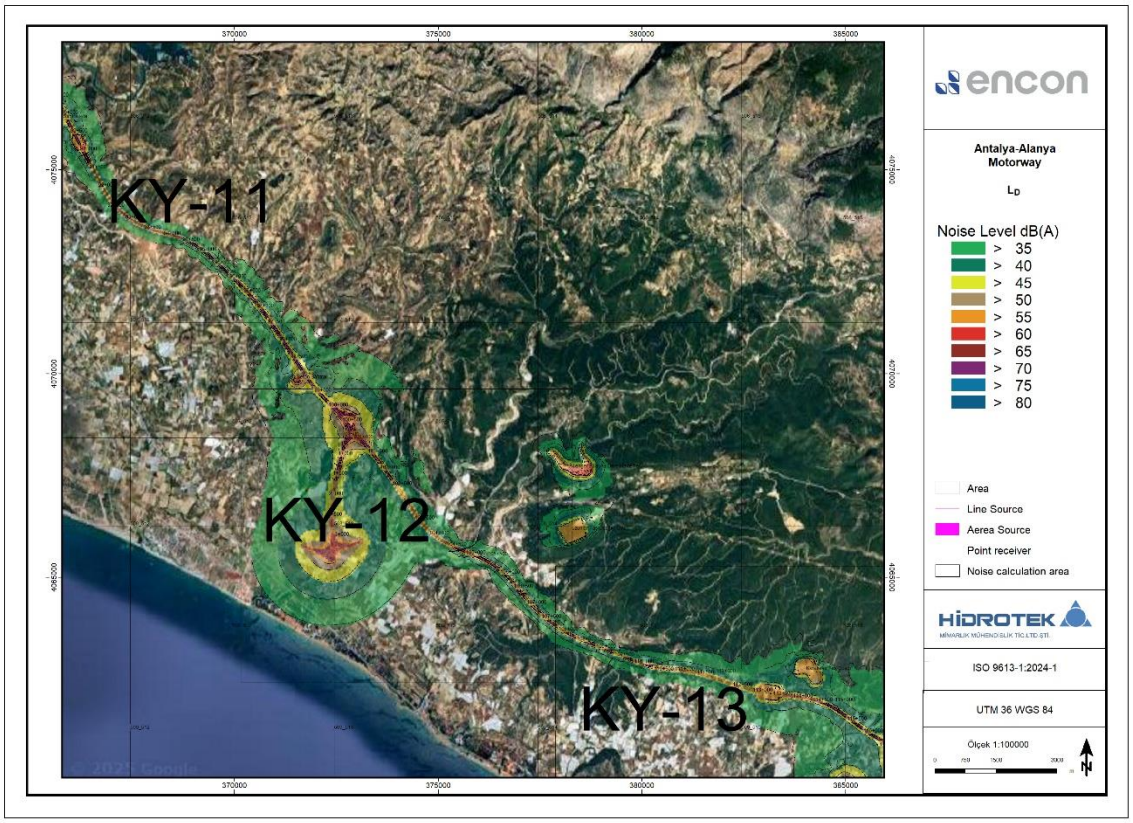

Figure 5.40 S-4 (90+000/116+500) L_D Noise Map for Construction Sites, Quarries and Motorway Route

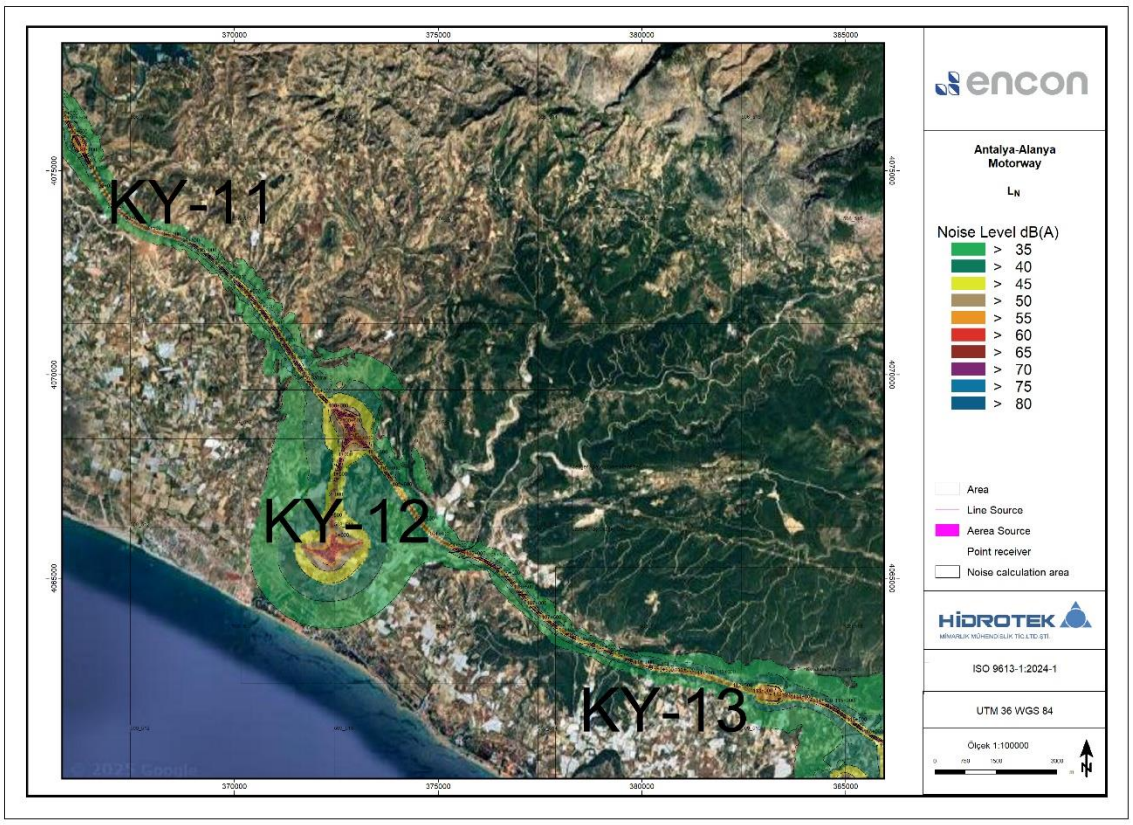

Figure 5.41 S-4 (90+000/116+500) L_N Noise Map for Construction Sites, Quarries and Motorway Route

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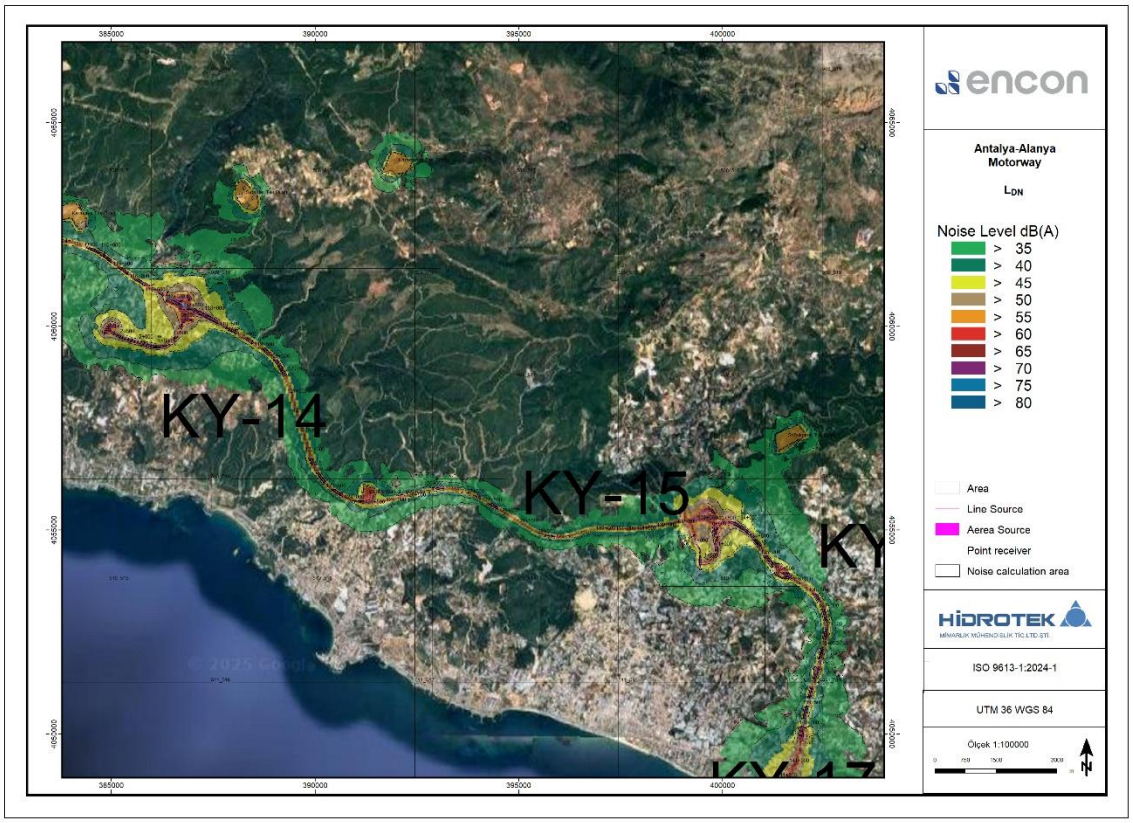

Figure 5.42 S-5 (114+000/141+000) L_{DN} Noise Map for Construction Sites, Quarries and Motorway Route

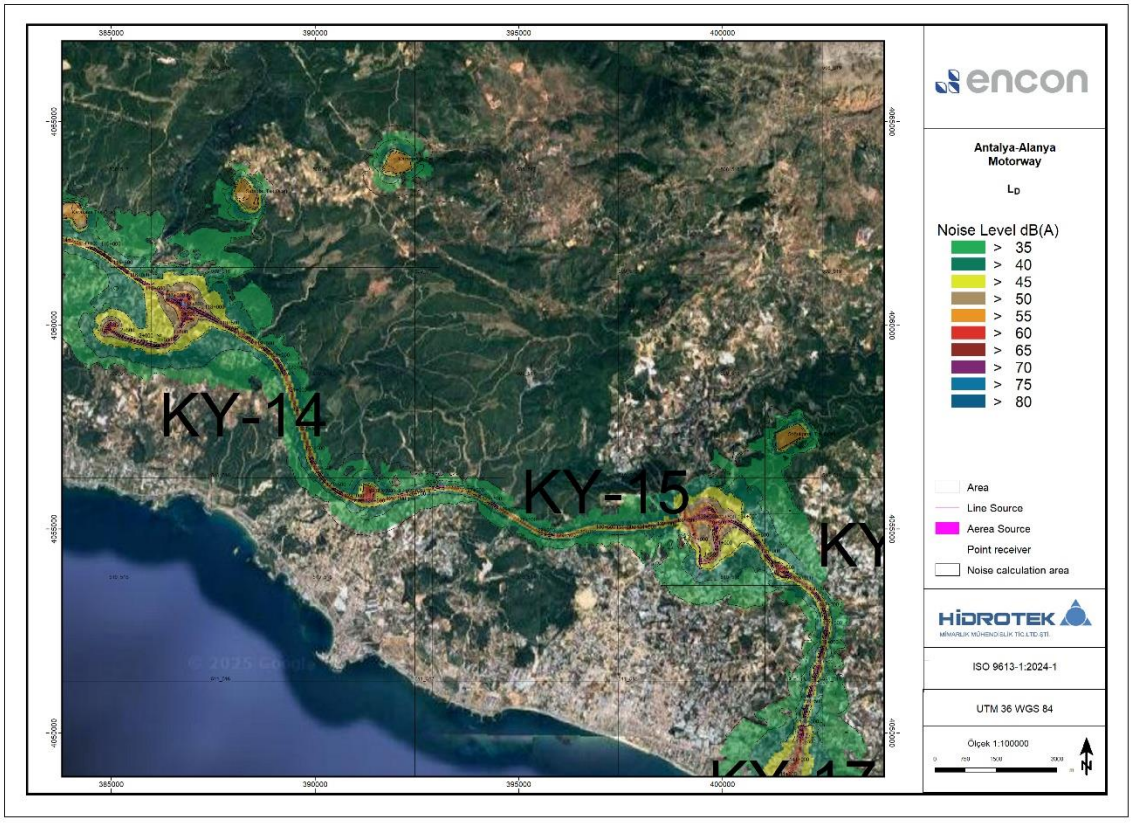

Figure 5.43 S-5 (114+000/141+000) L_{D} Noise Map for Construction Sites, Quarries and Motorway Route

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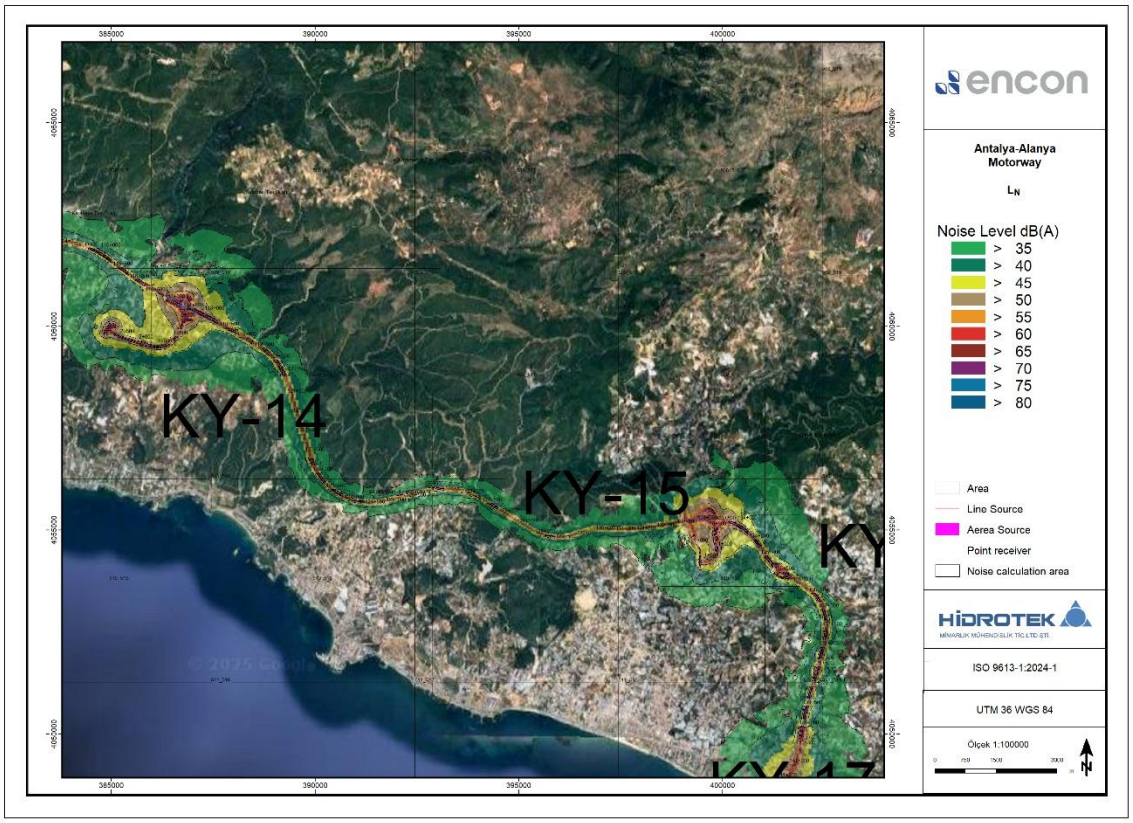

Figure 5.44 S-5 (114+000/141+000) L_N Noise Map for Construction Sites, Quarries and Motorway Route

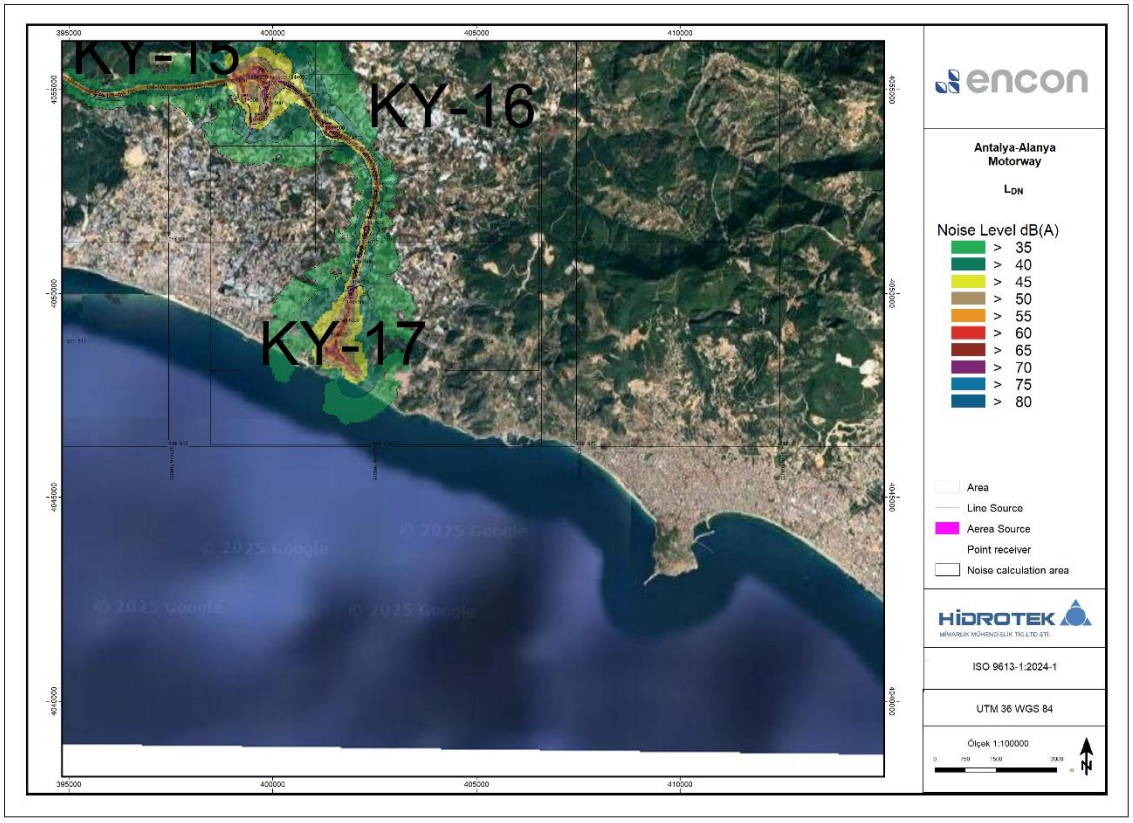

Figure 5.45 S-6 (128+500/141+500) L_{DN} Noise Map for Construction Sites, Quarries and Motorway Route

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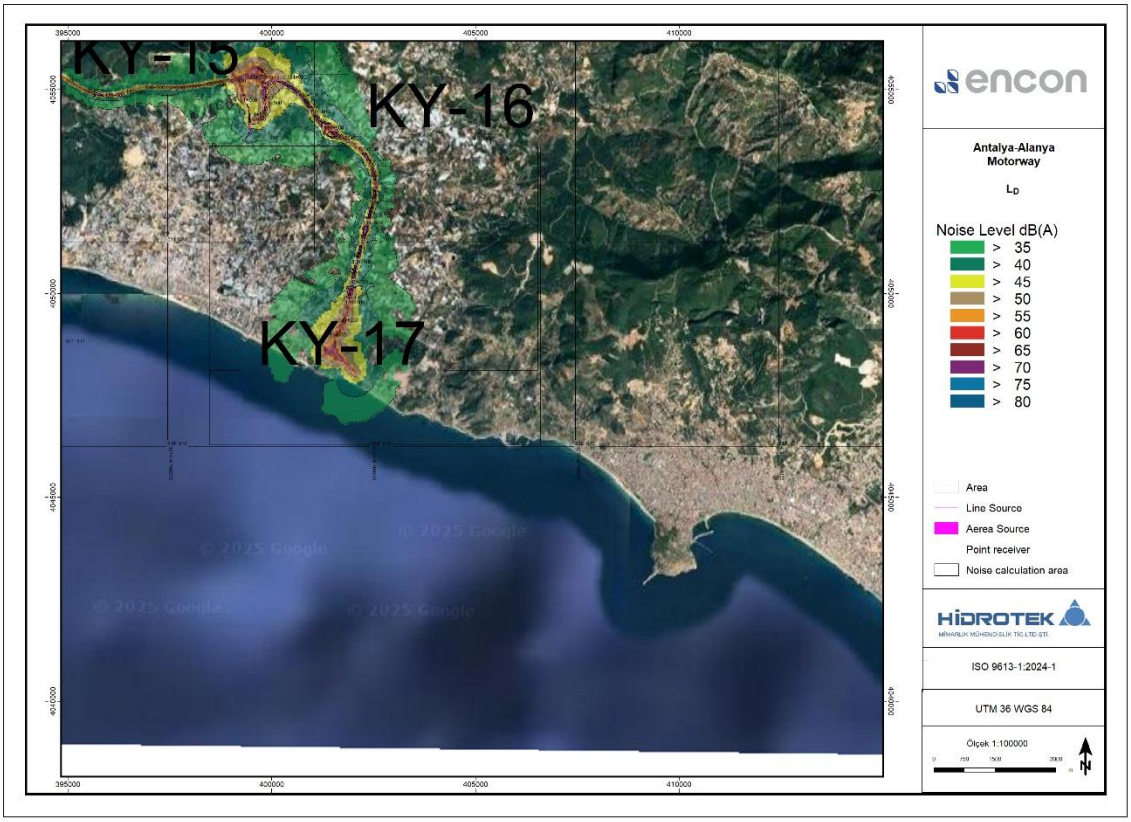

Figure 5.46 S-6 (128+500/141+500) L_D Noise Map for Construction Sites, Quarries and Motorway Route

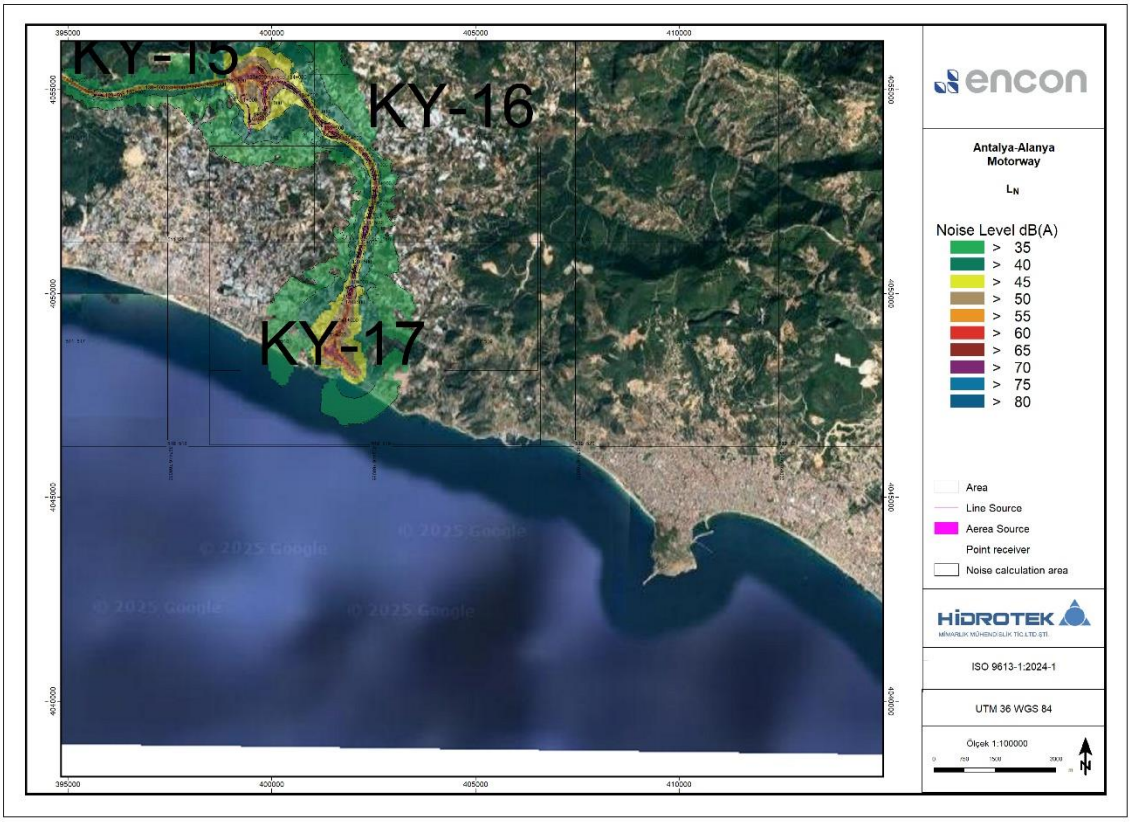

Figure 5.47 S-6 (128+500/141+500) L_N Noise Map for Construction Sites, Quarries and Motorway Route

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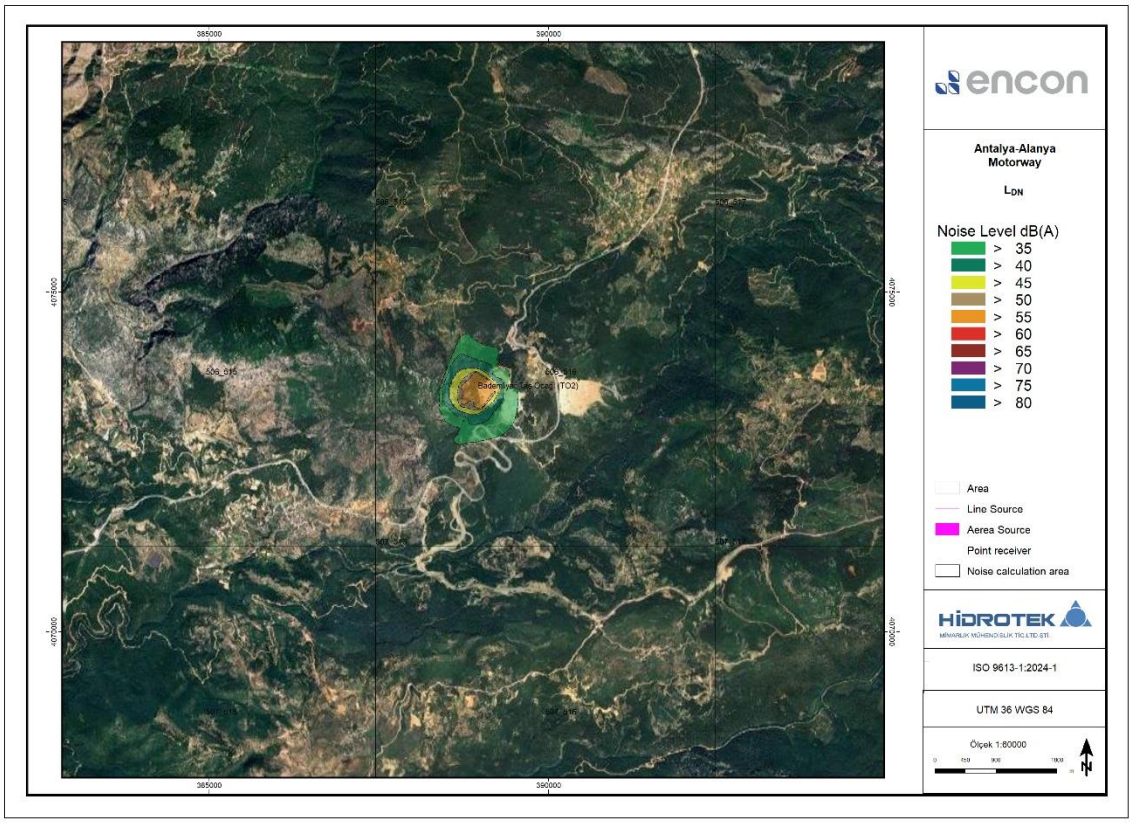

Figure 5.48 S-7 (Bademliyar) L_{DN} Noise Map for Construction Sites, Quarries and Motorway Route

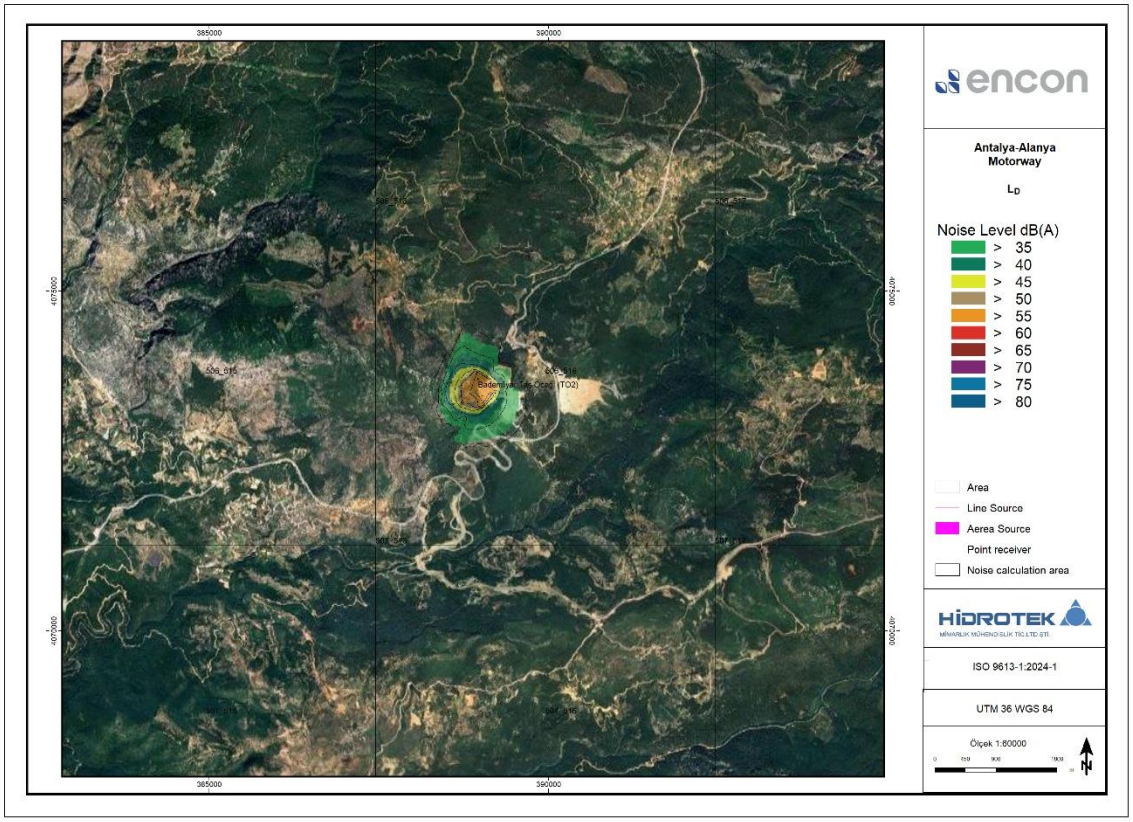

Figure 5.49 S-7 (Bademliyar) L_{D} Noise Map for Construction Sites, Quarries and Motorway Route

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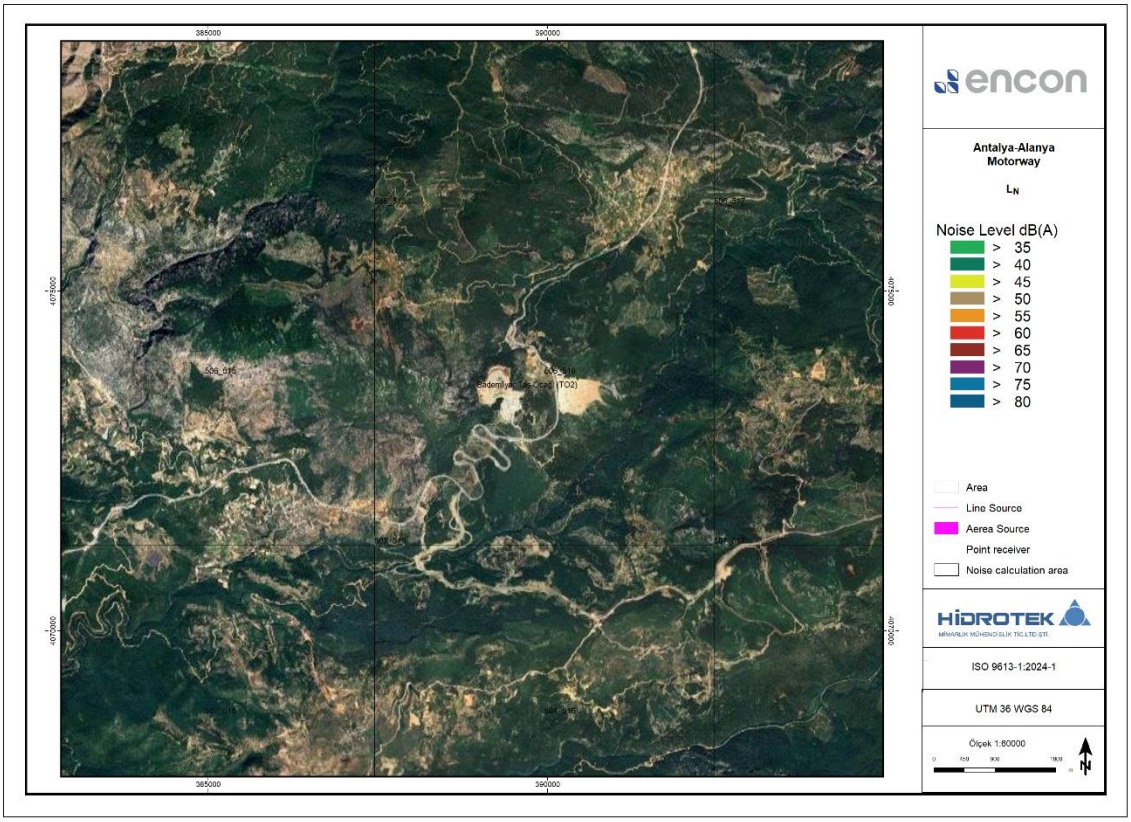

Figure 5.50 S-7 (Bademliyar) L_N Noise Map for Construction Sites, Quarries and Motorway Route

5.2 Modeled Case Assessment for Motorway:

Residential areas were taken into consideration in noise modeling. In the modeling phase, the working area was divided into sections by squaring. During the modeling phase, the working area was divided into sections by making a grid. Maps showing the grid sections are given in Figure 5.51.

The impact level was determined by comparing the modeling results with the limit values determined in the RENC. Noise maps showing the analysis generated by modeling for the motorway are shown in Figure 5.52- Figure 5.94.

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Figure 5.51 AAM Noise Map Plot Distribution

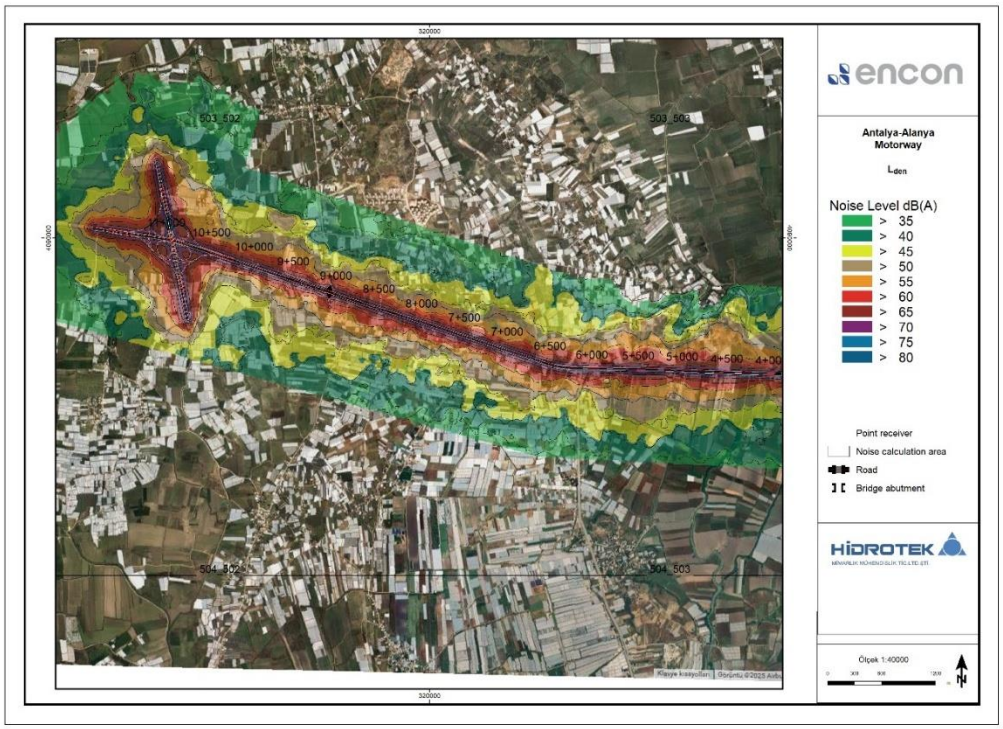

Figure 5.52 KY-1 (1+000/4+000) AAM Lden

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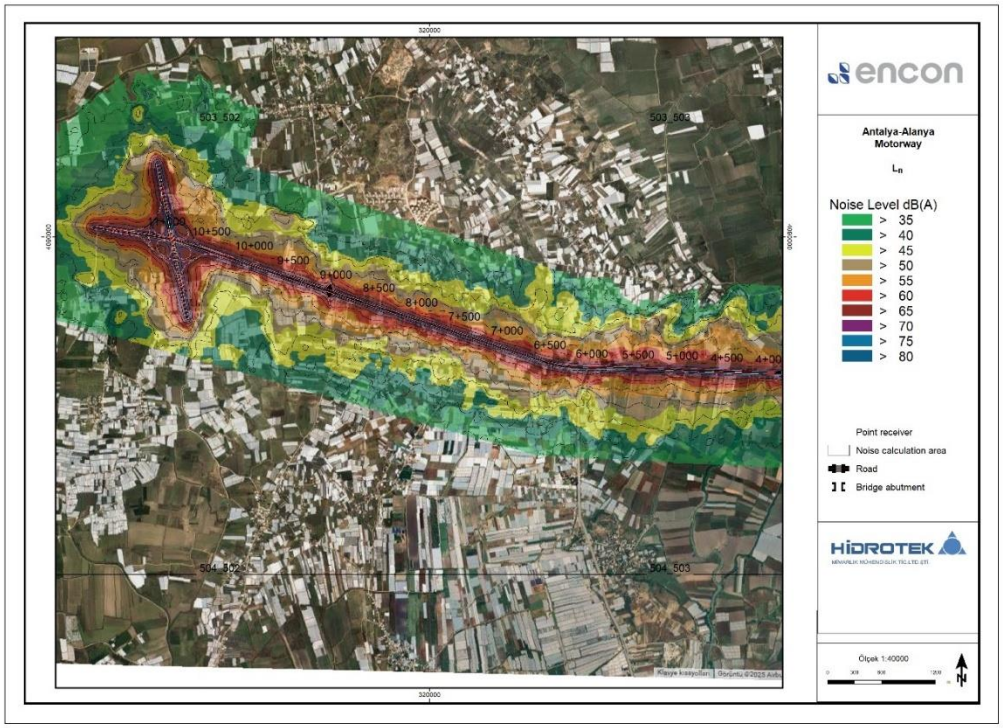

Figure 5.53 KY-1 (1+000/4+000) Ln

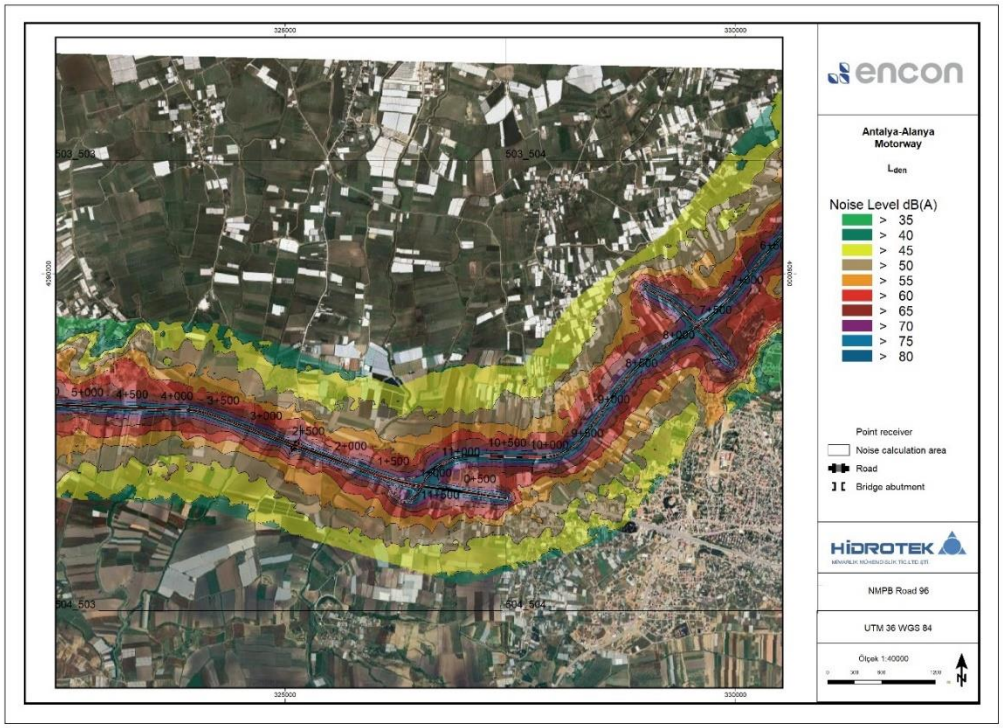

Figure 5.54 KY-2 (4+500/7+400) AAM Noise Map Lden

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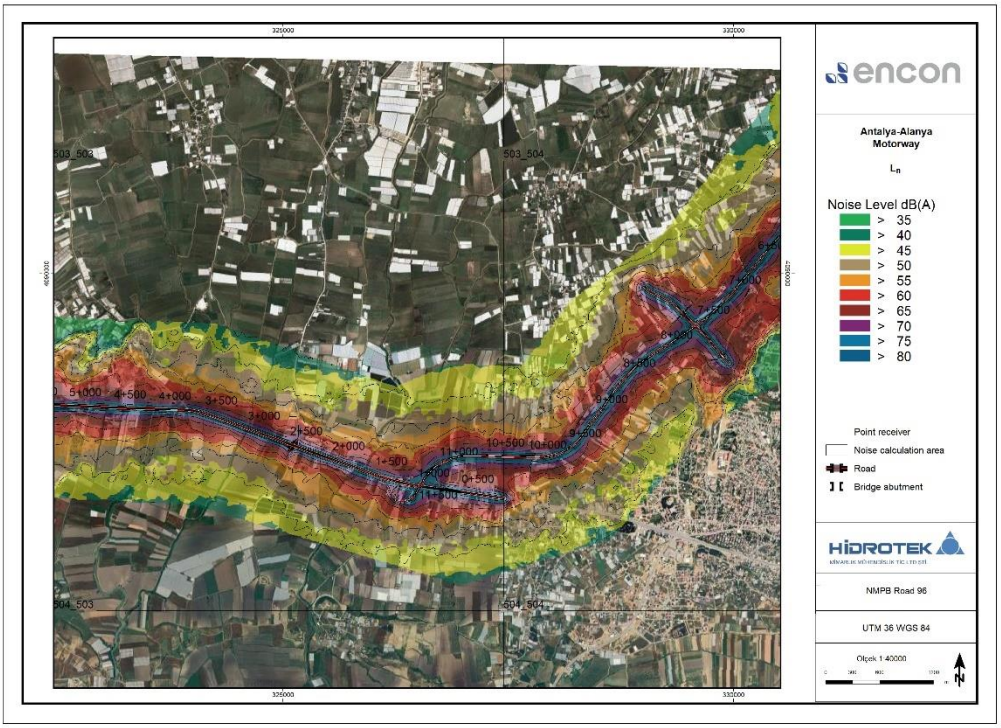

Figure 5.55 KY-2 (4+500/7+400) AAM Noise Map Ln

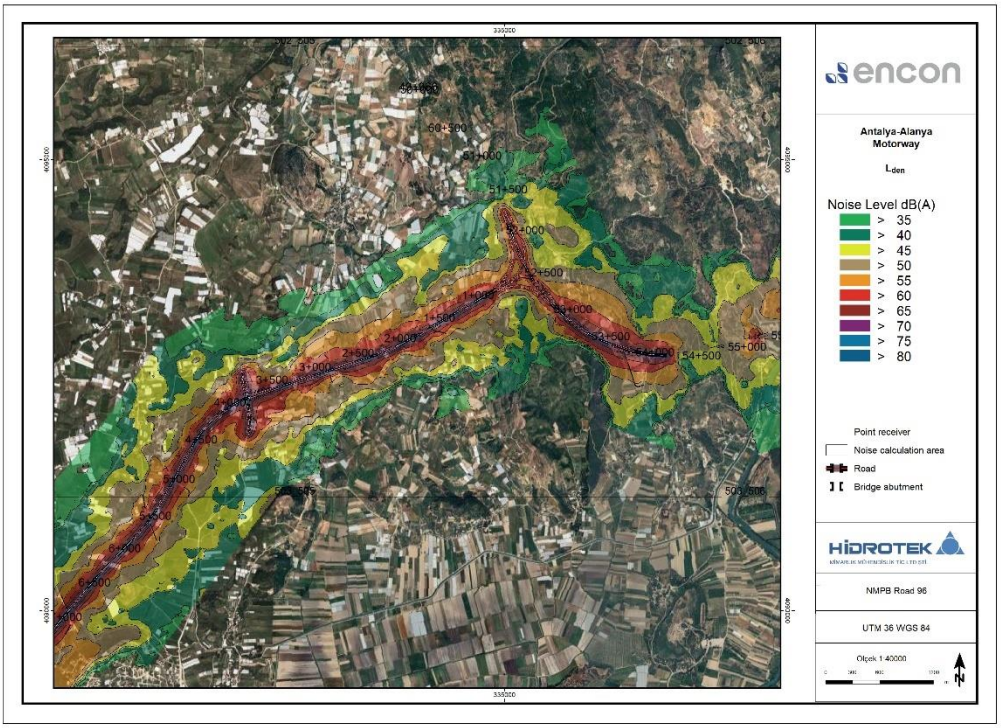

Figure 5.56 KY-3 (7+000/55+500) AAM Noise Map Lden

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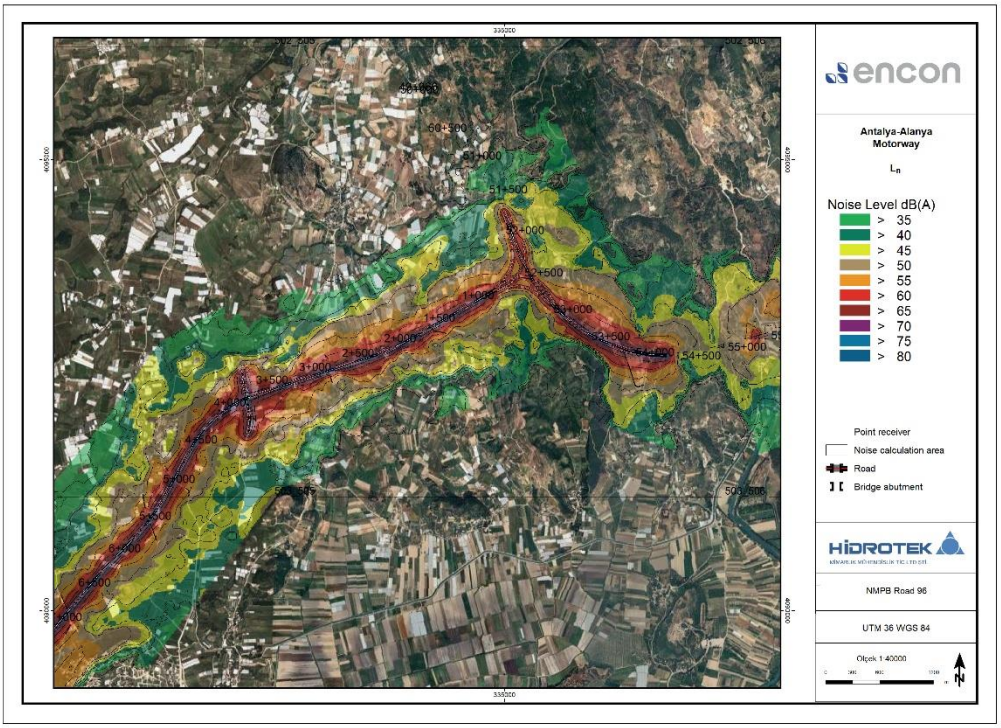

Figure 5.57 KY-3 (7+000/55+500) AAM Noise Map Ln

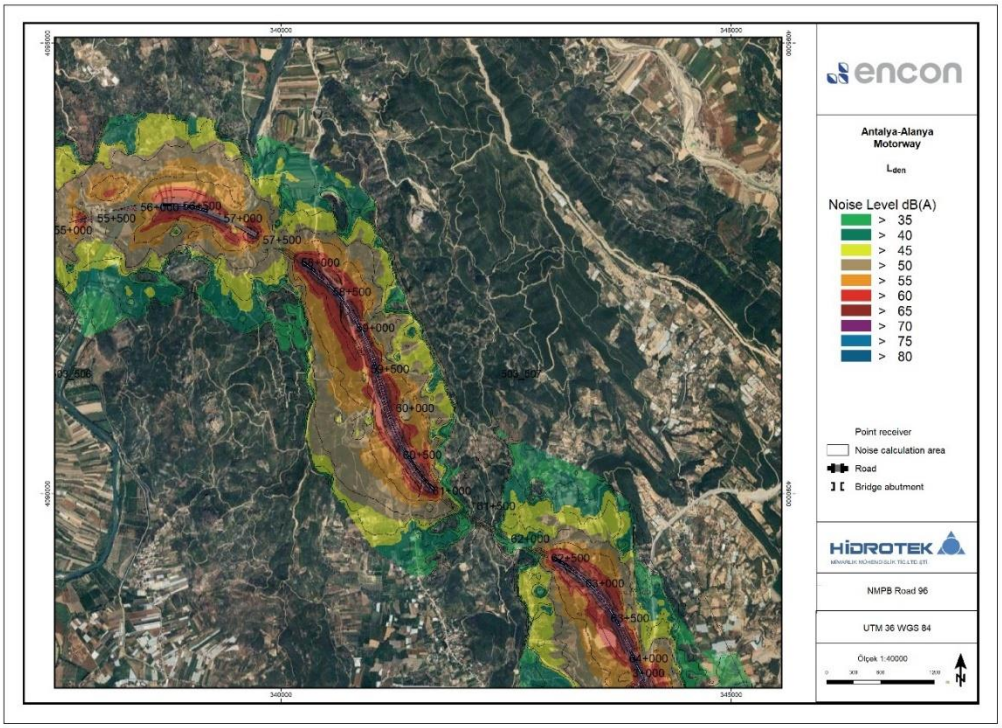

Figure 5.58 KY-3 (7+000/55+500)) AAM Noise Map Lden

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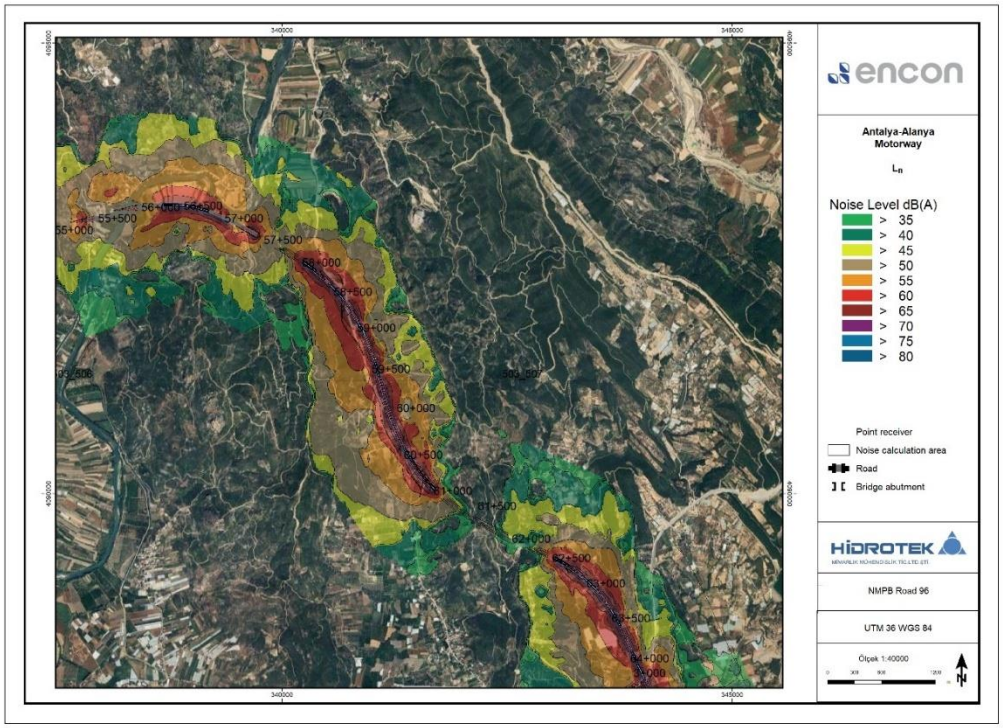

Figure 5.59 KY-4 (55+000/64+000) AAM Noise Map Ln

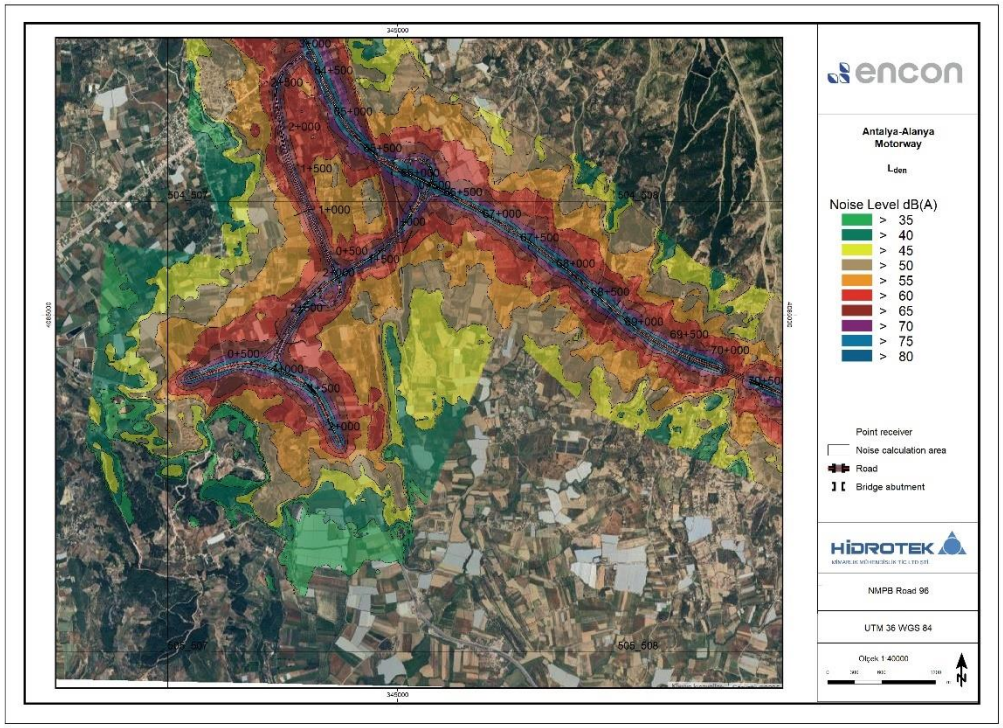

Figure 5.60 KY-5 (64+000/70+500) AAM Noise Map Lden

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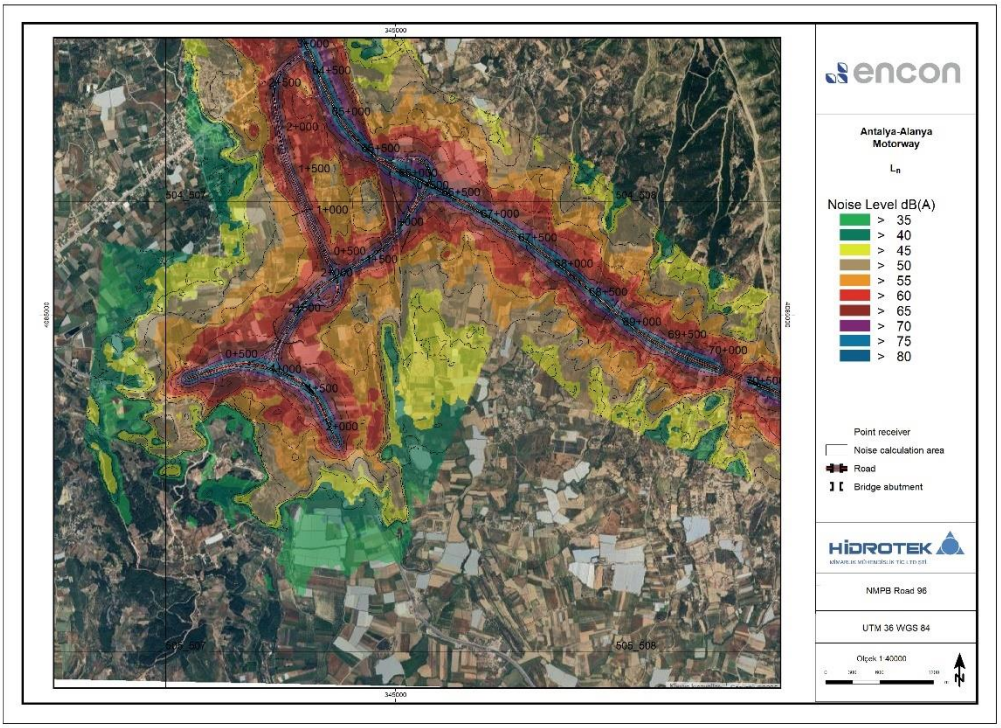

Figure 5.61 KY-5 (64+000/70+500) AAM Noise Map Ln

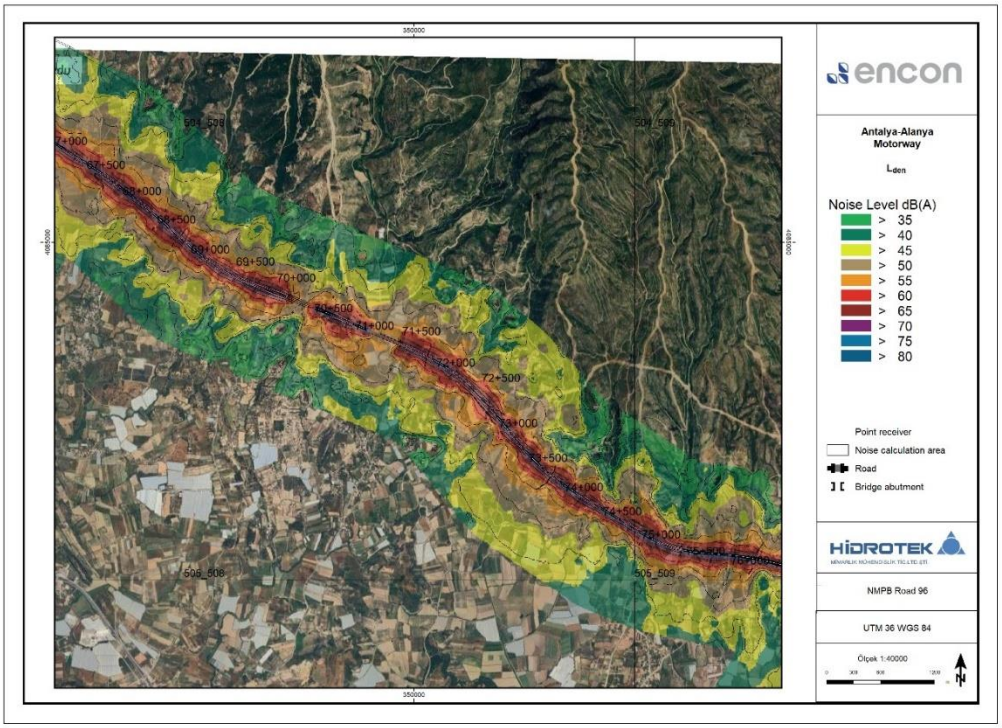

Figure 5.62 KY-7 (67+000/76+000) Noise Map Lden

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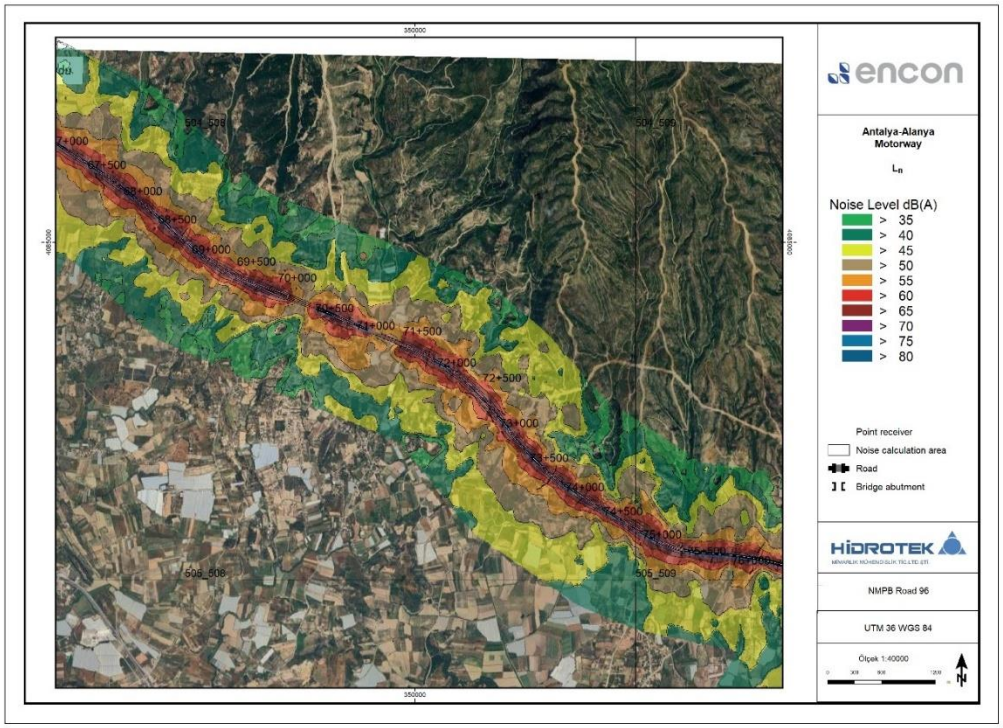

Figure 5.63 KY-7 (67+000/76+000) Noise Map Ln

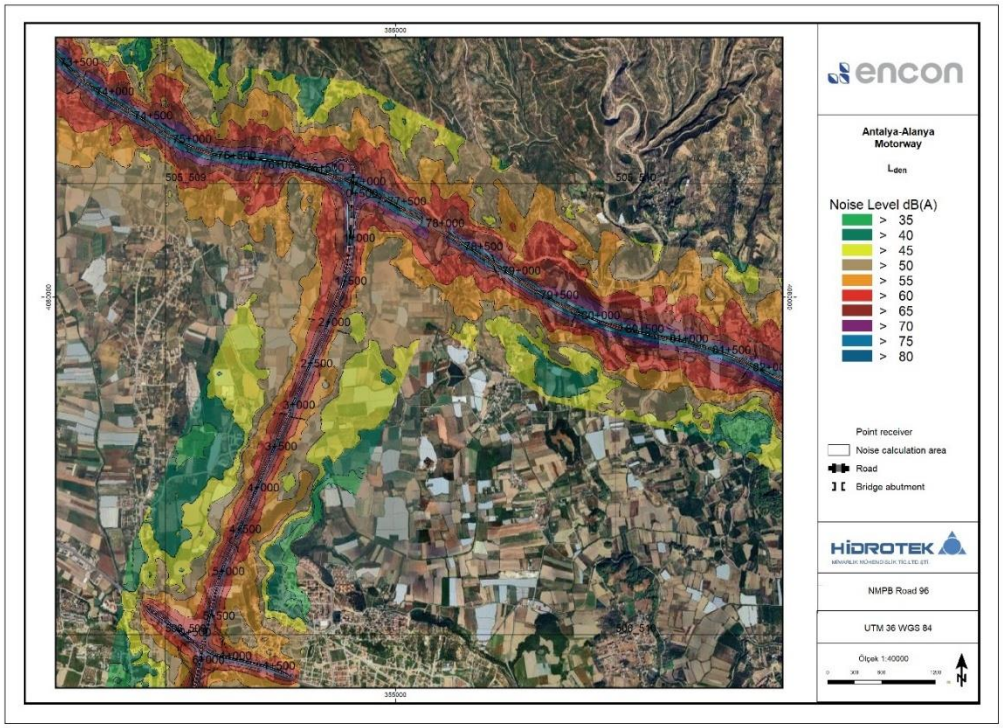

Figure 5.64 KY-8 (73+500/82+000) AAM Noise Map Lden

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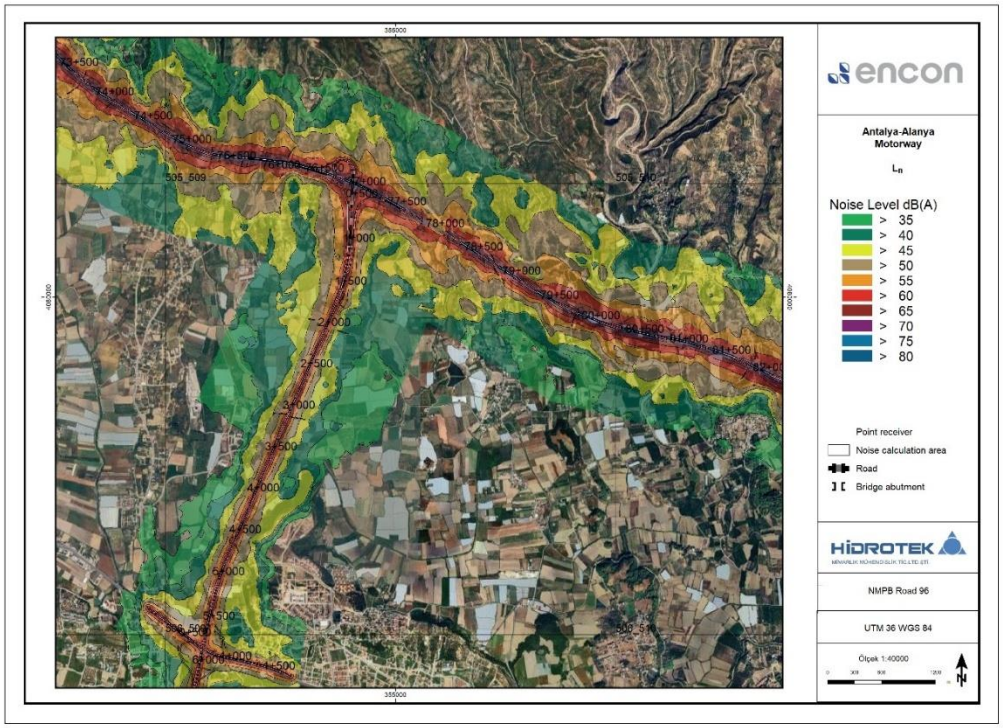

Figure 5.65 KY-8 (73+500/82+000) AAM Noise Map Ln

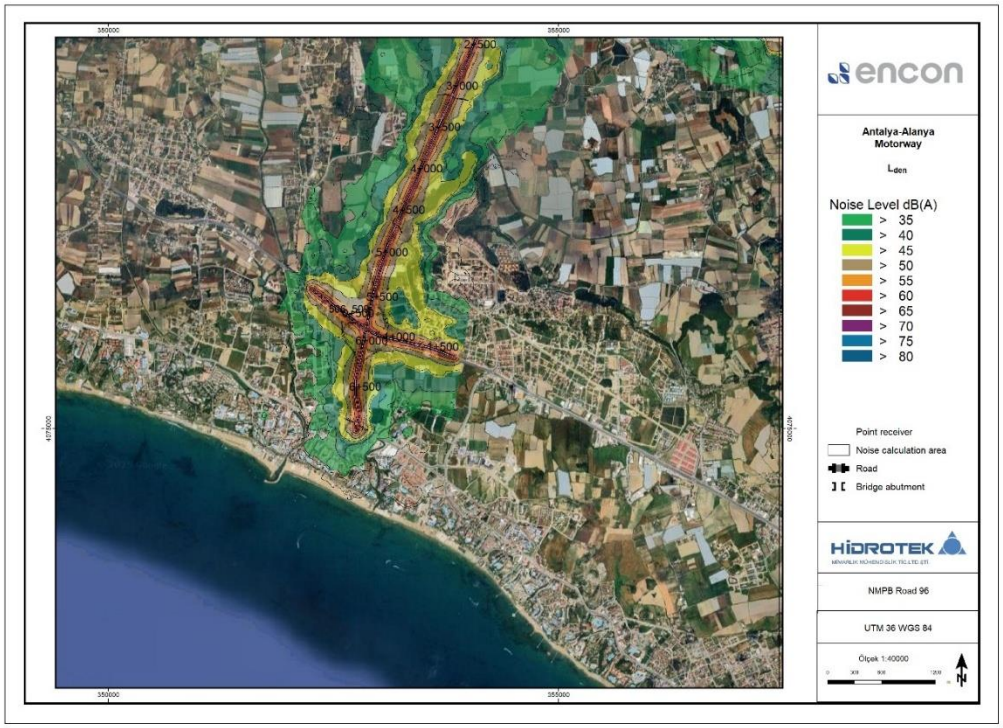

Figure 5.66 KY-9 (2+500/6+500) AAM Noise Map Lden

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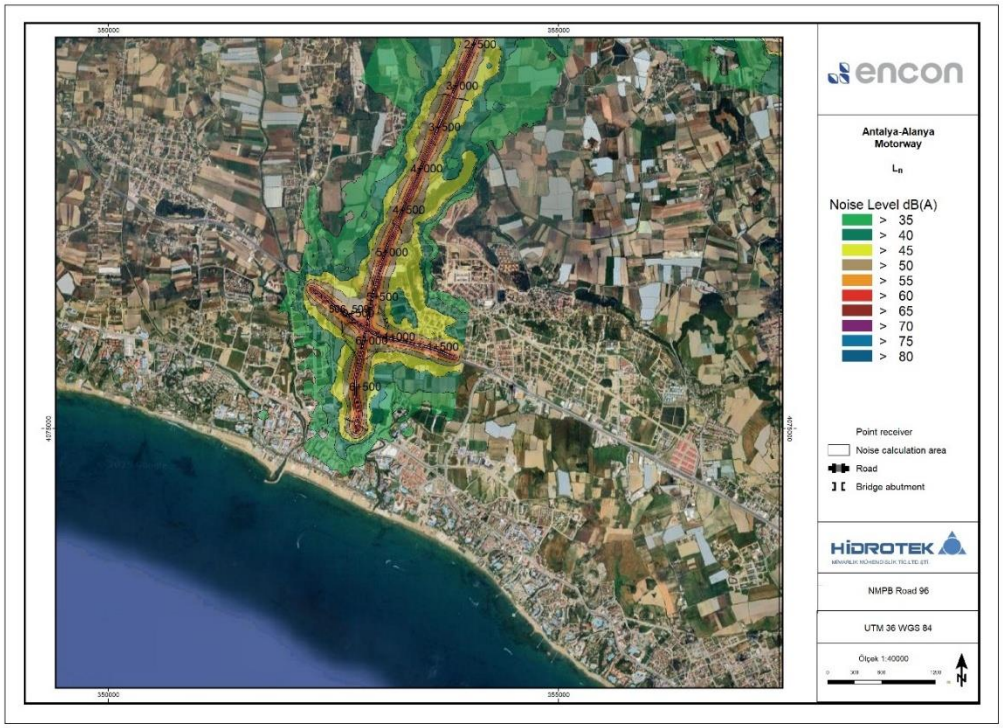

Figure 5.67 KY-9 (2+500/6+500) AAM Noise Map Ln

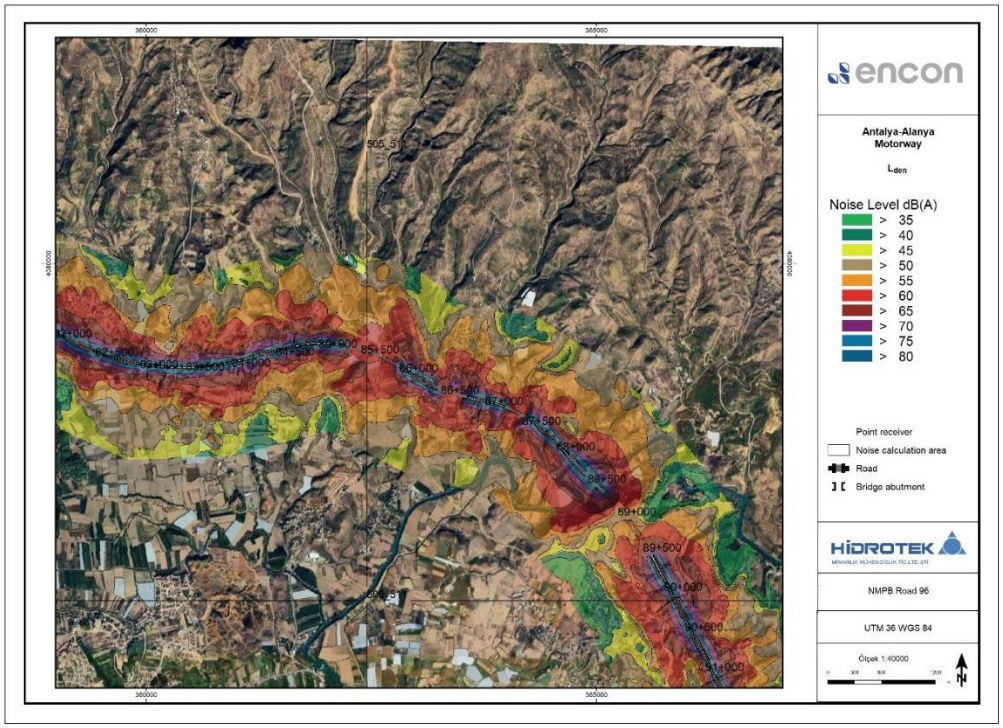

Figure 5.68 KY-10 (82+000/91+000) AAM Noise Map Lden

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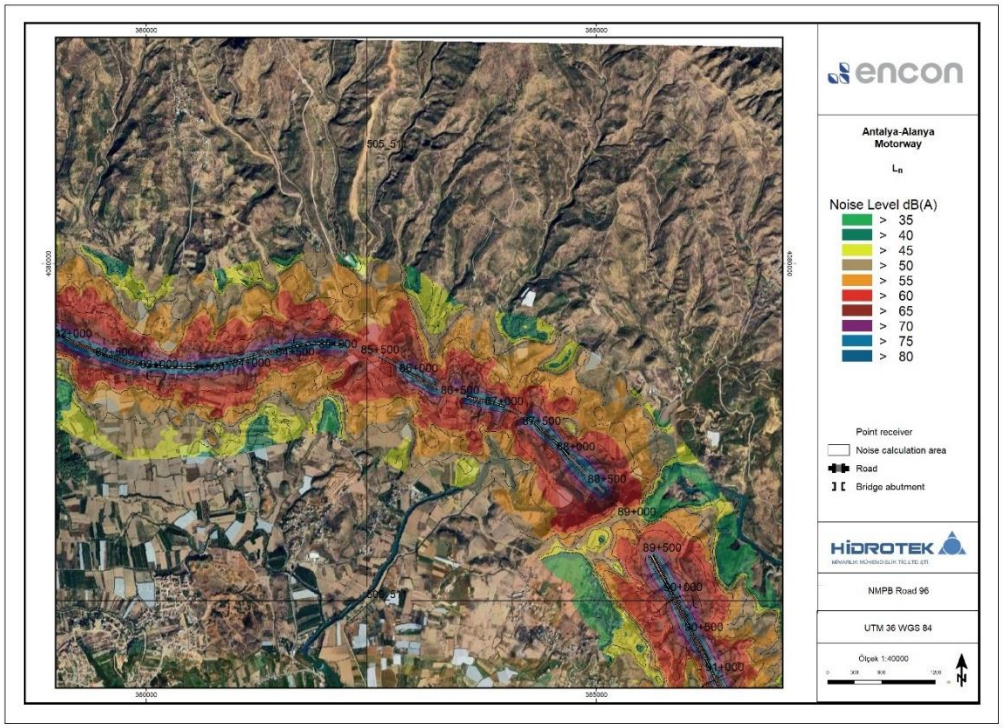

Figure 5.69 KY-10 (82+000/91+000) AAM Noise Map Ln

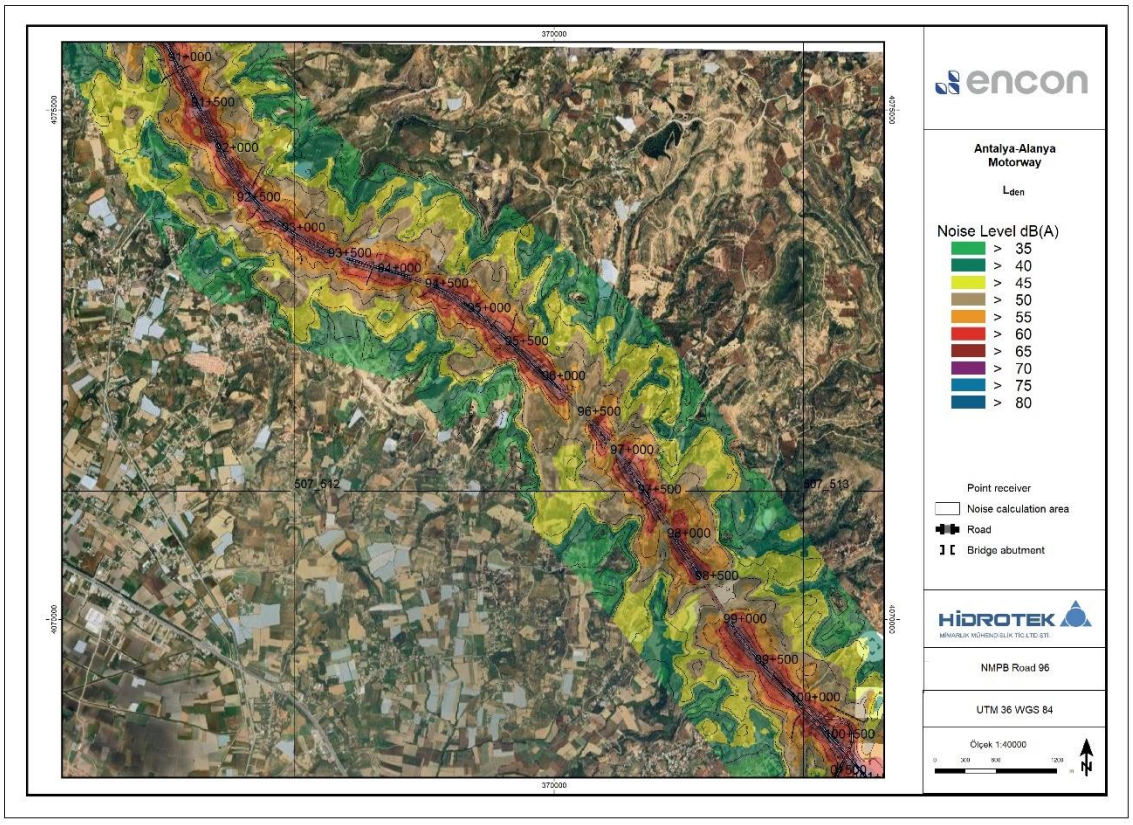

Figure 5.70 KY-11 (91+000/100+500) AAM Noise Map Lden

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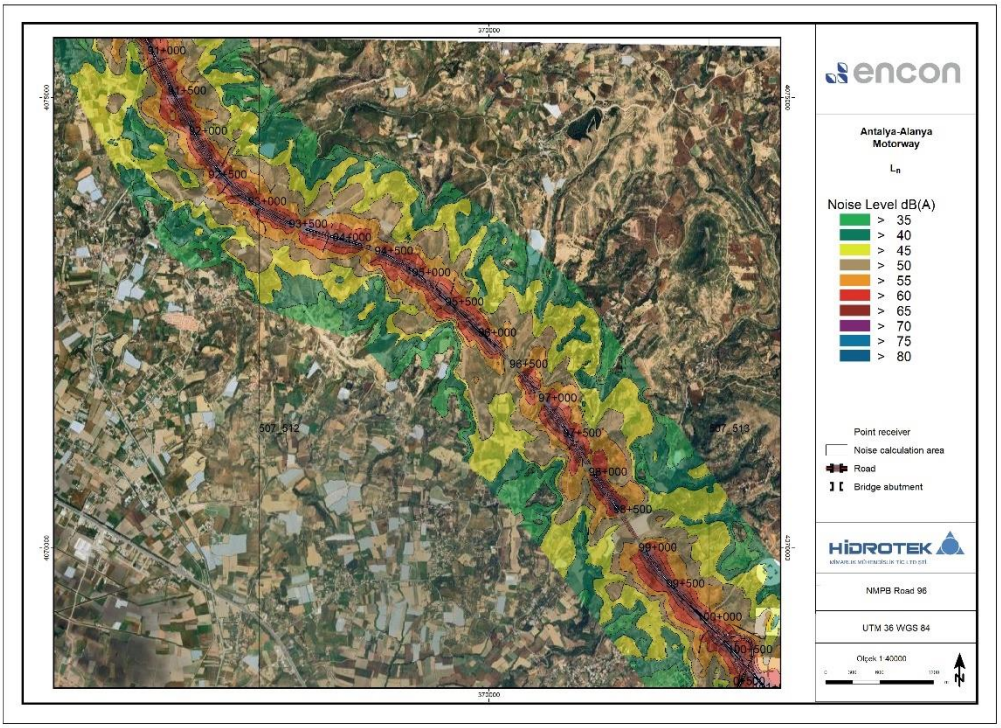

Figure 5.71 KY-11 (91+000/100+500) AAM Noise Map Ln

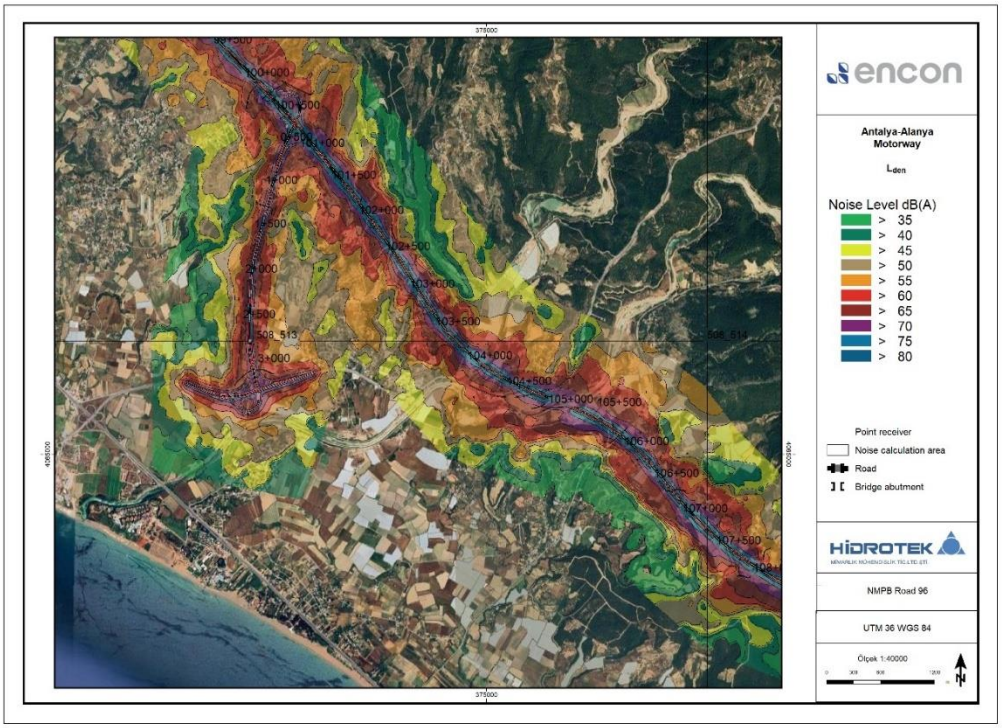

Figure 5.72 KY-12 (91+000/100+500) AAM Noise Map Lden

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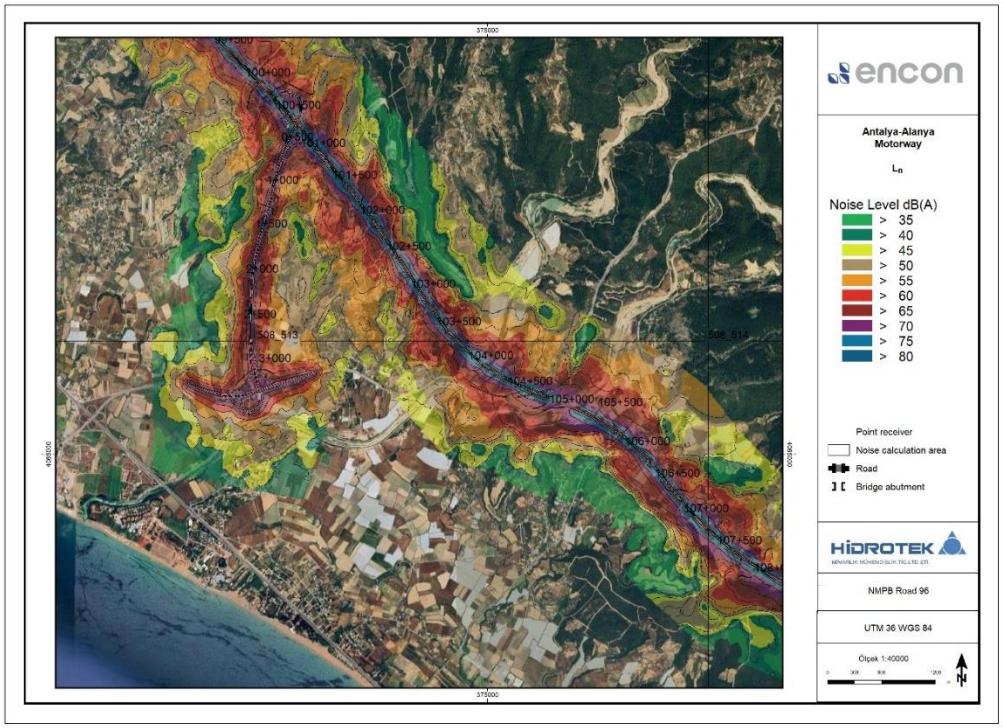

Figure 5.73 KY-12 (91+000/100+500) AAM Noise Map Ld

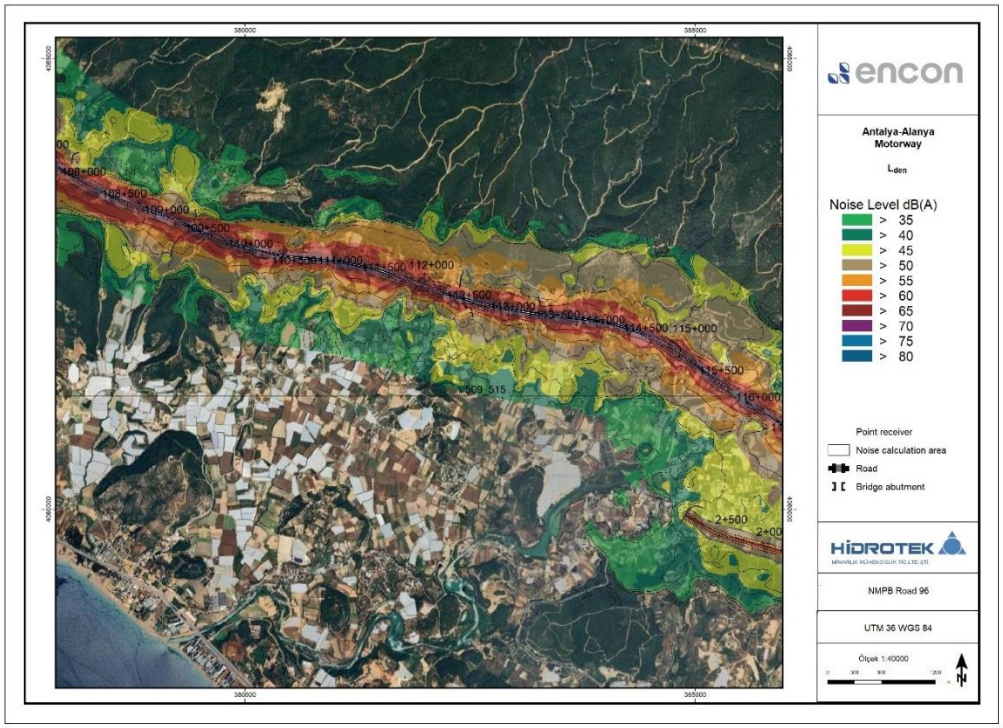

Figure 5.74 KY-13 (108+000/116+500) AAM Noise Map Lden

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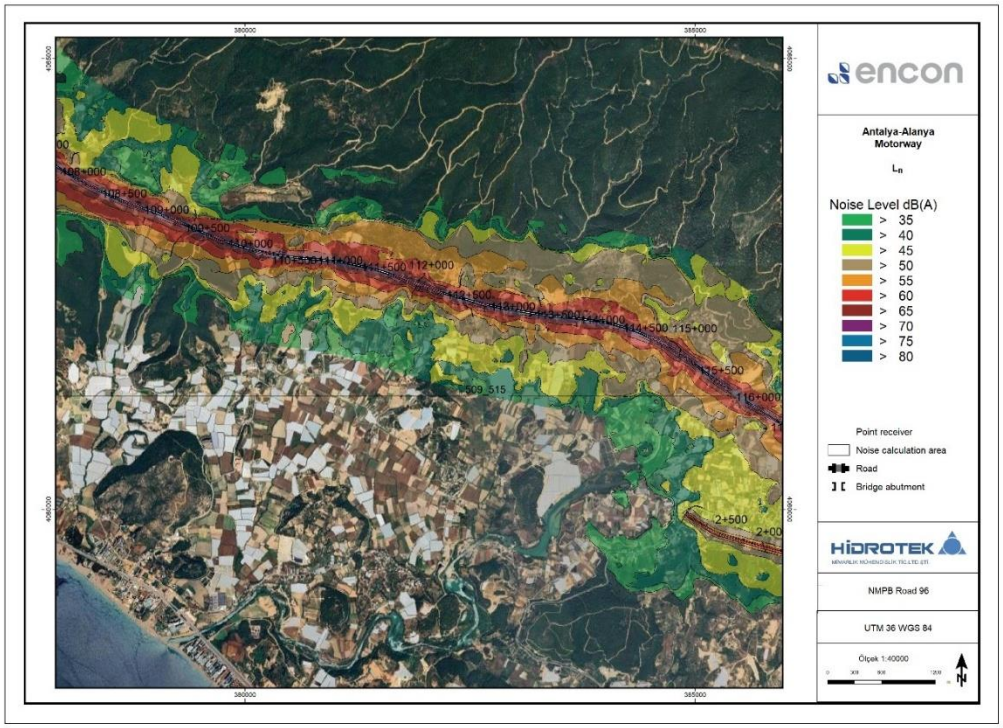

Figure 5.75 KY-13 (108+000/116+500) AAM Noise Map Ln

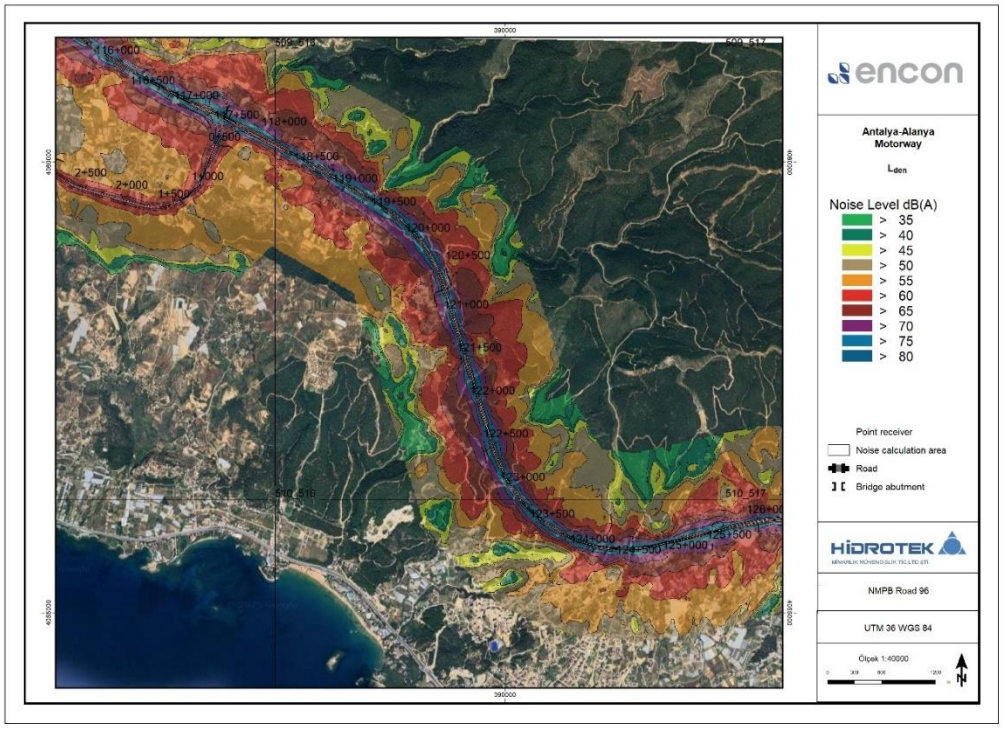

Figure 5.76 KY-14 (116+500/126+000) AAM Noise Map Lden

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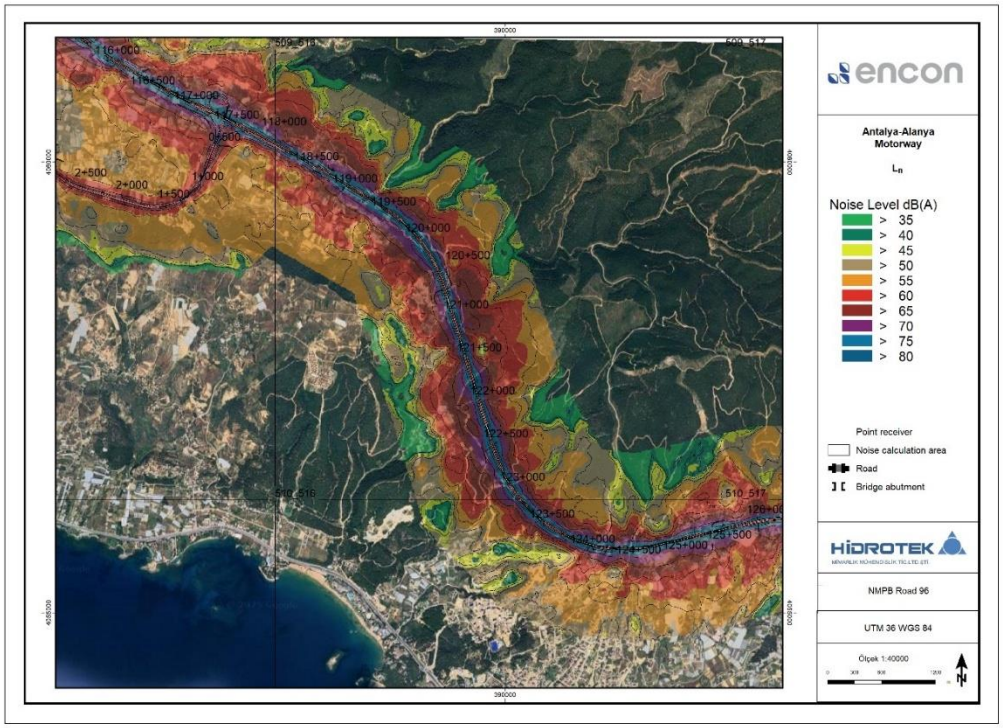

Figure 5.77 KY-14 (116+500/126+000) AAM Noise Map Ln

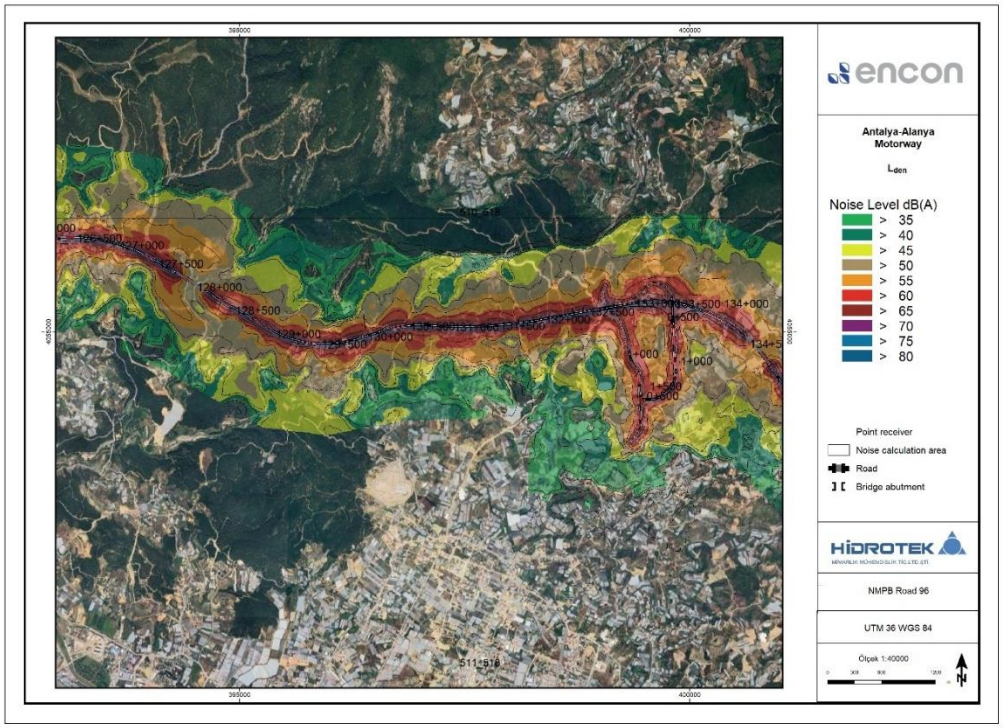

Figure 5.78 KY-15 (126+000/135+500) AAM Noise Map Lden

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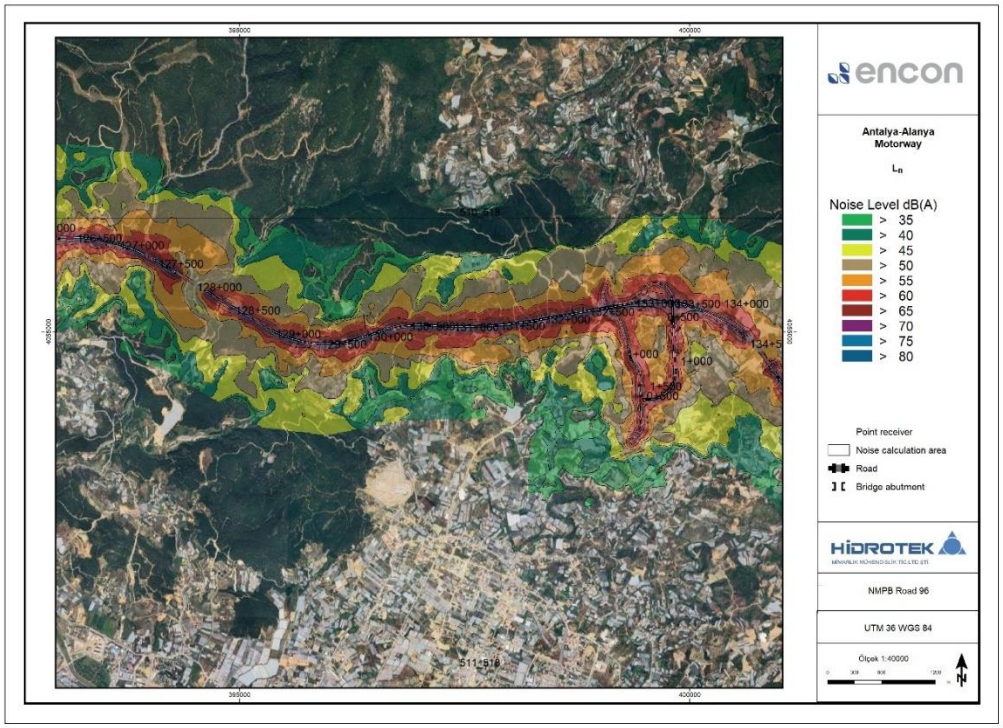

Figure 5.79 KY-15 (126+000/135+500) AAM Noise Map Ln

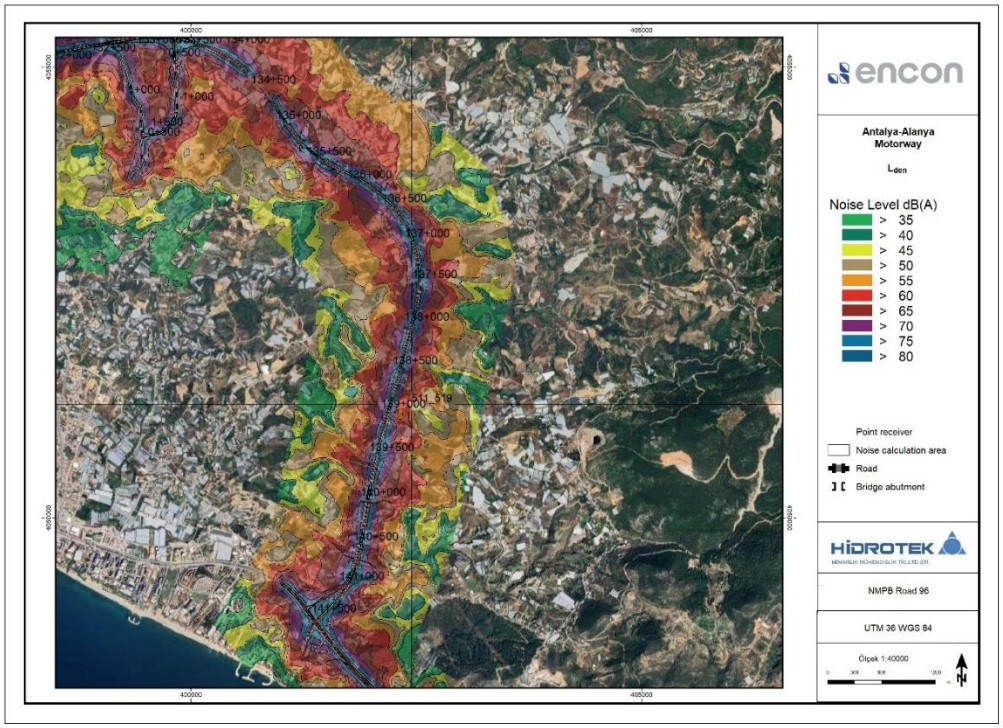

Figure 5.80 KY-16 (132+000/141+500) AAM Noise Map Lden

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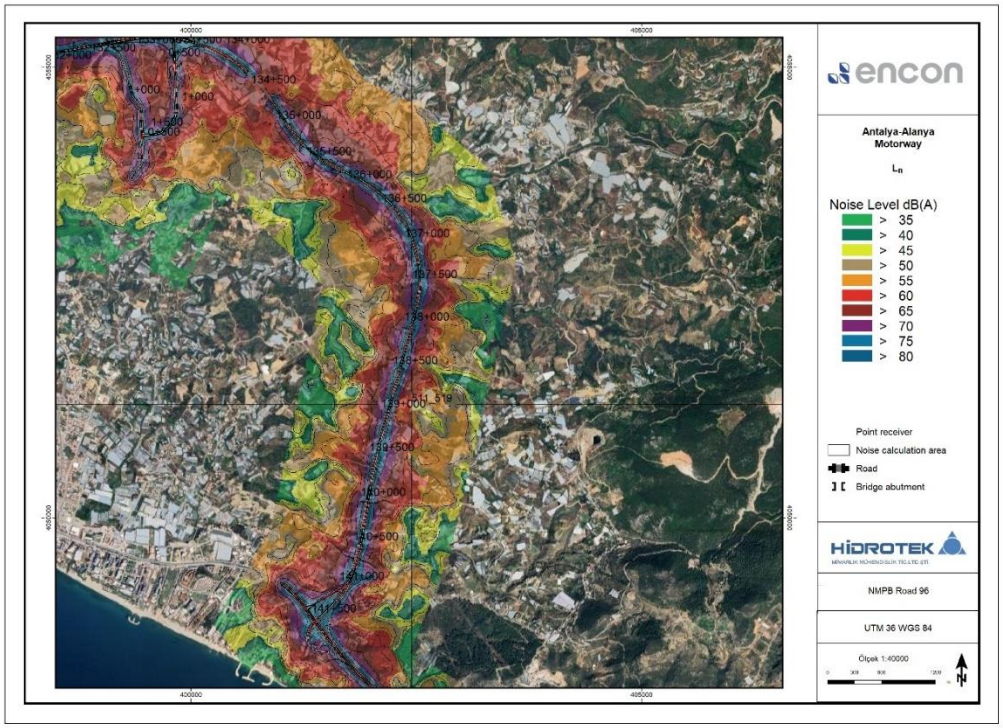

Figure 5.81 KY-16 (132+000/141+500) AAM Noise Map Lden

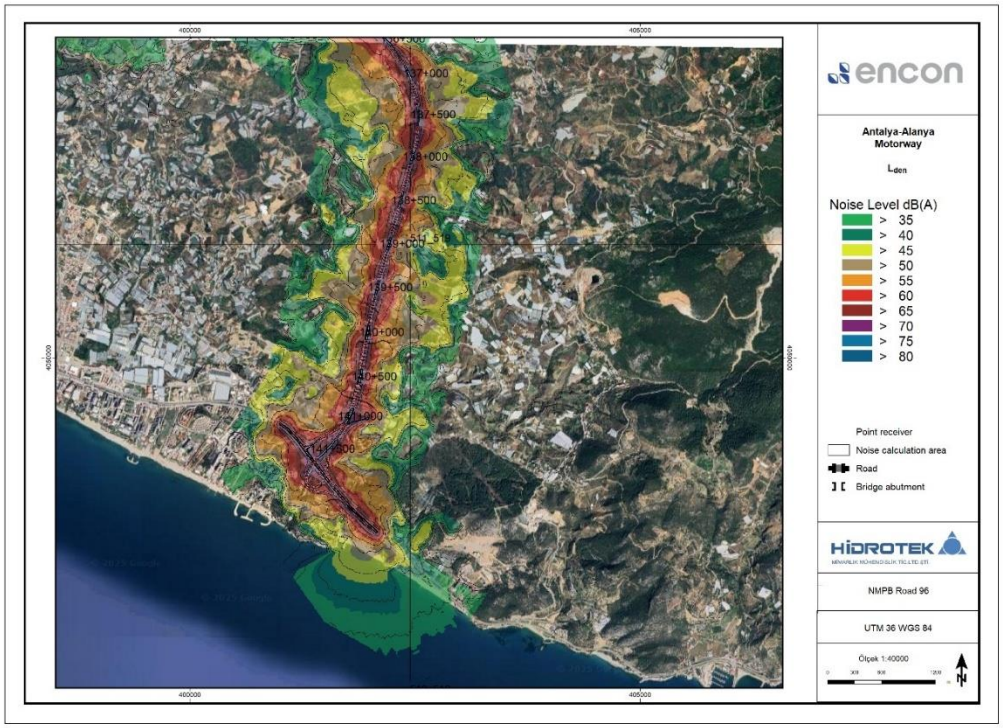

Figure 5.82 Figure 5.2.33 KY-17 (136+500/141+500) AAM Noise Map Lden

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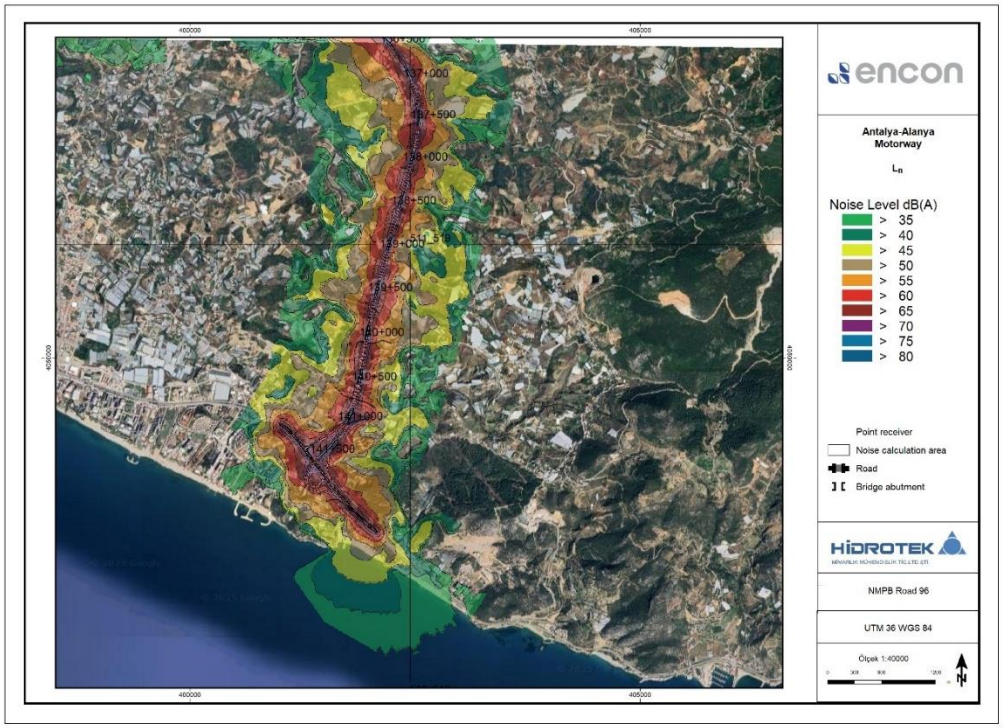

Figure 5.83 KY-17 (136+500/141+500) AAM Noise Map Ln

The impact level was determined by comparing the modeling results with the limit values set by IFC. Noise maps showing the analysis generated by modeling for the motorway are shown in Figure 5.84- **Error! Reference source not found.**.

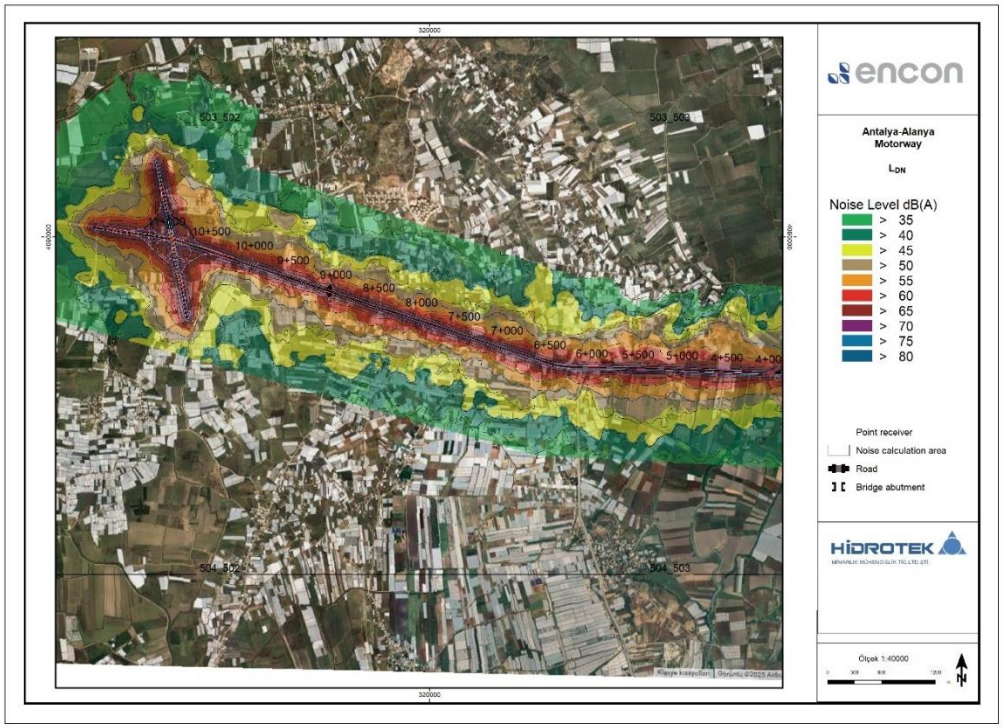

Figure 5.84 KY-1 (1+000/4+000) noise map LDN

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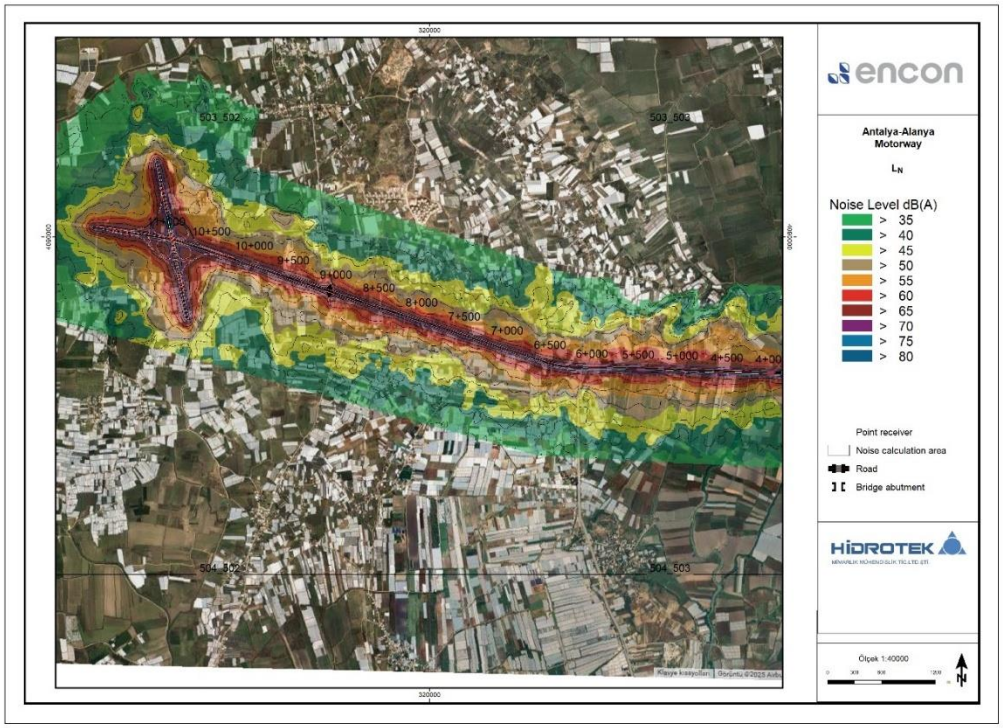

Figure 5.85 KY-1 (1+000/4+000) noise map LN

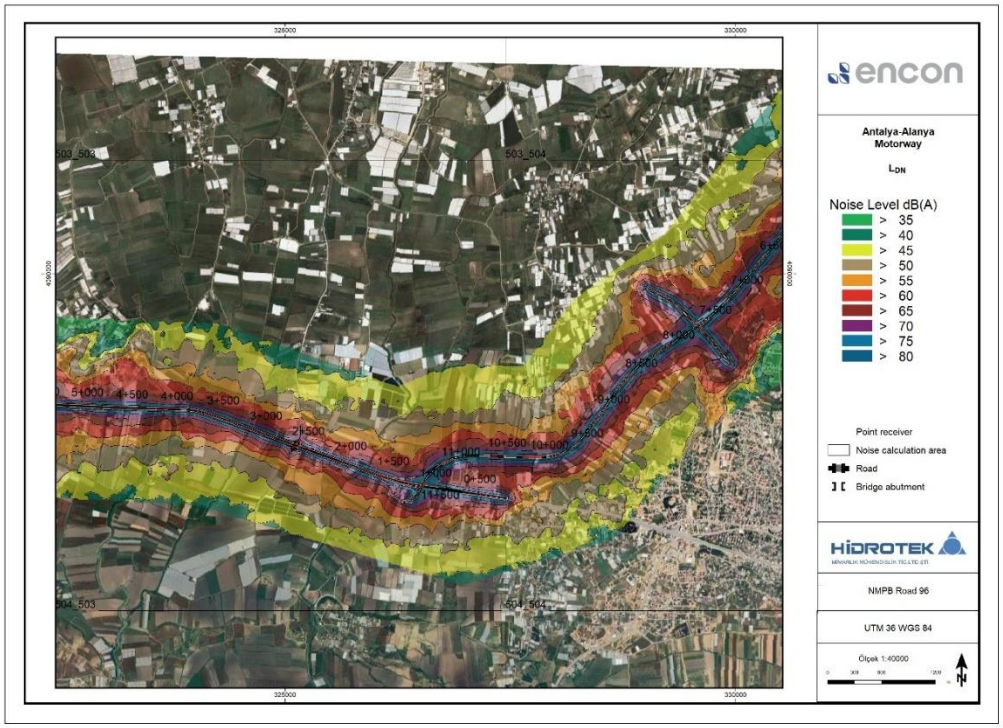

Figure 5.86 KY-2 (4+500/7+000) AAM noise map LDN

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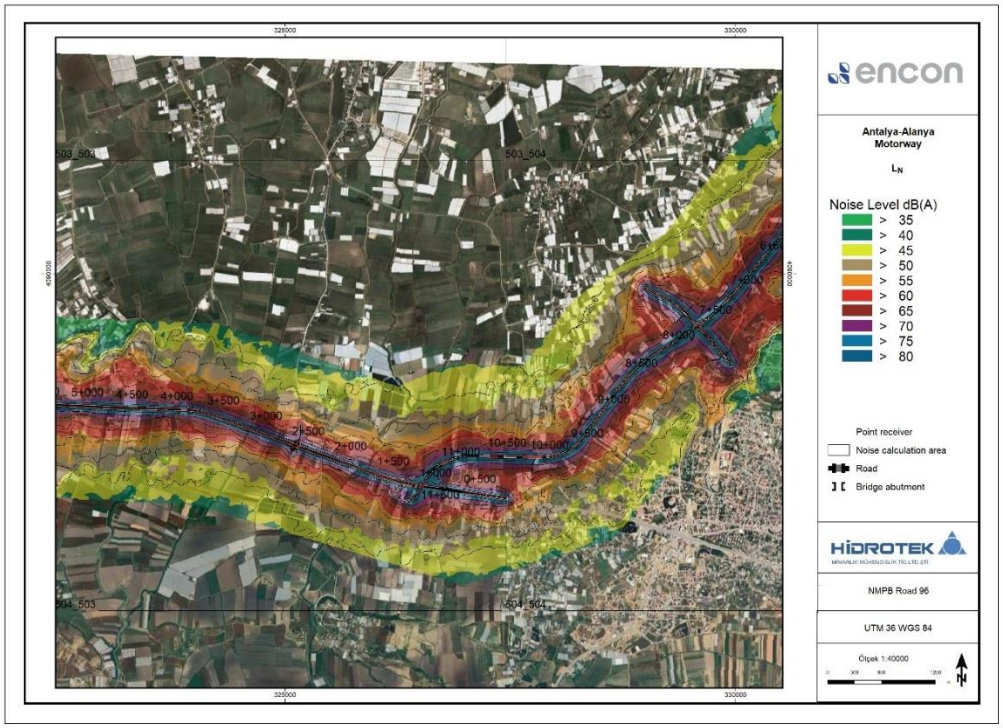

Figure 5.87 KY-2 (4+500/7+000) AAM noise map LN

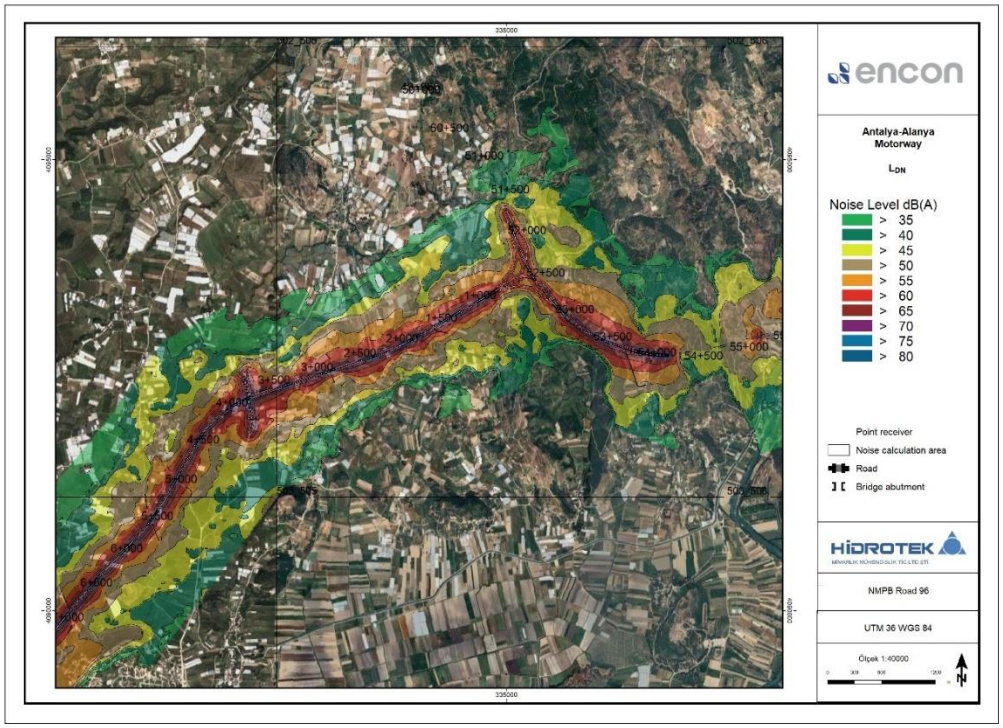

Figure 5.88 KY-3 (7+000/55+500) AAM noise map LDN

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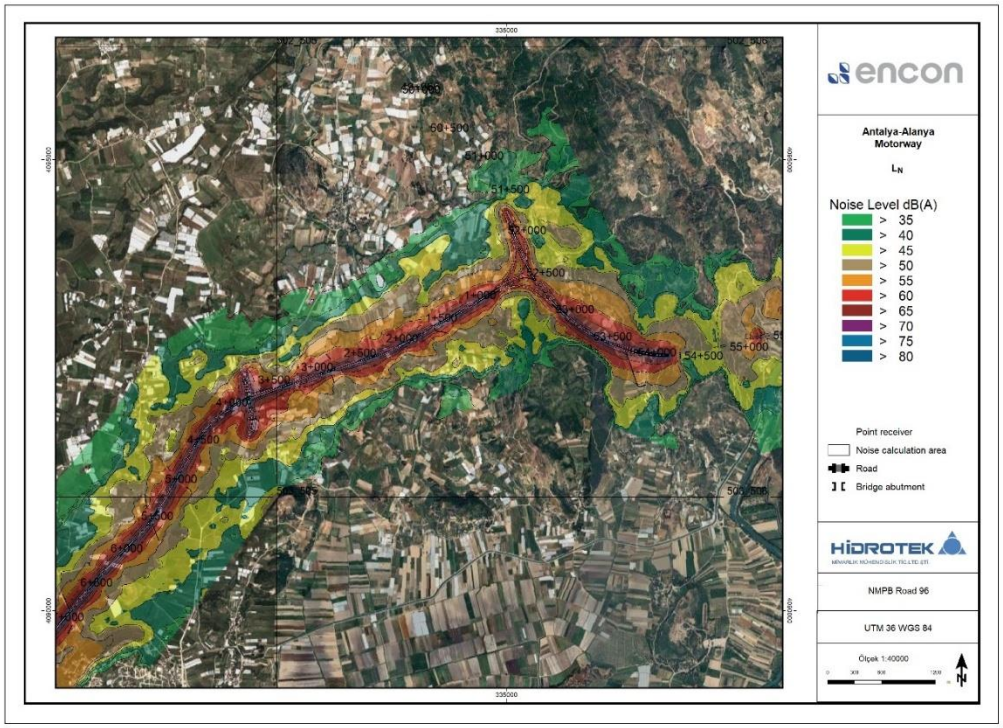

Figure 5.89 KY-3 (7+000/55+500) AAM noise map LN

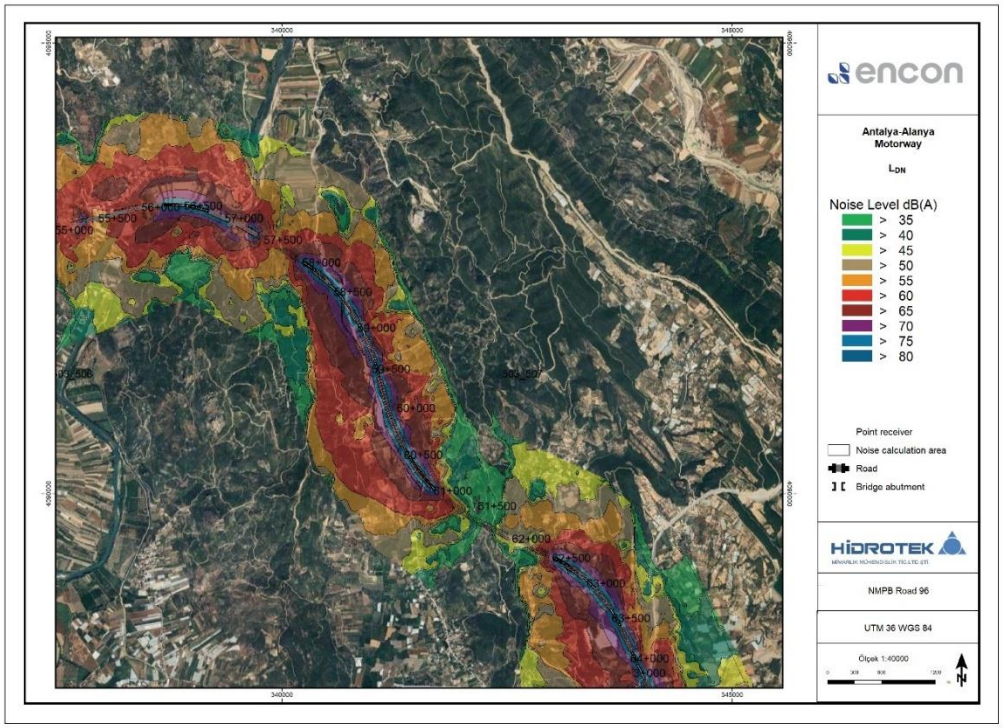

Figure 5.90 KY-4 (55+000/64+000) AAM noise map LDN

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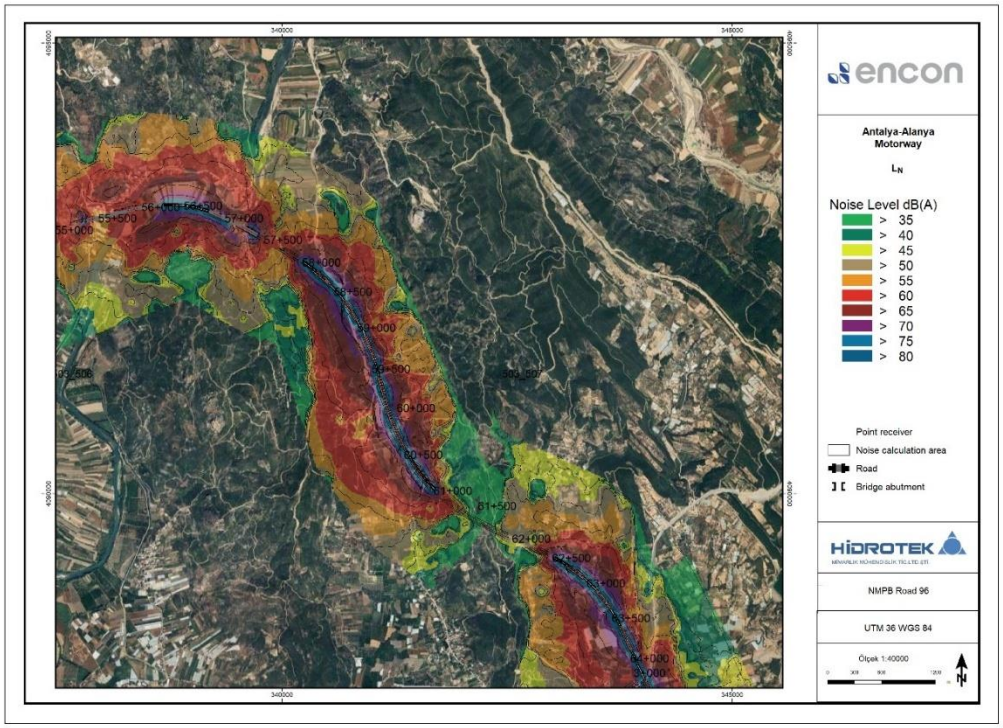

Figure 5.91 KY-4 (55+000/64+000) AAM noise map LN

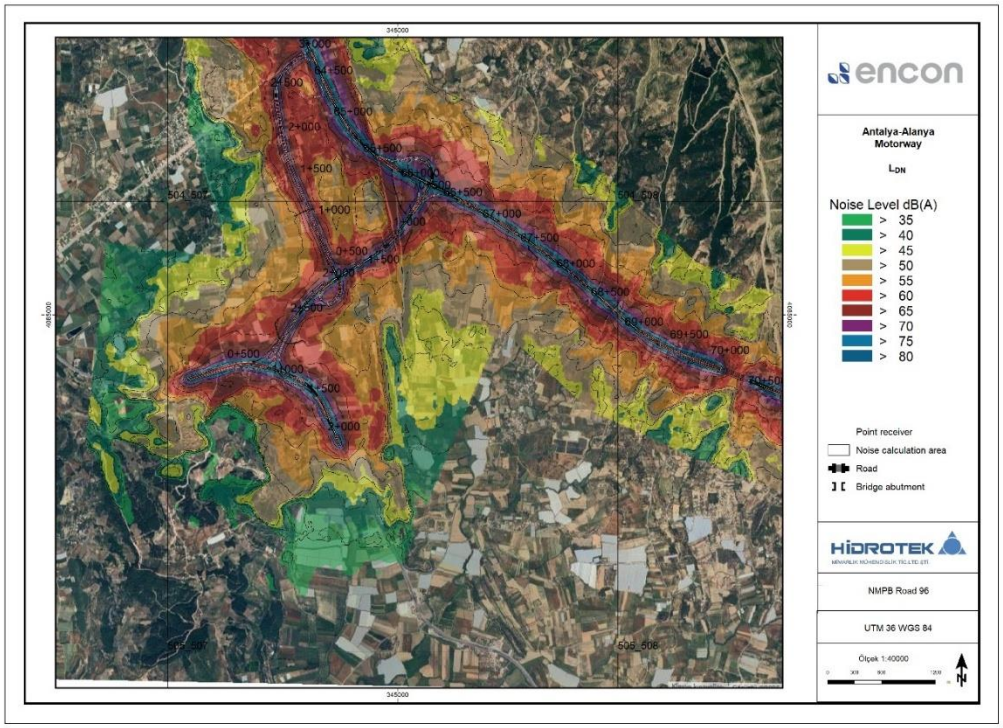

Figure 5.92 KY-5 (64+000/70+500) AAM noise map LDN

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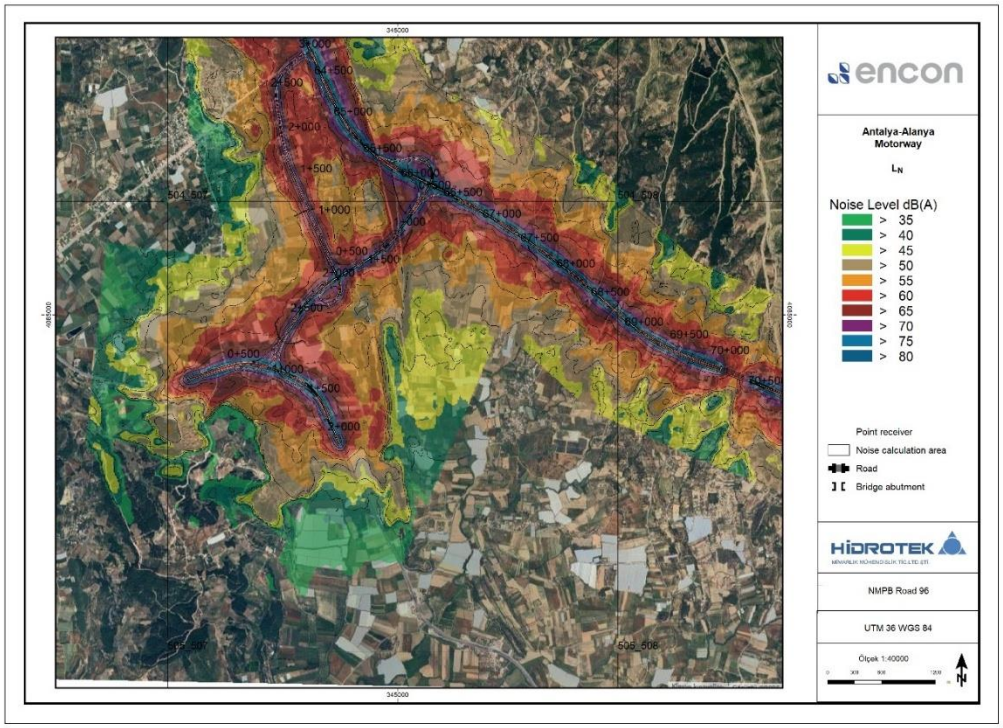

Figure 5.93 KY-5 (64+000/70+500) AAM noise map LN

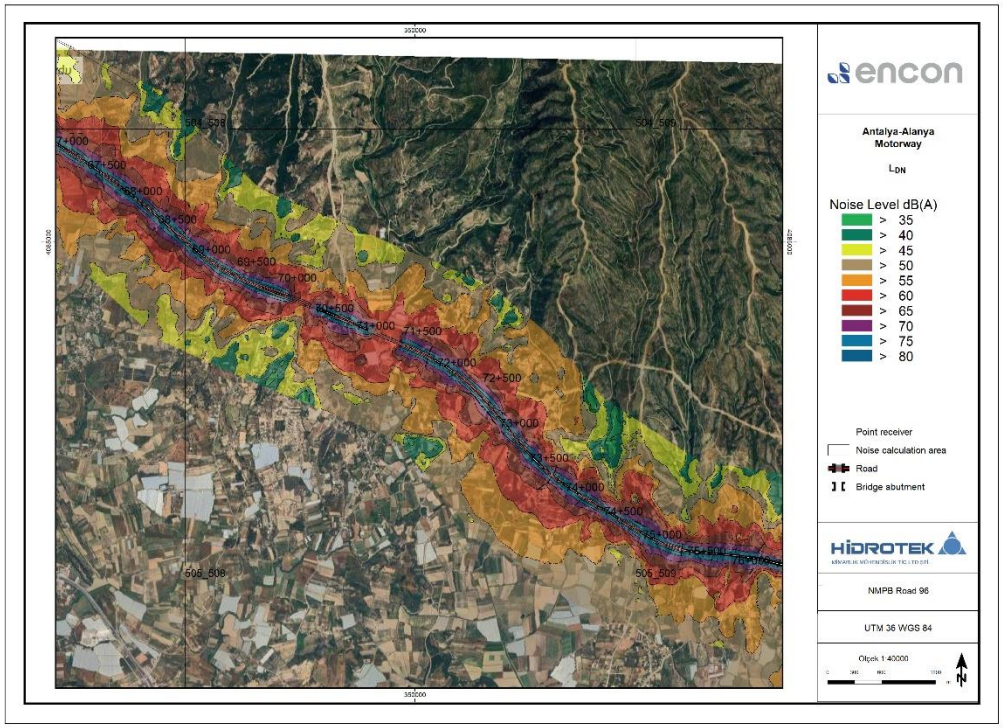

Figure 5.94 KY-7 (67+000/76+000) AAM noise map LdN

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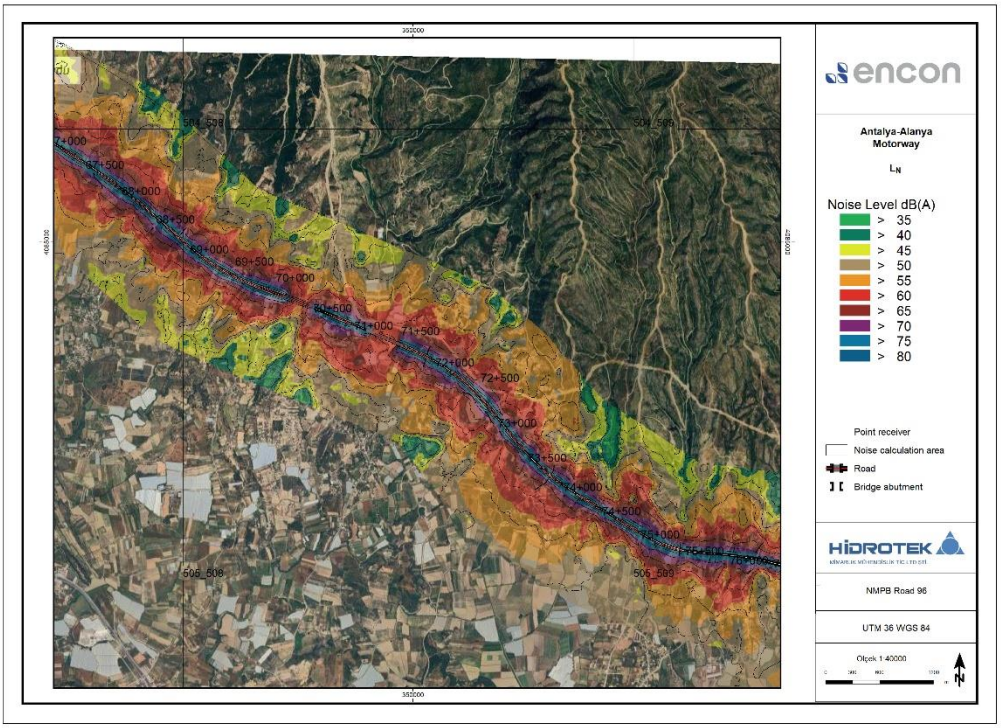

Figure 5.95 KY-7 (67+000/76+000) AAM noise map LN

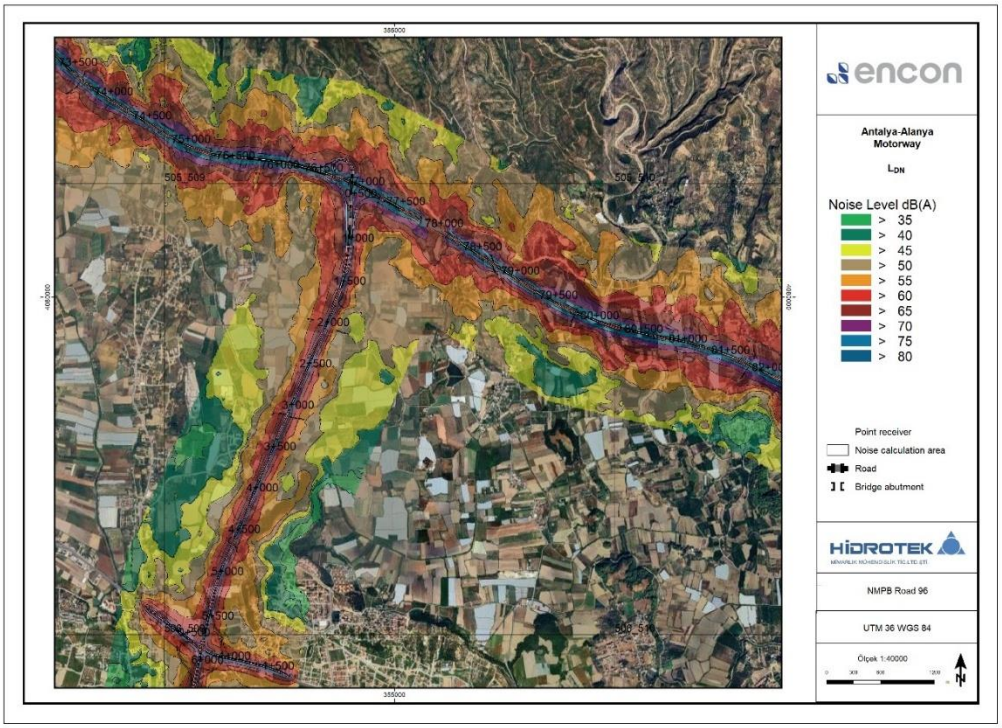

Figure 5.96 KY-8 (73+500/82+000) AAM noise map LDN

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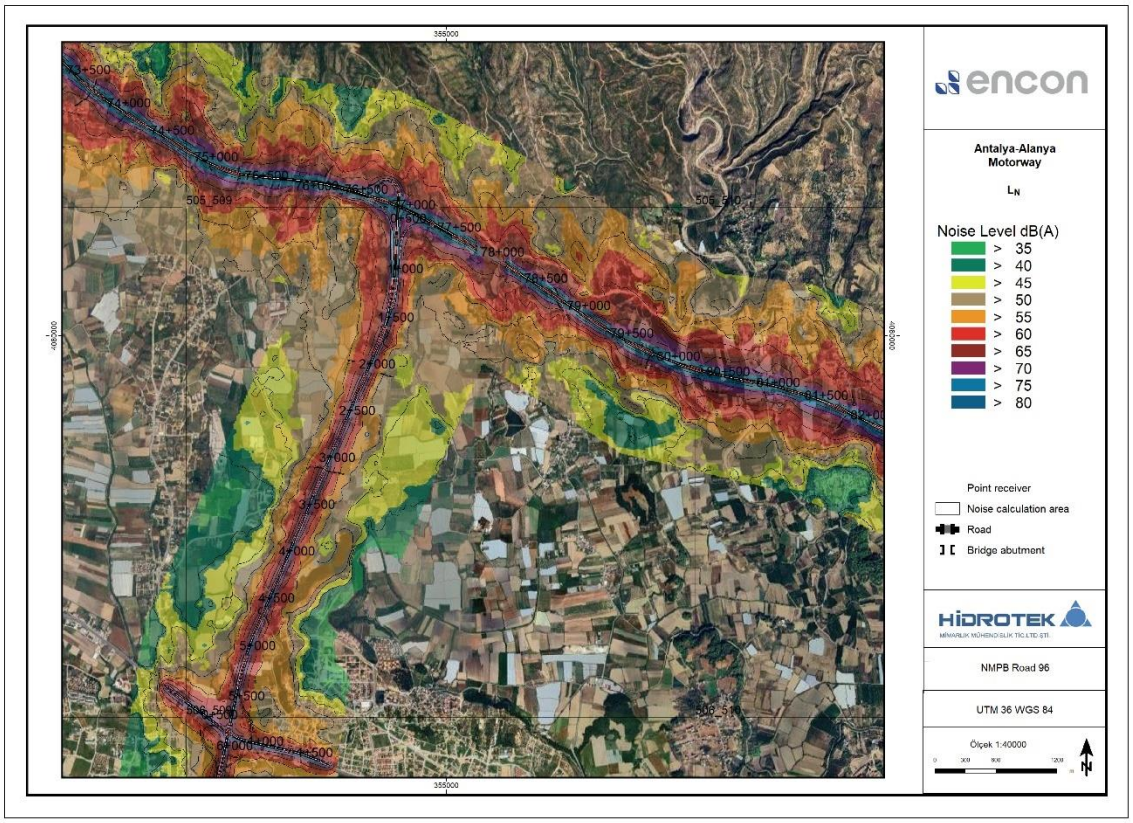

Figure 5.97 KY-8 (73+500/82+000) AAM noise map LN

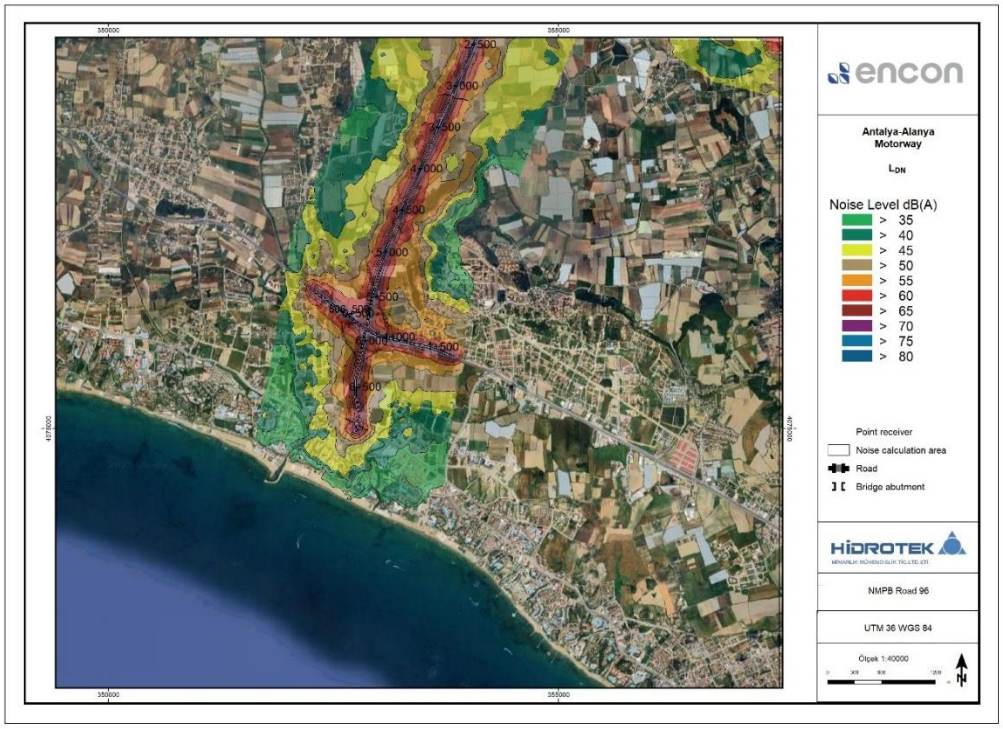

Figure 5.98 KY-9 (2+500/6+500) AAM noise map LDN

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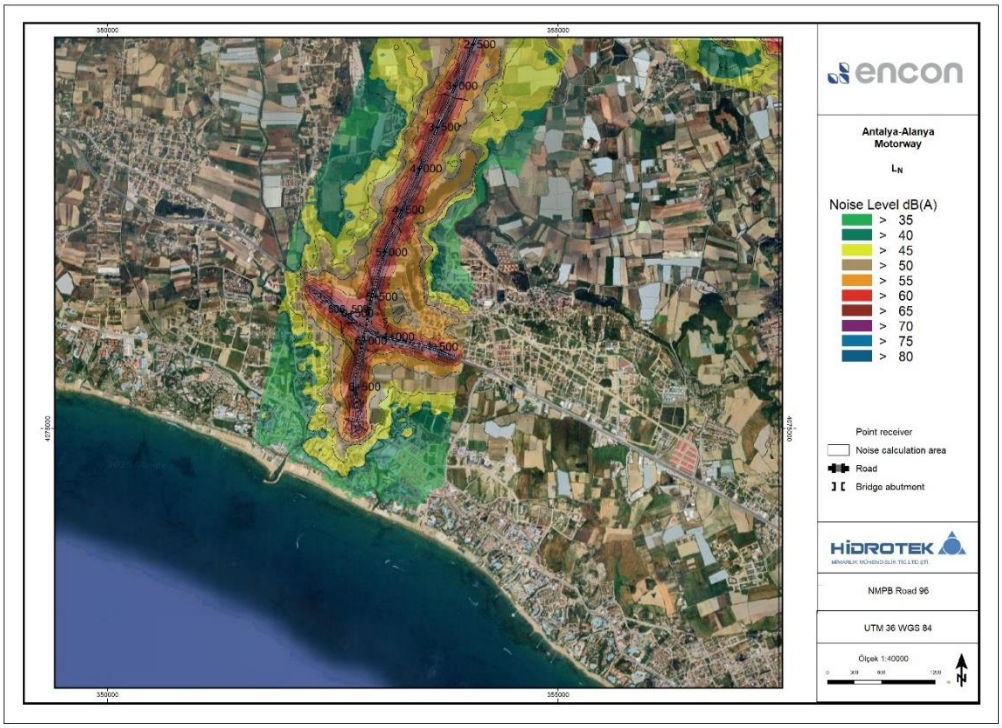

Figure 5.99 KY-9 (2+500/6+500) AAM noise map LN

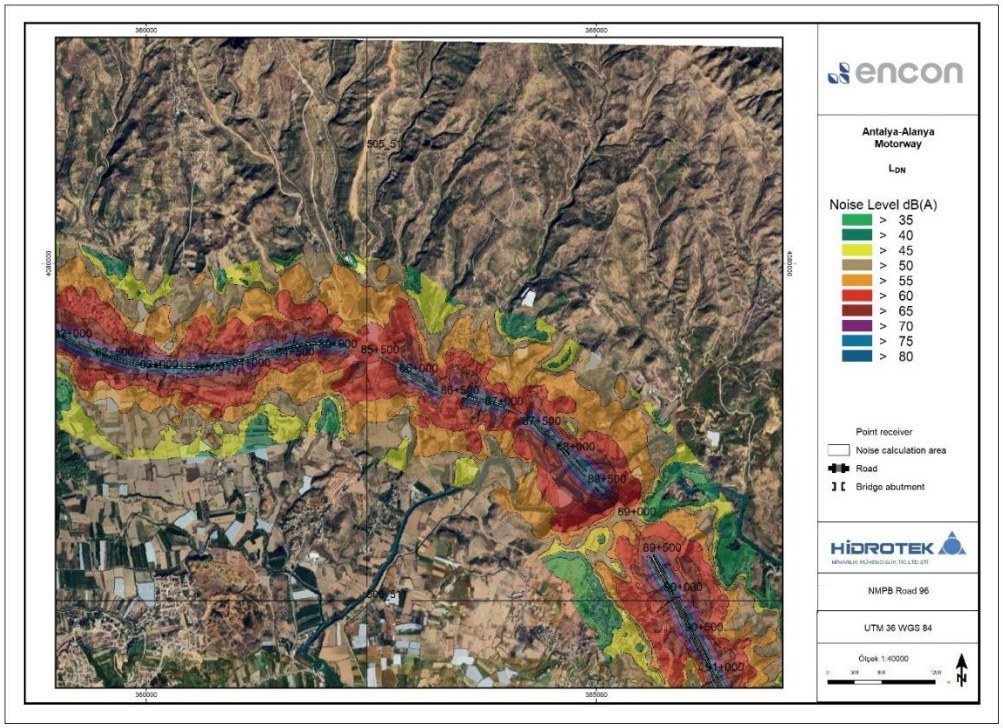

Figure 5.100 KY-10 (82+000/91+00) AAM noise map LDN

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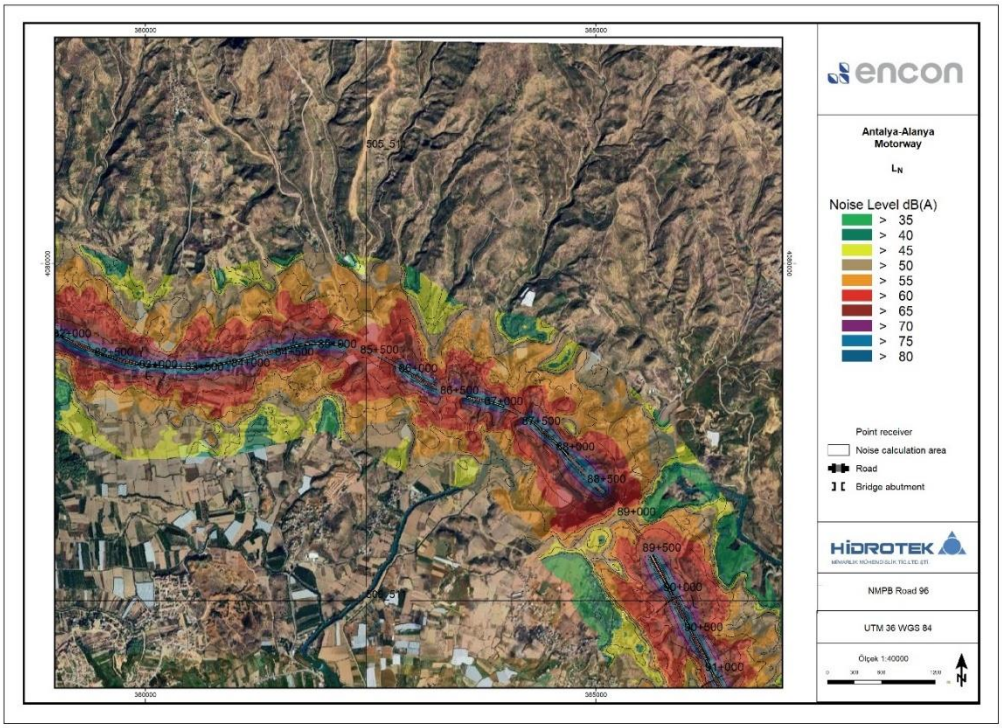

Figure 5.101 KY-10 (82+000/91+000) noise map LN

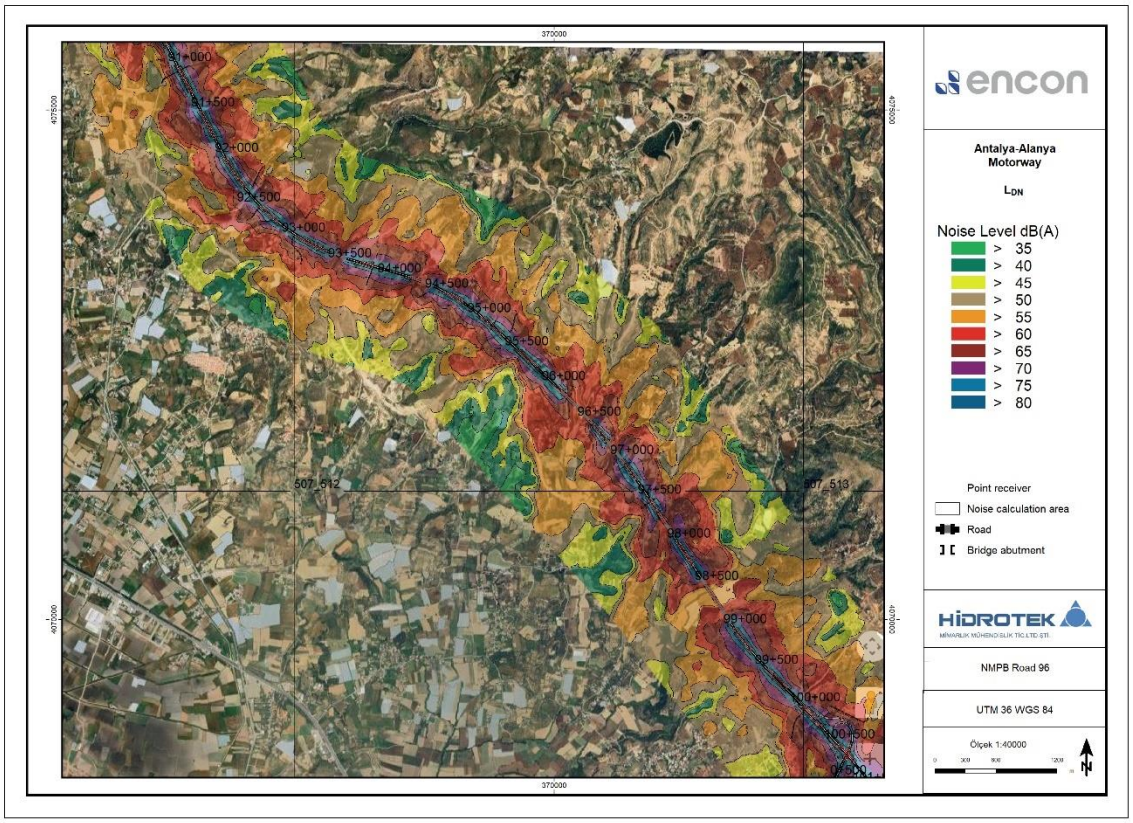

Figure 5.102 KY-11 (91+000/100+500) AAM noise map LDN

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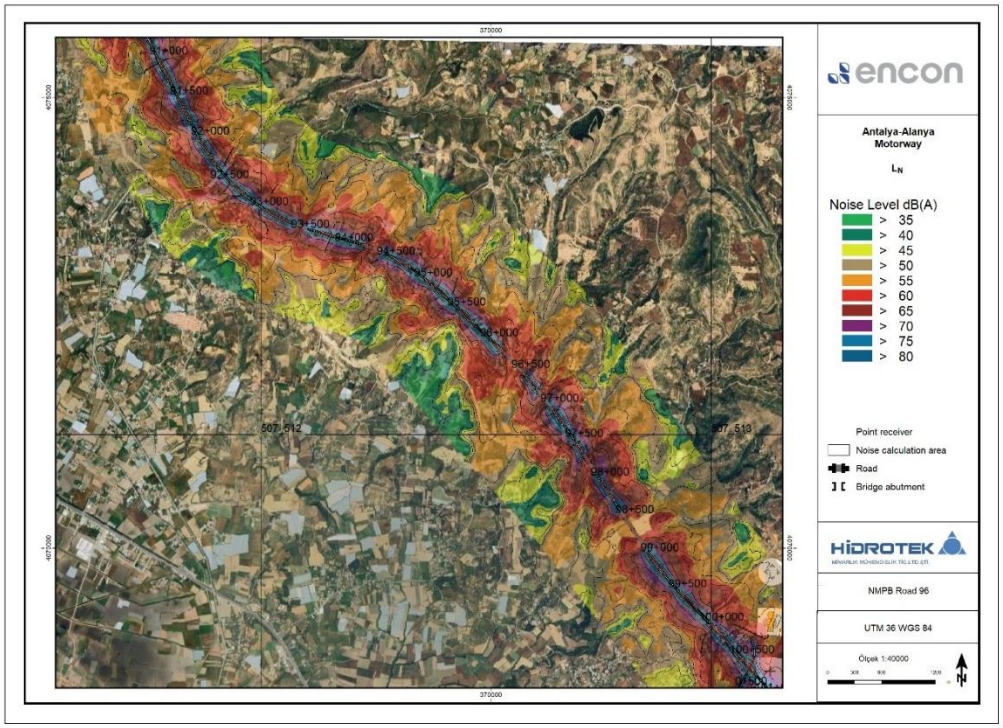

Figure 5.103 KY-11 (91+000/100+500) AAM noise map LN

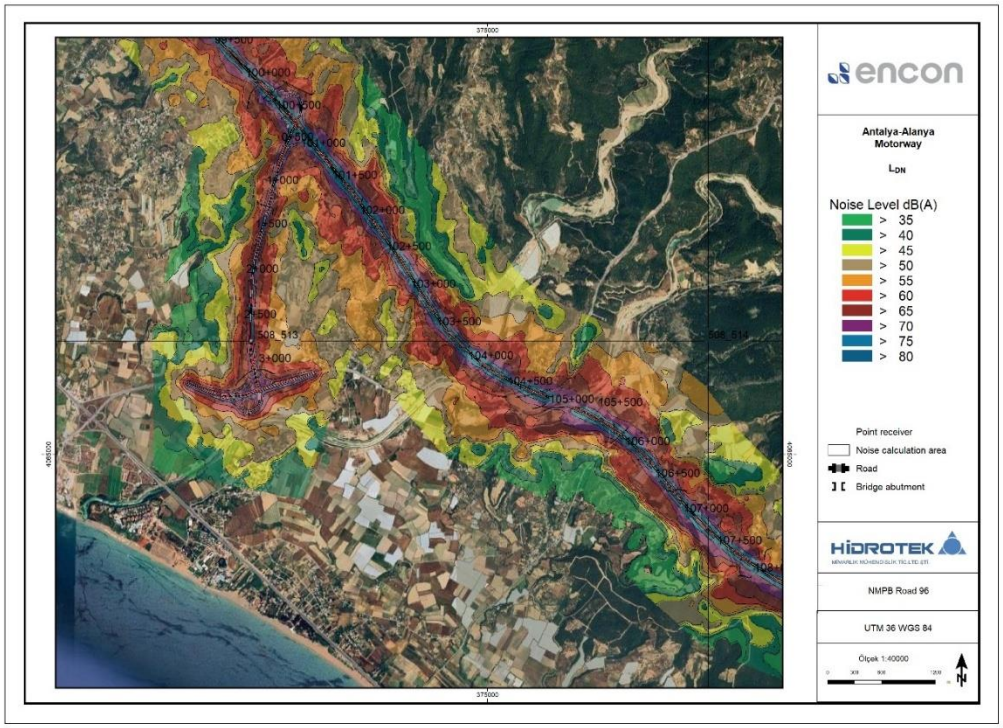

Figure 5.104 KY-12 (99+500/108+000)AAM noise map LDN

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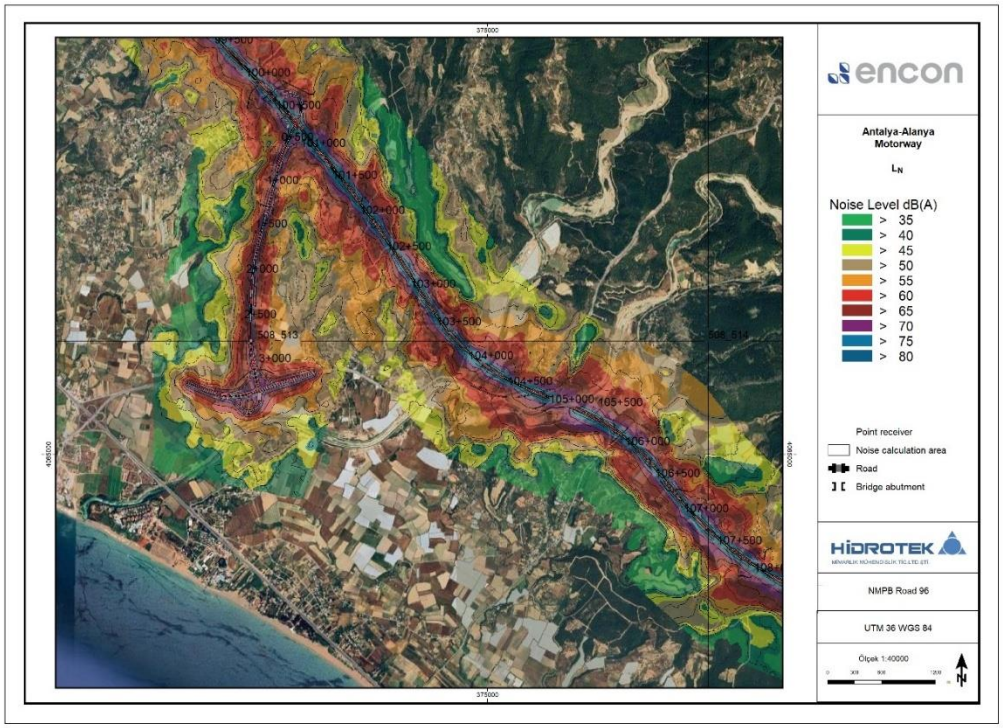

Figure 5.105 KY-12 (99+500/108+000) AAM noise map LN

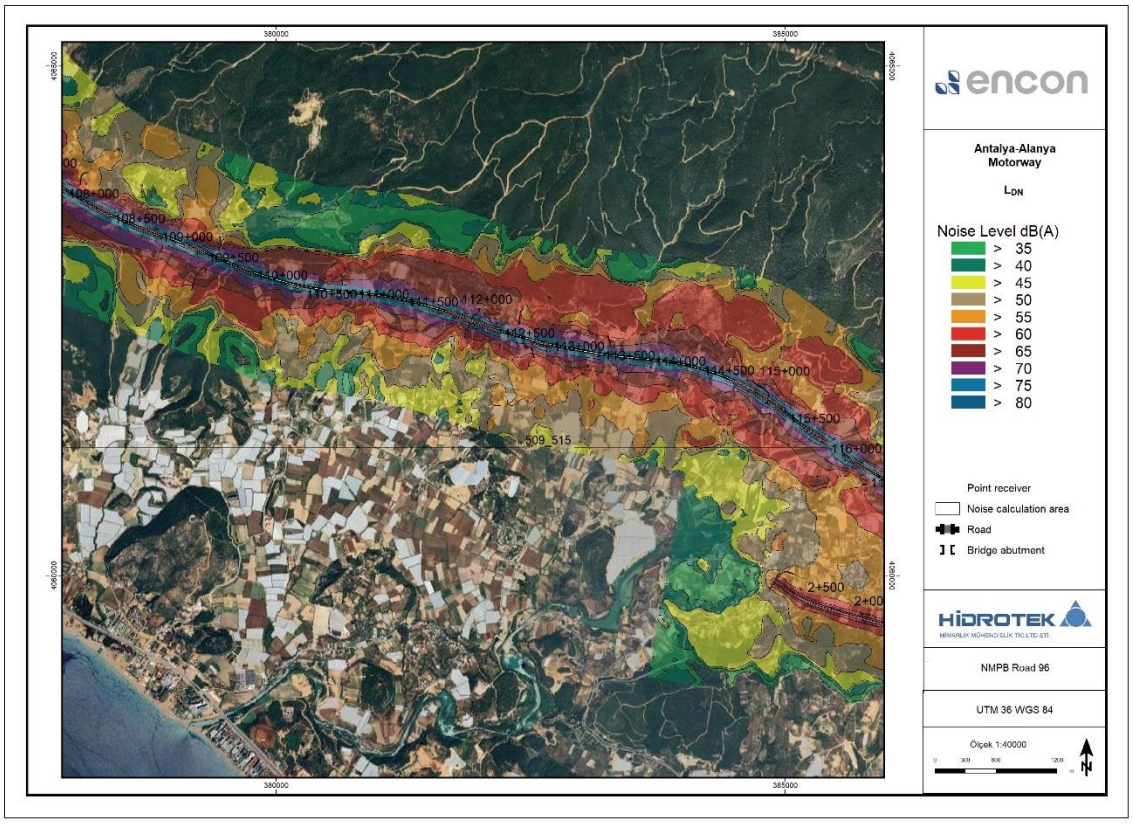

Figure 5.106 KY-13 (108+500/116+500) AAM noise map LDN

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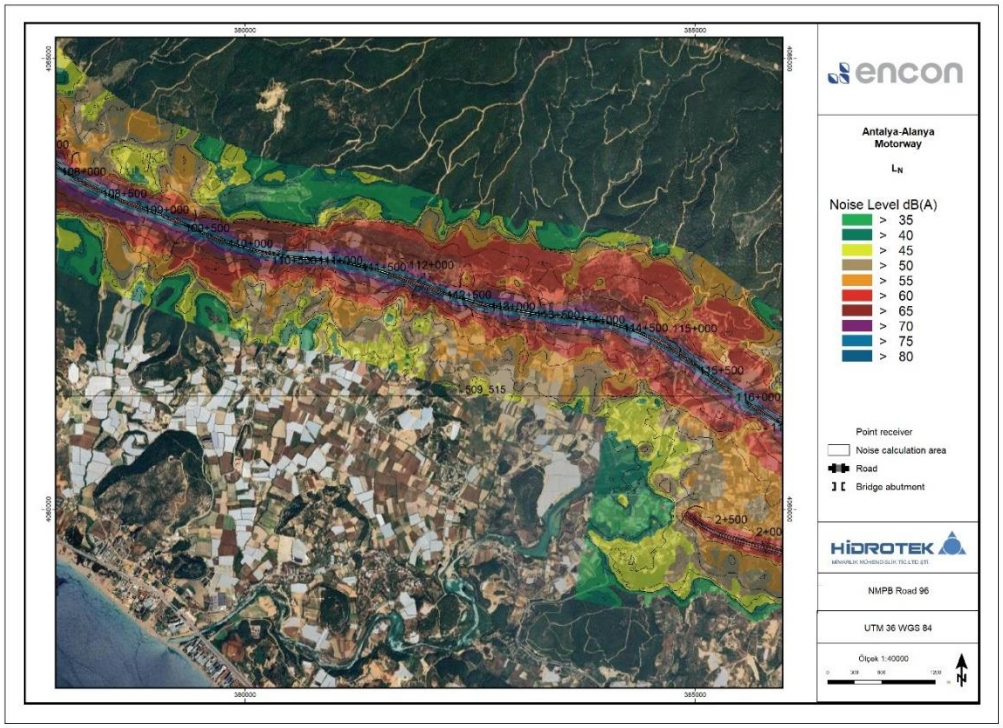

Figure 5.107 KY-13 (108+500/116+500) AAM noise map LN

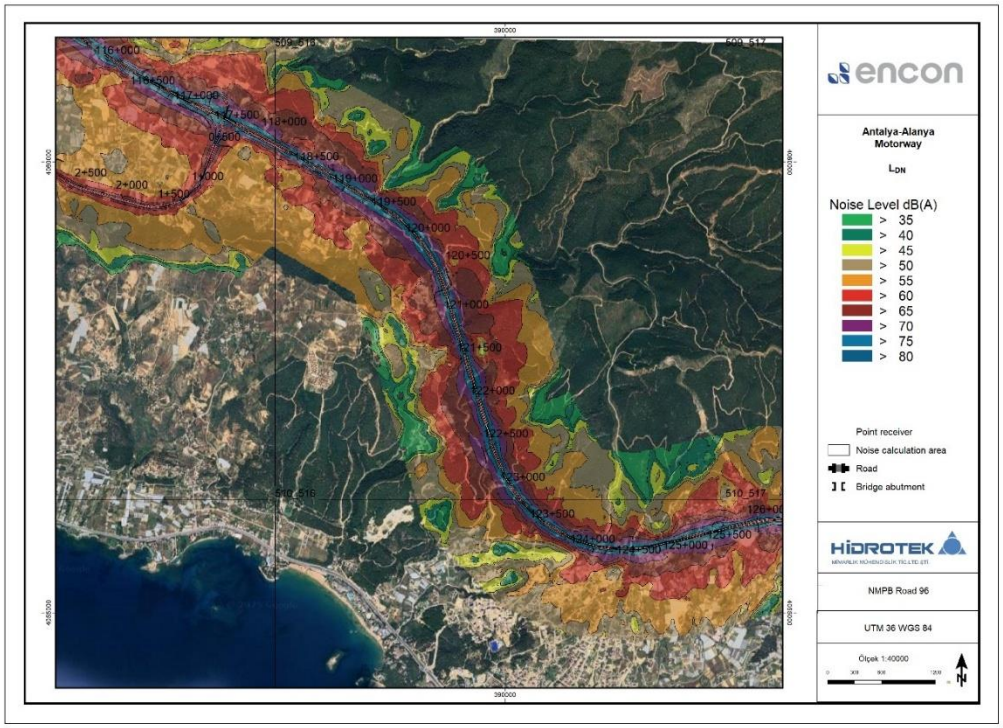

Figure 5.108 KY-14 (116+500/126+000) AAM noise map LDN

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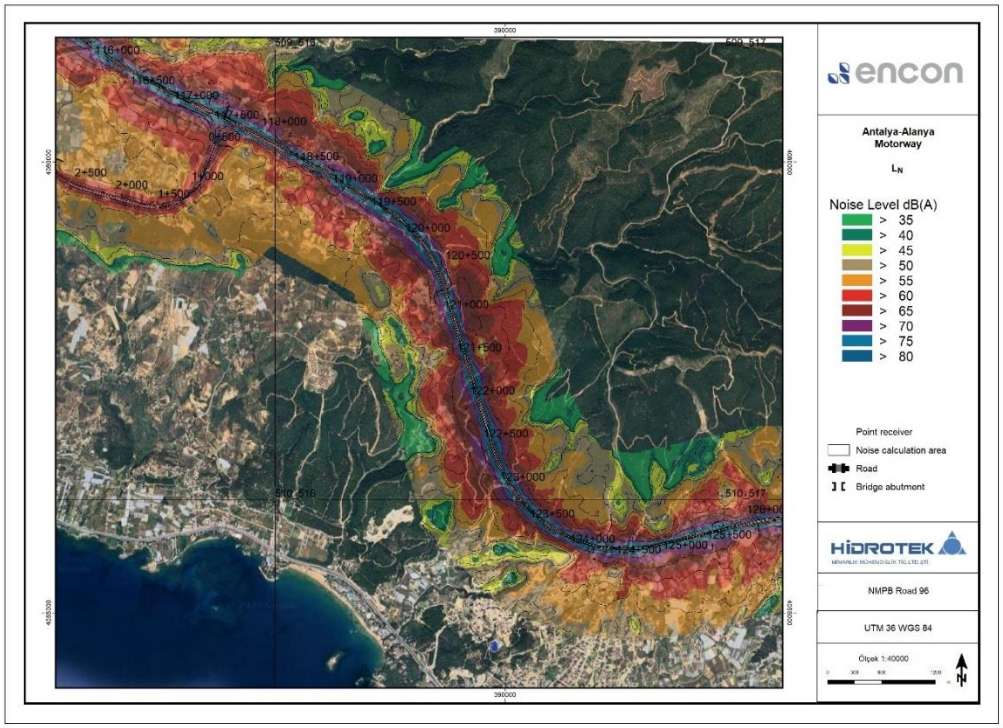

Figure 5.109 KY-14 (116+500/126+000) AAM noise map LN

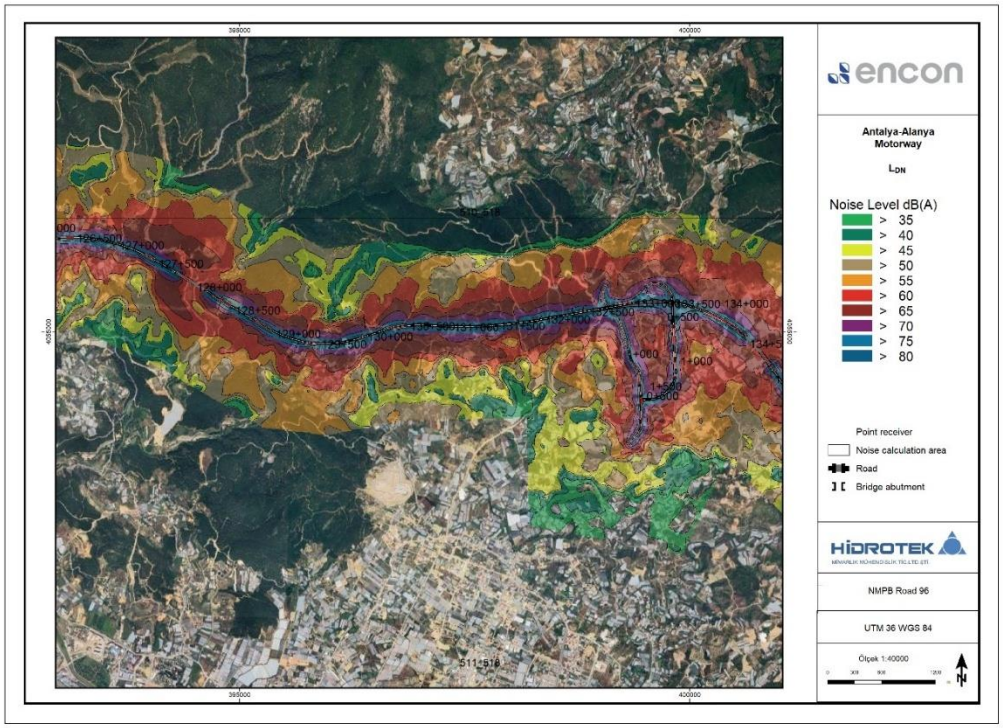

Figure 5.110 KY-15(126+500/135+000) AAM noise map LDN

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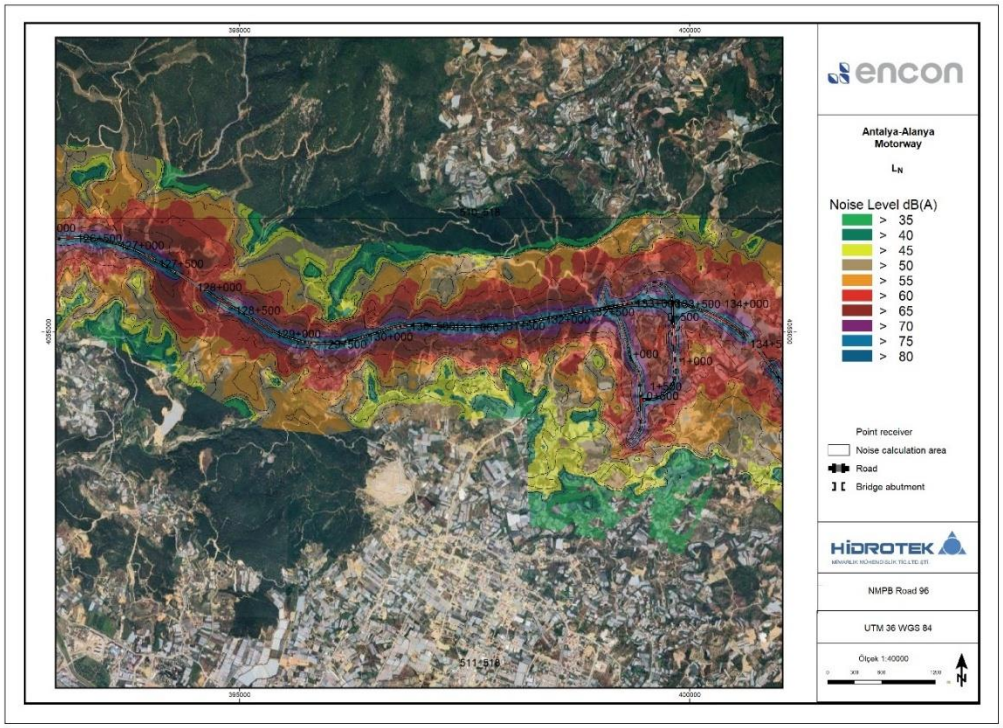

Figure 5.111 KY-15(126+500/135+000) AAM noise map LDN

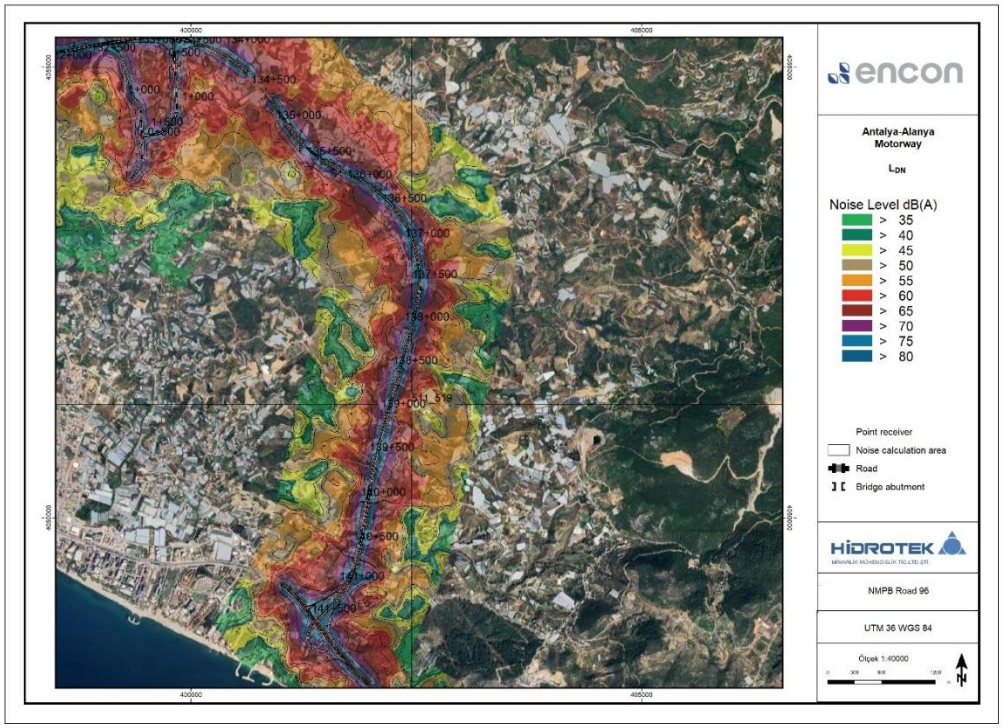

Figure 5.112 KY-16(132+000/141+500) AAM noise map LDN

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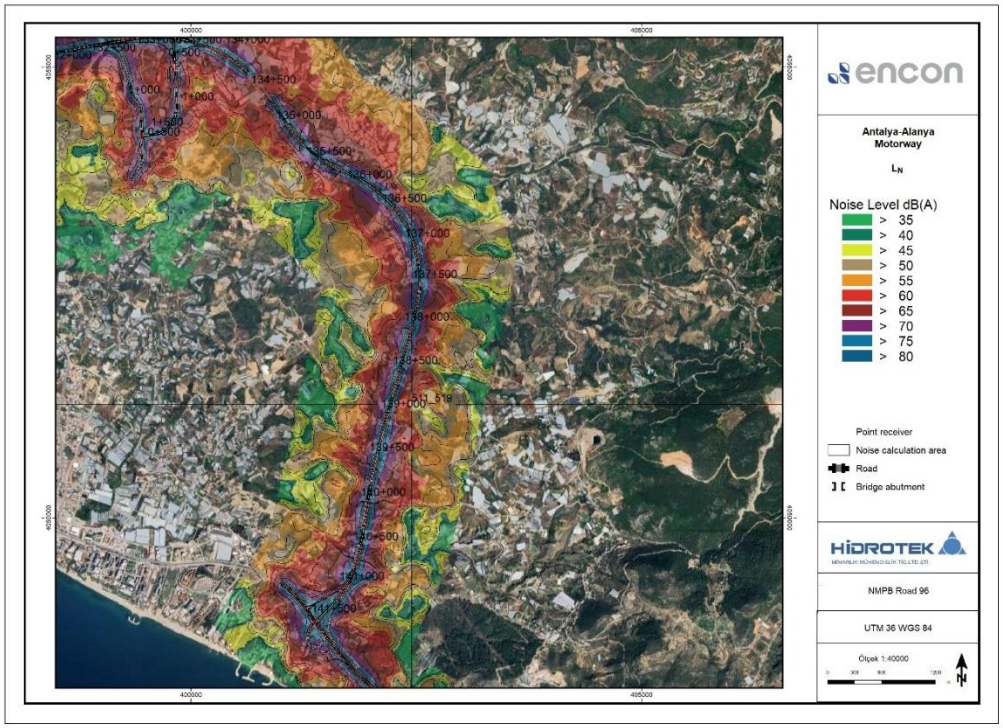

Figure 5.113 KY-16(132+000/141+500) AAM noise map LN

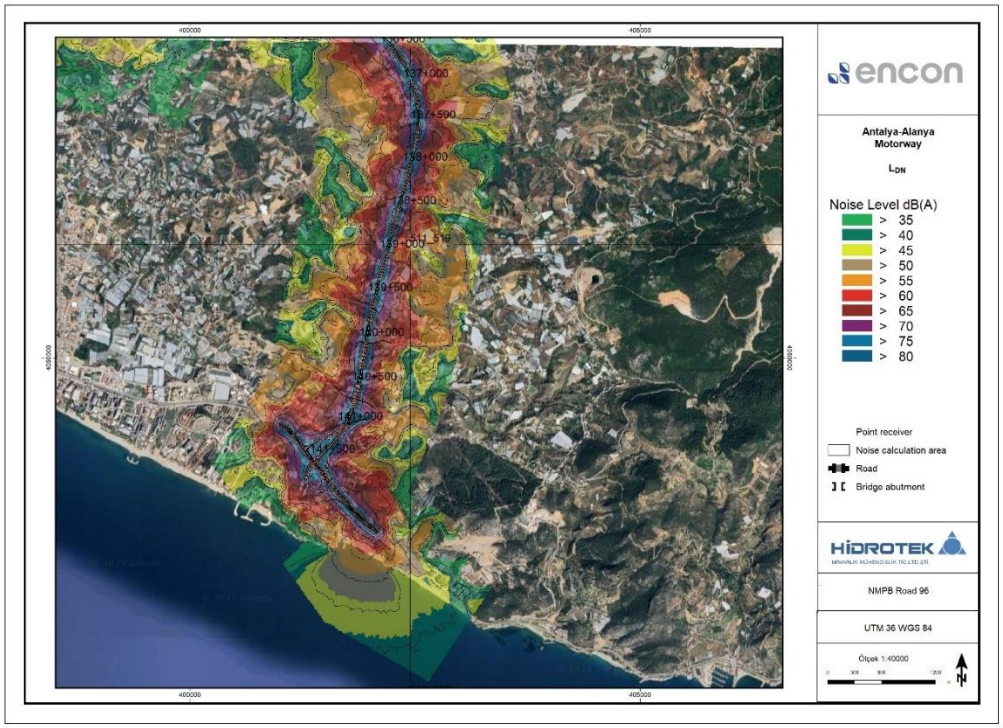

Figure 5.114 KY-16(136+500/141+500) AAM noise map LDN

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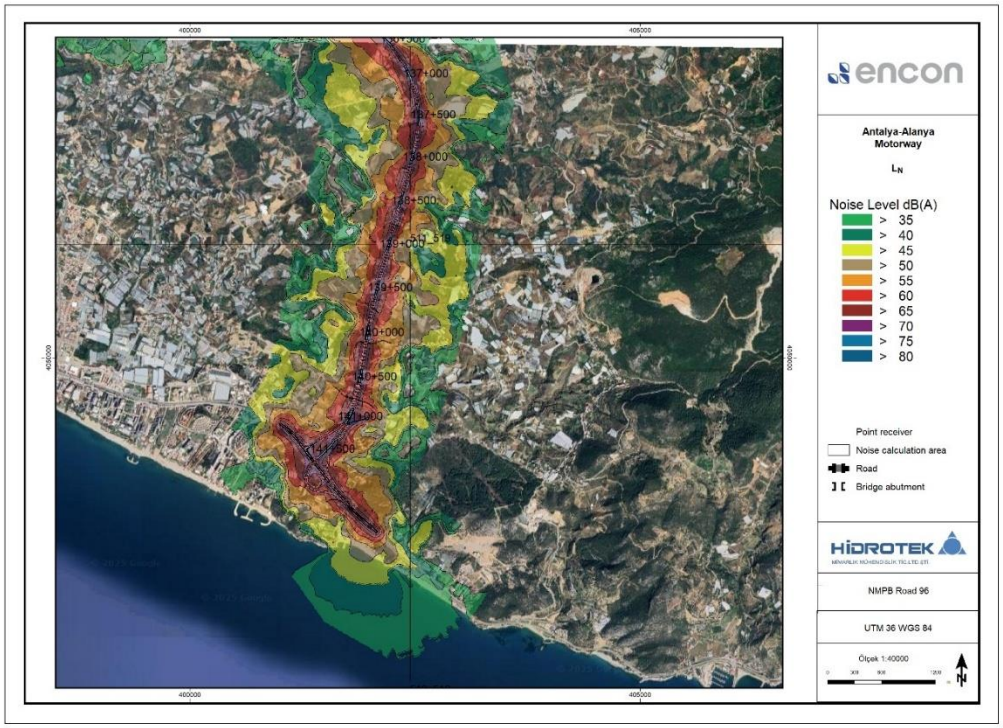

Figure 5.115 KY-16(136+500/141+500) AAM noise map LN

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5.3 Situation Assessment

The coordinates of the noise measurement points are provided in Table 5. To compare the measured values with the calculated values, virtual receivers were placed at these coordinate points and the calculations were performed accordingly.

Tablo 5.

Districts	Coordinates (UTMWGS84 Zone 35)
Konaklı	(36S 401287/4049717)
Çakallar	(36S 386572/4060940)
Avsallar	(36S 389720/4055765)
Akdam	(36S 393414/4055623)
Emişbeleni	(36S 399364/4055198)
Karakaya	(36S 385356/4061872)
Hacıobası	(36S 373104/4065985)
Uzunlar	(36S 376876/4066570)
Sülek	(36S 371900/4068786)
Sağırin	(36S 341974/4097230)
Sarıabalı	(36S 337884/4093014)
Sarılar	(36S 360448/4076493)
Bucakşeyhler	(36S 363395/4078780)
Kalemler	(36S 353691/4080989)
Köprüçay	(36S 339819/409532)
Bademliyar	(36S 389655/4072729)
Ulukapı	(36S 365551/4075913)
Taşağıl	(36S 343526/4087476)
Hacıali	(36S 370544/4070725)
Deniztepesi	(36S 334640/4094389)
Serik	(36S 330608/4089427)

5.3.1 Construction Site and Motorway Construction Noise

Table 5.1 (Arithmetic difference) , Table 5.2 AAM noise modeling results and comparison table (for 1st measurement values

	RENC						IFC					
	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00–19:00)	Calculated L_{eq} Evening (19:00-23:00)	Calculated L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)
te	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
	56.3	52.4	51.6	43.7	44.5	43.3	55.6	51.4	43.6	43.9	0.2	0.7
	58.3	56.5	41.9	52.1	52.9	51.6	57.9	48.7	52.0	52.3	0.9	1.6

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	57.2	54.2	53.9	30.7	28.8	27.5	56.8	53.6	30.1	28.2	0.0	0.0
	64.4	62.3	61.5	33.0	32.7	31.5	63.8	62.1	32.7	32.2	0.0	0.0
	59.8	59	52.2	56.2	57.0	55.8	59.8	52.2	56.1	56.5	1.6	2.1
	68.7	66.2	62.7	37.4	37.2	36.0	68.5	62.4	37.0	36.6	0.0	0.0
	55.9	50.3	50.2	49.0	49.8	48.5	55.3	50.2	48.9	49.2	0.8	2.8
	62.9	60.6	60.1	31.1	20.9	19.7	62.6	59.8	29.9	20.3	0.0	0.0
	57.9	50.5	50	42.4	42.6	41.3	57.2	49.8	42.1	42.0	0.1	0.7
	70.7	64.6	64.3	-	-	-	70.1	64	-	-	-	-
	62.4	56.2	53.6	71.8	72.6	71.3	61.5	53.2	71.7	72.0	9.9	16.5
	65.5	63.7	62	39.8	14.9	13.6	65.1	62.5	38.6	14.3	0.0	0.0
	70.3	56.3	55	38.0	34.0	32.7	69.3	55.6	37.1	33.4	0.0	0.0
	57.6	52.7	45.7	40.7	41.5	40.3	57.1	45.6	40.6	40.9	0.1	0.3
	63.9	58.6	58.5	22.3	9.8	8.5	63.2	58.8	21.1	9.2	0.0	0.0
	71.8	56.9	55.5	33.4	-	-	70.9	55.3	32.1		0.0	-
	60.2	59.8	59.4	44.3	32.2	31.0	60.4	59	43.2	31.6	0.1	0.0
	79.1	68.5	56.4	49.4	49.8	48.5	78.3	56.5	49.2	49.2	0.0	0.1
	73.1	45.6	43.9	33.6	28.7	27.5	72.2	43.5	32.7	28.1	0.0	0.1
	63.9	55.2	54.8	44.7	45.4	44.2	63.1	54.8	44.6	44.9	0.1	0.4
	64.4	63	60.4	42.5	43.3	42.1	64.3	60.2	42.4	42.7	0.0	0.0

Logarithmic difference

Table 5.3 (Logarithmic difference) Table 5.1 (Arithmetic difference) and Table 5.2 AAM noise modeling results and comparison table (for 1st measurement values

	RENC						IFC					
	L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated	Calculated	L_{eq} Day	L_{eq} Night	Calculated	Calculated	L_{eq} Day	L_{eq} Evening
	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day	L_{eq} Evening	L_{eq} Night	(07:00-22:00)	(22:00-07:00)	L_{eq} Day	L_{eq} Night	(07:00–19:00)	(19:00-23:00)
te				(07:00–19:00)	(19:00-23:00)	(23:00-07:00)			(07:00-22:00)	(22:00-07:00)		

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	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
	56.3	52.4	51.6	43.7	44.5	43.3	55.6	51.4	43.6	43.9	0.2	0.7
	58.3	56.5	41.9	52.1	52.9	51.6	57.9	48.7	52.0	52.3	0.9	1.6
	57.2	54.2	53.9	30.7	28.8	27.5	56.8	53.6	30.1	28.2	0.0	0.0
	64.4	62.3	61.5	33.0	32.7	31.5	63.8	62.1	32.7	32.2	0.0	0.0
	59.8	59	52.2	56.2	57.0	55.8	59.8	52.2	56.1	56.5	1.6	2.1
	68.7	66.2	62.7	37.4	37.2	36.0	68.5	62.4	37.0	36.6	0.0	0.0
	55.9	50.3	50.2	49.0	49.8	48.5	55.3	50.2	48.9	49.2	0.8	2.8
	62.9	60.6	60.1	31.1	20.9	19.7	62.6	59.8	29.9	20.3	0.0	0.0
	57.9	50.5	50	42.4	42.6	41.3	57.2	49.8	42.1	42.0	0.1	0.7
	70.7	64.6	64.3	-	-	-	70.1	64	-	-	-	-
	62.4	56.2	53.6	71.8	72.6	71.3	61.5	53.2	71.7	72.0	9.9	16.5
	65.5	63.7	62	39.8	14.9	13.6	65.1	62.5	38.6	14.3	0.0	0.0
	70.3	56.3	55	38.0	34.0	32.7	69.3	55.6	37.1	33.4	0.0	0.0
	57.6	52.7	45.7	40.7	41.5	40.3	57.1	45.6	40.6	40.9	0.1	0.3
	63.9	58.6	58.5	22.3	9.8	8.5	63.2	58.8	21.1	9.2	0.0	0.0
	71.8	56.9	55.5	33.4	-	-	70.9	55.3	32.1		0.0	-
	60.2	59.8	59.4	44.3	32.2	31.0	60.4	59	43.2	31.6	0.1	0.0
	79.1	68.5	56.4	49.4	49.8	48.5	78.3	56.5	49.2	49.2	0.0	0.1
	73.1	45.6	43.9	33.6	28.7	27.5	72.2	43.5	32.7	28.1	0.0	0.1
	63.9	55.2	54.8	44.7	45.4	44.2	63.1	54.8	44.6	44.9	0.1	0.4
	64.4	63	60.4	42.5	43.3	42.1	64.3	60.2	42.4	42.7	0.0	0.0

Logarithmic difference

Table 5.34 (Logarithmic difference),compares the noise level exceeding the measured background noise level by 7 dB(A) with the limit values specified in Table 2.1 and Table 2.2 for construction site and motorway construction noise according to the RENC.

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Table 5.1 AAM noise modeling results and comparison table (for 1st measurement values)

		RENC						IFC				Difference				
		L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated	Calculated	L_{eq} Day	L_{eq} Night	Calculated	Calculated	L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated
		(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	(07:00-22:00)	(22:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)
Districts	**Measurement Date**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**
Konaklı	17-18.09.2024	56.3	52.4	51.6	43.7	44.5	43.3	55.6	51.4	43.6	43.9	-12.6	-7.9	-8.3	-12.0	-7.5
Çakallar	17-18.09.2024	58.3	56.5	41.9	52.1	52.9	51.6	57.9	48.7	52.0	52.3	-6.2	-3.6	9.7	-5.9	3.6
Avsallar	17-18.09.2024	57.2	54.2	53.9	30.7	28.8	27.5	56.8	53.6	30.1	28.2	-26.5	-25.4	-26.4	-26.7	-25.4
Akdam	17-18.09.2024	64.4	62.3	61.5	33.0	32.7	31.5	63.8	62.1	32.7	32.2	-31.4	-29.6	-30.0	-31.1	-29.9
Emişbeleni	17-18.09.2024	59.8	59	52.2	56.2	57.0	55.8	59.8	52.2	56.1	56.5	-3.6	-2.0	3.6	-3.7	4.3
Karakaya	17-18.09.2024	68.7	66.2	62.7	37.4	37.2	36.0	68.5	62.4	37.0	36.6	-31.3	-29.0	-26.7	-31.5	-25.8
Hacıobası	17-18.09.2024	55.9	50.3	50.2	49.0	49.8	48.5	55.3	50.2	48.9	49.2	-6.9	-0.5	-1.7	-6.4	-1.0
Uzunlar	17-18.09.2024	62.9	60.6	60.1	31.1	20.9	19.7	62.6	59.8	29.9	20.3	-31.8	-39.7	-40.4	-32.7	-39.5
Sülek	17-18.09.2024	57.9	50.5	50	42.4	42.6	41.3	57.2	49.8	42.1	42.0	-15.5	-7.9	-8.7	-15.1	-7.8
Sağırin	17-18.09.2024	70.7	64.6	64.3	-	-	-	70.1	64	-	-	-	-	-	-	-
Sarıabalı	16-17.09.2024	62.4	56.2	53.6	71.8	72.6	71.3	61.5	53.2	71.7	72.0	9.4	16.4	17.7	10.2	18.8
Sarılar	16-17.09.2024	65.5	63.7	62	39.8	14.9	13.6	65.1	62.5	38.6	14.3	-25.7	-48.8	-48.4	-26.5	-48.2
Bucakşeyhler	16-17.09.2024	70.3	56.3	55	38.0	34.0	32.7	69.3	55.6	37.1	33.4	-32.3	-22.3	-22.3	-32.2	-22.2
Kalemler	16-17.09.2024	57.6	52.7	45.7	40.7	41.5	40.3	57.1	45.6	40.6	40.9	-16.9	-11.2	-5.4	-16.5	-4.7
Köprüçay	16-17.09.2024	63.9	58.6	58.5	22.3	9.8	8.5	63.2	58.8	21.1	9.2	-41.6	-48.8	-50.0	-42.1	-49.6
Bademliyar	16-17.09.2024	71.8	56.9	55.5	33.4	-	-	70.9	55.3	32.1		-38.4	-	-	-38.8	-55.3
Ulukapı	16-17.09.2024	60.2	59.8	59.4	44.3	32.2	31.0	60.4	59	43.2	31.6	-15.9	-27.6	-28.4	-17.2	-27.4
Taşağıl	16-17.09.2024	79.1	68.5	56.4	49.4	49.8	48.5	78.3	56.5	49.2	49.2	-29.7	-18.7	-7.9	-29.1	-7.3
Hacıali	16-17.09.2024	73.1	45.6	43.9	33.6	28.7	27.5	72.2	43.5	32.7	28.1	-39.5	-16.9	-16.4	-39.5	-15.4
Deniztepesi	16-17.09.2024	63.9	55.2	54.8	44.7	45.4	44.2	63.1	54.8	44.6	44.9	-19.2	-9.8	-10.6	-18.5	-9.9
Serik	16-17.09.2024	64.4	63	60.4	42.5	43.3	42.1	64.3	60.2	42.4	42.7	-21.9	-19.7	-18.3	-21.9	-17.5

Arithmetic difference

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Table 5.2 AAM noise modeling results and comparison table (for 1st measurement values

		RENC						IFC				Difference				
		L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated	Calculated	L_{eq} Day	L_{eq} Night	Calculated	Calculated	L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated
		(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day	L_{eq} Evening	L_{eq} Night	(07:00-22:00)	(22:00-07:00)	L_{eq} Day	L_{eq} Night	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day	L_{eq} Night
					(07:00–19:00)	(19:00-23:00)	(23:00-07:00)			(07:00-22:00)	(22:00-07:00)				(07:00-22:00)	(22:00-07:00)
Districts	Measurement Date	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Konaklı	17-18.09.2024	56.3	52.4	51.6	43.7	44.5	43.3	55.6	51.4	43.6	43.9	0.2	0.7	0.6	0.3	0.7
Çakallar	17-18.09.2024	58.3	56.5	41.9	52.1	52.9	51.6	57.9	48.7	52.0	52.3	0.9	1.6	10.1	1.0	5.2
Avsallar	17-18.09.2024	57.2	54.2	53.9	30.7	28.8	27.5	56.8	53.6	30.1	28.2	0.0	0.0	0.0	0.0	0.0
Akdam	17-18.09.2024	64.4	62.3	61.5	33.0	32.7	31.5	63.8	62.1	32.7	32.2	0.0	0.0	0.0	0.0	0.0
Emişbeleni	17-18.09.2024	59.8	59	52.2	56.2	57.0	55.8	59.8	52.2	56.1	56.5	1.6	2.1	5.2	1.5	5.7
Karakaya	17-18.09.2024	68.7	66.2	62.7	37.4	37.2	36.0	68.5	62.4	37.0	36.6	0.0	0.0	0.0	0.0	0.0
Hacıobası	17-18.09.2024	55.9	50.3	50.2	49.0	49.8	48.5	55.3	50.2	48.9	49.2	0.8	2.8	2.2	0.9	2.5
Uzunlar	17-18.09.2024	62.9	60.6	60.1	31.1	20.9	19.7	62.6	59.8	29.9	20.3	0.0	0.0	0.0	0.0	0.0
Sülek	17-18.09.2024	57.9	50.5	50	42.4	42.6	41.3	57.2	49.8	42.1	42.0	0.1	0.7	0.5	0.1	0.7
Sağırin	17-18.09.2024	70.7	64.6	64.3	-	-	-	70.1	64	-	-	-	-	-	-	-
Sarıabalı	16-17.09.2024	62.4	56.2	53.6	71.8	72.6	71.3	61.5	53.2	71.7	72.0	9.9	16.5	17.8	10.6	18.9
Sarılar	16-17.09.2024	65.5	63.7	62	39.8	14.9	13.6	65.1	62.5	38.6	14.3	0.0	0.0	0.0	0.0	0.0
Bucakşeyhler	16-17.09.2024	70.3	56.3	55	38.0	34.0	32.7	69.3	55.6	37.1	33.4	0.0	0.0	0.0	0.0	0.0
Kalemler	16-17.09.2024	57.6	52.7	45.7	40.7	41.5	40.3	57.1	45.6	40.6	40.9	0.1	0.3	1.1	0.1	1.3
Köprüçay	16-17.09.2024	63.9	58.6	58.5	22.3	9.8	8.5	63.2	58.8	21.1	9.2	0.0	0.0	0.0	0.0	0.0
Bademliyar	16-17.09.2024	71.8	56.9	55.5	33.4	-	-	70.9	55.3	32.1		0.0	-	-	0.0	0.0
Ulukapı	16-17.09.2024	60.2	59.8	59.4	44.3	32.2	31.0	60.4	59	43.2	31.6	0.1	0.0	0.0	0.1	0.0
Taşağıl	16-17.09.2024	79.1	68.5	56.4	49.4	49.8	48.5	78.3	56.5	49.2	49.2	0.0	0.1	0.7	0.0	0.7
Hacıali	16-17.09.2024	73.1	45.6	43.9	33.6	28.7	27.5	72.2	43.5	32.7	28.1	0.0	0.1	0.1	0.0	0.1
Deniztepesi	16-17.09.2024	63.9	55.2	54.8	44.7	45.4	44.2	63.1	54.8	44.6	44.9	0.1	0.4	0.4	0.1	0.4
Serik	16-17.09.2024	64.4	63	60.4	42.5	43.3	42.1	64.3	60.2	42.4	42.7	0.0	0.0	0.1	0.0	0.1

Logarithmic difference

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Table 5.3 AAM noise modeling results and comparison table (for 2nd measurement values)

		RENC						IFC				Difference				
		L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated	Calculated	L_{eq} Day	L_{eq} Night	Calculated	Calculated	L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated
		(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	(07:00-22:00)	(22:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)
Districts	Measurement Date	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Konaklı	21-22.09.2024	64.4	63.0	60.4	43.7	44.5	43.3	64.3	60.2	43.6	43.9	-20.7	-18.5	-17.1	-20.7	-16.3
Çakallar	21-22.09.2024	62.2	62.7	60.7	52.1	52.9	51.6	61.9	61.7	52.0	52.3	-10.1	-9.8	-9.1	-9.9	-9.4
Avsallar	21-22.09.2024	61.6	61.5	55.4	30.7	28.8	27.5	61.9	54.9	30.1	28.2	-30.9	-32.7	-27.9	-31.8	-26.7
Akdam	21-22.09.2024	62.1	60.2	57.4	33.0	32.7	31.5	62.0	56.9	32.7	32.2	-29.1	-27.5	-25.9	-29.3	-24.7
Emişbeleni	21-22.09.2024	71.6	69.5	66.7	56.2	57.0	55.8	71.3	66.6	56.1	56.5	-15.4	-12.5	-10.9	-15.2	-10.1
Karakaya	21-22.09.2024	73.0	72.8	63.8	37.4	37.2	36.0	73.2	63.6	37.0	36.6	-35.6	-35.6	-27.8	-36.2	-27.0
Hacıobası	21-22.09.2024	61.2	60.2	43.9	49.0	49.8	48.5	61.2	47.6	48.9	49.2	-12.2	-10.4	4.6	-12.3	1.6
Uzunlar	21-22.09.2024	74.5	62.3	53.5	31.1	20.9	19.7	73.6	54.3	29.9	20.3	-43.4	-41.4	-33.8	-43.7	-34.0
Sülek	21-22.09.2024	68.6	66.8	62.4	42.4	42.6	41.3	68.2	63.5	42.1	42.0	-26.2	-24.2	-21.1	-26.1	-21.5
Sağırin	21-22.09.2024	67.6	67.0	66.0	-	-	-	67.3	66.5	-	-	-	-	-	-	-
Sarıabalı	21-22.09.2024	61.9	55.7	55.6	71.8	72.6	71.3	61.2	55.5	71.7	72.0	9.9	16.9	15.7	10.5	16.5
Sarılar	21-22.09.2024	63.1	63.0	59.0	39.8	14.9	13.6	63.2	59.3	38.6	14.3	-23.3	-48.1	-45.4	-24.6	-45.0
Bucakşeyhler	21-22.09.2024	65.7	64.3	58.7	38.0	34.0	32.7	65.5	59.3	37.1	33.4	-27.7	-30.3	-26.0	-28.4	-25.9
Kalemler	21-22.09.2024	66.0	61.7	60.8	40.7	41.5	40.3	65.5	60.6	40.6	40.9	-25.3	-20.2	-20.5	-24.9	-19.7
Köprüçay	21-22.09.2024	64.0	62.9	62.8	22.3	9.8	8.5	64.0	62.4	21.1	9.2	-41.7	-53.1	-54.3	-42.9	-53.2
Bademliyar	21-22.09.2024	63.3	61.7	61.6	33.4	-	-	63.2	61.2	32.1		-29.9	-	-	-31.1	-61.2
Ulukapı	21-22.09.2024	62.7	57.9	54.9	44.3	32.2	31.0	62.1	55.0	43.2	31.6	-18.4	-25.7	-23.9	-18.9	-23.4
Taşağıl	21-22.09.2024	68.8	65.5	65.3	49.4	49.8	48.5	68.4	65.1	49.2	49.2	-19.4	-15.7	-16.8	-19.2	-15.9
Hacıali	21-22.09.2024	68.5	67.2	66.0	33.6	28.7	27.5	68.4	65.9	32.7	28.1	-34.9	-38.5	-38.5	-35.7	-37.8
Deniztepesi	21-22.09.2024	67.0	61.1	57.8	44.7	45.4	44.2	66.3	57.4	44.6	44.9	-22.3	-15.7	-13.6	-21.7	-12.5
Serik	21-22.09.2024	66.6	62.2	60.3	42.5	43.3	42.1	66.1	59.9	42.4	42.7	-24.1	-18.9	-18.2	-23.7	-17.2

Arithmetic difference

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Table 5.4 AAM noise modeling results and comparison table (for 2nd measurement values)

		RENC						IFC				Difference				
		L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated	Calculated	L_{eq} Day	L_{eq} Night	Calculated	Calculated	L_{eq} Day	L_{eq} Evening	L_{eq} Night	Calculated	Calculated
		(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day	L_{eq} Evening	L_{eq} Night	(07:00-22:00)	(22:00-07:00)	L_{eq} Day	L_{eq} Night	(07:00–19:00)	(19:00-23:00)	(23:00-07:00)	L_{eq} Day	L_{eq} Night
					(07:00–19:00)	(19:00-23:00)	(23:00-07:00)			(07:00-22:00)	(22:00-07:00)				(07:00-22:00)	(22:00-07:00)
Districts	**Measurement Date**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**	**dBA**
Konaklı	21-22.09.2024	64.4	63.0	60.4	43.7	44.5	43.3	64.3	60.2	43.6	43.9	0.0	0.1	0.1	0.0	0.1
Çakallar	21-22.09.2024	62.2	62.7	60.7	52.1	52.9	51.6	61.9	61.7	52.0	52.3	0.4	0.4	0.5	0.4	0.5
Avsallar	21-22.09.2024	61.6	61.5	55.4	30.7	28.8	27.5	61.9	54.9	30.1	28.2	0.0	0.0	0.0	0.0	0.0
Akdam	21-22.09.2024	62.1	60.2	57.4	33.0	32.7	31.5	62.0	56.9	32.7	32.2	0.0	0.0	0.0	0.0	0.0
Emişbeleni	21-22.09.2024	71.6	69.5	66.7	56.2	57.0	55.8	71.3	66.6	56.1	56.5	0.1	0.2	0.3	0.1	0.4
Karakaya	21-22.09.2024	73.0	72.8	63.8	37.4	37.2	36.0	73.2	63.6	37.0	36.6	0.0	0.0	0.0	0.0	0.0
Hacıobası	21-22.09.2024	61.2	60.2	43.9	49.0	49.8	48.5	61.2	47.6	48.9	49.2	0.3	0.4	5.9	0.2	3.9
Uzunlar	21-22.09.2024	74.5	62.3	53.5	31.1	20.9	19.7	73.6	54.3	29.9	20.3	0.0	0.0	0.0	0.0	0.0
Sülek	21-22.09.2024	68.6	66.8	62.4	42.4	42.6	41.3	68.2	63.5	42.1	42.0	0.0	0.0	0.0	0.0	0.0
Sağırin	21-22.09.2024	67.6	67.0	66.0	-	-	-	67.3	66.5	-	-	-	-	-	-	-
Sarıabalı	21-22.09.2024	61.9	55.7	55.6	71.8	72.6	71.3	61.2	55.5	71.7	72.0	10.3	17.0	15.8	10.9	16.6
Sarılar	21-22.09.2024	63.1	63.0	59.0	39.8	14.9	13.6	63.2	59.3	38.6	14.3	0.0	0.0	0.0	0.0	0.0
Bucakşeyhler	21-22.09.2024	65.7	64.3	58.7	38.0	34.0	32.7	65.5	59.3	37.1	33.4	0.0	0.0	0.0	0.0	0.0
Kalemler	21-22.09.2024	66.0	61.7	60.8	40.7	41.5	40.3	65.5	60.6	40.6	40.9	0.0	0.0	0.0	0.0	0.0
Köprüçay	21-22.09.2024	64.0	62.9	62.8	22.3	9.8	8.5	64.0	62.4	21.1	9.2	0.0	0.0	0.0	0.0	0.0
Bademliyar	21-22.09.2024	63.3	61.7	61.6	33.4	-	-	63.2	61.2	32.1		0.0	-	-	0.0	0.0
Ulukapı	21-22.09.2024	62.7	57.9	54.9	44.3	32.2	31.0	62.1	55.0	43.2	31.6	0.1	0.0	0.0	0.1	0.0
Taşağıl	21-22.09.2024	68.8	65.5	65.3	49.4	49.8	48.5	68.4	65.1	49.2	49.2	0.0	0.1	0.1	0.1	0.1
Hacıali	21-22.09.2024	68.5	67.2	66.0	33.6	28.7	27.5	68.4	65.9	32.7	28.1	0.0	0.0	0.0	0.0	0.0
Deniztepesi	21-22.09.2024	67.0	61.1	57.8	44.7	45.4	44.2	66.3	57.4	44.6	44.9	0.0	0.1	0.2	0.0	0.2
Serik	21-22.09.2024	66.6	62.2	60.3	42.5	43.3	42.1	66.1	59.9	42.4	42.7	0.0	0.1	0.1	0.0	0.1

Logarithmic difference

"No additional contribution is considered for the areas marked with a dash (-).

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When the tables are examined, it is seen that for the measured points;

It is seen that the noise level of 7 dB(A), which is the limit value in addition to the background noise defined in Table 5.1, 5.2. 5.3 and 5.4 in the day and evenning time period in the RENC -Table 2.1, is exceeded in Sarıbalı region when compared with the calculated noise level.

It is seen that the noise level of 5 dB(A), which is the limit value in addition to the background noise defined in Table 5.1, 5.2. 5.3 and 5.4 in the nighttime time period in the RENC -Table 2.1, is exceeded in Sarıbalı region when compared with the calculated noise level.

For construction site and motorway construction noise according to IFC, the limit values specified in Table 2.2 for construction site and motorway construction noise are compared with 55 dB(A) and background noise.

According to the IFC regulation; it is seen that the noise level of 55 dB(A), which is the limit value defined in Table 2.2 during the daytime, is exceeded in all regions when compared with the measured noise level. When the calculation result is compared with the background noise and the limit value of 55 dB(A) noise level, there will be a high noise level increase for Sarıbalı region.

For construction site and motorway construction noise according to IFC, the limit values specified in Table 2.2 for construction site and motorway construction noise are compared with 45 dB(A) and background noise.

According to the IFC regulation; it is seen that the noise level of 45 dB(A), which is the limit value defined in Table 2.2 during the daytime, is exceeded in all regions when compared with the measured noise level. When the calculation result is compared with the background noise and the limit value of 55 dB(A) noise level, there will be a high noise level increase for Sarıbalı region.

5.3.2 Motorway Operation Noise

According to the RENC, the limit values stated in Table 2.1 for motorway operation noise are 65 dB(A) during the daytime, 60 dB(A) during the evening and 55 dB(A) during the night time. These limit values and the calculated values with background noise level are compared in Table 5.5, 5.6, 5.7, and 5.8 .

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Table 5.5 AAM noise modeling results and comparison table (for1st measurement values)

Districts	Measurement Date	RENC						IFC				Difference				
		L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00–19:00)	Calculated L_{eq} Evening (19:00-23:00)	Calculated L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Konaklı	17-18.09.2024	56.3	52.4	51.6	57.9	52.8	50.2	55.6	51.4	57.0	50.7	1.6	0.4	-1.4	1.4	-0.7
Çakallar	17-18.09.2024	58.3	56.5	41.9	60.4	55.5	53.0	57.9	48.7	59.5	53.4	2.1	-1.0	11.1	1.6	4.7
Avsallar	17-18.09.2024	57.2	54.2	53.9	53.1	48.4	46.0	56.8	53.6	52.3	46.4	-4.1	-5.8	-7.9	-4.5	-7.2
Akdam	17-18.09.2024	64.4	62.3	61.5	58.8	54.1	51.7	63.8	62.1	58.0	52.1	-5.6	-8.2	-9.8	-5.8	-10.0
Emişbeleni	17-18.09.2024	59.8	59.0	52.2	65.9	60.4	57.4	59.8	52.2	65.0	57.9	6.1	1.4	5.2	5.2	5.7
Karakaya	17-18.09.2024	68.7	66.2	62.7	60.3	55.5	53.2	68.5	62.4	59.4	53.5	-8.4	-10.7	-9.5	-9.1	-8.9
Hacıobası	17-18.09.2024	55.9	50.3	50.2	58.4	52.4	48.8	55.3	50.2	57.5	49.5	2.5	2.1	-1.4	2.2	-0.7
Uzunlar	17-18.09.2024	62.9	60.6	60.1	-	-	-	62.6	59.8	-	-	-	-	-	-	-
Sülek	17-18.09.2024	57.9	50.5	50.0	51.7	46.9	44.5	57.2	49.8	50.9	44.9	-6.2	-3.6	-5.5	-6.3	-4.9
Sağırin	17-18.09.2024	70.7	64.6	64.3	-	-	-	70.1	64.0	-	-	-	-	-	-	-
Sarıabalı	16-17.09.2024	62.4	56.2	53.6	59.3	54.5	52.2	61.5	53.2	58.4	52.5	-3.1	-1.7	-1.4	-3.1	-0.7
Sarılar	16-17.09.2024	65.5	63.7	62.0	-	-	-	65.1	62.5	-	-	-	-	-	-	-
Bucakşeyhler	16-17.09.2024	70.3	56.3	55.0	65.9	61.2	58.8	69.3	55.6	65.1	59.2	-4.4	4.9	3.8	-4.2	3.6
Kalemler	16-17.09.2024	57.6	52.7	45.7	56.9	52.0	48.8	57.1	45.6	56.1	49.9	-0.7	-0.7	3.1	-1.0	4.3
Köprüçay	16-17.09.2024	63.9	58.6	58.5	-	-	-	63.2	58.8	-	-	-	-	-	-	-
Bademliyar	16-17.09.2024	71.8	56.9	55.5	-	-	-	70.9	55.3	-	-	-	-	-	-	-
Ulukapı	16-17.09.2024	60.2	59.8	59.4	55.4	50.7	48.3	60.4	59.0	54.5	48.6	-4.8	-9.1	-11.1	-5.9	-10.4
Taşağıl	16-17.09.2024	79.1	68.5	56.4	55.2	49.8	46.8	78.3	56.5	54.3	47.3	-23.9	-18.7	-9.6	-24.0	-9.2
Hacıali	16-17.09.2024	73.1	45.6	43.9	43.5	38.8	36.4	72.2	43.5	42.7	36.8	-29.6	-6.8	-7.5	-29.5	-6.7
Deniztepesi	16-17.09.2024	63.9	55.2	54.8	49.7	44.1	41.0	63.1	54.8	48.8	41.5	-14.2	-11.1	-13.8	-14.3	-13.3
Serik	16-17.09.2024	64.4	63.0	60.4	42.7	38.0	35.6	64.3	60.2	41.9	36.0	-21.7	-25.0	-24.8	-22.4	-24.2

Arithmetic difference

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Table 5.6 AAM noise modeling results and comparison table (for1st measurement values)

Districts	Measurement Date	RENC						IFC				Difference				
		L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00–19:00)	Calculated L_{eq} Evening (19:00-23:00)	Calculated L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Konaklı	17-18.09.2024	56.3	52.4	51.6	57.9	52.8	50.2	55.6	51.4	57	50.7	3.9	3.2	2.4	3.8	2.7
Çakallar	17-18.09.2024	58.3	56.5	41.9	60.4	55.5	53	57.9	48.7	59.5	53.4	4.2	2.5	11.4	3.9	6.0
Avsallar	17-18.09.2024	57.2	54.2	53.9	53.1	48.4	46	56.8	53.6	52.3	46.4	1.4	1.0	0.7	1.3	0.8
Akdam	17-18.09.2024	64.4	62.3	61.5	58.8	54.1	51.7	63.8	62.1	58	52.1	1.1	0.6	0.4	1.0	0.4
Emişbeleni	17-18.09.2024	59.8	59	52.2	65.9	60.4	57.4	59.8	52.2	65	57.9	7.1	3.8	6.3	6.3	6.7
Karakaya	17-18.09.2024	68.7	66.2	62.7	60.3	55.5	53.2	68.5	62.4	59.4	53.5	0.6	0.4	0.5	0.5	0.5
Hacıobası	17-18.09.2024	55.9	50.3	50.2	58.4	52.4	48.8	55.3	50.2	57.5	49.5	4.4	4.2	2.4	4.2	2.7
Uzunlar	17-18.09.2024	62.9	60.6	60.1	-	-	-	62.6	59.8	-	-	-	-	-	-	-
Sülek	17-18.09.2024	57.9	50.5	50	51.7	46.9	44.5	57.2	49.8	50.9	44.9	0.9	1.6	1.1	0.9	1.2
Sağırin	17-18.09.2024	70.7	64.6	64.3	-	-	-	70.1	64	-	-	-	-	-	-	-
Sarıabalı	16-17.09.2024	62.4	56.2	53.6	59.3	54.5	52.2	61.5	53.2	58.4	52.5	1.7	2.2	2.4	1.7	2.7
Sarılar	16-17.09.2024	65.5	63.7	62	-	-	-	65.1	62.5	-	-	-	-	-	-	-
Bucakşeyhler	16-17.09.2024	70.3	56.3	55	65.9	61.2	58.8	69.3	55.6	65.1	59.2	1.3	6.1	5.3	1.4	5.2
Kalemler	16-17.09.2024	57.6	52.7	45.7	56.9	52	48.8	57.1	45.6	56.1	49.9	2.7	2.7	4.8	2.5	5.7
Köprüçay	16-17.09.2024	63.9	58.6	58.5	-	-	-	63.2	58.8	-	-	-	-	-	-	-
Bademliyar	16-17.09.2024	71.8	56.9	55.5	-	-	-	70.9	55.3	-	-	-	-	-	-	-
Ulukapı	16-17.09.2024	60.2	59.8	59.4	55.4	50.7	48.3	60.4	59	54.5	48.6	1.2	0.5	0.3	1.0	0.4
Taşağıl	16-17.09.2024	79.1	68.5	56.4	55.2	49.8	46.8	78.3	56.5	54.3	47.3	0.0	0.1	0.5	0.0	0.5
Hacıali	16-17.09.2024	73.1	45.6	43.9	43.5	38.8	36.4	72.2	43.5	42.7	36.8	0.0	0.8	0.7	0.0	0.8
Deniztepesi	16-17.09.2024	63.9	55.2	54.8	49.7	44.1	41	63.1	54.8	48.8	41.5	0.2	0.3	0.2	0.2	0.2
Serik	16-17.09.2024	64.4	63	60.4	42.7	38	35.6	64.3	60.2	41.9	36	0.0	0.0	0.0	0.0	0.0

Logarithmic difference

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Table 5.7 AAM noise modeling results and comparison table (for 2nd measurement values)

Districts	Measurement Date	RENC						IFC				Difference				
		L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00–19:00)	Calculated L_{eq} Evening (19:00-23:00)	Calculated L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Konaklı	21-22.09.2024	64.4	63.0	60.4	57.9	52.8	50.2	64.3	60.2	57.0	50.7	-6.5	-10.2	-10.2	-7.3	-9.5
Çakallar	21-22.09.2024	62.2	62.7	60.7	60.4	55.5	53.0	61.9	61.7	59.5	53.4	-1.8	-7.2	-7.7	-2.4	-8.3
Avsallar	21-22.09.2024	61.6	61.5	55.4	53.1	48.4	46.0	61.9	54.9	52.3	46.4	-8.5	-13.1	-9.4	-9.6	-8.5
Akdam	21-22.09.2024	62.1	60.2	57.4	58.8	54.1	51.7	62.0	56.9	58.0	52.1	-3.3	-6.1	-5.7	-4.0	-4.8
Emişbeleni	21-22.09.2024	71.6	69.5	66.7	65.9	60.4	57.4	71.3	66.6	65.0	57.9	-5.7	-9.1	-9.3	-6.3	-8.7
Karakaya	21-22.09.2024	73.0	72.8	63.8	60.3	55.5	53.2	73.2	63.6	59.4	53.5	-12.7	-17.3	-10.6	-13.8	-10.1
Hacıobası	21-22.09.2024	61.2	60.2	43.9	58.4	52.4	48.8	61.2	47.6	57.5	49.5	-2.8	-7.8	4.9	-3.7	1.9
Uzunlar	21-22.09.2024	74.5	62.3	53.5	-	-	-	73.6	54.3	-	-	-	-	-	-	-
Sülek	21-22.09.2024	68.6	66.8	62.4	51.7	46.9	44.5	68.2	63.5	50.9	44.9	-16.9	-19.9	-17.9	-17.3	-18.6
Sağırin	21-22.09.2024	67.6	67.0	66.0	-	-	-	67.3	66.5	-	-	-	-	-	-	-
Sarıabalı	21-22.09.2024	61.9	55.7	55.6	-	-	-	61.2	55.5	58.4	52.5	-	-	-	-2.8	-3.0
Sarılar	21-22.09.2024	63.1	63.0	59.0	59.3	54.5	52.2	63.2	59.3	-	-	-3.8	-8.5	-6.8	-	-
Bucakşeyhler	21-22.09.2024	65.7	64.3	58.7	65.9	61.2	58.8	65.5	59.3	65.1	59.2	0.2	-3.1	0.1	-0.4	-0.1
Kalemler	21-22.09.2024	66.0	61.7	60.8	56.9	52.0	48.8	65.5	60.6	56.1	49.9	-9.1	-9.7	-12.0	-9.4	-10.7
Köprüçay	21-22.09.2024	64.0	62.9	62.8	-	-	-	64.0	62.4	-	-	-	-	-	-	-
Bademliyar	21-22.09.2024	63.3	61.7	61.6	-	-	-	63.2	61.2	-	-	-	-	-	-	-
Ulukapı	21-22.09.2024	62.7	57.9	54.9	55.4	50.7	48.3	62.1	55.0	54.5	48.6	-7.3	-7.2	-6.6	-7.6	-6.4
Taşağıl	21-22.09.2024	68.8	65.5	65.3	55.2	49.8	46.8	68.4	65.1	54.3	47.3	-13.6	-15.7	-18.5	-14.1	-17.8
Hacıali	21-22.09.2024	68.5	67.2	66.0	43.5	38.8	36.4	68.4	65.9	42.7	36.8	-25.0	-28.4	-29.6	-25.7	-29.1
Deniztepesi	21-22.09.2024	67.0	61.1	57.8	49.7	44.1	41.0	66.3	57.4	48.8	41.5	-17.3	-17.0	-16.8	-17.5	-15.9
Serik	21-22.09.2024	66.6	62.2	60.3	42.7	38.0	35.6	66.1	59.9	41.9	36.0	-23.9	-24.2	-24.7	-24.2	-23.9

Arithmetic difference

Table 5.8 AAM noise modeling results and comparison table (for 2st measurement values)

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Districts	Measurement Date	RENC						IFC				Difference				
		L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00–19:00)	Calculated L_{eq} Evening (19:00-23:00)	Calculated L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Konaklı	21-22.09.2024	64.4	63	60.4	57.9	52.8	50.2	64.3	60.2	57	50.7	0.9	0.4	0.4	0.7	0.5
Çakallar	21-22.09.2024	62.2	62.7	60.7	60.4	55.5	53	61.9	61.7	59.5	53.4	2.2	0.8	0.7	2.0	0.6
Avsallar	21-22.09.2024	61.6	61.5	55.4	53.1	48.4	46	61.9	54.9	52.3	46.4	0.6	0.2	0.5	0.5	0.6
Akdam	21-22.09.2024	62.1	60.2	57.4	58.8	54.1	51.7	62	56.9	58	52.1	1.7	1.0	1.0	1.5	1.2
Emişbeleni	21-22.09.2024	71.6	69.5	66.7	65.9	60.4	57.4	71.3	66.6	65	57.9	1.0	0.5	0.5	0.9	0.5
Karakaya	21-22.09.2024	73	72.8	63.8	60.3	55.5	53.2	73.2	63.6	59.4	53.5	0.2	0.1	0.4	0.2	0.4
Hacıobası	21-22.09.2024	61.2	60.2	43.9	58.4	52.4	48.8	61.2	47.6	57.5	49.5	1.8	0.7	6.1	1.5	4.1
Uzunlar	21-22.09.2024	74.5	62.3	53.5	-	-	-	73.6	54.3	-	-	-	-	-	-	-
Sülek	21-22.09.2024	68.6	66.8	62.4	51.7	46.9	44.5	68.2	63.5	50.9	44.9	0.1	0.0	0.1	0.1	0.1
Sağırin	21-22.09.2024	67.6	67	66	-	-	-	67.3	66.5	-	-	-	-	-	-	-
Sarıabalı	21-22.09.2024	61.9	55.7	55.6	-	-	-	61.2	55.5	58.4	52.5	-	-	-	1.8	1.8
Sarılar	21-22.09.2024	63.1	63	59	59.3	54.5	52.2	63.2	59.3	-	-	1.5	0.6	0.8	-	-
Bucakşeyhler	21-22.09.2024	65.7	64.3	58.7	65.9	61.2	58.8	65.5	59.3	65.1	59.2	3.1	1.7	3.1	2.8	3.0
Kalemler	21-22.09.2024	66	61.7	60.8	56.9	52	48.8	65.5	60.6	56.1	49.9	0.5	0.4	0.3	0.5	0.4
Köprüçay	21-22.09.2024	64	62.9	62.8	-	-	-	64	62.4	-	-	-	-	-	-	-
Bademliyar	21-22.09.2024	63.3	61.7	61.6	-	-	-	63.2	61.2	-	-	-	-	-	-	-
Ulukapı	21-22.09.2024	62.7	57.9	54.9	55.4	50.7	48.3	62.1	55	54.5	48.6	0.7	0.8	0.9	0.7	0.9
Taşağıl	21-22.09.2024	68.8	65.5	65.3	55.2	49.8	46.8	68.4	65.1	54.3	47.3	0.2	0.1	0.1	0.2	0.1
Hacıali	21-22.09.2024	68.5	67.2	66	43.5	38.8	36.4	68.4	65.9	42.7	36.8	0.0	0.0	0.0	0.0	0.0
Deniztepesi	21-22.09.2024	67	61.1	57.8	49.7	44.1	41	66.3	57.4	48.8	41.5	0.1	0.1	0.1	0.1	0.1
Serik	21-22.09.2024	66.6	62.2	60.3	42.7	38	35.6	66.1	59.9	41.9	36	0.0	0.0	0.0	0.0	0.0

Logarithmic difference

"No additional contribution is considered for the areas marked with a dash (-).

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RENC -Table 2.1 shows that the noise levels calculated with the defined limit values and background noise levels in the day, evening and night time periods are exceeded in Bucakşeyhler and Emişbeleni areas.

According to IFC, the limit values stated in Table 2.2 for motorway operation noise are 55 dB(A) for daytime, 45 dB(A) for nighttime and compared with background noise.

IFC -Table 2.2 shows that the noise levels calculated with the defined limit values and background noise levels in the day, evening and night time periods are exceeded in Bucakşeyhler and Emişbeleni.

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6 NOISE CONTROL MEASURES

6.1 Construction Site and Construction

During the construction of the motorway in Sarıabalı region, it was found that the background noise level increased by more than 7 dB(A) during the daytime. It is recommended that the machinery and equipment that will work in this area should consist of machines with low noise levels and that noise measurements should be carried out regularly.

6.2 Noise control measures in Bucakşeyhler and Emişbeleni

Calculations are based on the traffic load in 2040. Therefore, whether this noise level is reached should be checked by regular noise measurements.

Noise control measures such as noise barrier or earth pallet systems, which are accepted in the world and in our country, can be applied.

When the physical conditions were examined, it was determined that there was no area to build a pallet system on the side of the motorway. Therefore; high absorption aluminum noise barrier is recommended as noise barrier (Figure 6.2.1).

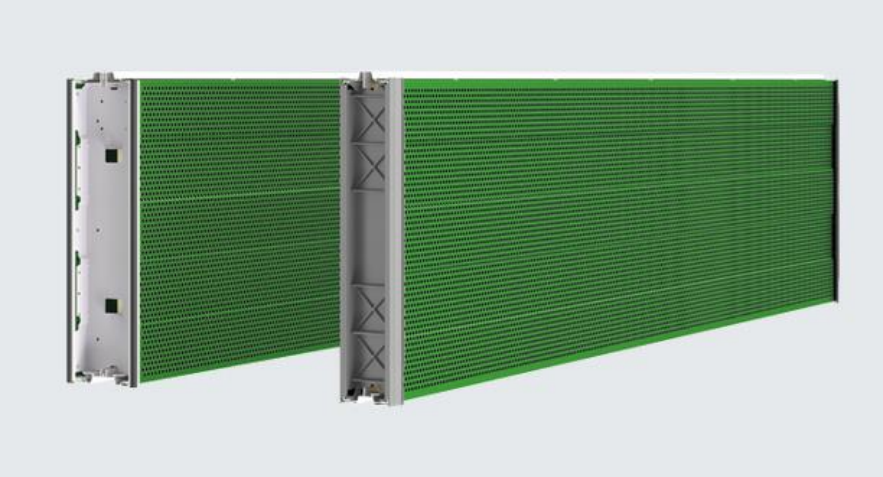

Figure 6.1 Absorption type aluminum noise barrier

High absorption wall cladding is recommended for tunnel portal entrances and exits (Figure 6.2.2).

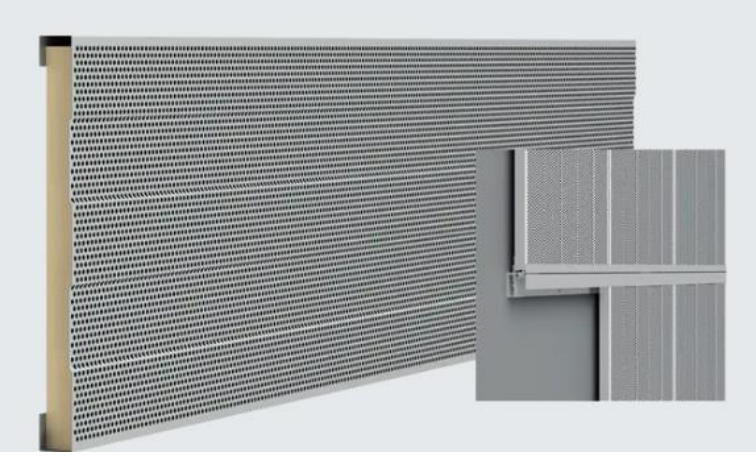

Figure 6.2 Absorption type aluminum noise barrier

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Technical specifications for aluminum noise barrier;

FEATURES OF THE ABSORBER TYPE NOISE BARRIER:

- **According to EN 1793-1: Single number rating of sound absorption: $DL_\alpha \geq 25$ dB A3**
- **According to EN 1793-2: Insulation performance class $DL_R \geq 8$ dB B3**

Standards for barriers to be used to reduce road noise:

- **TS EN 14388:** Traffic noise reduction devices - Technical specifications
- **TS EN 1793-1:** Road traffic noise reduction devices - Test method for determining acoustic performance - Part 1: Actual characteristics of sound absorption under diffuse sound field conditions
- **TS EN 1793-2:** Road traffic noise attenuation systems - Test method for the determination of acoustic performance - Part 2: Basic properties of airborne sound insulation under uniformly distributed sound field conditions
- **TS EN 1793-3:** Road traffic noise reduction systems - Test method for the determination of acoustic performance - Part 3: Normalized traffic noise spectrum
- **TS EN 1793-4:** Road traffic noise attenuation systems - Test method for the determination of acoustic performance - Part 4: Basic properties - Sound refraction values
- **TS EN 1793-5:** Road traffic noise attenuation systems - Test method for the determination of acoustic performance - Part 5: Basic properties - Sound reflection values under direct sound field conditions
- **TS EN 1793-6:** Road traffic noise attenuating devices - Test methods for the determination of acoustic performance - Part 6: Basic characteristics - In situ values of the insulation of airborne sound under direct field conditions
- **TS EN 1794-1+AC**: Road traffic noise reduction devices - Non-acoustic performance - Part 1: Mechanical performance and stability requirements
- **TS EN 1794-2:** Road traffic noise attenuation systems - Non-acoustic performance - Part 2: General safety requirements and environmental requirements
- **TS EN 1794-3:** Road traffic noise reducing devices - Non-acoustic performance - Part 3: Reaction to fire - Combustion behavior and classification of noise reducing devices
- **TS EN 14389-1** Road traffic noise attenuation systems - Methods for assessing long-term performance Part 1: Acoustic characteristics
- **TS EN 14389-2** Road traffic noise attenuation systems - Methods for assessing long-term performance Section 2: Acoustic external characteristics

An action plan has been developed for both areas.

Noise maps prior to the action plan are provided in Figures 6.3 to 6.6 in accordance with the Environmental Noise Directive, and in Figures 6.7 and 6.10 in accordance with IFC.

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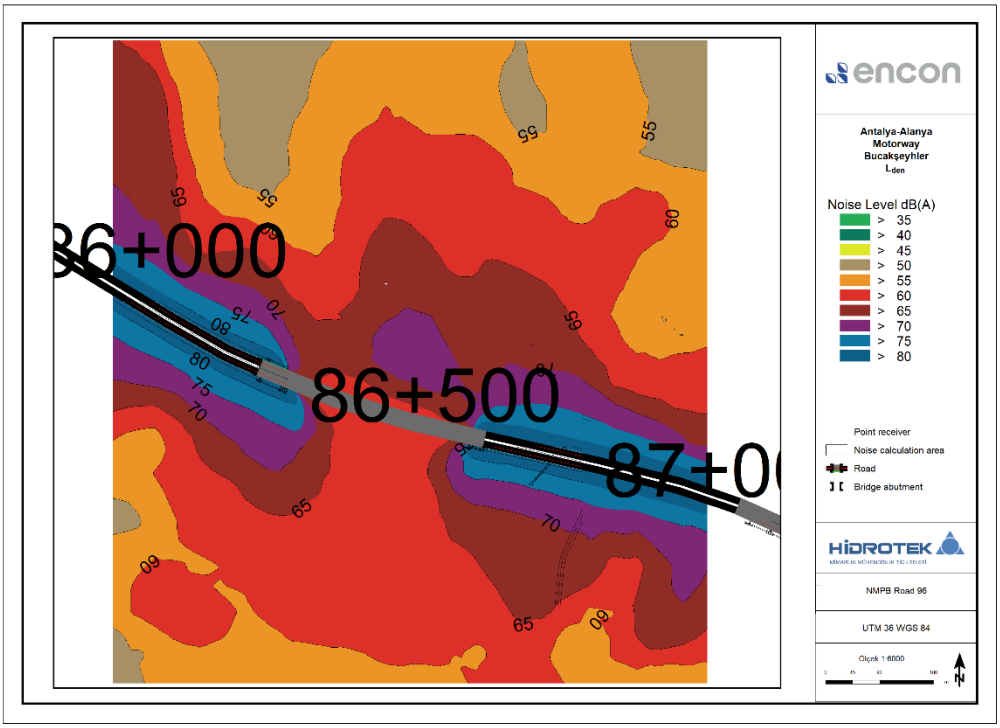

Figure 6.3 Bucakşeyhler noise map Lden

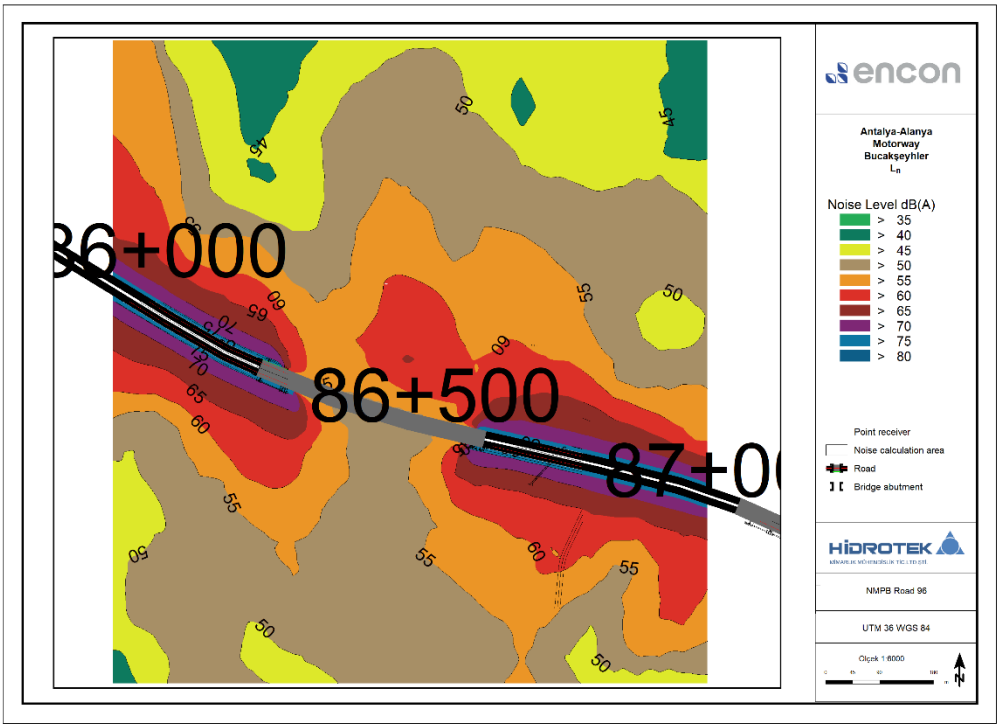

Figure 6.4 Bucakşeyhler noise map Ln

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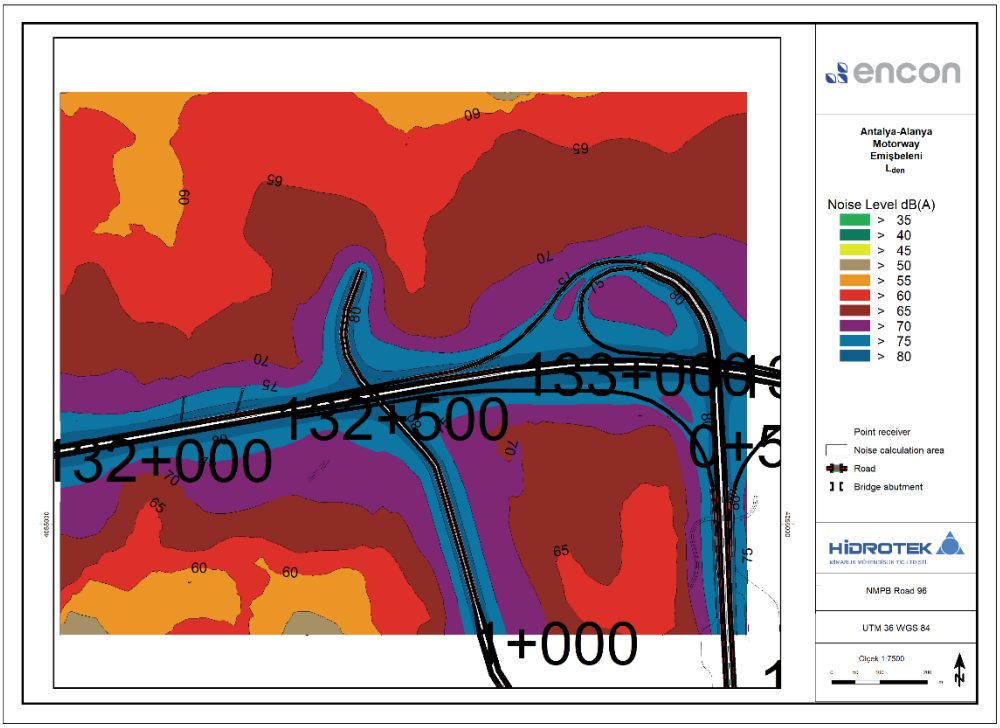

Figure 6.5 Emişbelen noise map Lden

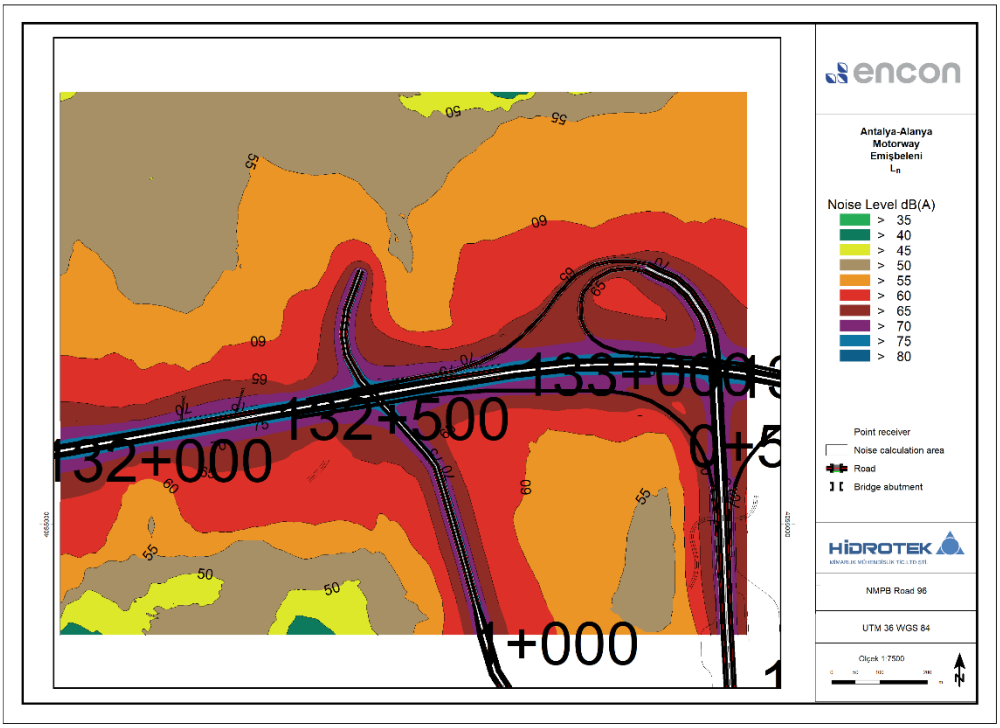

Figure 6.6 Emişbelen noise map Ln

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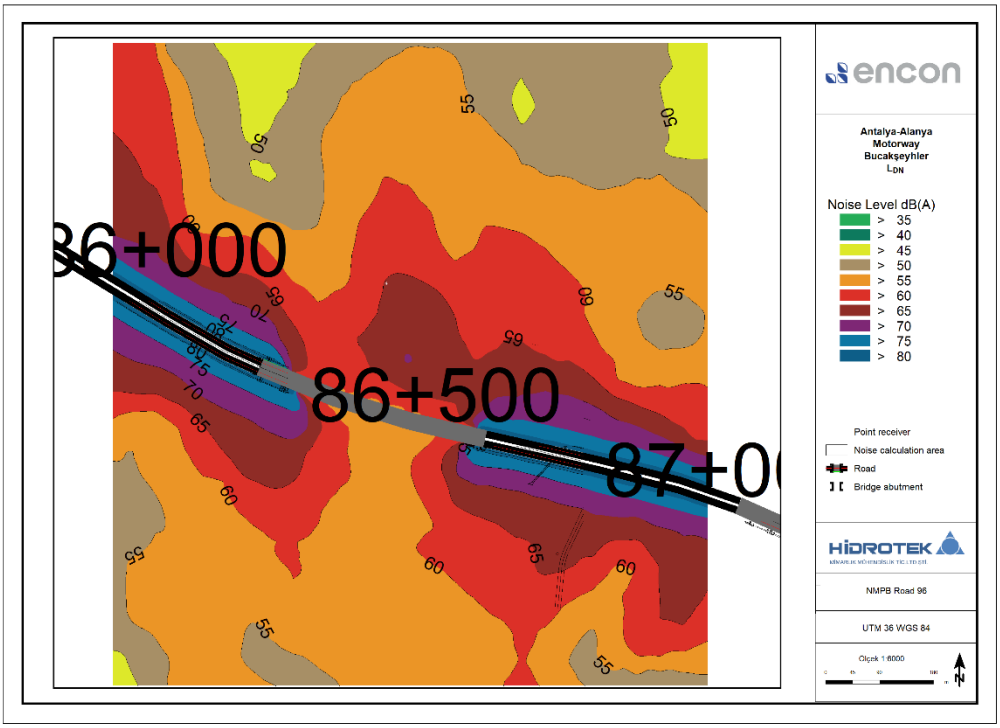

Figure 6.7 Bucakşeyhler noise map LDN

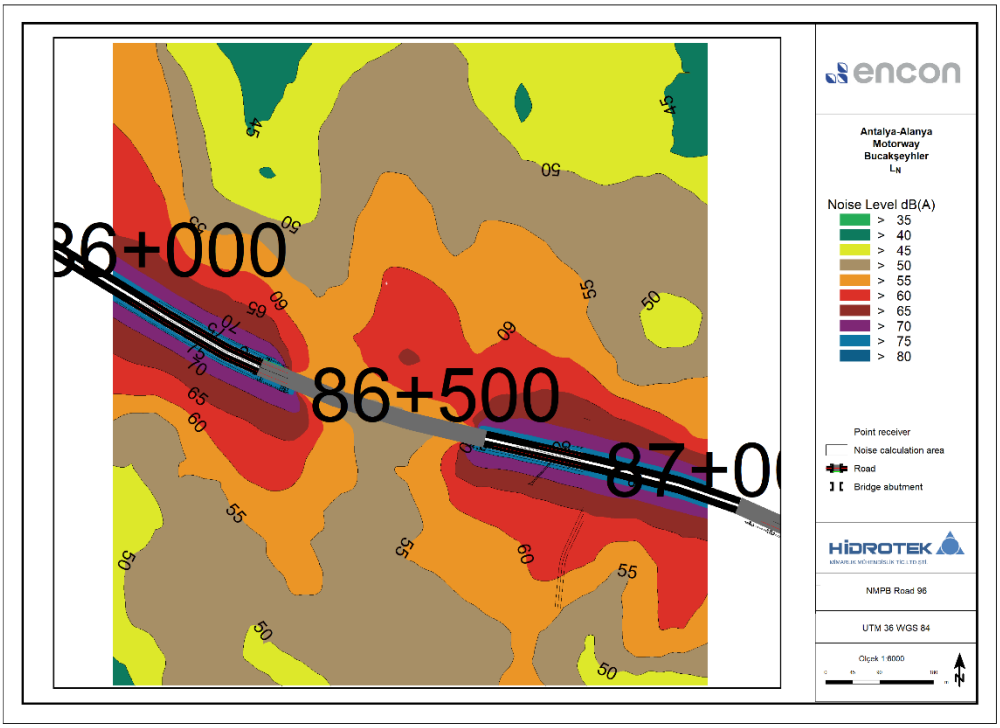

Figure 6.8 Bucakşeyhler noise map LN

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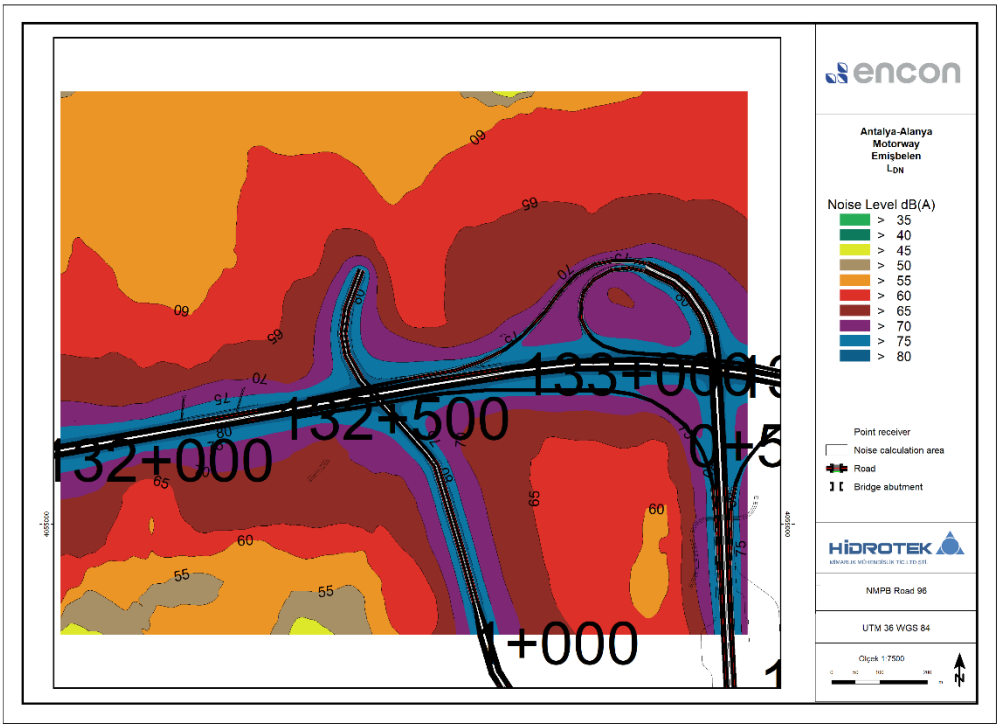

Figure 6.9 Emişbelen noise map LDN

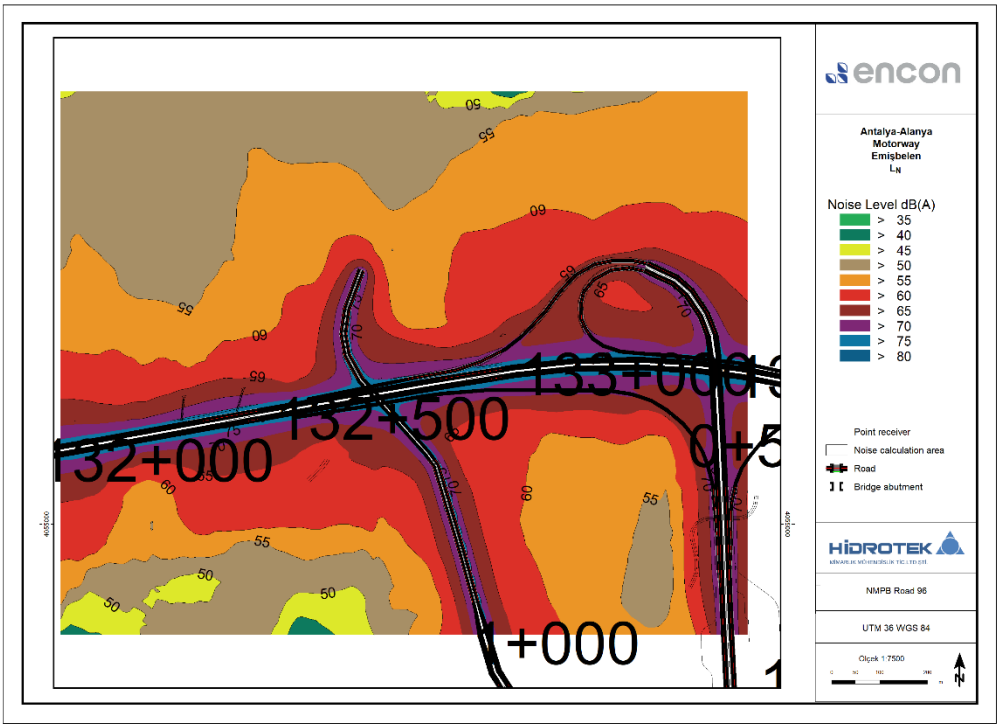

Figure 6.10 Emişbelen noise map LN

The noise barrier layout for both areas where action plans were developed is shown in Figures 6.11 and 6.12.

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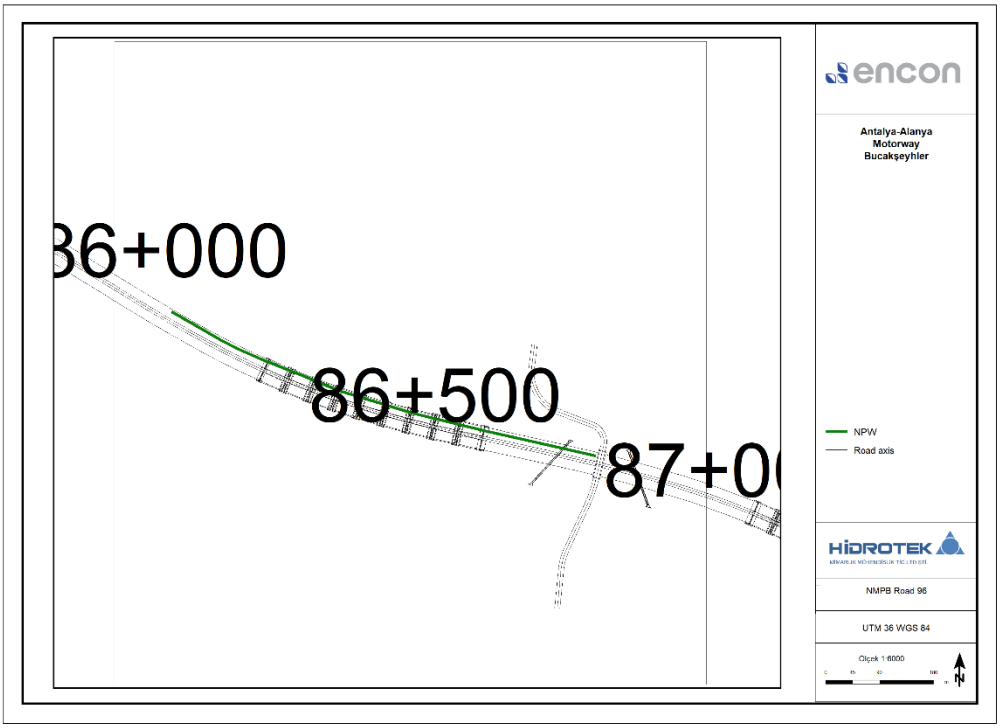

Figure 6.11 Noise barrier locations for Bucakşeyhler

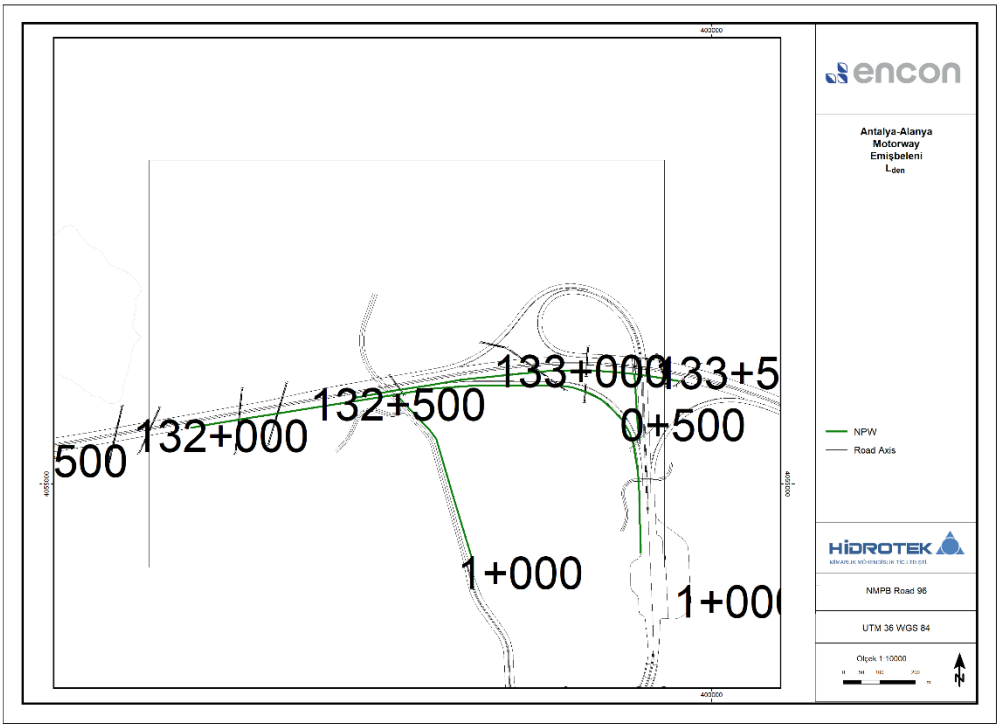

Figure 6.12 Noise barrier locations for Emişbelen

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Noise maps after action planning were provided in Figures 6.13 to 6.16 in accordance with the Environmental Noise Directive, and in Figures 6.17 to 6.20 in accordance with IFC.

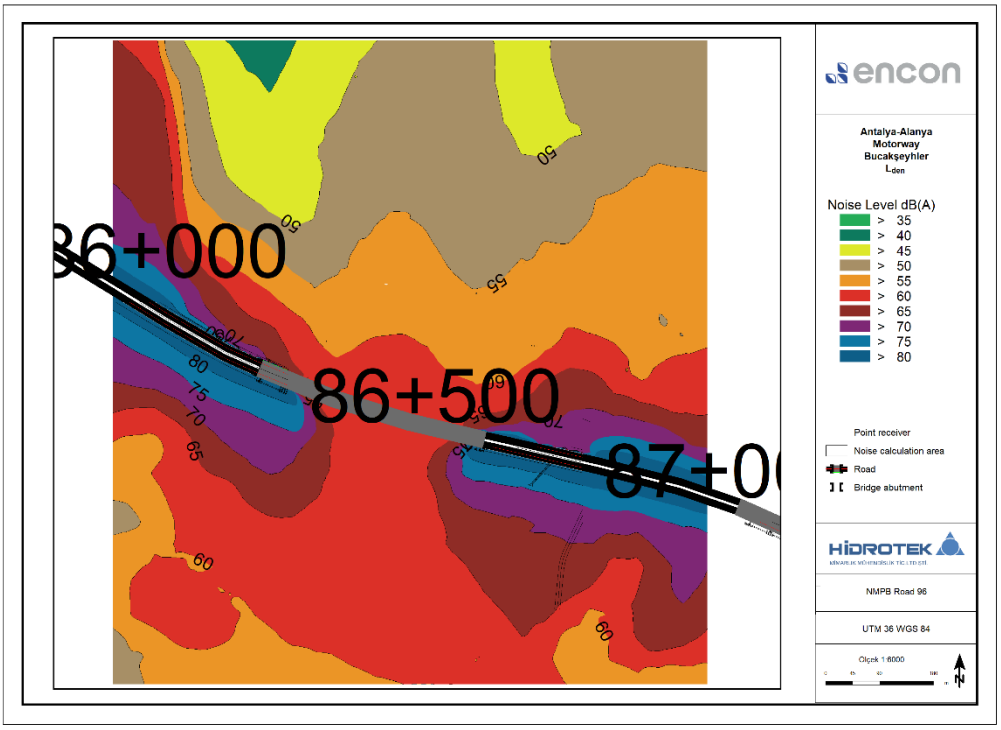

Figure 6.13 Bucakşeyhler noise map Lden

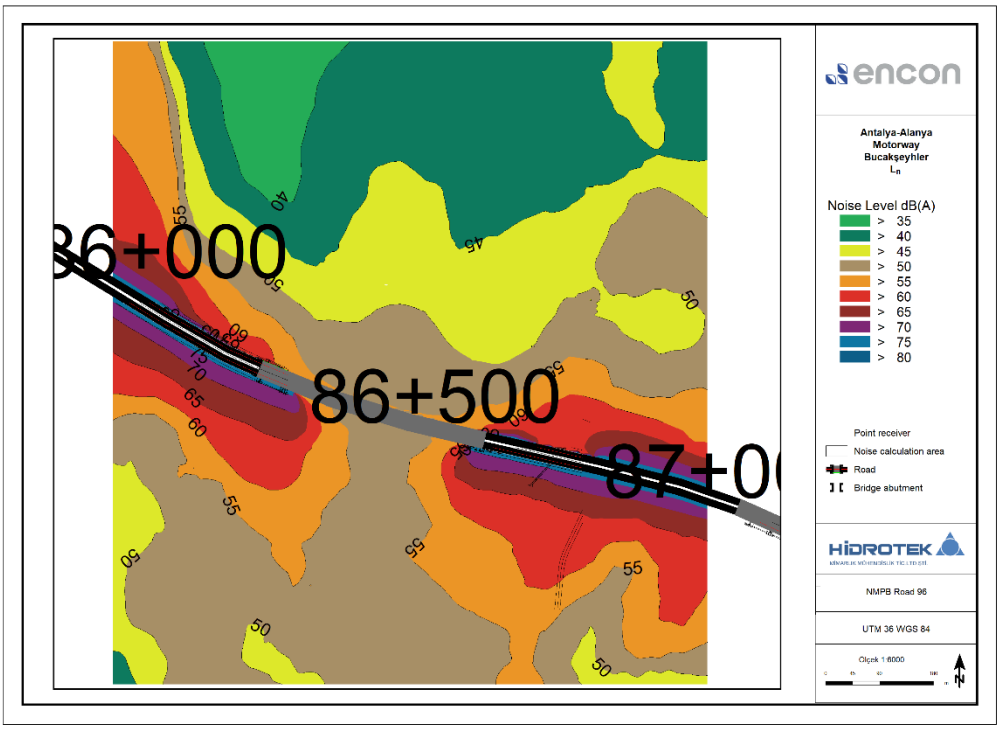

Figure 6.14 Bucakşeyhler noise map Ln

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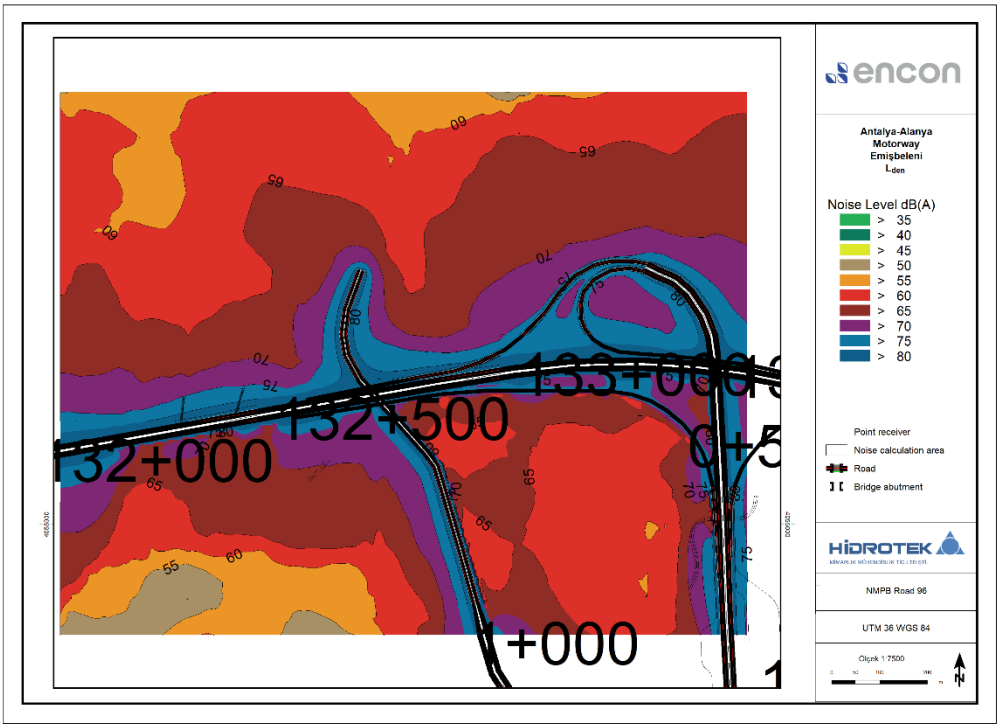

Figure 6.15 Emişbelen noise map Lden

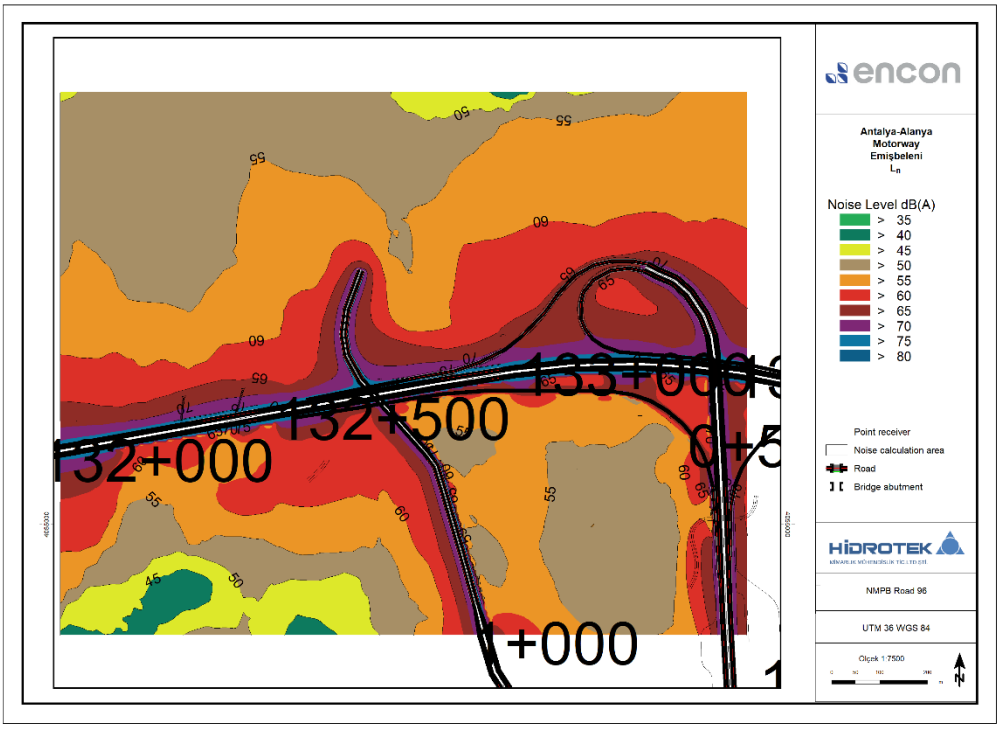

Figure 6.16 Emişbelen noise map Ln

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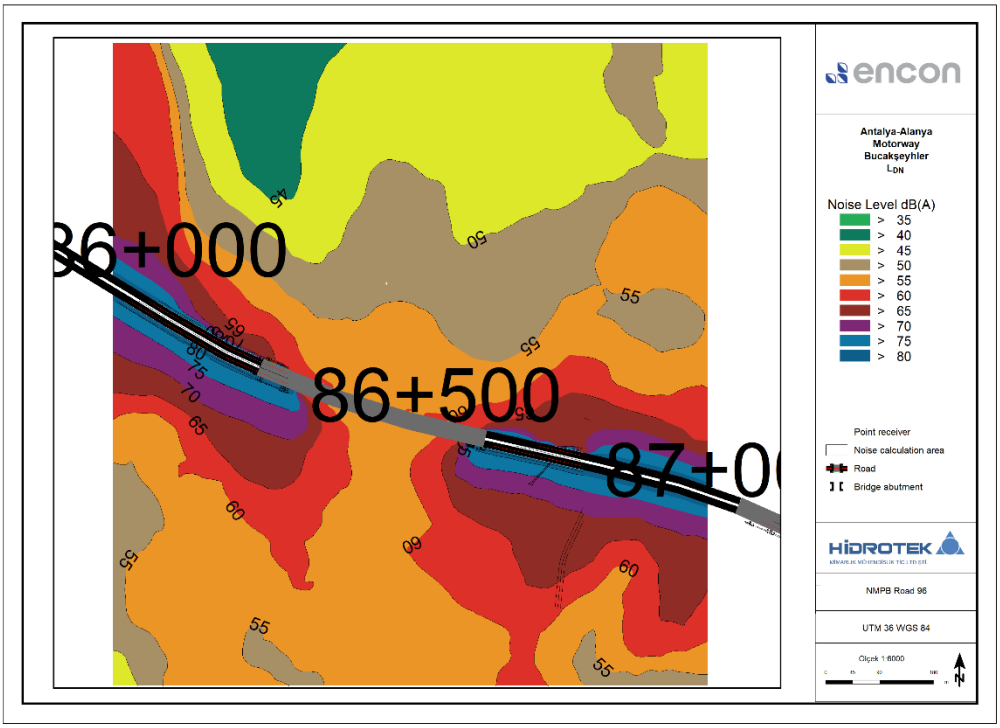

Figure 6.17 Bucakşeyhler noise map LDN

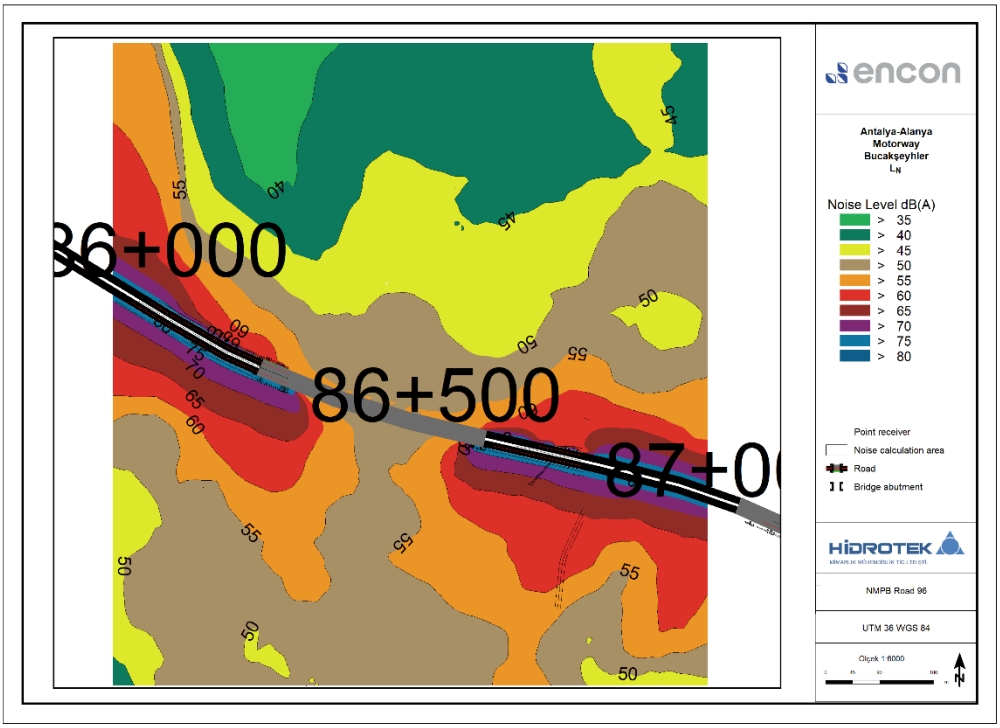

Figure 6.18 Bucakşeyhler noise map LN

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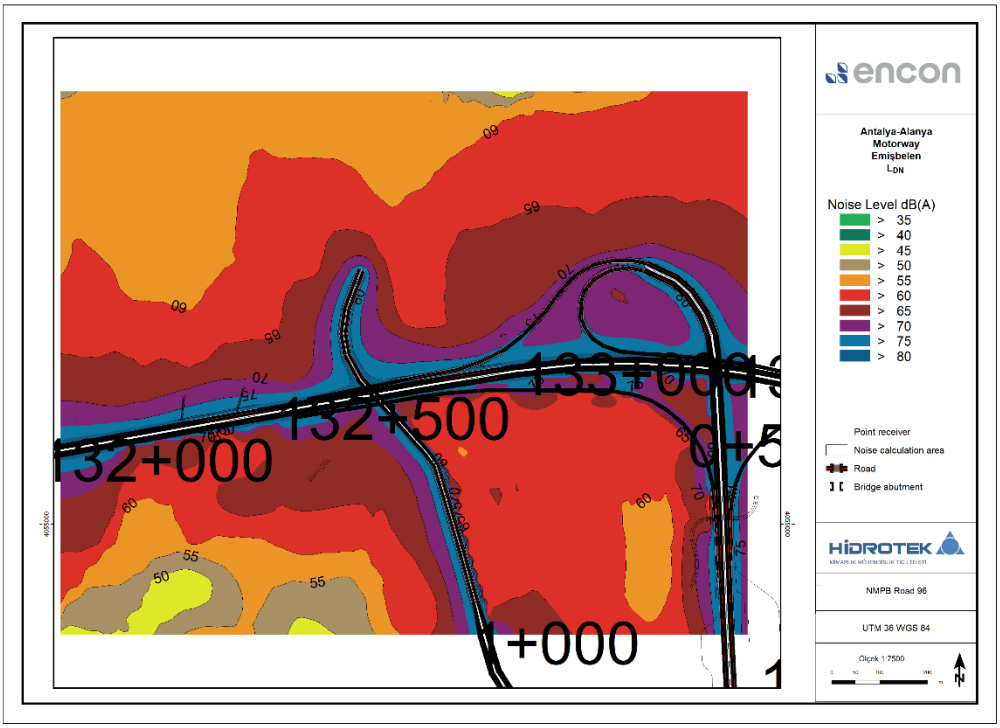

Figure 6.19 Emişbelen noise map LDN

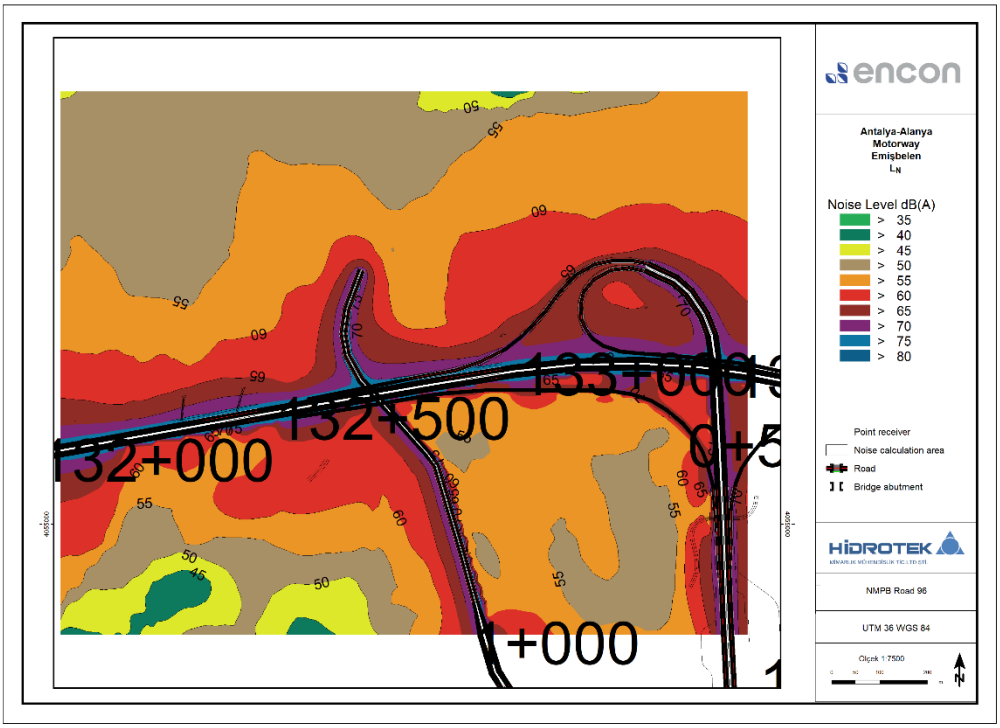

Figure 6.20 Emişbelen noise map LN

After the action plan was made;

Improvements were compared in accordance with the Environmental Noise Directive and IFC. Comparison tables are provided in Table 6.1 and Table 6.2.

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Tablo 6.1 AAM noise modeling results and comparison table (for1st measurement values)(After the action plan)

Districts	Measurement Date	RENC						IFC				Difference				
		L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00–19:00)	Calculated L_{eq} Evening (19:00-23:00)	Calculated L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Emişbeleni	17-18.09.2024	59.8	59.0	52.2	62.0	56.4	53.4	59.8	52.2	61.1	53.9	2.2	-2.6	1.2	1.3	1.7
Bucakşeyhler	16-17.09.2024	70.3	56.3	55.0	56.0	51.2	48.8	69.3	55.6	55.1	49.2	-14.3	-5.1	-6.2	-14.2	-6.4

Tablo 6.2. AAM noise modeling results and comparison table (for2st measurement values)(After the action plan)

Districts	Measurement Date	RENC						IFC				Difference				
		L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00–19:00)	Calculated L_{eq} Evening (19:00-23:00)	Calculated L_{eq} Night (23:00-07:00)	L_{eq} Day (07:00-22:00)	L_{eq} Night (22:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)	L_{eq} Day (07:00–19:00)	L_{eq} Evening (19:00-23:00)	L_{eq} Night (23:00-07:00)	Calculated L_{eq} Day (07:00-22:00)	Calculated L_{eq} Night (22:00-07:00)
		dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA	dBA
Emişbeleni	21-22.09.2024	71.6	69.5	66.7	62.0	56.4	53.4	71.3	66.6	61.1	53.9	-9.6	-13.1	-13.3	-10.2	-12.7
Bucakşeyhler	21-22.09.2024	65.7	64.3	58.7	56.0	51.2	48.8	65.5	59.3	55.1	49.2	-9.7	-13.1	-9.9	-10.4	10.1

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When the tables are examined, it can be seen that the limit values according to Environmental Noise Directive and IFC are not exceeded.

Noise barrier locations used in action plans;

The dimensions for the Bucakşeyhler are given in Figure 6.11. The material to be used is a noise barrier with an absorption coefficient of 4.5 m high and approximately 750 m long, which complies with "**TS EN 14388:** Traffic noise reduction devices - Technical specifications ". The approximate cost for this noise barrier is calculated to be 850,000.- Euro (part of this noise barrier is located on a viaduct).

For Emişbeleni, it is shown in Figure 6.12. The material to be used is a noise barrier with sound absorption properties compliant with "**TS EN 14388:** Traffic noise reduction devices - Technical specifications " measuring 4.5 meters in height and a total length of 3 kilometers (1.5+1+0.5 kilometers). The approximate cost for this noise barrier is calculated as 3,500,000.- Euro

There are a total of 5 tunnels (10 double-sided tunnels) within the scope of the project. There is an increase in noise at the entrances and exits of the tunnels. To prevent this increase, the tunnel entrance and exit portals should be covered with "High absorption wall cladding". The cladding to be used must comply with **TS EN 14388:** Traffic noise reduction devices - Technical specifications. The estimated total cost for the 5 tunnels (10 in total for two-way traffic, including entrance and exit portals) is approximately 6,000,000.- Euro.

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7 RESULTS

Noise emission impacts of the AAM Project have been assessed using SoundPLAN V 9.1 (64 bit) program within the scope of the RENC and IFC- regulation. Projected traffic data for 2040 was used for noise level predictions. Existing noise levels were measured at 21 points along the motorway route and construction sites, and noise levels were calculated by assigning virtual receivers for these points. During the construction phase of the Motorway, according to the legislation, the limit values are exceeded at Quarries and Construction Site. It is calculated that there will be exceedance of the limit value due to the motorway in two regions after the motorway becomes operational and in the following period. Noise barriers have been proposed for Bucakşeyhler and Emişbeleni sections. Monitoring activities should be carried out for both regions in the future.

7.1 Action Plan Recommendations

According to the modeling results, afforestation is foreseen in the region in order to keep the noise levels within the limit value.

In order for afforestation to be used in noise mitigation, some conditions must be met. In the area where afforestation will be planted, at least 30 m wide from the motorway, winter and summer evergreen and dense trees should be planted. The selected tree type should also be selected from the category of trees whose leaves are absorptive in order to have an effect on noise reduction.

Another action plan envisages the use of earthen embankments to provide elevation. Earthen embankments are an artificial retaining application created by applying an elevation higher than natural piles. They can be made of wooden/concrete pieces, steel nets or woven grasses into which tree saplings can be planted. Earthen embankments provide the motorway environment with a visually aesthetic structure with flowering works.

Where there is not enough free space, noise barriers can be applied. For the implementation of noise barriers and other measures, background noise measurements should be carried out in sensitive receiving environments during the construction and operation phases and such applications should be realized in cases where the results exceed the environmental noise limit values. In this respect, it is recommended that measurement, evaluation and measure taking (implementation) processes should be monitored and decided upon.

Ali AKDAĞ
Acoustician

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Explanations:

L_{gag}	:	L_{den}	L_{den}	00:00-00:00	gün ortalaması (gündüz -akşam gece / day-evening night)
$L_{gündüz}$	:	L_{d}	L_{day}	07:00-19:00	gündüz - day
$L_{akşam}$	:	L_{e}	$L_{evening}$	19:00-23:00	akşam -evening
L_{gece}	:	L_{n}	L_{night}	23:00-07:00	gece-night

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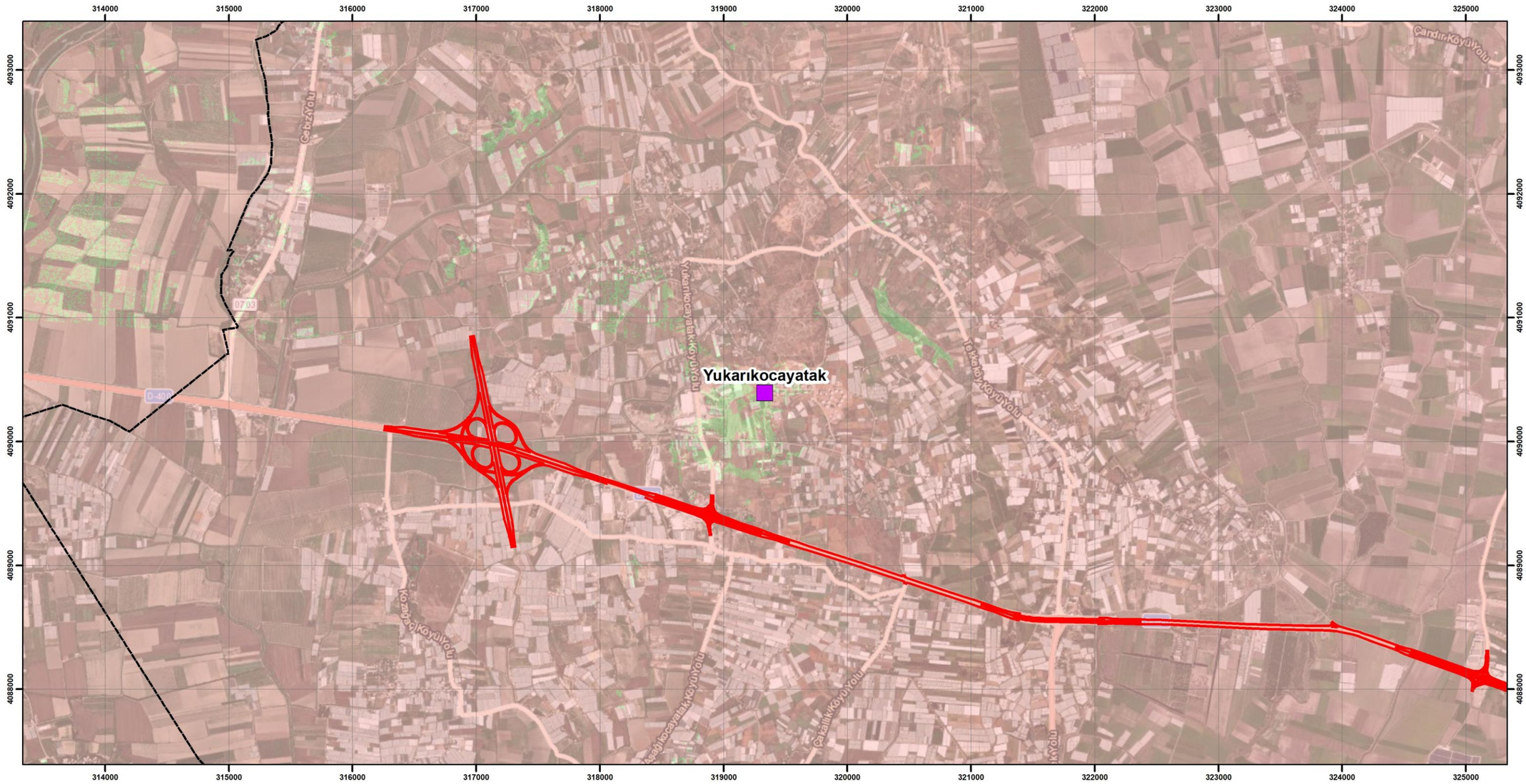

LEGEND

Boundaries
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Yukarıkocayatak Neighbourhood

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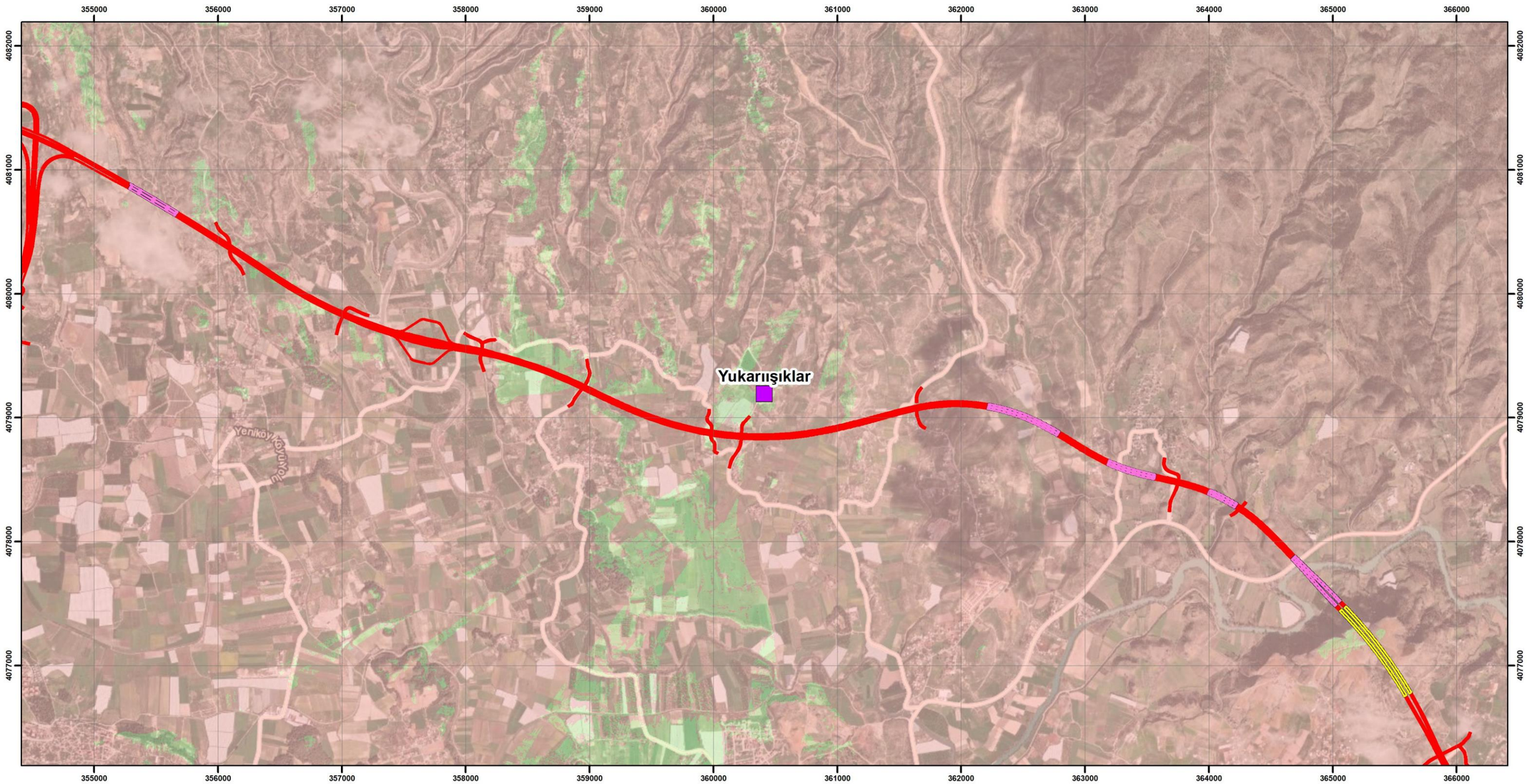


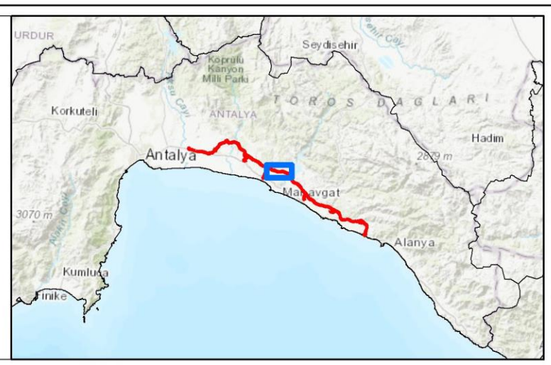
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

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Visibility Map of Yukarıışıklar Neighbourhood

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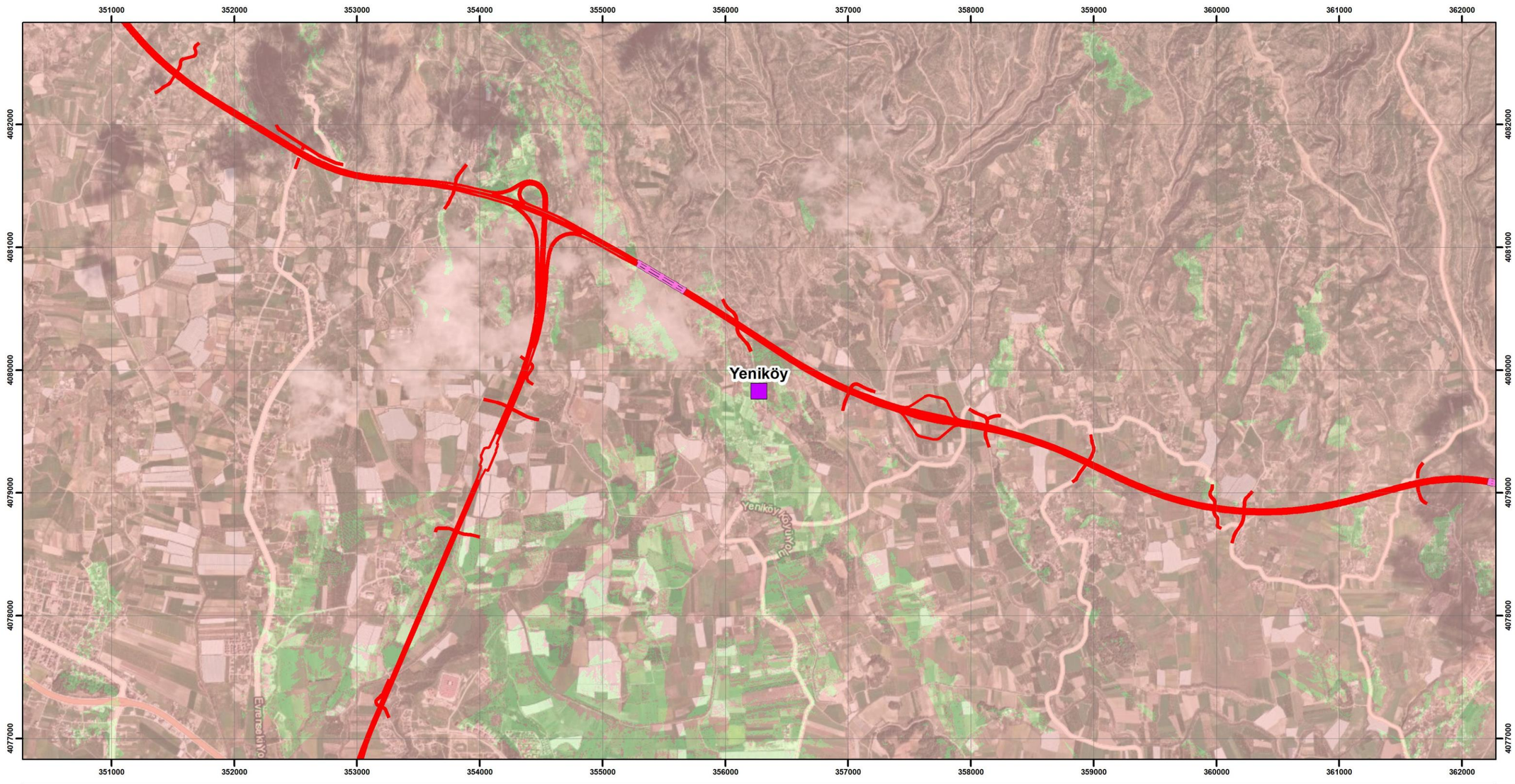

LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

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Visibility Map of Yeniköy Neighbourhood

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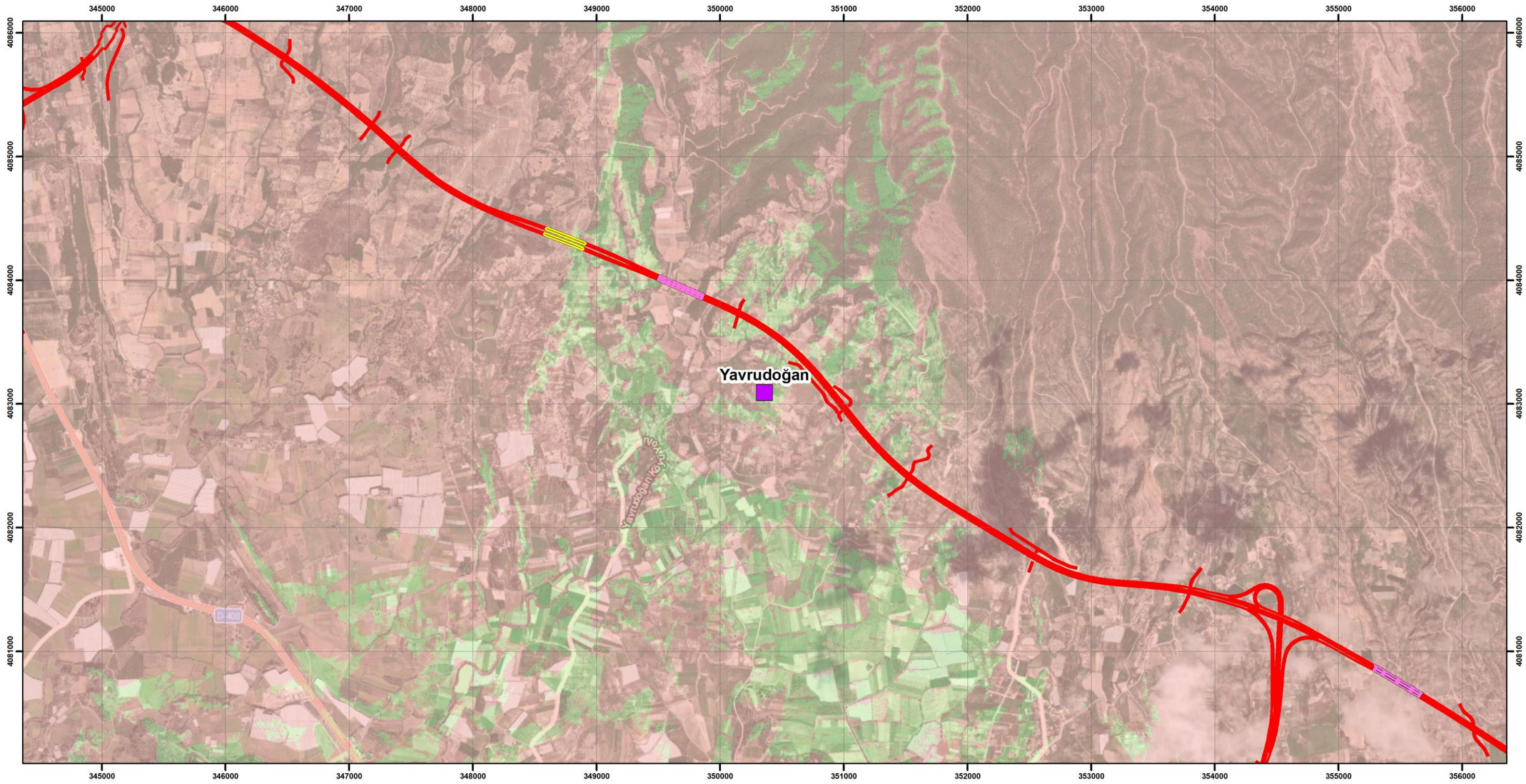

LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

N
W E
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0 300 600 1.200 m

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Visibility Map of Yavrudoğan Neighbourhood

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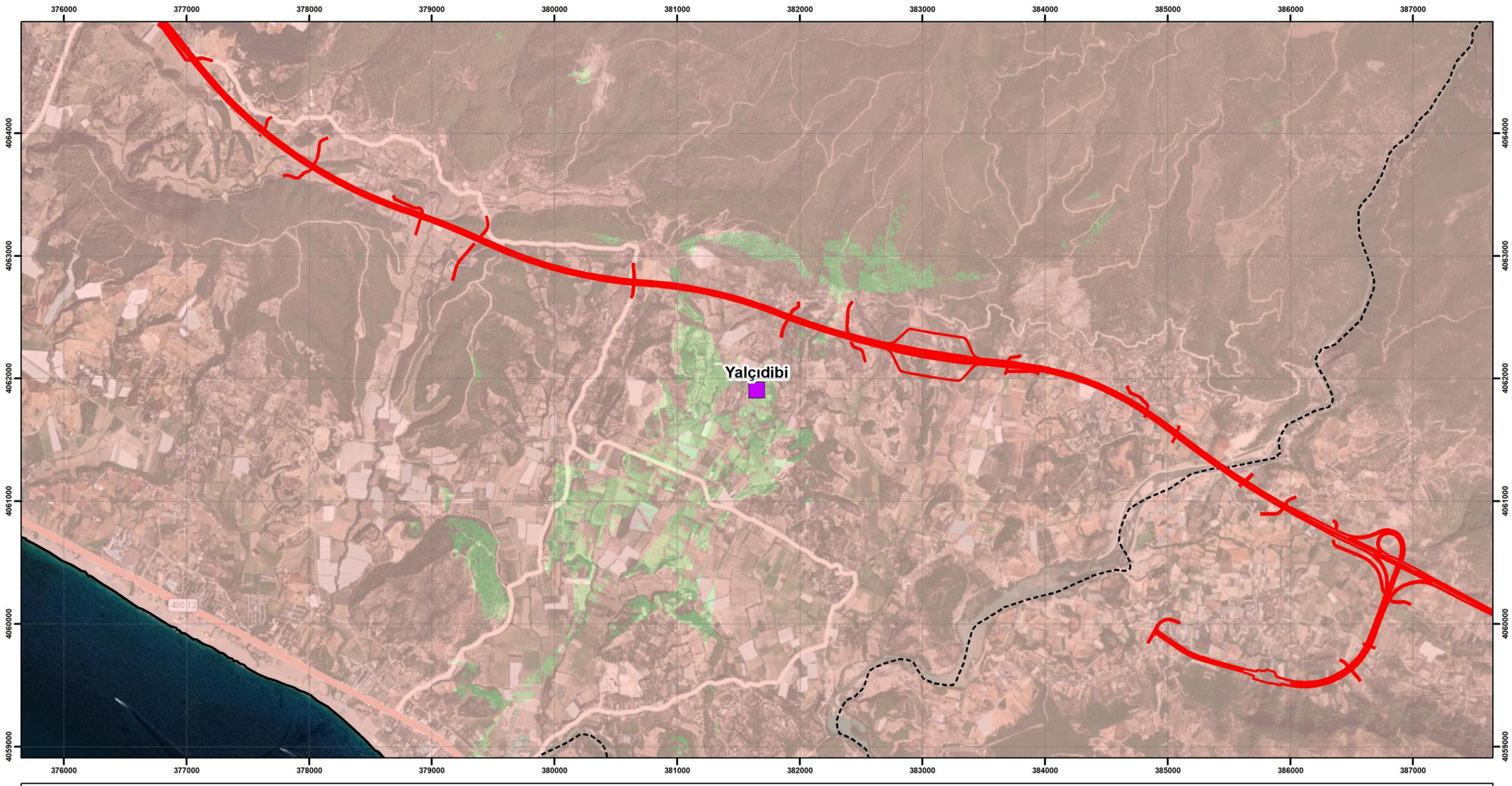

LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

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Visibility Map of Yalçıdibi Neighbourhood

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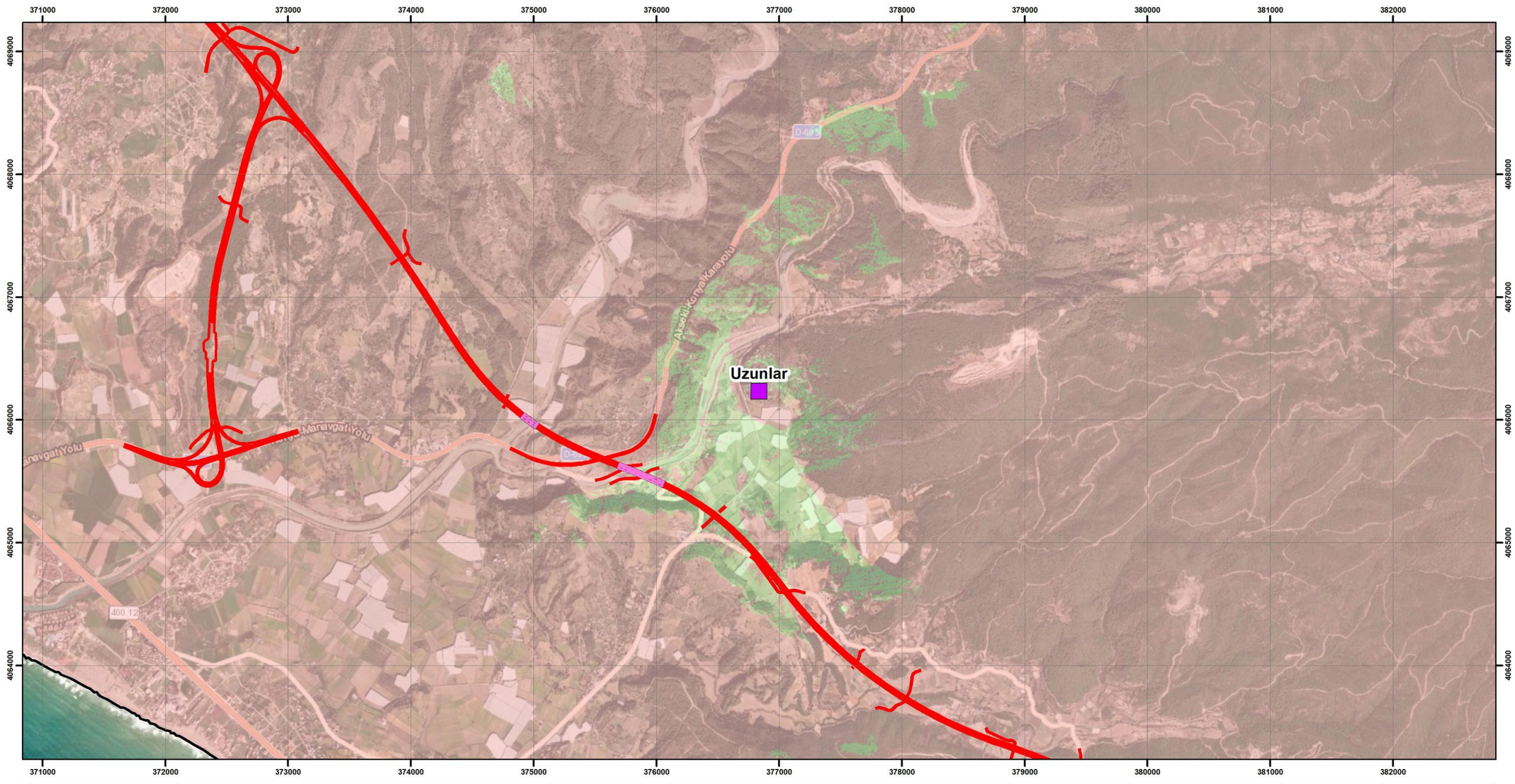

LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
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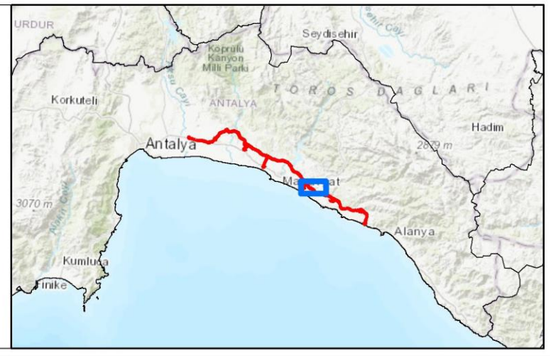
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

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Visibility Map of Uzunlar Neighbourhood

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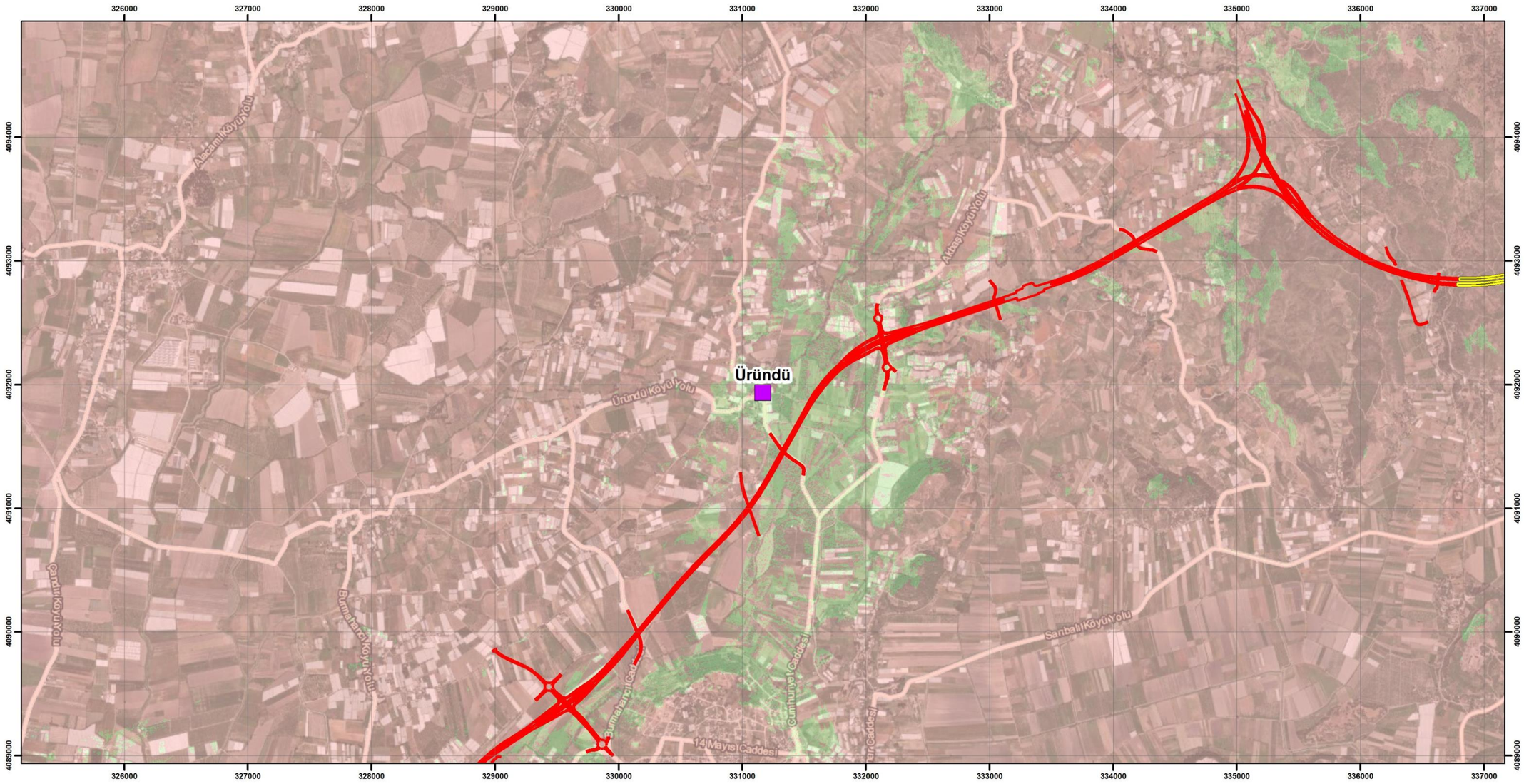

LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

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ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Üründü Neighbourhood

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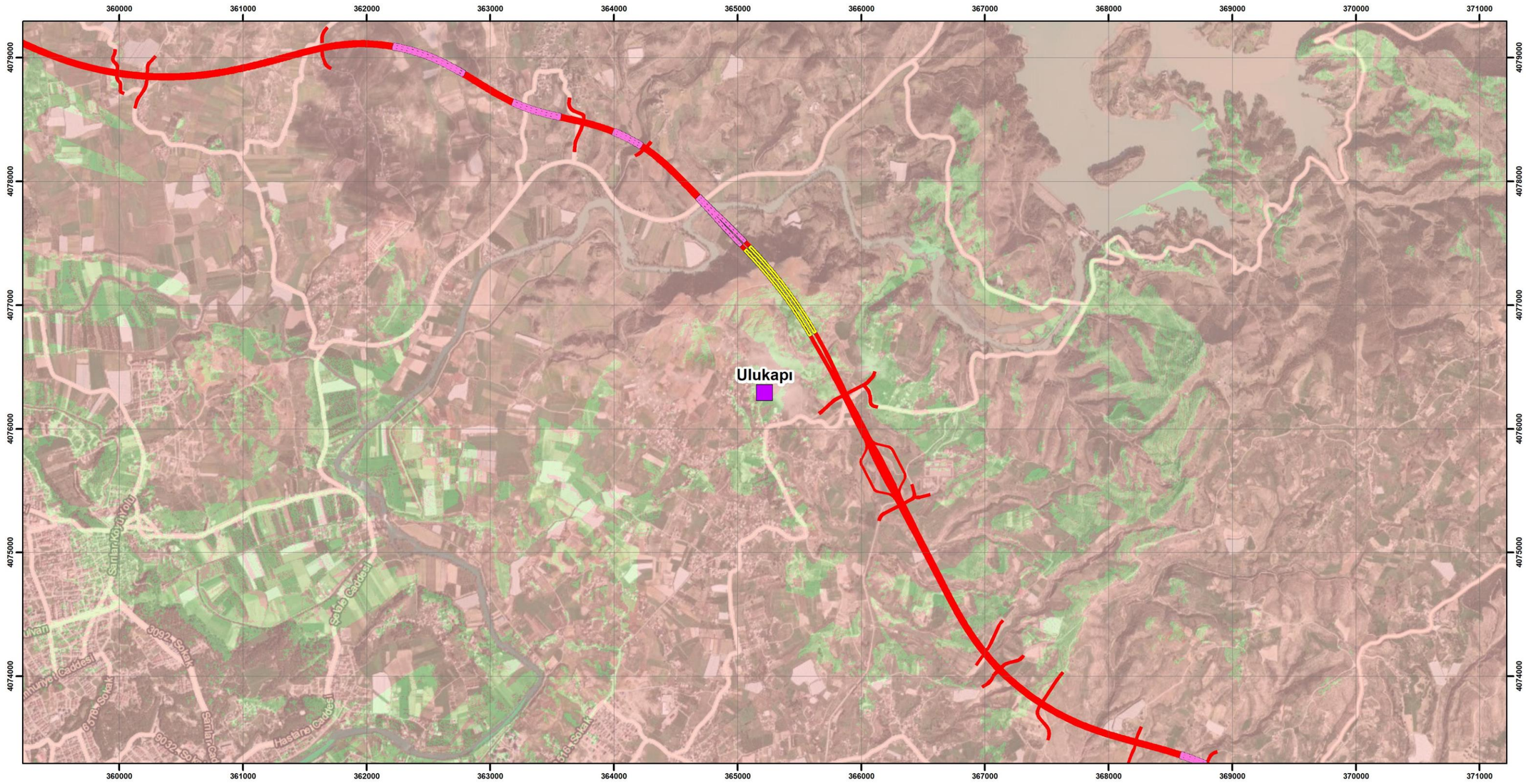


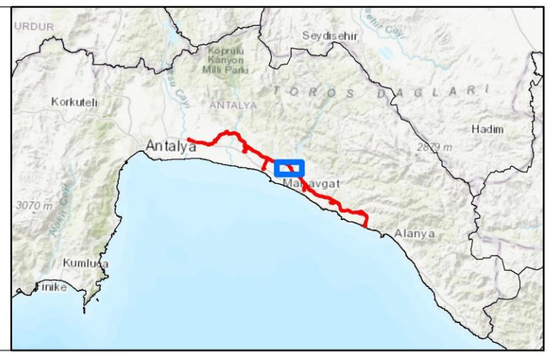
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

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Visibility Map of Ulukapı Neighbourhood

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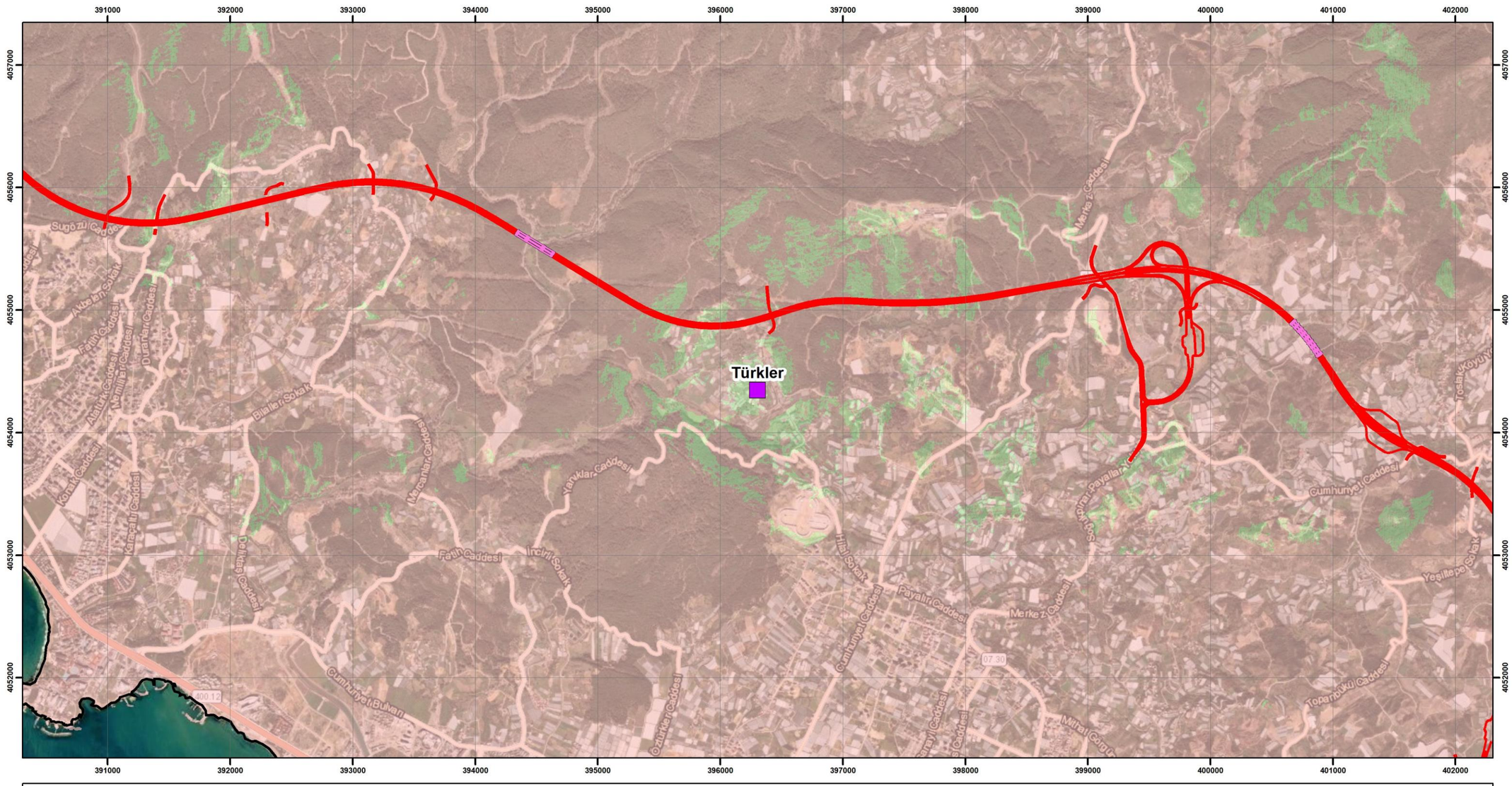

LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

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Visibility Map of Türkler Neighbourhood

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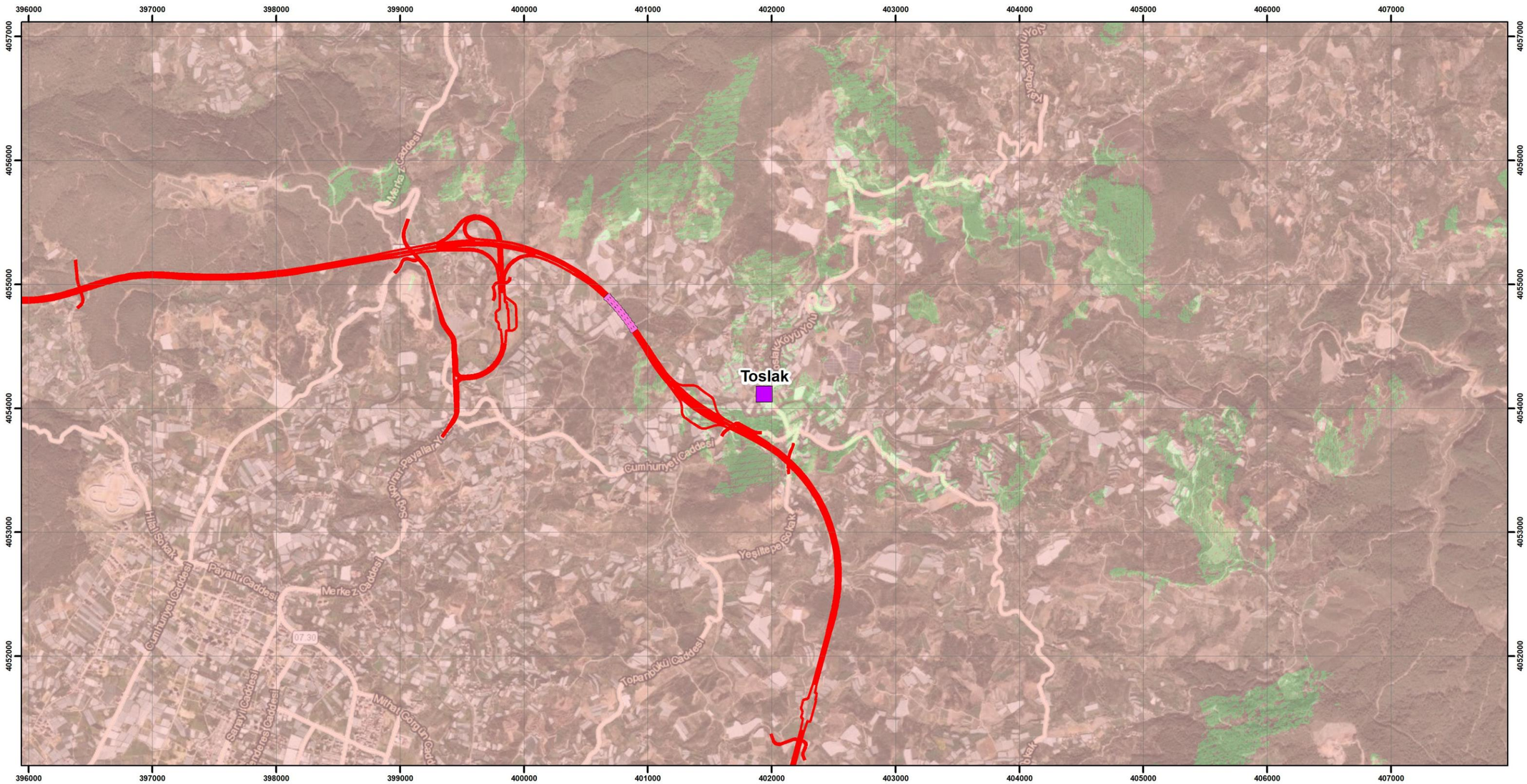

LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
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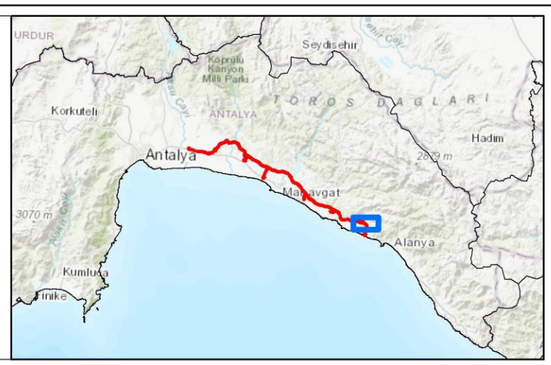
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

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Visibility Map of Toslak Neighbourhood

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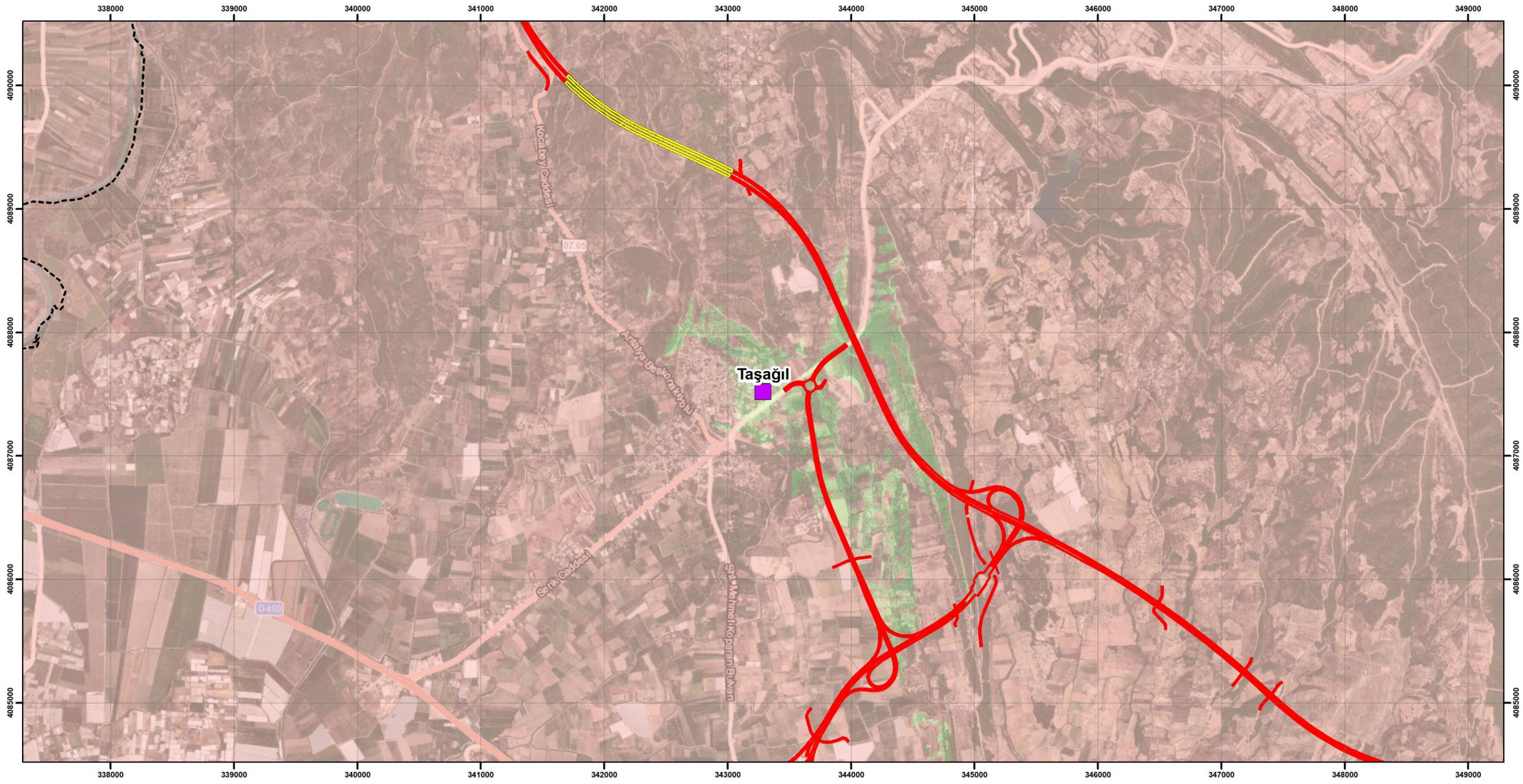


LEGEND

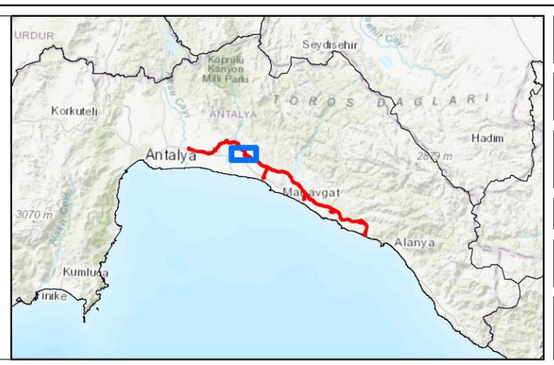
Boundaries
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

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Visibility Map of Taşağıl Neighbourhood

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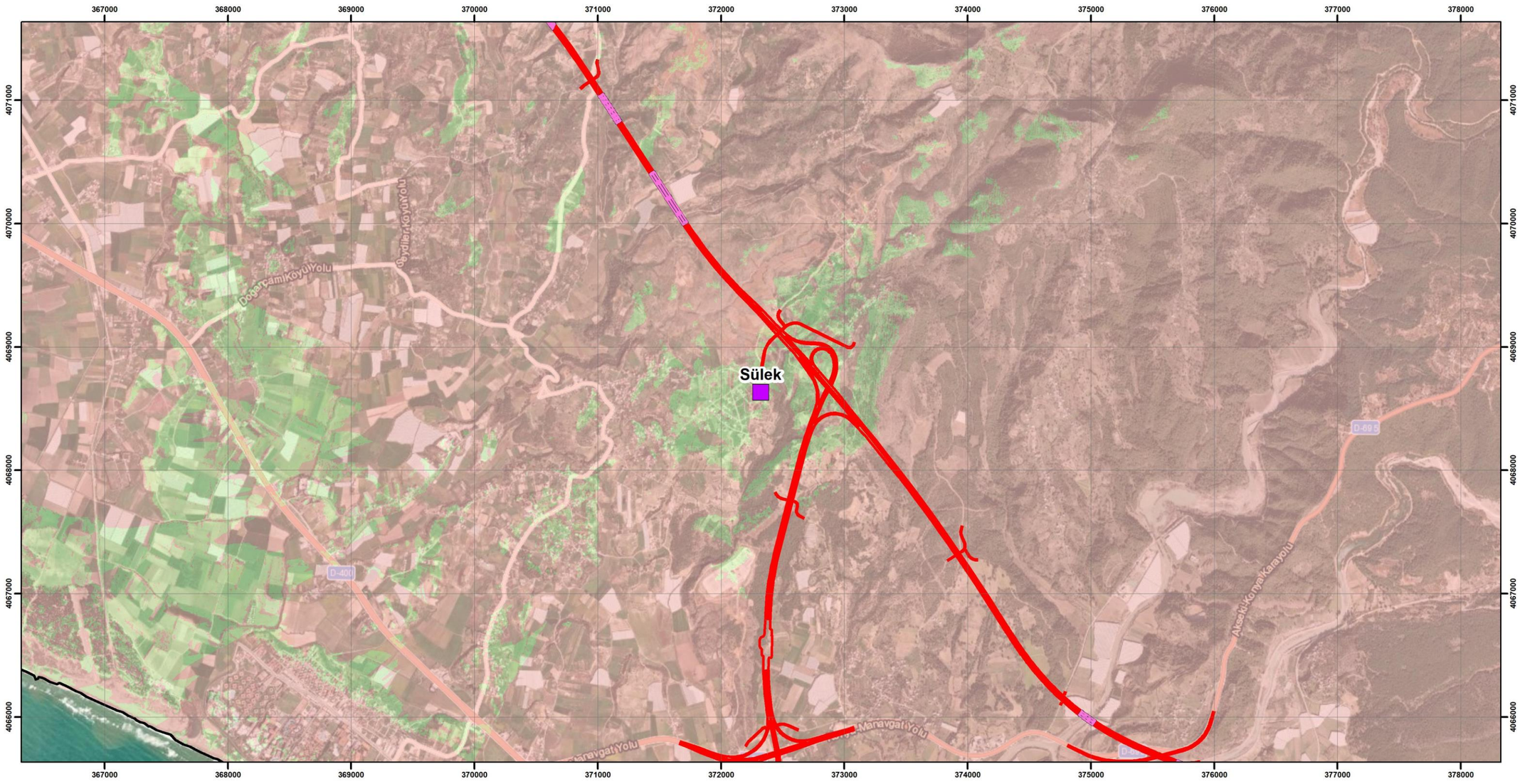

LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

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Visibility Map of Sülek Neighbourhood

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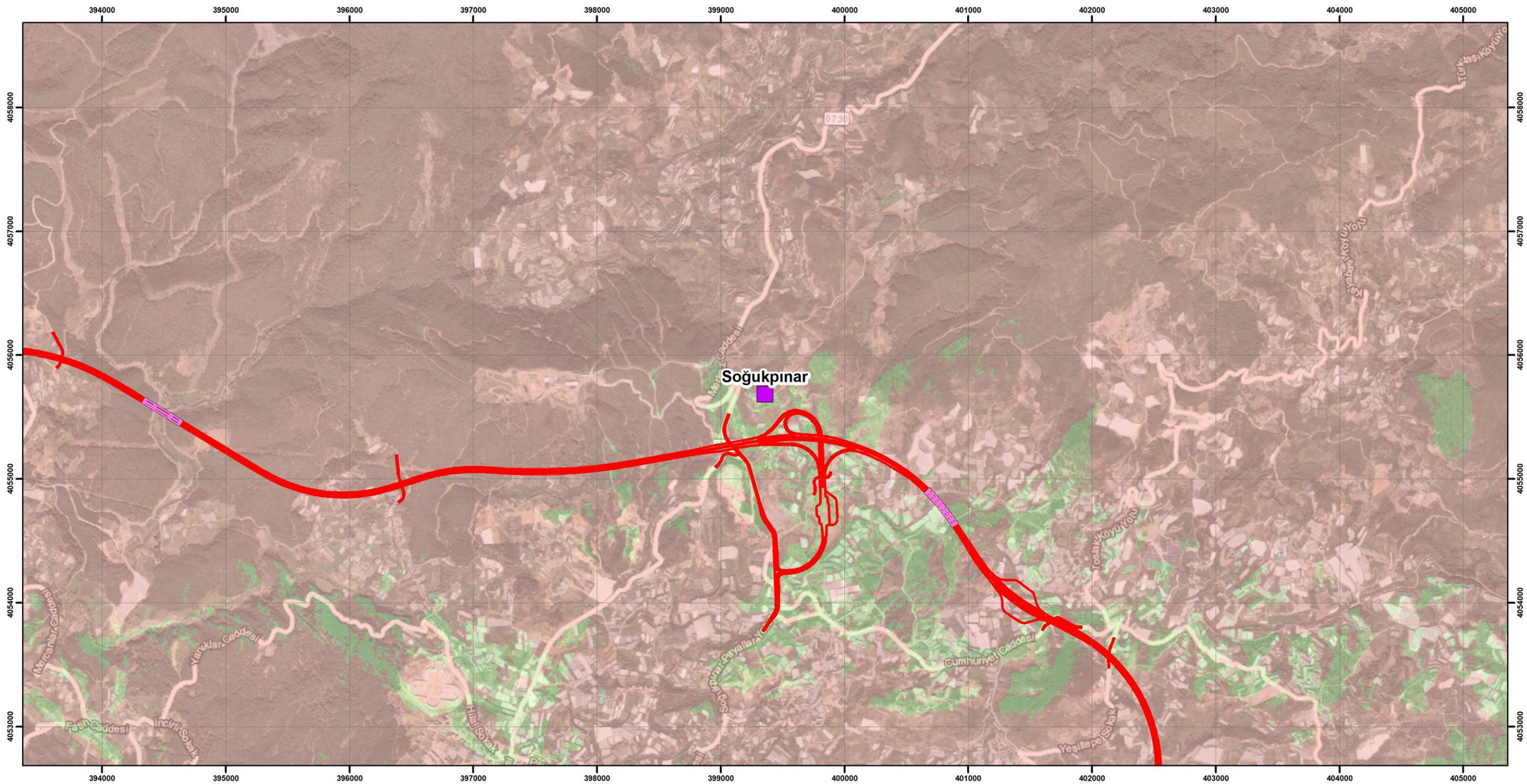

LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

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ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Soğukpınar Neighbourhood

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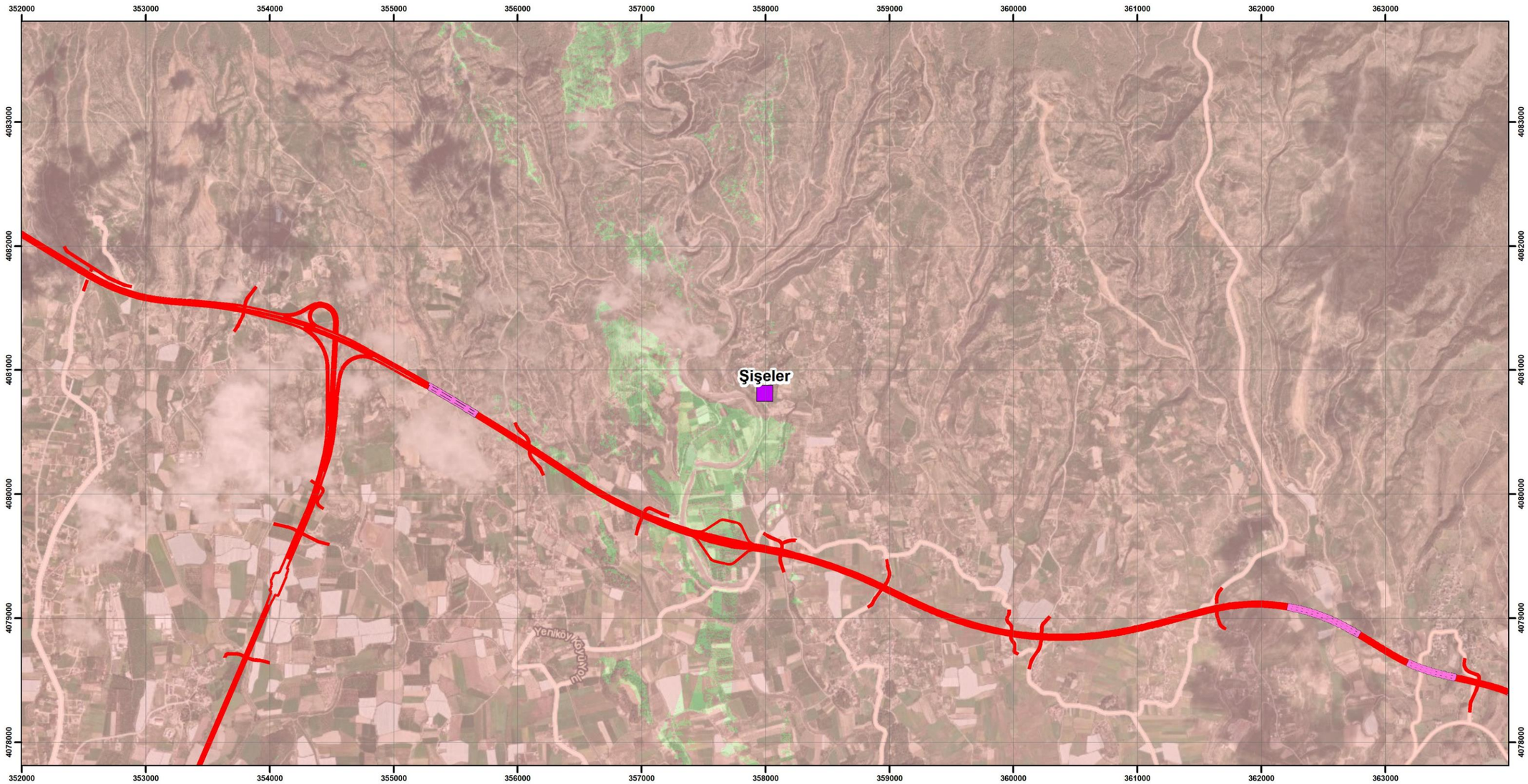


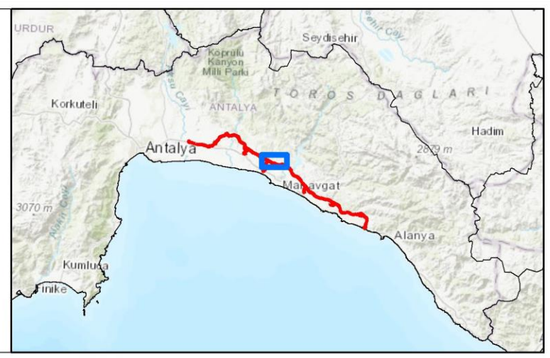
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Şişeler Neighbourhood

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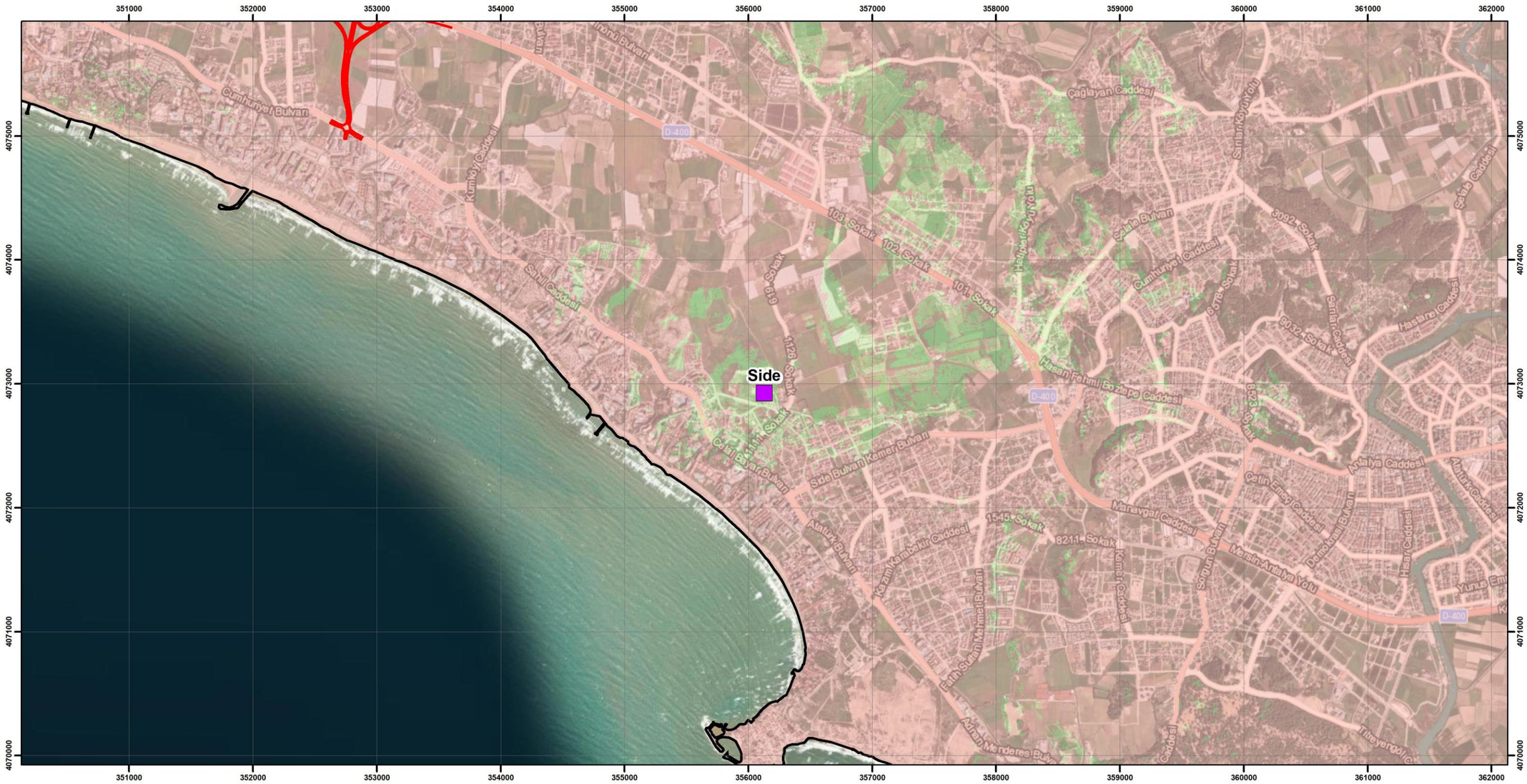


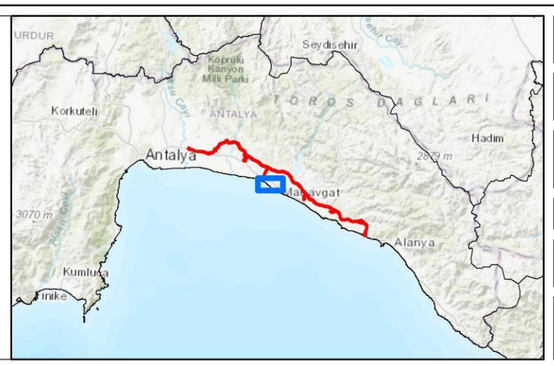
LEGEND

Boundaries
- Province Boundary
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Side Neighbourhood

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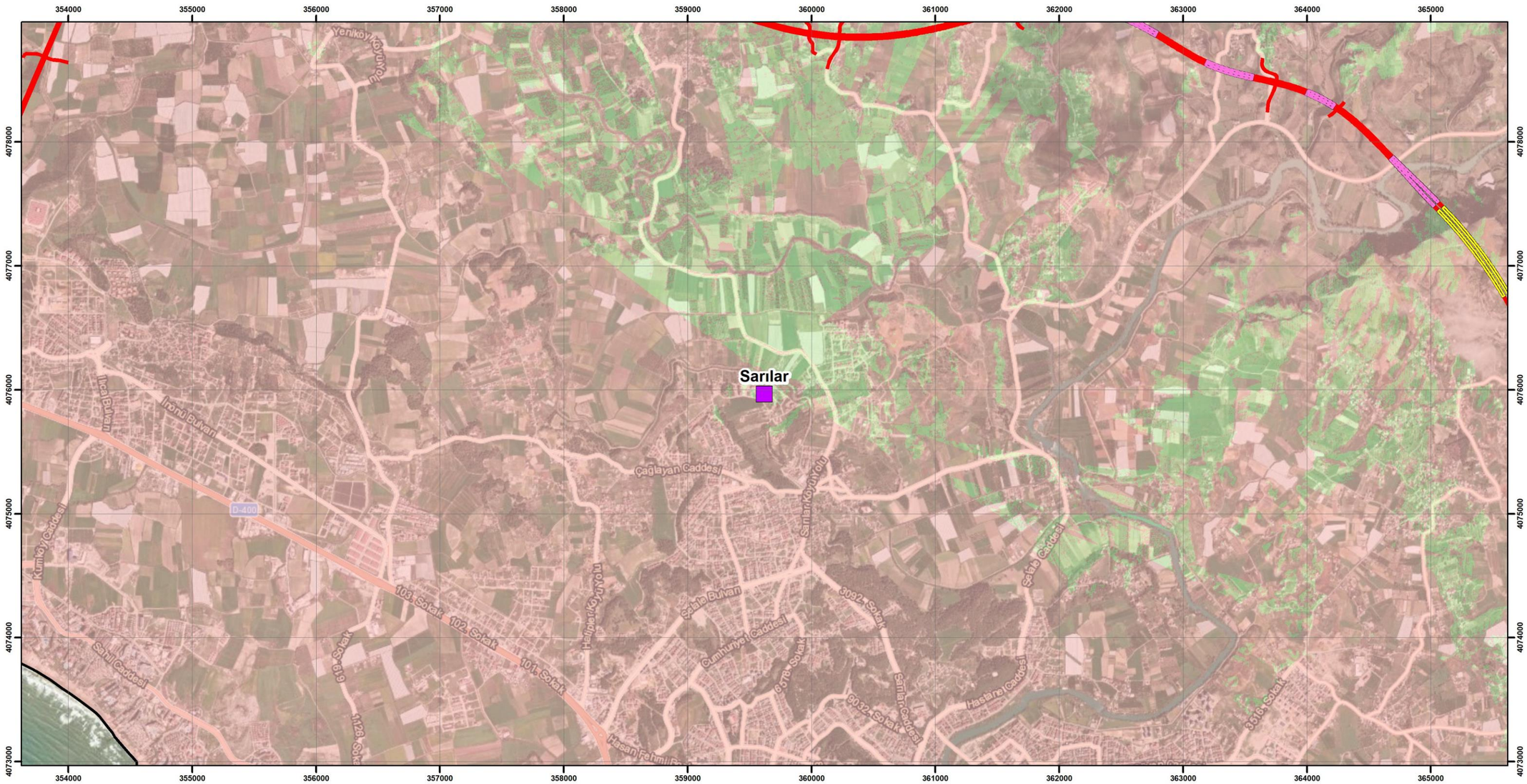

LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Sarılar Neighbourhood

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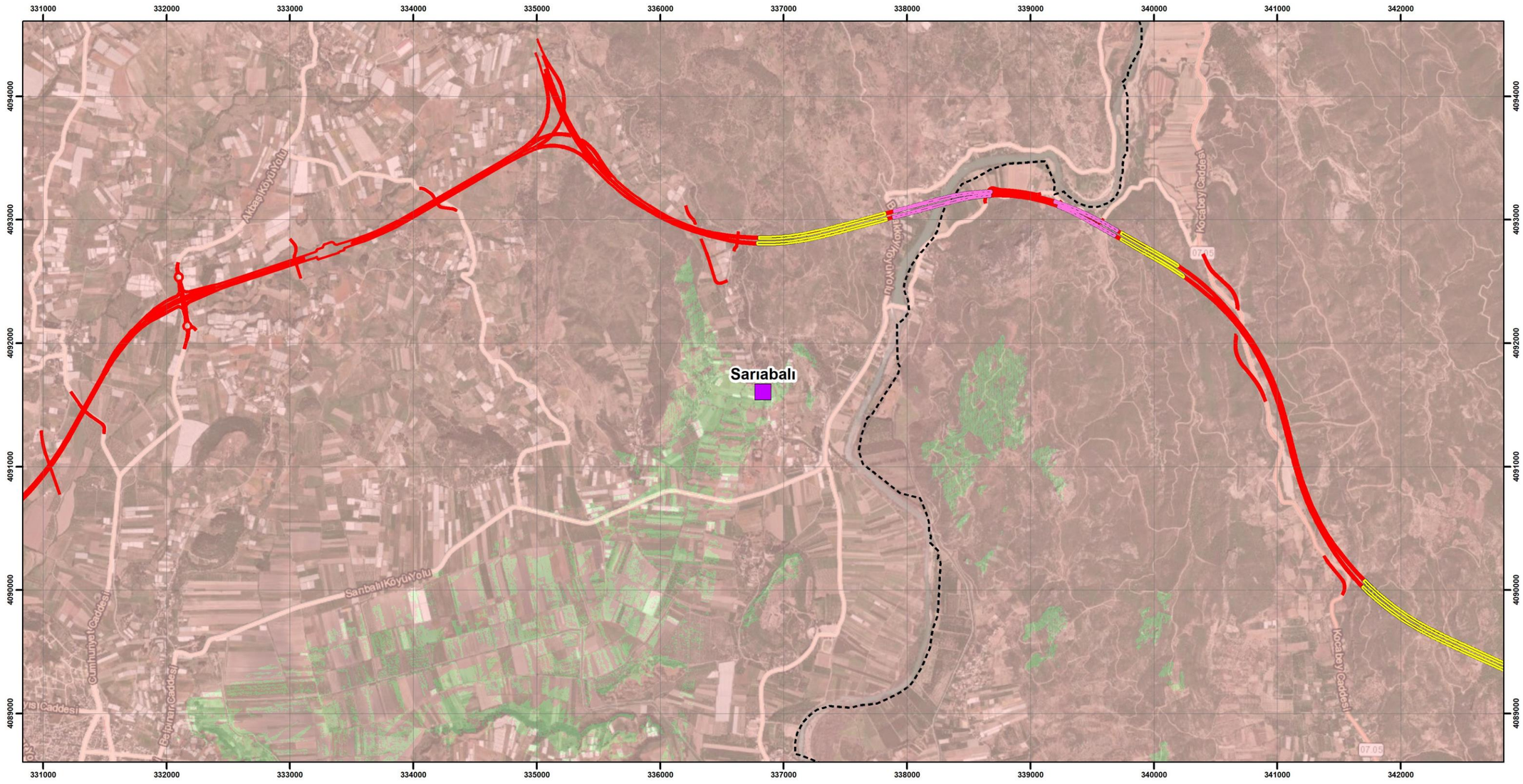

LEGEND

Boundaries
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Sarıabalı Neighbourhood

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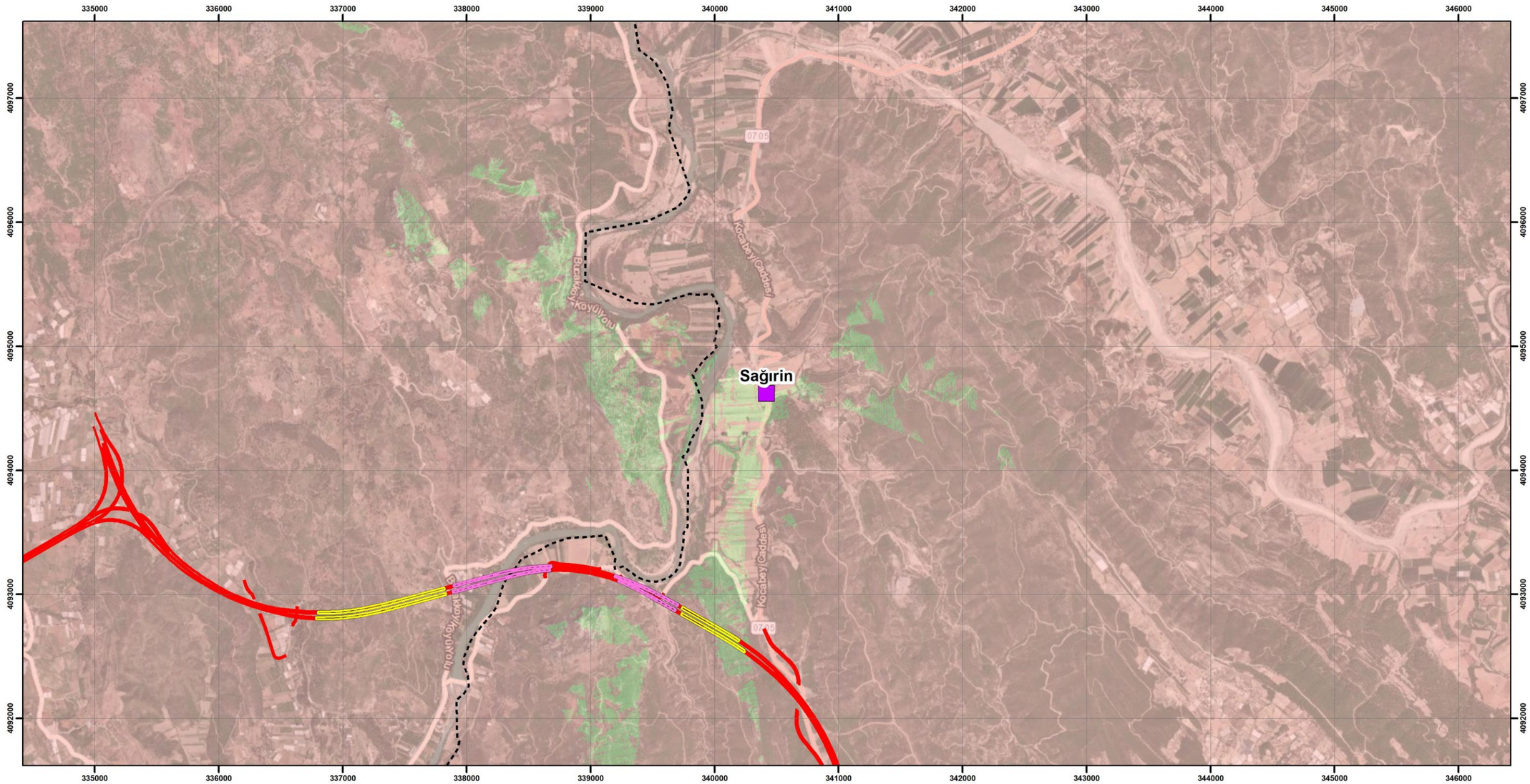


LEGEND

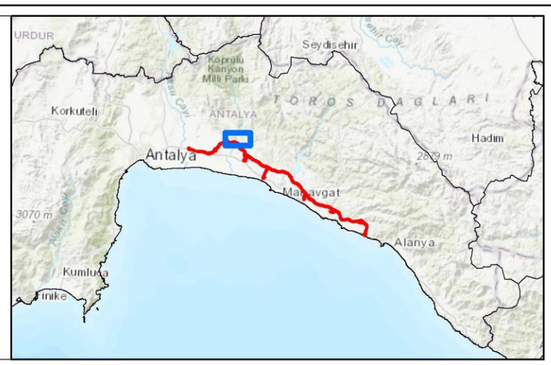
Boundaries
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Sağırin Neighbourhood

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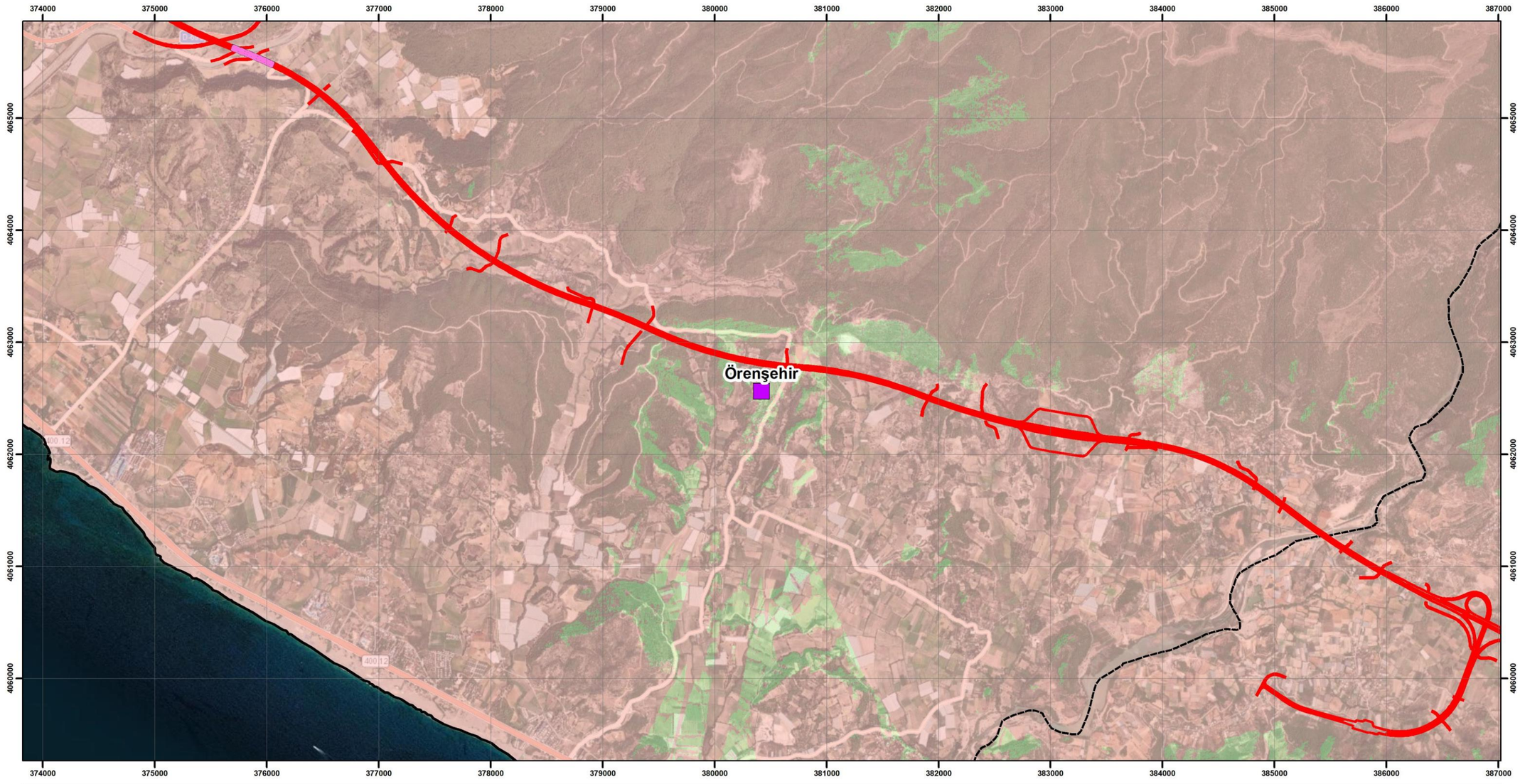


LEGEND

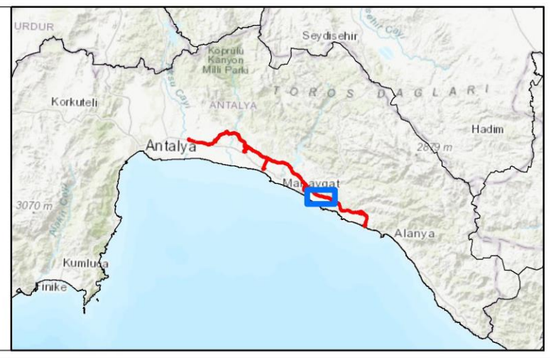
Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

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0 300 600 1.200 m

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Örenşehir Neighbourhood

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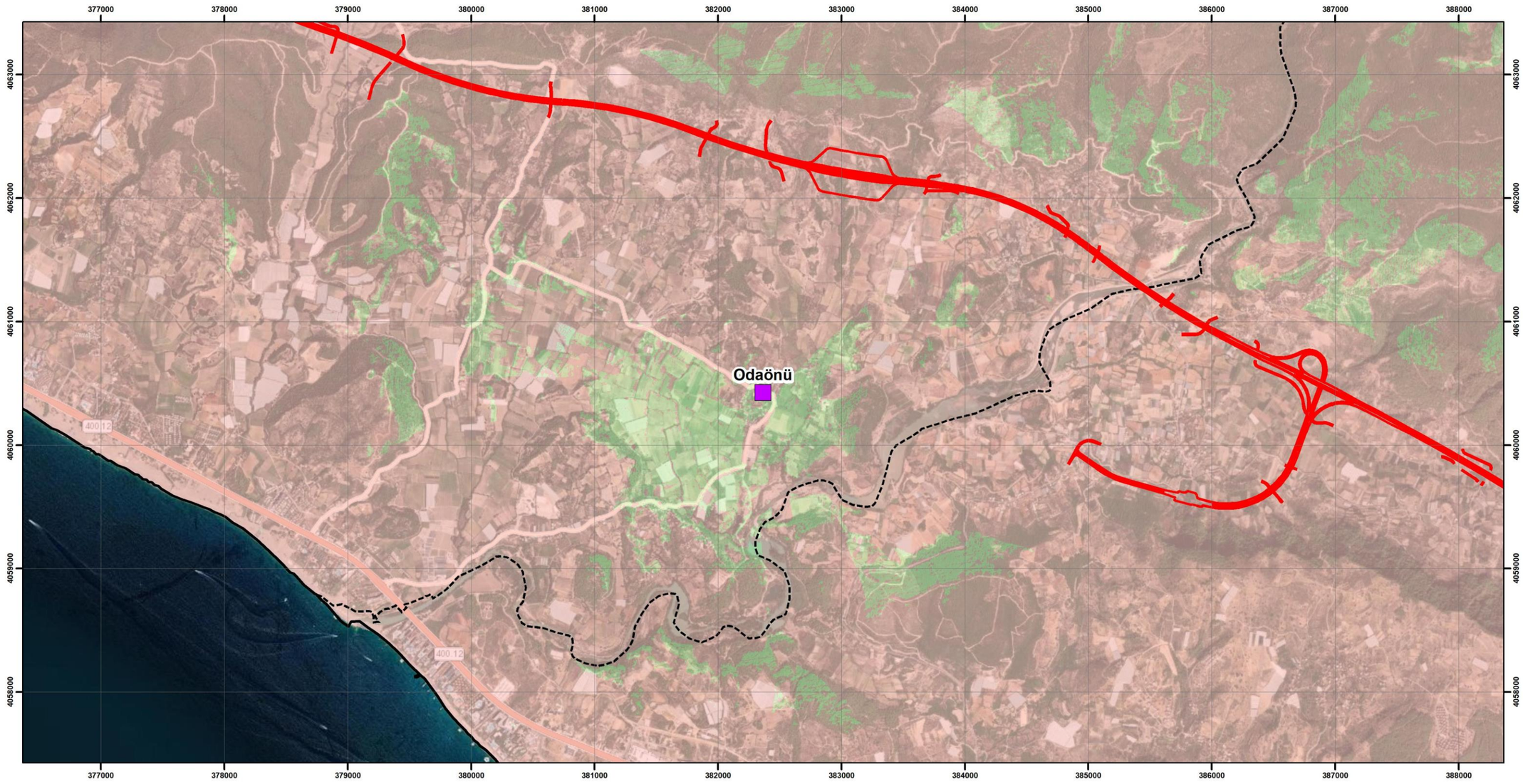


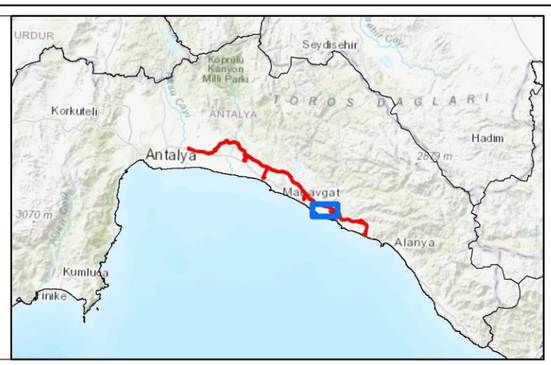
LEGEND

Boundaries
- Province Boundary
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Odaönü Neighbourhood

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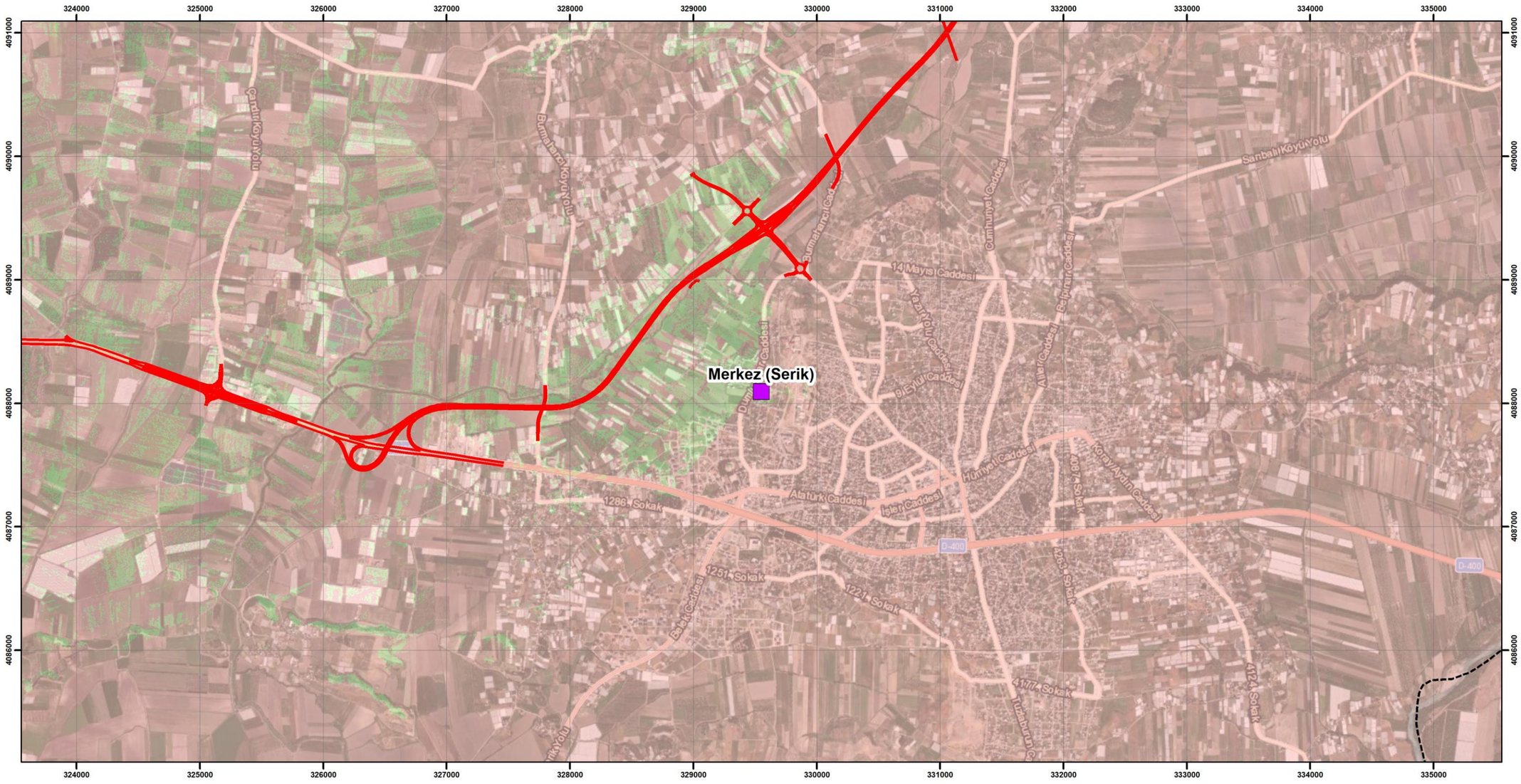

LEGEND

Boundaries
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Merkez (Serik) Neighbourhood

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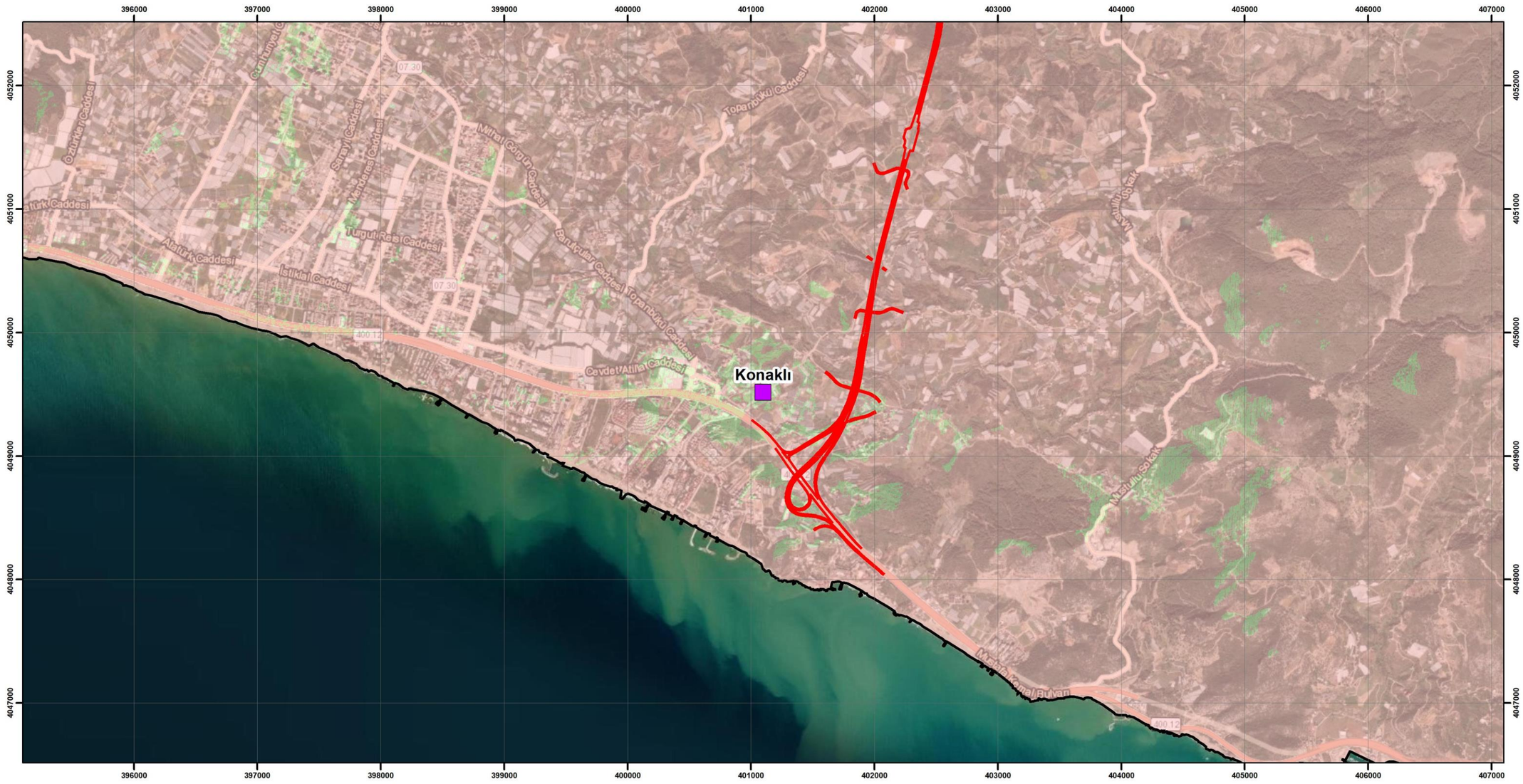

LEGEND

Boundaries
- Province Boundary
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Konaklı Neighbourhood

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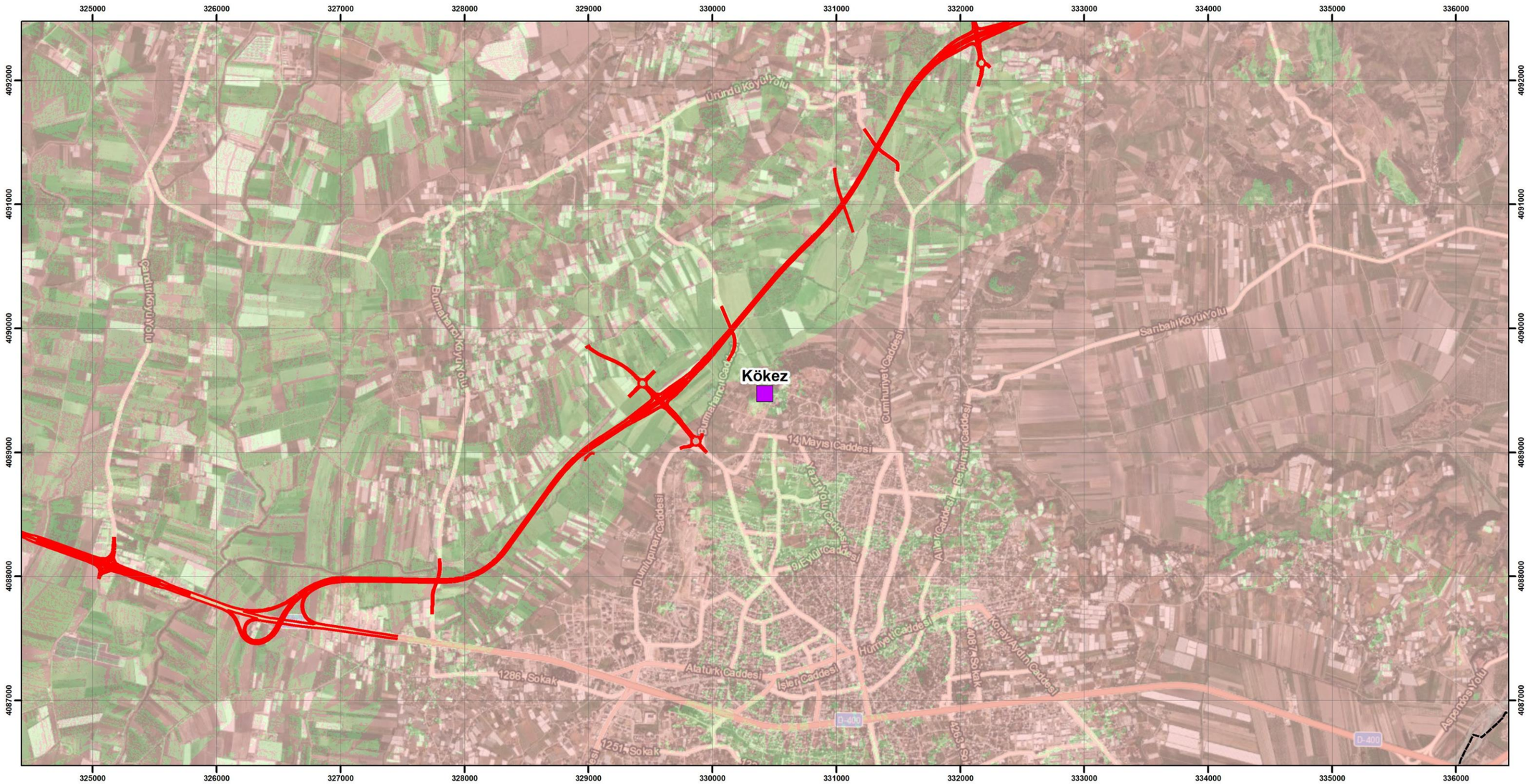
encon@encon.com.tr



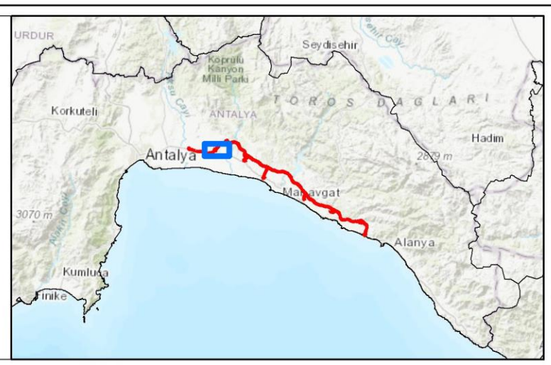
LEGEND

Boundaries
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Kökez Neighbourhood

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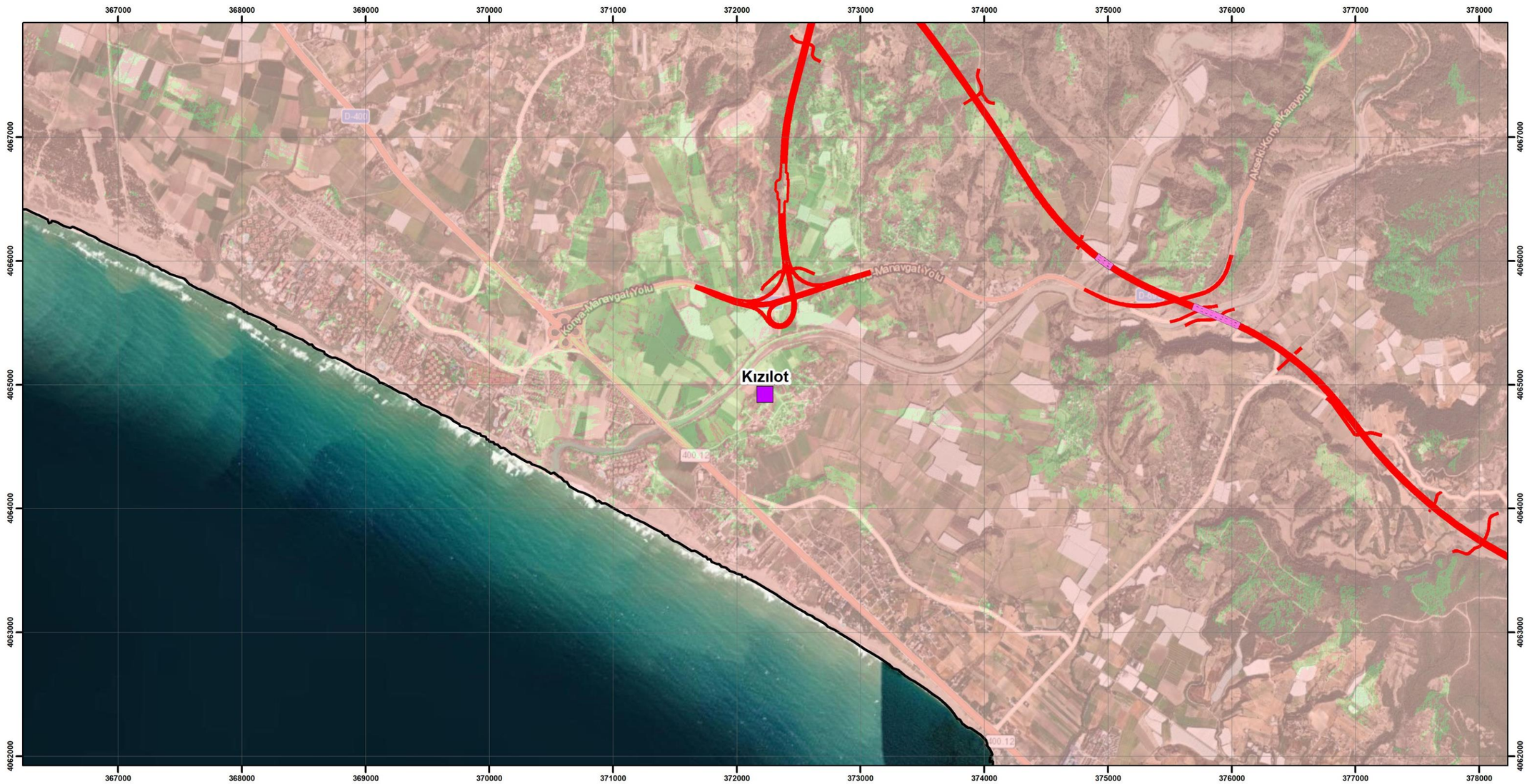


LEGEND

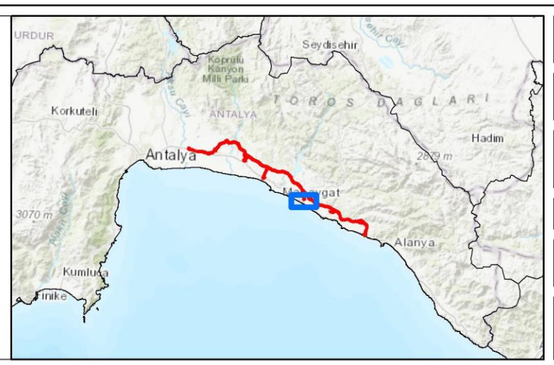
Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Kızılot Neighbourhood

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LEGEND

Settlements	Section Description	Visibility
Settlement	Antalya-Alanya Motorway Project	Not Visible
		Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Kayaburnu Neighbourhood

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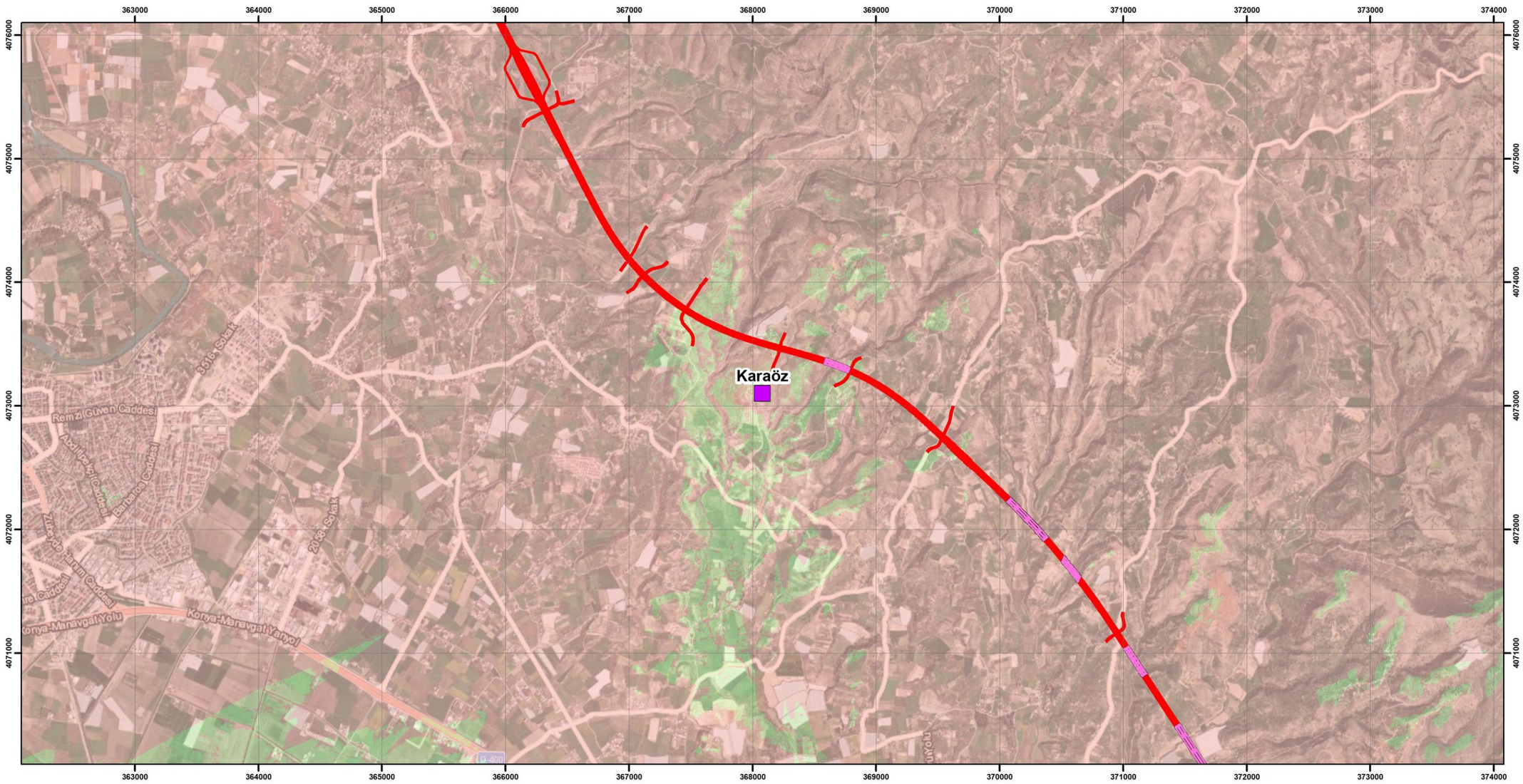

LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Karaöz Neighbourhood

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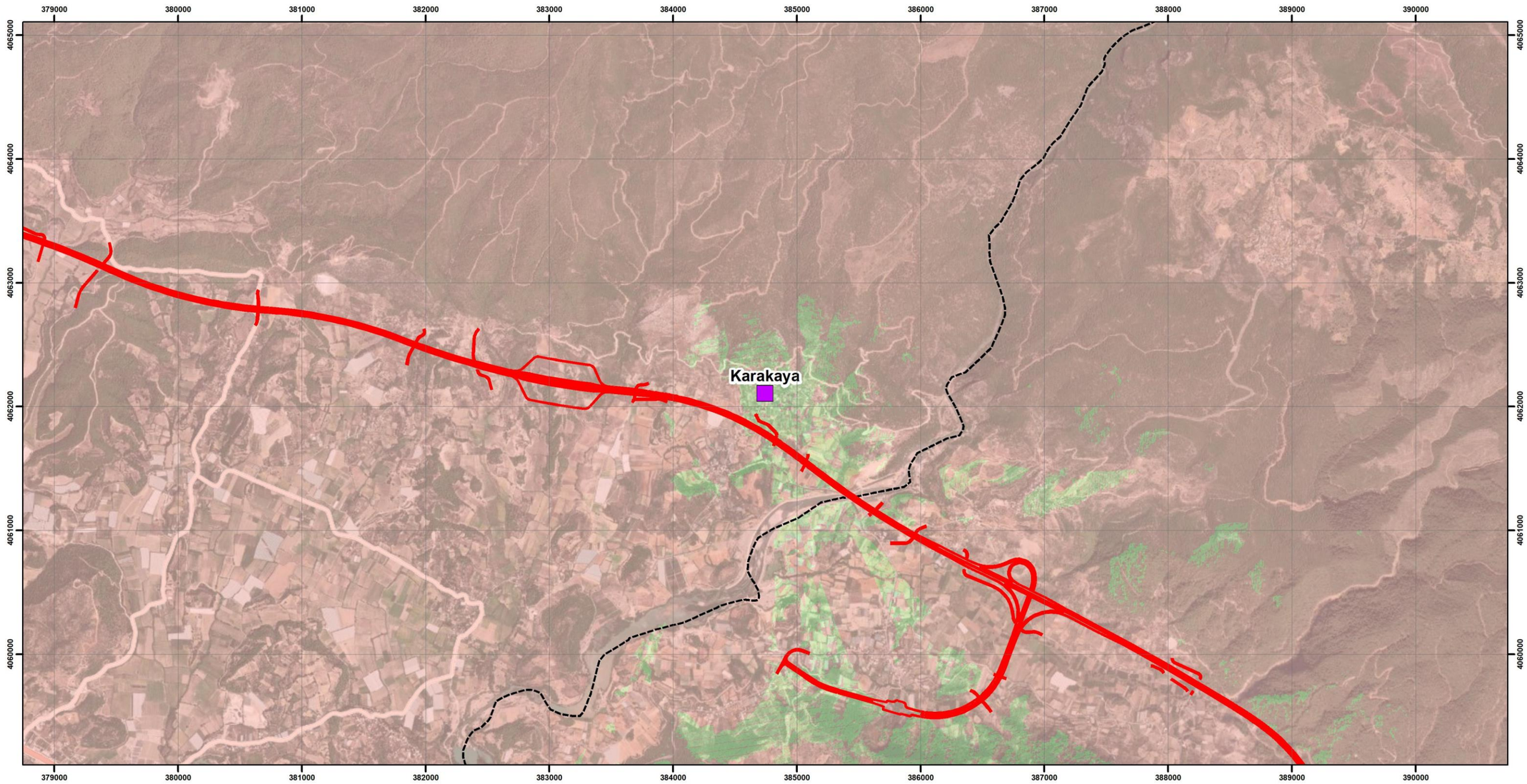

LEGEND

Boundaries
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Karakaya Neighbourhood

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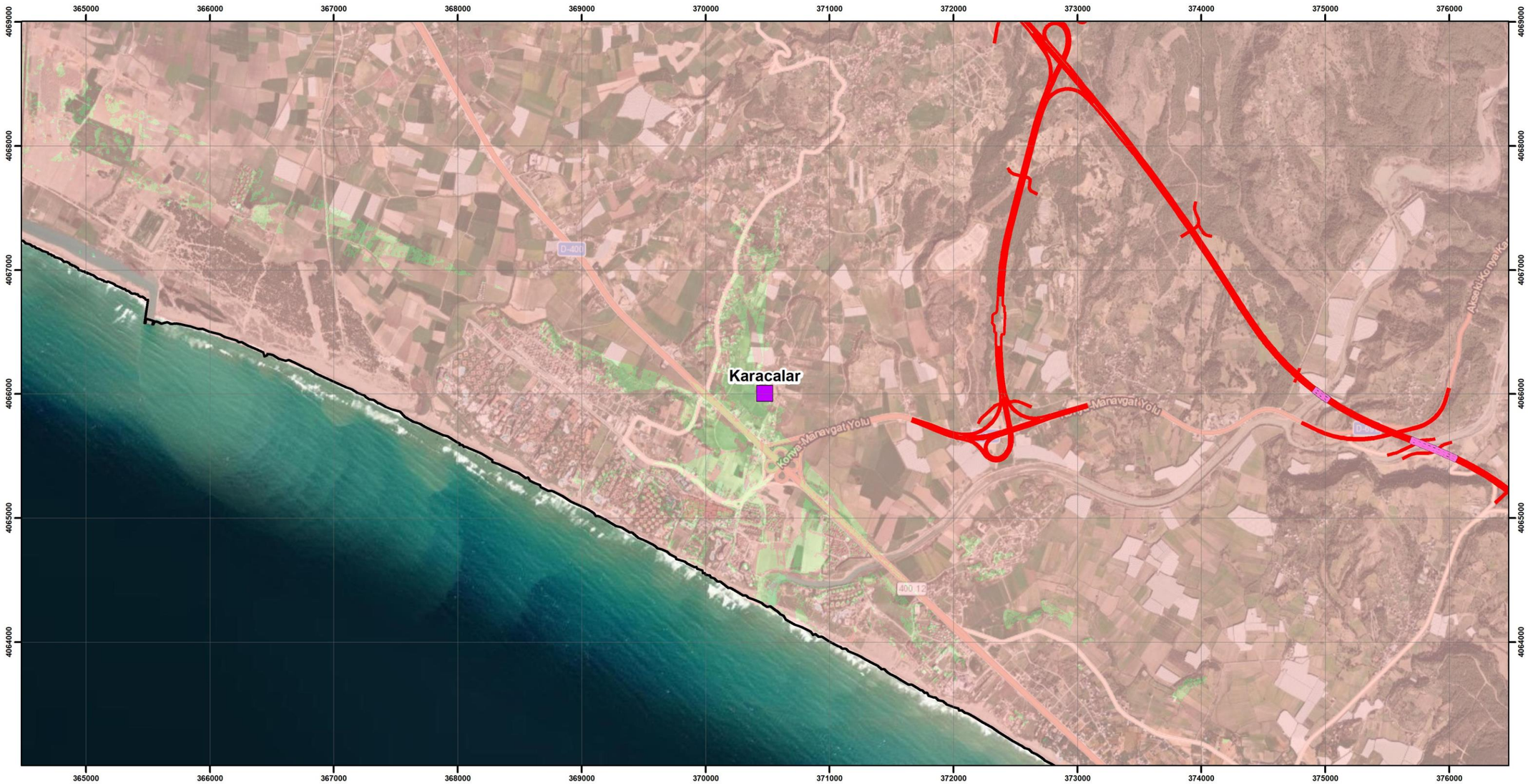


LEGEND

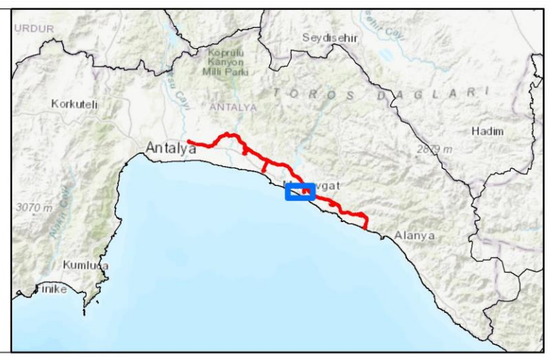
Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Karacalar Neighbourhood

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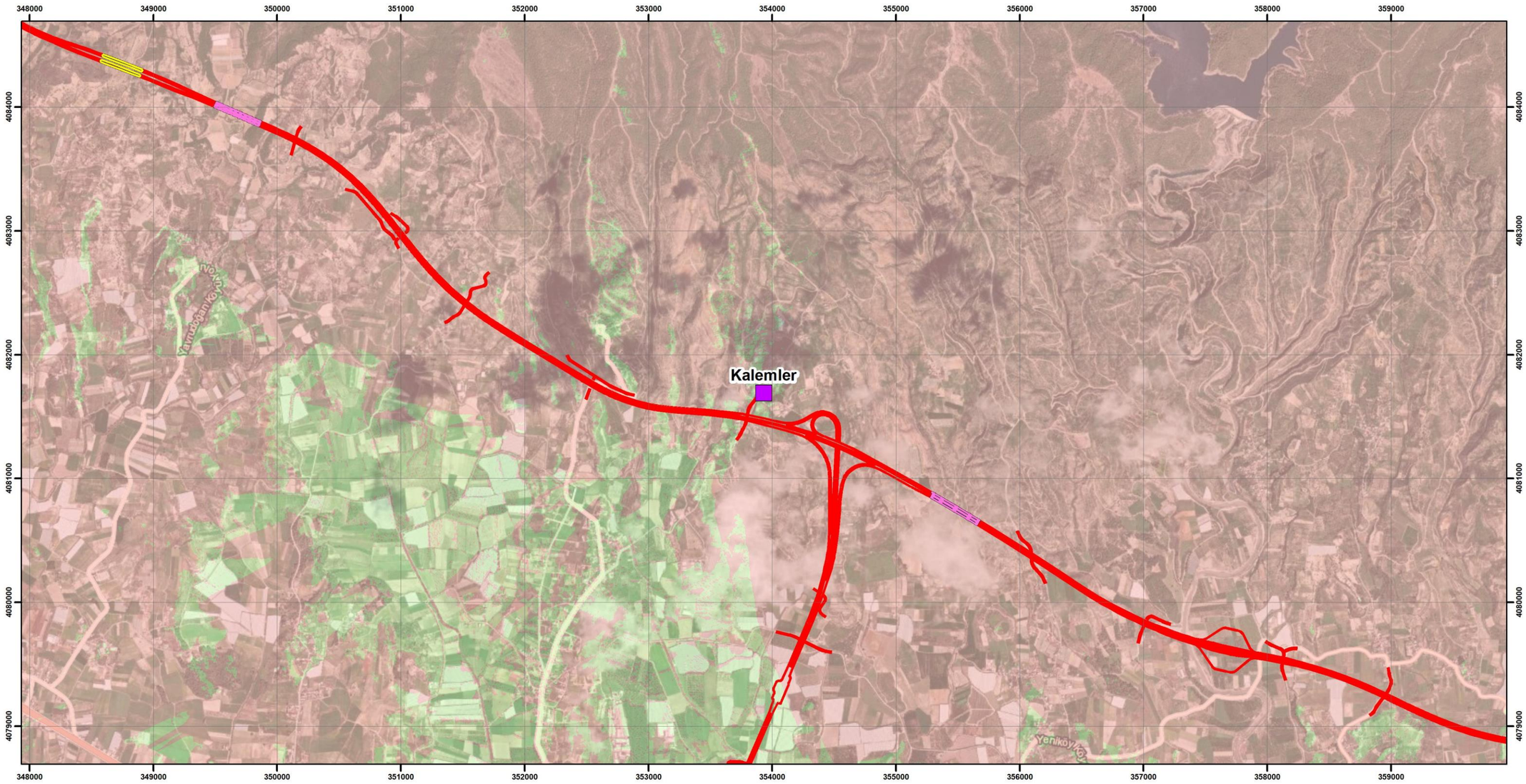


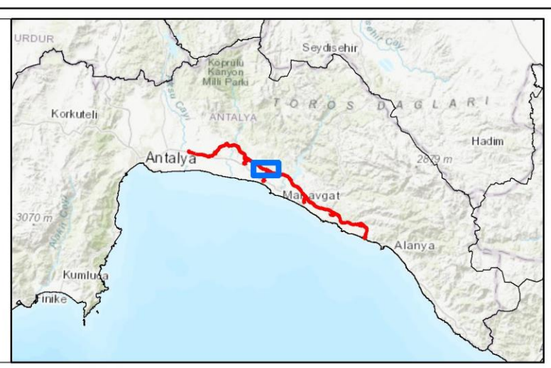
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Kalemler Neighbourhood

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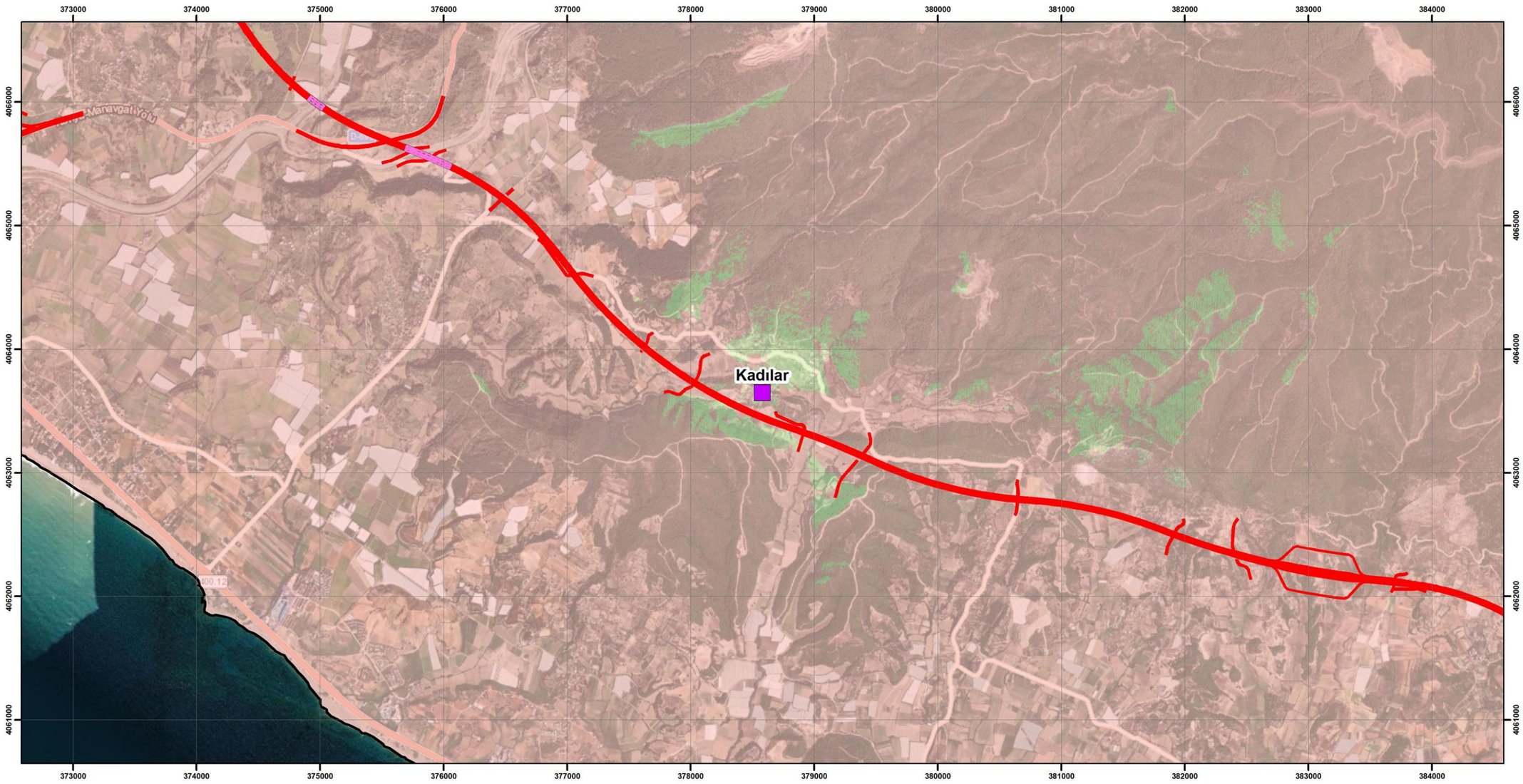


LEGEND

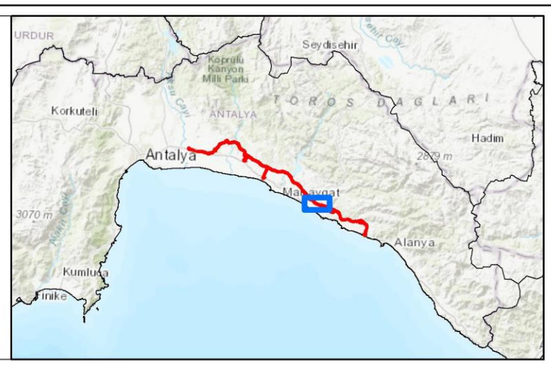
Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Kadılar Neighbourhood

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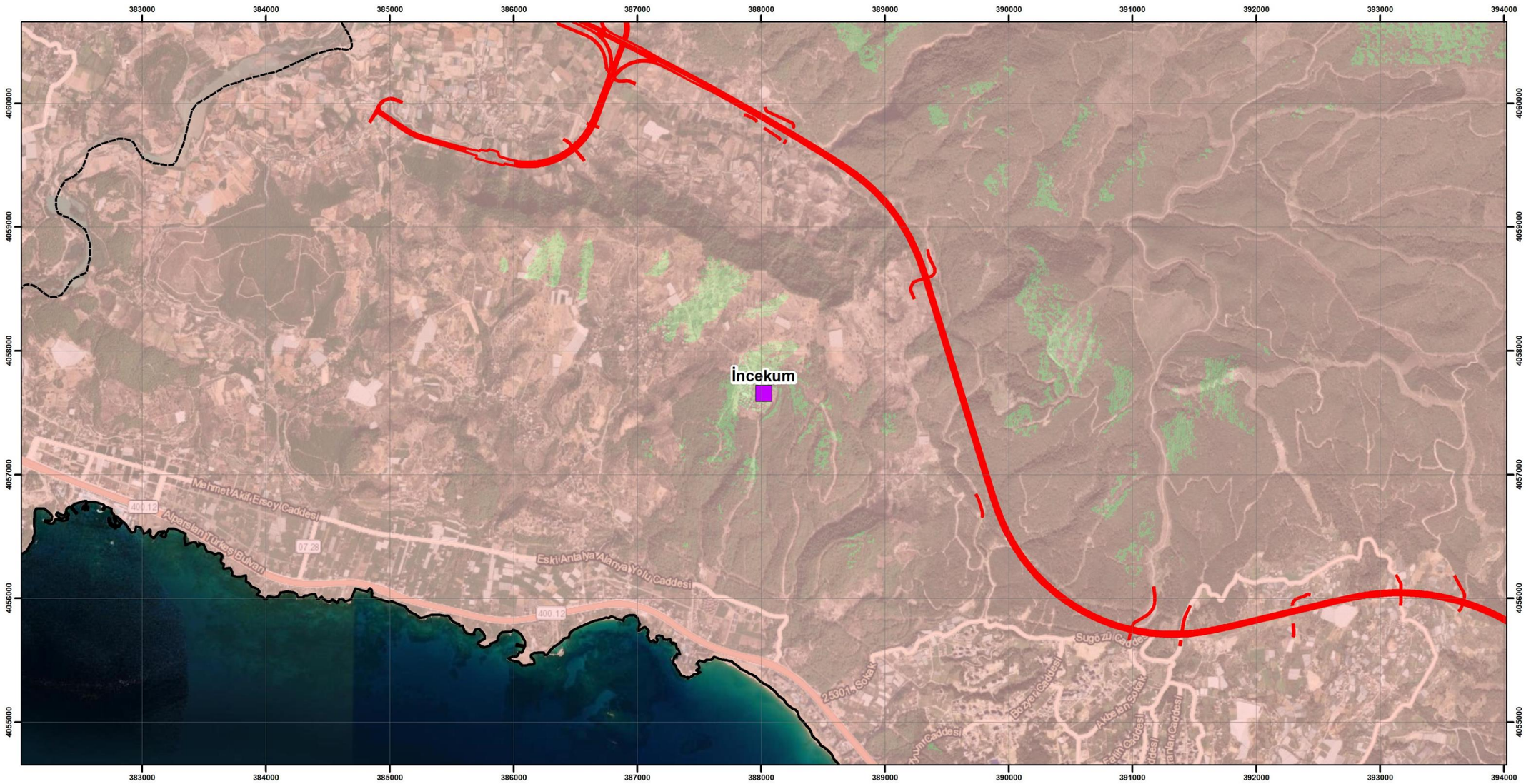


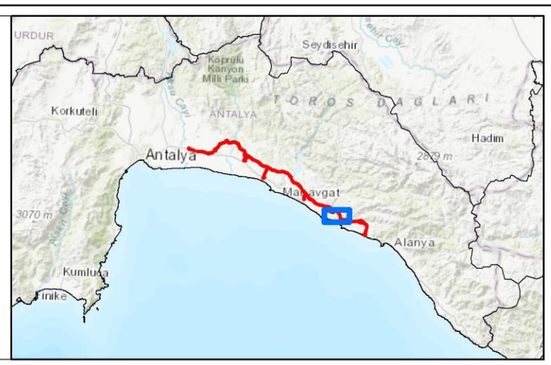
LEGEND

Boundaries
- Province Boundary
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of İncekum Neighbourhood

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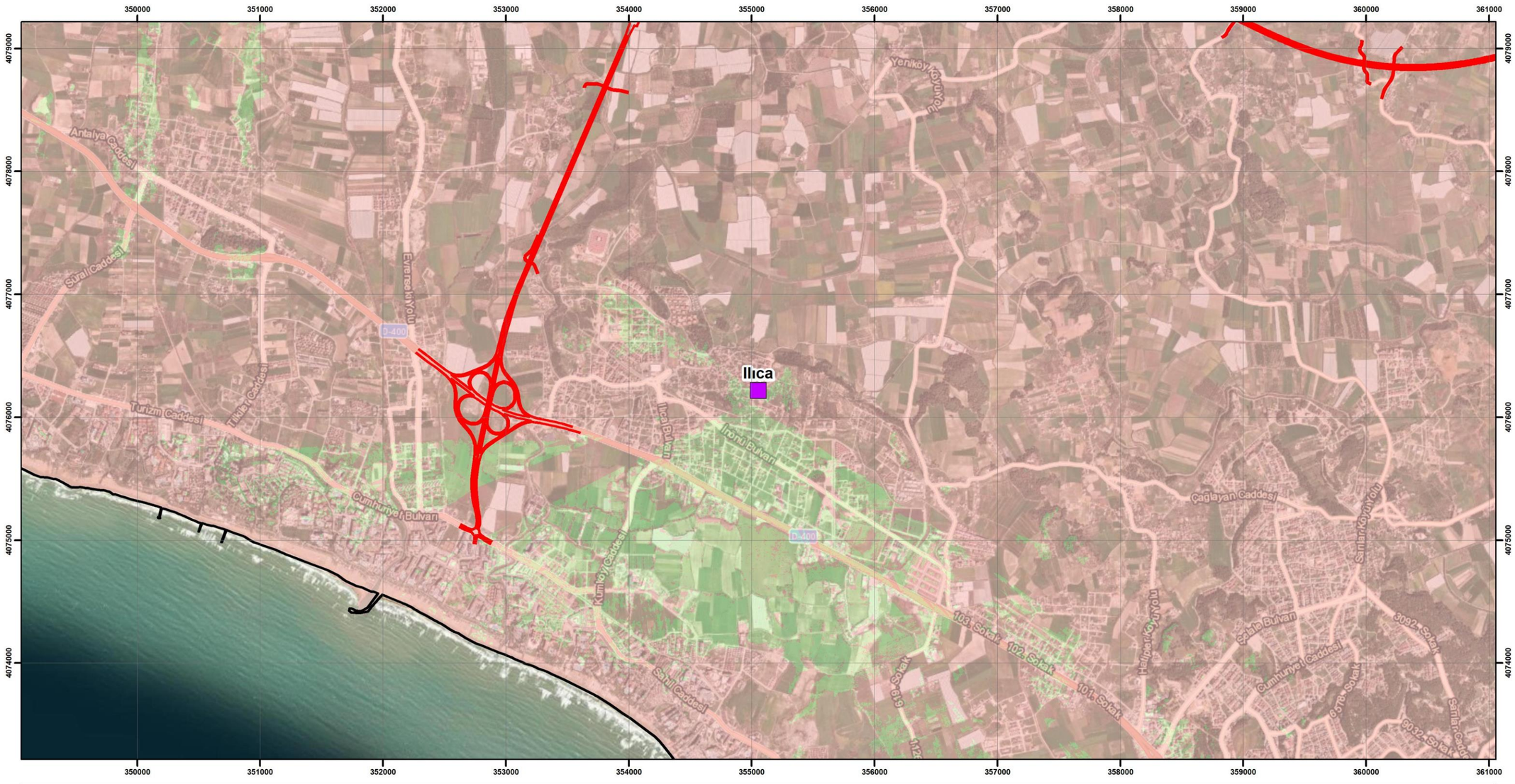

LEGEND

Boundaries
- Province Boundary
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Ilıca Neighbourhood

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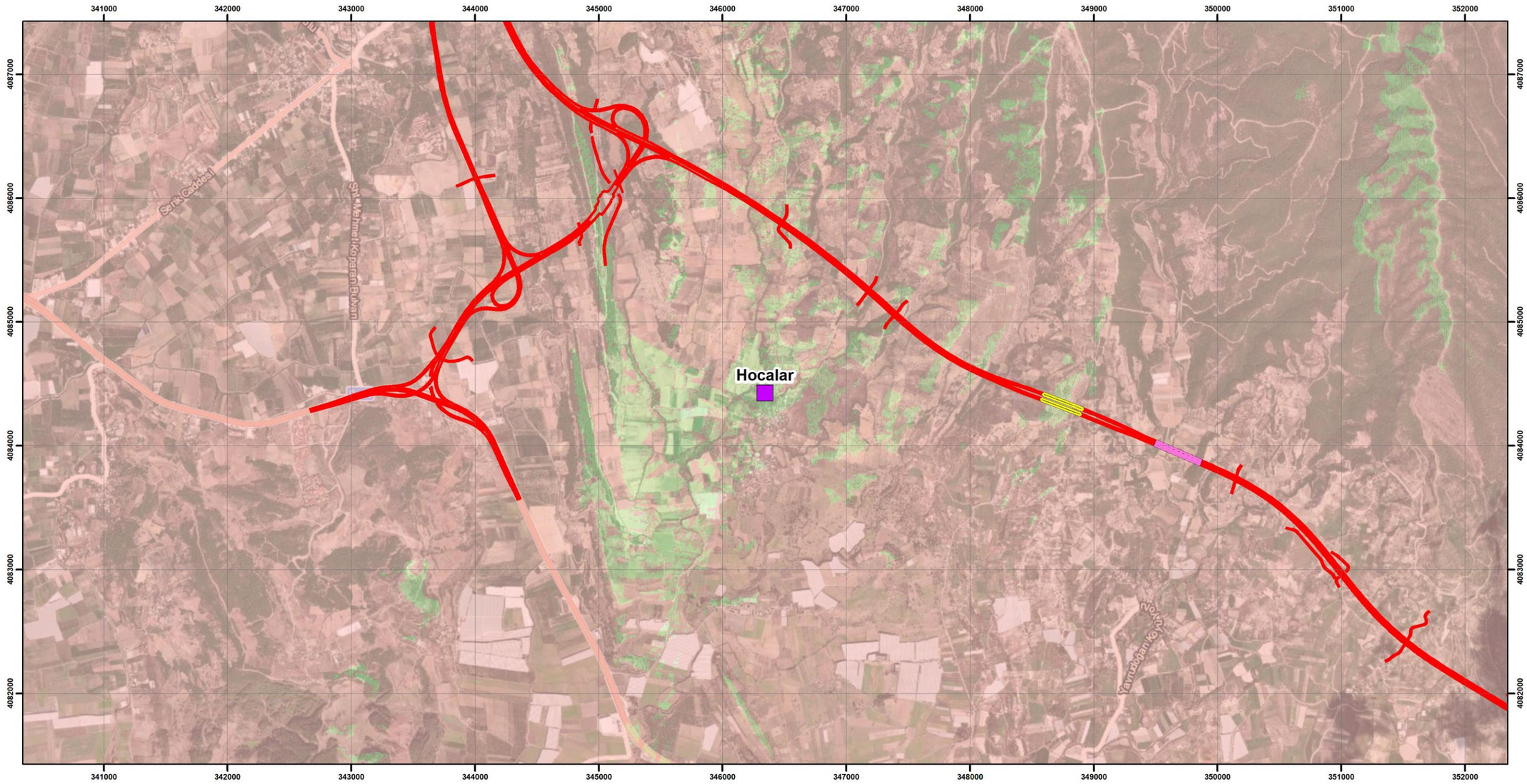


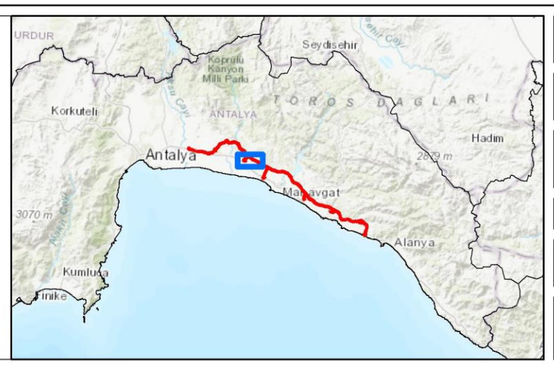
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Hocalar Neighbourhood

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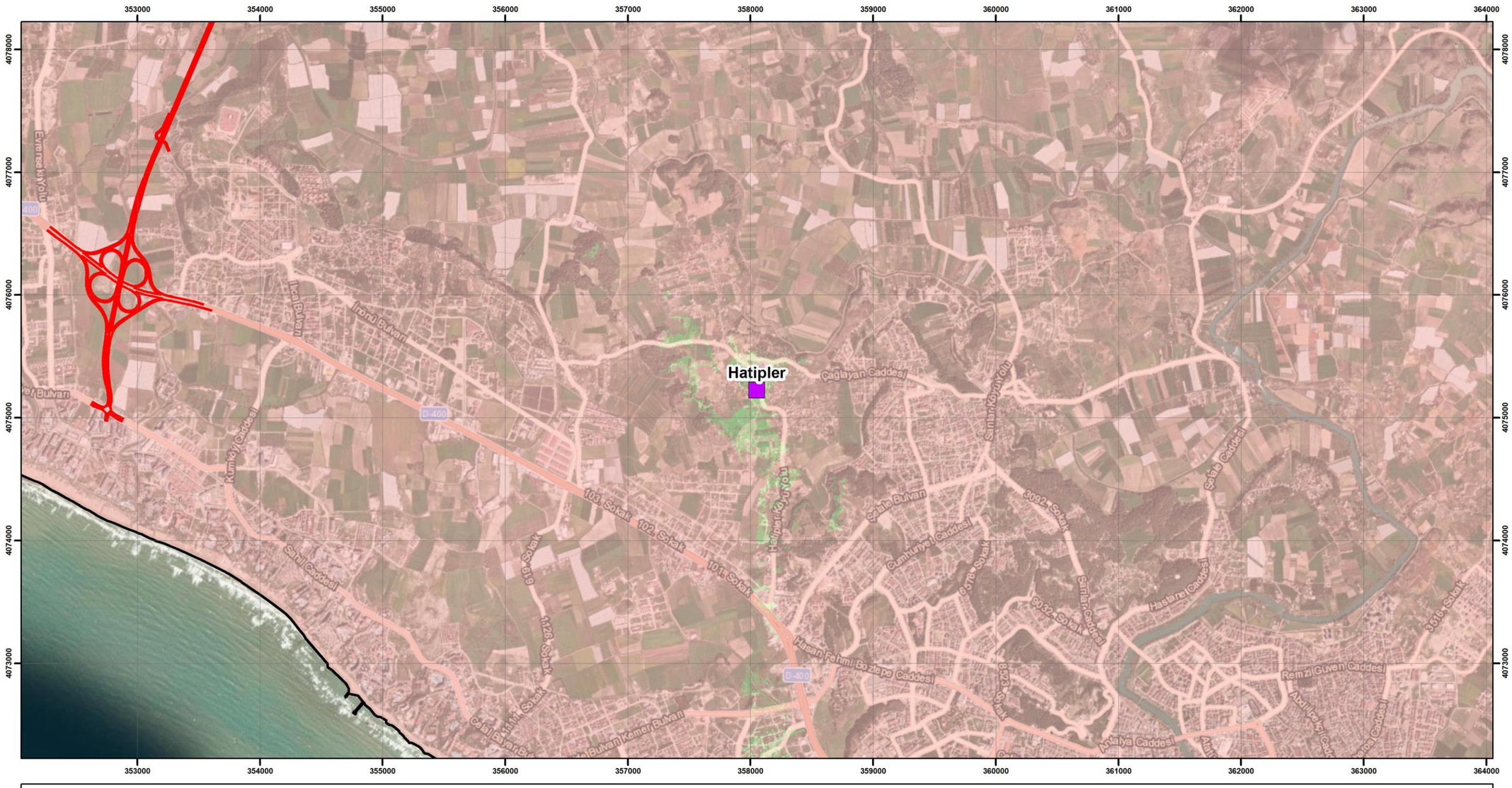

LEGEND

Boundaries
- Province Boundary
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Hatipler Neighbourhood

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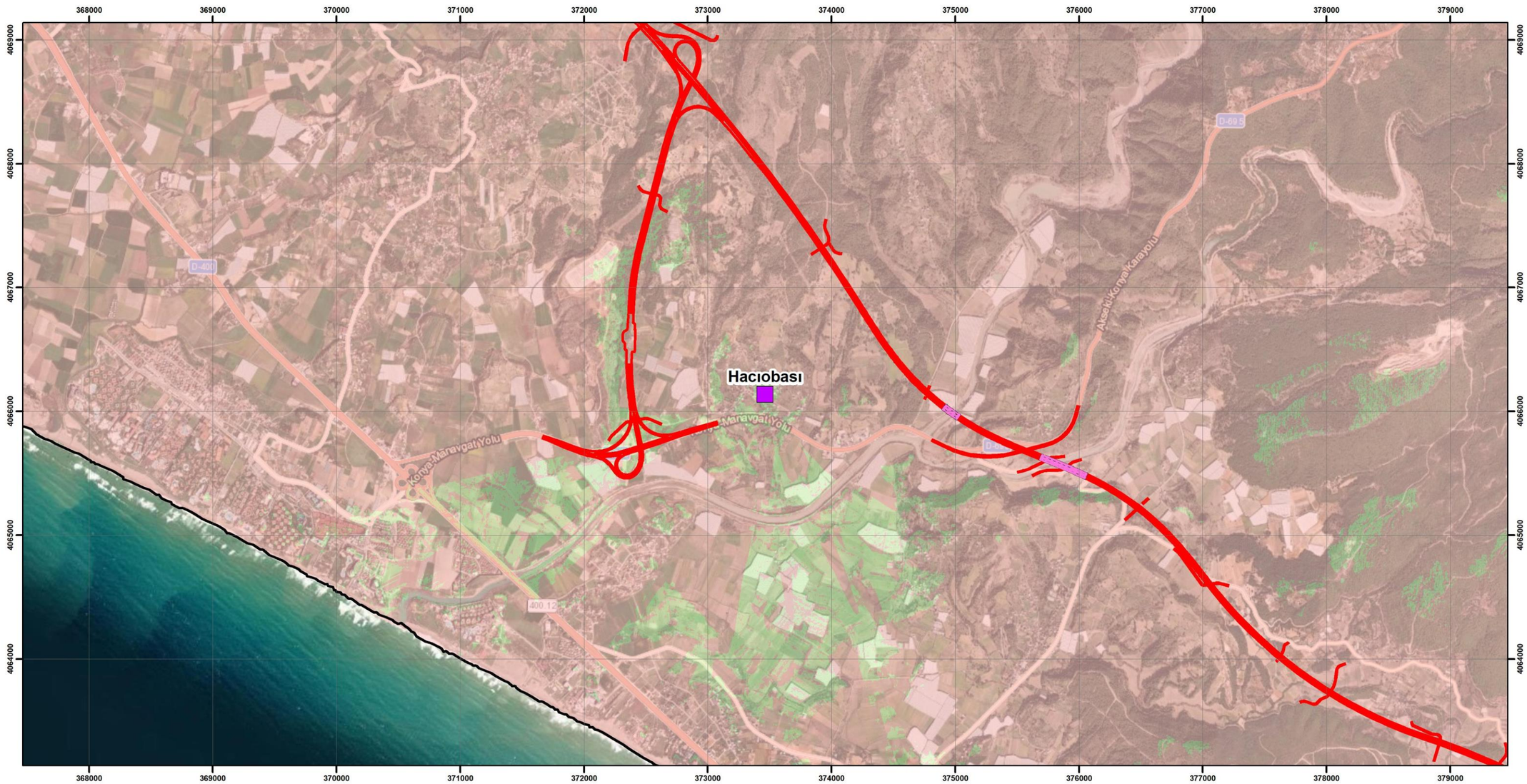


LEGEND

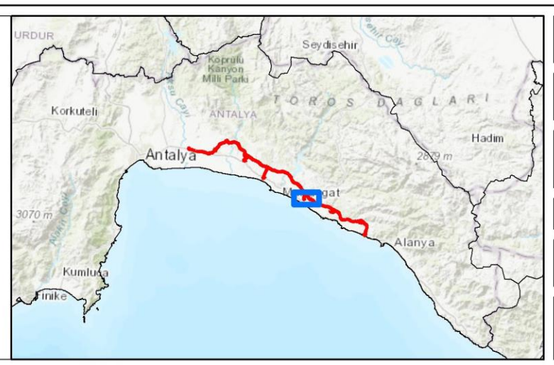
Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Hacıobası Neighbourhood

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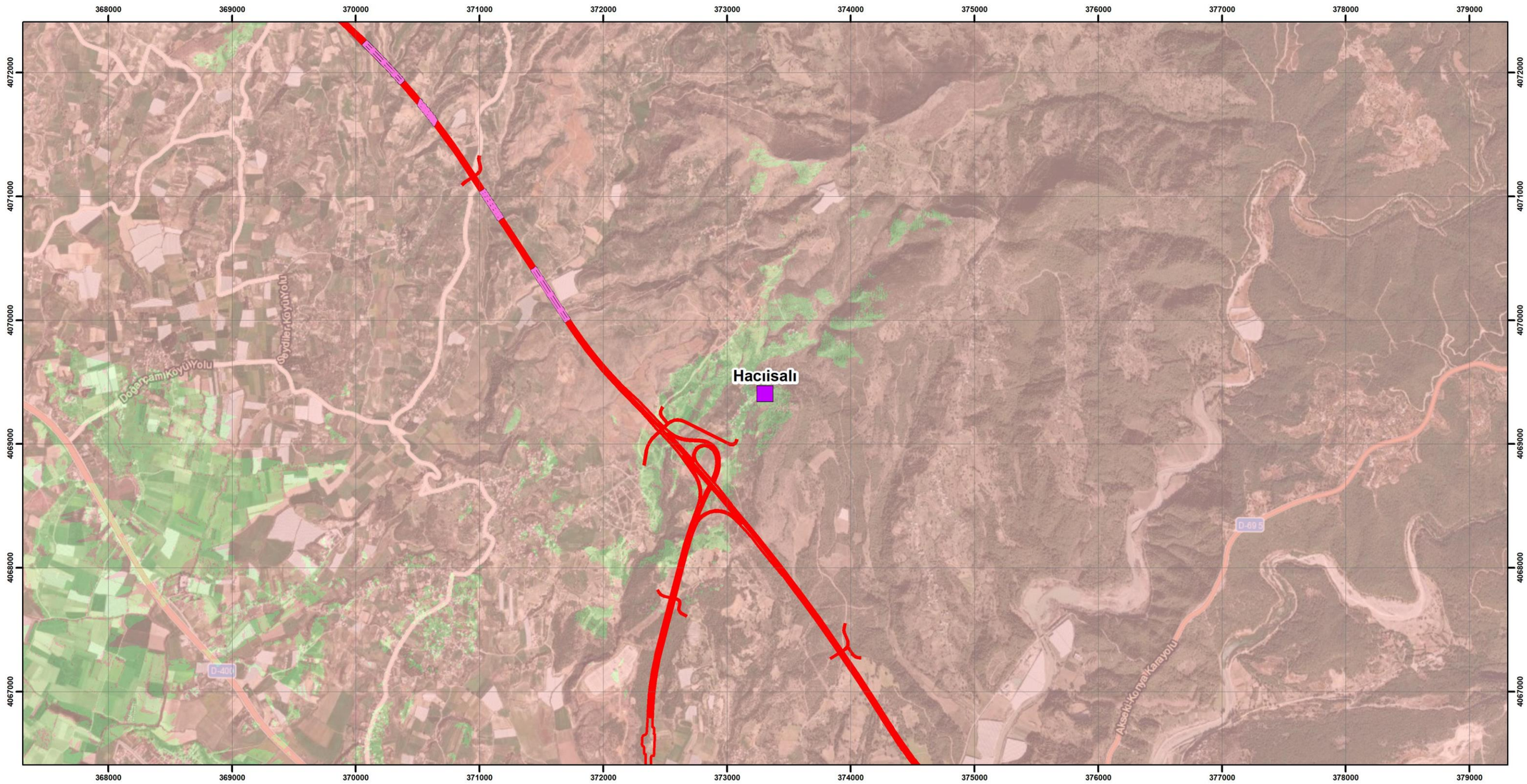


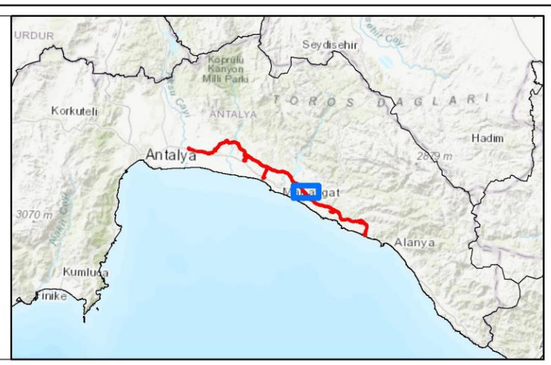
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Hacıisalı Neighbourhood

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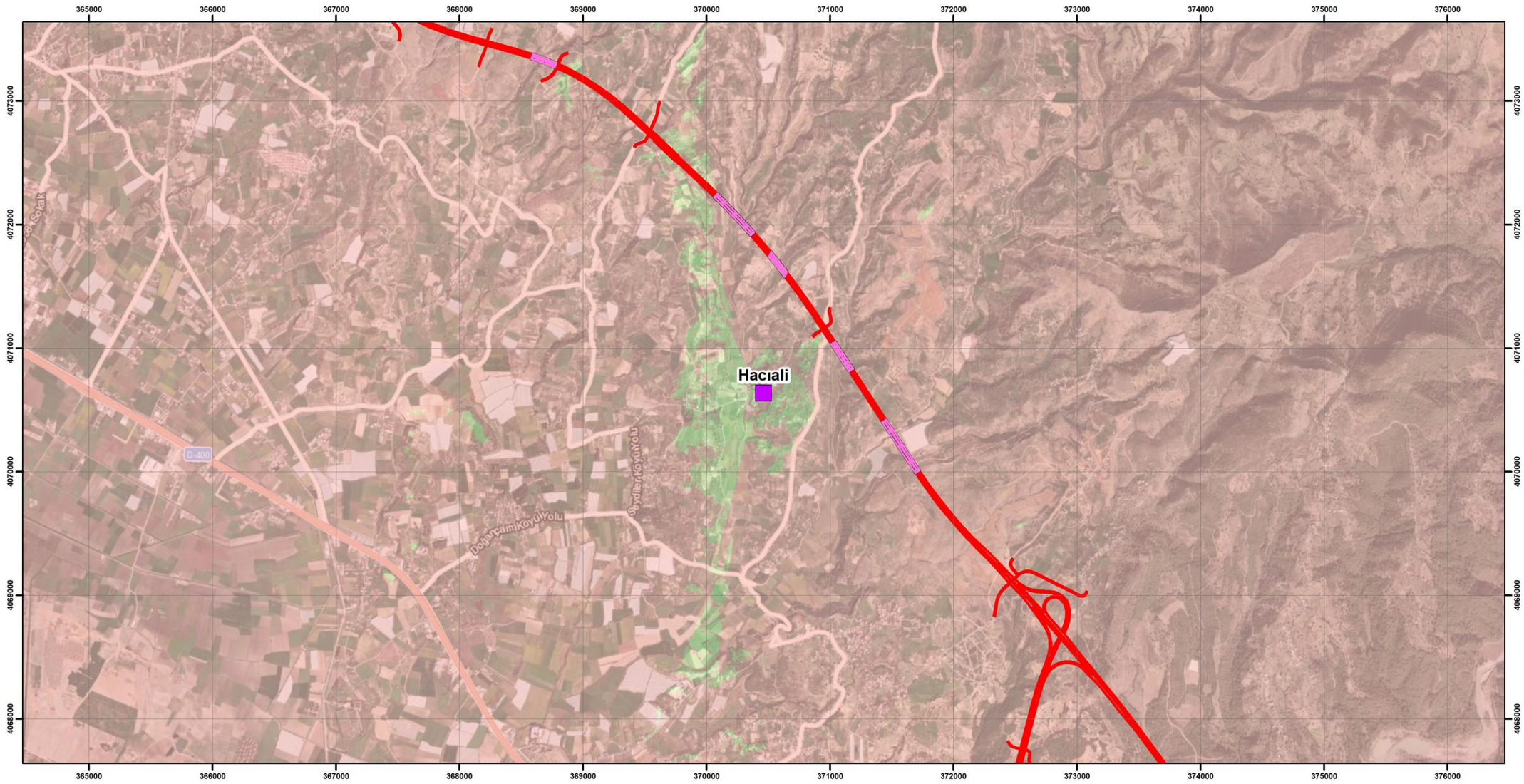


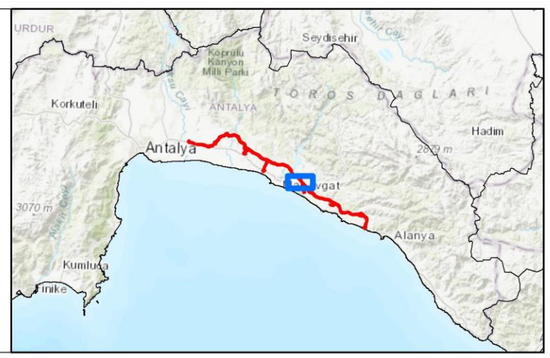
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Hacıali Neighbourhood

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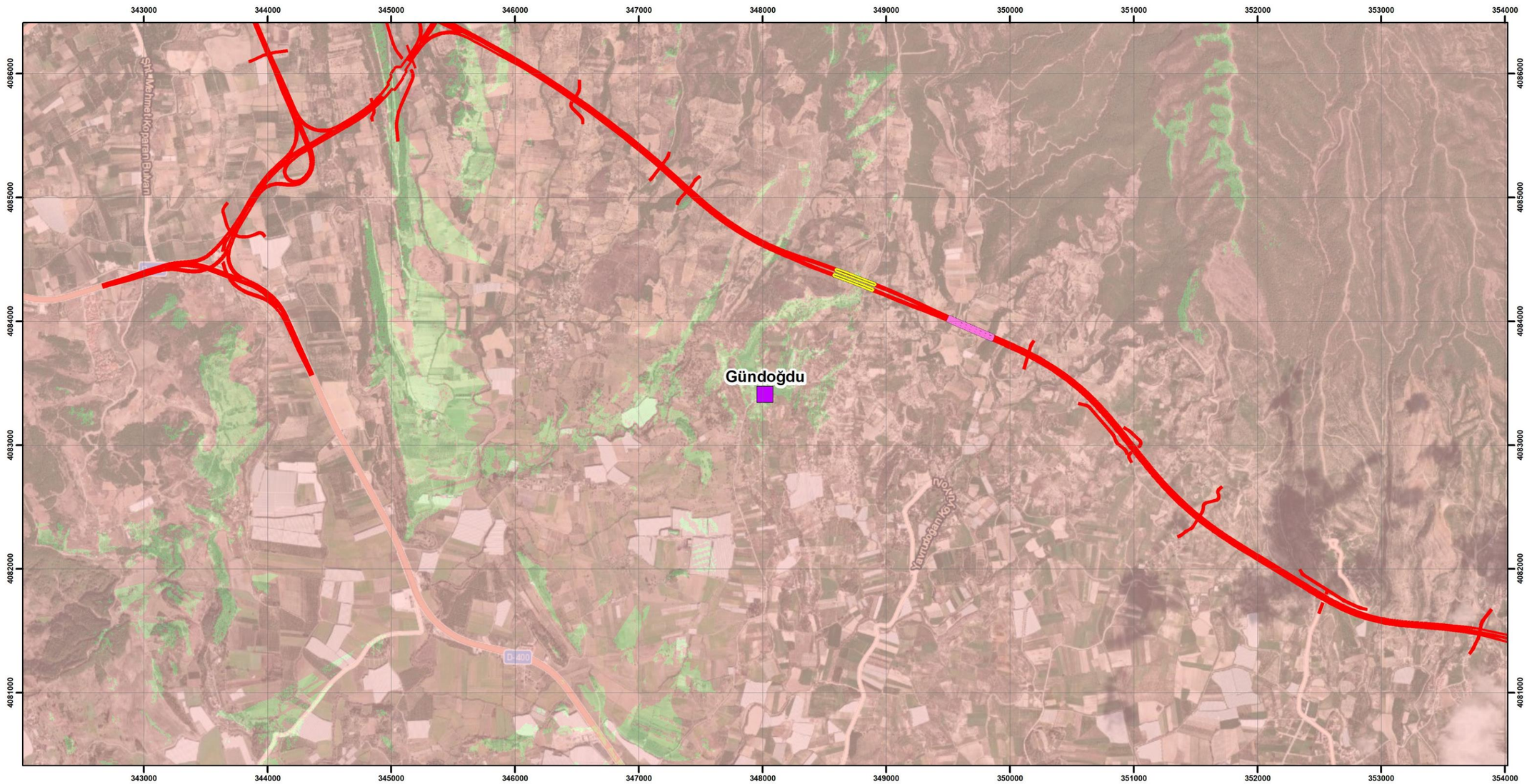


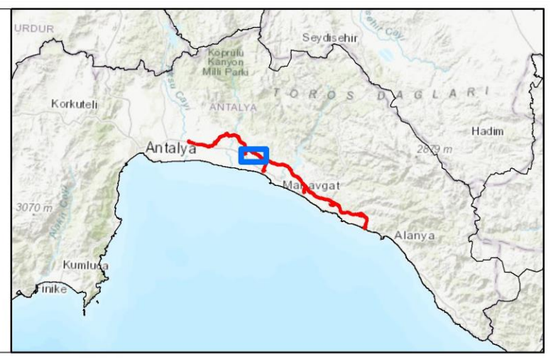
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Gündoğdu Neighbourhood

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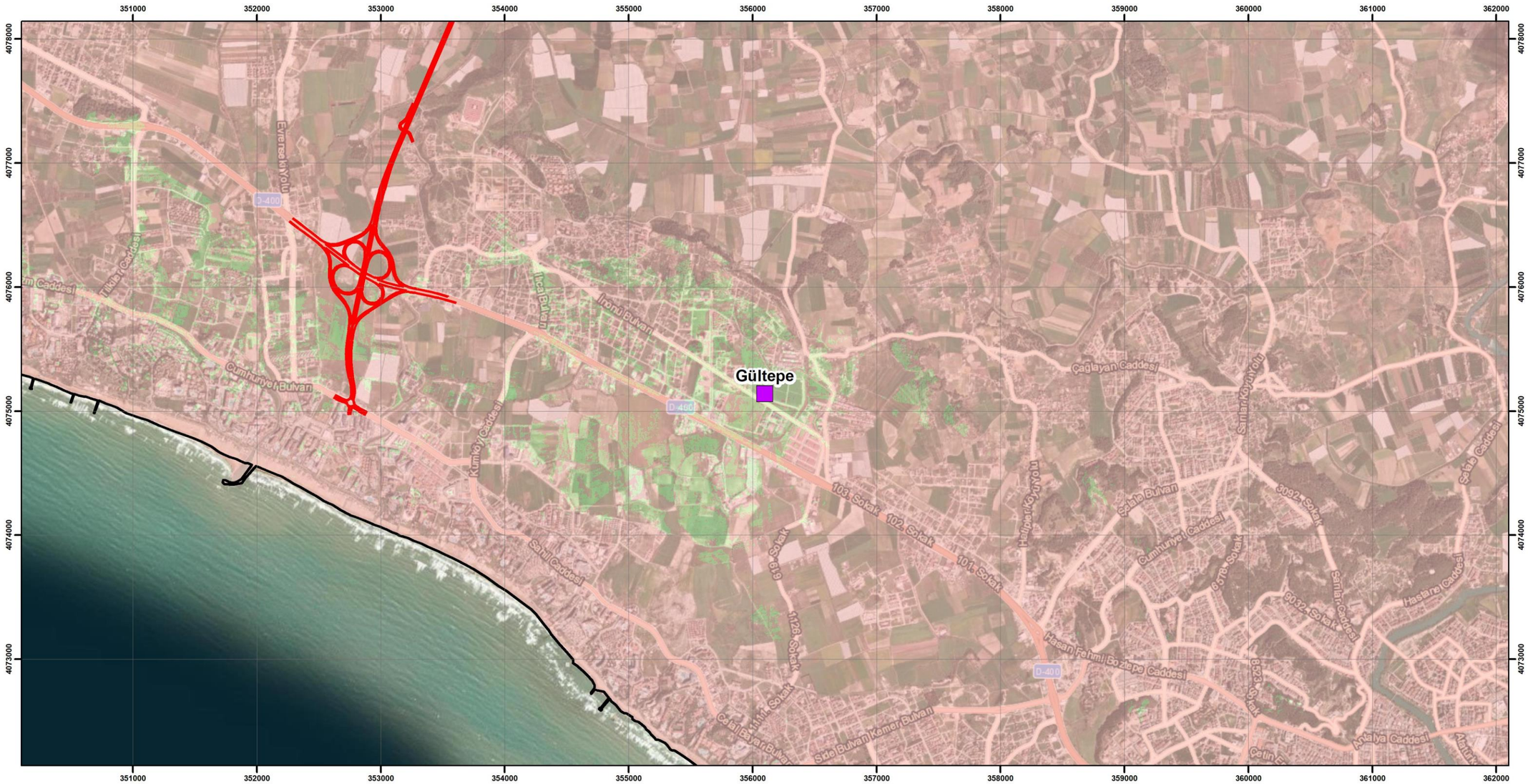


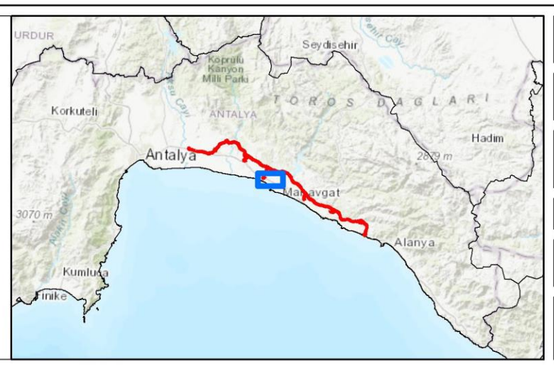
LEGEND

Boundaries
- Province Boundary
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Gültepe Neighbourhood

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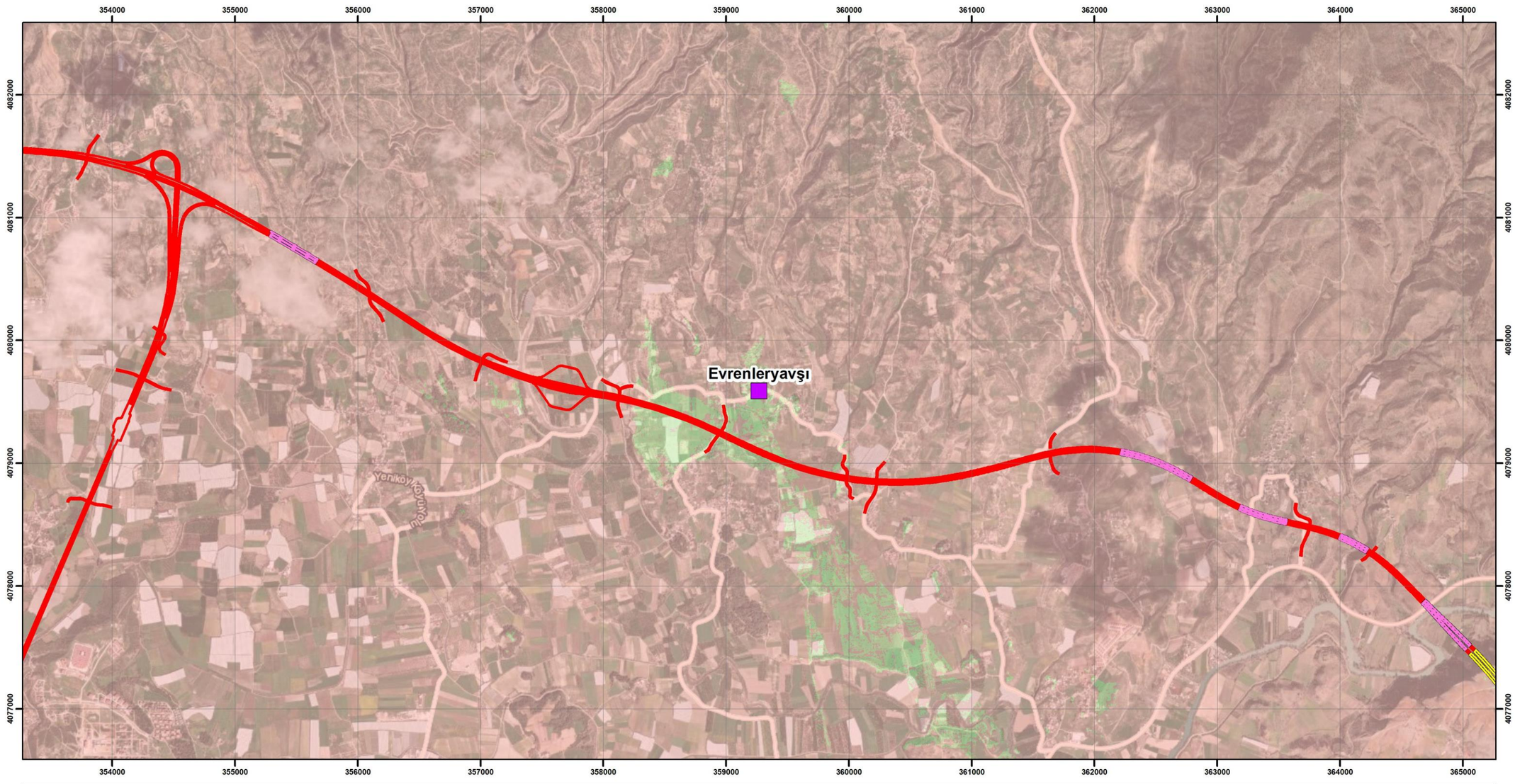

LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Evrenleryavşı Neighbourhood

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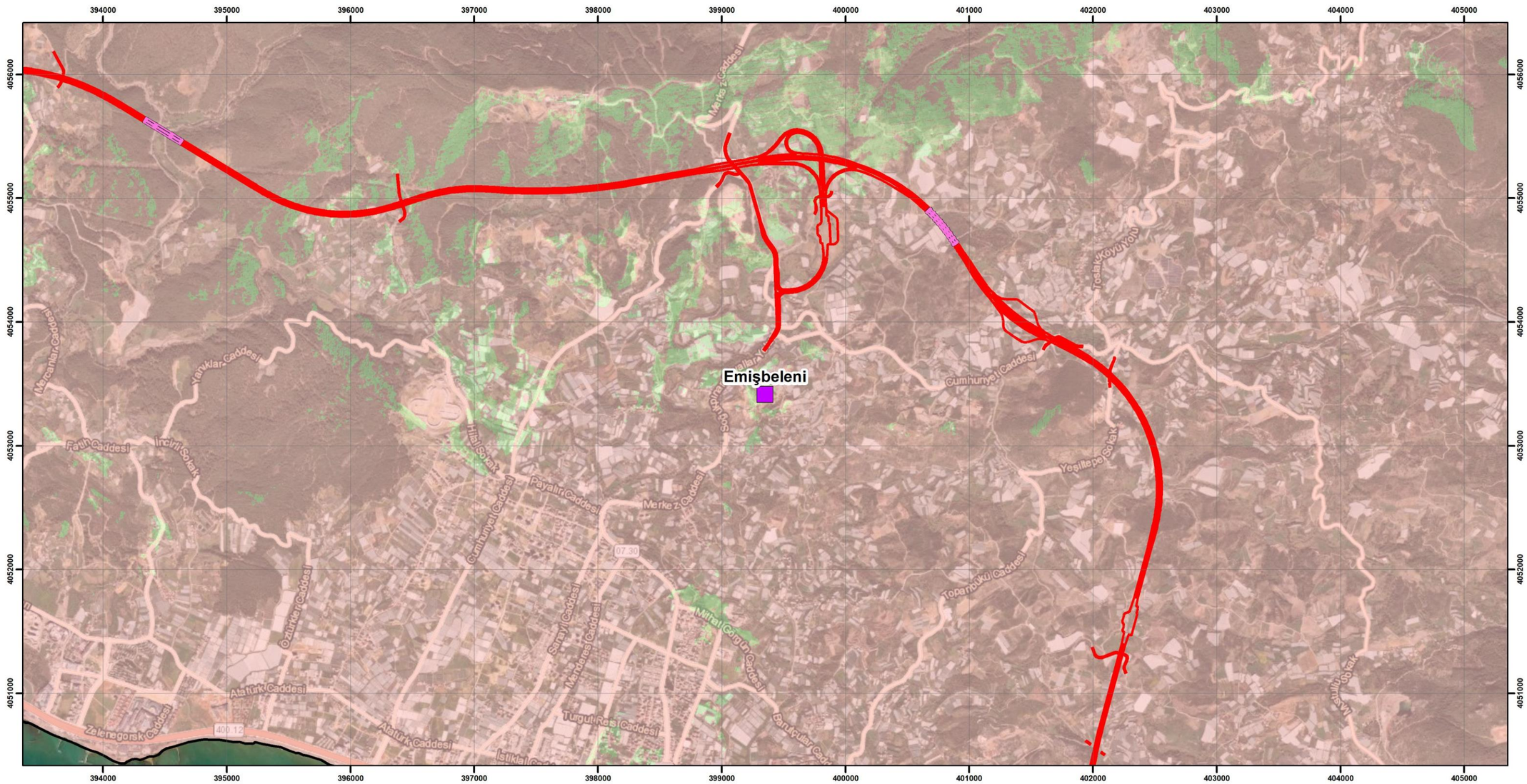

LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Emişbeleni Neighbourhood

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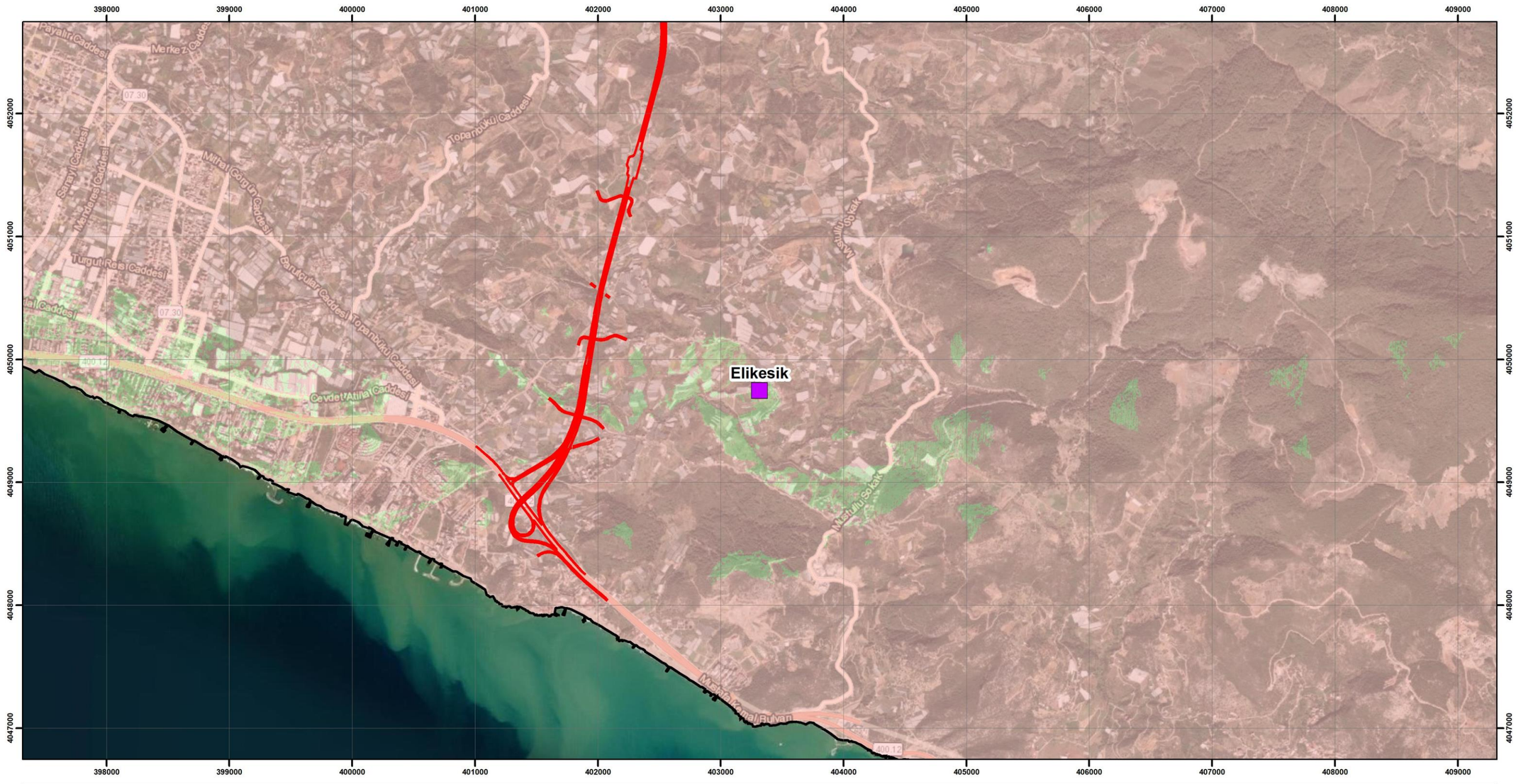
encon@encon.com.tr



LEGEND

Boundaries
- Province Boundary
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1,200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Elikesik Neighbourhood

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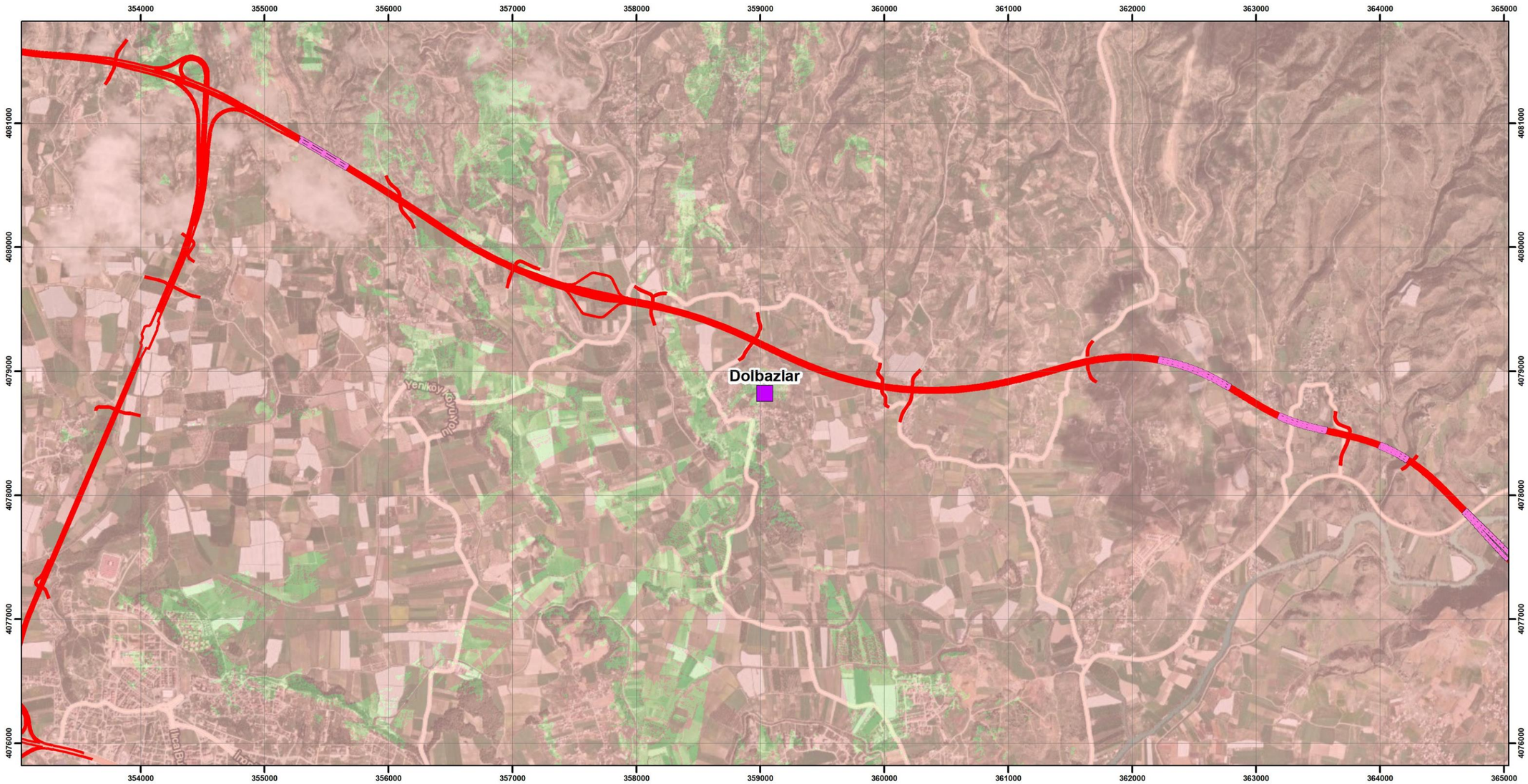


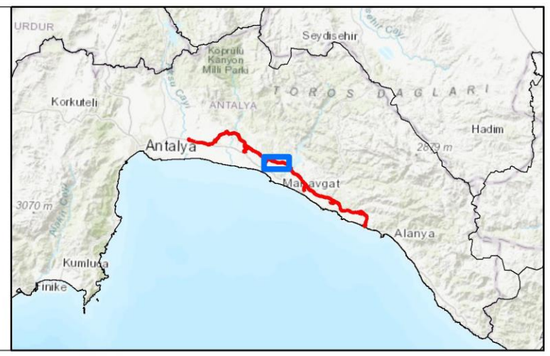
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Dolbazlar Neighbourhood

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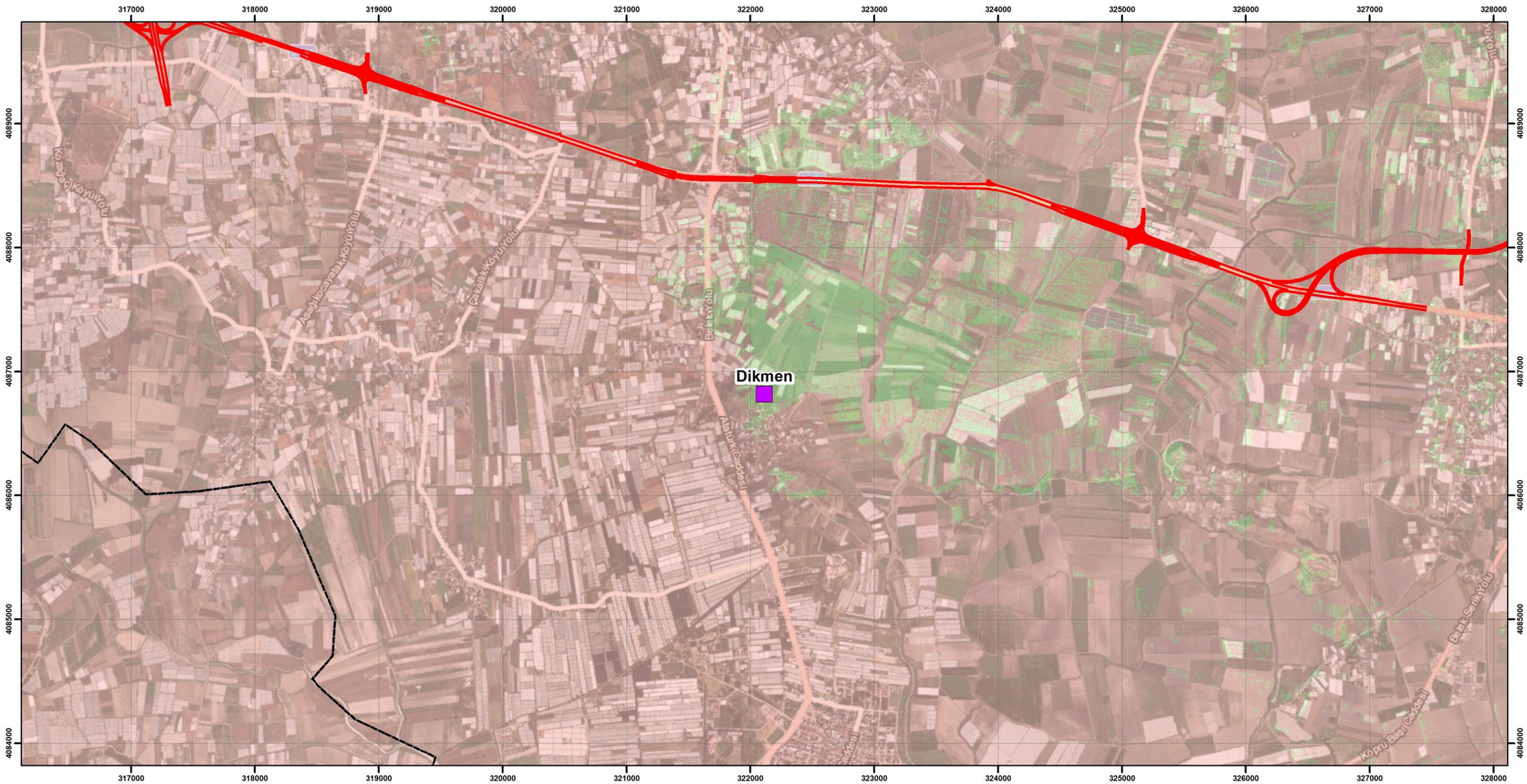

LEGEND

Boundaries
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1,200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Dikmen (Serik) Neighbourhood

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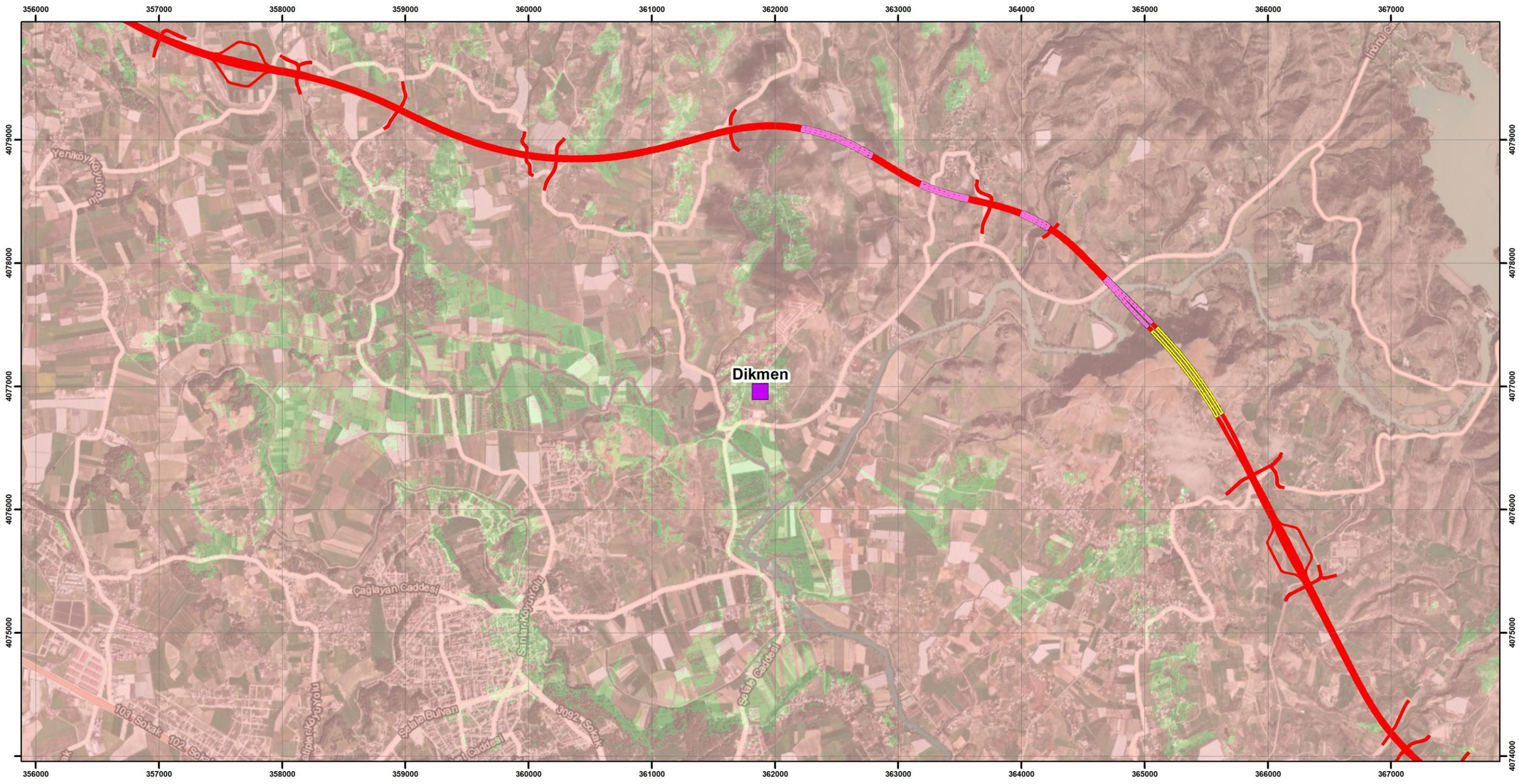
encon@encon.com.tr



LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

N W E S

0 300 600 1.200 m

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Dikmen (Manavgat) Neighbourhood

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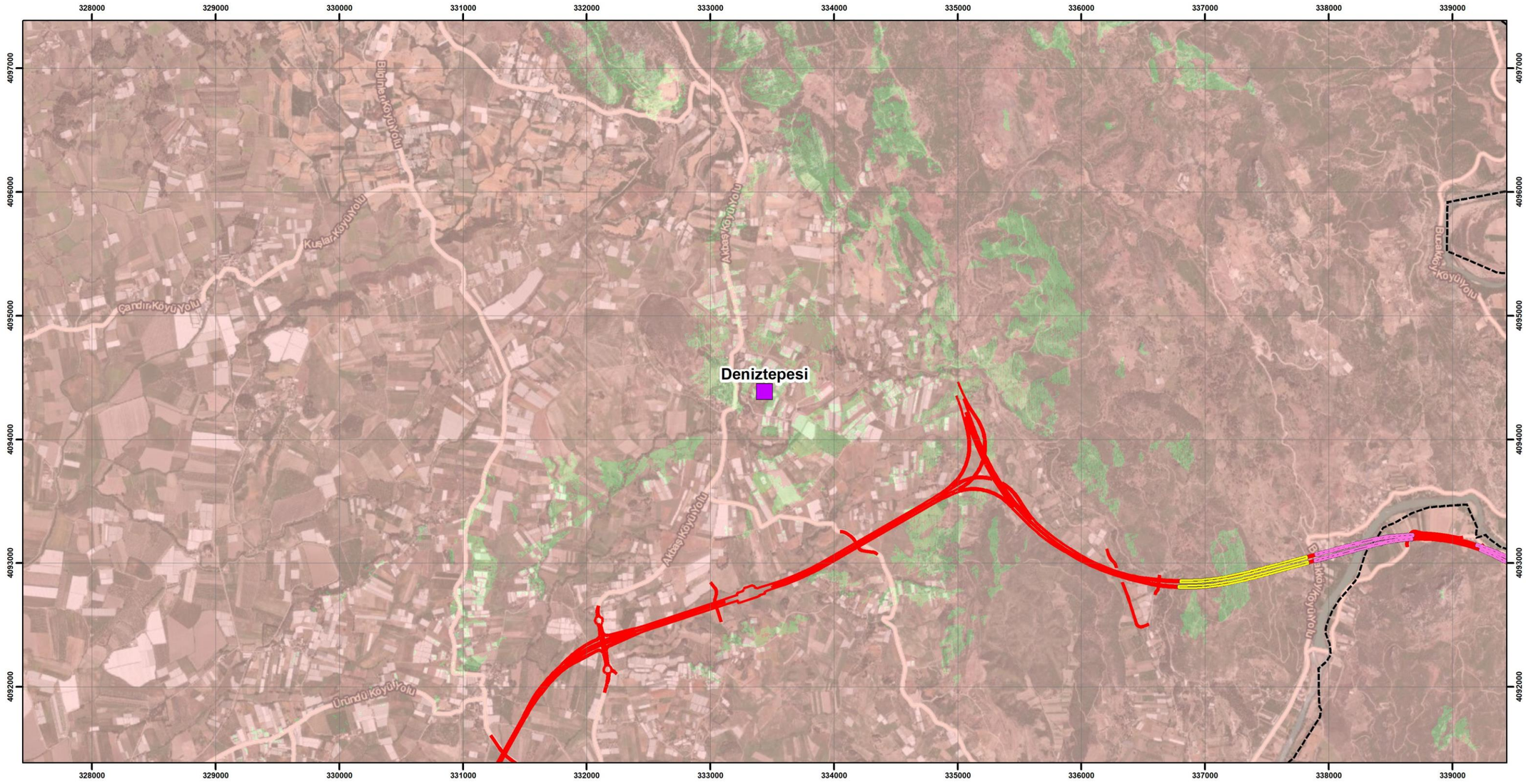

LEGEND

Boundaries
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Deniztepesi Neighbourhood

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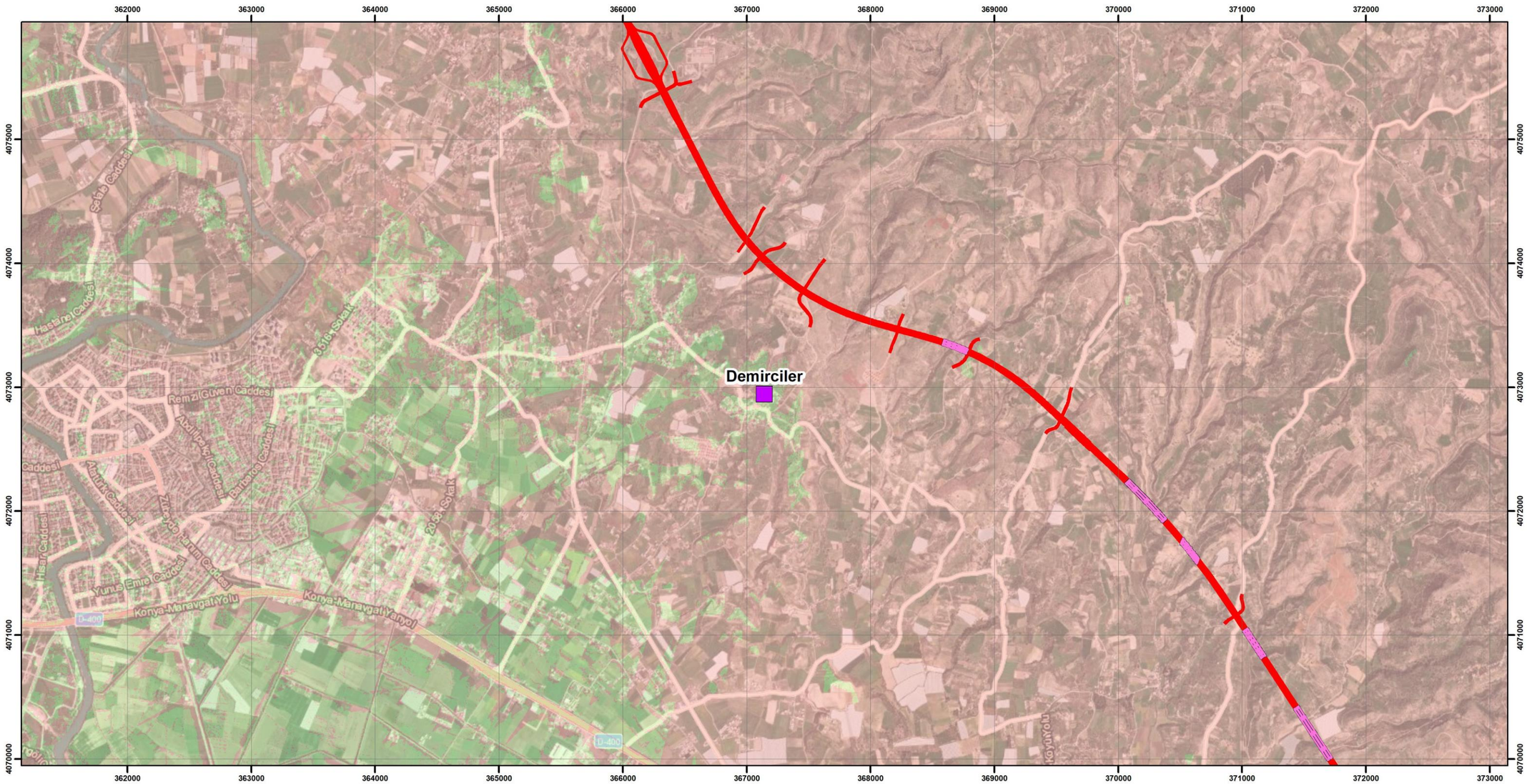


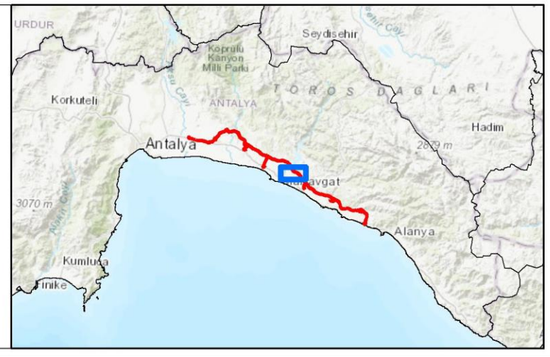
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Demirciler Neighbourhood

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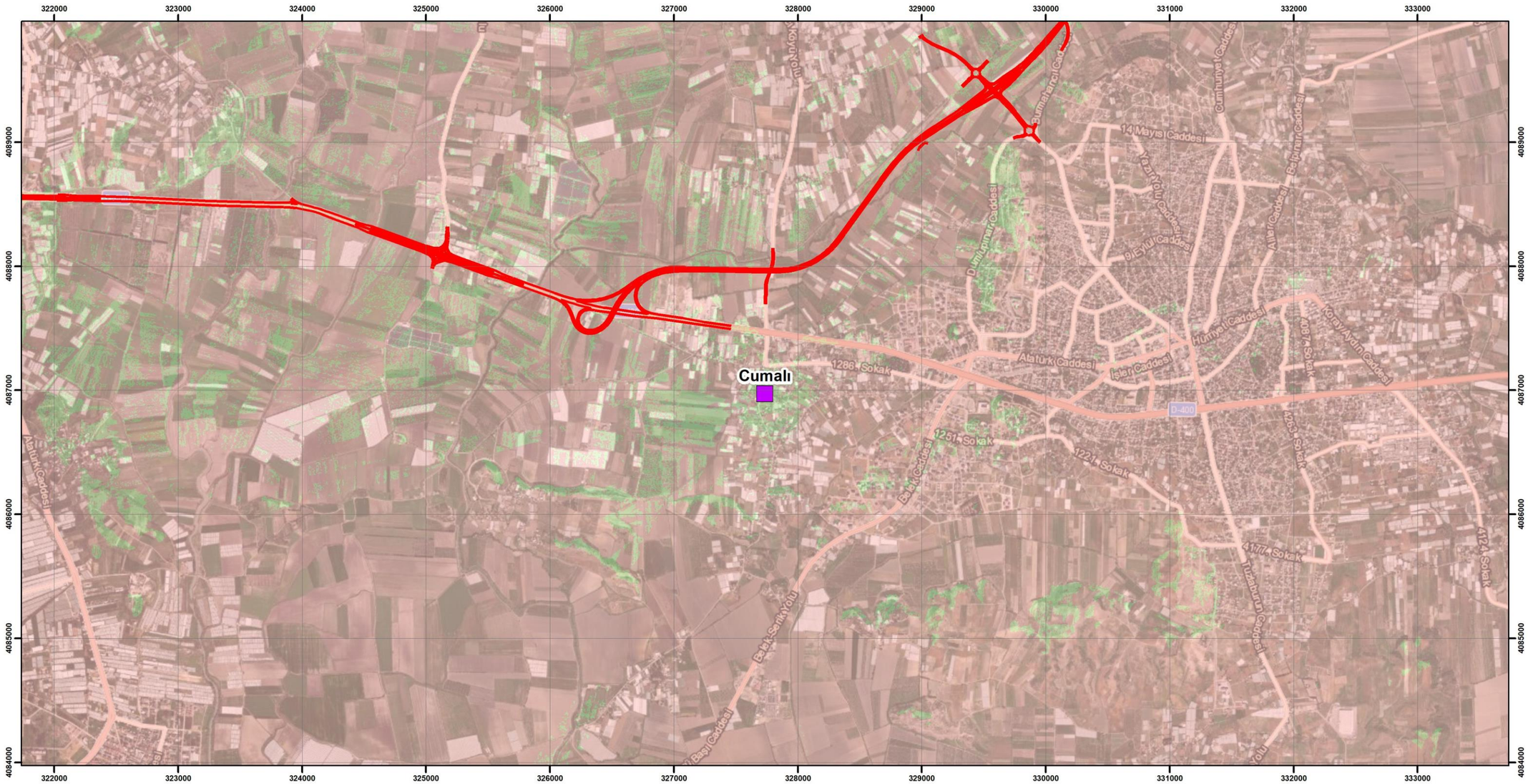

LEGEND

Settlements Settlement

Section Description Antalya-Alanya Motorway Project

Visibility Not Visible, Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Cumalı Neighbourhood

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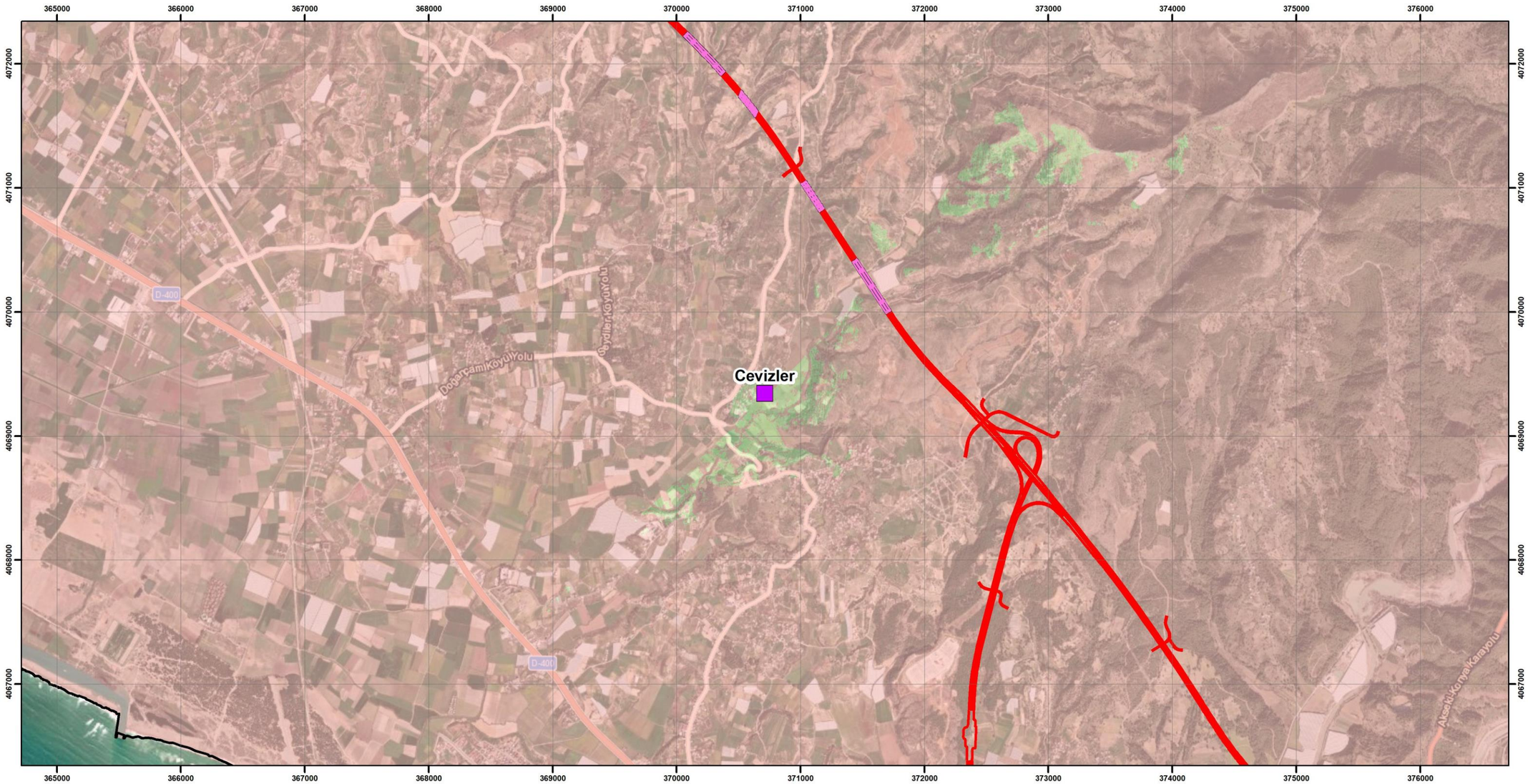


LEGEND

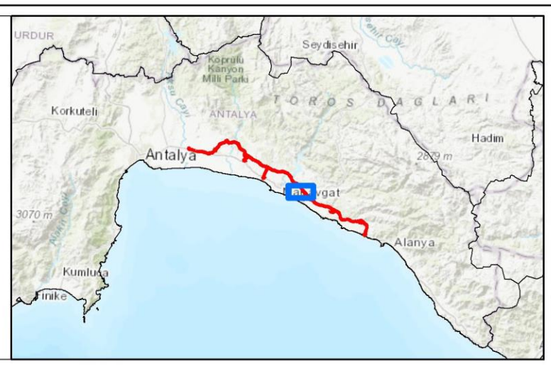
Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Cevizler Neighbourhood

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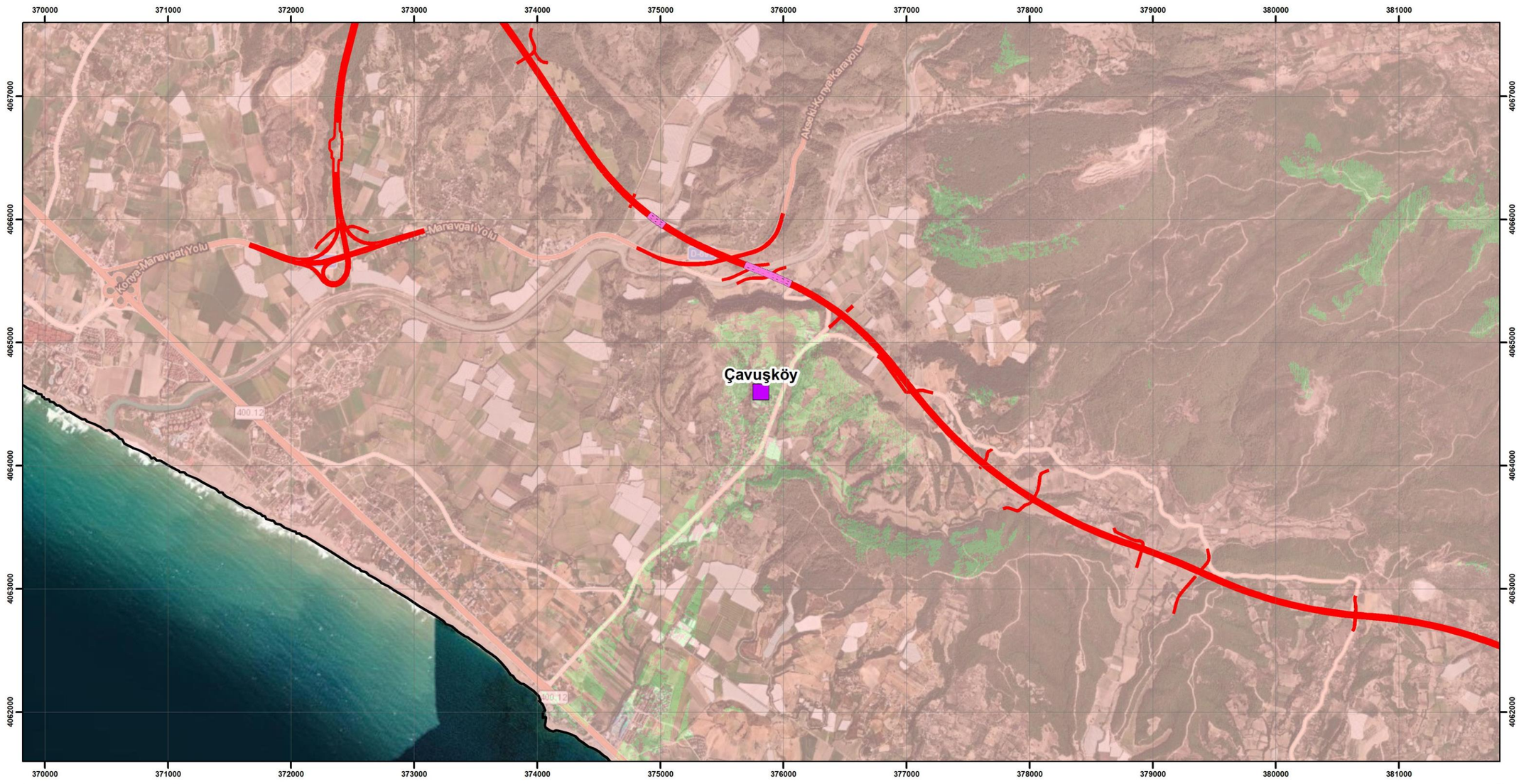


LEGEND

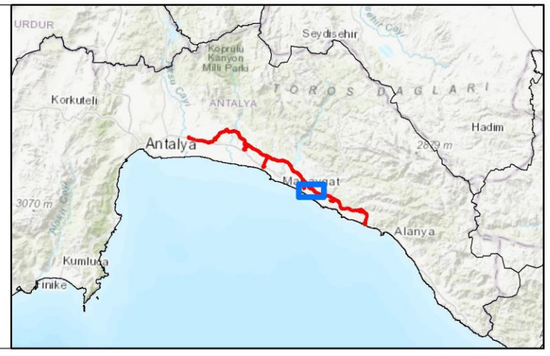
Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Çavuşköy Neighbourhood

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LEGEND

Settlements Settlement

Section Description Antalya-Alanya Motorway Project

Visibility Not Visible, Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Çandır Neighbourhood

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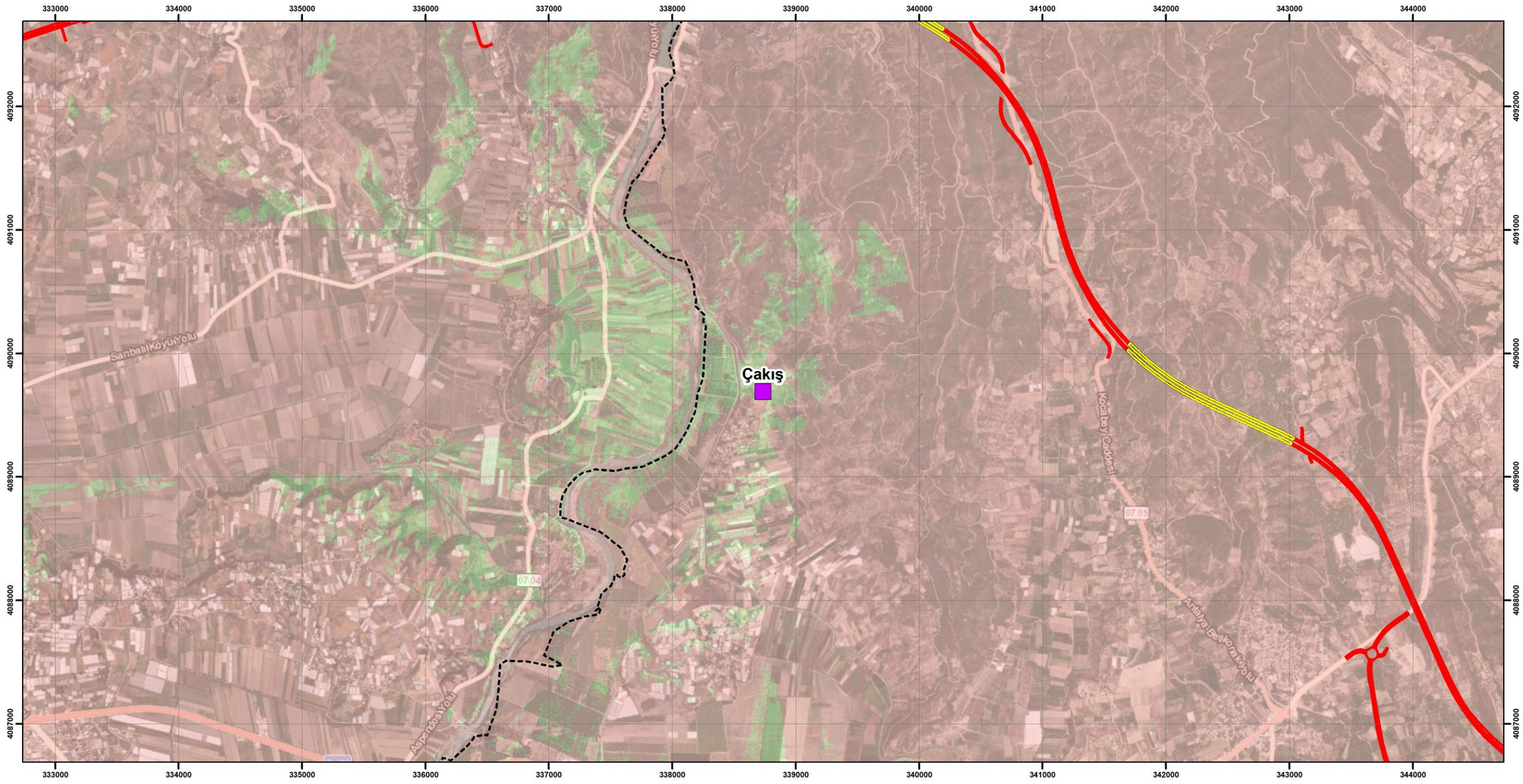
encon@encon.com.tr



LEGEND

Boundaries
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Çakış Neighbourhood

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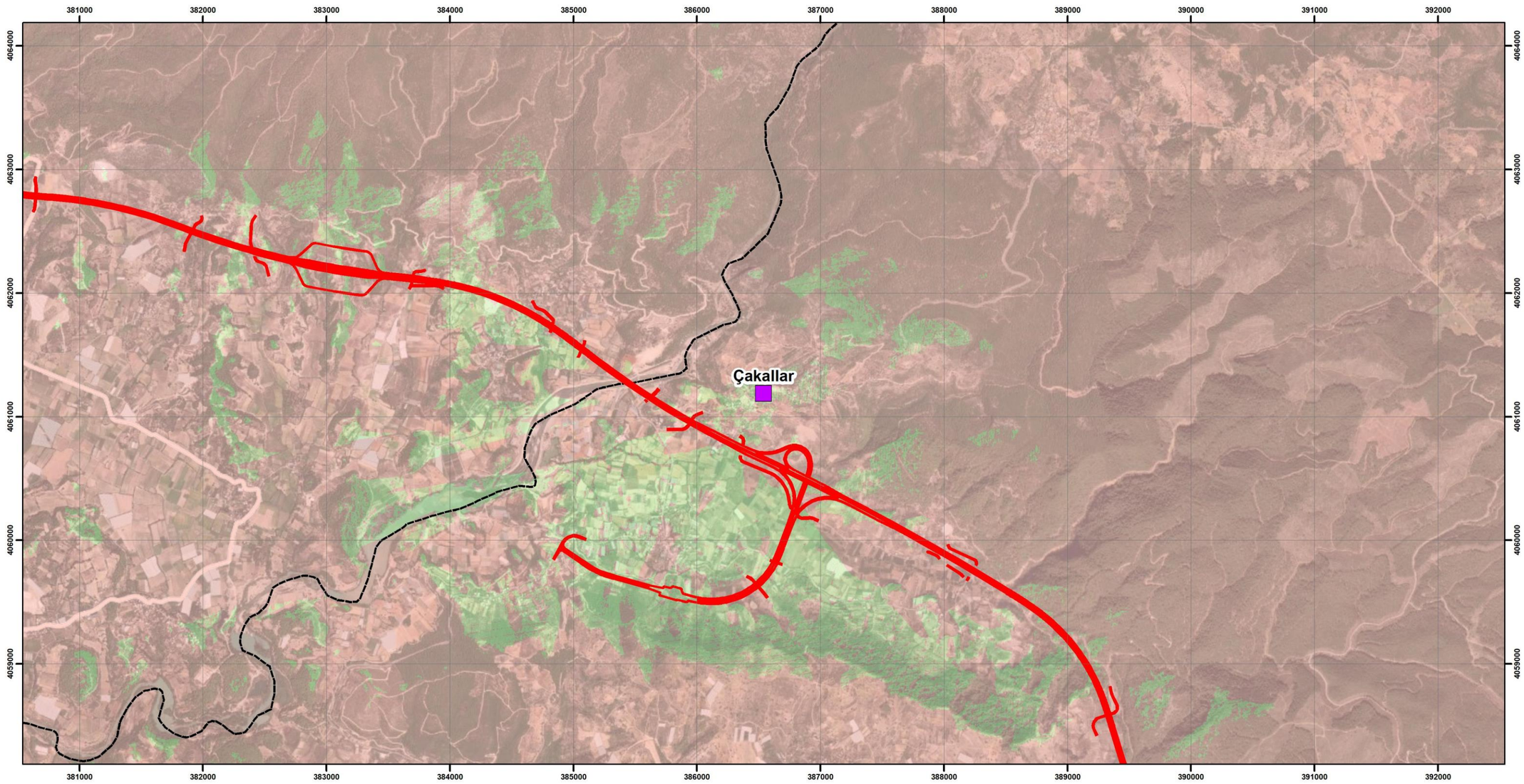

LEGEND

Boundaries
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Çakallar Neighbourhood

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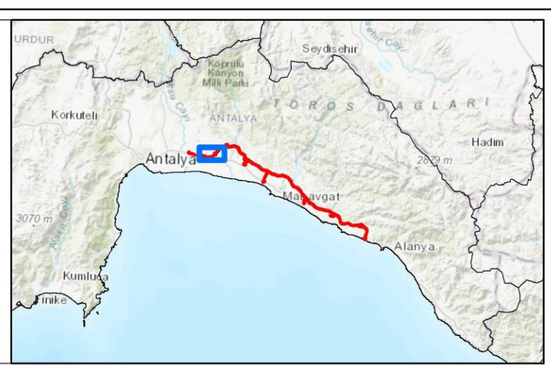
LEGEND

Settlements Settlement

Section Description Antalya-Alanya Motorway Project

Visibility Not Visible, Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Burmahancı Neighbourhood

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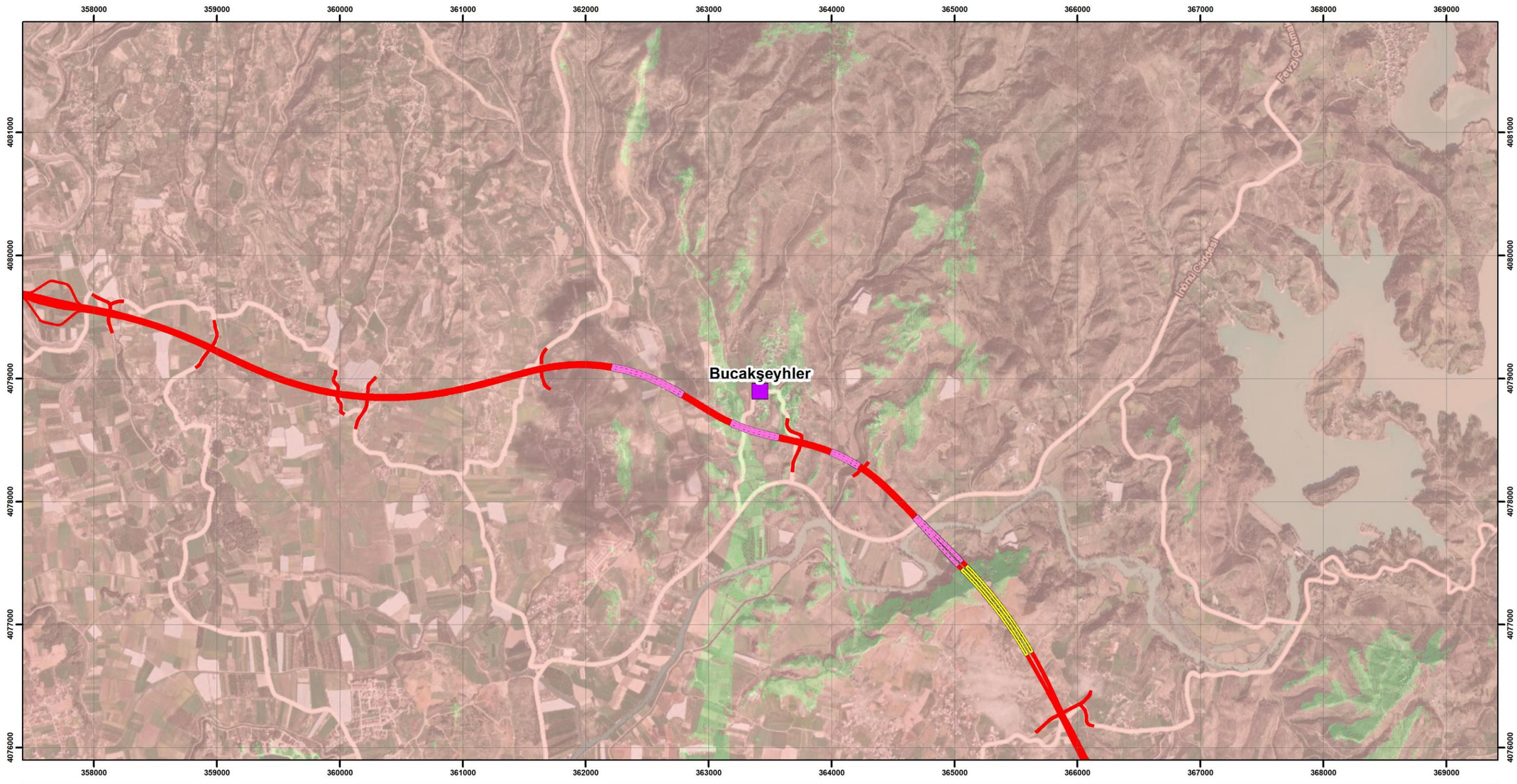

LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1,200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Bucakşeyhler Neighbourhood

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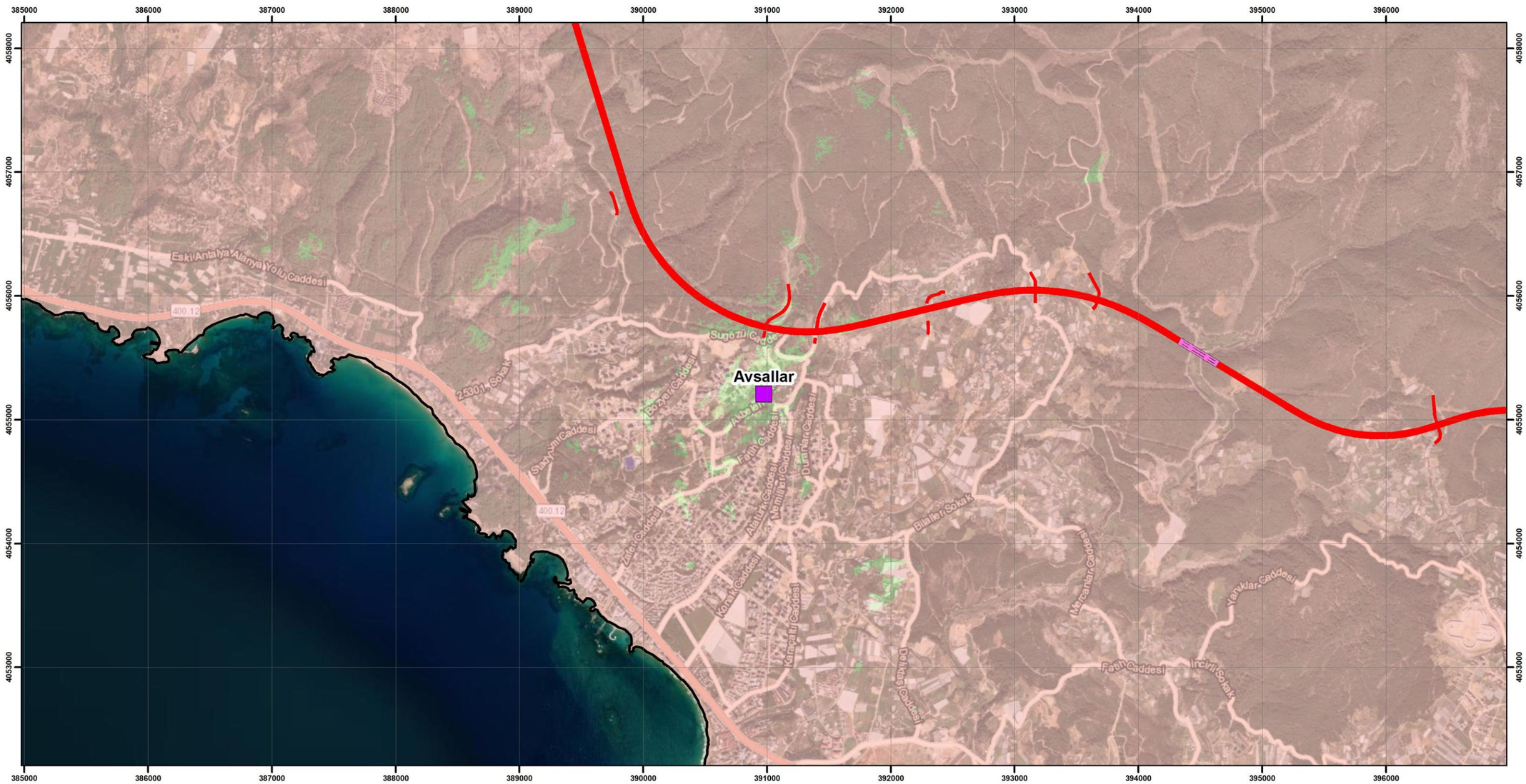

LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Avsallar Neighbourhood

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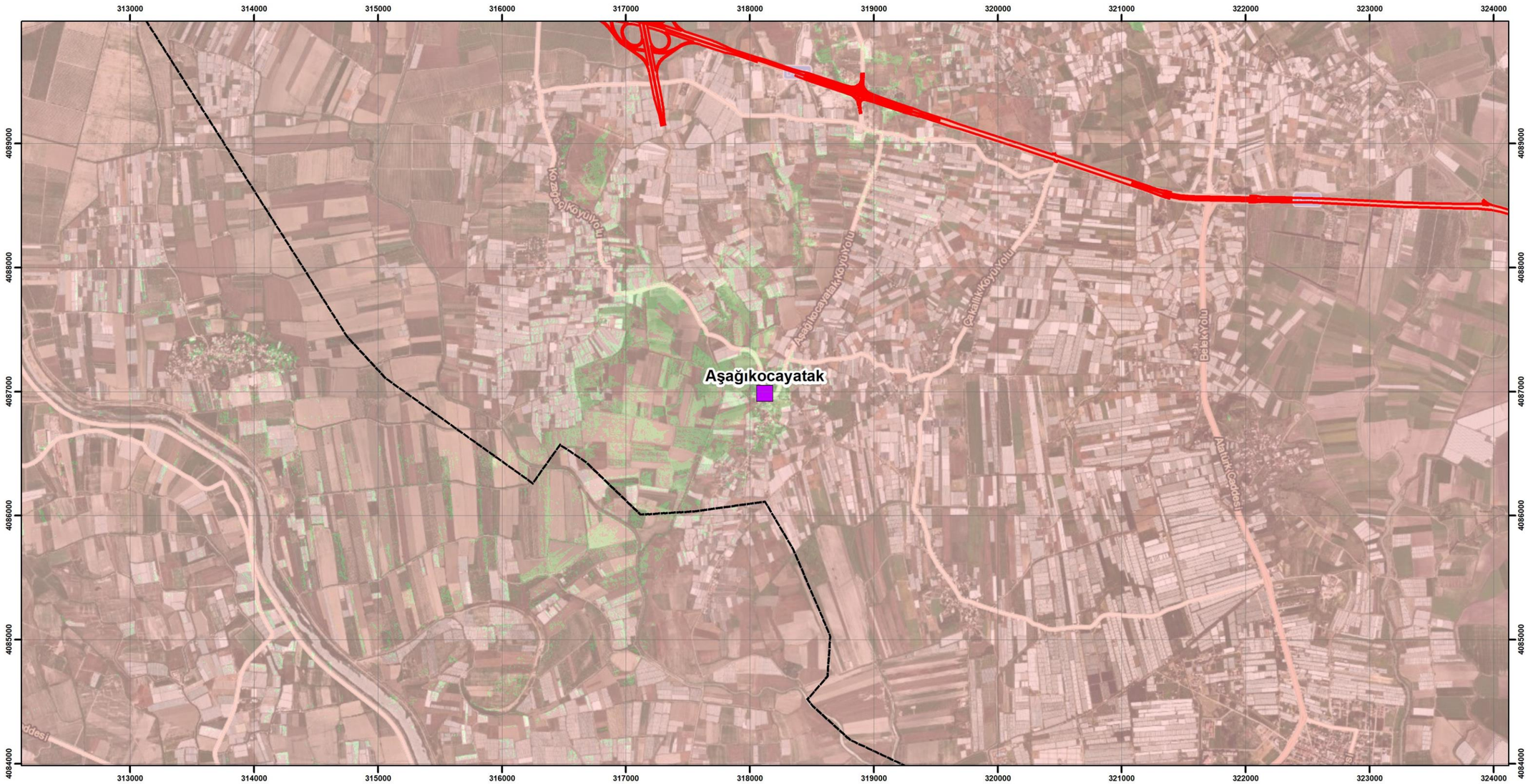
encon@encon.com.tr



LEGEND

Boundaries
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Aşağıkocayatak Neighbourhood

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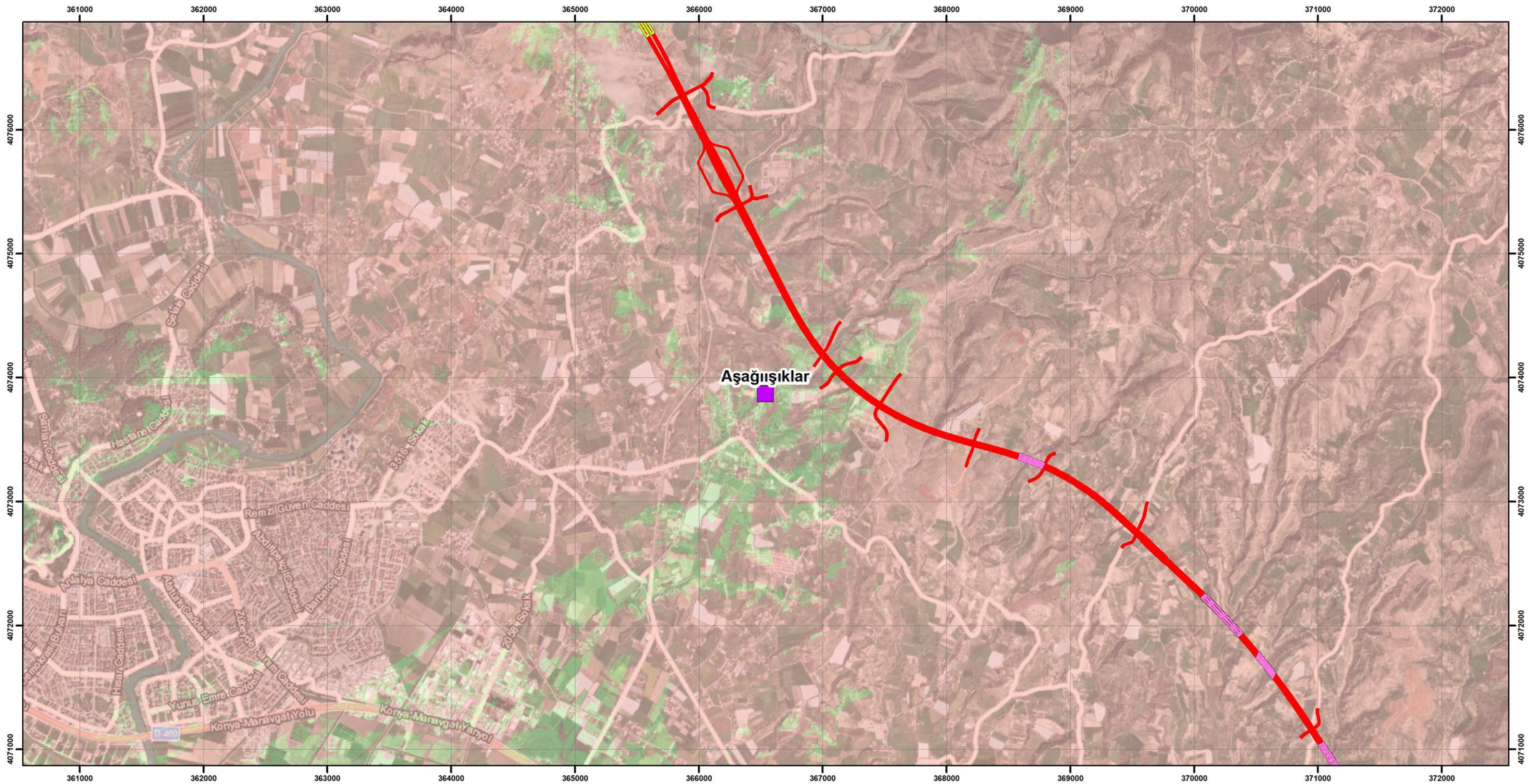


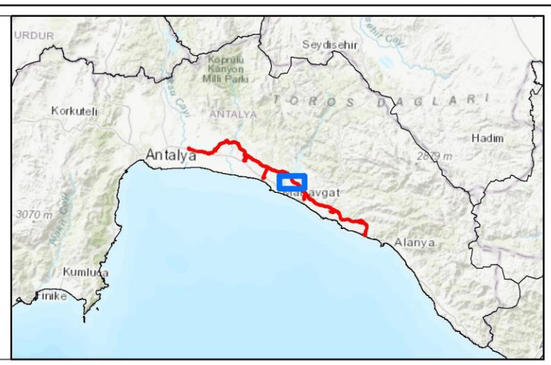
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct
- Tunnel

Visibility
- Not Visible
- Visible



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Aşağıışıklar Neighbourhood

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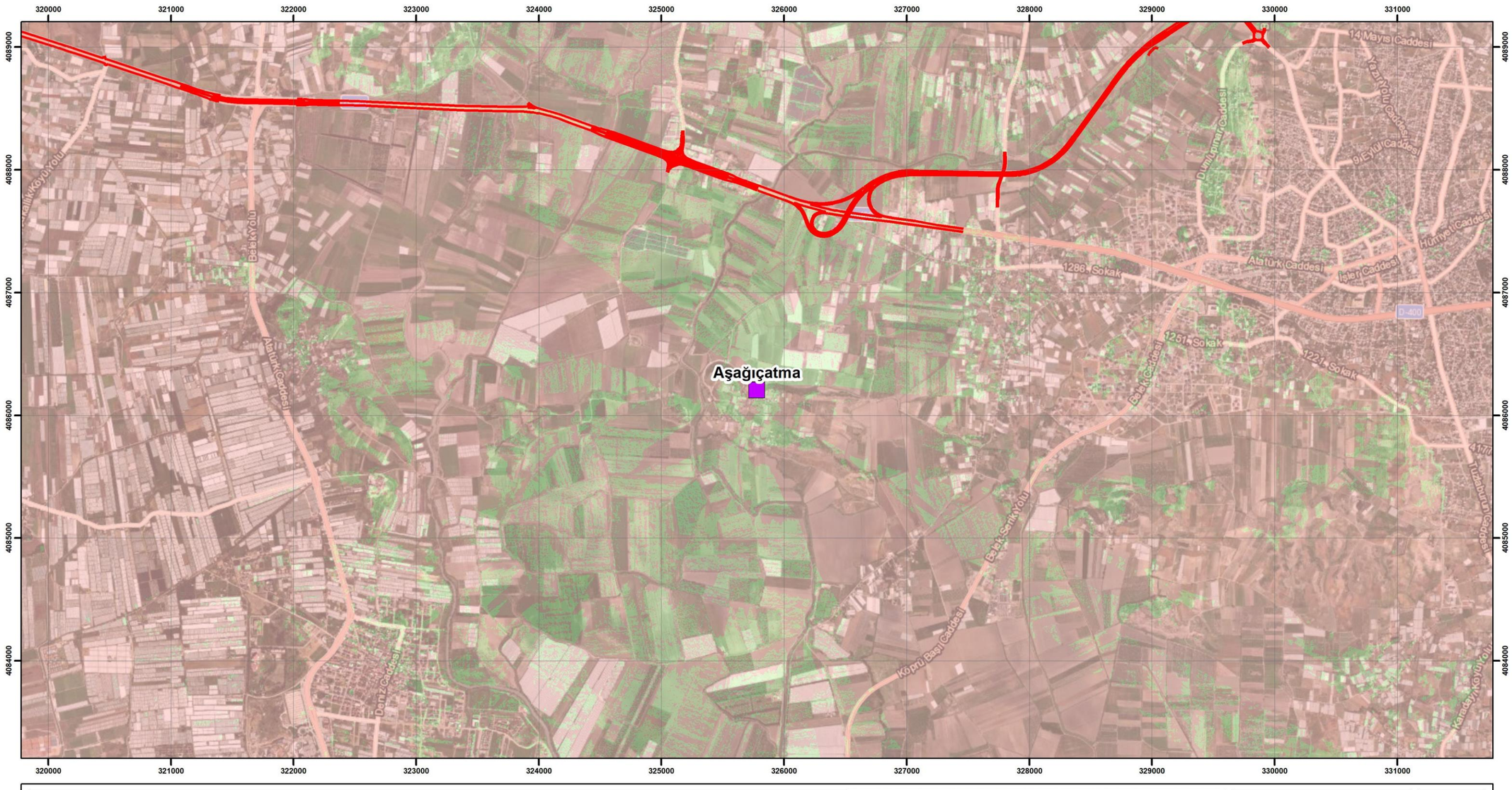

LEGEND

Settlements Settlement

Section Description Antalya-Alanya Motorway Project

Visibility Not Visible, Visible



UTMWGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Aşağıçatma Neighbourhood

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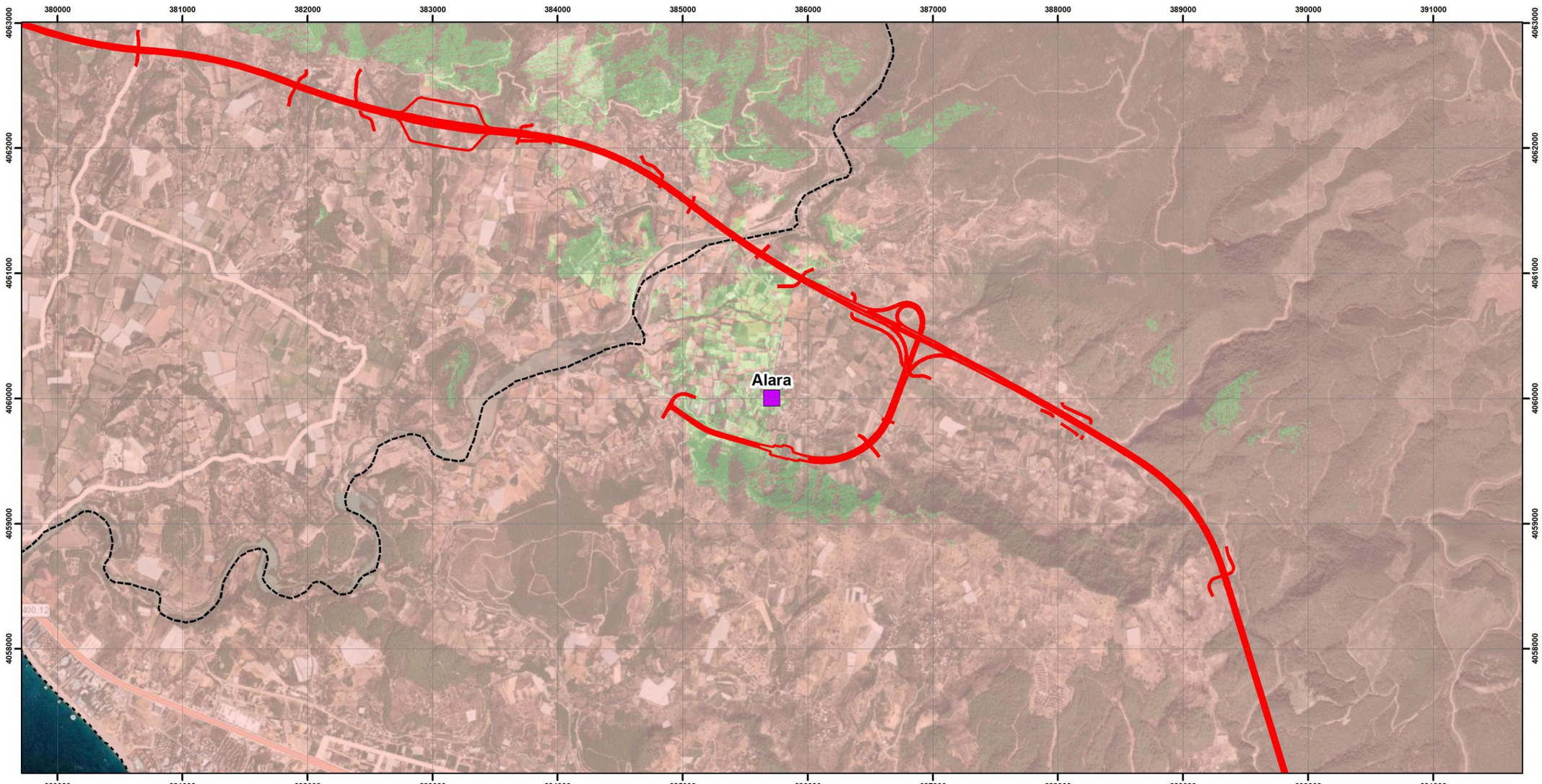


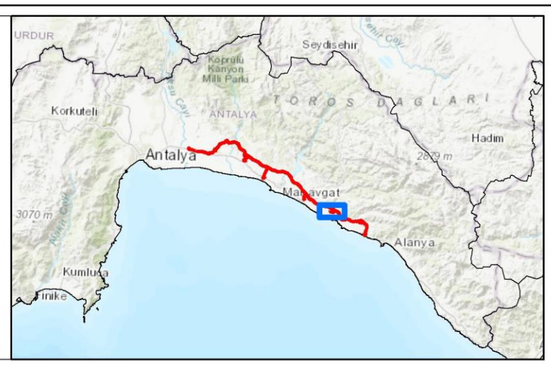
LEGEND

Boundaries
- District Boundary

Section Description
- Antalya-Alanya Motorway Project

Visibility
- Not Visible
- Visible

Settlements
- Settlement



UTM WGS84 ZONE36

0 300 600 1.200 m

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Alara Neighbourhood

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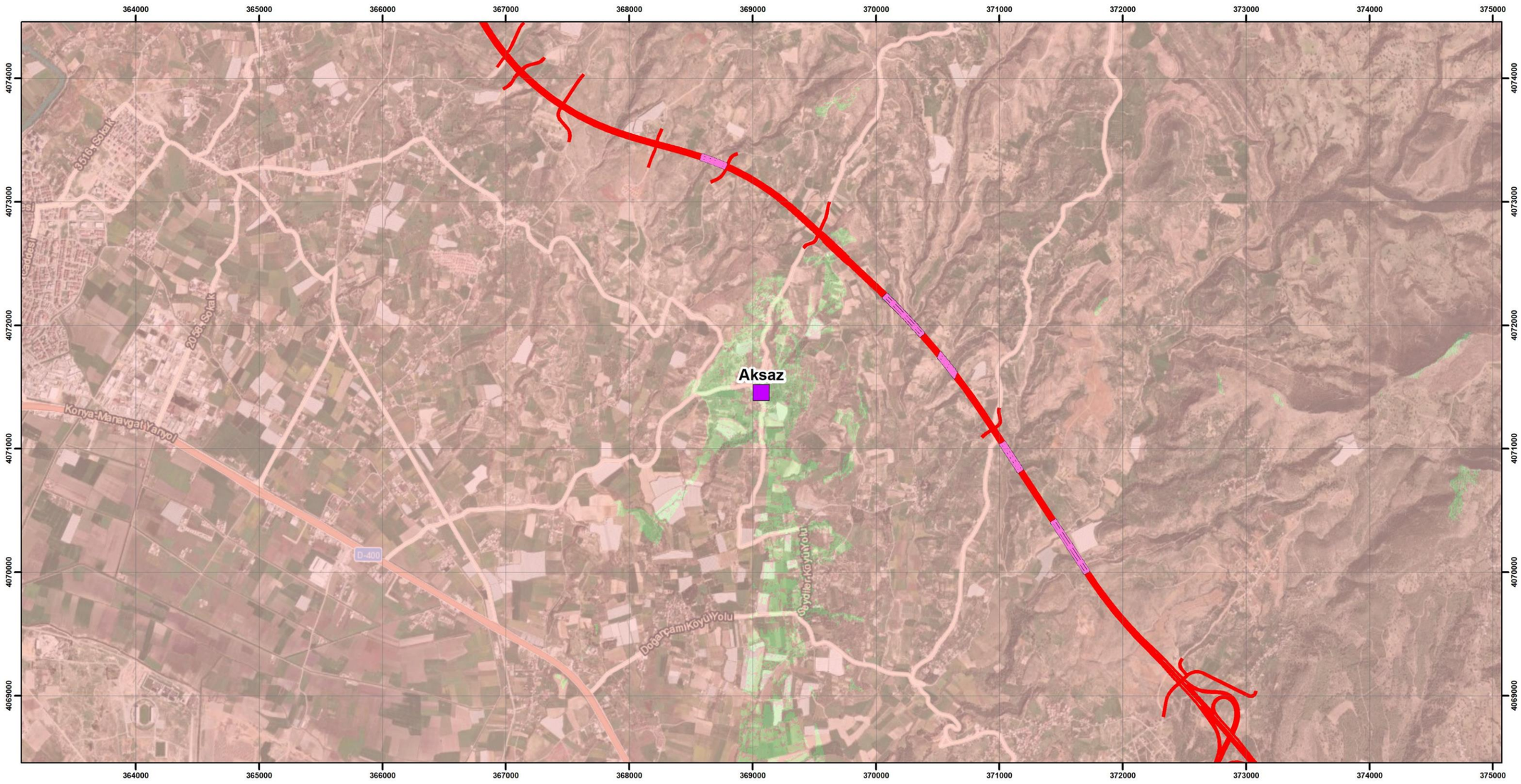


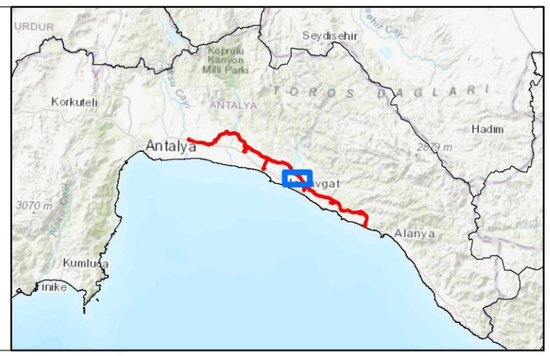
LEGEND

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



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N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Aksaz Neighbourhood

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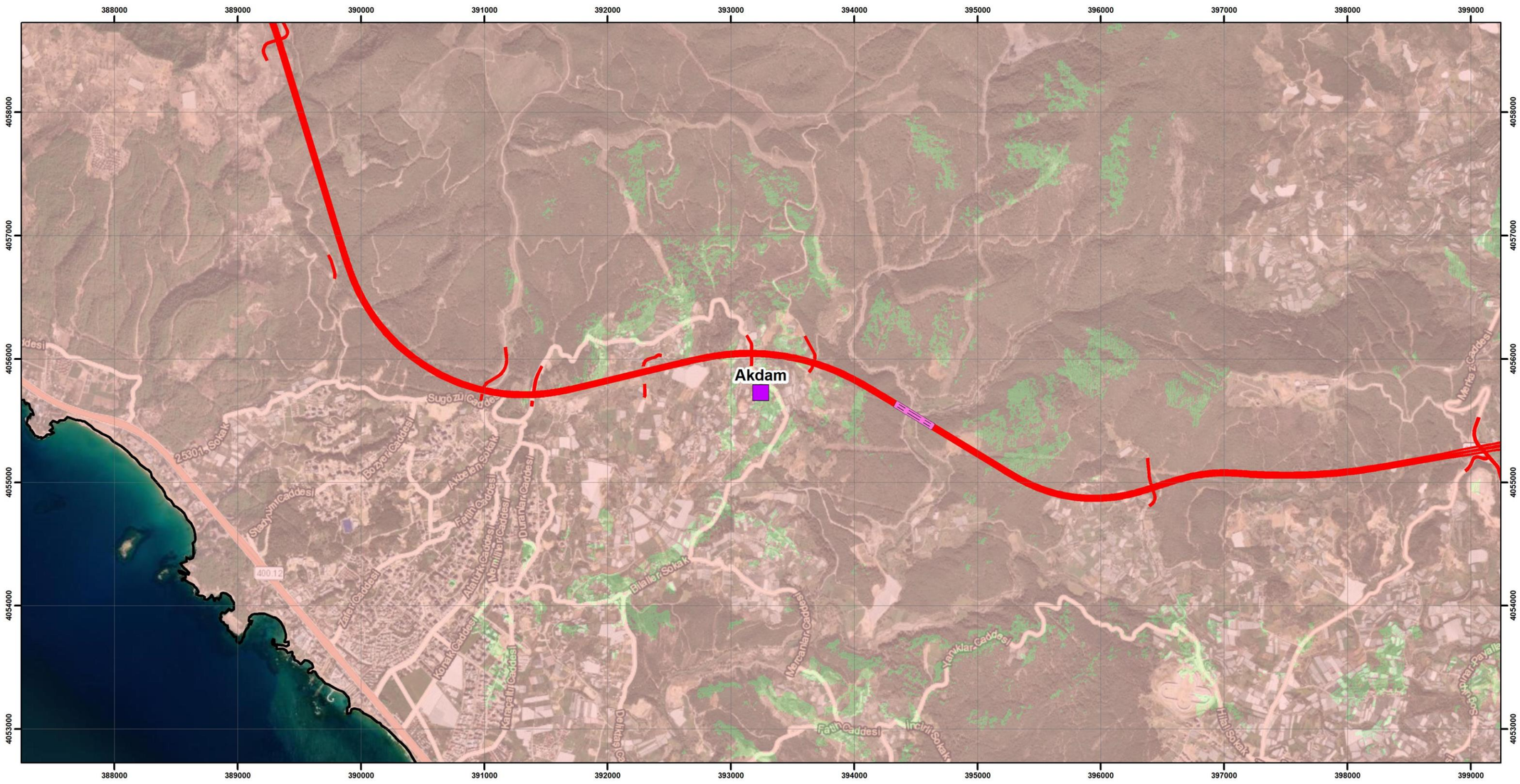

LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlements
- Settlement

Section Description
- Antalya-Alanya Motorway Project

Engineering Structures
- Viaduct

Visibility
- Not Visible
- Visible



UTMWGS84 ZONE36

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N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

Visibility Map of Akdam Neighbourhood

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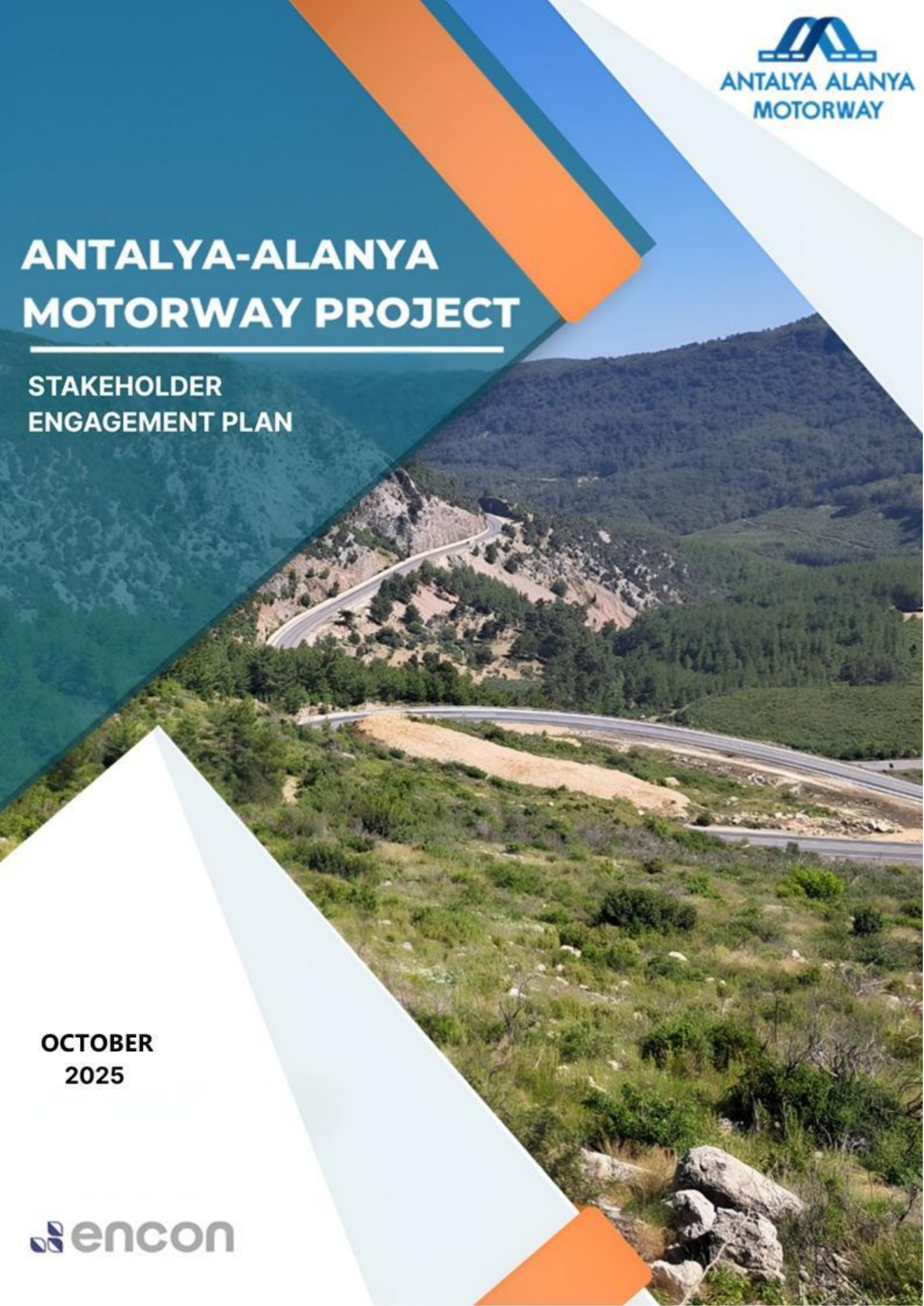
ANTALYA ALANYA MOTORWAY

ANTALYA-ALANYA MOTORWAY PROJECT

STAKEHOLDER ENGAGEMENT PLAN



OCTOBER 2025

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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya Alanya Otoyol İnşaat Yatırım ve İşletme A.Ş.
AFAD	Prime Ministry's Disaster and Emergency Management Presidency
ANTOK	Antalya Orchids and Biodiversity Protection Association
BOT	Build, Operate and Transfer
BOTAS	Petroleum Pipeline Company
CEKUL	Foundation for the Protection and Promotion of the Environment and Cultural Heritage
CIMER	The Presidency's Communication Centre
DSİ	General Directorate of State Hydraulic Works
EIA	Environmental Impact Assessment
EP	Equator Principles
IFC	International Finance Corporation
AIIB	Asian Infrastructure Investment Bank
ESIA	Environmental Social Impact Assessment
GBV	Gender-Based Violence
GLAC	Guide to Land Acquisition and Compensation
GM	Grievance Mechanism
IFIs	International Finance Institutions
INTES	Union of Construction Industry Employers
ISKUR	General Directorate of Turkish Employment Agency
MoEUCC	Ministry of Environment, Urbanization and Climate Change
ARHB	Antalya Regional Heritage Board
PAP	Project Affected People/Population
PCMs	Public Consultation Meetings
PPM	Project-affected People's Mechanism
SEAH	Sexual Exploitation, Abuse and Harassment
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
TOBB	The Union of Chambers and Commodity Exchanges of Turkey
TURK-IS	Confederation of Unions of Turkish Workers
WGM	Workers' Grievance Mechanism
WWF	World Wide Fund for Nature
YIMER	The Foreigners Communication Centre
YOL-IS	Union of Turkish Roads, Buildings and Construction Workers

I. INTRODUCTION

This Stakeholder Engagement Plan ("the Plan" or "SEP") has been prepared by ENCON Environmental Consultancy Co. (Consultant) for Antalya-Alanya Motorway Project (the "Project or AAMP") in Türkiye. This SEP will be updated in the event of significant changes in the Project and will be reviewed and updated at least annually.

Ministry of Transport, and Infrastructure (former Ministry of Transport, Maritime Affairs and Communications), General Directorate of Highways ("KGM" or "the Administration"), as the owner of the Antalya-Alanya Motorway Project, has tendered for a contract in May 2010 in accordance with the Law on Implementation of Some of the Investments and Services in the Framework of Build, Operate and Transfer Model (Law No: 3996). As a result of the tendering process, KGM has awarded Limak (the Project Sponsor) with a Build, Operate and Transfer (BOT) contract for the implementation of the Project. In this regard, Limak is referred as Project Sponsor in the scope of the plan, and in the ESIA studies.

In accordance with the provisions of the BOT contract, the Project encompasses financing, planning/design, construction, operation, maintenance, and all repair works throughout the operation period, including the transfer of the Motorway to the KGM at the end of the contract period. It is also expected that at the end of the contract period, the Motorway will be handed over to KGM free of any debt or obligation, in a well-maintained and operational condition, without any charges. The Project Sponsor's rights to operate maintain, and repair the Motorway will expire at the end of the contract period specified in the BOT contract.

Stakeholder engagement is the basis for establishing sustainable, constructive, and responsive relationships that are essential for successfully managing a project's environmental and social impacts. The purpose of stakeholder engagement is to establish and maintain a constructive relationship with a various external stakeholders thought the duration of the project. Initiating the engagement process in the early phases of the project helps ensure timely public access to all relevant information. It provides the stakeholders with an opportunity to input into the project design and the assessment of impacts.

The SEP should be easy to understand and straightforward. Its primary focus should be describing the project and identifying the stakeholders involved. It is crucial to determine the information available to the public and where it can be accessed. The SEP must also explain how the public can share their views and opinions, provide a deadline for requirements, and outline how individuals will be notified about any new information or opportunities for feedback or comments. The plan also aims to establish a project-based structure and approach to prevent Gender-Based Violence (GBV) and Sexual Exploitation, Abuse and Harassment (SEAH) throughout the project's entire lifecycle. SEP will be designed to enable the Project Sponsor, Contractor Company, affected local communities, and all other stakeholders to identify and establish an effective engagement strategy.

In addition to this SEP, to provide people affected by Project-related land acquisition ("Project Affected People" or "PAPs") with a clear and concise overview of the expropriation process carried out by KGM in accordance with the Expropriation Law, and summarise the key principles of Project's Resettlement Action Plan (RAP), particularly regarding additional compensation and assistance measures that go beyond the legally mandated cash compensation to ensure alignment with international standards and Lender requirements, stand-alone Guide to Land Acquisition and Compensation (GLAC) documents have been prepared for the Project and finalised in October 2025 for distribution in affected settlements. There are three versions of the GLAC: (i) for affected lands, (ii) for affected houses, and (iii) for affected businesses (see ANNEX-5.A, ANNEX-5.B, ANNEX-5.C). In addition, the Project information brochure (ANNEX-4) has been distributed during Public Consultation Meetings (PCMs) and continues to be distributed in subsequent meetings. It will be updated and re-distributed throughout the process as needed. Kurdish and Arabic versions of the brochure has also been prepared and shared when necessary. Also, to support the information process related to expropriation and RAP, the SPV distributed printed copies of KGM's booklet on procedural steps of expropriation in affected settlements (presented in RAP – Appendix F) in all affected settlements in May 2025. Distribution of additional copies will continue in line with the Project's expropriation and construction schedules, as needed.

I.1 Purpose and the Scope of the Stakeholder Engagement Plan

The SEP is a public document which presents plans for stakeholder engagement, information disclosure and consultation. This Plan is valid for the both construction and operation phase of the Project.

SEP covers the following aspects:

- Applicable national and international regulations and IFC requirements on stakeholder engagement, particularly IFC PS1;
- Project plans to engage with stakeholders during the construction phase and the operation phase of the Project;
- Key Project stakeholders that will be identified and will be interacted with;
- Strategy for consultation and information disclosure;
- Timetable for various stakeholder engagement activities;
- Resources and responsibilities for the implementation of the SEP;
- Means of monitoring and reporting on consultation and disclosure activities; and
- A grievance mechanism for stakeholders and the public to raise concerns, provide feedback and comments about the Project operations and how complaints/comments will be handled.

The main goal of this SEP is to ensure that project-affected people and other stakeholders are provided relevant, timely and accessible information so that they have an opportunity to express their views and concerns about the Project and its impacts. Stakeholder engagement process helps to:

- Identify the stakeholders that are affected, and/or able to influence the Project and its activities;
- Identify their particular interests and requirements related to the Project;
- Generate a good understanding of the Project among those that will be affected;
- Identify issues early in the Project cycle that may pose risks to the Project or its stakeholders;
- Provide to these groups opportunities to voice their concerns and opinions;
- Define a consultation approach for stakeholders in relation to operation of the Project;
- Ensure that comments are received in a timely manner so that they can be taken into account during the decision-making process;
- Ensure that mitigation measures are appropriate (implementable, effective and efficient);
- Ensure that adequate and timely information is provided to those potentially affected by a project;
- Ensure a technically and culturally appropriate approach to engagement with all key stakeholders;
- Establish a system for long-term communication between the Project and communities that is of benefit to all parties.
- Identify resources and responsibilities for implementation and monitoring of the consultation program; and
- Set up a grievance mechanism for the stakeholders, including a process to address views and concerns.

The ultimate purpose of this SEP is to establish and maintain constructive relationships with the local community and other interested stakeholders that are essential for the successful management of the Project's environmental and social impacts. The SEP is the responsibility of Project Sponsor and Project Sponsor is fully committed to undertaking necessary engagement activities in a manner that is consistent with international standards and national legislation as outlined in next sections.

The SEP encompasses planned stakeholder consultation activities and the process of stakeholder engagement. The SEP is prepared in compliance with IFC Performance Standards and international requirements and best practices, in addition to Turkish legislation.

I.2 Project Description

The Project (Antalya-Alanya Motorway Project) is one of the two sub-projects that constitute the Afyonkarahisar-Alanya Motorway Project and is designed to connect Serik and Alanya districts through Manavgat district of Antalya province. The project aims to improve transportation services and connectivity to surrounding provinces such as Burdur, Muğla, Konya, Isparta, Karaman, and Mersin. As of April 2025, the motorway is designed to be 117.8 kilometers long and will mainly consist of three lanes, with some sections having two lanes (3x2 and 2x2) in each direction.

Figure I.1 presents the current design of Antalya-Alanya Motorway Project's route.

The current Project design includes a total of 117.8 km of road, comprising 84 kilometers of main road (motorway) and 33.8 kilometers of access roads (see Table I.1)

Table I-1. Antalya-Alanya Motorway Sections in the scope of the Project

Project	Start and End Locations of the Section (Km)		Length of the Road (Km)		
	Start Location	End Location	Main Road (Motorway)	Access Roads	Total
Antalya-Alanya Motorway	Km 52+000	Km 136+000	84+000	33+800	117+800



Figure I-l The Route of the Antalya-Alanya Motorway Project

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II. PUBLIC CONSULTATION/STAKEHOLDER ENGAGEMENT REQUIREMENTS

Implementation of the Project will follow the framework laws and regulations of the Republic of Türkiye as well as applicable international standard, IFC requirements. In this context, stakeholder engagement activities will conform to relevant IFC Performance Standards (i.e. IFC PS1) Equator Principles 4 (EPFI 5 Stakeholder Engagement, Principle 6 Grievance Mechanism and EU Directives).

Further details of the relevant Turkish legislation and applicable international requirements are provided in the following sections.

II.1. National Regulations and Requirements

Under Article 10, Environmental Law sets out the general scope of the Environmental Impact Assessment (EIA) procedure in Türkiye, indicating that institutions, agencies and establishments that lead to environmental problems as a result of their planned activities are obliged to prepare environmental impact assessment report or Project Information File. Based on this legal framework, the EIA Regulation was put into force for the first time after being published in the Official Gazette numbered 21489 and dated on February 7, 1993. Since then there had been several amendments in the first regulation and new EIA regulations were published in 2008, 2013 and 2014 repealing the former regulations in force. The latest EIA Regulation (2022 EIA Regulation) has been published in the Official Gazette dated 29.07.2022 and numbered 31907, which repealed the 2014 EIA Regulation.

Under its annexes, the EIA Regulation categorizes investments as projects subject to full EIA (Annex-1) and projects subject to screening-elimination criteria (Annex-2). This categorization is done based on the type of activity and/or plant capacity. If the planned investment is defined as an activity under Annex-1 of the EIA Regulation, a full EIA Report is required. For Annex-2 activities, first a Project Information File is prepared in accordance with a limited format specified in the Annex-4 of the EIA Regulation and the MoEUCC evaluates the need for a full EIA process for the project.

The categorization for motorway projects under Turkish EIA regulation is done according to the type or length of the road (km) as follows:

- Full EIA process is required for the following Annex-1 activities;
  - Highways and state motorways (Article 9-c).
- Limited EIA process is required to be conducted for the following Annex-2 activities;
  - Facilities with a production capacity of 5 tons/hour and above, producing shaped materials using cement or other binding materials (Article 18-c),
  - Asphalt plants (Article 22),
  - Provincial roads and ring roads (except neighborhood/village roads; Article 28-d),
  - Addition of tunnels to highways or railways (Article 28-e).

The Project's EIA Report had been prepared in March 2016, submitted to the MoEUCC, reviewed by the evaluation committee and EIA Positive decision had issued in June 2018 In accordance with the EIA legislation in force on the date when the Project EIA Positive Decision was given (2014 EIA Regulation), the EIA Report of the Project has the vested right of upholding its EIA Positive Decision validity for 7 years before the start of the construction works for the Project.

In accordance with the related article, it is the legal responsibility of a project owner to organize an official Public Consultation Meeting for the projects that are included in Annex 1 of the Regulation (as the case in the EU EIA Directive).

As a result, Project Sponsor aims to develop a communication plan to inform relevant stakeholders about the Project activities in operation phase in line with this SEP.

Turkish national policy on protection of environment, cultural heritage and conservation of biological resources has been constituted on the base of relevant international agreements that Türkiye has signed or ratified.

Freedom of Thought and Opinion (Part 2, Fundamental Rights and Duty- Article 25)

Everyone has the right to freedom of thought and opinion and should not be compelled to reveal or be blamed for them.

Freedom of Expression and Dissemination of Thought (Part 2, Fundamental Rights and Duty- Article 26)

Everyone has the right to express and share their thoughts and opinions through speech, writing, pictures, or other media, individually or collectively, and to receive and communicate information and ideas freely without interference from official authorities.

Right of Petition, Right to Information, and Appeal to the Ombudsperson (Part 2, Fundamental Rights and Duty- Article 74)

Citizens and foreign residents can submit their requests and complaints in writing to the authorities and the Turkish Grand National Assembly based on the principle of reciprocity.

Other main national laws/regulations:

Civil Law (Law No. 4721 (Issued on 08.12.2001, Official Gazette No. 24607))

Real property rights and restrictions are defined under the relevant section of Civil Law and will be considered and met throughout the Project according to Turkish Civil Law.

Law on the Right to Information (Law No. 4982 (Issued on 24.10.2003, Official Gazette No. 25269)

The Right to Information Law ensures access to information based on the principles of equality, impartiality, and openness. Everyone has the right to information about public institutions and qualifying professional organizations.

Law on the Use of Right to Petition (Law No.3071 (Issued on 10.11.1984, Official Gazette No. 18571)

Under Article 3 of the Law on the Use of Right to Petition, Turkish citizens and foreign residents have the right to submit written requests and complaints in Turkish to the Turkish Grand National Assembly and relevant authorities.

Expropriation Law (Law No: 2942 (Issued on 04.11.1983, Official Gazette No. 18215))

Another law related to the involvement of stakeholders in the Project is the Expropriation Law.

The Expropriation Law requires public disclosure and a meeting process. It starts with the approval of the relevant authority for the expropriation works in the public interest. This decision is made public for 15 days at the village or neighborhood mukhtars' office, after which it becomes the "cut-off date."

The administration action of the expropriation process is performed in line with the Expropriation Law according to its purpose, authorization, procedure, reason, and the subject of the action.

The responsible agency for Antalya-Alanya Motorway Project (the expropriation procedures will be carried out by KGM) establishes a Valuation Commission to determine the values of assets and resources. Subsequently, a negotiation commission is established to negotiate with property owners on the value. Each negotiation commission consists of at least three members. The Commission sends an official invitation letter to each property owner without disclosing the previously estimated value of the asset.

The Environmental Impact Assessment Regulation (Official Gazette No: 31907, Article 9)

The EIA Regulation, originally from 1998, has had revisions and was most recently amended on July 29th, 2022. It is based on the EU EIA Directive but includes Turkish laws, making it distinct.

1. The meeting to inform the public about the investment and receive their opinions is held at a central place and time determined by the provincial directorate, with the participation of qualified institutions/organizations, the Ministry, and the project owner.
2. An announcement with the meeting details must be published in a newspaper at least 10 days before the meeting and in a local periodical specific to the region where the Project will be carried out.
3. A public meeting will be chaired by the provincial director or an appointed official to inform and consult with the public about a project. Attendees will be informed about the Project, and their opinions, suggestions, and objections will be recorded in meeting minutes. The minutes will be sent to the Ministry, with a copy kept by the provincial directorate.
4. Before finalizing the format, the Commission members should visit the planned project area and participate in the public information and consultation meeting on the specified date.
5. Stakeholder Engagement Plan (SEP) is prepared by authorized institutions to inform the public about the Project, receive their opinions and suggestions, and is presented in the EIA application file annex. Authorized institutions may request additional activities, such as distributing brochures, conducting surveys and seminars, or preparing a website. The plan may be updated if requested by the Ministry during the EIA process.

The lead government agency responsible for environmental protection in Türkiye is the Ministry of Environment, Urbanization and Climate Change ("MoEUCC"). MoEUCC is the responsible organization for the issuing and implementation of policies and legislation adapted for the protection and conservation of the environment and sustainable development and management of natural resources.

The main responsibilities of the MoEUCC, relevant to the Project, are:

- Implementation of the EIA regulations and decision-making in the EIA approval processes,
- Setting policies and principles for environmental management in Türkiye, including the administrative framework for environmental enforcement,
- Defining and applying environmental quality standards,
- Supervision of the network of environmental laboratories in Türkiye,
- Pollution control and inspection activities,
- Agroforestry support, soil management and erosion control, and
- Protection of Türkiye's natural heritage, including national parks, areas of conservation interest, biodiversity, and wildlife.
- The Gender Based Violence (GBV) Regulation The laws in force in Türkiye related to GBV issues are listed below with publication dates and numbers;
  - Labor Law (Law No. 4857, Issued on 10.06.2003)
  - Turkish Criminal Law (Law No. 5237, Issued on 12.10.2004)
  - Law of Protection of Family and Prevention of Violence Against Women (Law No. 6284, Issued on 20.03.2012)

The purpose of Labor Law (4857) is to govern the rights and responsibilities of workers employed under an employment contract and the working conditions provided by employers. This law applies to all workplaces, employers, employer representatives, and their employees, regardless of their field of activity. According to Articles 24 and 25, termination of the contract is permissible in the event of Sexual Harassment (SH) in the workplace, allowing the employee or employer to terminate the contract before the term's expiration or without waiting for the notification period.

Turkish Criminal Law aims to prevent crimes and safeguard the rights and freedoms of individuals, public order, security, public health, the environment, and community peace. Articles 102, 103, 104, and 105 in Section 6 detail GBV-related offenses and their penalties, including sexual assault, sexual abuse of children, sexual intercourse with a minor, and sexual harassment.

Law on Protection of Family and Prevention of Violence against Women (6284) is the cornerstone of Türkiye's response to violence against women. This law aims to regulate procedures and principles for the protection of women, children, all family members, and individuals subjected to persistent pursuit. It is rooted in the Turkish Constitution, international conventions to which Türkiye is a state party and relevant legal regulations.

Some key features of the Law No. 6284 include:

- Empowering local authorities to issue injunctions swiftly and efficiently in emergencies.
- Providing support services for survivors and perpetrators of violence, establishing Violence Prevention and Monitoring Centers and outlining the basics for temporary financial aid and medical expenses.
- Introducing preventive and protective measures for survivors, including forced imprisonment in case of a violation of preventive measures, and establishing a mechanism for monitoring the effective implementation of measures.
- Designating the Ministry as an active agent in the prevention of violence against women, granting it various responsibilities, including involvement in judicial cases.
- Basic principles to be observed in the implementation of this law include:
- Providing support and services to victims of violence through a fair, effective, and swift procedure based on basic human rights and equality between men and women.
- Fulfilling measures for victims and perpetrators of violence in a manner consistent with human dignity.
- Ensuring that special measures preventing gender-based violence against women and protecting women from such violence are not interpreted as discrimination under this law.

II.2. International Requirements and Best Practices

International financial institutions follow certain policies and procedures regarding assessment and management of environmental and social impacts of the projects to be financed. The relevant environmental and social requirements of these institutions are mainly based on World Bank Group (WBG) Safeguard Policies. For the private sector financing, WBG/International Finance Corporation's (IFC) Environmental Health and Safety Guidelines and Performance Standards on Environmental and Social Sustainability, as well as the Environmental and Social Policy and Standards of the Asian Infrastructure Investment Bank (AIIB), have become some of the most important international requirements. These standards have also been adopted by the major international private banks through the so called Equator Principles (EPs). These principles aim to ensure that projects to be financed by these banks are developed in a socially and environmentally sound manner.

The Project is intended to meet applicable international standards and best practices of the International Finance Institutions (IFIs). IFIs consider community engagement as being central to the successful management of risks and impacts on communities affected by projects, as well as central to achieving enhanced community benefits. In this context, SEP follows the requirements of EU directives, IFC PS1 and EPFI Principle 5 and EPFI Principle 6. The IFC PS1 Assessment and Management of Environmental and Social Risks and Impacts covers public consultation and disclosure and in this respect, required consultation and disclosure activities have to be conducted taking the scale and nature of the Project into account covering the following:

- Identifying the range of stakeholders;
- Providing affected communities with access to relevant project information;
- Implementing and maintaining a grievance mechanism; and
- Engaging with and providing information to project-affected and other interested parties throughout the life-cycle of the Project.

II.2.1. AIIB Environmental and Social Policy and Standards

The Asian Infrastructure Investment Bank (AIIB) applies its Environmental and Social Policy (ESP, 2016) and the accompanying Environmental and Social Standards (ESSs) to ensure that all projects it finances are implemented in a manner that is environmentally and socially sustainable. The ESP sets out AIIB's vision to integrate environmental and social considerations into all aspects of its operations and requires borrowers to identify, assess, and manage the environmental and social risks and impacts associated with their projects.

The AIIB's three Environmental and Social Standards (ESSs) define the mandatory requirements for borrowers:

ESS 1: Environmental and Social Assessment and Management

Establishes the process for assessing and managing environmental and social risks and impacts, including stakeholder engagement and information disclosure.

ESS 2: Involuntary Resettlement

Aims to avoid or minimize physical and economic displacement and requires fair compensation and livelihood restoration for affected persons.

ESS 3: Indigenous Peoples

Ensures respect for the rights, dignity, and culture of Indigenous Peoples and promotes their full participation in project design and implementation.

Stakeholder engagement is a core requirement under ESS 1, which obliges the client to establish and maintain a Stakeholder Engagement Plan (SEP) proportional to project risks and impacts, ensuring continuous, inclusive, and transparent dialogue with affected communities.

In addition, AIIB provides affected communities with access to its Project-affected People's Mechanism (PPM) — an independent accountability mechanism through which individuals or groups who believe they are or may be adversely affected by an AIIB-financed project can raise their concerns directly with the Bank.

II.2.2. Equator Principles IV

Principle 5: Stakeholder Engagement

For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to: the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion and intimidation.

Principle 6: Grievance Mechanism

For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the Environmental and Social Management System, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The grievance mechanism is required to be scaled to the risks and impacts of the Project and have Affected Communities as its primary user.

Principle 10: Reporting and Transparency

In addition, regarding reporting and transparency, Principle 10 requires the client to make at a minimum, a summary of the ESIA that includes a summary of Human Rights and climate change risks and impacts when relevant accessible and available online for all Category A and, as appropriate, Category B Projects.

II.2.3. IFC's Standards and Guidelines

IFC published its current Policy on Environmental and Social Sustainability in 2012. Within the framework of this Policy, it applies a comprehensive set of Performance Standards to manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing in the member countries eligible for financing. The Performance Standards may also be applied by other financial institutions electing to apply them to projects in emerging markets.

The following eight Performance Standards establish the requirements that the client has to meet throughout the life of an investment supported by IFC or other relevant financial institution using these Standards:

PS 1: Assessment and Management of Environmental and Social Risks and Impacts
PS 2: Labor and Working Conditions
PS 3: Resource Efficiency and Pollution Prevention
PS 4: Community Health, Safety and Security
PS 5: Land Acquisition and Involuntary Resettlement
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
PS 7: Indigenous Peoples
PS 8: Cultural Heritage

PS 1 defines Stakeholder engagement as an ongoing process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and ongoing reporting to Affected Communities. According to IFC PS 1;

- Clients should identify the range of stakeholders that may be interested in their actions and consider how external communications might facilitate a dialogue with all stakeholders. Where projects involve specifically identified physical elements, aspects and/or facilities that are likely to generate adverse environmental and social impacts to Affected Communities the client will identify the Affected Communities and will meet the relevant requirements.
- The client will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities.
- The client will provide Affected Communities with access to relevant information on (i) the purpose, nature, and scale of the project; (ii) the duration of proposed project activities; (iii) any risks to and potential impacts on such communities and relevant mitigation measures; (iv) the envisaged stakeholder engagement process; and (v) the grievance mechanism.
- The client will undertake a process of consultation in a manner that provides the Affected Communities with opportunities to express their views on project risks, impacts and mitigation measures.
- The client will conduct an Informed Consultation and Participation (ICP) process that will build upon the steps outlined above in the Consultation and will result in the Affected Communities' informed participation. ICP involves a more in-depth exchange of views and information, and an organized and iterative consultation, leading to the client's incorporating into their decision-making process the views of the Affected Communities on

matters that affect them directly, such as the proposed mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

IFC PS2 (Labor and Working Conditions) specifically relates to harassment, intimidation, and/or exploitation. According to IFC PS 2;

- The client will take measures to prevent and address harassment, intimidation, and/or exploitation, especially in regard to women.

Retaliation Risk Prevention and Safe Stakeholder Participation

The Project is committed to ensuring that all stakeholders can freely express their concerns without fear of retaliation. In alignment with the IFC Good Practice Note for the Private Sector: Addressing the Risks of Retaliation Against Project Stakeholders (2021), a series of practical measures have been integrated into the Stakeholder Engagement Plan (SEP) to safeguard stakeholder participation.

As part of the stakeholder identification and mapping process, the Project conducts a risk assessment to identify potential threats of retaliation, particularly toward vulnerable or marginalized groups. This assessment is used to design safe and inclusive engagement approaches tailored to local sensitivities. To further support this, the Grievance Mechanism (GRM) offers multiple anonymous reporting options-such as locked suggestion boxes and secure hotlines-ensuring that all personal data is managed with strict confidentiality in line with national data protection laws and IFC Performance Standard 1.

Sensitive issues, especially those related to gender-based violence and harassment (GBVH), are handled by trained female Social Chief and Community Liaison Officers (CLOs), who adopt a survivor-centered approach and ensure privacy and trust throughout the reporting process. In addition, project staff and grievance handlers receive specific training to recognize and respond to signs of intimidation or retaliation, using appropriate internal protocols to ensure timely and secure handling of such cases.

Allegations or risks of retaliation are closely monitored and promptly escalated to senior management, where necessary. The Project has adopted a zero-tolerance policy for retaliation in any form-whether by project personnel, contractors, or third parties-reinforcing a culture of safety, respect, and open dialogue for all stakeholders involved.

II.2.4. IFI Joint Statement on Continuous Advancement of Standards to Prevent Sexual Harassment, Abuse, and Exploitation

Recognizing the important role they play in both the example they set in their own institutional practices and in the high standards they adopt in their projects and operations, in April 2018, the IFIs reaffirmed their commitment to advance standards to prevent sexual harassment, abuse and exploitation through seven principles. According to IFIs reaffirm their commitment to (Principle 2) establish and maintain standards aimed at preventing sexual harassment, abuse, exploitation and other forms of misconduct. Implementation of this principle can be seen in the following:

- All IFIs maintain codes of ethics/conduct which embed high ethical standards and include provisions on harassment and misconduct including sexual misconduct which are applicable to staff behavior both within and outside the institution. Some IFIs have also adopted specific policies aimed at preventing and responding to sexual harassment, exploitation and abuse. These are applicable to all staff and are reviewed periodically and strengthened as needed.
- Some IFIs include behavioral clauses in contracts of appointment for non-staff members (including consultants, and contractors) to ensure that they too adhere to expected high standards of behavior. Breach of such provisions would provide an IFI with a right to terminate the underlying contract.

III. PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES

In the scope of Antalya-Alanya Motorway Project, various studies were carried out with both internal and external stakeholders before the planned Public Consultation activities in the scope of this SEP. The Project Sponsor recognizes the importance of the stakeholder engagement activities and will carry out the activities planned under this SEP in order to make these activities more efficient, inclusive and continuous. Both internal and external previous stakeholder engagement activities are described in this section.

III.1. Public Consultation Meetings (PCMs) in the Scope of EIA Process

Within the scope of the EIA studies, one public consultation meetings were held alongside the route. The aim of the public participation meeting is to inform people who may be potentially affected about the Project and to understand their concerns, opinions and suggestions about the project. This process is the only formal requirement for stakeholder participation according to Turkish legislation.

The stakeholder engagement activities specific to the Project started at the time of the national EIA process. In this context, Antalya Provincial Directorate of Environment and Urbanization, relevant district Municipalities, District Governorships and Neighborhood/Village mukhtars were contacted in March 2016 to organize the stakeholder engagement activities. The formal stakeholder engagement meetings (public consultation meeting), a requirement of the Turkish EIA Regulation, were held on April 7th, 2016, at Ekşili Village Coffeehouse, Alanya Municipality Çıplaklı Wedding Hall, and Manavgat Chamber of Commerce and Industry Assembly Meeting Hall. Therefore, a total of three consultation meetings were held at three different districts of the Project route (based on EIA report, 2018): Döşemealtı, Alanya, and Manavgat districts of Antalya Province. Table III.1 shows the meetings were announced in one local and one national newspaper as per the regulatory requirements. The meetings comprise the presentation of the Project details such as construction and operation activities, and noted the comments and suggestions by participants during the meetings. The relevant opinions and suggestions are presented in Table III.2.

Table III-1. Information of PCMs in EIA Process

PCMs	Districts	Date	Time	Location
1	Döşemealtı	07.04.2016	09:30	Ekşili Village Coffeehouse
2	Alanya	07.04.2016	11:00	Alanya Municipality Çıplaklı Wedding Hall
3	Manavgat	07.04.2016	15:00	Manavgat Chamber of Commerce and Industry Assembly Meeting Hall

Table III-2. Questions, Opinions, and Suggestions Submitted During the Public Consultation Meeting

Location – Date – Time	Question, Comment, or Suggestion	Response	Main Discussion Points & Feedback Summary
Ekşili Village Coffeehouse / 07.04.2016 – 09:30	A specific location along the project route was mentioned, and concerns were raised regarding the expropriation of houses and pastures. A question was asked about the possibility of changing the route.	It was explained that due to elevation differences and geometric conditions at the connection point, the current route had been selected.	Local concern over property loss and desire for route revision; project constraints due to topography. This issue explained in the Institutional and Legal Framework Chapter.
	A question was raised about whether there is a railway project along the route.	The presence of a railway project was acknowledged, and it was explained that it is a separate and unrelated project.	Clarification requested regarding interaction with other infrastructure projects. This issue explained in the

Location – Date – Time	Question, Comment, or Suggestion	Response	Main Discussion Points & Feedback Summary
			Cumulative Impact Assessment Chapter.
	Questions were asked regarding the expropriation process (e.g., number of affected properties, areas involved, and procedures).	It was stated that the entire process would be carried out in accordance with the Expropriation Law.	Community members requested clarification regarding the legal procedures and scope of land acquisition. This matter is addressed in detail within the Institutional and Legal Framework section and throughout the RAP.
Çıplaklı Wedding Hall / 07.04.2016 – 11:00	Concerns were raised about the environmental pollution that may occur during construction and operation phases, and its potential impact on nearby settlements and agricultural products. A request was made to change the route.	The route was shown on a map, and it was emphasized that expropriation is necessary to complete the road. Despite the increased cost, alternative solutions such as tunnels were considered in order to safeguard the well-being of the local community.	Participants raised concerns about environmental and agricultural risks and acknowledged the consideration of alternatives such as tunnels. These aspects are addressed in the Land Use and Property section and the Project Description chapter.
	It was stated that the road would divide the village by passing through its center, and a request was made to shift the route 200–300 meters northward (towards the forest).	It was explained that the requested area falls within a wildlife conservation zone and therefore cannot be used.	Route modification options are addressed in the Analysis of Alternatives section, with conservation considerations further discussed in the Protected Areas and Cultural Heritage chapters.
	Participants cited tunnels used in other villages and requested a similar tunnel for their own. They also expressed concerns about an inappropriate route selection for expropriation purposes.	Three participants submitted written statements (recorded in the minutes). No response was provided.	Tunnel requests were raised by the community. Relevant design adjustments are considered in the Project Description and Analysis of Alternatives sections.
Manavgat Chamber of Commerce and Industry – Assembly Hall / 07.04.2016 – 15.00	Negative environmental, agricultural, and tourism impacts were expressed.	It was stated that mitigation measures would be taken during construction, and that during the operation phase, the project would contribute positively to the transportation of agricultural products and increase tourism circulation.	The ESIA comprehensively assesses potential impacts during both construction and operation phases. Specific mitigation measures have been developed accordingly. Additionally, the potential benefits of the Project are also evaluated within the ESIA.
	Negative feedback regarding the project route was shared (e.g., adverse impacts, expropriation issues).	Responses were provided, and it was mentioned that the route could be revised in coordination with relevant authorities, depending on stakeholder feedback.	Route modifications are considered in the Analysis of Alternatives section, based on stakeholder requests and in coordination with relevant authorities.
	Questions were raised regarding potential negative impacts on settlements and the mitigation measures to be taken.	It was explained that measures such as road watering to prevent dust, covering truck trailers, and installing noise barriers would be implemented.	Project routes are defined in the Project Description section of the ESIA, and potential impacts during construction and operation in these locations are addressed in detail throughout the report. Specific mitigation

Location – Date – Time	Question, Comment, or Suggestion	Response	Main Discussion Points & Feedback Summary
			measures are developed in Chapter 15: Community Health and Safety.

During the Public Consultation Meetings (PCMs), the majority of questions, comments, and complaints were related to the proposed route of the Project. Local stakeholders expressed concerns about the potential impacts of land acquisition activities along the route, particularly regarding their effects on the agriculture and tourism sectors. Accordingly, a significant portion of the complaints received from local residents focused on the loss of agricultural lands and restricted access to tourism facilities.

In the meetings held in and around Manavgat, tourism-related questions predominated, as the proposed Project route passes near touristic areas. Participants frequently requested revisions to the route and raised concerns about the expropriation process. In response, representatives of the relevant authorities emphasized that all procedures will be carried out in compliance with the Expropriation Law No. 2942, ensuring full adherence to national legal frameworks.

Topics such as archaeological sites and protected cultural heritage areas were mentioned less frequently. However, for the questions raised on these matters, project officials clarified that appropriate mitigation measures will be implemented, and coordination with relevant heritage protection authorities will be ensured throughout the project lifecycle.

In June 2024, ENCON conducted a comprehensive four-day field study aimed at gathering qualitative data from a wide range of stakeholders across various regions in Antalya province. The study included interviews and focus group discussions with academics, local authorities, and community members, targeting diverse demographic and occupational groups. The detailed breakdown of the activities conducted during the field study is presented in Table III.3. The feedback received during the interviews and how they were responded to is presented in Table III.4.

Table III-3. Summary of Field Study Activities Conducted by Encon in June 2024

No	Work Items	Locations
1. Day		
1	Academician Interview	Akdeniz University/Faculty of Agriculture
2	Academician Interview	Akdeniz University / Faculty of Tourism and Biology
2. Day		
3	Official Institution Interview	Serik District Governor
4	NGO Interview	Head of Serik Chamber of Tradesmen and Craftsmen
5	Key Informant Interview	Serik/ Mukhtar of Merkez Neighborhood
6	Focus Group Interview	Serik / Merkez Neighborhood
7	Focus Group Interview	Manavgat/Taşağıl Neighborhood
8	Vulnerable Group (Elderly) Interview	Manavgat/ Taşağıl Neighborhood
3. Day		
9	Focus Group Interview	Manavgat/Kalemler Neighborhood
10	Vulnerable Group (Women) Interview	Manavgat/Kalemler Neighborhood
11	Focus Group Interview	Manavgat/Ulukapı Neighborhood

No	Work Items	Locations
12	Vulnerable Group (Women) Interview	Manavgat/Ulukapı Neighborhood
13	Key Informant Interview	Manavgat/ Mukhtar of Ulukapı Neighborhood
14	NGO Interview	Manavgat Head of the Chamber of Agriculture
15	Official Institution Interview	Manavgat Directorate of Technical Affairs
16	Focus Group Interview	Manavgat/Hacıisalı Neighborhood
17	Vulnerable Group (Elderly) Interview	Manavgat/Hacıisalı Neighborhood - Ayrancılar
4. Day		
18	Key Informant Interview	Manavgat/ Mukhtar of Karakaya Neighborhood
19	Focus Group Interview	Manavgat/ Mukhtar of Karakaya Neighborhood
		Alanya/ Mukhtar of Çakallar Neighborhood
		Alanya/ Alara Neighborhood Household
20	Focus Group Interview	Alanya/Akdam Neighborhood
21	Focus Group Interview	Alanya/Toslak Neighborhood
		Alanya/Konaklı Neighborhood
		Alanya/Alara Neighborhood
		Mukhtars and Households
22	Key Informant Interview	Alanya/ Mukhtar of Toslak Neighborhood

Table III-4. Summary of Field Study Interview Conducted by Encon in June

Interview Type and Location	Summary of the Interview	Main Discussion Topics and Responses
Akdeniz University / Faculty of Agriculture – Academic Interview	Emphasis was placed on the protection of agricultural lands, prevention of zoning pressure, and continued support for small-scale producers. Protection of underground water resources was also requested.	Agricultural lands will be preserved, and monitoring and preventive measures for water resources will be implemented to support farmers' activities.
Akdeniz University / Faculty of Tourism and Biology – Academic Interview	Recommendations included preventing fragmentation of natural habitats, using local plant species (olive, carob) in medians, and declaring the Alarahan area a nature park.	The route was planned to avoid habitat fragmentation. Local species will be used in landscaping, and coordination with relevant institutions will be ensured.
Serik District Governorate – Official Institution Interview	The project is viewed positively; however, it was requested that construction not coincide with tourism and agricultural seasons.	Efforts will be made to ensure that construction activities do not overlap with peak tourism and harvest periods.
Serik Chamber of Tradesmen and Craftsmen – NGO Interview	The road is expected to benefit tradespeople and farmers; it was requested that rest areas be designed to support commercial activities.	Rest facilities will be made accessible to local producers and tradespeople to support commercial activities.
Serik / Merkez Neighborhood – Mukhtar Interview and Focus Group	Requests included ensuring road access to villages, controlling dust/noise, and increasing information dissemination.	Noise and air quality control measures will be implemented and monitored. Village access will be maintained with planned connection roads. An inclusive grievance mechanism has also been developed.

Interview Type and Location	Summary of the Interview	Main Discussion Topics and Responses
Manavgat / Taşağıl Neighborhood – Focus Group and Elderly Group	Elderly individuals face challenges accessing information; it was suggested to use audio announcements.	Information access for the elderly will be provided through public announcements in spaces such as mosques and mukhtar offices.
Manavgat / Kalemler Neighborhood – Focus Group and Women Group	The road's positive contribution to health and agricultural access was noted; women expressed social support needs.	Social support requests specific to women will be considered.
Manavgat / Ulukapı Neighborhood – Focus Group, Women Group, Mukhtar	Requested the preservation of field roads and uninterrupted access during construction.	Field roads and connections between settlements will be maintained with underpasses and overpasses ensuring uninterrupted access.
Manavgat Chamber of Agriculture – NGO Interview	Support for producers and participation in decision-making processes were requested.	Regular coordination and information meetings will be held with producer unions.
Manavgat Directorate of Technical Affairs – Official Institution Interview	Requested compatibility with urban planning and integration with public infrastructure.	Planning will be coordinated with municipalities, and infrastructure transitions will be integrated into the project.
Manavgat / Hacıisalı Neighborhood – Focus Group and Elderly Group	Requested reduction of social isolation and safe crossings.	Safe pedestrian crossings and transport services will be provided.
Manavgat / Karakaya Neighborhood – Mukhtar and Focus Group Interview	Suggested preventing the village from being divided and constructing tunnels/underpasses.	Underpasses and bridges will be evaluated for critical crossing areas.
Alanya / Akdam, Toslak, Konaklı, Alara – Focus Group and Mukhtars	Requested support for loss of agricultural land, routing away from residential areas, and eco-tourism-oriented rest areas.	Support will be provided to affected producers and alternative route scenarios have been evaluated. Eco-tourism-focused designs will be considered for rest areas.

The EIA Review and Evaluation Commission set up by the MoEUCC; General Directorate of EIA, Permit and Inspection at the scoping stage of the national EIA processes included the governmental stakeholders listed in Table III.5 .

Table III-5. Governmental Stakeholders Involved in the Scoping, Review and Evaluation of the National EIA Process

Organization	Directorate/ Administration
General Directorate of Highways	General Directorate of Highways 13th Regional Directorate
Governorship of Antalya	Investment Monitoring And Coordination Department Antalya Governorship Repealed Provincial Directorate of Agriculture Antalya Governorship Provincial Directorate of National Education
Antalya Metropolitan Municipality	Department of Housing and Urbanization Department of Real Estate and Expropriation
Ministry of Transport and Infrastructure	Antalya Airport Chief Directorate
General Directorate of Mineral and Research and Exploration	General Directorate of Mining Affairs, Exploration Department
Ministry Of Agriculture And Forestry	General Directorate of State Hydraulic Works Department of Survey, Planning and Allocations Directorate General of Agricultural Reform General Directorate of Nature Conservation and National Parks General Directorate of Forestry Department of Permits and Easements
Ministry of Forestry And Water Affairs	Repealed Ministry of Forestry and Water Affairs 6th Regional Directorate Antalya Branch Directorate
Repealed Electricity Generation-Transmission Inc. (TEAŞ)	General Directorate of Electricity Generation Corporation
Ministry of Culture and Tourism	Directorate General of Investments and Enterprises Regional Board of Protection of Cultural Heritage
Ministry of Environment, Urbanization and Climate Change	General Directorate of Conservation of Natural Assets Provincial Directorate of Environment, Urbanization and Climate Change
Ministry of Interior	Provincial Directorate of Disaster and Emergency
Ministry of National Defense	General Directorate of Machinery and Chemical Industry Corporation
Ministry Of Industry And Technology	Directorate General for Industrial Zones

The EIA Application File was prepared on behalf of General Directorate of Highways and submitted to the Ministry of Environment and Urbanization by the e-EIA system on 04.03.2016, and the EIA process was initiated. During the preparation of the Project's EIA Report, the comments and opinions expressed by the local communities during the Public Participation Meeting, and the official views of the governmental stakeholders that formed the EIA Review and Evaluation Commission, were incorporated. Following the finalization of the report, the EIA was disclosed to the public via the MoEUCC and the Provincial Directorate of the Environment, Urbanization and Climate Change as per the requirements of the national EIA Regulation.

III.2. Stakeholder Engagement as part of the ESIA Process

The expert team in Encon held two separate field studies as part of the ESIA study, as summarized in Table III.6 . The first one was a reconnaissance study carried out on May 2-3, 2024 with the main objective of identifying the environmental and social features and sensitivities of the Project. This included planned art structures along the motorway route, campsites, quarries, and facilities such as the concrete plant, asphalt, and mechanical plan.

The second field study, conducted on 3-6 June 2024, focused on key informant, focus group, vulnerable groups, and other stakeholders (NGOs, Academicians, Communities, etc., in the region) interviews. During the social field study, key informative interviews were conducted with the mukhtars of four (4) settlements previously determined. Focus group interviews were held in eight (8) settlements, including mukhtars and households of 12 neighborhoods in the impact areas. Focus group interviews in Serik Merkez, Taşağıl, Kalemler, Ulukapı, Hacıisalı, Karakaya-Çakallar-Alara, Akdam, and Toslak-Konaklı-Alara neighborhoods; and vulnerable group interviews were conducted in those areas. Additionally, other stakeholders such as academics, local officials, and local communities were interviewed to gather expert opinions on the socio-economic impacts of the Project.

Table III-6. Summary of the Social Field Studies Conducted as part of the ESIA

Tasks	Date of the Field Study	Scope of the Field Study
Site visit	May 2024	● The reconnaissance study started at Km: 52+000, and ended at Km: 135+000 ● Visiting the license area: planned tunnel, viaduct, quarry, facility area, and construction site and storage area.
Key Informant Interviews Focus Group Interviews, Other Stakeholder Meetings	June 2024	● Four (4) key informant interviews in Serik/Merkez, Manavgat/Ulukapı, Manavgat/Karakaya, and Alanya/Toslak neighborhoods ● Eight (8) Focus group interviews in Serik Merkez, Taşağıl, Kalemler, Ulukapı, Hacıisalı, Karakaya-Çakallar-Alara, Akdam, and Toslak-Konaklı-Alara ● Interviews with Academics, local officials, and local communities
Road Trip Study Public Consultation Meetings (PCMs)*	August 2025	● Informing the local community about the Project and collecting feedback from stakeholders, including complaints, suggestions, and opinions.

**Shuttle vehicles were arranged for appropriate residential areas in order to facilitate access to the Public Participation Meetings and to increase attendance rates.*

In parallel to the ESIA studies, the Company has started to establish close relationships. In this scope, Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş participate the reconnaissance study in the project area May, 2024.

A Stakeholder/Public Consultation Meeting (PCM) had been organized after the finalization of the expropriation plan by the General Directorate of Highways (KGM). During the meeting, details about the project, its potential environmental and social impacts/risks, mitigation measures to be taken, and implementation/ monitoring/reporting responsibilities of different parties had been shared with the stakeholders; and then their opinions and suggestions received during the question-answer (Q&A) session are recorded and included in Table III.9.

III.2.1. Road Trip

In December 2024, Public Consultation Meetings (PCMs) was planned to be held in the four most affected locations related to the "Road Trip" study. However, due to delays in the completion of expropriation procedures, these meetings had been postponed and were organized once sufficient progress has been made. These meetings aimed to disclose Project impacts and planned mitigation measures, while creating a space for meaningful public feedback prior to the commencement of construction.

For the Project, four Public Consultation Meetings (PCMs) were held in selected locations: Orta (Serik, Antalya), Yukarıpazarcı (Manavgat, Antalya), Avsallar (Alanya, Antalya), and Konaklı (Alanya, Antalya). Venues within local neighborhoods, which possess adequate capacity and appropriate physical conditions, were used for these meetings. This preference was based on the observation that participation levels are generally higher in such local venues, according to past experiences. Moreover, selecting the exact place/location were considered to create a more inclusive environment that enables women and vulnerable groups to participate. Figure III.1 and Figure III.2 shows the locations of the conducted PCMs and those that social field study was conducted.

To ensure broad awareness and community participation, announcements regarding the PCMs were made through multiple channels, including: public bulletin boards in central neighborhood locations, local mukhtars' offices, municipality websites, and local radio broadcasts where feasible. Additionally, printed invitations and visual materials such as posters and leaflets will be distributed, and mobile messaging applications (e.g., WhatsApp groups commonly used in local communities) may also be utilized to reach wider audiences. In addition to those the announcement at the national newspaper will also be done. All announcements will be made at least two weeks prior to the meetings and will be provided in Turkish, with Arabic translations where needed to ensure inclusivity for refugee or migrant populations.

PCMs took place along the entire Motorway route from the Serik district to the Alanya district of Antalya province. Table III.8 displays details about the planning of PCMs. The meeting locations were selected based on findings from key informant and focus group interviews conducted in the region by a social expert employed in ENCON. The overall motorway route spans 117.8 km, including the main carriageway and the access roads. Since it would not be possible to organize a meeting in every settlement that is located within the study area, in the selection of the settlements at which the public consultation meetings were planned, it was aimed that a meeting location is determined every 30 (plus minus) km along the Motorway route to ensure to the extent possible that the meeting location was accessible for the local people from the surrounding settlements and in order to acquire a more inclusive Road Trip for all different stakeholders.

The meetings were held with the participation of representatives of Limak as Project Sponsors (senior officials and technical Project team members including design and expropriation), authorities from the 13th Regional Directorate of KGM, and the Environmental and Social Impact Assessment (ESIA) Consultant (ENCON Environmental Consultancy Co.).

The ESIA Consultant moderated the meetings. The meetings commenced with an introduction and an explanation of the meeting's purpose and scope. This was followed by a presentation from the ESIA consultant and a final discussion session to address any questions, concerns, and suggestions. The main topics covered in the presentations were as follows:

- What is the Antalya-Alanya Motorway Project?
- Who are the project sponsor and ESIA Consultant?
- What are roles of the Project Sponsor and ESIA Consultant?
- What are the Anticipated Benefits of the Project?
- What is the Environmental and Social Impact Assessment Process?
- Stakeholder Engagement: How to Participate in the Process?
- Discussion (Questions and Answers) Session

Large-scale (in A0 format) maps showing the relevant part of the route in each meeting were posted on the walls of the meeting venue. In addition, project information brochures (see ANNEX-4) was shared the participants. Different parties participated, including government officials or (significantly) from adjacent neighborhoods.

Table III.7 shows the expected local representatives of participant profile in planned PCMs. A list of participants will be maintained at the meeting.

Table III-7. Summary of Participants Profiles

PCM No	Meeting Location	Adjacent Neighborhoods from which Representatives (Mukhtar or Local People) will Participated in the Meeting
1	Serik / Merkez	Cumalı, Burmahancı, Deniztepesi, Kayaburnu, Çandır, Üründü, Aşağıkocayatak, Yukarıkocayatak, Sarıabalı, Aşağıçatma, Dikmen and Belpınarı neighbourhoods
2	Manavgat / Merkezı	Çakış, Taşağıl, Gündoğdu, Hocalar, Yavrudoğan, Çolaklı, Seki, Kalemler, Evren, Ilıca, Yeniköy, Şişeler, Evrenleryahşi, Dolbazlar, Yukarıışıklar, Dikmen, Bucakşeyhler, Ulukapı, Aşağıışıklar, Demirciler, Karaöz, Aksaz, Hacıali, Cevizler, Sülek, Hacıisalı, Hacıobası, Kızılot, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Odaönü, Karakaya neighborhoods
3	Alanya / Avsallar	Avsallar, Akdam, İncekum, Alara, and Çakallar neighbourhoods
4	Alanya / Konaklı	Türkler, Emişbeleni, Toslak, Konaklı, Elikesik, Payallar neighbourhoods

Table III-8. Organizational Details of the Planning Public Consultation Meetings in Antalya

PCM No	Province	District	Neighborhood	Km Chain age	Population (TURKSTAT, 2024)	Date of the Meeting	Time of the Meeting	Meeting Venue	Number of Participants
1	Antalya	Serik	Merkez	Km 52+000 (Access Road)	17,969	27.08.2025	09.00 - 12.00	Serik Multipurpose Cultural Hall	80-
2	Antalya	Manavgat	Merkez	Km 87+000	6,374	27.08.2025	15.00 - 18.00	Manavgat İbrahim Sözen Youth Center	187-
3	Antalya	Alanya	Avsallar	Km 125+000	16,118	26.08.2025	09.00 - 12.00	Avsallar Kör Ali Baysal Wedding Hall	200-
4	Antalya	Alanya	Konaklı	Km 141+000	17,927	26.08.2025	15.00 - 18.00	Alanya Municipality Konaklı Cultural Center	300-

**To facilitate access to the Public Participation Meetings and to increase attendance rates, shuttle vehicles were arranged for the eligible residential areas specified in Table III.7*



LEGEND

Boundaries
- Province Boundary
- District Boundary

Settlement Centers
- District Center
- Neighbourhood (Metropolitan)

Study Areas
- Socio-Economic Environment Study Area (4000m Corridor)

Section Description
- Antalya-Alanya Motorway Project

Social Field Interviews
- Key Informant Interview
- Focus Group Interview

UTM WGS84 ZONE36

0 3 6 12 km

N W E S

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

The Map of Conducted Social Field Study Locations

encon
Environmental Consultancy Co.
encon@encon.com.tr

Figure III-I Locations of Conducted Social Field Study



Figure III-II Locations of Conducted Public Consultation Meeting

III.2.2. Field Study with Women

As part of the Project, Community Liaison Officers (CLOs) conducted a series of focus group discussions specifically with women in different districts and villages located along the Project corridor. These meetings were held between late July and late August 2025, covering Serik, Manavgat, and Alanya districts. The purpose of the discussions was to collect women's perspectives, identify their specific concerns, and ensure that their voices are incorporated into the Project's social assessment and engagement process. The record list of the meetings is presented in Table III.9

Table III-9. Focus Interviews Conducted by CLOs

No	Date	District	Village / Neighborhood	Facilitator	Meeting Status
1	7/28/2025	Serik	Sarıabalı	CLOs	Held
2	8/23/2025	Serik	Cumalı	CLOs CLOs	Held
3	8/24/2025	Serik	Üründü	CLOs	Held
5	8/24/2025	Manavgat	Taşağıl	CLOs	Held
6	8/22/2025	Manavgat	Yukarıışıklar	CLOs	Held
7	8/23/2025	Manavgat	Bucakşeyhler	CLOs	Held
8	8/24/2025	Manavgat	Ulukapı (Araplar Street)	CLOs CLOs CLOs	Held
			Ulukapı (Isparta Street)		
			Ulukapı (Alibazlı Street)		
9	8/23/2025	Alanya	Konaklı	CLOs CLOs	Held
10	8/23/2025	Alanya	Türkler	CLOs	Held
11	8/24/2025	Alanya	Avsallar	CLOs	Held

Each session was facilitated by a designated CLOs and provided an opportunity for women community members to share their expectations, highlight potential gender-related impacts, and discuss measures to address them. The outcomes of these meetings will serve as an important input for shaping the Project's Stakeholder Engagement Plan and informing mitigation strategies that are responsive to women's needs and priorities.

III.2.3. Public Consultation Meetings Summary

A detailed review of the PCMs held on August 26-27 as part of the project's ESIA process is presented below. Figure III.3 shows the shuttle vehicle arranged to facilitate access to the PCM and used participation list form. The neighborhoods designated as shuttle points are listed under the meeting locations with transportation demand.


ANTALYA-ALANYA OTOYOLU PROJESİ HALKIN KATILIMI TOPLANTISI KATILIMCI LİSTESİ

MAHALLE: Avşallar

TARİH: 26.08.2025 SAAT: 10.00

KATILIMCILAR

İsim - Soyisim | Meslek | Temsil Ettiği Kurum / Yerleşim Yeri | Telefon Numarası | İmza

Figure III-III Shuttle for PCM

Avsallar

The Public Consultation Meeting was held on August 26, between 9 and 11 a.m, at the Kör Ali Baysal Avsallar Wedding Hall. To facilitate access to the PCM and to increase attendance rates, shuttle vehicles were arranged for the Alara, Akdam, Çakallar and Türkler. The headmans of Akdam and Çakallar stated that the residents would provide transportation using their own resources. A total of 200 people attended the meeting, 34 of whom were women. It was observed that the majority of participants were between the ages of 35 and 64. It was also noted that 4-5 participants were aged 75+, and one physically disabled individual was present at the meeting. Before the meeting began, conversations were held with participants who had contacted, and their concerns were listened to. The project presentation began at 10 a.m. after which complaints, questions, and opinions were received. While the village heads and participants expressed their complaints, tensions arose among the participants from time to time. While a group of questions were being answered by project officials, the participants expressed their reactions by protesting the meeting, and as a result, the meeting could not be completed.

Figure III.4 shows the venue where the meeting took place, the layout of the meeting room, the project route maps hung on the walls for informational purposes, and the presentation made during the meeting. Figure II I.5 shows the informational brochures (see ANNEX-4). These include the Project information

brochures distributed during the meetings and the informational brochures created regarding expropriation.

At the Avsallar - Kör Ali Baysal Wedding Hall, during part of the meeting and in the pre-meeting discussions, the main requests included shifting the route over the Alara River or constructing a tunnel through the forest corridor. Participants also emphasized the need to protect agricultural lands and to avoid adverse impacts on parks, greenhouses, irrigation canals, and residential houses. In addition, greater transparency was requested regarding information on quarries and their permitting processes. On the other hand, the main concerns expressed were the increase in the number of houses affected due to the route change, grievances caused by the quarries, inappropriate working hours, and the risk posed to drinking water sources resulting from drillings. Concerns were also raised that expropriation compensation amounts would be too low. Prior to the meeting, the Expropriation Director provided information about the legal procedures, while ENCON Environmental Consultancy explained the compensation mechanisms foreseen within the RAP framework. The participants' Q&A table is presented in Table III.9.



Figure III-IV PCM in Avsallar



Figure III-V The Informational Brochures in PCM

Konaklı

The Public Consultation meeting was held on August 26, between 3 and 6 p.m., at the Alanya Municipality Konaklı Cultural Center. The local headmen and residents stated that they would arrange their own transportation for the meeting held here. A total of 300 people attended the meeting, 26 of whom were women. Since the meeting in Avsallar could not be completed, some participants attended the meeting in Konaklı.

Figure III.6 shows the venue where the meeting took place, the layout of the meeting room, the project route maps hung on the walls for informational purposes, and the presentation made during the meeting. Figure III.7 shows the informational brochures.

At the meeting held at the Alanya Municipality Konaklı Culture Center, the main requests included ensuring the continuity of the Konaklı–Alanya road, extending the road to Gazipaşa, and improving the design of the Konaklı junction. Tunnel and alternative crossing options were also suggested in order to prevent damage to agricultural lands. Complaints were mainly focused on the Konaklı junction dividing the neighborhood into two, the connection road design increasing traffic load, uncertainties regarding expropriation compensations and procedures, and concerns about 2B lands. In addition, the negative impacts of the Project on agricultural production and livelihoods were emphasized. Questions from participants regarding parcel and compensation information were answered by the AAOİAŞ Expropriation Director, while social impacts and measures under the RAP were explained by ENCON Environmental Consultancy and the AAOİAŞ Environment and Social Manager. CLOs conducted interview with local stakeholders prior to the session and also collected the contact information of participants who raised sensitivities during the meeting. The participants' Q&A Table is presented in Table III.9.



Figure III-VI PCM in Konaklı



Figure III-VII The Informational Brochures in PCM

Serik / Orta Neighborhood

The Public Consultation meeting was held on August 27, between 9 and 12 a.m., at the Antalya Metropolitan Municipality Multi-purpose Cultural Hall. The mukhtars and residents stated that they would arrange their own transportation for the meeting held here. A total of 80 people attended the meeting, 15 of whom were women.

At the meeting held at the Serik Multipurpose Cultural Center, the most frequently raised requests included a route change to protect the cemetery, the widening of the culvert under the D400 road, and ensuring access to greenhouses and houses through underpasses and connection roads.

The main complaints focused on the low level of expropriation compensations, the loss of value of payments due to inflation, the loss of fertile agricultural lands, and the risks faced by greenhouses built through loans. In addition, the absence of representatives from the General Directorate of Highways (KGM) was criticized. Questions related to the cemetery were addressed by AAOİAŞ representatives, who provided explanations on technical reasons and the inspections to be carried out. Details regarding expropriation compensations and legal procedures were provided by the Expropriation Director, while social impacts and livelihood losses were evaluated by the AAOİAŞ Environment and Social Manager. CLOs collected the addresses and contact numbers of households they had engaged with prior to the meeting as well as those who expressed sensitivities during the session.

The participants' Q&A Table is presented in Table III.9, while the meeting photos are presented in Figure III.8.



Figure III-VIII PCM in Serik / Orta Neighborhood

Manavgat / Yukarı Pazarcı Neighborhood

The Public Consultation meeting was held on August 27, between 3 and 6 p.m., at the Ibrahim Sözen Youth Center. To facilitate access to the PCM and to increase attendance rates, shuttle vehicles were arranged for the Yavrudoğan, Yeniköy, Dolbazlar, Karaöz, Hacıobası and Karakaya. A total of 187 people attended the meeting, 39 of whom were women.

At the meeting held at the Manavgat İbrahim Sözen Youth Center, the main complaints included uncertainties regarding expropriation negotiations and the payment schedule, issues related to fragmented parcels, risks of dust and asbestos as well as negative impacts from blasting, the risk of yield loss in olive trees, and the absence of representatives from the General Directorate of Highways (KGM). Questions concerning parcels and inherited properties were addressed by the AAOİAŞ Expropriation Director, while issues related to livelihood losses and vulnerable groups were answered by ENCON Environmental Consultancy and the AAOİAŞ Environment and Social Manager. Prior to the meeting, CLOs carried out information activities, and during the meeting, the addresses and contact details of participants who expressed sensitivities were collected in order to plan further engagements. The participants' Q&A Table is presented in Table III.9, while the meeting photos are presented in Figure III.9.



Figure III-IX PCM in Manavgat / Yukarı Pazarcı Neighborhood

Figure III-X Questions, Opinions, and Suggestions Submitted During the Public Consultation Meeting

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
Avsallar Kör Ali Baysal Wedding Hall / 26.08.2025 09:00-11.00	Headman of Akdam Neighborhood	It was emphasized that the Project would have negative impacts on agriculture and that both the local community and individuals would suffer losses.	A few questions, requests, and opinions were received first. Afterwards, while a representative from the General Directorate of Highways (KGM) was responding on behalf of the Project Officials, the meeting was interrupted and ended prematurely.	
	Resident	It was noted that the number of houses affected by the route change increased from 5 to 40, and a request was made to shift the route over the Alara River. It was also stated that parks, greenhouses, irrigation canals, and houses would be affected by the route.		
	Headman of Çakallar Neighborhood	It was stated that no prior notification had been provided regarding construction works, and that permission would not be granted once construction reached the village. A request was made for the Project route to pass through the forest instead of the settlement, including the construction of a tunnel if necessary. Objections to the quarries and the current route were reiterated, which were supported by applause from the community. Concerns were also expressed that the Project would not create employment, that people whose livelihoods depend on agriculture would lose their income sources, and that they would only be employed as cleaning staff.		
	Resident	It was stated that the local community did not want expropriations to be carried out. The procedures and legal processes related to expropriation were shared. It was also expressed that participants believed the compensation		

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		amounts for expropriation would be low.		
	Headman of Saburlar Neighborhood	It was stated that the motorway and quarries caused serious grievances and that the working hours were inappropriate. Questions were raised about whether EIA reports had been obtained for the quarries and who had granted the approvals. Concerns were expressed about the muddy water resulting from the drillings, noting that the Saburlar Quarry is located 200 meters upstream of the water source. It was further stated that a complaint petition had been submitted to the General Directorate of Highways (KGM) regarding this issue, but no action had been taken.		
Alanya Municipality Konaklı Culture Center / 26.08.2025 15:00-18.00	Resident	It was stated that there is a need for a road and that no alternative route exists, which causes heavy traffic. A request was made for the continuation of the Konaklı–Alanya road, noting that there is no entrance to Alanya after Konaklı.		
	Resident in Toslak Neighborhood	It was asked why the Project route had recently been changed and what the justification for this change was.	Representative of AAOİAŞ	Minor changes were made at the D-400 connection section in order to ease traffic.
	CHP District Chairman	It was stated that while the road is needed, it should not be constructed in its current form. The route passes through agricultural lands in Alarahan and Toslak, which constitute the livelihood of local people. It was requested that the complaints be taken into consideration, emphasizing that the destruction of agricultural lands would have significant impacts on climate and water scarcity. It	Representative of ENCON	It was explained that in line with international standards, different solutions for expropriation activities and the associated costs are also being taken into account.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		was also noted that it currently takes one hour to travel 15 km, but congestion will still occur with the proposed connection roads.		
	Mayor of Konaklı (2014–2019)	It was stated that if the road is planned to be extended up to Gazipaşa, then the connection road in Konaklı (behind the New Hospital) should be cancelled. A concern was raised about whether it would first be constructed and then cancelled, emphasizing that people are already being adversely affected by the Konaklı connection road.	Representative of ENCON and AAOİAŞ	Reference was made to the Erdemli–Kızkalesi Project, where an extension was carried out as described. It was further explained that in addition to the motorway, certain connections are also included in the General Directorate of Highways' plans and will likely be expanded.
	Resident	Questions were raised regarding when the construction will take place and when it will be completed. Concerns were expressed about ongoing agricultural activities and related expenses (e.g., irrigation costs of 11,000 TL) as well as newly built structures (houses and buildings), and whether they would be demolished and compensated if affected.	Representative of AAOİAŞ	It was explained that initial assessments are being carried out, with inspections conducted by the General Directorate of Highways (KGM). The value of the land is determined based on the 2019 Expropriation Plan, taking into account unit costs and tax calculations. If any errors are identified during the assessments, these will be corrected. Notifications will be issued starting from March. Those seeking earlier information were advised to contact KGM directly. It was also stated that prices offered do not have to be accepted, and that lawsuits can be filed under Articles 27 and 10. Article 27 corresponds to an approximately two-month process, while Article 10 (Action for Price Determination and Registration) may take longer.
	Young Farmer Mustafa	A request was made for the service to be carried out properly, rejecting the route passing through fertile lands. It was stated that this is a wrong decision in the midst of a food crisis. It was	Representative of ENCON	It was stated that the concerns will be duly considered.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		further noted that ending the route in Konaklı would not solve the traffic problem, and that if the road is constructed in its current form, outward migration and unemployment will increase.		
	Resident	It was stated that the area is not well known, and that traffic congestion occurs between Okurcular and Alanya. It was suggested that the Emişbeleni–Gazipaşa Tunnel Project should be implemented.	Representative of AAOİAŞ	It was stated that the concerns will be duly considered.
	Farmer, Resident	It was questioned whether this meeting would have been more effective if it had been held before the route was determined, and whether complaints would be taken seriously after the route has already been set.	Representative of ENCON	Complaints and requests will be taken into consideration to improve mitigation measures and the RAP. The necessary revisions and updates will continue to be implemented.
	Lawyer, Resident of Emişbeleni	It was stated that the Konaklı junction passes through the neighborhood, leading to the loss of greenhouses and damaging the efforts invested. It was questioned whether there is any land of equal value, emphasizing that the Project harms farmers.	Representative of ENCON	A RAP is being prepared within the scope of the Project, and losses will be compensated in line with international practices.
	Headman of Konaklı Neighborhood	It was stated that the approved Project route, particularly the junction on the Konaklı side, would negatively affect community life and divide the settlement into two.	Representative of AAOİAŞ	The settlement pattern is taken into account in the Project design, and necessary adjustments will be reviewed to minimize potential social impacts of the route.
		Concerns were raised that vehicles coming from the Alanya direction would increase the existing traffic load when connecting to the main route through the connection road due to the current design.	Representative of AAOİAŞ	Traffic impact analyses are being carried out, and measures to reduce traffic congestion will be considered in the junction designs.
		A request was made for the improvement of the junction design for these reasons.	Representative of AAOİAŞ	The matter will be re-evaluated with the relevant engineering design team, and appropriate technical

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
				solutions will be explored.
		An objection was expressed to the approved design, and an alternative route was requested.	Representative of AAOİAŞ	The approved route has been determined in line with national plans. However, the requests communicated will be recorded and forwarded to the relevant authorities.
		Questions were raised regarding the recent change in the Project route and the justification for this change.	Representative of AAOİAŞ	Route changes have been made by considering technical requirements and issues such as traffic safety.
		The possibility of further changes to the approved route was brought up.	Representative of AAOİAŞ	The Project route has been approved by the relevant authorities, and no substantial changes are foreseen.
		It was noted that the previous markings were more functional compared to the current design, and that the subsequent changes were negatively received.	Representative of ENCON	All markings and signages are implemented in compliance with national standards, and feedback received during implementation will be taken into account.
		It was emphasized that if improvements are made to the route, the community would show satisfaction, otherwise the reactions would continue.	Representative of ENCON	Stakeholder views will be regularly collected, and possible improvements will be made. The aim is to ensure community satisfaction.
		Participants expressed their discontent regarding the absence of representatives from the General Directorate of Highways (KGM) at the meeting.	Representative of AAOİAŞ	Participants' views in this regard have been recorded, and necessary steps will be taken to ensure the participation of the relevant authority representatives in future meetings.
	Resident in Emişbeleni	The local community stated that they did not want expropriations to be carried out.	Representative of AAOİAŞ	Expropriation will be carried out in accordance with the relevant national legislation and legal procedures, and the necessary information is being provided.
	Resident in Emişbeleni	Participants expressed their concern that the compensation amounts for expropriation would be low.	Representative of AAOİAŞ	Compensation amounts are determined through independent valuation studies, and participants were informed about the available legal appeal mechanisms.
	Resident in Akdam	The local community requested the implementation of the initial project design.	Representative of AAOİAŞ	The Project route has been updated considering technical requirements and traffic safety; however,

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
				the requests have been recorded and will be conveyed to the relevant authorities.
	Resident in Emişbeleni	Participants expressed concern about the potential loss of fertile agricultural lands.	Representative of AAOİAŞ	While determining the route, efforts were made to preserve fertile agricultural lands as much as possible; potential losses will be addressed through compensation mechanisms under the RAP.
	Resident	Participants mentioned that there are 2B lands in the area and stated that they did not know how to claim their rights.	Representative of AAOİAŞ	Processes related to 2B lands are carried out in line with the existing national legislation, and the rights holders have been provided with the necessary information.
	Resident	It was asked whether a new EIA Report would be required for route changes, noting that the road is shifted by 2 meters after the EIA Report is obtained.	Representative of AAOİAŞ	It was explained that before the tender, limited drilling works are carried out for design purposes. However, once the contractor takes over after the tender, the design cannot be finalized. Further drilling works are then conducted, and if the ground conditions are found unsuitable, route changes may occur.
	Resident in Akdam	Concerns were raised that the operating authorities did not act with due consideration and that construction works continued despite the complaints.	Representative of AAOİAŞ	Before construction, the headmen are informed and the CLOs provide relevant information. The address has been obtained and will be communicated to the CLOs.
	Resident in Emişbeleni	A question was raised regarding the possibility of reaching a settlement for the expropriation of the remaining portion of the land, as 73% has already been acquired.	Representative of AAOİAŞ	It was explained that a petition should be submitted for the expropriation of the remaining part. Depending on the assessment of the situation, the remaining portion may also be expropriated. For example, if access to the land is restricted, the petition would likely result in a favorable outcome.
	Resident in Konaklı	It was stated that the Konaklı junction has no benefit, and a request was made to return to the previous route. In addition, a	Representative of AAOİAŞ	The Konaklı junction and route designs have been prepared by taking into account traffic safety and transportation needs.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		request was made for the road to be extended to Gazipaşa. It was also suggested that Aksu should be connected to the Isparta road.		Returning to the previous route is not technically feasible. The requests for extending the road to Gazipaşa and for connecting Aksu to the Isparta road have been noted and will be considered within the planning framework of the relevant authorities.
Serik Multipurpose Cultural Center / 27.08.2025 09.00-12.00	Headman of Yukarıkocayatak	A request was made for a route change due to the Mektebirli Cemetery located on parcel no. 1101. It was stated that 14–15 graves would be affected under the current route.	Representative of AAOİAŞ	It was explained that cancellation of the route is not possible. Following the meeting, a site inspection will be carried out to clarify the exact number of affected graves, as the figure was initially thought to be lower. It was further explained that the proposed route change does not comply with motorway standards; therefore, the current design must be maintained. A separate meeting will be organized with the headman and the concerned parties to share technical details, including why a change cannot be made and how the existing procedures will be followed. Further contact with the headman will be established at the beginning of the week.
	Headman of Kayaburnu	It was stated that the existing culvert under the D400 road is insufficient and needs to be widened. It was noted that the culvert is used by three neighborhoods, currently barely meets the demand, and may pose an overflow risk during sudden rainfall. It was asked whether the culvert could be widened during the D400 road expansion works. It was also stated that a petition had been submitted to KGM regarding this issue.	Representative of AAOİAŞ	It was noted that the issue will be reviewed with the relevant technical teams.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
	Headman of Deniztepesi	Concerns were raised that expropriation payments are too low and will lose value due to inflation by the time they are paid. A request was also made for land consolidation.	Representative of AAOİAŞ	It was clarified that there is a misunderstanding, as prices will be updated in the new year and payments will be made based on 2026 rates. It was also explained that land consolidation will not be possible after this stage of the process.
	Resident	It was asked whether compensation would be paid for greenhouses and structures.	Representative of AAOİAŞ	It was explained that compensation will be paid for structures. In the case of jointly owned lands, agreements may be reached through negotiation, or the matter can proceed to court.
	Resident	The public requested a clear timeline for the payment of expropriation compensations.	Representative of AAOİAŞ	It was stated that compensation amounts will be determined and paid according to the applicable legal schedule, and affected landowners will be informed individually.
	Resident	Information was requested regarding the size of the parcels to be expropriated.	Representative of AAOİAŞ	It was explained that the total area along the route has been calculated and that landowners of the affected parcels will be provided with specific information.
	Resident	Participants expressed that the offered expropriation compensations are significantly below market value.	Representative of AAOİAŞ	It was clarified that the compensations are determined through independent valuation studies, and landowners retain the right to appeal through legal mechanisms.
	Resident	Concerns were raised about the absence of representatives from the General Directorate of Highways (KGM) at the meeting.	Representative of AAOİAŞ	It was noted that this feedback has been recorded and will be conveyed to the relevant authority to ensure future participation.
	Resident	It was asked how payments would be made in parcels with multiple heirs.	Representative of AAOİAŞ	It was explained that payments will be made in accordance with inheritance shares, as determined under applicable legislation.
	Resident	Citizens requested adequate underpasses, culverts, and connection roads to ensure access to houses and greenhouses.	Representative of AAOİAŞ	It was stated that existing culverts will be extended and widened where necessary to maintain access.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
	Resident	Concerns were raised that cemeteries should not be affected by the Project.	Representative of AAOİAŞ	It was noted that measures will be taken to avoid impacts on cemeteries as far as possible, and any unavoidable cases will follow due procedures.
	Resident	It was stated that some parcels, houses, and greenhouses will be adversely affected by expropriation.	Representative of AAOİAŞ	It was explained that these impacts are recognized, and compensations will be provided in line with national legislation and the RAP framework.
	Resident	Concerns were expressed that expropriation payments would be insufficient to purchase new land.	Representative of AAOİAŞ	It was explained that compensations are based on independent valuations and legal requirements; however, concerns have been noted for further consideration in the RAP.
	Resident	It was noted that some greenhouses were built through loans, leading to additional grievances.	Representative of AAOİAŞ	It was explained that such cases will be reviewed on an individual basis, and compensation procedures will take account of legally recognized investments.
	Resident	Concerns were raised that certain routes may damage cemeteries and drinking water resources.	Representative of AAOİAŞ	It was stated that the Project design aims to avoid such sensitive areas; in cases where impacts are unavoidable, mitigation measures will be implemented in line with environmental and social standards.
	Resident in Kayaburnu (Parcel: 39 / 102)	Owns a single land plot of 11.5 decares with no other property. Stated that citrus trees planted in 2013 (12–13 years old) will be entirely affected, estimating a loss of 600–700 trees. Highlighted that the land is adjacent to a zoned area, making it highly valuable, and that acquiring new land under these conditions is impossible. Mentioned an annual income of 1,500–2,000 TL and stated that the road will not provide any benefit to him.	Representative of AAOİAŞ	The valuation of trees and land will be carried out through independent expert assessments. The proximity of the land to zoned areas, its current use, and agricultural productivity will be taken into account. Lost income and livelihoods will be addressed under the RAP.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
	Resident in Burmahancı (Parcel: 102 / 88)	Raised concern that the KMZ is outdated at the location of the DSİ canal and needs to be checked. Noted that in the Ministry of Environment's e-Plan, the zoning plan attached to the EIA report is updated, and the problem stems from the outdated report. Stated that there is already a DSİ road where lands are being taken, and that the additional T-junction road is unnecessary. Referred to the DSİ irrigation canal built in the 1970s.	Representative of AAOİAŞ	The DSİ canal and existing roads will be reviewed by the technical teams. Discrepancies between the KMZ and the EIA plans will be checked, and the request regarding the additional connection road will be conveyed to the relevant authorities.
	Resident in Üründü	sked about the Project's start date. Stated that his greenhouse was divided and asked how water and electricity will be provided. Asked when he should stop agricultural activities, noting: "Should I plant or not?" Asked whether underpasses or culverts would be built since the route cuts through greenhouses and orange orchards. Asked how long before construction notification would be given.	Representative of AAOİAŞ	Notification will be given at least three months before construction begins.
		Asked whether there would be support for dismantling and transporting his greenhouse.	Representative of AAOİAŞ	Dismantling and transportation will be the responsibility of the landowner, but labor support may be provided.
	Resident in Cumalı (Parcel: 102 / 41)	Asked when the payments will be made and when construction will begin in their neighborhood.	Representative of AAOİAŞ	Expropriation payments and construction start dates will be determined in line with the official schedule, and landowners will be informed accordingly.
	Resident in Sarıbalı (Parcel: 249 / 5)	Stated that 10 households in the neighborhood are affected, 8 of which are in economic difficulty. Reported that 5 decares of his land will be lost, affecting his house and trees. Noted the presence of a tunnel passage on the route	Representative of AAOİAŞ	Yes, such a study is underway. Although the land is occupied, additional solutions are being explored.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		and asked whether there is a viaduct project to save his house.		
	Resident in Üründü (Parcel: 135 / 6-4)	Noted that they are 5 co-heirs and the land originally belonged to their grandfather. Stated that the house, greenhouse, and orange orchard (approx. 300 trees, 20 years old) will be affected. Explained that this orchard is his livelihood, generating 2 million TL annually, and that selling for 1 million TL is unacceptable. Emphasized that in 3 meetings held within 6 months, no clear information was provided about construction start dates or expropriation payments.	Representative of AAOİAŞ	Üründü is not included in this year's construction plan.
	Resident in Burmahancı (Parcel: 102 / 40)	Reported that their 15-decare greenhouse will be completely lost and that they are 3 co-owners. Stated that their house and sources of income will disappear and that they had not been directly consulted before.	Representative of AAOİAŞ	Valuations will be carried out for greenhouses and houses affected by expropriation, and individual consultations will be held with the landowners. Loss of income will be considered under the RAP.
	Resident in Burmahancı	Asked why fertile agricultural lands are not being preserved as in countries like Germany. Stated that the Project design was made without consulting the local people and emphasized that fertile soils should not be lost. Noted that the local people are not involved in tourism but rely entirely on agriculture.	Representative of AAOİAŞ	Efforts have been made to avoid fertile agricultural lands as much as possible when determining the route. Public consultation meetings are being held to collect stakeholder opinions, and feedback from these meetings will be communicated to the relevant authorities.
	Resident in Üründü (Parcel: 117 / 5)	Reported that the 130-meter greenhouse is cut in half by the route, leaving unusable land on both sides. Noted that they took a 7-year loan from Ziraat Bank in 2021 and payments are still ongoing. Stated that the land represents years of labor, and despite	Representative of AAOİAŞ	Investments made with loans and agricultural facilities will be taken into account during expropriation valuation. Compensation mechanisms under the RAP will be evaluated to prevent grievances for landowners.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		health challenges (platinum in arm), agricultural production continues, but the Project disregards their efforts.		
	Resident in Cumalı	Noted that apart from their 5-decare land on the route (Cumalı neighborhood, Antalya side), they have no other property. Previously, 10 decares had been requested for a hospital project (5 decares from a relative, 5 from themselves), but this project was later canceled due to the motorway. Requested that expropriation compensation reflect not only the land value but also the economic losses from the canceled hospital project. Ali Bey added that his wife is a cancer patient who has undergone chemotherapy.	Representative of AAOİAŞ	Expropriation compensation will be determined through independent expert assessments. Although losses arising from the cancellation of the hospital project cannot be considered under the official process, existing grievances will be assessed within the RAP framework. Social sensitivities have been conveyed to the project team.
Manavgat İbrahim Sözen Youth Center/ 27.08.2025 15.00-18.00	Resident	It was noted that there is no liaison office in Manavgat, and the Serik liaison office is not accessible for local citizens.	Representative of AAOİAŞ	Different communication channels (phone, email, CLO) will be used to facilitate citizens' access. Requests regarding office accessibility will be evaluated.
	Resident	Two lawyers attended the meeting and asked questions about expropriation processes.	Representative of AAOİAŞ	Answered questions regarding expropriation processes by Expropriation Director.
	Resident	The public requested a clear timeline for when expropriation negotiations and payments would be made.	Representative of AAOİAŞ	Expropriation payments and construction start dates will be determined in line with the official schedule, and landowners will be informed accordingly.
	Resident	Information was requested about the parcel sizes to be expropriated.	Representative of AAOİAŞ	It was explained that the total area along the route has been calculated and specific information will be provided to affected landowners.
	Resident	Participants stated that the offered expropriation compensations are far below market value.	Representative of AAOİAŞ	It was explained that landowners retain the right to appeal.

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
	Resident	Participants criticized the absence of representatives from KGM at the meeting.	Representative of AAOİAŞ	This feedback has been recorded; the necessary steps will be taken to ensure the participation of institutional representatives in future meetings.
	Resident in Örenşehir	Raised concerns about 15 years of income loss, asking who would cover this. Asked why shifting the road north is not possible, noting there are technical solutions. Asked what people will do for their livelihood after construction, emphasizing that they will not benefit from the motorway.	Representative of AAOİAŞ	Income losses and impacts on livelihoods will be assessed within the scope of the RAP. The road route has been determined based on technical requirements, and alternative requests will be recorded and forwarded to the relevant institutions.
	Resident in Hacıobası	Their house and business are affected. Asked why expropriation compensation is divided among all co-owners and how they can ensure that only they receive payment.	Representative of AAOİAŞ	Explained that consent must be obtained from other co-owners; if not, proof of ownership (e.g., bills) can be used. If necessary, a lawsuit can be filed to prove ownership.
	Resident in Taşağıl	Asked whether a study was carried out on dust and asbestos risks due to construction. Reported being close to the tunnel entrance and affected by blasting, leading to repeated complaints to the gendarmerie. Highlighted the presence of four elderly people (80+) and vulnerable individuals (Alzheimer's, visually impaired, broken arm), emphasizing negative impacts.	Representative of AAOİAŞ	Measures are being taken for dust control and blasting safety during the construction process, and regular measurements and inspections are being carried out. Vulnerable groups (the elderly, disadvantaged individuals) will be specifically assessed under the RAP and EIA.
	Headman of Taşağıl	Stated that the Taşağıl headman did not provide sufficient information about the meeting, and that they had difficulty learning about it.	Representative of AAOİAŞ	Meeting announcements were made through various channels (village council, public notice, website, newspaper). Feedback in this regard has been recorded. More frequent updates will be provided at subsequent meetings.
	Resident	Reported that her house and workplace at the Akseki road junction are affected by expropriation and that she has no other source of income.	Representative of AAOİAŞ	Payments for inherited land will be made in accordance with legal procedures. Loss of livelihood and damages will be

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		Asked how expropriation would be handled for inherited property. Expressed concern about losing her livelihood from running a roadside greengrocery.		addressed under the RAP.
	Headman of Gündoğdu	Reported that an electricity pole was placed on his land without official notification or expropriation information. Suggested that the route should pass 300–500 meters above the settlement to reduce impacts. Mentioned that high-voltage towers were initially placed in the middle of the road but later shifted to the side after consultations. Requested the installation of a low-voltage line. Another citizen reported that only 2 decares of land remained after expropriation and asked how the process would proceed. Criticized the absence of KGM at the meeting. Raised concerns that construction dust would prevent olive trees from yielding crops and asked how this would be compensated.	Representative of AAOİAŞ	The expropriation processes for power lines and poles will be carried out in coordination with the relevant institutions, and official notifications will be made to the rightful owners. The route has been determined in accordance with current design engineering and safety standards. Requests for low-voltage lines will be forwarded to the relevant institutions and evaluated based on technical suitability. Dust control measures are being taken for trees, and compensation mechanisms will be activated under the RAP in case of damage.
	Resident in Çolaklı	Reported having olive groves on land with 42 inheritance division agreements, where his mother is a co-owner. Requested that compensation for his mother's share be paid directly to her.	Representative of AAOİAŞ	Provided an explanation regarding the process.
	Lawyer	Stated that her clients learned about the expropriation by chance rather than through official notification. Requested information specifically about parcel 138/1530.	Representative of AAOİAŞ	Provided an explanation regarding the parcel.
	Headman of Aksaz	Reported that he had given consent for the service road route and was promised a stabilized road in return. Requested a dedicated information meeting for Aksaz.	Representative of AAOİAŞ	The request for a stabilized road has been recorded, and coordination with the relevant institutions will be ensured. Holding a special information meeting

Location - Date - Time	Participants	Question, Comment, or Suggestion	Responser	Feedback Summary
		Reiterated demand for route changes, suggesting the route should pass 20 meters above the settlement to reduce impacts.		for Aksaz will be evaluated. The route has been determined according to engineering criteria; requests will be recorded and forwarded to the relevant institutions.
	Headman of Ulukapı	Noted that sociologists, engineers, and foremen were assigned for community information, but there is a lack of legal support. Suggested that lawyers should also be involved in the process to ensure that both community and company rights are properly understood.	Representative of AAOİAŞ	The necessary legal information will be provided so that stakeholders understand the process correctly. A proposal to include lawyers in the fieldwork has been recorded.

Across the four meetings, the most frequently raised issue was the demand for route changes. In particular, participants consistently emphasized the need to protect agricultural lands, cemeteries, and water resources. The view that the Konaklı junction would affect community life was also expressed. Concerns about level of expropriation payments and the process were among the asked questiontions. On the other hand, some participants stressed the clear need for the road and the necessity of a new arrangement to reduce the heavy traffic load in the region. In addition, repeated requests were made to ensure adequate underpasses, culverts, and connection roads to maintain access to houses, greenhouses, and agricultural lands.

During the meetings, questions regarding parcel information, payment schedules, and compensation mechanisms were answered by the Expropriation Director and the Environment & Social Manager. Furthermore, CLOs engaged in one-on-one communication with vulnerable groups both prior to and during the meetings. This approach ensured that the meetings were conducted in line with the principle of participation.

III.2.4. Internal Stakeholder Engagement Activities

Employee Satisfaction Survey

The internal stakeholders of a project are crucial for its healthy progress. The largest group of internal stakeholders in terms of quantity is the employees. Employees of the project sponsor and subcontractors are involved in all stages of the Project's life cycle. Therefore, engaging with internal stakeholders through stakeholder engagement activities is an essential and crucial key performance indicator criterion. The project sponsor is expected to conduct various stakeholder engagement activities with internal stakeholders.

As part of internal stakeholder engagement activities, the Project Sponsor may conduct an employee survey to gather feedback on the overall operation of the Project. This survey aims to identify areas for improvement in management and the workplace and emphasize the importance of gender equality. By doing so, the Project aspires to promote inclusivity and create a better working environment for all employees, ensuring that everyone's views are valued and considered in the quest to enhance workplace dynamics and fairness.

The suggested employee questionnaire is prepared with at least a 5-point Likert scale. The survey study is set up to analyze the answers given by the employees to the given statements. The answers are categorized as strongly disagree (1), disagree (2), partially agree (3), agree (4), and strongly agree (5). The statements given to the employees to express their opinions within the scope of the survey are as follows:

1. I am satisfied with the cafeteria and the food served.
2. In the workplace, cleanliness, organization, and order are given importance.
3. The company attaches great importance to occupational health and safety issues.
4. The company provides the personal protective equipment required for the job.
5. I am satisfied with the working hours.
6. The behavior of the employees towards each other is good.
7. I have access to the things I need to do my job well.
8. My salary makes me satisfied.
9. In general, I am happy with my supervisor/top manager.
10. I am satisfied with the Company's Management.
11. Necessary security measures (other than occupational health and safety issues) are taken in our company.
12. I recommend this company to work with.
13. I am satisfied with the possibilities offered for the service.
14. Social areas within the construction site where we can spend time outside work are sufficient.
15. I am happy with the laundry and dormitory conditions.
16. The company promotes gender equality and ensures equal opportunities for all employees.

This survey will be conducted separately by the female CLO for the female employees, and in order to avoid trust issues, it will be stated that the female employees will share all their problems except for the questions and that these will remain anonymous if they wish. How the process of complaints or requests received here will work is explained in the Grievance Mechanism section.

Provide SEAH and GBV training or develop a safety plan for women workers before the construction starts. It is detailed at Labor and Working Conditions chapter at ESIA.

IV. STAKEHOLDER IDENTIFICATION

In order to develop an effective SEP, it is necessary to determine who is likely to be affected (both directly and indirectly) by the Project ("affected parties"); who may have an interest in the Project ("interested parties"); and have the potential to influence project outcomes or operations.

An important stage of the stakeholder identification is the groups that are likely to be affected by the Project more or differently than other stakeholders, and whose influence on these possible impacts is expected to be relatively low. These groups are defined as "vulnerable groups" in the literature. One of the aims of the stakeholder engagement plan is to carry out an effective and sustainable communication, information and consultation process with these vulnerable groups. For this purpose, this SEP covers the following objectives related to vulnerable groups:

- Identifying vulnerable groups,
- The method and frequency of communication with vulnerable groups,
- Opportunities and priorities for vulnerable groups,
- Monitoring process,

IV.1. Stakeholder Identification Methodology

Stakeholders were identified through a structured and participatory methodology aligned with international best practices, including IFC Performance Standard 1, the Equator Principles.

The identification process aimed to ensure the inclusion of all individuals, groups, and organizations who may be directly or indirectly affected by the project or who may influence its outcomes. The detailed methodological steps followed during this process are presented in Table IV.1 .

Table IV-1. Methodological Steps for Stakeholder Identification Aligned with International Standards

Method	Description	Key Focus Areas	Target Groups / Sources
Desk-Based Review	Review of existing documentation and spatial data	Identification of affected areas, land parcels, community assets	ESIAs, Resettlement Frameworks and Baseline Studies, Local government records and cadastral maps, Previous stakeholder engagement records
Field Visits & Observations	On-site visits along proposed motorway corridor	Land use, mobility, seasonal migration (e.g., Yörük routes), presence of informal or unregistered groups	Local terrain and communities along the corridor
Key Informant Interviews (KIIs)	Semi-structured interviews with diverse local actors	Local insights on social dynamics, vulnerabilities, potential project impacts	Mukhtars, women, elderly, farmers, Yörük communities, seasonal workers, NGOs, CSOs
Vulnerability Mapping	Identification and assessment of at-risk populations	Vulnerability related to land acquisition, access to information, livelihood risks, social marginalization	Illiterate adults, women-headed households, seasonal workers, elderly, disabled, refugees

IV.1.1. Stakeholder Categorization

Stakeholders were categorized into Project-Affected People, Vulnerable Groups, Interested Parties, and Governmental and Regulatory Stakeholders. This multi-tiered classification ensured a comprehensive and inclusive approach focused on human rights risks related to displacement, participation, and access to remedies (see Table IV.2).

Table IV-2. Stakeholder Categorization

Category	Description / Details
Project-Affected People (PAPs)	Individuals and households directly impacted by land acquisition or construction activities; business owners
Vulnerable Groups	Those with limited capacity to participate in decision-making or to absorb adverse impacts
Interested Parties	Institutions, NGOs, unions, academic groups, business owners, or the general public with a stake in the project outcomes. This includes civil society actors and service organizations supporting local communities, including those involved in health, social welfare, gender-based violence response, shelter, or community development.
Governmental and Regulatory Stakeholders	Local, provincial, and national-level authorities responsible for project permitting and oversight. This also includes emergency response units (e.g., disaster management authorities, fire brigades), public health services, municipal utilities, and security or protection bodies involved in addressing GBV and community safety.

The vulnerable groups identified in the Project are as follows:

- Children
- Children with special needs
- Out-of-school children (school-age children who cannot attend school)
- Elderly people (75+)
- Elderly people requiring care and social assistance (65+)
- Illiterate adults
- Persons with chronic illness (e.g., heart, diabetes, kidney)
- Persons with other serious health conditions (e.g., cancer, Alzheimer)
- Disabled persons (physical / mental)
- Unemployed people (even though they are actively seeking work)
- Seasonal agricultural workers
- Households dependent on natural resources (agriculture, livestock, forest products)
- Green Card holders
- State aid beneficiaries
- Informally employed workers (without social security)
- Physically and economically displaced households
- Female-headed households
- Landless households
- Low-income households (below minimum wage)
- Migrant and refugee households (e.g., Syrian, Afghan)
- Ethnic or linguistic minority groups
- Semi-nomadic Yörük communities
- Households previously affected by expropriation

Gender inequality may be seen in stakeholder engagement process. Although it is not defined as a vulnerable group on its own, it is necessary to be sensitive to situations where women cannot take part in these stakeholder engagement activities. Project Sponsor should consider gender equality in the stakeholder engagement processes of the project and should approach with sensitivity to the problems that may arise in this regard. Project Company will take short and long-term steps towards resolving these problems. Arranging time and space so that women can participate in meetings and other events

equally is one of the simplest and most effective steps that can be taken in this regard. In addition to the above-mentioned vulnerable groups, gender equality will be considered in the process of stakeholder identification, consultation with stakeholders and grievance management process.

In the context of the Project, women are identified as a vulnerable group due to a combination of socio-economic, cultural, and spatial dynamics that influence their exposure to project-related impacts. Because the location area of the project is rural and peri-urban areas, women often rely on informal or subsistence-based economic activities - such as agriculture, livestock care, and seasonal labor - which are typically unregistered and under-recognized in compensation and livelihood restoration schemes. Moreover, women may face mobility restrictions due to gender norms and lack of access to private transportation, which can be further exacerbated if the motorway alters local routes, increases travel distances, or reduces public transportation availability. In areas like Manavgat, where tourism and agriculture are dominant, women's economic roles are often linked to place-based activities (e.g., local markets, childcare close to home), making them more vulnerable to displacement or disruption. Additionally, the influx of a temporary male workforce during construction may elevate risks of gender-based violence and harassment, particularly in communities with limited protective infrastructure or social services. For these reasons, it is crucial that the project incorporates a gender-sensitive approach in its impact assessments, stakeholder engagement processes, and mitigation strategies to ensure that women's voices are heard, their specific risks addressed, and their livelihoods and well-being protected.

In the neighborhoods within the impact area of the project, especially in the Central neighborhood of Serik district, it was determined in the field study conducted by Encon in June 2024 that Syrians under temporary protection status and Syrian Migrants live. According to Refugees Association's May 2025 Report, the number of Syrians living in Antalya is 6,839. Attacks against Syrian refugees, especially in Serik district, were reported in the news.

On the other hand, nomads living in the Antalya region go to the plateau at certain times of the year. Antalya-Serik-Ovacık plateau visited by Yoruks is located within the project area. Nomads who will pass through this region are a vulnerable group both in terms of the impact of construction on their journeys and in terms of accommodation. The migration pathway of nomads is given in FigureVII.1 as referenced to the motorway alignment.

On the other hand, nomads living in the Antalya region go to the yayla at certain times of the year. A section of the migration route to the Antalya-Serik-Ovacık yayla, which is visited by the Yörüks, is located 1,200 meters from the project area. Nomads passing through this region are a vulnerable group in terms of both the impact of construction on their journeys and accommodation. The migration route of the nomads is given in Figure IV.1 according to the highway route.

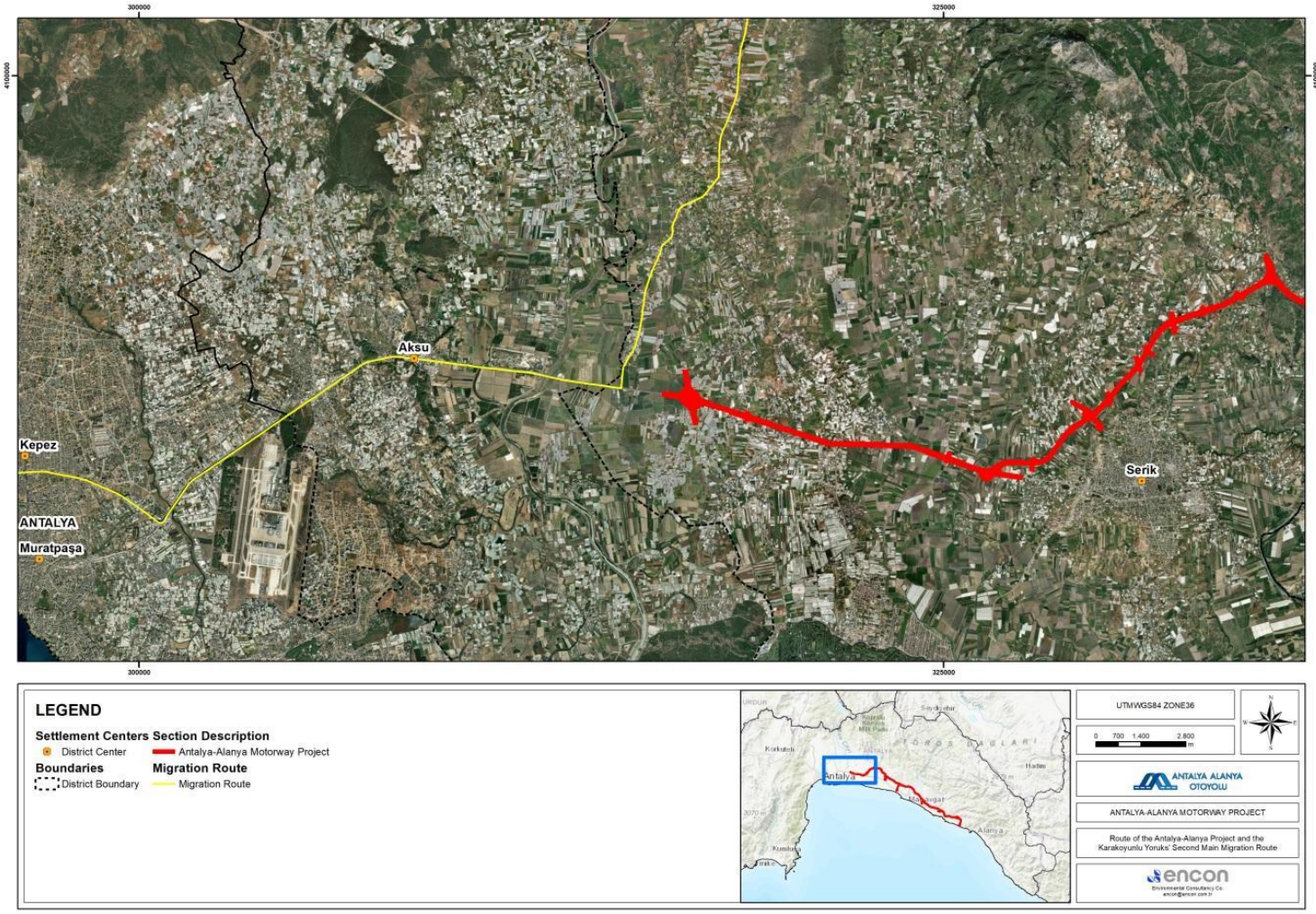

Figure IV-I The Migration Pathway of Nomads in the Region

IV.1.1.1. Project-Affected People (PAPs)

Project-Affected People (PAPs) are defined as individuals, households, or communities who will experience either physical or economic displacement as a result of the Antalya–Alanya Motorway Project. The identification of PAPs is based on expropriation plans (as of April–May 2025), site-specific scoping studies, and preliminary stakeholder consultations. Impacts vary by geography, land tenure, land use, and vulnerability status. The categories of Project-Affected People (PAPs) identified for the Antalya–Alanya Motorway Project are summarized in Table IV.3, based on expropriation plans, scoping studies, and preliminary consultations, reflecting variations in land tenure, land use, and vulnerability.

Table IV-3. Categories of Project-Affected People (PAPs) for the Antalya–Alanya Motorway Project

Category	Description / Key Details
1. Landowners and Land Users	Privately-owned parcels will be subject to expropriation. These include agricultural fields, orchards, greenhouses, and constructible plots. Some parcels may become "orphaned land," and in addition, there are lands informally used by non-owners such as farmers or tenants.
2. Structure Owners	299 houses, 599 greenhouses, 37 business structures affected - many with multiple structures - Includes small-scale agricultural and informal businesses
3. Livelihood-Dependent Farmers	Households losing >20% of productive land, especially greenhouse/orchard farmers, at high economic displacement risk - Parcels <500 m² post-expropriation considered unviable for farming
4. Residents in Fragmented or Severed Parcels	Parcels divided by motorway causing difficult or impossible internal access - Planned engineering solutions (underpasses, culverts) to mitigate access loss; effectiveness to be confirmed via RAP consultations
5. Vulnerable and Marginalized Groups	Illiterate adults unable to comprehend expropriation/compensation - Elderly with limited mobility/access - Women without land title or informal income earners - Migrants, refugees, seasonal workers with undocumented tenure - Semi-nomadic Yörük communities with migration routes crossing project area, children
6. Users of State-Owned and Public Lands	Greenhouses/agricultural plots on state treasury or forest lands used informally by locals - May qualify for compensation or assistance under national policies or livelihood restoration programs

Project-Affected People by Settlement

Based on the expropriation data and field surveys from April–May 2025, the following neighborhoods are most significantly affected. In addition, specific findings on Migratory Status and Nomadic Populations (Yörük Communities) have been presented separately below the table, as the former draws on both ENCON fieldwork and data from the Refugees Association, while the latter was identified during the desk study stage.

Table IV-4. Vulnerability Groups in the Expropriation Corridor

District	Neighbourhood	Vulnerable Groups
Serik	**Deniztepesi**	Other significant health issues, Economically displaced household
	Sarıabalı	Physically displaced household, Economically displaced household, Landless household, Household s who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Unemployed (Although looking for a job), Chronic diseases, Children of school age who do not attend school, Illiterate, Mental Disability/ Issues, People who do not speak and/or understand Turkish
	Çandır	Economically displaced household, Household s who lose more than 20 percent of their total productive area
	Cumalı	Economically displaced household, Chronic diseases, Physical Disability, Mental Disability/ Issues
	Burmahancı	Economically displaced household, Landless household, Low income household, Household s who lose more than 20 percent of their total productive area
	Üründü	Economically displaced household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases
Manavgat	**Çakış**	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Elderly (over 65) in need of care, Illiterate, Physical Disability

District	Neighbourhood	Vulnerable Groups
	Taşağıl	Economically displaced household, Landless household, Household s who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Other significant health issues
	Gündoğdu	Economically displaced household, Low-income households, Chronic diseases
	Hocalar	Economically displaced household, Landless household, Household s who lose more than 20 percent of their total productive area, Low-income households, Elderly (over 65) in need of care, Illiterate, Chronic diseases, Unemployed (Although looking for a job)
	Yavrudoğan	Economically displaced household, Households who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Illiterate, Chronic diseases
	Çolaklı	Physically displaced household, Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Women-headed household, Low income household, Seasonal agricultural worker, Illiterate, Chronic diseases
	Seki	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Chronic diseases
	Kalemler	Economically displaced household, Households who lose more than 20 percent of their total productive area, Landless household, Women-headed household, Low income household, Elderly (over 65) in need of care, Chronic diseases, Physical Disability
	Evren	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases
	Yeniköy	Economically displaced household, Elderly (over 65) in need of care, Chronic diseases
	Şişeler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Children with special needs, Chronic diseases
	Evrenleryavşi	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Children with special needs, Chronic diseases, Unemployed (Although looking for a job)
	Yukarıışıklar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Illiterate, Physical Disability, Chronic diseases, Mental Disability/ Issues, Seasonal agricultural workers
	Dikmen	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area
	Bucakşeyhler	Economically displaced household, Low income household, Illiterate, Physical Disability, Chronic diseases
	Ulukapı	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Aşağıışıklar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Physical Disability, Chronic diseases, Other significant health issues
	Karaöz	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Aksaz	Economically displaced household, Landless household, Low income household, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Chronic diseases
	Hacıali	Economically displaced household, Low income household, Household resettled in the neighborhood after earthquake or other disasters (Fire), Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Illiterate, Chronic diseases
	Cevizler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Chronic diseases
	Hacıisalı	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Other significant health issues
	Hacıobası	Economically displaced household, Women-headed household, Landless household, Low income household, Households who lose more than 20 percent of their total

District	Neighbourhood	Vulnerable Groups
		productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75, Chronic diseases, Physical Disability, Other significant health issues
	Uzunlar	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75, Chronic diseases, Elderly (over 65) in need of care, Physical Disability, Other significant health issues
	Kadılar	Economically displaced household, Women-headed household, Low income household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Other significant health issues, Beneficiary of governmental aid
	Örenşehir	Economically displaced household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Yalçıdibi	Economically displaced household, Women-headed household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75, Chronic diseases, Elderly (over 65) in need of care, Illiterate, Physical Disability, Other significant health issues
	Odaönü	Economically displaced household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Karakaya	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Significantly affected by expropriation of other past projects, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Physical Disability, Chronic diseases, Seasonal agricultural workers
Alanya	**Alara**	Economically displaced household, Women-headed household, Landless household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Illiterate, Chronic diseases
	Çakallar	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Advance Old Age (over 75), Elderly (over 65) in need of care, Illiterate, Chronic diseases, Mental Disability/ Issues, Beneficiary of governmental aid
	İncekum	Economically displaced household
	Türkler	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Chronic diseases, Physical Disability
	Emişbeleni	Economically displaced household, Landless household, Households who lose more than 20 percent of their total productive area, Illiterate
	Toslak	Economically displaced household, Landless household, Low income household, Households who lose more than 20 percent of their total productive area, Elderly (over 65) in need of care, Illiterate, Chronic diseases, Physical Disability, Mental Disability/ Issues, Employed without social security
	Telatiye	Economically displaced household, Households who lose more than 20 percent of their total productive area, Chronic diseases
	Elikesik	Economically displaced household, Landless household, Low income household, Illiterate, Chronic diseases, Seasonal agricultural workers

Migratory Status: Field research conducted by Encon in June 2024 identified Syrian citizens and other migrant groups under temporary protection, particularly in the Central District of Serik. Greenhouse owners in Serik, Manavgat, and Alanya districts have stated that they employ migrant workers. Seasonal workers are primarily Afghan and Syrian nationals. According to the RAP Report, registered and unregistered migrant workers are present in the neighborhoods of Emişbeleni, Aşağıçatma, Evren (registered), Toslak, and Çakış. According to the Refugees Association, as of May 2025, there are approximately 6,839 Syrians residing in Antalya. Tensions toward refugees have been reported, particularly in Serik. Project materials will be provided in Arabic to support inclusive participation. Additionally, necessary information will be communicated specifically by CLOs.

Nomadic Populations (Yörük Communities): Seasonal nomadic groups such as the Yörüks were identified along migration routes passing near the project alignment (~1,200 m away at times). Semi-nomadic communities are also present in Toslak, Ulukapı, and Karakaya. These groups often:

- Rely heavily on livestock grazing and pasture access
- Have low literacy rates and limited access to health services
- Are excluded from formal consultation due to their mobile lifestyle

To support them, the project will incorporate culturally sensitive engagement methods, preserve grazing corridors where feasible, and consider compensation or assistance through the Livelihood Restoration Plan.

Within the scope of the Project, it is important to identify stakeholders at the beginning of the process to inform key stakeholders (local people, relevant state institutions and NGOs) about the Project and provide effective participation of the stakeholders. To this end, the following individuals and groups should be considered specifically:

- People who are likely to be affected, directly or indirectly by the Project,
- People or institutions may have an interest in the Project,
- People or institutions that have the potential to influence
- Project outcomes or company operations.

Besides it is an important process to identify vulnerable or disadvantaged people or groups, who are likely to be affected by the Project in certain phases, accurately during the identification of stakeholders. Possible stakeholders who are likely to be affected by the Project or have an influence on the Project are listed below:

- Project employees, including Contractors. Project parties;
- National governmental and non-governmental organizations (NGOs);
- Local governmental organizations and NGOs;
- Local residents (potentially project affected persons including vulnerable groups); and
- Local businesses and universities

The stakeholders listed in Table IV.5 are the most prominent in the Project. Organizations or groups not listed can contact the Project Sponsor and provide their contact information to be informed about the Project.

People living in residential areas near the Project will be considered as potential Project affected people/population (PAP) in this Stakeholder Engagement Plan (SEP). These settlements are also listed in Table IV.5 . Therefore, one of the objectives of the SEP is to effectively consult and share information with these groups and address their concerns.

Table IV-5. Project's Stakeholders List

Level	Category	Organization / Entity
Internal	**Appointed Company**	Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş
	Contractor's Personnel	Information N/A
	Sub-contractors	Information N/A
National	**Ministries and Relevant Authorities**	Ministry of Transportation and Infrastructure
		General Directorate of Highways
		General Directorate of Infrastructure Investments
		General Directorate of Transport Services Regulation
		Ministry of Agriculture and Forestry
		General Directorate of State Hydraulic Works (DSİ)
		General Directorate of Forestry
		General Directorate of Meteorology

Level	Category	Organization / Entity
		Ministry of Environment, Urbanization and Climate Change
		General Directorate of Spatial Planning
		General Directorate of Environmental Management
		General Directorate of Preservation of Natural Heritage
		General Directorate of Land Registry and Cadaster
		Ministry of Culture and Tourism
		General Directorate of Cultural Heritage and Museums
		Ministry of Energy and Natural Resources
		General Directorate of Mineral Research and Exploration
		General Directorate of Electricity Generation Corporation (EUAS)
		General Directorate of Electricity Transmission Company (TEIAS)
		Ministry of Interior
		Gendarmerie General Command
		General Directorate of Security Affairs
		Ministry of Labor and Social Security
		General Directorate of Turkish Employment Agency (ISKUR)
		Ministry of Development
		Ministry of Defense
		Petroleum Pipeline Company (BOTAS)
		Prime Ministry's Disaster and Emergency Management Presidency (AFAD)
	NGOs	The Union of Chambers and Commodity Exchanges of Turkey (TOBB)
		World Wide Fund for Nature (WWF)
		Foundation for the Protection and Promotion of the Environment and Cultural Heritage (CEKUL)
		Environment Foundation of Turkey
		Turkish Environmental and Woodlands Protection Society (TURCEK)
		Union of Forestry Workers (ORMAN-IS)
		Union of Turkish Roads, Buildings and Construction Workers (YOL-IS)
		Confederation of Unions of Turkish Workers (TURK-IS)
		Union of Construction Industry Employers (INTES)
		The Turkish Foundation for Combating Erosion Reforestation and the Protection of Natural Habitats (TEMA)
		Nature Association
Regional	**Governmental Agencies and Authorities**	Ministry of Agriculture and Forestry Regional Directorate
		Ministry of Transportation and Infrastructure Regional Directorate of Highways
		Antalya Regional Directorate of Forestry
		Antalya Water and Sewerage Administration
		Antalya Provincial Directorate of Employment Agency

Level	Category	Organization / Entity
		Antalya Regional Directorate of the Conservation Council for Cultural Heritage
		General Directorate of Highways 13th Regional Directorate
	NGOs	Greenhouse Investors and Producers Association
		Eastern Mediterranean Research Association
		Mediterranean Protection Association
		Turkish Foresters Association Western Mediterranean Branch
		Mediterranean Association
		Archaeologists Association Western Mediterranean Branch
		Mediterranean Archaeology Association
Local	**Governmental / Local Authorities and Agencies**	Antalya Governorate
		Antalya Metropolitan Municipality
		Serik District Governorate
		Manavgat District Governorate
		Alanya District Governorate
		Serik District Municipality
		Manavgat District Municipality
		Alanya District Municipality
		Antalya Provincial Police Department
		Antalya Provincial Gendarmerie Command
		Antalya Provincial Family and Social Policies Directorate
		Antalya Provincial Culture and Tourism Directorate
		Antalya Regional Heritage Board
		Antalya Agriculture and Forestry Directorate
		Antalya Provincial Food, Agriculture and Livestock Directorate
		Antalya Forestry Regional Directorate
		Antalya Provincial Industry and Trade Directorate
		Antalya Environment, Urbanization and Climate Change Provincial Directorate
		Antalya Provincial Directorate of National Education
	NGO's	Antalya Orchids and Biodiversity Protection Association (ANTOK, TÜRKİYE)
		Antalya Chamber of Commerce and Industry
		Turkish Agriculturalists Association Antalya Branch
		Turkish Nature Protection Association Antalya Branch
		Natural Resources and Biodiversity Protection Association
		Antalya Cultural Heritage Association
		Women's Social Life Research and Examination Association Antalya Branch
		Antalya Environment Platform
		Antalya Women's Cooperative

Level	Category	Organization / Entity
		Antalya Businesswomen's Association (ANTİKAD)
		Serik Chamber of Agriculture Presidency
		Serik Chamber of Tradesmen and Craftsmen Presidency
		S.S. Serik Boğazkent Women's Initiative Production and Business Cooperative
		Manavgat Women of Taurus Cooperative
		Turkish Agricultural Credit Cooperatives- Antalya
		TMMOB Chamber of City Planners Antalya Branch
		TMMOB Chamber of Agricultural Engineers Antalya Branch
		TMMOB Chamber of Forest Engineers Western Mediterranean Branch
		Alanya Sera-Bir Association
		Culture Routes Society
		Mediterranean Youth Association
		Antalya Industrialists and Business People Association
		Serik Youth Education Culture, Environment and Sport Association
	Residential Areas/Local Communities/Mukhtars/Potentially Project Affected People*	**Antalya/Serik:** Yukarıkocayatak, Aşağıkocayatak, Kayaburnu, Dikmen, Çandır, Aşağıçatma, Burmahancı, Cumalı, Üründü, Deniztepesi, Sarıabalı,and Belpınarı, Neighborhoods
		Antalya/Manavgat: Çakış, Taşağıl, Gündoğdu, Hocalar, Yavrudoğan, Çolaklı, Seki, Kalemler, Evren, Ilıca, Yeniköy, Şişeler, Evrenleryahşi, Dolbazlar, Yukarıışıklar, Dikmen, Bucakşeyhler, Ulukapı, Aşağıışıklar, Demirciler, Karaöz, Aksaz, Hacıali, Cevizler, Sülek, Hacıisalı, Hacıobası, Kızılot, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Odaönü, Karakaya Neighborhoods
		Antalya/Alanya: Alara, Çakallar, İncekum, Avsallar, Akdam, Türkler, Payallar, Emişbeleni, Toslak, Telatiye (Konaklı), Elikesik Neighborhoods
		Users of the pasture located within the License Area of the Project*
	Business Enterprises	Business enterprises located along the route
	Universities	Akdeniz University
		Alanya Alaaddin Keykubat University
		Antalya Bilim University
		Antalya Belek University
		Alanya University

IV.1.2. Field Study Report

The result of the field study is shown in the Table IV.6 . Processes like expropriation, public consultation meetings, working conditions will be advanced according to these results.

Table IV-6. The Result of the Field Study

District	Neigborhood	Findings About Vulnerable Gruops
Serik	Merkez	There is no vulnerable group that does not receive support within the knowledge of the mukhtar. There is a high proportion of Syrian refugees/immigrants living in this neighborhood.

District	Neigborhood	Findings About Vulnerable Gruops
Manavgat	Taşağıl	Since the elderly population in the neighborhood is high and the elderly population in need of care and social assistance is the dominant group, a focus group study was conducted.
Manavgat	Kalemler	A focus group study was conducted since the female population of the neighborhood is dominated by divorced/divorced women. Generally, female heads of households and single women work or their children provide care for those who are unable to work. **It was identified that the house and adjacent agricultural land in the potential impact area of the highway project belongs to a physically disabled household head (male). This person stated that he lives on his own. He stated that there is a risk of losing 95% of his land due to expropriation. Parcels: 136/6, 136/7.
Manavgat	Ulukapı	Considering the neighborhood population, the female household head vulnerable group is in the majority. A vulnerable focus group interview was conducted with female participants.
Manavgat	Hacıisalı	A focus group study was conducted in the neighborhood as the population of women who have lost their spouses/divorced and elderly people in need of care are the dominant group. It was informed that there are 3 people who will lose more than 20% of their total productive area in this neighborhood in the potential impact area of the motorway project. Two people have olive groves and one person has a glass greenhouse on the project route. It was informed that the land and residence of the female-headed household will probably be affected by the project.
Manavgat	Karakaya	Considering the neighborhood population, no dominant vulnerable group has been identified. It was informed that the route of the highway passes through the agricultural land and residence of the disabled person.
Alanya	Alara	There may be farmers who have lost more than 20% of their total productive area due to expropriation.
Alanya	Çakallar	There may be farmers who have lost more than 20% of their total productive area due to expropriation.
Alanya	Akdam	There may be farmers who have lost more than 20% of their total productive area due to expropriation. It was also informed that the land and residence of the female-headed household would likely be affected by the project.
Alanya	Toslak	There may be farmers who have lost more than 20% of their total productive area due to expropriation.
Alanya	Konaklı	There may be farmers who have lost more than 20% of their total productive area due to expropriation.

*Source: ENCON Field Study (2024)

V. STAKEHOLDER ENGAGEMENT PLAN

This part of the SEP introduces the stakeholder engagement plan for the Project Company and gives a detailed description of the disclosure process and timeline. It then presents AAMP's methods and frequencies for stakeholder engagement, along with the proposed stakeholder engagement plan for the construction and operation phases.

V.1. Methods and Tools for Information Dissemination and Stakeholder Engagement

Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. used appropriate methods to disclose information about the planned Project, consult with stakeholders on potential benefits and risks of the planned project and potential adverse impact mitigation measures. Disclosure of relevant project information helps stakeholders better understand the risks, impacts and opportunities associated with the proposed projects. Information will be disclosed using methods, which is suitable for various groups of stakeholders at all project implementation stages. For all disclosure attempts IFC PS1 and EPFI Principle 5 is followed and by doing so, the Project is kept in international standards. The relevant means for consultations with stakeholders with possible timing are provided in Table V.1 .

Different engagement methods are proposed and cover different stakeholder needs as stated below:

- Formal/ informal face-to-face meetings,
- Focus group meetings,
- One-on-one interviews,
- Digital communication tools (including web pages, correspondence by phone/email, WhatsApp, short message service),
- Written materials,
- Grievance mechanism,
- Social Media promotions.

A range of tools are beingutilized for stakeholder engagement under this Project. Stakeholder engagement will continue to utilize these already established communication mechanisms, along with new mechanisms to be used as needed to ensure efficient and effective engagement throughout the lifetime of the Project. The project has and will continue to use the following methods for interacting with stakeholders:

Table V-1. Stakeholder Engagement Plan - Communication Methods with Timing

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
MoTI – General Directorate of Highways (KGM)	●To exchange information and build understanding and consensus on the project progress, implementation of ESIA, SEP, RAP, and other project specific E&S management action plans and procedures. ●To establish implementation responsibilities and coordination mechanism related to project progress and project E&S documents ●To provide necessary information and reporting on relevant and important stakeholder engagement activities and address issues that concern local communities and stakeholders	●Through digital copies of E&S documentation published on Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Through hard copies of E&S documentation (in the format requested by the authority) ●Face-to-face meetings ●Information disclosure and reports, monitoring, permit requests	●KGM (Ankara) ●SPV offices ●Project site offices ●Official correspondence (monthly reports and permits) Project website (https://www.antalyaalanyaotoyolu.com.tr/)	Monthly	●Corporate Senior Management ●SPV – General Manager ●SPV – E&S Manager

[1] The frequency indicated will be valid for the construction phase. Prior to operation phase, the frequency will be updated in consultation with Lenders and IESC.

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
13th Regional Directorate of KGM			●13th Regional Directorate of KGM (Antalya) ●Project site offices ●Official correspondence (monthly reports and permits) ●Project website (https://www.antalyaalanyaotoyolu.com.tr/)	Bi-weekly	●Corporate Senior Management ●SPV – General Manager ●SPV – E&S Manager ●SPV – Expropriation Manager ●EPC – Project Director

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Antalya Regional Heritage Board	●Coordination on the protection and management of tangible cultural heritage during construction and operation stages ●Continuous engagement regarding management, monitoring and assurance of Project impacts on cultural heritage assets, including vibration impacts of blasting and grave relocation ●To notify the ARHB about the cultural heritage sites found in project corridor ●To obtain permits on conducting trial pits, salvage excavations on the cultural heritage sites ●To work in coordination with Board's experts on excavation works as requested by Board	●Face-to-face meetings with the ARHB ●Regular monitoring and reporting by the Project Archaeologist ●Joint review meetings in case of vibration-related findings or heritage risks Joint meetings in case of grave relocation	●Related Cultural Heritage Sites ●Project site offices ●Official correspondence (meeting, permits, letters, reports)	Meetings whenever required (Ongoing throughout Project's construction phase – at least monthly communication)	●Corporate Senior Management ●SPV – General Manager ●SPV – E&S Manager ●EPC – E&S Manager ●EPC - Archaeologist

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Local and Central Governmental Institutions/Agencies (District Governorates, DSI, Forestry and etc.) (see Table IV.5 for other Local Governments)	●To inform regarding Project progress and undertake official correspondence ●To obtain necessary approvals/permits/opinions during project execution	●Through digital copies published on Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Through hard copies (in the format requested by the authority) ●Official correspondence (letters, etc.) ●Face-to-face meetings Information disclosure and reports, monitoring, permit requests	●Official correspondence (permits, letters, reports) ●Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●SPV offices ●Project site offices	Meetings whenever required (Ongoing throughout Project's construction phase – at least monthly communication in case of permits)	●Corporate Senior Management ●SPV – General Manager ●SPV – E&S Manager ●SPV – Expropriation Manager ●EPC – Project Director
AFAD Local emergency services, fire brigades, utility owners and operators, local police, coast guard, health services	●To inform relevant local authorities about Project and undertake official correspondence when needed ●Coordinate on emergency preparedness and response.	●Through digital copies published on Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Official correspondence ● Face-to-face meetings	●Meetings in person and official letters ●Project website (https://www.antalyaalanyaotoyolu.com.tr/)	On a periodic basis and whenever coordination is required for safety or emergency planning	●SPV – HS Manager ●EPC – HS Manager

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Settlement Heads (Mukhtars)	●To provide/exchange up-to-date information about the project in a timely, understandable, manner regarding the following; - Project progress - Potential E&S impacts of the activities (such as blasting) - Expropriation process - Planned stakeholder engagement events ●To collect feedback, grievances, suggestions related with the Project ●To identify specific concerns/issues related to vulnerable persons and women, including gender-based violence and harassment (GBVH).	●Through digital copies published on Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Through hard copies distributed to the offices of the settlement heads and other public places, as appropriate ●Face-to-face meetings ●Phone calls and messaging applications Related brochures and booklets	●Project site offices ●Offices of the settlement heads or other mutually agreed locations in affected settlements ●Project website (https://www.antalyaalanyaotoyolu.com.tr/)	Monthly in each settlement throughout the construction phase Grievance boxes and feedback will be checked on a weekly basis throughout the Project's construction phase	●SPV – E&S Manager ●SPV – Expropriation Manager ●EPC – Project Director SPV – CLOs

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Affected Households		●Through digital copies published on Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Through hard copies distributed to the offices of the settlement heads and other public places, as appropriate ●Face-to-face individual or group meetings Phone calls and messaging applications	●Affected house plot or mutually agreed locations in affected settlements Project website (https://www.antalyaalanyaotoyolu.com.tr/)	Periodically in each settlement throughout the construction phase Grievance boxes and feedback will be checked on a weekly basis throughout the Project's construction phase	●SPV – E&S Manager ●SPV – Expropriation Manager ●EPC – Project Director SPV – CLOs
Women and Vulnerable and members of the local/affected households (see Section IV.1.1 Stakeholder Categorization for vulnerable groups)		●Face-to-face individual meetings Phone calls and messaging applications	Residences of vulnerable households or women or mutually agreed locations in affected settlements	Periodically in each settlement throughout the construction phase Grievance boxes and feedback will be checked on a weekly basis throughout the Project's construction phase	●SPV – E&S Manager ●SPV – Expropriation Manager ●EPC – Project Director SPV – CLOs

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Local/affected businesses		●Through digital copies published on Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Through hard copies distributed to the offices of the settlement heads and other public places, as appropriate ●Face-to-face individual or group meetings Phone calls and messaging applications	●Affected business structures or other mutually agreed locations ●Project website (https://www.antalyaalanyaotoyolu.com.tr/)	In accordance with RAP	●SPV – E&S Manager ●SPV – Expropriation Manager ●EPC – Project Director SPV – CLOs

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Households / local communities / businesses near blasting areas	●To inform residents about upcoming blasting activities and schedules To ensure public safety and awareness regarding vibration, noise, and access restrictions	●Posting blasting schedule on public bulletin boards, in tea/coffee houses, and at mosques. ●Audible announcements through mosques or local loudspeakers. ●Messages or calls via local messaging platforms (e.g., WhatsApp). ●Face-to-face or one-to-one notification meetings with residents of nearby settlements, if any.	●Conducted in person to residents of nearby settlements communication channels, including: ●Bulletin boards ●Mosques or local speakers ●Calls or messaging applications (e.g., WhatsApp)	Prior to each blasting at all relevant sites/settlements: - Public posting: Before blasting starts in each settlement - Messages via messaging platforms: 1–2 days before each blasting - Audible announcements: On the blasting day, before each blasting	●EPC - Basting Chies ●SPV – E&S Manager ●EPC – E&S Manager ●SPV CLOs
Lenders	●To inform and update the Lenders about the project Project's E&S Performance	●Through digital copies published on Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Reporting ●E-mail correspondence ●Phone calls ●Face to face meetings	●Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Project site offices ●Other venues to be agreed upon	Quarterly monitoring site visits during construction (by Lenders or their IESC) Periodic monitoring site visits during operation (by Lenders or their IESC)	●Corporate Senior Management ●SPV – General Manager ●SPV – E&S Manager

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Interested national and local NGOs (see Table IV.5 for NGOs) (Other interested organizations will be added, as identified throughout the life of the Project)	●To provide information on the nature of the Project, duration of the Project, potential environmental, social and economic impacts (positive and negative) ●To potentially help to identify key issues pertaining to the local community (vulnerable groups) and the local environment	●Special engagement methods to be developed based on relevance and interest of stakeholders	●Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Other venues to be agreed upon ●NGO Offices ●Public bulletin boards	As required throughout construction	●Corporate Senior Management
Engagement with the relevant authorities (such as municipal departments, Cemetery Guardian / religious leader, etc.) (for grave relocation)	●To engage with relevant authorities about their responsibilities related to grave relocation ●To have official correspondence, etc., with participation from relevant authorities as needed	●Official correspondence (meetings, phone calls, etc.) ● Face-to-face meetings	●Meetings in person with relevant authorities ●Official correspondence (letter, permits) with relevant authorities	During the gravel relocation planning phase – prior to grave relocation	●Corporate Senior Management ●SPV – General Manager ●SPV – E&S Manager ●EPC – E&S Manager ●EPC - Archaeologist

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Engagement with grave owners (for grave relocation)	●To communicate (one to one) with grave owners and obtain signed consent forms	●Face-to-face meetings	●Mutually agreed locations with grave owners	During the gravel relocation planning phase – prior to grave relocation	●Corporate Senior Management ●SPV – General Manager ●SPV – E&S Manager ●EPC – E&S Manager ●EPC - Archaeologist

Stakeholder	Purpose of Communication / Areas of Information Disclosure	Engagement / Communication Method	Platform	Frequency of Engagement[1]	Responsible
Internal Stakeholders (Contractor and Subcontractor employees)	●To share information on; - Project Standards including Project specific E&S policy and ESMS Documentation - Project-related news - Workers rights and working conditions, - Occupational health and safety requirements ●Ensure successful implementation of the Project SEP including the internal and external grievance and feedback mechanisms (covering in ternal GBVH issues)	●Sharing relevant written documentation with the Project employees (at the time of hiring ●Induction and orientation trainings (at the time of hiring) Toolbox trainings ●Job-specific trainings ●Training on E&S Management System Emergency Preparedness Drills	●Project website (https://www.antalyaalanyaotoyolu.com.tr/) ●Contractor/subcontractor construction camp/facility sites, Camp site accommodation facilities	At the time of hiring At frequencies specified for each engagement method	●Corporate Senior Management ●SPV – General Manager ●SPV – E&S Manager ●EPC – E&S Manager ●SPV – HS Manager ●EPC – HS Manager ●SPV - CLOs

To ensure inclusive and equitable participation in the project lifecycle, the following gender-sensitive engagement measures are being implementing:

- **Targeted Outreach to Women**: Separate consultation meetings with women in each affected settlement, facilitated by female staff at every neigborhood in the Project area without exception from beginning of the construction. .It is defined below at the Stakeholder Engagement Plan Section.
- **Accessible Meeting Formats**: The meetings are organized to start at 10.00 - 11.00 a.m. the most convenient time of the day for women,
- **Trusted Local Channels**: Utilize existing women's networks, cooperatives, health centers, and neighborhood heads to disseminate project-related information.
- **Language and Literacy Considerations**: Use visual materials and oral communication methods to accommodate illiterate and semi-literate women.
- **Safe Reporting Mechanisms**: Design grievance systems that allow confidential reporting of gender-based risks and ensure that women feel secure using these channels.
- The call center with the Grievance Mechanism will have a dedicated contact number for women and ensure that the staff listening to the complaint/request are women.
- **Continuous Feedback Loops**: Review and, where appropriate, integrate women's feedback into project decisions, and provide tailored updates to explain how their input has been addressed.

These measures aim to strengthen social inclusion and minimize unintended harms by addressing the gender-specific barriers that may prevent full participation and benefit sharing.

All neighborhood mukhtars (names of neighborhoods are given below) within the project impact area will be interviewed, active communication will be maintained throughout the construction phase, withthe mukhtars approved, separate Whatsapp groups are established for each district and active communication is ensured.

Before the Public Participation Meetings, meetings held with the neighborhood headmen of each district in Alanya, Manavgat and Serik districts, and information was given about both the project and the public participation meetings.

The WhatsApp groups with Muhtars are been used to inform about the meetings, monitoring the complaint boxes and unexpected developments.

V.2. Specific Communication Strategies

Neigborhoods:

Antalya/Serik: Yukarıkocayatak, Aşağıkocayatak, Kayaburnu, Çandır, Aşağıçatma, Burmahancı, Cumalı, Üründü, Deniztepesi, Sarıabalı, Belpınarı, and Dikmen neighborhoods
Antalya/Manavgat: Çakış, Taşağıl, Gündoğdu, Hocalar, Yavrudoğan, Çolaklı, Seki, Kalemler, Evren, Ilıca, Yeniköy, Şişeler, Evrenleryahşi, Dolbazlar, Yukarıışıklar, Dikmen, Bucakşeyhler, Ulukapı, Aşağıışıklar, Demirciler, Karaöz, Aksaz, Hacıali, Cevizler, Sülek, Hacıisalı, Hacıobası, Kızılot, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Odaönü, Karakaya

Antalya/Alanya: Alara, Çakallar, İncekum, Avsallar, Akdam, Türkler, Payallar, Emişbeleni, Toslak, Telatiye (Konaklı), Elikesik

Table V-2. Serik- Merkez Neigborhood

Category	Details
Target Groups	Local women, refugee women (especially Syrians), elderly residents, small-scale farmers
Identified Barriers and Risks	Women have limited access to formal consultation mechanisms, language barriers (Arabic speakers), time limitations due to domestic responsibilities, and discomfort attending mixed-gender meetings
Recommended Meeting Frequency	Every 3 months during the construction phase
Suggested Venue	S.S. Serik Boğazkent Women's Initiative Production and Business Cooperative or another trusted, central, and accessible space for women such as a municipal social center
Suggested Time	Weekday mornings (e.g., 10:00–11:00) or early afternoon for increased flexibility
Pre-Meeting Notification Method	Physical announcements (posters) at mukhtar offices, women's cooperative, and local grocery stores Bilingual printed materials (Turkish–Arabic) to reach refugee women Coordination with NGOs experienced in refugee engagement and women participation
Suggested Partners |	S.S. Serik Boğazkent Women's Cooperative Serik Municipality's Women and Family Services Unit Local NGOs working with refugee or displaced populations (e.g. Refugees Association, SGDD-ASAM if active locally)

Table V-3. Manavgat- Taşağıl Neigborhood

Category	Details
Target Groups	Women, elderly, low-income households, informal agricultural workers
Identified Barriers and Risks	Strong gendered norms discourage women's active participation; women may perceive they are not allowed or not qualified to speak; informal workers lack official channels to express concerns
Recommended Meeting Frequency	Every 3 months, especially before and after major project milestones
Suggested Venue	Municipal social hall, women's training center (if any), or a local school building temporarily adapted for community meetings
Suggested Time	Mid-morning or early afternoon (when domestic obligations are lower)
Pre-Meeting Notification Methods	Leaflets/posters in Turkish displayed at local market, health centers, mosque entrance, and mukhtar's Office Mosque loudspeaker announcements coordinated with the mukhtar Verbal reminders during market days or in front of local bakeries Tea/snack service and seating arrangement that reduces formality Any active women-led cooperatives or school-parent associations (if discovered later)

Table V-4. Manavgat- Kalemler and Hacısali Neigborhoods

Category	Details
Target Groups	Women, elderly, subsistence farmers, seasonal workers
Identified Barriers and Risks	GBV/SEAH risks due to incoming male construction workers Literacy barriers, especially among elderly women

Category	Details
Recommended Meeting Frequency	Every 3 months, especially in coordination with seasonal work cycles i.e. April-May
Proposed Meeting Venue(s)	Local school building, Open-air gathering space (market place)
Notification Methods (Pre-Meeting)	• Mosque loudspeaker announcements coordinated with the mukhtar • Printed flyers distributed at local markets and shops • Word-of-mouth through health workers or midwives • WhatsApp messages forwarded via local grocery shop owners
Suggested Partners	• Mukhtar's office • Local schoolteachers or volunteers • Community health workers or nurses • Religious leaders or imams (to increase neutrality and reach)

Table V-5. Alanya- Toslak and Konaklı Neigborhoods

Category	Details
Target Groups	Refugee/migrant women (Arabic speakers), seasonal workers, low-income families, elderly
Identified Barriers and Risks	• Language barrier (Arabic speakers with limited or no Turkish) •Limited mobility for women due to social norms and safety concerns • GBV and SEAH risks related to incoming male labor force
Recommended Meeting Frequency	Every 3 months; more frequently during peak construction or labor influx periods
Proposed Meeting Venue(s)	Local school building, Open-air gathering space (market place)
Notification Methods (Pre-Meeting)	Bilingual flyers (Turkish–Arabic) distributed at grocery shops, mosque entrance, and via female market vendors Mosque loudspeaker announcements coordinated with the mukhtar In-person outreach by social workers, local women representatives, or trusted Arabic-speaking NGO staff Door-to-door info sharing by female CLO or female municipal outreach staff
Suggested Partners	• Municipality's Women and Family Services • Local Arabic-speaking outreach volunteers • NGOs working with refugee/migrant communities (e.g. ASAM, IBC, CARE if present) • Local health unit or midwife, local female health staff network

Table V-6. Serik- Çandır, Aşağıkocayatak and Kayaburnu Neigborhoods

Category	Details
Target Groups	Yörük families (especially women), agricultural workers, elderly residents
Identified Barriers and Risks	• Seasonal mobility due to Yörük transhumance (yayla migration) • Low formal education and digital connectivity • Limited visibility of women in public consultation processes • Male-dominated decision-making structures • Safety concerns during yayla migration especially for women
Recommended Meeting Frequency	Twice per year: once before migration (spring) and once after return (early autumn) Also, every 3 months for stayers
Proposed Meeting Venue(s)	• Mukhtar's garden or shaded outdoor space • Mosque courtyard (off-prayer hours) • Nearby school building or mobile tent

Notification Methods (Pre-Meeting)	• Personal outreach via mukhtar and Yörük elders (aksakallar) • Announcements via mosque and village gatherings • Informal visits by community liaison team a few days before the meeting • Verbal invitation delivered through animal feed sellers or shepherds' network • Women-to-women verbal invitations via relatives
Suggested Partners	• Mukhtar and community elders • Local agricultural cooperatives • Nomadic family associations (if any) • Female outreach staff or locally respected women (e.g., imam's wife, elder women)

Special communication channels may need to be developed for some disadvantaged groups. Different disadvantaged groups can be targeted through home visits or phone calls for individuals who cannot leave their homes; visually oriented leaflets and phone calls for illiterate individuals; leaflets and posters in different languages.

Among the vulnerable groups potentially affected by the Project are nomadic Yörük families, refugee/migrant women, the elderly, subsistence farmers, and seasonal workers, all of whom face various social, cultural, and economic barriers.

The seasonal migration patterns of the Yörük communities make it difficult for them to access information meetings, while women's participation in public consultation processes is often limited by traditional gender norms. Therefore, it is planned to hold at least two information meetings annually-before and after migration-and to organize these meetings in familiar community spaces such as the village head's (mukhtar's) yard, mosque courtyards, or mobile tents. The notification process will be conducted through mukhtars, community elders, herder networks, and verbal communication among women. Additionally, mobile teams will visit highland settlements (yaylas), safe transportation support will be provided for women, and female CLO will be actively involved in the process.

For refugee and migrant women, the main barriers identified are language limitations, restricted mobility, and the risk of gender-based violence (GBV/SEAH). Meeting announcements will be made via bilingual Turkish-Arabic-Kurdish brochures, and face-to-face outreach will be carried out by trusted local Arabic-speaking actors. In addition, special consultation sessions for women will be organized, focus group discussions with interpreter support will be held, and mobile support teams and psychosocial assistance mechanisms will be introduced to address SEAH risks.

Among elderly individuals and low-income women, low literacy rates and traditional norms that discourage women from speaking publicly reduce active participation. Therefore, meetings are already planned to be held in the late morning or near noon, with tea/snack services provided to create an informal and welcoming atmosphere. In addition to brochure distribution, home visits will be conducted. Furthermore, to increase women's participation, neighborhood-based mini women's advisory groups will be established and regular women-only information sessions will be organized.

A common challenge for all these groups is the hesitancy and distrust related to accessing grievance and feedback mechanisms. Therefore, it is essential to enhance awareness of the Grievance Mechanism (GM), with installed locked complaint boxes to allow for anonymous submissions, and introduce female CLO members who handles complaints submitted by women. Additionally, it is recommended to display simplified visual explanations of the grievance process, including the follow-up, resolution, and feedback loops, on community bulletin boards.

V.3. Operation Phase Community Engagement Plan (Post-Construction)

The stakeholder engagements developed during the construction process will be used effectively both in terms of public participation and authorized institutions, like NGOs and trade unions, and the communication and relations will continue to be used during the operation phase.

Table V-7. Operation Phase Focus Category

Category	Operation Phase Focus
Communication Objective	Ensure that vulnerable community members (women, elderly, children, pastoralist groups) are informed and can provide feedback on operational impacts such as traffic safety, access restrictions, and long-term social concerns.
Frequency of Communication	Twice per year (at minimum): Spring (prior to tourism and migration season) Autumn (after peak seasonal activity) Additional ad-hoc meetings in case of complaints or operational disruptions.
Communication Methods	Posters and flyers at local hubs (muhtar, mosque, health centers) WhatsApp messages and voice notes via community focal points Public information sessions when relevant (e.g., new signage, access road changes) Mobile info team visit once a year per settlement (if available)
Ongoing Risks / Key Topics	Road safety (especially for children, elderly, school routes) Access to agricultural land for women and small farmers Yörük livestock migration coordination and crossing points Street lighting needs in isolated or unlit areas Gender-based violence (GBV) risks around roadside zones Bus stop placements and pedestrian safety for women and elderly
Feedback & Grievance Channels	Maintain grievance redress mechanism (GRM) Add suggestion box in local gathering points (especially for women) Use female CLO or trusted female intermediary for verbal reporting
Partners and Outreach Actors	Mukhtar offices School teachers and health workers Local women's cooperatives Elder women or pastoralist representatives Municipal transport and safety units

V.4. Schedule and Timetable

The method, timing and form of activities for stakeholder engagement activities given in the previous section are detailed in Table V.1 .

In addition to this SEP, the RAP prepared for the Project separately includes a detailed Stakeholder Engagement Action Plan for RAP disclosure and implementation phases, which will be implemented in alignment with this Project SEP.

VI. ROLES AND RESPONSIBILITIES

The anticipated activities in the SEP will be conducted and completed by Project Company and KGM. In activities such as the grievance mechanism, Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. will be responsible for following requests, suggestions and complaints, and in the upcoming process, AAOİAŞ will fulfil the requirements by being responsible for this mechanism in accordance with the IFC PS1, EPFI Principle 5 and Principle 6.

The implementation of this SEP will be conducted and monitored by Project Sponsor's Environmental and Social Manager who is responsible to appoint the Social Chief and the Environment and Social Deputy Manager to be responsible for the stakeholder engagement for the Project, implementation of this SEP and grievance management. The Social Chef and the Environment and Social Deputy Manager will perform the following functions:

- Information disclosure and obtaining feedback;
- Processing, managing and tracking grievances, including ensuring timely responses to and closure of grievances;
- Control over the implementation of the corrective actions to remedy grievances;
- Regular review and if necessary, update of the SEP and stakeholder engagement mechanism to ensure it is effective and reflects Project circumstances;
- Participation in discussion on responses and the resolution of disputes, and
- Assistance in the preparation of the Environmental and Social Performance Reports.

Depending on the complexity of issues, Project Sponsor's project management and experts of KGM may also be involved.

VII. GRIEVANCE MECHANISM

VII.1. Purpose of the Grievance Mechanism

The purpose of this mechanism is to establish a system for handling, evaluation and resolution of all kinds of internal and external grievances, concerns, queries and proposals of the affected communities and other stakeholders, such as construction workers, regarding the project activities.

Managing grievances, including avoiding and minimizing them as well as effective handling, is an integral part of a sound stakeholder engagement strategy. Experience shows that significant numbers of grievances arise from misunderstandings, and that such grievances can be avoided, or their numbers reduced, through proactive and consistent engagement with communities. Engagement also helps anticipate and review community concerns to prevent them from escalating into grievances.

In accordance with IFC PS 2 and EPFI Principle 6, a process is established by which people who deem that they have been adversely affected by the Project during planning, construction or operation can bring grievances to the Project for consideration and, if required, resolution. A specific Project grievance mechanism (GM) is beneficial in addressing community and individual concerns and complaints before they escalate beyond control.

VII.2. Responsible Stakeholders

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. is responsible for implementing the grievance mechanism during the land preparation and construction and operation phases.AAOİAŞ has to ensure that the grievance mechanism is implemented effectively.

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. Community Liaison Officers (CLOs), under the supervision of the Social Chief and Environment and Social Manager, are responsible for receiving and managing grievances, coordinating the actions to be taken for resolution, and keeping proper records. The Environment and Social Manager is responsible for compiling and reporting grievance-related information to the General Directorate of Highways (KGM).

VII.2.1. Grievance Mechanism at the National Level

Presidency's Communication Centre:

The Presidency's Communication Centre (CIMER) provides a centralized complaint system for Turkish citizens, legal persons and foreigners. CIMER only allow applications in Turkish. Contact details of CIMER are given in Table VII.1 .

Through CIMER, applicants can direct their requests directly to the relevant authorities. The requests submitted to CIMER are resolved within 30 days. If the applicants do not receive feedback within this period, they can re-submit their grievance to CIMER or elevate it to the Ombudsman Institution (www.ombudsman.gov.tr).

Table VII-1. Contact Details of CIMER

Webpage:	www.CIMER.gov.tr/ www.turkiye.gov.tr/
Call Centre (hotline):	150
Phone number:	+90 312 590 20 00
Fax number:	+90 0312 473 64 94
Official Letter/Petition:	Republic of Türkiye, Directorate of Communications T.C. Cumhurbaşkanlığı Külliyesi 06560 Beştepe/ Ankara
Individual Application:	Community relations desks at governorates, ministries and district governorates.

CIMER will be available to Project stakeholders as an alternative and well-known channel for conveying their Project-related grievances and feedback directly to state authorities.

Foreigners Communication Centre:

The Foreigners Communication Centre (YIMER) provides a centralized complaint system for foreigners. YIMER will be available to Project stakeholders as an alternative and well-known channel for conveying their Project-related grievances and feedback directly to state authorities. Contact details of YIMER are given in Table VII.2 .

Table VII-2. Contact Details of YIMER

Webpage:	www.YIMER.gov.tr
Email:	YIMER@goc.gov.tr
Call Centre (hotline):	157
Phone number:	+90 312 515 11 22
Fax number:	+90 312 920 06 09
Official Letter/Petition:	Republic of Türkiye General Directorate of Migration Management, Çamlıca Mahallesi 122. Sokak No: 4 Yenimahalle/ Ankara
Individual Application:	Republic of Türkiye General Directorate of Migration Management

VII.2.2. Community Grievance Mechanism at the Project Level

The main aim of the community grievance mechanism is to assist in resolving complaints and grievances in a timely, effective, and efficient manner that satisfies all parties involved. The GM is intended to serve as a mechanism to:

- Allow identification and impartial, timely and effective resolution of issues affecting the project,
- Strengthen accountability of the beneficiaries, including project-affected stakeholders, and,
- Provide channels for the stakeholders to provide feedback and raise concerns.

External stakeholders can initiate the grievance/comment mechanism by using the following methods:

- Grievance/comment boxes and forms have been placedin public places including places commonly/ comfortably visited by women)
- Verbally during face-to-face meetings/visits to be held by the Project personnel (e.g. chiefs/ managers, CLOs)
- CLO's contact numbers have been shared with the mukhtars and also information leaflets have been hanged in each neighborhood sharing the contach information of the CLO's.
- E-mail (the e-mail address for the submittal of grievances/comments have been shared with the local communities.
- Website (with the anonymous option)

On the website of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. there is a Contact page which is available in Turkish and English (https://www.antalyaalanyaotoyolu.com.tr/). The grievances/requests related to Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş activities can be communicated through this page and the resolution process is followed. The page includes information on email, phone number and mailing address of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. Name e-mail address, telephone number and explanation/message/grievance could be entered in the online platform. Notification that the application has been received is made via e-mail address.

If the grievance/comment holder would like to fill out the form Annex-1 anonymously, the form will allow the grievance/comment holder to file it without any personal contact information. For grievances/comments received verbally in person, the Project representatives will request the grievance/comment holder to fill in the form himself/herself by providing the required guidance, where necessary. If the grievance/comment holder wishes the form to be filled out by the Project representatives, they will fill the form on behalf of the grievance/comment holder. In such cases, the grievance/comment holder will be required to read the filled form and both the grievance/comment holder and the Project representative who filled in the form will be required to approve and sign the form. The Project representative will provide a copy of the filled form to the grievance/ comment holder stakeholder. The CLO will ensure that the grievance/comment forms are collected from the grievance/comment boxes weekly.

Grievance boxes and information leaflets were placed in all affected neighborhoods at mukhtar's offices and the installation have been completed. An example of the installed grievance mechanism is shown in Figure VII.1.



Figure VII-I The Grievance Box and Information Leaflets at Mukhtar's Office

The office in Serik, where the address is written, also works as an information office: ORTA, BELEK CADDESI, NO: 7, IÇ KAPI NO: 9 SERIK/ANTALYA. The temporary construction site can also be used as an information office.

Within the scope of the project, Community Liaison Officers (CLOs) started to work within SPV. In addition, a call center has been established and can be reached at 0850 202 07 07.

The roles and responsibilities of Community Liaison Officers (CLOs) are presented in Table VII.3.

Table VII-3. Roles and Responsibilities of the Community Liaison Officer (CLO)

Role	Responsibilities
Community Liaison Officer (CLO)	• Inform the public about the scope, progress, and potential impacts of the Project. • Organize and facilitate regular community meetings, focus group discussions, and engagement forums. • Maintain open communication channels with project-affected persons (PAPs), community leaders, and local institutions. • Develop and distribute communication materials tailored to various community audiences. • Ensure that all internal and external complaints, including those under the Stakeholder Engagement Plan (SEP), are managed in line with the Grievance Mechanism (GM). • Log, track, and resolve complaints and appeals in a timely and respectful manner. • Provide regular training to site personnel during the construction phase. • Conduct regular internal audits and report non-conformities. • Ensure that non-conformities are recorded and promptly addressed. • Participate in the development and follow-up of corrective and/or improvement actions. • Report on the implementation performance of this Plan. • Support the review and update processes of this Plan. • Ensure that lessons learned and field experiences are reflected in plan revisions and training updates. • Collaborate with Health & Safety (H&S) and Social teams to address cross-cutting issues. • Facilitate resolution of community disputes or concerns related to project activities. • Assess how vulnerable or marginalized groups may be affected by the Project.

Role	Responsibilities
	• Propose mitigation measures or tailored engagement approaches for at-risk or underrepresented populations. • Ensure equitable participation in consultation processes, particularly for women, youth, elders, and people with disabilities. • Support the monitoring and recording of the implementation of the social related issues, including activities carried out by subcontractors. • Support the evaluation of the SEP's implementation performance and community feedback • Contribute to regular internal audits and the reporting of non-conformities. • Ensure that relevant non-conformities are recorded and addressed immediately. • Participate in the development of corrective and/or improvement actions and support their follow-up. • Support the periodic review and update of the SEP and related procedures in coordination with the E&S Manager. • Provide input to lessons learned from engagement outcomes and grievance trends. • Maintain up-to-date records of all stakeholder meetings, grievances, resolutions, and community commitments. • Submit routine reports to the Social Chief and/or E&S Manager summarizing community feedback, grievance status, and engagement Milestones. Ensure confidentiality and proper data handling, especially for sensitive community issues.
Social Chief	• Supervise and mentor CLOs, ensuring their work aligns with project priorities and stakeholder engagement strategy. • Develop and implement work plans and schedules for the CLO team. • Ensure consistent messaging, processes, and reporting methods across all field teams. • Conduct regular team meetings to review community issues, grievances, engagement outcomes, and field updates. • Lead the implementation of the Stakeholder Engagement Plan (SEP) and ensure it reflects community realities. • Oversee the planning and execution of community consultations, public meetings, and disclosure activities. • Ensure that engagement activities are inclusive of vulnerable and marginalized groups. • Build and maintain positive, trust-based relationships with local communities, leaders, and institutions. • Supervise the effective functioning of the grievance mechanism (GM) at community and project levels. • Ensure all grievances are recorded, processed, and resolved in a timely and transparent manner. • Analyse grievance trends and escalate systemic issues to the E&S Manager. • Contribute to the continuous improvement of the GRM process based on community feedback and internal review. • Monitor the performance of social engagement activities and their compliance with SEP objectives. • Ensure accurate, timely, and complete reporting of CLO activities, stakeholder interactions, and grievance outcomes. • Review and validate weekly/monthly reports from CLOs and prepare consolidated updates for senior management. • Ensure all engagement activities meet national regulations and international standards (e.g., IFC PS, Equator Principles). • Identify training needs and deliver or coordinate training for CLOs on stakeholder engagement, conflict resolution, and field documentation. • Promote professional development and capacity building within the social team. • Train subcontractors and relevant staff on community interaction protocols and grievance management. • Contribute to the development, review, and periodic updating of the SEP and related social management plans. • Ensure CLOs support the implementation and documentation of these plans at the field level. • Support the integration of lessons learned into updated plans and engagement strategies. • Coordinate with the E&S Manager, E&S Specialists, H&S, legal, and construction teams to address community-related impacts.

Role	Responsibilities
	• Support alignment between community concerns and project execution through proactive communication with technical departments. • Contribute social performance inputs to reports for lenders, regulators, and corporate leadership.

The Community Liaison Officers (CLOs) appointed within the Project hold undergraduate and/or postgraduate degrees in disciplines such as sociology, social policy, public relations, and other social sciences. With both strong academic backgrounds and practical experience, they significantly contribute to the effective implementation of environmental and social management processes. In total, three experts are expected to undertake the role of CLOs within the scope of the Project.The CLOs work under the supervision of the Social Chief, who has extensive experience in stakeholder engagement, coordination with local NGOs and public institutions, gender-sensitive approaches, and the implementation of social development and awareness-raising initiatives in line with national legislation and IFC Performance Standards.

In addition to meeting the above-mentioned qualifications, the current CLOs also possess practical knowledge of social performance management in accordance with World Bank and IFC standards. These experts play an active role in areas such as social impact management, establishment and monitoring of grievance mechanisms, stakeholder engagement processes, gender-sensitive approaches, field research, reporting, and communication. Their key competencies include reporting, problem-solving, leadership, data processing with SPSS, engaging with communities, expertise in child and women's rights programs, and compliance with relevant national and international regulations.

Furthermore, the experts have completed various training and certification programs in areas such as "Community Engagement and Gender-Based Violence Prevention," "Stakeholder Engagement," "Digital Literacy," "Family Counseling," "NLP," and "Play Therapy," thereby enhancing their professional skill sets. The Social Chief has also received adequate training in handling sensitive grievances, ensuring that such cases are managed with professionalism, confidentiality, and care.

In addition to the Project-level Grievance Mechanism, affected people may also raise concerns regarding the Project's compliance with AIIB's Environmental and Social Policy through the *AIIB Project-affected People's Mechanism (PPM)*.

The PPM provides an independent and impartial channel for project-affected people to submit complaints if they believe they have been, or are likely to be, adversely affected by AIIB-financed projects. Complaints can be submitted in writing, by email, or online through AIIB's official website.

Information about the PPM, including submission procedures and contact details, will be made available to local communities through the regular community meetings held monthly and through printed materials (e.g. grievance mechanism brochures, notice boards).

Complaints can be submitted online via the official PPM webpage https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism, by email to ppm@aiib.org, or in writing to the following address:

Managing Director, Complaints-resolution, Evaluation & Integrity Unit (CEIU)
Asian Infrastructure Investment Bank (AIIB)
Tower A, Asia Financial Center, No. 1 Tianchen East Road,
Chaoyang District, Beijing 100101, People's Republic of China

Detailed information on the PPM's procedures, submission form, and eligibility criteria is available on the AIIB website. Affected people are generally encouraged to first utilize the Project's community grievance mechanism before contacting the AIIB, unless there are valid reasons to believe that doing so would be ineffective or unsafe.

VII.2.3. Worker's Grievance Mechanism

The main aim of the worker's grievance mechanism is to ensure that all project workers have access to a fair, transparent, and accessible process for raising and resolving workplace-related concerns in a timely, effective, and confidential manner. The worker's grievance mechanism is intended to:

- Enable workers to raise employment-related concerns, complaints, or suggestions and ensure their impartial, timely, and effective resolution,
- Promote accountability of the employer and management towards fair treatment and workplace rights,
- Provide clear channels for workers to safely provide feedback and report issues without fear of retaliation.

Workers who report violations such as forced labor, mistreatment, or wage exploitation within the scope of the Project shall be protected against any form of retaliation in line with IFC Performance Standard 2 and IFC's Good Practice Note: Addressing Risks of Retaliation Against Project Stakeholders (2021). To this end, the grievance mechanism is designed to allow for anonymous submissions. Workers will be able to submit grievances safely either through anonymous online forms available on the Project website or via locked complaint boxes installed at the Temporary Const. Site, Viaduct 4, Viaduct 8, T-5 Entry, Viaduct 12, and in HRM32 - Registered Archaeological Site. As part of this process, the Internal Grievance Form provided in Annex-2 will be used to ensure that complaints are collected and evaluated in a standardized format. Additionally, the procedural steps established for the grievance mechanism will apply to both internal and external complaints (Table VII.5). In addition, workers may submit their grievances and feedback by calling the toll-free line 0850 202 07 07 or by visiting the Information Office.

During the grievance review process, the identity of the complainant will remain strictly confidential and will be stored in encrypted systems accessible only to designated Community Liaison Officers (CLOs), and will not be shared with other managers under any circumstances. Meetings related to sensitive issues will be conducted exclusively by authorized social specialists, in private and secure settings, to ensure the safety and privacy of the complainant. Any adverse actions taken against a complainant following the submission of a grievance - such as reassignment, wage deduction, intimidation, or exclusion - will be treated as retaliation. In such cases, disciplinary proceedings will be initiated against the responsible individuals, and contracts with subcontractors may be suspended or terminated if necessary. The effectiveness of these procedures will be monitored by CLOs, and any potential retaliation incidents following grievance submissions will be tracked, documented, and reviewed.

VII.2.4. Gender-Sensitive Accessibility to the Grievance Mechanism

To ensure equitable access to the Grievance Mechanism (GM), gender-specific challenges have been identified across affected communities in Serik, Manavgat, and Alanya. Women, especially those in rural or conservative settings, often face social, mobility, and communication barriers that limit their ability to file formal complaints.

Barriers identified include:

- Limited mobility due to unpaid care work and household responsibilities
- Lack of awareness of complaint channels, particularly among refugee or elderly women
- Discomfort speaking in male-dominated spaces or to male project staff
- Low literacy or digital skills
- Cultural norms discouraging women from voicing dissatisfaction publicly

Table VII-4. Gender-Sensitive Accessibility to the Grievance Mechanism

Measure	Description
Female CLOs or trusted intermediaries	Women will have the option to submit grievances through female liaison officers or locally respected women (e.g., women cooperative members or mukhtar's wife)
Anonymous feedback channels	Lockable complaint boxes in women-accessed locations (e.g., cooperatives, health centers) and verbal relay via trusted mediators
Outreach using local networks	Use of female-focused WhatsApp groups and word-of-mouth messaging to raise awareness of the GM
Language support	Bilingual grievance forms (Turkish and Arabic) for refugee women in areas like Serik and Toslak
Verbal grievance intake	Women will be allowed to submit complaints orally, especially in low-literacy or elderly populations (e.g. Kalemler, Hacısali)
Culturally appropriate meeting spaces	Women-only consultation sessions where grievances and concerns can be voiced safely and privately
Communication Line	A separate hotline will be set up for women, and it will be explained through CDCs and leaflets that the person answering the phone is a woman and will listen to complaints anonymously, without prejudice or comment, and that complaints will be recorded according to the request

Table VII-5. Procedural Steps of Grievance Mechanism

Step	Description of Process	Time Frame	Responsibility
GM implementation structure	There exist two Grievance Mechanism at the National Level: ● Presidency's Communication Centre and ● Foreigners Communication Centre	-	Presidency's Communication Centre, and Foreigners Communication Centre and related authorities, CLO
Grievance uptake	Grievances can be submitted via the following channels: ● Telephone ● Verbally ● E-mail ● Website ● Grievance/comment boxes ● Letter to Grievance focal points at local facilities Complaint form to be logged via any of the above channels ● Walk-ins may register a complaint in a grievance logbook at a facility or suggestion box Anonymous Grievances can be submitted via the following channels: ● Telephone ● Letter to Grievance focal points at local facilities ● Grievance box in headman's office and the camp sites ● Website	CLO must open grievance boxes every week during the construction phase and every 30 working days during the operational phase	CLO
Sorting, processing	Any complaint received is forwarded to Environment and Social Manager and SPV General Manager, Logged in the Grievance	Within 3 business days of receipt	CLO

Step	Description of Process	Time Frame	Responsibility
	Log, and categorized according to the complaint types[2]: If the complaint is assessed to be out of the scope of the Grievance Mechanism, a grievant will be notified through the desired communication method and an alternative mode of solution will be suggested.		
Acknowledgement and follow-up	Receipt of the grievance is acknowledged to the complainant by CLO through a personal meeting, phone call or letter as appropriate, within a target of 3 business days after submission. If the grievance is not well understood or if additional information is required, clarification will be sought from the complainant.	Within 3 business days of receipt	CLO
Verification, investigation, action	Investigation of the complaint is led by Environment and Social Manager and SPV General Manager. The SPV General Manager s notified of Level 1, 2 or 3 grievances. The Social Chief, as appropriate, support the Environment and Social Manager in deciding who should deal with the grievance and determines whether additional support for the response is necessary. A proposed resolution is formulated by Social Chief, as appropriate, supports the Environment and Social Manager and is communicated to the complainant by CLO through the grievance/comment close-out form.	Responses within 30 business days of receipt	SPV General Manager, E&S Manager, Social Chief, Community Liaison Officers
Monitoring and evaluation	Data on complaints are collected in a database and reported to SPV General Manager, Environment and Social Manager and AAOİAŞ HQ every three months	Quarterly	CLO

[2] *Level 1 Complaint: A complaint that is isolated or 'one-off' (within a given reporting period - one year) and essentially local in nature.*

Note: Some one-off complaints may be significant enough to be assessed as a Level 3 complaint e.g., when a national or international law is broken (see Level 3).

Level 2 Complaint: A complaint that is widespread and repeated (e.g., noise from the facilities, dust, etc.).

Level 3 Complaint: A one-off complaint, or one which is widespread and/or repeated that, in addition, has resulted in a serious breach of the Project's policies or National law and/or has led to negative national/international media attention, or is judged to have the potential to generate negative comment from the media or other key stakeholders (e.g., inadequate waste management).

Step	Description of Process	Time Frame	Responsibility
Provision of feedback	Feedback from complainants regarding their satisfaction with complaint resolution is collected by CLO through phone calls or face-to-face interviews.	15 business days after the implementation of the resolution	CLO

Once all possible means to resolve the complaint have been proposed and if the complainant is still not satisfied, then they should be advised of their right to legal recourse including the right of petition, right to information and appeal to the ombudsperson (constitution, article 74) and right to constitutional complaint (constitution, article 148).

In addition to the project's GM for its internal and external stakeholders, EP 6: Grievance Mechanism requires the establishment of a Workers' Grievance Mechanism (WGM) for the project workers. The project workers will use the WGM to convey their concerns or suggestions regarding their working conditions and workplace. The Worker Grievance Mechanism is defined as the mechanism that receives complaints from Project employees (including both direct and indirect employees).

Any comments or concerns will be brought to the Company's attention verbally or in writing (by post or e-mail) or by filling in a grievance form. The grievance form is available on the Company website, at the Project site, at the mukhtar's office, alongside a description of the grievance mechanism. All grievances will be:

- Acknowledged within seven days after receipt;
- Responded no later than within 30 business days after receipt, and
- Specifically, nominated and trained members of staff will record grievance information in a grievance register. The information in the grievance register will include Stakeholder name and contact details and details of the grievance and how and when it was submitted, acknowledged, responded to and closed out.

Individuals can request the right to have their names kept confidential, and this mechanism does not preclude the right for stakeholders to process grievances through other judicial means.

- Step 1: Receipt of grievance and registering of grievance (3 business days),
- Step 2: Assessment,
- Step 3: Acknowledgement of grievance (acknowledged within 3 business days after receipt),
- Step 4: Investigation and resolution of grievance,
- Step 5: Closure; and (3 0 business days)
- Step 6: Outcome of the corrective action (15 business days after completion).

Appeals Committee

In case the complainants are not satisfied with the decision of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş and/or EPC on their complaints, they can refer to the Appeals Committee via Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş social impact team.

Appeals Committee consisting of Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş management teams is responsible for ensuring grievance mechanism is effectively managed. Furthermore, the committee will directly investigate and respond grievances as well as grievances that are not closed when complainant refuses the corrective actions, or the actions are not closed on time.

The mandate of the Appeals Committee covers considering complaints on the issues listed below (excluding those related with Labor Law and Expropriation Law):

- Unsolved grievance related to damage to environment,
- Unsolved grievance related to damage to public assets and infrastructure,
- Unsolved grievance related to damage to private assets (land, crops, houses etc.),
- Unsolved grievance related to impacts on livelihood.

The Appeals Committee carries out the following tasks:

- Meeting at least once a month or more often depending upon the existence of unresolved disputes,
- Reviewing the complaints by hearing both complainants and LİMAK and/or EPC
- Investigating the complaints in accordance with project requirements, LİMAK Policies, legal framework and referring to relevant expertise where required,
- Preparing an evaluation report based on the inquiries,
- Making a proposal on resolution of the disputes between parties.

The decision of the Appeals Committee is not binding and if parties do not agree on the Appeals Committee proposal, they still have the opportunity to either negotiate or litigate.

The Appeals Committee consists of the following members:

- SPV General Manager
- Health and Safety Manager
- Environment and Social Manager
- Expropriation Manager
- Social Chief
- Community Liaison Officer
- Matter Expert, if required
- Relevant NGO officer or village leaders

The grievance mechanism will be widely announced to the public with stakeholder meetings held for project affected communities. Additional meetings will be organized to target women PAPs and vulnerable groups for sharing information on grievance mechanism that also allows anonymous grievances. The grievances will be reviewed by the team according to the Project human rights and grievance mechanism.

The relationships developed through effective stakeholder engagement activities and the involvement of local organizations in the appeals committee will reduce concerns about objectivity and ensure a more transparent process for the grievance mechanism and the right to appeal.

Rules and Procedures of the Appeals Committee

1. Purpose and Scope

This manual outlines the procedures and operating rules of the Appeals Committee established under the grievance mechanism of the Antalya-Alanya Motorway Project. The purpose of the Appeals Committee is to ensure an effective, transparent, and fair review of grievances that remain unresolved or are not accepted by the complainant after the initial resolution process.

The Committee is responsible for investigating grievances that fall under its mandate, ensuring alignment with project policies, applicable legislation, and international environmental and social standards.

The Appeals Committee shall consider complaints unresolved by Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş and/or EPC, specifically on the following issues (excluding matters under Labor Law or Expropriation Law):

- Environmental damage
- Damage to public assets and infrastructure
- Damage to private property (land, crops, houses, etc.)
- Impacts on livelihood

2. Committee Structure and Responsibilities

The Appeals Committee includes the following members:

- SPV General Manager (Chair)
- Health and Safety Manager
- Environment and Social Manager
- Expropriation Manager
- Social Chief
- Community Liaison Officer
- Subject Matter Expert (as needed)
- Representative of local NGOs or village leadership

The Committee may invite additional stakeholders or technical advisors as needed, based on the nature of the grievance under review.

The Committee is responsible for the following tasks:

- Reviewing unresolved or escalated grievances submitted via the Social Impact Team.
- Ensuring complainants are heard fairly and respectfully.
- Conducting investigations in line with project requirements, legal frameworks, and LİMAK Group's environmental and social policies.
- Seeking input from technical experts and community representatives where appropriate.
- Developing reasoned proposals to resolve disputes.
- Preparing detailed evaluation reports for each reviewed grievance.

3. Implementation

- Appeals must be submitted to the CLOs, which will forward them to the Appeals Committee Secretariat.
- Appeals are logged, assigned a case number, and acknowledged within 5 working days.
- The Committee shall meet at least once a month, or more frequently if required by the number or urgency of unresolved grievances.
- The Committee verifies the grievance falls under its mandate.
- Both the complainant and the project/EPC representatives are given the opportunity to present their perspectives.
- The Committee may conduct site visits, consult experts, and review relevant documentation.
- Committee members engage in internal review processes in a confidential manner and aim to reach decisions through consensus wherever possible."
- A written resolution proposal is shared with both parties within three (3) business days following the Committee meeting.
- The grievance case documentation, including the Committee's findings, rationale, and resolution recommendations, is securely archived and integrated into the project's grievance monitoring and reporting system.
- All Committee members shall maintain strict confidentiality.
- Any member with a potential conflict of interest must recuse themselves from the specific case.
- The effectiveness of the Appeals Committee and its procedures will be reviewed annually.
- Lessons learned will be incorporated into future updates of this manual and SEP revisions.

Grievances Related GBV/SH/SEA

To properly address SEA/SH risks, the GM will be in place prior to contractors mobilizing. For GBV- and particularly SEA/SH-complaints, there are risks of stigmatization, rejection and reprisals against complainant. This creates and reinforces a culture of silence so complainant may be reticent to approach the project directly. To enable women to safely access the GM, multiple channels through which complaints will be registered in a safe and confidential manner will be enabled. These channels will be designed to respect privacy, ensure accessibility, and allow for anonymous reporting, using approaches such as - but not limited to - confidential verbal reporting, written submissions, or digital tools, depending on the local context and available resources.Anonymous submissions are accepted and processed with the same level of seriousness.

The Social Chef and CLO is ensure on how to collect SEA/SH cases confidentially and empathetically (with no judgement). Where possible, at least one female CLO shall be available to receive SEA/SH-related complaints.

The Project has multiple complaint channels. No identifiable information on the survivor will be stored in the GM and all data related to GBV/SH/SEA grievances will be handled and stored securely in accordance with applicable data protection laws and the AAOİAŞ's confidentiality policies. The GM will not ask for, or record, information on more than the following related to the SEA/SH allegation:

- The nature of the complaint (what the complainant says in her/his own words without direct questioning);
- If, to the best of the survivor's knowledge, the perpetrator was associated with the project;
- If possible, the age and sex of the survivor; and
- If possible, information on whether the survivor was referred to services.

In line with IFC's Good Practice Note: Addressing Risks of Retaliation Against Project Stakeholders (2021),the information in the GM will be confidential-especially when related to the identity of the complainants or witnesses. Any form of retaliation against individuals submitting GBV/SH/SEA grievances is strictly prohibited. Such actions may result in disciplinary measures for company personnel and, where applicable, appropriate contractual follow-up or escalation with third-party actors, including contractors and service providers.

Complainants will be informed about and referred to appropriate support services, such as medical care, psychosocial support, legal aid, or protection services. AAOİAŞ will maintain an up-to-date referral list of local service providers for this purpose.

GBV/SH/SEA grievances will be acknowledged within 3 business days and resolved as quickly as possible, with sensitivity to the emotional and physical needs of the Complainants. Complainants shall be informed of outcomes or steps taken, as appropriate and with their consent.

All GBV/SH/SEA grievances will be documented separately and securely, with access limited to authorized personnel. Non-identifiable summary data may be used for monitoring, evaluation, and reporting purposes only.

VII.3. MONITORING AND REPORTING

The SEP is a living document that will be updated periodically (at least annually) to document consultations conducted, issues raised, actions taken, and change materials. It will also include lessons learned, any modifications to the consultation process, and a schedule for ongoing future interaction.

VII.4. Internal Monitoring

The Project Sponsor will monitor the participation of the stakeholders in the planned engagement activities. Through the evaluation of outcomes and the effect of engagement, LİMAK intends to obtain regular feedback from stakeholders and to learn if the planned outcomes are achieved or if there is a need to change the approach.

Throughout the Project, Project Sponsor will communicate with stakeholders and inform them about any significant issues, such as changes in the Project schedule.

Monthly summaries/reports of grievances, queries, and related incidents, together with the implementation status of corrective/preventive actions, will be prepared by the CLOs and submitted to Environmental and Social Manager. The monthly summaries/reports will be a means to assess both the number and nature of complaints (if any), along with the Project Sponsor's ability to address complaints in a timely and effective manner.

During the operation phase, the Environmental and Social Manager will also prepare quarterly overall performance reports.

VII.5. External Monitoring

In addition to internal monitoring, external monitoring activities will be carried out quarterly- in the construction phase and biannually during the operation phase of the project by lenders IESC (ESAP monitoring experts) to verify environmental and social monitoring information and perform monitoring services.

As part of the external monitoring process, a final evaluation will be conducted to determine whether the implementation of the ESMS/ESMP complies with national environmental laws, international agreements, protocols, environmental and social standards such as the Equator Principle, IFC Policy (2012) and related Performance Standards on Environmental and Social Sustainability applicable to the Antalya-Alanya Motorway Project.

Besides, local authorities and the Ministry of Environment, Urbanization and Climate Change (MoEU) have the authority to execute monitoring and inspection activities to follow up on the conformity of the Project activities with the environmental requirements as per the relevant legislation.

VII.6. Phase-Differentiated Monitoring

Monitoring requirements differ between the construction and operation phases due to the evolving nature of impacts and stakeholder interactions.

During Construction Phase:

- **Indicators:**
    - Number and frequency of community consultations held
    - Percentage of women, elderly, and vulnerable groups reached
    - Number of grievances received and resolved within defined timelines
    - Occupational health and safety incidents reported and addressed
    - Number of disruptions to access/mobility and mitigations implemented
- **Methods:**
    - Site-level monitoring by social and environmental officers
    - Community feedback sessions and grievance intake
    - Weekly reporting by contractors

During Operation Phase:

- **Indicators:**
    - Road safety incident reports and follow-up actions
    - Long-term noise and air quality measurements
    - Accessibility improvements for vulnerable groups (e.g., crossings, lighting)
    - Continued functionality of grievance mechanism (response rate, satisfaction)
    - Periodic satisfaction surveys with local residents and road users
- **Methods:**
    - Bi-annual monitoring reports submitted to financing institutions
    - Independent audits and third-party verifications (if required)
    - Coordination with local authorities and CSOs for long-term oversight

VII.6.1.1. Vulnerability-Focused Monitoring

Special attention will be given to tracking how the project affects vulnerable groups identified in this HRA:

- Sex- and age-disaggregated data will be maintained for all engagement and grievance records.
- Gender-based violence (GBV) indicators will be tracked in coordination with local NGOs.
- Mobility/access concerns for the elderly and disabled will be assessed during site visits.

VII.6.1.2. Reporting and Disclosure

- Monitoring results will be disclosed in an accessible format (e.g., summary brochures, radio announcements, community meetings).
- Reports will be prepared in Turkish and, where relevant, simplified formats or visualized to ensure comprehension by illiterate or semi-literate populations.
- An annual Stakeholder Monitoring Summary will be shared with local authorities, community representatives, and the public.

This structured and adaptive monitoring and reporting system ensures transparency, learning, and responsiveness throughout the project duration.

VIII. ANNEXES

ANNEX-1 External Grievance Form

TALEP/ŞİKÂYET FORMU *REQUEST/COMPLAİNT FORM*	
A- Genel Bilgi *General Information*	
Proje Adı *Project Name*	
Talep/Şikayet/Geri Bildirimi Alan Proje Personelinin İsmi *Name of the Project Personnel who Received the Request/Grievance/ Feedback:*	
Talep/Şikayet/Geri Bildirimin Yapıldığı Tarih *Date of Request/Grievance/ Feedback Filed by the Grievance/ Feedback Holder*	
Talep/Şikayet/Geri Bildirimin Alınış Şekli (şikayet kutusu, yazılı sözlü ya da sözlü, istişareler sırasında) *Method of Request/Grievance/Feedback Receipt (Complaint box, written or Oral, through consultations)*	
B- Talep/Şikayet/Geri Bildirim Sahibi Hakkında Bilgi *Information about the Stakeholder who Lodged Request/Grievance/ Feedback Owner*	
Talep/Şikayet/Geri Bildirim Sahibinin İsmi (isteğe bağlı) *Name of Stakeholder who Lodged the Request/Grievance/ Feedback (optional)*	
Talep/Şikayet/Geri Bildirim Sahibinin Nereden Geldiği (Yerleşim, Şirket, vb.) *Origin of Stakeholder who Lodged the Request/Grievance/Feedback (Settlement, Company, etc.)*	
İletişim Bilgisi *Contact Information*	Tel: e-posta:
C- Talep/Şikayet/Geri Bildirim Hakkında Bilgi (talep/şikayete ilişkin detaylı açıklama) *Information on the Request/Complaint/Feedback (detailed description of the request/complaint)*	

TALEP/ŞİKÂYET FORMU *REQUEST/COMPLAİNT FORM*	
A- Genel Bilgi *General Information*	
Proje Adı *Project Name*	
Talep/Şikayet/Geri Bildirimi Alan Proje Personelinin İsmi *Name of the Project Personnel who Received the Request/Grievance/ Feedback:*	

ANNEX-2 Internal Grievance Form

İÇ TALEP/ŞİKÂYET FORMU *INTERNAL REQUEST/COMPLAİNT FORM*	
A- Genel Bilgi *General Information*	
Proje Adı *Project Name*	
Şikayet/Geri Bildirimi Alan Proje Personelinin İsmi *Name of the Project Personnel who Received the Grievance/ Feedback:*	
Talep/Şikayet/Geri Bildirimin Yapıldığı Tarih *Date of Request/Grievance/ Feedback Filed by the Grievance/ Feedback Holder*	
Talep/Şikayet/Geri Bildirimin Alınış Şekli (şikayet kutusu, yazılı sözlü ya da sözlü, istişareler sırasında) *Method of Request/Grievance/Feedback Receipt (Complaint box, written or Oral, through consultations)*	
B- Talep/Şikayet/Geri Bildirim Sahibi Hakkında Bilgi	
Şikayet/Geri Bildirim Sahibinin İsmi (isteğe bağlı) *Name of Stakeholder who Lodged the Grievance/ Feedback (optional)*	
Talep/Şikayet/Geri Bildirim Sahibinin Nereden Geldiği (Yerleşim, Şirket, vb.) *Origin of Stakeholder who Lodged the Request/Grievance/Feedback (Settlement, Company, etc.)*	
İletşim Bilgisi *Contact Information*	Tel: e-posta:
C- Talep/Şikayet Hakkında Bilgi *Information on the Request/Complaint*	
Şikayetin İlgili Olduğu Taraf (Şirket, Yüklenici, Altyüklenici, Üçüncü Taraf) *Relevant to Project Company, Contractor, Subcontractor, Third-party,*	

İÇ TALEP/ŞİKÂYET FORMU *INTERNAL REQUEST/COMPLAİNT FORM*	
A- Genel Bilgi *General Information*	
Proje Adı *Project Name*	
Şikayet/Geri Bildirimi Alan Proje Personelinin İsmi *Name of the Project Personnel who Received the Grievance/ Feedback:*	
Talep/şikayete ilişkin detaylı açıklama *(detailed description of the request/complaint)*	

ANNEX -3 Key Performance Indicator

KPI	Target	Frequency	Responsible	Data Source
Number of meetings conducted with the relevant	1 per 30 km stretch	Semiannually / construction phase Annually / operational phase	CLO, E&S Manager	Meeting reports, photos
Number of regular community meetings held to disclose Project progress, E&S performance, and RAP implementation updates	Minimum 1 per month during construction; 1 per quarter during operation	Monthly / Quarterly	CLO, E&S Manager	Meeting minutes, attendance records, photos, feedback forms
% of meetings with at least one female facilitator	100%	Each meeting	CLO, Female Staff	Participant list
% of female participants in community meetings	At least 40% (if not seperate female meeting will be conducted)	Semiannually / construction phase Annually / operational phase	CLO	Disaggregated participant data
Number of WhatsApp / digital announcements posted	Min. 2/month/region	Monthly	CLO	Screenshots, message logs
Number of grievances received from women	Separate tracking required	Monthly	Female CLO	GM logs
% of grievances resolved within 30 days	75%	Monthly	Environment and Social Manager	GM logs
Number of grievance channels accessible to illiterate or elderly PAPs	At least one in each sub-region (Serik, Manavgat, Alanya)	Ongoing	CLO	Field visits, GM audit
Number of GBV or SEAH trainings held	one per campsite before construction	Pre-construction	H&S Manager, Female CLO	Training logs
Number of engagement events for vulnerable groups (women, Yörüks, refugees)	Min. One per group per year	Annual	CLO, E&S Manager	Meeting records
Number of satisfaction surveys conducted (incl. gender focus)	2/year	Biannual	Female CLO	Survey results maintained by the SPV General Manager
% of brochures/materials with visual/auditory accessibility	90%	Before dissemination	E&S Manager, Social Chief	Outreach records
Increase women's participation in employment by 2029	30%	Annual (2029–2032)	SPV General Manager	Personnel records maintained by SPV General Manager
Increase women's participation in employment by 2032	35%	Annual (2032–2035)	SPV General Manager	Personnel records maintained by SPV General Manager

Increase women's participation in employment by 2035	40%	Annual (2035–2040)	SPV General Manager	Personnel records maintained by SPV General Manager
Maintain women's participation at Board level by 2035	40%	Annual (2029–2040)	SPV General Manager	Board composition records maintained by SPV General Manager

ANNEX-4: Project Information Brochure: Turkish, Arabic and Kurdish

Turkish Version

ÇEVRESEL ve SOSYAL ETKİ DEĞERLENDİRMESİ (ÇSED) ÇALIŞMALARI

Antalya-Alanya Otoyolu Projesi kapsamında, Çevresel ve Sosyal Etki Değerlendirmesi (ÇSED) süreci başlamıştır. Proje'nin çevre ve sosyal hayat üzerindeki olası etkileri tespit edilmiş, değerlendirilmiş ve bu etkileri azaltmaya yönelik önlemler önerilmiştir.

Projeyi yürüten Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ), bu çalışmayı yürütmek üzere ENCON Çevre Danışmanlık Ltd. Şti.'yi görevlendirmiştir.

Mevcut çevresel ve sosyal koşullar, Proje süresince göz önünde bulundurulmaya devam edilecektir.

ÇSED çalışmaları kapsamında detaylı olarak incelenen temel çevresel ve sosyal konular aşağıda özetlenmektedir:

- ✓ Mevcut arazi kullanımı ve gelir kaynaklarında bölgesel değişimler
- ✓ Gürültü ve hava kalitesinde yaşanabilecek değişiklikler
- ✓ İnşaat faaliyetleri nedeniyle oluşabilecek rahatsızlıklar
- ✓ İnşaat malzemelerinin temini ve atık bertarafı
- ✓ Yol ve trafik güvenliği ile ilgili konular
- ✓ Doğal habitatlar ile bu habitatlarda bulunan hayvanlar ve bitki örtüsü üzerindeki etkiler
- ✓ Kültürel miras açısından önemli yerler ve bilinmeyen arkeolojik kalıntıların keşif potansiyeli
- ✓ Kadınlar, yaşlılar gibi hassas gruplar öncelikli olmak üzere halkın yaşam koşullarının korunması
- ✓ Proje'nin yerel ekonomi, tarım ve geçim kaynakları üzerindeki etkileri
- ✓ Halk sağlığı ve güvenliği açısından oluşabilecek riskler ve alınacak önlemler

GÖRÜŞ BİLDİRME OLANAKLARI

Antalya-Alanya Otoyolu Projesi kapsamında yürütülen ÇSED süreci, projeden etkilenebilecek veya projeye ilgi duyan tüm kişi ve kurumların görüşlerini alma esasına dayanmaktadır.

Bu kişiler ve kuruluşlar "paydaş" olarak tanımlanmakta olup, şunları kapsamaktadır:

- ✓ Ulusal ve yerel düzeyde kamu kurumları
- ✓ Çevresel, sosyal veya ekonomik konularla ilgilenen sivil toplum kuruluşları
- ✓ Projeden doğrudan etkilenebilecek yerel halk ve geçimini bu bölgelerden sağlayan bireyler

Bu broşür, paydaş katılım sürecinin bir parçası olarak hazırlanmıştır. Amaç, Proje hakkında mümkün olduğunca çok sayıda kişiye bilgi sunmak ve görüşlerini paylaşmaya davet etmektir. Böylece öneriler geliştirilirken ve etki azaltma önlemleri tespit edilirken, paydaşların görüşlerini de değerlendirmeye alabilmek amacıyla hazırlanmıştır.

Antalya-Alanya Otoyolu Projesi'ne ilişkin görüş, öneri ve fikirlerinizi yerleşim birimlerinde bulunan şikayet ve öneri kutuları ile birlikte aşağıdaki kanallar vasıtası ile bize iletebilirsiniz:

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.

- Çağrı Merkezi: 0850 202 07 07
- Danışma Ofisi Adres: Orta Mah. Belek Cad. No:7, İç Kapı No:9, Serik, Antalya, Türkiye
- E-posta: info@antalyaalanyaotoyolu.com.tr

www.antalyaalanyaotoyolu.com.tr

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA OTOYOLU PROJESİ

BİLGİLENDİRME BROŞÜRÜ

AĞUSTOS 2025





PROJE' NİN BİLEŞENLERİ NELERDİR?

Antalya-Alanya Otoyolu, Serik Kavşağı'ndan başlamakta, daha sonra doğuya yönelerek Serik ve Manavgat ilçeleri sınırları içerisinde Toros Dağları'nın eteklerindeki koridoru takip etmekte ve Konaklı'nın kuzeyinde Alanya Kavşağı'nda sonlanmaktadır.

Sözleşmeye Esas Otoyol Kesimleri

Ana Yol (Otoyol) : 84 km
Bağlantı Yolları : 33.8 km
Toplam Uzunluk : 117.8 km

Ana Yapı Bileşenleri

- ✓ Viyadükler
- ✓ Köprüler
- ✓ Kavşaklar
- ✓ Altgeçitler ve Üstgeçitler
- ✓ Menfezler
- ✓ Otoyol Gişeleri
- ✓ Servis Alanları
- ✓ Bakım ve İşletme Merkezleri

PROJE HANGİ AŞAMADADIR?

Proje kapsamında kamulaştırma planları çıkarılmış ve belirli bölgelerde kamulaştırma çalışmalarına başlanmıştır.

İnşaat faaliyetlerine başlanmış ve ilgili kesimlerde şantiyeler kurulmuştur.

Proje inşaat faaliyetlerinin Ekim 2028 içerisinde tamamlanması planlanmaktadır.

PROJE' NİN BEKLENEN FAYDALARI NELERDİR?

Ulaşım Ağlarına ve Yol Kullanıcılarına Sağlayacağı Faydalar:

- ✓ Burdur, Isparta, Konya, Karaman ve Mersin gibi çevre illere ulaşımın kolaylaştırılması
- ✓ Antalya ile Alanya arasında kesintisiz, güvenli ve hızlı ulaşım sağlanması
- ✓ Mevcut D-400 Karayolu'nun trafik yükünün azaltılarak yoğunluğun hafifletilmesi
- ✓ Yolculuk sürelerinin önemli ölçüde kısaltılması ve seyahat konforunun artırılması
- ✓ Turizm sezonunda yaşanan trafik sıkışıklığına karşı yüksek kapasiteli alternatif bir güzergâh oluşturulması
- ✓ Güzergâh boyunca farklı bölgelere erişimin artırılarak bölgesel entegrasyonun desteklenmesi

Sosyal ve Ekonomik Faydalar:

- ✓ Proje'nin inşaat ve işletme aşamalarında yerel istihdam olanakları
- ✓ Otoyol aracılığıyla eğitim, sağlık, turizm ve ticaret merkezlerine daha hızlı ve kolay erişim
- ✓ Tarım ürünlerinin (özellikle narenciye, sebze ve çiçek) pazarlara daha kısa sürede ulaştırılmasıyla ürün tazeliği korunması ve ekonomik değer artışı
- ✓ Yol güvenliğinin artırılmasıyla birlikte trafik kazalarının ve buna bağlı can kayıplarının azaltılması
- ✓ Köy yolları ve bağlantılar üzerindeki ağır araç trafiği azalacağı için ulaşımda güvenliğin artması
- ✓ Seyahat süresinin kısalması sonucu yakıt tüketimi ve hava emisyonlarında azalma
- ✓ Şehir içi trafik yükünün, özellikle kamyon ve otobüs gibi ağır araç trafiğinin azalmasıyla, gece saatlerinde yaşanan gürültü seviyesinin düşmesi
- ✓ Modern bir ulaşım altyapısı sayesinde yerel kalkınmanın teşvik edilmesi ve yatırım cazibesinin artırılması
- ✓ Acil durumlarda (örneğin yangın, trafik kazası vb.) müdahale süresinin kısalmasıyla toplumsal güvenlik düzeyinin artırılması

Arabic Version

ANTALYA ALANYA OTOYOLU

مشروع الطريق السريع أنطاليا-ألانيا

بروشور المعلومات

أغسطس 2025



إمكانيات التعبير عن الرأي

تعتمد عملية تقييم الأثر البيئي والاجتماعي لمشروع طريق أنطاليا-ألانيا السريع على مبدأ جمع آراء جميع الأفراد والمؤسسات المتأثرة بالمشروع أو المهتمة به.

يُعرَف هؤلاء الأفراد والمنظمات بـ"أصحاب المصلحة"، وهم:

- ✓ المؤسسات العامة الوطنية والمحلية
- ✓ منظمات المجتمع المدني الوطنية المعنية بالقضايا البيئية والاجتماعية والاقتصادية
- ✓ المجتمعات المحلية والأفراد المتأثرين مباشرةً بالمشروع والذين يكسبون رزقهم في هذه المناطق

أُعدّ هذا الكتيب كجزء من عملية إشراك أصحاب المصلحة. والهدف هو توفير معلومات حول المشروع لأكبر عدد ممكن من الناس، وحثّهم على إبداء آرائهم. تضمن هذه العملية مراعاة آراء أصحاب المصلحة عند وضع التوصيات وتحديد تدابير التخفيف.

يمكنكم إرسال آرائكم ومقترحاتكم وأفكاركم بخصوص مشروع الطريق السريع أنطاليا-ألانيا من خلال صناديق الشكاوى والاقتراحات الموجودة في المناطق السكنية، وكذلك من خلال القنوات التالية:

شركة طريق أنطاليا ألانيا السريع للإنشاءات والاستثمار والتشغيل المساهمة

- مركز الاتصال: **08502020707**
- عنوان مكتب الاستشارات: حي أورتا، شارع بيليك الرقم 7، الباب الداخلي رقم 9، سيريك، أنطاليا، تركيا
- البريد الإلكتروني: **info@antalyaalanyaotoyolu.com.tr**

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دراسات تقييم الأثر البيئي والاجتماعي

بدأت عملية تقييم الأثر البيئي والاجتماعي لمشروع طريق أنطاليا-ألانيا السريع. وتم تحديد وتقييم الآثار البيئية والاجتماعية المحتملة للمشروع، واقتراح تدابير للتخفيف من حدتها.

وقد كلفت شركة طريق أنطاليا-ألانيا السريع للإنشاءات والاستثمار والتشغيل المساهمة (AAOİAŞ)، الجهة التنفيذية للمشروع، شركة إنكون ENCON للاستشارات البيئية المحدودة بإجراء هذه الدراسة.

سيستمر مراعاة الظروف البيئية والاجتماعية الحالية طوال مدة المشروع.

فيما يلي ملخص للقضايا البيئية والاجتماعية الرئيسية التي دُرست بالتفصيل في نطاق دراسات تقييم الأثر البيئي والاجتماعي:

- ✓ التغيرات الإقليمية في استخدامات الأراضي الحالية ومصادر الدخل
- ✓ التغيرات المحتملة في الضوضاء وجودة الهواء
- ✓ الاضطرابات التي قد تنشأ عن أنشطة البناء
- ✓ توريد مواد البناء والتخلص من النفايات
- ✓ القضايا المتعلقة بسلامة الطرق والمرور
- ✓ التأثيرات على الموائل الطبيعية وحيواناتها ونباتاتها
- ✓ إمكانية اكتشاف مواقع ذات أهمية تراثية ثقافية وبقايا أثرية مجهولة
- ✓ حماية الظروف المعيشية للسكان، وخاصة الفئات الضعيفة مثل النساء وكبار السن
- ✓ آثار المشروع على الاقتصاد المحلي والزراعة وسبل العيش
- ✓ المخاطر المحتملة على الصحة والسلامة العامة والتدابير الواجب اتخاذها

ما هي الفوائد المتوقعة من المشروع؟

الفوائد لشبكات النقل ومستخدمي الطرق:

- ✓ تسهيل الوصول إلى المحافظات المحيطة مثل بوردور، وإسبرطة، وقونيا، وكرمان، ومرسين.
- ✓ توفير نقل متواصل وآمن وسريع بين أنطاليا وألانيا.
- ✓ تخفيف الازدحام المروري على الطريق السريع D-400 الحالي.
- ✓ تقصير أوقات الرحلات بشكل ملحوظ وتحسين راحة السفر.
- ✓ إنشاء طريق بديل عالي السعة لتخفيف الازدحام المروري خلال الموسم السياحي.
- ✓ دعم التكامل الإقليمي من خلال زيادة إمكانية الوصول إلى مختلف المناطق على طول الطريق.

الفوائد الاجتماعية والاقتصادية:

- ✓ فرص عمل محلية خلال مرحلتي بناء وتشغيل المشروع.
- ✓ وصول أسرع وأسهل إلى مراكز التعليم والرعاية الصحية والسياحة والتجارة عبر الطريق السريع.
- ✓ الحفاظ على نضارة المنتجات وزيادة قيمتها الاقتصادية من خلال توصيل المنتجات الزراعية (وخاصة الحمضيات والخضراوات والزهور) إلى الأسواق بسرعة أكبر.
- ✓ الحد من حوادث المرور والوفيات الناجمة عنها من خلال تحسين السلامة على الطرق.
- ✓ زيادة سلامة النقل بفضل انخفاض حركة مرور المركبات الثقيلة على طرق القرى والتقاطعات.
- ✓ خفض استهلاك الوقود والانبعاثات الهواء بفضل تقصير أوقات السفر.
- ✓ خفض مستويات الضوضاء الليلية بفضل انخفاض حركة المرور في المناطق الحضرية، وخاصة حركة مرور المركبات الثقيلة مثل الشاحنات والحافلات.
- ✓ تعزيز التنمية المحلية وزيادة جاذبية الاستثمار من خلال بنية تحتية حديثة للنقل.
- ✓ تعزيز السلامة العامة من خلال تقليل أوقات الاستجابة في حالات الطوارئ (مثل الحرائق وحوادث المرور، إلخ).

ما هي مكونات المشروع؟

يبدأ طريق أنطاليا-ألانيا السريع عند تقاطع سيريك، ثم ينعطف شرقًا، متتبعًا الممر على طول سفوح جبال طوروس ضمن حدود مقاطعتي سيريك ومانافغات، وينتهي عند تقاطع ألانيا شمال كوناكلي.

أقسام الطريق السريع التعاقدية

الطريق الرئيسي (الطريق السريع): **84** كم
الطرق المتصلة: **33.8** كم
الطول الإجمالي: **117.8** كم

مكونات الهيكل الرئيسي

- ✓ الجسور العلوية
- ✓ الجسور
- ✓ التقاطعات
- ✓ الأنفاق السفلية والعلوية
- ✓ القنوات المائية
- ✓ كبائن تحصيل الرسوم
- ✓ مناطق الخدمة
- ✓ مراكز الصيانة والتشغيل

إلى أي مرحلة وصل المشروع؟

تم إعداد خطط نزع الملكية للمشروع، وبدأت أعمال نزع الملكية في بعض المناطق.

بدأت أعمال البناء، وتم تحديد مواقع البناء في المناطق المعنية.

من المقرر الانتهاء من بناء المشروع في أكتوبر **2028**.



Kurdish Version

ANTALYA ALANYA MOTORWAY

encon

ANTALYA ALANYA OTOYOLU

ئۆتۆبانی ئەنتالیا-ئالانیا

نامیلکەی زانیاری

نابی 2025



دەرئەنجامەکانی دەرپڕینی ڕا و بۆچوون

پرۆسەی ÇSED کە لە چوارچێوەی پرۆژەی ئۆتۆبانی نەنتالیا-نالانیادا پەڕیوەدەچێت، لەسەر بنەمای وەرگرتنی ڕا و بۆچوونی هەموو لایەنە کەس و دامەزراوانەی کە ڕەنگە کاریگەریی پرۆژەکەیان لەسەر بێت یان گرنگی پێ پرۆژەکە دەدەن.

ئەم کەس و ڕێکخراوانە وەک "لایەنی پەیوەندیدار" پێناسە دەکرێن و ئەمانە لەخۆدەگرن:

- ✓ دامەزراوە گشتییەکان لەسەر ناستی نیشتمانی و ناوخۆیی
- ✓ ڕێکخراوەکانی کۆمەڵگەی مەدەنی کە گرنگی بە بابەتە ژینگەیی، کۆمەڵایەتی یان نابووریییەکان دەدەن
- ✓ خاڵکی ناوچەکە کە ڕاستەوخۆ کاریگەریی پرۆژەکەیان لەسەرە و ئەو کەسانەی کە بڕیوییان لەسەر ئەم ناوچانەیە

ئەم نامیلکەیە وەک یەکێک لە پرۆسەی پەشداربێنکردنی لایەنە پەیوەندیدارەکان ئامادەکراوە. ئامانج لێی پێشکەشکردنی زانیارییە بە زۆرترین ژمارەی خاڵک سەبارەت بە پرۆژەکە و بانگهێشتکردنیانە بۆ هاویەشیکردنی ڕا و بۆچوونەکانیان. بەم شێوەیە، بۆ ئەوە ئامادەکراوە کە لە کاتی گەشەپێدانی پێشنیارەکان و دیاریکردنی ڕێوشوێنەکانی کەمکردنەوەی کاریگەرییەکاندا، ڕا و بۆچوونی لایەنە پەیوەندیدارەکان لەبەرچاو بگیرێت.

ڕا و پێشنیار و بیرۆکەکانتان سەبارەت بە پرۆژەی ئۆتۆبانی نەنتالیا-نالانیا دەتوانن لە ڕێگەی سندوقەکانی سکاڵا و پێشنیار لە یەکە نیشتەجێبوونەکان و هەروەها لە ڕێگەی ئەم کەناڵانەی خوارەوە پێمان بگەیەنن:

کۆمپانیای پشکی هاوبەشی وەبەرهێنان و کارپێکردنی دروستکردنی ڕێگاوبانی نەنتالیا نالانیا (Antalya Alanya (Otoyolu İnşaat Yatırım ve İşletme A.Ş.

سەنتەری پەیوەندی: 0850 202 07 07

- گەڕەکی نۆرتا، شەقامی بێلەک ژمارە: ۷، دەرگای ناوەوە ژمارە: ۹، سێریک، نەنتالیا، تورکیە (Orta Mah. Belek (Cad. No:7, İç Kapı No:9, Serik, Antalya, Türkiye
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کارەکانی هەڵسەنگاندنی کاریگەریی ژینگەیی و کۆمەڵایەتی(ÇSED)

لە چوارچێوەی پرۆژەی ئۆتۆبانی نەنتالیا-نالانیا، پرۆسەی هەڵسەنگاندنی کاریگەریی ژینگەیی و کۆمەڵایەتی (ÇSED) دەستی پێکردووە. کاریگەرییە نەگەرییەکانی پرۆژەکە لەسەر ژینگە و ژیانی کۆمەڵایەتی دیاریکراون، هەڵسەنگاندنیان بۆ کراوە و ڕێوشوێنی پێویست بۆ کەمکردنەوەی ئەم کاریگەرییانە پێشنیار کراون.

کۆمپانیای وەبەرهێنان و پەڕیوەبردنی دروستکردنی ئۆتۆبانی نەنتالیا-نالانیا (AAOİAŞ) (Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ) کە پرۆژەکە پەڕیوە دەبات، کۆمپانیای ئینکۆن بۆ ڕاوێژکاری ژینگەیی سنووردارای ENCON Çevre (Danışmanlık Ltd. Şti. بۆ ئەنجامدانی ئەم کارە ڕاسپاردووە.

بارودۆخی ژینگەیی و کۆمەڵایەتیی ئێستا، لە ماوەی پرۆژەکەدا یەردەوام لەبەرچاو دەگیرێت.

بابەتە سەرەکییەکانی ژینگەیی و کۆمەڵایەتی کە لە چوارچێوەی کارەکانی ÇSED بە وردی لێکۆڵینەوەیان لەسەر کراوە، لە خوارەوە کورتکراوەتەوە:

- ✓ گۆڕانکارییە هەرێمییەکان لە یەکارهێناتی زەوی و سەرچاوەکانی داهاتی نیستا
- ✓ گۆڕانکارییە نەگەرییەکان لە ناستی ژاوەژاو و کوالێتیی هەوا
- ✓ ناڕاحەتییەکانی نەگەری یەهۆی چالاکییەکانی دروستکردنەوە
- ✓ دابینکردنی کەرەستەکانی دروستکردن و قرتدانی باشماوەکان
- ✓ بابەتەکانی پەیوەست بە سەلامەتیی ڕێگا و هاتووچۆ
- ✓ کاریگەرییەکان لەسەر نشینگەی سروشتی و نازەڵان و ڕووەکی ناو ئەم نشینگانە
- ✓ شوێنە گرنگەکان لە ڕووی میراتی کولتوورییەوە و نەگەری دۆزینەوەی باشماوە شوێنەوارییە نەزانراوەکان
- ✓ باراستنی بارودۆخی ژیانی خاڵک، بەتایبەتی گرووپە هەستیارەکان وەک ژنان و پەسالاچووان
- ✓ کاریگەرییەکانی پرۆژەکە لەسەر نابووریی ناوخۆیی، کشتوکاڵ و سەرچاوەکانی بژێوی
- ✓ مەترسییە نەگەرییەکان لە ڕووی تەندروستی و سەلامەتیی گشتییەوە و ڕێوشوێنەکانی پێویست

سوودە چاوەڕوانکراوەکانی پڕۆژەکە چین؟

سوودەکانی بۆ تۆڕەکانی گواستنەوە و بەکارهێنەرانی ڕێگا:

- ✓ ناسانکردنی گەیشتن بە پارێزگا دراوسێکان وەک بوردور، نیسپارتا، قۆنیا، کارامان و مێرسین
- ✓ دابینکردنی گواستنەوەی بێ بچران، سەلامەت و خێرا لە نێوان نەتنالیا و نالانیا
- ✓ کەمکردنەوەی بارى هاتووچۆی سەر ڕێگای D-400ی نێستا و سووکردنی قەرەبالغی
- ✓ کورتکردنەوەی بەرچاوی ماوەی گەشتکردن و زیادکردنی ناسوودەیی گەشت
- ✓ دروستکردنی ڕێڕەوێکی جێگرەوەی بەتوانای بەرز بۆ بەرەنگاربوونەوەی قەرەبالغی هاتووچۆ لە وەرزی گەشتیاریدا
- ✓ پشتگیریکردنی یەکگرتنی هەرێمی لە ڕێگەی زیادکردنی دەرفەتی گەیشتن بە ناوچە جیاوازەکان بە درێژایی ڕێڕەوەکە

سوودە کۆمەڵایەتی و نابووریيەکان:

- ✓ دابینکردنی هەلی کاری ناوخۆیی لە قۆناغەکانی دروستکردن و بەڕێوەبردنی پڕۆژەکەدا
- ✓ گەیشتنی خێراتر و ئاسانتر بە ناوەندەکانی خوێندن، تەندروستی، گەشتیاری و بازرگانی لە ڕێگەی نۆتۆبانەوە
- ✓ پاراستنی تازەیی بەرهەمە کشتوکاڵییەکان (بەتایبەتی مزرەمەنییەکان، سەوزە و گوڵ) و زیادبوونی بەهای نابووریيان لە ڕێگەی گەیاندنیان بە بازارەکان لە ماوەیەکی کورتتردا
- ✓ کەمکردنەوەی ڕووداوەکانی هاتووچۆ و گیانلەدەستدانی بەهۆیانەوە لە ڕێگەی زیادکردنی سەلامەتیی ڕێگا
- ✓ زیادبوونی سەلامەتی لە گواستنەوەدا بەهۆی کەمبوونەوەی هاتووچۆی نۆتۆمبێلی بارهەڵگری قورس لەسەر ڕێگای گوندەکان و ڕێگا گرێدەرەکان
- ✓ کەمبوونەوەی بەکارهێنانی سووتەمەنی و دەرهاوێشتە هەواییەکان بەهۆی کورتبوونەوەی ماوەی گەشت
- ✓ کەمبوونەوەی ئاستی زاوەزاو لە کاتەکانی شەودا بەهۆی کەمبوونەوەی بارى هاتووچۆی ناو شار، بەتایبەتی هاتووچۆی نۆتۆمبێلە قورسەکان وەک بارهەڵگر و پاس
- ✓ هاندانی گەشەپێدانی ناوخۆیی و زیادکردنی سەرنجڕاکێشیی وەبەرهێنان بەهۆی بوونی زێرخانێکی گواستنەوەی مۆدێرن
- ✓ بەرزبوونەوەی ئاستی سەلامەتیی کۆمەڵایەتی لە ڕێگەی کورتکردنەوەی ماوەی وەڵامدانەوە لە حاڵەتە لەناکاوەکاندا (بۆ نموونە ئاگرکەوتنەوە، ڕووداوی هاتووچۆ و هتد.)

پێکهاتەکانی پڕۆژەکە چین؟

نۆتۆبانی نەتنالیا-نالانیا لە یەکترپڕی سێرکەوە دەست پێدەکات، پاشان ناراستەی پڕۆژەهەڵات دەگرێتەبەر و بەدوای ئەو ڕێڕەوەدا دەڕوات کە دەکەوێتە بنارى چیاکانی تۆرۆس لە ستووری قەڕاکانی سێرک و ماناڤگات، و لە یاکووری کۆناکلی لە یەکترپڕی نالانیادا کۆتایی دێت.

بەشەکانی نۆتۆبان بەپێی گرێبەستە

ڕێگای سەرەکی (نۆتۆبان): 84کم
ڕێگا گرێدەرەکان: 33,8 کم
کۆی گشتی درێژی: 117,8 کم

پێکهاتە سەرەکییەکانی بیناسازی

- ✓ پردە دۆڵییەکان (ڤیادەکت)
- ✓ پردەکان
- ✓ ژێرپارەکان و سەرپارەکان
- ✓ کاتاڵەکانی ناو
- ✓ خاڵەکانی وەرگرتنی باجی نۆتۆبان
- ✓ ناوچەکانی خزمەتگوزاری
- ✓ ناوەندەکانی چاککردنەوە و بەڕێوەبردن

پڕۆژەکە لە چ قۆناغێکدایە؟

لە جوارچێوەی پڕۆژەکەدا، پلانەکانی یەخاوەنکردنی گشتی (نیستملاک) نامادەکراون و لە هەندێک ناوچەدا کارەکانی یەخاوەنکردنی گشتی دەستپان پێکردووە.

چالاکییەکانی دروستکردن دەستپان پێکردووە و لە یەشە یەیوەندیدارەکاندا شوێنی کار (شەنتیە) دامەزراون.

پلان وایە چالاکییەکانی دروستکردنی پڕۆژەکە لە تشرینی یەکەمی 2028 دا تەواو بن.



ANNEX-5.A: GLAC – Affected Lands

ANTALYA ALANYA MOTORWAY

ANTALYA – ALANYA MOTORWAY PROJECT

RESETTLEMENT ACTION PLAN (RAP)

GUIDE TO LAND ACQUISITION AND COMPENSATION (GLAC)

– AFFECTED LANDS –



OCTOBER 2025

REVISION 1

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APPENDIX: GENERAL DIRECTORATE OF HIGHWAYS' (KGM) BOOKLET REGARDING PROCEDURAL STEPS IN EXPROPRIATION ACTIVITIES

A. INTRODUCTION

1. What is Antalya-Alanya Motorway Project?

The **Antalya-Alanya Motorway** Project (the "**Project**") is a Public-Private Partnership (PPP), with the **Public Partner** – being the Republic of Türkiye Ministry of Transportation and Infrastructure (MoTI), represented by the **Directorate General of Highways (KGM)**, and the **Private Partner** – being the **Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.** (the Assigned Company).

Implemented under a **Build-Operate-Transfer (BOT)** model, the Project is one of two sub-projects that constitute the broader Afyonkarahisar-Alanya Motorway Project, which was initially tendered in 2010.

The Project is located in **Antalya province,** southern Türkiye and traverses the boundaries of **three districts** – **Serik, Manavgat and Alanya** – which are key touristic and commercial hubs of the country.



2. Who is the Granting Authority under the BOT Contract?

Within the context of the BOT Implementation Contract, the **Granting Authority** is the **Republic of Türkiye Ministry of Transportation and Infrastructure** (MoTI), represented by the **Directorate General of Highways (KGM)**. KGM is responsible for implementing the land acquisition and expropriation works required for the Project in accordance with the Expropriation Law of Türkiye.

3. Who is the Assigned Company under the BOT Contract?

The Company assigned under the BOT Implementation Contract is **Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş**. – a Special Purpose Vehicle (SPV) established by **Limak İnşaat Sanayi ve Ticaret A.Ş., an affiliate of Limak Holding**.

The Assigned Company is responsible for the **design, construction, financing, operation, and maintenance** of the Motorway until its transfer to KGM at the end of the BOT concession period.

4. What are the Project's Applicable International Standards

The Project is financed by international financial institutions (IFIs) and commercial banks. A Finance Agreement was signed between the Assigned Company and the Lenders on 6 October 2025.

The following international standards are applicable to the Project:

- **International Finance Corporation (IFC)** Performance Standards (PSs) (2012),
- **Equator Principles (EP) 4** (2020), and
- **Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework** (2019)**.**

5. Why has a Resettlement Action Plan (RAP) been prepared, and how will it be implemented?

The land acquisition required for the Project results in risks and impacts related to both physical and economic displacement. Accordingly, a **Resettlement Action Plan (RAP)** has been prepared in line with applicable international standards, with the objective of developing and implementing measures to mitigate these risks and impacts on individuals owning and/or or using the affected lands and houses, as well as on the employers and employees of impacted businesses.

The entitlements, measures, and livelihood restoration and improvement programs under RAP are in addition to the compensation provided by KGM in accordance with the Expropriation Law. The additional costs associated with RAP implementation will be covered by the SPV **through the RAP Fund, which is allocated and managed by the SPV –** separate from KGM's Expropriation Budget.

The **RAP is a living document** and will be updated as necessary.

It is disclosed in Turkish and English under the Project's ESIA Package at the Project website (www.antalyaalanyaotoyolu.com.tr).

The RAP will be implemented by the SPV in collaboration with KGM. The RAP implementation period will cover a duration of **36 months**, commencing from the singing of finance agreement, though **implementation of the key principles by the SPV has already commenced.**

6. What other Environmental and Social (E&S) studies have been undertaken for the Project?

The Project secured an **EIA Positive Decision** on 17 August 2018, in accordance with the Environmental Impact Assessment (EIA) Regulation in force at the time.

Additionally, an **Environmental and Social Impact Assessment (ESIA) package,** including a Non-technical Summary (NTS), Stakeholder Engagement Plan (SEP) and E&S Management Plans, compliant with the applicable international standards, has been prepared for the Project and disclosed in Turkish and English at the Project website (www.antalyaalanyaotoyolu.com.tr).

7. How the RAP has been reviewed independently?

Potential Lenders of the Project retained an independent **Environmental and Social Consultant (IESC)** in October 2024 to carry out an **Environmental and Social Due Diligence (ESDD)** review.

The purpose of the ESDD was to conduct an independent review of the Project's ESIA package – including the RAP – and to evaluate the compliance of land acquisition activities with the standards and requirements of the Lenders. Based on this review, the IESC also developed an **Environmental and Social Action Plan (ESAP).**

The RAP implementation will be periodically monitored by the **Lenders' IESC.**

8. Why this Guide to Land Acquisition and Compensation (GLAC) has been prepared?

This GLAC has been prepared to provide people affected by Project-related land acquisition ("Project Affected People" or "PAPs") with a clear and concise overview of **the expropriation process carried out by KGM** in accordance with the Expropriation Law, and summarise the **key principles of the RAP,** particularly regarding additional compensation and assistance measures that go beyond the legally mandated cash compensation to ensure alignment with international standards and Lender requirements.

In addition, this GLAC outlines how affected people can apply to the SPV to access RAP entitlements and convey their grievances, inquiries, and feedback to the Project parties.

There are three versions of the GLAC: (i) for affected lands, (ii) for affected houses, and (iii) for affected businesses. This version is the GLAC concerning affected lands.

B. PROJECT DESCRIPTION

9. What are the key Project Components?

The Project, designed as a **dual carriageway**, has a total length of **117.8 km**, encompassing both the main Motorway (84 km – 2x3 lanes) and connection roads (33.8 km – 2x2 lanes).

Other key Project components include **7** main interchanges, **5** tunnels, **16** viaducts, **22** bridges, **56** overpasses, **43** underpasses, and **308** culverts, with **auxiliary features** including an Operational and Maintenance (O&M) Centre, four Motorway Service Facilities, toll collection areas and temporary construction facilities.

10. Are there any associated facilities of the Project?

There are no additional associated facilities in the current design. Please refer to Question 15 for information regarding temporary facilities to be used during construction.

11. What is Motorway Expropriation Corridor?

The **expropriation corridor** defines the boundaries within which land acquisition, expropriation and all construction activities are carried out for the Motorway and associated connection roads.

The width of the expropriation corridor varies along the route, with the minimum and maximum widths as follows?

- **Minimum width: ~ 55 m**
- **Maximum width: ~450 m** (at the location of service areas)

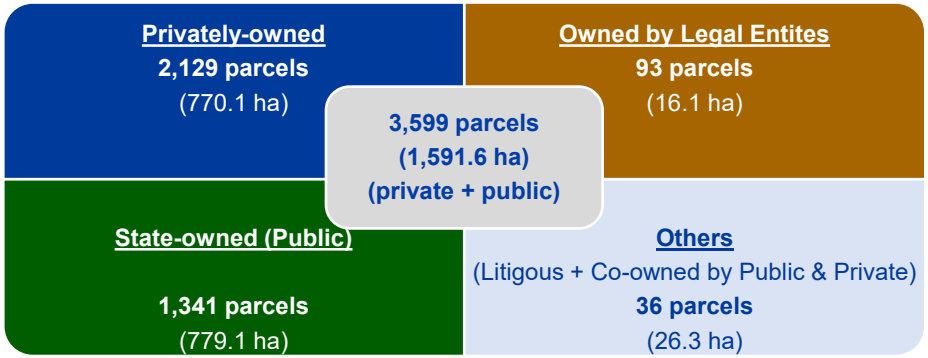
12. Which Settlements are affected within the Expropriation Corridor?

The land acquisition for the Project affects 3 districts and 57 neighbourhoods.

- **Serik (12 neighbourhoods):** Deniztepesi, Sariabali, Yukarikocayata, Asagikocayatak, Kayaburnu, Dikmen, Candir, Asagicatma, Cumali, Burmahanci, Urundu, Belpinar
- **Manavgat: (34 neighbourhoods):** Cakis, Tasagil, Gundogdu, Hocalar, Yavrudogan, Colakli, Seki, Kalemler, Evren, Ilica, Yenikoy, Siseler, Evrenleryahsi, Dolbazlar, Yukariisiklar, Dikmen, Bucakseyhler, Ulukapi, Asagisiklar, Demirciler, Karaoz, Aksaz, Haciali, Cevizler, Sulek, Haciisali, Haciobası, Kızılot, Uzunlar, Kadilar, Orensehir, Yalcidibi, Odaonu, Karakaya
- **Alanya (11 neighbourhoods):** Alara, Cakallar, Incekum, Avsallar, Akdam, Turkler, Payallar, Emisbeleni, Toslak, Telatiye, Elikesik

13. How many Parcels are Affected?

There are **3,599 private, legal entity, and public (state-owned)** parcels to be acquired **within Project's expropriation corridor.**



14. What is the land registry type of affected parcels?

The majority of the affected parcels are registered as **agricultural land**, **road**, and **forest**.

Number of Parcels per Land Registry Type (3,599 parcel)	Area of Parcels per Land Registry Type (1,591.6 ha parcel)
• **Agricultural** (2,507 parcel)	• **Agricultural** (825.6 ha)
• **Road** (258 parcel)	• **Forest** (553.5 ha)
• **Forest** (149 parcel)	• **Road** (53 ha)
• **Land with structures** (148 parcel)	• **Land with structures** (42.2 ha)
• **Constructible plot** (87 parcel)	• **Constructible plot** (9.1 ha)
• **Orchard** (101 parcel)	• **Orchard** (21.7 ha)
• **Raw soil** (83 parcel)	• **Raw soil** (15.8 ha)
• **Litigous** (13 parcel)	• **Litigous** (12.2 ha)
• **Pasture** (3 parcel)	• **Pasture** (0.2 ha)
• **Others** (250 parcel)	• **Others** (58.3 ha)

15. Which temporary facilities will be required during construction?

During the **construction phase**, the Project will utilise various temporary facilities, including **construction camp sites**, **production plants and facilities** (such as concrete batching plants, crushing/mechanical plants, and asphalt plants), as well as **quarries** and **excavated material storage sites**.

A list of planned facilities is included in the RAP.

Construction Camp Sites	• Temporary Construction Camp (KM 59+500) • Main Construction Camp Site (KM 64+500) • Manavgat Construction Camp Site (KM 87+500) • Alanya Construction Camp Site (124+300)
Plants and Facilities	• 7 concrete plants • 4 crushing/mechanical plants • 3 asphalt plants
Quarries	• 11 potential quarries
Excavated Material Storage Sites	• 20 potential excavated material storage sites

16. How is the private land for temporary facilities acquired by the Project?

Private parcels required for temporary facilities are acquired by the SPV/EPC through rental agreements, mutual protocols, or other similar arrangements made with the landowners or shareholders. Upon completion of temporary use, the land is rehabilitated and returned to the owner in accordance with the agreed terms.

17. What are key milestones in the Project schedule?

No	Key Milestones / Tasks	Date
0	**BOT Contract Signing, Site Delivery**	14 October 2024
1	**Expropriation**	
1.1	Start of inventory of assets and valuation study commenced by appointed valuation contractor	November 2024
1.2	Start of expropriation procedures – through Article 8 negotiations – by KGM	February 2025
1.3	Completion of valuation	Q4 2025 (*target*)
1.4	Completion of Article 8 negotiations as part of expropriation procedures undertaken by KGM	
	Phase 1: KM 52 – 56; KM 74 – 104; KM ~64 (O&M Centre), KM ~80 (Concrete Plant)	February – August 2025 (***completed***)
	Phase 2: KM 56 – 74; KM 104 – 116; Connection Roads: Manavgat East, D-400, Serik	September 2025 – January 2026 (*target*)
	Phase 3: KM 116 – 141; Connections roads: Taşağıl, Manavgat, Alarahan and Konaklı	April 2026 (*target*)
2	**E&S Studies and Finance Agreement**	
2.1	Start of ESIA Package studies	March 2024
2.2	Start of RAP studies	April 2025
2.3	ESIA Package Disclosure by SPV, Lenders (60 days)	Q2 and Q3 2025
2.4	Finance Agreement Signing	6 October 2025
3	**Construction Works**	36 months after Signing
3.1	Land entry by the Project for design-related activities	November 2024
3.2	Site Mobilisation and Start of Construction	March 2025
3.3	Earthworks and Construction of Engineering Structures (incl. Connection Roads)	January 2028
	KM 52+000 – 80+000	November 2027 (*target*)
	KM 80+000 – 114+750	January 2028 (*target*)
	KM 114+750 – 141+705	November 2027 (*target*)
3.4	Tunnels, Viaducts, Superstructure, O&M Centre, Motorway Service Facilities (MSFs) and Other Secondary Works	March 2028
4.	**Motorway Commissioning**	Within 36 months from the date of signing the finance agreement

C. LAND ACQUISITION STATUS AND DISPLACEMENT IMPACTS

18. What is the status of land acquisition?

A **Public Benefit Decision** (No: 2023/371) for the Project was declared by the MoTI on **28 November 2023.**

A Presidential Decree (No. 9708) concerning the **Accelerated Expropriation** of certain immovable properties under the scope of the Project (located within the settlements covered by the Decree) by the KGM in line with **Article 27 of the Expropriation Law of Türkiye** (Law No. 2942, 1983) was published in the Official Gazette (No. 32857) on **30 March 2025.**

The **Expropriation Decisions** were taken for the Project by KGM between December 2024 and May 2025.

Pursuant to these decisions, **land acquisition activities for the Project commenced in February 2025**.

- Between February and August 2025, expropriation procedures were initiated for 22% of the **private parcels through Article 8 invitations and negotiation meetings.** and
- KGM has resorted to the **accelerated expropriation** for **3%** of the **private parcels.**
- Forestry permits have been obtained for over 75% of the forest lands located within the Motorway's expropriation corridor.

Planned Schedule of Article 8 Negotiation Meetings

Negotiation Meeting Date	Settlements
Completed between February – September 2025	Serik: Deniztepesi, Sarıabalı
	Manavgat: Şişeler, Taşağıl, Aksaz, Cevizler, Demirciler, Hacıali, Hacıisalı, Hacıobası, Karaöz, Sülek, Aşağıışıklar, Bucakşeyhler, Dikmen, Ulukapı, Yukarıışıklar, Dolbazlar, Evrenleryavşi, Kalemler, Seki, Yeniköy, Şişeler
October 2025 *(planned)*	Manavgat: Kadılar, Karakaya, Odaönü, Örenşehir, Uzunlar, Yalçıdibi
November 2025 *(planned)*	Serik: Aşağıkocayatak, Çandır, Dikmen, Kayaburnu, Yukarıkocayatak
	Manavgat: Çakış, Çolaklı, Gündoğdu, Hocalar, Taşağıl, Yavrudoğan
November 2025 *(planned)*	Manavgat: Hacıobası, Kızılot
January – February 2026 *(planned)*	Serik: Deniztepesi, Sarıabalı, Üründü, Belpınarı, Burmahancı, Cumalı, Aşağıçatma
February – April 2026 *(planned)*	Manavgat: Evren, Ilıca
	Alanya: Alara, Çakallar, Akdam, İncekum, Avsallar, Türkler, Payallar, Emişbeleni, Toslak, Telatiye, Elikesik

19. What is the status of land entry and construction?

The site was officially delivered by KGM to the SPV in October 2024, following the signing of the BOT Contract.

After site delivery, design-related activities – including drilling operations– were initiated in **November 2024**.

Site mobilisation for Project construction began in **March 2025**, financed through the Company's own equity.

Currently, **construction works are ongoing primarily on forest parcels**, for which forestry permits have been obtained.

As the expropriation of privately owned parcels is finalised, construction activities are also initiated by the SPV and EPC on those parcels following the compensation payments by KGM, in line with the national Expropriation Law, and the provision of additional support by the SPV under the RAP.

20. What are the potential displacement impacts of the Project and who would be affected?

Permanent or temporary land acquisition for the Project will lead to **physical or economic displacement** for the **owners and/or users (formal or informal)** of the affected lands and structures.

The land acquisition-related impacts are primarily classified under the following:

(i) **Affected lands** (may include non-residential and non-commercial structures)
(ii) **Affected houses** (299 building on 231 parcels with 341 households)
(iii) **Affected greenhouses** (599 greenhouse units on 347 parcels)
(iv) **Affected businesses** (29 businesses to be relocated + 8 roadside local product vendors operating on lands already expropriated by KGM)
(v) **Impacts on vulnerable people**
(vi) **Temporary losses/impacts during construction**, and
(vii) **Impacts during operation**

21. Will there be further land acquisition beyond the current expropriation Corridor?

The Project may require **further land acquisition** beyond the currently defined expropriation corridor, either during construction or, on a limited basis, after commissioning.

In case of future land acquisition requirements, the required land will be acquired by KGM in line with the Expropriation Law. Potential displacement impacts and access restrictions associated with such land acquisition or expropriation will be managed by the SPV – in collaboration with KGM – in accordance with the RAP principles.

22. What are the cumulative land acquisition and resettlement impacts of the Project?

Cumulative land acquisition impacts may arise when landowners or users are affected by multiple, overlapping land-related acquisitions linked to the Project or other developments in the region or directly to the Project.

During RAP implementation, a field-based cumulative impact assessment study will be conducted by the SPV, with support from third-party technical consultants, to make parcel-based identification of affected owners and users, assess and address these impacts under the specific budget allocated by the SPV.

D. EXPROPRIATION PROCESS IN LINE WITH EXPROPRIATION LAW

23. What is the legal basis of the expropriation process?

In the Republic of Türkiye, expropriation is carried out in accordance with **Article 46 of the Constitution** and implemented through the provisions of **Expropriation Law (No. 2942).**

The **Directorate General of Highways (KGM)** is responsible for the expropriation of privately-owned parcels in accordance with Türkiye's Expropriation Law (No. 2942), as well as coordinating the allocation of public parcels.

According to the BOT Contract, the SPV is responsible for covering a portion of the expropriation costs for the Project. The amount to be covered by the SPV is specified in the BOT Contract. Any costs exceeding this specified amount will be covered by KGM.

24. Which procedures does KGM carry out under the Expropriation Law?

Land acquisition is conducted through either negotiated settlement (Article 8) or judicial expropriation.

For detailed information on the expropriation process carried out by the KGM and its procedural steps, please refer to the booklet titled *"**Procedural Steps in Expropriation Activities Conducted by the General Directorate of Highways**"*, which has been distributed by the SPV alongside this GLAC.

25. Who is eligible for compensation under the Expropriation Law?

Under national legislation, the following categories of PAPs are eligible for compensation:

Affected Asset	Eligible PAPs
Private Parcels	• **Owners** of lands, trees, crops, structures on affected lands • **Formal land users** (with official documentation) for trees, structures, crops on affected lands • **Informal land users who have evidence** of structure and tree ownership on affected lands (eligible under Exp. Law - Art. 19) • **Litigant owners/shareholders or formal and informal users of litigious parcels**
Public Lands	• **Formal public land users** (who have official documentation, e.g. adequate pay "*ecrimisil*", rental agreement) for trees, crops, and structure • **Informal public land users who have evidence** of structure and tree ownership on affected lands (eligible under Exp. Law - Art. 19)
Greenhouses	• Owner of the greenhouse – owner/shareholder of the private land • Owner of the greenhouse – formal tenant of the land, owner of the greenhouse • Formal tenant of the greenhouse on lands owned by others (not the owner of the greenhouse) • Owner of the greenhouse – informal user of treasury lands (with no official documentation for land use but can prove their ownership of the structure) • Owner of the greenhouse – informal user of forest and pasture lands or with no official documentation proving their ownership of the structure

E. COMPENSATION AND ENTITLEMENTS UNDER RAP TO MEET INTERNATIONAL STANDARDS

26. What additional compensation and entitlements are provided by the SPV through RAP implementation, beyond those offered by KGM under the Expropriation Law?

In addition to the compensation provided by KGM in accordance with the Expropriation Law, **the SPV implements supplementary compensation and livelihood restoration measures under the RAP** for owners as well as formal and informal users of affected lands, and greenhouses.

The SPV has established a dedicated **RAP Fund** for covering all costs arising from the implementation of additional measures beyond those required under national legislation. This Fund is allocated and managed by SPV, in coordination with KGM.

27. What are the Key Compensation and Assistance principles outlined in the RAP?

- Avoidance of Forced Eviction: The Project will not carry out forced evictions except in accordance with national legislation and the requirements of IFC PS5.
- Prioritisation of Purchase through Negotiated Settlement over Expropriation: KGM has prioritised negotiated settlements through Article 8 (purchase method). Article 27 will be used by KGM as a last resort, only after Article 8 process.
- Compensation at Full Replacement Cost: All compensation to people affected by land acquisition will be provided at full replacement cost. This includes market value plus any applicable transaction costs, as required by Lenders.
- Livelihood Restoration and Assistance in addition to cash compensation: The SPV will provide livelihood restoration and assistance measures to eligible affected people, including owners and users of affected houses and lands, as well as their formal and informal users, in accordance with the requirements of the Lenders.
- Early Consultations and Notification for Land Acquisition Process:

  Affected houses: The SPV will notify the owners and tenants of affected structures at least **three months** in advance of the commencement of expropriation, in alignment with KGM's expropriation programme. This is intended to avoid forced eviction and allow sufficient time (more than six months) for resettlement planning.

  In cases where expropriation has already been concluded, the SPV will inform property owners of the Project schedule. Each owner will be granted a six-month notice period to vacate the property following notification, unless a mutually agreed alternative timeframe is established.

  Affected lands: The SPV will notify **users of affected lands at least three months** before land entry.

  Land entry will only proceed after the completion of the expropriation process – including payment – or upon finalisation of mutual agreements.
- Vulnerable Groups: The SPV will pay specific attention to vulnerable individuals and households, and provide tailored assistance in line with the measures outlined in the RAP. In-kind support will be provided by the SPV to the vulnerable households.

  The identification of vulnerable individuals and households has already been initiated as part of the RAP process. Households to be provided with support will be further determined (depending on their vulnerability levels) by the SPV, with support from third-party implementation partners and consultants, during RAP implementation.

28. What is Cut-off Date for Eligibility?

The **cutoff date** is the date after which any new structures, trees, crops, and other immovable assets will no longer be counted or measured for compensation purposes.

The cut-off dates are determined **based on the completion date of the census and asset inventory surveys** conducted in each respective settlement. Therefore, the cutoff is specific to each affected settlement.

The SPV posts the list of affected parcels along with a notice disclosing the applicable cut-off date and its conditions. These are posted in the offices of the mukhtars, local coffee houses, and other appropriate public venues (such as mosques and community gathering spaces used by local men and women) within the respective affected settlements.

29. Who is Eligible for Compensation and Assistance under RAP?

All people affected by the Project and owning and/or using (formally or informally) the affected lands and assets **before the cut-off dates** defined in the RAP are eligible for compensation and assistance under RAP.

Accordingly, **people who encroach on the Project area after the cut-off date** are **not** eligible for compensation or assistance provided through the implementation of the RAP.

Regarding the affected lands, all persons using the lands for generating agricultural income (including both formal and informal users – regardless of their total productive agricultural area) will be eligible for entitlements and livelihood restoration and improvement measures defined in the RAP.

PAPs who believe they have not been included in the process or are eligible for the entitlements can apply to the Project CLOs with the required documents and an application letter. Their eligibility for compensation and/or assistance will be evaluated by the SPV. After the evaluation, they will be informed of the outcome, and if deemed eligible, they will be granted access to the relevant compensation and/or assistance.

The eligibility categories identified in the RAP are as follows:

Affected Lands	• Landowners (private parcels) • Formal and informal land users (private and public parcels used for agriculture and grazing) • Users of litigous properties • Owners, formal and informal users of orphan and fragmented parcels • Users of forest parcels for economic activity • Owners of affected crops and trees on affected lands • Owners of non-residential and secondary structures on affected lands (maybe formal or informal user of affected land) • Vulnerable landowners and land users • Owners, formal and informal users of parcels acquired through constitution of servitude
Affected Greenhouses	• Owner of the affected greenhouse, owner of land • Owner of the affected greenhouse, formal or informal user of the land • Tenant of the affected greenhouses • Vulnerable landowners or land users
Lands subject to Temporary Losses and Impacts during Construction	• Owners of lands and structures affected temporarily • Formal and informal users of and structures affected temporarily • Beneficiaries of infrastructures and services termpoarily affected during construction

30. What are the RAP entitlements specific for owners and users of affected private parcels?

- **Owners and Shareholders of Affected Private Parcels**

Under the Expropriation Law of Türkiye, **owners and shareholders** of affected private parcels are entitled to receive cash compensation from KGM for their affected land, structures (after depreciation is deducted), trees and crops that cannot be harvested.

The owners and shareholders of affected private parcels are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- **Assistance in searching replacement land** that is of similar quality, size, and location, subject to availability.
- Compensation to cover **transaction costs** applicable to the acquisition of replacement, if replacement land of similar quality, size, and location is identified by the PAPs who reach an agreement with KGM under Article 8.
- SPV support to cover **small costs** for official expropriation procedures (such as power of attorney costs, working capital fund for title deed transactions, inner and inter city transportation costs, etc.)
- SPV support for **relocating movable assets** to an alternative land determined by PAP.
- **Access to livelihood restoration, improvement and assistance measures** (as outlined under Question 35) provided by SPV through RAP Fund if land is used for economic activity.

> ***Important Note to PAPs**: Regarding expenditures such as transaction costs or small costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Formal and Informal (Agricultural) Users of Affected Private Parcels:**

Under the Expropriation Law of Türkiye, **formal or informal users** of affected private parcels are **not** entitled to receive cash compensation from KGM. However, they are compensated for their trees and any structures or fixed improvements/investments (after depreciation is deducted) on the rented land, provided they can demonstrate ownership of these crops and assets.

The users of affected private parcels are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- **Assistance in searching replacement land** that is of similar quality, size, and location, subject to availability.
- **One-off transitional support equivalent to the 1-year rental fee (**including any transaction costs such as new tenancy registration, fees to the authorities, cost of transport, etc.) of the lost agricultural land
- **For long-term formal tenants** (whether for greenhouses or open fields) who have paid rent in advance, guidance by the SPV regarding the legal procedures to follow to obtain a refund for the unused portion of the rental payment and if the unused portion of the rental payment cannot be obtained from the landowner, compensation of the outstanding amount by the SPV from the RAP Fund (such tenants and their tenancy agreement conditions will be determined by the SPV on a case-by-case basis during RAP implementation).
- **For long-term formal tenants** (whether for greenhouses or open fields), in cases where tenants are subject to fines under their lease agreements due to early termination, support or compensation by SPV to ensure that tenants are not disadvantaged (based on case-by-case review of the specifics of tenancy agreements).
- Notification of the user by SPV **three months in advance of land entry.**
- If land entry by the Project is required before the end of the harvesting period, **cash compensation for unharvested crops and products** (e.g., fruits) prior to land entry.
- SPV support for **relocating movable assets** to an alternative land determined by PAP.
- If there are major fixed improvements or investments (*including structures such as barns, sheds, depots, pools, etc.)* made or owned by the **informal user** on the affected land, top-up compensation in addition to the compensation paid by KGM (based on evidence of ownership) – in order to reflect market value as KGM compensates only for the **minimum material cost** under Article 19 of the Expropriation Law.
- Access to **livelihood restoration, improvement and assistance** measures (as outlined under Question 35) provided by SPV through RAP Fund.

> ***Important Note to PAPs****: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Litigant Owners and Shareholders:**

When there is a court dispute regarding the ownership of a litigious parcel, the rightful owners or shareholders eligible for compensation under the Expropriation Law are determined by the court in accordance with Article 18 of the Law.

The SPV will inform the litigant owners **about the land acquisition process**, as well as their rights and entitlements under this RAP.

Individual consultations will be held with the litigant owners/shareholders of parcels that contain houses and greenhouses to identify any specific vulnerabilities for design and delivery of tailored measures on a case-by-case basis.

The court proceedings will be monitored by SPV to mitigate any potentially exacerbated impacts arising from lengthy legal procedures.

If the case is concluded in favour of the litigant owner, they will be entitled to all RAP entitlements defined for private landowners.

- **Owners of Orphan Lands (Unacquired parts of Expropriated Parcels)**

For the unacquired portions that were not previously included in KGM's expropriation, the owner or shareholder of the affected parcel **has the right to formally apply to KGM**, in accordance with Article 12 of the Expropriation Law, to request the acquisition of the remaining part of the parcel if it is deemed economically unusable or undevelopable.

For all parcels, in line with the Expropriation Law and KGM's established practice, KGM accepts official applications from affected people – submitted within 30 days of receiving notice of expropriation by agreement – requesting the expropriation of orphan lands and evaluates each application on a case-by-case basis.

Relevant requests submitted by landowners to KGM through petitions will be periodically reviewed by the SPV as part of the Project's grievance mechanism. For cases where the acquisition request of the owners or shareholders is not positively concluded by KGM or where relevant grievances or claims are received by the Project, the SPV will engage a third-party valuation expert to review each case/claim individually and determine the actions required to be taken by SPV, if any.

- **Owners of Affected Crops**

According to Article 20 of the Expropriation Law, the evacuation of cultivated lands that are subject to expropriation must take place after the harvest period. If land entry occurs before harvesting, the crop owners are entitled to compensation.

The SPV will notify the crop owners at least **three** months in advance of land entry.

If land entry by the Project is required before the end of the harvesting period, **cash compensation for unharvested crops and products** (e.g., fruits) prior to land entry.

- **Owners of Affected Trees**

In accordance with the Expropriation Law, cash compensation is provided by KGM to the owner of the trees. Pursuant to Article 19 of the Expropriation Law, when trees are located on titled lands owned by others, on ownerless lands, or on lands not legally acquired by their possessors, compensation by KGM is paid to the possessor of the trees. This does not apply to trees on forest or pasture parcels.

The owners of affected trees are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

  - Notification of the tree owners at least **three** months in advance of land entry.
  - If land entry by the Project is required before the end of the harvesting period of the fruit trees, **cash compensation for unharvested products** (e.g., fruits) prior to land entry.
  - For fruit trees owned by informal users on **forestry or pasture lands**, which are not subject to compensation by KGM, **determination of the product value by a third-party valuation expert** commissioned by the SPV and provision of cash compensation reflecting this value to the informal users by the SPV from the RAP Fund.
  - Where needed, top-up cash compensation to compensate dense planting deduction applied by KGM, if any.
  - Commissioning of **third-party valuation expert** by the SPV for the verification of compliance of tree valuation with international standards, or and determination of the actions required to be taken by the SPV, where needed.
  - Commissioning of **third-party valuation expert** by the SPV for the review of any grievance, claim, or request raised during Article 8 negotiation meetings related to orchard valuation, and determination of the actions required to be taken by the SPV (such as provision of top-up compensation to cover any compensation gap with international standards), where needed.

- **Owners of major non-residential/secondary structures (may be the owner or formal or informal user of land)**

In accordance with the Expropriation Law, cash compensation for non-residential structures and infrastructure is provided by KGM. Depreciation is applied. As per Article 19 of the Expropriation Law, for buildings or structures located on titled lands owned by others, on ownerless lands, or on lands not legally acquired by their possessors, the minimum material cost of the structure is paid to the possessor.

The owners of *major* non-residential/secondary structures (*including structures such as barns, sheds, depots, pools, etc.)* are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

  - **Top-up cash compensation** to the structure owner (may be the land owner or formal land user with evidence) in order to cover the amount deducted for depreciation.
  - If there are major fixed improvements or investments made or owned by the **informal user** on the affected land (with proof of structure ownership), provision of **top-up compensation** by SPV in addition to the compensation paid by KGM – in order to reflect market value as KGM compensates only for the **minimum material cost** under Article 19 of the Expropriation Law.
  - **If the assets owner (informal land users) cannot prove her/his ownership claim,** commissioning of **third-party valuation expert** by the SPV for the review of the case and determination of market value for these assets for provision of cash compensation at full replacement cost by the SPV from the RAP Fund.

- **Owners of parcels to be acquired through constitution of servitude** (easement rights)

In accordance with Article 4 of the Expropriation Law, instead of acquiring full ownership of immovable assets, easement rights may be established through expropriation on a specific section, height, depth, or source of the immovable, provided that such rights are sufficient to serve the intended purpose.

Cash compensation is paid to the owners/shareholders for the alignments. As stipulated by the Law, ownership rights remain with the landowner, subject to the implementation of necessary safety measures.

They will be entitled to access livelihood restoration, improvement, and assistance measures provided by the SPV through the RAP Fund.

31. What are the RAP entitlements specific for the formal and informal users of affected public parcels?

Formal and informal users of public parcels are entitled to the same entitlements as those provided to formal and informal users of affected private parcels, as outlined under Question 30.

Additionally, if there are major fixed improvements or investments (*including structures such as barns, sheds, depots, pools, etc.)* made or owned by the informal user on the affected land – **excluding those on forest and pasture lands** – top-up compensation will be provided by the SPV from the RAP Fund to the informal user (based on evidence of structure ownership) – in order to reflect market value as KGM compensates only for the **minimum material cost** under Article 19 of the Expropriation Law.

If the trees and assets owned by informal users are located **on forestry or pasture lands**, which are not subject to compensation by KGM, their market value will be determined by a third-party valuation expert to be commissioned by the SPV. Cash compensation reflecting this value will be provided to the informal users by the SPV from the RAP Fund (based on evidence of structure ownership).

32. What are the Specific RAP Entitlements specific for the Owners and Users of Affected Greenhouses?

- **Owners of the Greenhouses – who own the Land**

In accordance with the Expropriation Law, cash compensation for greenhouses is provided by KGM to the owner of the greenhouse. Depreciation is deducted. In this Project, for parcels containing **greenhouses**, the parcel may be expropriated fully if the remaining area is **less than 400 m²** – subject to application by the PAPs and evaluation by KGM.

The owners of affected greenhouses – who own the Land – are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- Notification of the crop owners at least **three** months in advance of land entry.
- Top-up cash compensation to cover the amount deducted for **depreciation**;
- If not included in the expropriation value provided by KGM, additional cash compensation at full replacement cost to cover the cost of fixed (non-movable) investments and improvements made by the greenhouse owner, such as irrigation, heating, drainage, lighting system and components, etc. – a third-party valuation expert commissioned by the SPV will determine the associated costs on market prices.
- Compensation for costs incurred by greenhouse owners – whose greenhouses are partially expropriated – to support repair and adjustment works on the remaining portions, such as the rearrangement of irrigation or drainage systems, repair of greenhouse nylon covers, and similar interventions.
- If land entry by the Project is required before the end of the harvesting period, **cash compensation for unharvested crops and products** (e.g., fruits) prior to land entry. If the greenhouse is partially affected, crop compensation will be provided for the affected part.
- Assistance in searching a replacement site for the relocation of the greenhouse, if such relocation is planned by the greenhouse owner.
- If requested by the PAPs, support for the preparation of the land where the greenhouse will be reestablished – this may include the provision of construction machinery and labour, land levelling, provision of suitable topsoil stripped from Project areas, infrastructure connections for electricity, water, other utilities, etc.
- Assistance for rearranging the greenhouse to ensure continuity of operations (rearrangement of irrigation system, drainage system, heating system, etc.), if requested, if the greenhouse is partially affected and the owner continues operations on the remaining land.
- Arranging the full relocation or reimbursement of the moving costs (disassembly-assembly) incurred by the greenhouse owners for their movable assets and infrastructure components (such as movable irrigation system components), through direct payment to vendors or based on submitted evidence or documentation, at the time the expenses are incurred.
- **Access to livelihood restoration, improvement and assistance measures** (as outlined under Question 35) provided by SPV through RAP Fund.
- Information of the landowners and shareholders about their right to apply for the acquisition of orphan land in accordance with the Expropriation Law and coordinating consultations with KGM to facilitate the acquisition of the remaining portion – subject to evaluation and approval by KGM.

- **Owners of the Greenhouses – who are formal user (tenant) of the Land**

In accordance with the Expropriation Law, cash compensation for greenhouses is provided by KGM to the greenhouse owner, provided that the greenhouse owner holds a formal tenancy agreement or has obtained formal consent from the landowner.

The owners of affected greenhouses – who are formal users (tenants) of the Land – are entitled to all relevant entitlements outlined for the "**Owners of the Greenhouse – who own the Land**".

They are further entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- **One-off transitional support equivalent to the 1-year rental fee (**including any transaction costs such as new tenancy registration, fees to the authorities, cost of transport, etc.) of the lost agricultural land with affected greenhouse.
- **For long-term formal tenants** who have paid rent in advance, guidance by the SPV regarding the legal procedures to follow to obtain a refund for the unused portion of the rental payment and if the unused portion of the rental payment cannot be obtained from the landowner, compensation of the outstanding amount by the SPV from the RAP Fund (such tenants and their tenancy agreement conditions will be determined by the SPV on a case-by-case basis during RAP implementation).
- **For long-term formal tenants** in cases where tenants are subject to fines under their lease agreements due to early termination, support or compensation by SPV to ensure that tenants are not disadvantaged (based on case-by-case review of the specifics of tenancy agreements).

***Important Note to PAPs**: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Formal Tenant of the Greenhouses on lands owned by others – not the owner of the greenhouse**

In accordance with the law, no compensation for greenhouses is provided to the tenants of the greenhouses on land owned by others. However, the greenhouse owner and tenant may reach a separate agreement based on the terms and conditions of the tenancy contract.

They are entitled to all relevant entitlements outlined for the "Owners of the Greenhouse – who are formal user (tenant) of the Land" **but not entitled to** any "Top-up Cash Compensation to achieve Full Replacement Value of the Structures".

- **Owners of the Greenhouses – who are informal users of Treasury Lands** (with no official documentation for land use but can prove their ownership of the structure)

As per Article 19 of the Expropriation Law, for buildings/structures on lands with title deeds belonging to others, lands which do not have owners, and/or lands not acquired by their possessors, minimum material cost of the structure is paid to the possessor.

They are entitled to all relevant entitlements outlined for the "**Owners of the Greenhouse – who own the Land**"

They are further entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- Top-up cash compensation to reflect market value and achieve full replacement cost of the assets, as KGM pays for minimum material cost as per Article 19 of the Expropriation Law – a third-party valuation expert commissioned by the SPV will determine the replacement cost at market value.
- **One-off transitional support equivalent to the 1-year rental fee (**including any transaction costs such as new tenancy registration, fees to the authorities, cost of transport, etc.) of the lost agricultural land with affected greenhouse

> ***Important Note to PAPs****: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Owners of the Greenhouses – who are informal users of Forest and Pasture Lands or who cannot prove her/his ownership claim**

In accordance with the Expropriation Law, **no compensation** for land or structures is provided as informal users of forest and pasture lands are considered as illegal occupants and they are not entitled to any form of legal compensation for either the land or the assets.

They are entitled to all relevant entitlements outlined for the ""**Owners of the Greenhouse – who own the Land**" **but not entitled to** any "Top-up Cash Compensation to achieve Full Replacement Value of the Structures".

They are entitled to receive the following compensation and assistance from the SPV under the RAP:

For greenhouses owned by informal users are on forestry and pasture lands, which are not subject to compensation by KGM, or if the greenhouse owner (informal land users) cannot prove her/his ownership claim, determination of the market value of the affected greenhouse by a **third-party valuation expert** commissioned by the SPV and provision of cash compensation reflecting this value by the SPV

- **One-off transitional support equivalent to the 1-year rental fee (**including any transaction costs such as new tenancy registration, fees to the authorities, cost of transport, etc.) of the lost agricultural land with affected greenhouse

> ***Important Note to PAPs****: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

33. What specific RAP entitlements are available for people affected by construction impacts?

Construction phase impacts on people and environment will be managed through the measures specified in the Project ESIA, ESMP and subject-specific management plans (e.g. Community Health and Safety Plan) to be implemented by the SPV and construction (EPC) contractors (including subcontractors) with the objective of avoiding the impacts where possible, and where avoidance is not possible minimising and/or compensating the impacts.

PAPs may contact Project CLOs through contact information provided at the end of this GLAC to submit their construction-related grievances and feedback through Project's Grievance Mechanism.

The RAP entitlements to be provided by the SPV through implementation by the party causing the damages and losses that cannot be avoided during construction will be as below:

- **Private owners/shareholders of lands to be used temporarily during construction (including access restrictions)** will be provided with cash compensation for the use of land and any economic activity (cost of crops, trees, infrastructure etc. at market prices) based on mutual agreements /rental agreements.
- **Formal and informal users of public and private lands to be used temporarily during construction** will be compensated for crops, trees and structures, provided with 1-year rental support for the lost agricultural area and access to livelihood restoration measures defined under RAP.
- **Owners and formal/informal users of lands and assets damaged by construction** will be compensated at full replacement value for any damage on properties.

34. What Type of Assistance will be Provided to Vulnerable Groups and Individuals?

Households with vulnerable members will be provided by the SPV with special support and/or assistance on a case-by-case basis.

- **In-kind support** (e.g. agricultural input materials, tailored support packages) to vulnerable households identified during RAP preparation and implementation.
- **For vulnerable households affected by physical and/or economic displacement, priority** for all livelihood restoration, improvement, and assistance measures outlined in the RAP.
- Specific attention to vulnerable people during information, consultation, negotiation and post-resettlement monitoring processes through individually informing vulnerable PAPs about the Project, land acquisition process, RAP entitlements/support, and the grievance mechanism.
- Timely updates regarding expropriation status and court decisions, based on notifications received from KGM
- Assistance with applications to KGM for acquisition of remaining, unusable land parcels (orphan lands), including help with documentation, communication, and logistics.
- Support in completing legal and administrative procedures to enable timely access to expropriation payments.
- Facilitation of access to legal advice and public institutions, including assistance with preparing and submitting required documentation.
- In case the vulnerable PAPs own non-residential structures affected by the Project (e.g. barns, sheds, etc.), in-kind support and assistance for reconstruction of the affected structure at an available location to be indicated by the vulnerable PAP.
- Assistance in identifying and applying to existing government or third-party support programs targeting vulnerable individuals or households
- Where needed or requested, support to individuals in opening bank accounts to facilitate direct access to compensation and support payments.
- Priority for unemployed female members of physically and/or economically displaced households who are actively seeking employment.
- Training programmes to be designed and delivered by the external Agricultural Consultancy Companies.
- Women-specific training programmes.

35. What types of Livelihood Restoration, Improvement, and Assistance Packages are available to Agricultural Land Users in relation to their affected lands?

Livelihood restoration, improvement, and assistance will be provided to people who use the affected agricultural lands – including both formal and informal users of open fields and greenhouses. These measures aim to help them return to their previous income levels, or improve their livelihoods where possible.

The support packages available to agricultural land users will include the following measures:

Livelihood Restoration, Improvement and Assistance Packages for Affected Lands					
Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
External Agricultural Consultancy Support (for 36 months)	Agricultural Training Programs	Distribution of Seedlings, Agricultural Inputs and Materials	Transitional (One-year) Rental Support for Replacement Land	Crop Payments	Priority in Project Employment

All individuals using the affected lands to generate agricultural income – including both formal and informal users, regardless of the total size of their productive agricultural area – will be eligible for the entitlements and livelihood restoration and improvement measures defined in the RAP.

As RAP implementation progresses, consultations between the SPV and affected individuals will continue on an ongoing basis.

Livelihood restoration and improvement measures will be updated as necessary.

Vulnerable households affected by physical and/or economic displacement will be prioritised for all livelihood restoration, improvement, and assistance measures outlined in the RAP. Tailored support and assistance for vulnerable households and individuals

36. How will eligible PAPs be identified, and which documents will be requested from them for eligibility evaluation and decision-making?

During RAP implementation, the SPV will proactively engage with the PAPs to identify potential eligible people and inform them about the livelihood restoration, improvement and assistance measures available to them and requested documents. The eligibility of PAPs to benefit from RAP entitlements will be evaluated by the SPV on a case-by-case basis.

Important Note to PAPs: *PAPs may also contact the Project CLOs using the contact information provided at the end of this GLAC to request further information, share suggestions, or express their interest in participating in the relevant support packages.*

The documentation requested from PAPs for the evaluation of their eligibility for RAP entitlements may include, but is not limited to, the following. It should be noted that this list is not exhaustive, and the SPV reserves the right to request additional documentation at any stage of the eligibility assessment process:

Affected Agricultural Land Users

- Official documentation of ownership for the affected assets such as lands, greenhouses, etc. (e.g., land registry records/title deeds, inheritance documents, ownership documents) (*for owners*)
- Documentation on the total productive area owned and/or used, both within and outside the expropriation corridor (*for owners, formal and informal users*)
- Tenancy agreements (*for formal users*)
- Evidence/confirmation of land use provided by settlement heads, community leaders, and other credible witnesses or third parties (*for informal users*)
- Documentation on transaction costs (*for owners, formal and informal users*)
- Evidence of expenditures made for fixed investments and improvements (*for greenhouse owners*)

F. STAKEHOLDER ENGAGEMENT AND INFORMATION DISCLOSURE

37. How will PAPs and interested parties be engaged during the Disclosure Period and RAP implementation period?

The Project has a **Stakeholder Engagement Plan (SEP)** disclosed at the Project website (www.antalyaalanyaotoyolu.com.tr).

The RAP separately includes a detailed **Stakeholder Engagement Action Plan** for RAP disclosure and implementation phases. The following RAP specific disclosure activities are conducted:

- The RAP (including the GLAC) **will be published in English and Turkish on the SPV and Lenders' websites**, in line with their disclosure policies and timelines.
- This GLAC, explaining the entitlements and next steps clearly to all affected people and stakeholders, will be delivered to the offices of mukhtars and directly to affected people and vulnerable individual in each settlement.
- The **hard copies (in Turkish)** of the final RAP and GLAC will be made available at the following locations: Project Information Office in Serik, Project's Construction Camp Sites, and Offices of the settlement heads (mukhtars)
- The **SPV CLOs will engage individually with affected households that include vulnerable members** to distribute the GLAC and communicate the key information from the RAP, as applicable.
- Specifically for the disclosure of the RAP, the RAP Implementation Team will organise separate group and/or individual meetings and information sessions prior to Article 8 negotiation meetings. **Priority will be given to settlements where land was or will be expropriated in the 2025, as listed in the table below under the "**Priority Settlements to be covered during the Disclosure Period".
- Meetings in other settlements will continue throughout the first year of RAP implementation, in alignment with the expropriation and construction schedules.
- **The Project will continue engaging with affected people throughout the 36-month RAP implementation period** in line with the RAP Stakeholder Engagement Action Plan for RAP.

G. PROJECT GRIEVANCE MECHANISM

38. How can stakeholders submit complaints and feedback about land acquisition to KGM?

KGM, as the authority responsible for expropriation, collects and manages all complaints, objections, and feedback related to land acquisition in line with its official procedures.

Stakeholders can submit land acquisition-related complaints and feedback to KGM through **KGM's institutional grievance channels**, which operate **in parallel with the Project's own grievance mechanism**.

Complaints related to expropriation, valuations, or compensation procedures carried out by KGM can be submitted **directly to KGM** through official channels, including:

- Through KGM's online grievance system: https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Root/SikayetGeriBildirim.aspx
- Direct applications or petitions to **KGM 13th (Antalya) Regional Directorate** (Expropriation Department):
  - Mail or in-person application: Fabrikalar Mah. Gazi Bulvarı 07090, Kepez, Antalya, Türkiye
  - Phone: +90 242 320 70 00 Fax: +90 242 345 36 99
  - E-mail: bol13@kgm.gov.tr

In addition, stakeholders may submit grievances through the Presidency's Communication Centre (CIMER – https://www.cimer.gov.tr/ or 150). While CIMER is a national-level centralised communication platform, any land acquisition-related grievances submitted via CIMER are forwarded to and handled by KGM through internal coordination systems.

The grievances that fall under KGM's legal responsibility will be managed under **national administrative and legal procedures**, separate from the Project's grievance process.

The SPV does **not have a mandate to intervene** in grievances that fall under KGM's legal authority. If PAPs submit such complaints to the SPV, the SPV will guide them to the correct channels. When needed, the SPV will forward these complaints to KGM in writing.

39. Is there a Project-specific Grievance Mechanism and how can stakeholders submit their land acquisition-related complaints and feedback to SPV?

Yes, the **SPV has set up a Project-specific Grievance Mechanism** as part of the ESIA process, alongside the preparation of the RAP. This mechanism is used to collect and manage complaints and feedback related to the **SPV's areas of responsibility**, including RAP implementation and construction-related impacts.

This Mechanism is accessible to all stakeholders, including Project-Affected Persons (PAPs) and vulnerable individuals.

Grievances related to formal expropriation or compensation procedures under the legal responsibility of KGM and **must be submitted directly to KGM.**

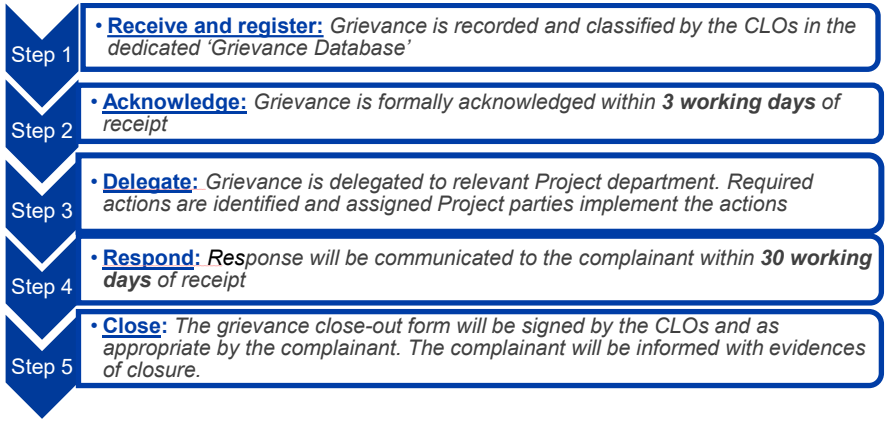
Through this mechanism, stakeholders can submit their concerns using the **channels listed below in Section H "CONTACT INFORMATION FOR STAKEHOLDERS"**

Any grievance and feedback (verbal or written) lodged or conveyed through different channels will be registered in the Project Grievance Database and managed as per the Project SEP, **by observing the requirements stipulated by the Law on the Protection of Personal Data (Law No. 6698, 2016).**

This Mechanism does not replace citizens' right to apply to other formal mechanisms including courts, CIMER) and Antalya Metropolitan Municipality's portal and call centre, among others.

40. What are the steps of the Project's Grievance Mechanism and how are complaints handled?

Key steps and timeframes of the Project Grievance Mechanism are presented below.



41. What appeal mechanisms are available if a grievance is not resolved to the satisfaction of the complainant?

If a grievance is not resolved to the satisfaction of the complainant, the Project offers an appeal mechanism. In such cases, the SPV will launch a second-tier review involving relevant authorities, third-party experts, or academics as independent parties. Based on their recommendations, the SPV will take appropriate action to resolve the grievance.

H. CONTACT INFORMATION FOR STAKEHOLDERS

Stakeholders can contact the Project and submit their questions, complaints, or feedback through the following communication channels:

Project website	**www.antalyaalanyaotoyolu.com.tr**
E-mail	**info@antalyaalanyaotoyolu.com**
Mail	**Ankara – Centre:** Kazım Özalp Mahallesi Hafta Sokak No:9, Çankaya, Ankara, Türkiye **Ankara – Office:** Söğütözü Cd. Koç Kuleleri No:2, A Blok, Kat 9, Daire 92, Çankaya, Ankara, Türkiye **Antalya Project Information Office:** Orta Belek Caddesi No:7, Kapi no: 9, Serik, Antalya, Türkiye
Phone (toll free line)	**+90 850 202 07 07**
Mobile Phone (SPV – CLOs)	**+90 530 978 78 42** **+90 539 935 16 46** **+90 536 345 39 23**
Grievance boxes and forms	Grievance and feedback boxes and forms are placed and maintained by the SPV in all affected settlements, at relevant work and mobilisation sites, and in mobile Project vehicles
Social media	**Linkedin:** https://www.linkedin.com/company/antalyaalanyaotoyolu/ **Instagram:** https://www.instagram.com/antalyaalanyaotoyolu/ **Youtube:** https://www.youtube.com/@AntalyaAlanyaOtoyolu

ANTALYA ALANYA MOTORWAY

www.antalyaalanyaotoyolu.com.tr

ANNEX-5.B: GLAC – Affected Lands&Houses

ANTALYA ALANYA MOTORWAY

ANTALYA – ALANYA MOTORWAY PROJECT

RESETTLEMENT ACTION PLAN (RAP)

GUIDE TO LAND ACQUISITION AND COMPENSATION (GLAC)

– AFFECTED LANDS AND HOUSES –



OCTOBER 2025

REVISION 1

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C.	LAND ACQUISITION STATUS AND DISPLACEMENT IMPACTS
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APPENDIX: GENERAL DIRECTORATE OF HIGHWAYS' (KGM) BOOKLET REGARDING PROCEDURAL STEPS IN EXPROPRIATION ACTIVITIES

A. INTRODUCTION

1. What is Antalya-Alanya Motorway Project?

The **Antalya-Alanya Motorway** Project (the "**Project**") is a Public-Private Partnership (PPP), with the **Public Partner** – being the Republic of Türkiye Ministry of Transportation and Infrastructure (MoTI), represented by the **Directorate General of Highways (KGM)**, and the **Private Partner** – being the **Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.** (the Assigned Company).

Implemented under a **Build-Operate-Transfer (BOT)** model, the Project is one of two sub-projects that constitute the broader Afyonkarahisar-Alanya Motorway Project, which was initially tendered in 2010.

The Project is located in **Antalya province,** southern Türkiye and traverses the boundaries of **three districts** – **Serik, Manavgat and Alanya** – which are key touristic and commercial hubs of the country.



2. Who is the Granting Authority under the BOT Contract?

Within the context of the BOT Implementation Contract, the **Granting Authority** is the **Republic of Türkiye Ministry of Transportation and Infrastructure** (MoTI), represented by the **Directorate General of Highways (KGM)**. KGM is responsible for implementing the land acquisition and expropriation works required for the Project in accordance with the Expropriation Law of Türkiye.

3. Who is the Assigned Company under the BOT Contract?

The Company assigned under the BOT Implementation Contract is **Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş**. – a Special Purpose Vehicle (SPV) established by **Limak İnşaat Sanayi ve Ticaret A.Ş., an affiliate of Limak Holding**.

The Assigned Company is responsible for the **design, construction, financing, operation, and maintenance** of the Motorway until its transfer to KGM at the end of the BOT concession period.

4. What are the Project's Applicable International Standards

The Project is financed by international financial institutions (IFIs) and commercial banks. A Finance Agreement was signed between the Assigned Company and the Lenders on 6 October 2025.

The following international standards are applicable to the Project:

- **International Finance Corporation (IFC)** Performance Standards (PSs) (2012),
- **Equator Principles (EP) 4** (2020), and
- **Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework** (2019).

5. Why has a Resettlement Action Plan (RAP) been prepared, and how will it be implemented?

The land acquisition required for the Project results in risks and impacts related to both physical and economic displacement. Accordingly, a **Resettlement Action Plan (RAP)** has been prepared in line with applicable international standards, with the objective of developing and implementing measures to mitigate these risks and impacts on individuals owning and/or or using the affected lands and houses, as well as on the employers and employees of impacted businesses.

The entitlements, measures, and livelihood restoration and improvement programs under RAP are in addition to the compensation provided by KGM in accordance with the Expropriation Law. The additional costs associated with RAP implementation will be covered by the SPV **through the RAP Fund, which is allocated and managed by the SPV –** separate from KGM's Expropriation Budget.

The **RAP is a living document** and will be updated as necessary.

It is disclosed in Turkish and English under the Project's ESIA Package at the Project website (www.antalyaalanyaotoyolu.com.tr).

The RAP will be implemented by the SPV in collaboration with KGM. The RAP implementation period will cover a duration of **36 months**, commencing from the singing of finance agreement, though **implementation of the key principles by the SPV has already commenced.**

6. What other Environmental and Social (E&S) studies have been undertaken for the Project?

The Project secured an **EIA Positive Decision** on 17 August 2018, in accordance with the Environmental Impact Assessment (EIA) Regulation in force at the time.

Additionally, an **Environmental and Social Impact Assessment (ESIA) package,** including a Non-technical Summary (NTS), Stakeholder Engagement Plan (SEP) and E&S Management Plans, compliant with the applicable international standards, has been prepared for the Project and disclosed in Turkish and English at the Project website (www.antalyaalanyaotoyolu.com.tr).

7. How the RAP has been reviewed independently?

Potential Lenders of the Project retained an independent **Environmental and Social Consultant (IESC)** in October 2024 to carry out an **Environmental and Social Due Diligence (ESDD)** review.

The purpose of the ESDD was to conduct an independent review of the Project's ESIA package – including the RAP – and to evaluate the compliance of land acquisition activities with the standards and requirements of the Lenders. Based on this review, the IESC also developed an **Environmental and Social Action Plan (ESAP).**

The RAP implementation will be periodically monitored by the **Lenders' IESC.** .

8. Why this Guide to Land Acquisition and Compensation (GLAC) has been prepared?

This GLAC has been prepared to provide people affected by Project-related land acquisition ("Project Affected People" or "PAPs") with a clear and concise overview of **the expropriation process carried out by KGM** in accordance with the Expropriation Law, and summarise the **key principles of the RAP,** particularly regarding additional compensation and assistance measures that go beyond the legally mandated cash compensation to ensure alignment with international standards and Lender requirements.

In addition, this GLAC outlines how affected people can apply to the SPV to access RAP entitlements and convey their grievances, inquiries, and feedback to the Project parties.

There are three versions of the GLAC: (i) for affected lands, (ii) for affected houses, and (iii) for affected businesses. This version is the GLAC concerning affected lands and houses.

B. PROJECT DESCRIPTION

9. What are the key Project Components?

The Project, designed as a **dual carriageway**, has a total length of **117.8 km**, encompassing both the main Motorway (84 km – 2x3 lanes) and connection roads (33.8 km – 2x2 lanes).

Other key Project components include **7** main interchanges, **5** tunnels, **16** viaducts, **22** bridges, **56** overpasses, **43** underpasses, and **308** culverts, with **auxiliary features** including an Operational and Maintenance (O&M) Centre, four Motorway Service Facilities, toll collection areas and temporary construction facilities.

10. Are there any associated facilities of the Project?

There are no additional associated facilities in the current design. Please refer to Question 15 for information regarding temporary facilities to be used during construction.

11. What is Motorway Expropriation Corridor?

The **expropriation corridor** defines the boundaries within which land acquisition and expropriation activities are carried out by KGM for the Motorway and associated connection roads.

All construction activities related to the main Motorway, such as excavation, embankment works, and the installation of permanent infrastructure, are executed within this designated corridor.

The width of the expropriation corridor varies along the route., width the minimum and maximum widths as follows:

- **Minimum width: ~ 55 m**
- **Maximum width: ~450 m** (at the location of service areas)

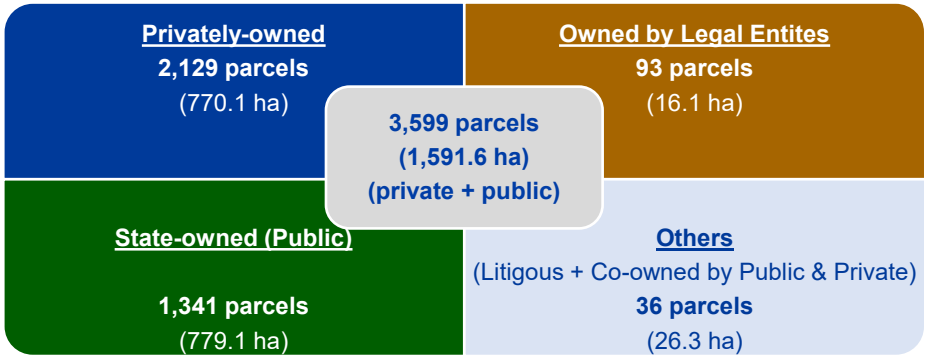
12. Which Settlements are affected within the Expropriation Corridor?

The land acquisition for the Project affects 3 districts and 57 neighbourhoods.

- **Serik (12 neighbourhoods):** Deniztepesi, Sariabali, Yukarikocayata, Asagikocayatak, Kayaburnu, Dikmen, Candir, Asagicatma, Cumali, Burmahanci, Urundu, Belpinar
- **Manavgat: (34 neighbourhoods):** Cakis, Tasagil, Gundogdu, Hocalar, Yavrudogan, Colakli, Seki, Kalemler, Evren, Ilica, Yenikoy, Siseler, Evrenleryahsi, Dolbazlar, Yukariisiklar, Dikmen, Bucakseyhler, Ulukapi, Asagisiklar, Demirciler, Karaoz, Aksaz, Haciali, Cevizler, Sulek, Haciisali, Haciobası, Kızılot, Uzunlar, Kadilar, Orensehir, Yalcidibi, Odaonu, Karakaya
- **Alanya (11 neighbourhoods):** Alara, Cakallar, Incekum, Avsallar, Akdam, Turkler, Payallar, Emisbeleni, Toslak, Telatiye, Elikesik

13. How many Parcels are Affected?

There are **3,599 private, legal entity, and public (state-owned)** parcels to be acquired **within Project's expropriation corridor.**



14. What is the land registry type of affected parcels?

The majority of the affected parcels are registered as **agricultural land**, **road**, and **forest**.

Number of Parcels per Land Registry Type (3,599 parcel)	Area of Parcels per Land Registry Type (1,591.6 ha parcel)
• **Agricultural** (2,507 parcel)	• **Agricultural** (825.6 ha)
• **Road** (258 parcel)	• **Forest** (553.5 ha)
• **Forest** (149 parcel)	• **Road** (53 ha)
• **Land with structures** (148 parcel)	• **Land with structures** (42.2 ha)
• **Constructible plot** (87 parcel)	• **Constructible plot** (9.1 ha)
• **Orchard** (101 parcel)	• **Orchard** (21.7 ha)
• **Raw soil** (83 parcel)	• **Raw soil** (15.8 ha)
• **Litigous** (13 parcel)	• **Litigous** (12.2 ha)
• **Pasture** (3 parcel)	• **Pasture** (0.2 ha)
• **Others** (250 parcel)	• **Others** (58.3 ha)

15. Which temporary facilities will be required during construction?

During the **construction phase**, the Project will utilise various temporary facilities, including **construction camp sites**, **production plants and facilities** (such as concrete batching plants, crushing/mechanical plants, and asphalt plants), as well as **quarries** and **excavated material storage sites**.

A list of planned facilities is included in the RAP.

Construction Camp Sites	• Temporary Construction Camp (KM 59+500) • Main Construction Camp Site (KM 64+500) • Manavgat Construction Camp Site (KM 87+500) • Alanya Construction Camp Site (124+300)
Plants and Facilities	• 7 concrete plants • 4 crushing/mechanical plants • 3 asphalt plants
Quarries	• 11 potential quarries
Excavated Material Storage Sites	• 20 potential excavated material storage sites

16. How is the private land for temporary facilities acquired by the Project?

Private parcels required for temporary facilities are acquired by the SPV/EPC through rental agreements, mutual protocols, or other similar arrangements made with the landowners or shareholders.

Upon completion of temporary use, the land is rehabilitated and returned to the owner in accordance with the agreed terms.

17. What are key milestones in the Project schedule?

No	Key Milestones / Tasks	Date
0	**BOT Contract Signing, Site Delivery**	14 October 2024
1	**Expropriation**	
1.1	Start of inventory of assets and valuation study commenced by appointed valuation contractor	November 2024
1.2	Start of expropriation procedures – through Article 8 negotiations – by KGM	February 2025
1.3	Completion of valuation	Q4 2025 (*target*)
1.4	Completion of Article 8 negotiations as part of expropriation procedures undertaken by KGM	
	Phase 1: KM 52 – 56; KM 74 – 104; KM ~64 (O&M Centre), KM ~80 (Concrete Plant)	February – August 2025 (***completed***)
	Phase 2: KM 56 – 74; KM 104 – 116; Connection Roads: Manavgat East, D-400, Serik	September 2025 – January 2026 (*target*)
	Phase 3: KM 116 – 141; Connections roads: Taşağıl, Manavgat, Alarahan and Konaklı	April 2026 (*target*)
2	**E&S Studies and Finance Agreement**	
2.1	Start of ESIA Package studies	March 2024
2.2	Start of RAP studies	April 2025
2.3	ESIA Package Disclosure by SPV, Lenders (60 days)	Q2 and Q3 2025
2.4	Finance Agreement Signing	6 October 2025
3	**Construction Works**	36 months after Signing
3.1	Land entry by the Project for design-related activities	November 2024
3.2	Site Mobilisation and Start of Construction	March 2025
3.3	Earthworks and Construction of Engineering Structures (incl. Connection Roads)	January 2028
	KM 52+000 – 80+000	November 2027 (*target*)
	KM 80+000 – 114+750	January 2028 (*target*)
	KM 114+750 – 141+705	November 2027 (*target*)
3.4	Tunnels, Viaducts, Superstructure, O&M Centre, Motorway Service Facilities (MSFs) and Other Secondary Works	March 2028
4.	**Motorway Commissioning**	Within 36 months from the date of signing the finance agreement

C. LAND ACQUISITION STATUS AND DISPLACEMENT IMPACTS

18. What is the status of land acquisition?

A **Public Benefit Decision** (No: 2023/371) for the Project was declared by the MoTI on **28 November 2023.**

A Presidential Decree (No. 9708) concerning the **Accelerated Expropriation** of certain immovable properties under the scope of the Project (located within the settlements covered by the Decree) by the KGM in line with **Article 27 of the Expropriation Law of Türkiye** (Law No. 2942, 1983) was published in the Official Gazette (No. 32857) on **30 March 2025.**

The **Expropriation Decisions** were taken for the Project by KGM between December 2024 and May 2025.

Pursuant to these decisions, **land acquisition activities for the Project commenced in February 2025**.

- Between February and August 2025, expropriation procedures were initiated for 22% of the **private parcels through Article 8 invitations and negotiation meetings.** and
- KGM has resorted to the **accelerated expropriation** for **3%** of the **private parcels.**
- Forestry permits have been obtained for over 75% of the forest lands located within the Motorway's expropriation corridor.

Planned Schedule of Article 8 Negotiation Meetings

Negotiation Meeting Date	Settlements
Completed between February – September 2025	Serik: Deniztepesi, Sarıabalı
	Manavgat: Şişeler, Taşağıl, Aksaz, Cevizler, Demirciler, Hacıali, Hacıisalı, Hacıobası, Karaöz, Sülek, Aşağıışıklar, Bucakşeyhler, Dikmen, Ulukapı, Yukarıışıklar, Dolbazlar, Evrenleryavşi, Kalemler, Seki, Yeniköy, Şişeler
October 2025 *(planned)*	Manavgat: Kadılar, Karakaya, Odaönü, Örenşehir, Uzunlar, Yalçıdibi
November 2025 *(planned)*	Serik: Aşağıkocayatak, Çandır, Dikmen, Kayaburnu, Yukarıkocayatak
	Manavgat: Çakış, Çolaklı, Gündoğdu, Hocalar, Taşağıl, Yavrudoğan
November 2025 *(planned)*	Manavgat: Hacıobası, Kızılot
January – February 2026 *(planned)*	Serik: Deniztepesi, Sarıabalı, Üründü, Belpınarı, Burmahancı, Cumalı, Aşağıçatma
February – April 2026 *(planned)*	Manavgat: Evren, Ilıca
	Alanya: Alara, Çakallar, Akdam, İncekum, Avsallar, Türkler, Payallar, Emişbeleni, Toslak, Telatiye, Elikesik

19. What is the status of land entry and construction?

The site was officially delivered by KGM to the SPV in October 2024, following the signing of the BOT Contract.

After site delivery, design-related activities – including drilling operations– were initiated in **November 2024**.

Site mobilisation for Project construction began in **March 2025**, financed through the Company's own equity.

Currently, **construction works are ongoing primarily on forest parcels**, for which forestry permits have been obtained.

As the expropriation of privately owned parcels is finalised, construction activities are also initiated by the SPV and EPC on those parcels following the compensation payments by KGM, in line with the national Expropriation Law, and the provision of additional support by the SPV under the RAP.

20. What are the potential displacement impacts of the Project and who would be affected?

Permanent or temporary land acquisition for the Project will lead to **physical or economic displacement** for the **owners and/or users (formal or informal)** of the affected lands and structures.

The land acquisition-related impacts are primarily classified under the following:

(i) **Affected lands** (may include non-residential and non-commercial structures)
(ii) **Affected houses** (299 building on 231 parcels with 341 households)
(iii) **Affected greenhouses** (599 greenhouse units on 347 parcels)
(iv) **Affected businesses** (29 businesses to be relocated + 8 roadside local product vendors operating on lands already expropriated by KGM)
(v) **Impacts on vulnerable people**
(vi) **Temporary losses/impacts during construction**, and
(vii) **Impacts during operation**

21. Will there be further land acquisition beyond the current expropriation Corridor?

The Project may require **further land acquisition** beyond the currently defined expropriation corridor, either during construction or, on a limited basis, after commissioning.

In case of future land acquisition requirements, the required land will be acquired by KGM in line with the Expropriation Law. Potential displacement impacts and access restrictions associated with such land acquisition or expropriation will be managed by the SPV – in collaboration with KGM – in accordance with the RAP principles.

22. What are the cumulative land acquisition and resettlement impacts of the Project?

Cumulative land acquisition impacts may arise when landowners or users are affected by multiple, overlapping land-related acquisitions linked to the Project or other developments in the region or directly to the Project.

During RAP implementation, a field-based cumulative impact assessment study will be conducted by the SPV, with support from third-party technical consultants, to make parcel-based identification of affected owners and users, assess and address these impacts under the specific budget allocated by the SPV.

D. EXPROPRIATION PROCESS IN LINE WITH EXPROPRIATION LAW

23. What is the legal basis of the expropriation process?

In the Republic of Türkiye, expropriation is carried out in accordance with **Article 46 of the Constitution** and implemented through the provisions of **Expropriation Law (No. 2942).**

The **Directorate General of Highways (KGM)** is responsible for the expropriation of privately-owned parcels in accordance with Türkiye's Expropriation Law (No. 2942), as well as coordinating the allocation of public parcels.

According to the BOT Contract, the SPV is responsible for covering a portion of the expropriation costs for the Project. The amount to be covered by the SPV is specified in the BOT Contract. Any costs exceeding this specified amount will be covered by KGM.

24. Which procedures does KGM carry out under the Expropriation Law?

Land acquisition is conducted through either negotiated settlement (Article 8) or judicial expropriation.

For detailed information on the expropriation process carried out by the KGM and its procedural steps, please refer to the booklet titled *"**Procedural Steps in Expropriation Activities Conducted by the General Directorate of Highways**"*, which has been distributed by the SPV alongside this GLAC.

25. Who is eligible for compensation under the Expropriation Law?

Under national legislation, the following categories of PAPs are eligible for compensation:

Affected Asset	Eligible PAPs
Private Parcels	• **Owners** of lands, trees, crops, structures on affected lands • **Formal land users** (with official documentation) for trees, structures, crops on affected lands • **Informal land users who have evidence** of structure and tree ownership on affected lands (eligible under Exp. Law - Art. 19) • **Litigant owners/shareholders or formal and informal users of litigious parcels**
Public Lands	• **Formal public land users** (who have official documentation, e.g. adequate pay "ecrimisil", rental agreement) for trees, crops, and structure • **Informal public land users who have evidence** of structure and tree ownership on affected lands (eligible under Exp. Law - Art. 19)
Houses	• **The owners of the houses** (in case of multiple shareholders, this refers to the actual owner of the house, subject to the consent of other shareholders who recognise the ownership of the actual owner) • **All land shareholders (in proportion to their shares) in case of multiple land ownership**, when there is no consent from other shareholders recognising the ownership of the actual structure owner
Greenhouses	• Owner of the greenhouse – owner/shareholder of the private land • Owner of the greenhouse – formal tenant of the land, owner of the greenhouse • Formal tenant of the greenhouse on lands owned by others (not the owner of the greenhouse) • Owner of the greenhouse – informal user of treasury lands (with no official documentation for land use but can prove their ownership of the structure) • Owner of the greenhouse – informal user of forest and pasture lands or with no official documentation proving their ownership of the structure

E. COMPENSATION AND ENTITLEMENTS UNDER RAP TO MEET INTERNATIONAL STANDARDS

26. What additional compensation and entitlements are provided by the SPV through RAP implementation, beyond those offered by KGM under the Expropriation Law?

In addition to the compensation provided by KGM in accordance with the Expropriation Law, **the SPV implements supplementary compensation and livelihood restoration measures under the RAP** for owners as well as formal and informal users of affected lands, houses, and greenhouses.

The SPV has established a dedicated **RAP Fund** for covering all costs arising from the implementation of additional measures beyond those required under national legislation. This Fund is allocated and managed by SPV, in coordination with KGM.

27. What are the Key Compensation and Assistance principles outlined in the RAP?

- Avoidance of Forced Eviction: The Project will not carry out forced evictions except in accordance with national legislation and the requirements of IFC PS5.
- Prioritisation of Purchase through Negotiated Settlement over Expropriation: KGM has prioritised negotiated settlements through Article 8 (purchase method). Article 27 will be used by KGM as a last resort, only after Article 8 process.
- Compensation at Full Replacement Cost: All compensation to people affected by land acquisition will be provided at full replacement cost. This includes market value plus any applicable transaction costs, as required by Lenders.
- Livelihood Restoration and Assistance in addition to cash compensation: The SPV will provide livelihood restoration and assistance measures to eligible affected people, including owners and users of affected houses and lands, as well as their formal and informal users, in accordance with the requirements of the Lenders.
- Early Consultations and Notification for Land Acquisition Process: Affected houses: The SPV will notify the owners and tenants of affected structures at least **three months** in advance of the commencement of expropriation, in alignment with KGM's expropriation programme. This is intended to avoid forced eviction and allow sufficient time (more than six months) for resettlement planning.

  In cases where expropriation has already been concluded, the SPV will inform property owners of the Project schedule. Each owner will be granted a six-month notice period to vacate the property following notification, unless a mutually agreed alternative timeframe is established.

  Affected lands: The SPV will notify **users of affected lands** at least **three months** before land entry.

  Land entry will only proceed after the completion of the expropriation process – including payment – or upon finalisation of mutual agreements.

28. What is Cut-off Date for Eligibility?

The **cutoff date** is the date after which any new structures, trees, crops, and other immovable assets will no longer be counted or measured for compensation purposes.

The cut-off dates are determined **based on the completion date of the census and asset inventory surveys** conducted in each respective settlement. Therefore, the cutoff is specific to each affected settlement.

The SPV posts the list of affected parcels along with a notice disclosing the applicable cut-off date and its conditions. These are posted in the offices of the mukhtars, local coffee houses, and other appropriate public venues (such as mosques and community gathering spaces used by local men and women) within the respective affected settlements.

29. Who is Eligible for Compensation and Assistance under RAP?

All people affected by the Project and owning and/or using (formally or informally) the affected lands and assets **before the cut-off dates** defined in the RAP are eligible for compensation and assistance under RAP.

Accordingly, **people who encroach on the Project area after the cut-off date** are **not** eligible for compensation or assistance provided through the implementation of the RAP.

Regarding the affected lands, all persons using the lands for generating agricultural income (including both formal and informal users – regardless of their total productive agricultural area) will be eligible for entitlements and livelihood restoration and improvement measures defined in the RAP.

PAPs who believe they have not been included in the process or are eligible for the entitlements can apply to the Project CLOs with the required documents and an application letter. Their eligibility for compensation and/or assistance will be evaluated by the SPV. After the evaluation, they will be informed of the outcome, and if deemed eligible, they will be granted access to the relevant compensation and/or assistance.

The eligibility categories identified in the RAP are as follows:

Affected Lands	• Landowners (private parcels) • Formal and informal land users (private and public parcels used for agriculture and grazing) • Users of litigous properties • Owners, formal and informal users of orphan and fragmented parcels • Users of forest parcels for economic activity • Owners of affected crops and trees on affected lands • Owners of non-residential and secondary structures on affected lands (maybe formal or informal user of affected land) • Vulnerable landowners and land users • Owners, formal and informal users of parcels acquired through constitution of servitude
Affected Houses	• Owners of affected houses • Formal users of affected houses (tenants) • Informal users of affected houses • Vulnerable households
Affected Greenhouses	• Owner of the affected greenhouse, owner of land • Owner of the affected greenhouse, formal or informal user of the land • Tenant of the affected greenhouses • Vulnerable landowners or land users
Lands subject to Temporary Losses and Impacts during Construction	• Owners of lands and structures affected temporarily • Formal and informal users of and structures affected temporarily • Beneficiaries of infrastructures and services termpoarily affected during construction
Lands and structures subject to impacts during Operation	• Owners or users (formal or informal) of houses that cannot be mitigated to levels compliant with Project standards through operation phase E&S management plans

30. What are the RAP entitlements specific for owners and users of affected private parcels?

- **Owners and Shareholders of Affected Private Parcels**

Under the Expropriation Law of Türkiye, **owners and shareholders** of affected private parcels are entitled to receive cash compensation from KGM for their affected land, structures (after depreciation is deducted), trees and crops that cannot be harvested.

The owners and shareholders of affected private parcels are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- **Assistance in searching replacement land** that is of similar quality, size, and location, subject to availability.
- Compensation to cover **transaction costs** applicable to the acquisition of replacement, if replacement land of similar quality, size, and location is identified by the PAPs who reach an agreement with KGM under Article 8.
- SPV support to cover **small costs** for official expropriation procedures (such as power of attorney costs, working capital fund for title deed transactions, inner and inter city transportation costs, etc.)
- SPV support for **relocating movable assets** to an alternative land determined by PAP.
- **Access to livelihood restoration, improvement and assistance measures** (as outlined under Question 36) provided by SPV through RAP Fund if land is used for economic activity.

> ***Important Note to PAPs**: Regarding expenditures such as transaction costs or small costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Formal and Informal (Agricultural) Users of Affected Private Parcels:**

Under the Expropriation Law of Türkiye, **formal or informal users** of affected private parcels are **not** entitled to receive cash compensation from KGM However, they are compensated for their trees and any structures or fixed improvements/investments (after depreciation is deducted) on the rented land, provided they can demonstrate ownership of these crops and assets.

The users of affected private parcels are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- **Assistance in searching replacement land** that is of similar quality, size, and location, subject to availability.
- **One-off transitional support equivalent to the 1-year rental fee (**including any transaction costs such as new tenancy registration, fees to the authorities, cost of transport, etc.) of the lost agricultural land
- **For long-term formal tenants** (whether for greenhouses or open fields) who have paid rent in advance, guidance by the SPV regarding the legal procedures to follow to obtain a refund for the unused portion of the rental payment and if the unused portion of the rental payment cannot be obtained from the landowner, compensation of the outstanding amount by the SPV from the RAP Fund (such tenants and their tenancy agreement conditions will be determined by the SPV on a case-by-case basis during RAP implementation).
- **For long-term formal tenants** (whether for greenhouses or open fields), in cases where tenants are subject to fines under their lease agreements due to early termination, support or compensation by SPV to ensure that tenants are not disadvantaged (based on case-by-case review of the specifics of tenancy agreements).
- Notification of the user by SPV **three months in advance of land entry.**
- If land entry by the Project is required before the end of the harvesting period, **cash compensation for unharvested crops and products** (e.g., fruits) prior to land entry.
- SPV support for **relocating movable assets** to an alternative land determined by PAP.
- If there are major fixed improvements or investments (*including structures such as barns, sheds, depots, pools, etc.)* made or owned by the **informal user** on the affected land, top-up compensation in addition to the compensation paid by KGM (based on evidence of ownership) – in order to reflect market value as KGM compensates only for the **minimum material cost** under Article 19 of the Expropriation Law.
- Access to **livelihood restoration, improvement and assistance** measures (as outlined under Question 36) provided by SPV through RAP Fund.

> ***Important Note to PAPs****: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Litigant Owners and Shareholders:**

When there is a court dispute regarding the ownership of a litigious parcel, the rightful owners or shareholders eligible for compensation under the Expropriation Law are determined by the court in accordance with Article 18 of the Law.

The SPV will inform the litigant owners **about the land acquisition process**, as well as their rights and entitlements under this RAP.

Individual consultations will be held with the litigant owners/shareholders of parcels that contain houses and greenhouses to identify any specific vulnerabilities for design and delivery of tailored measures on a case-by-case basis.

The court proceedings will be monitored by SPV to mitigate any potentially exacerbated impacts arising from lengthy legal procedures.

If the case is concluded in favour of the litigant owner, they will be entitled to all RAP entitlements defined for private landowners.

- **Owners of Orphan Lands** (Unacquired parts of Expropriated Parcels)

For the unacquired portions that were not previously included in KGM's expropriation, the owner or shareholder of the affected parcel **has the right to formally apply to KGM**, in accordance with Article 12 of the Expropriation Law, to request the acquisition of the remaining part of the parcel if it is deemed economically unusable or undevelopable.

For all parcels, in line with the Expropriation Law and KGM's established practice, KGM accepts official applications from affected people – submitted within 30 days of receiving notice of expropriation by agreement – requesting the expropriation of orphan lands and evaluates each application on a case-by-case basis.

Relevant requests submitted by landowners to KGM through petitions will be periodically reviewed by the SPV as part of the Project's grievance mechanism. For cases where the acquisition request of the owners or shareholders is not positively concluded by KGM or where relevant grievances or claims are received by the Project, the SPV will engage a third-party valuation expert to review each case/claim individually and determine the actions required to be taken by SPV, if any.

- **Owners of Affected Crops**

According to Article 20 of the Expropriation Law, the evacuation of cultivated lands that are subject to expropriation must take place after the harvest period. If land entry occurs before harvesting, the crop owners are entitled to compensation.

The SPV will notify the crop owners at least **three** months in advance of land entry. If land entry by the Project is required before the end of the harvesting period, **cash compensation for unharvested crops and products** (e.g., fruits) prior to land entry.

- **Owners of Affected Trees**

In accordance with the Expropriation Law, cash compensation is provided by KGM to the owner of the trees. Pursuant to Article 19 of the Expropriation Law, when trees are located on titled lands owned by others, on ownerless lands, or on lands not legally acquired by their possessors, compensation by KGM is paid to the possessor of the trees. This does not apply to trees on forest or pasture parcels.

The owners of affected trees are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

  - Notification of the tree owners at least **three** months in advance of land entry.
  - If land entry by the Project is required before the end of the harvesting period of the fruit trees, **cash compensation for unharvested products** (e.g., fruits) prior to land entry.
  - For fruit trees owned by informal users on **forestry or pasture lands**, which are not subject to compensation by KGM, **determination of the product value by a third-party valuation expert** commissioned by the SPV and provision of cash compensation reflecting this value to the informal users by the SPV from the RAP Fund.
  - Where needed, top-up cash compensation to compensate dense planting deduction applied by KGM, if any.
  - Commissioning of **third-party valuation expert** by the SPV for the verification of compliance of tree valuation with international standards, or and determination of the actions required to be taken by the SPV, where needed.
  - Commissioning of **third-party valuation expert** by the SPV for the review of any grievance, claim, or request raised during Article 8 negotiation meetings related to orchard valuation, and determination of the actions required to be taken by the SPV (such as provision of top-up compensation to cover any compensation gap with international standards), where needed.

- **Owners of major non-residential/secondary structures** (may be the owner or formal or informal user of land)

In accordance with the Expropriation Law, cash compensation for non-residential structures and infrastructure is provided by KGM. Depreciation is applied. As per Article 19 of the Expropriation Law, for buildings or structures located on titled lands owned by others, on ownerless lands, or on lands not legally acquired by their possessors, the minimum material cost of the structure is paid to the possessor.

The owners of *major* non-residential/secondary structures (*including structures such as barns, sheds, depots, pools, etc.)* are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

  - **Top-up cash compensation** to the structure owner (may be the land owner or formal land user with evidence) in order to cover the amount deducted for depreciation.
  - If there are major fixed improvements or investments made or owned by the **informal user** on the affected land (with proof of structure ownership), provision of **top-up compensation** by SPV in addition to the compensation paid by KGM – in order to reflect market value as KGM compensates only for the **minimum material cost** under Article 19 of the Expropriation Law.
  - **If the assets owner (informal land users) cannot prove her/his ownership claim,** commissioning of **third-party valuation expert** by the SPV for the review of the case and determination of market value for these assets for provision of cash compensation at full replacement cost by the SPV from the RAP Fund.

- **Owners of parcels to be acquired through constitution of servitude** (easement rights)

In accordance with Article 4 of the Expropriation Law, instead of acquiring full ownership of immovable assets, easement rights may be established through expropriation on a specific section, height, depth, or source of the immovable, provided that such rights are sufficient to serve the intended purpose.

Cash compensation is paid to the owners/shareholders for the alignments. As stipulated by the Law, ownership rights remain with the landowner, subject to the implementation of necessary safety measures.

They will be entitled to access livelihood restoration, improvement, and assistance measures provided by the SPV through the RAP Fund.

31. What are the RAP entitlements specific for the formal and informal users of affected public parcels?

Formal and informal users of public parcels are entitled to the same entitlements as those provided to formal and informal users of affected private parcels, as outlined under Question 30.

Additionally, if there are major fixed improvements or investments (*including structures such as barns, sheds, depots, pools, etc.)* made or owned by the informal user on the affected land – **excluding those on forest and pasture lands** – top-up compensation will be provided by the SPV from the RAP Fund to the informal user (based on evidence of structure ownership) – in order to reflect market value as KGM compensates only for the **minimum material cost** under Article 19 of the Expropriation Law.

If the trees and assets owned by informal users are located **on forestry or pasture lands**, which are not subject to compensation by KGM, their market value will be determined by a third-party valuation expert to be commissioned by the SPV. Cash compensation reflecting this value will be provided to the informal users by the SPV from the RAP Fund.

32. What are the Specific RAP Entitlements specific for the Owners and Users of Affected Houses?

- **Owners of Affected House on Private Parcels**

In accordance with the Expropriation Law, cash compensation by KGM is provided to owners. Depreciation is applied.

In cases of joint landownership, compensation is paid to the owner of the structure who is the actual resident, provided that he or she has obtained formal consent from the other co-owners confirming ownership rights. If such consent is not available, cash compensation is distributed among all landowners in proportion to their registered shares.

The owners and users of **affected houses** are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- Notification at least **three months in advance of the start of expropriation** (which is approximately six months before land entry).
- **Top-up cash compensation** to cover the amount deducted for depreciation by KGM and achieve full replacement cost.
- In case of joint landownership, help the actual resident engage – and, if possible, reach an agreement with other shareholders – with support from KGM officials, to ensure that the house owner (actual resident) receives compensation for the house at full replacement cost or provided with a replacement house; if the house owner (actual resident) cannot receive full compensation, top-up compensation by the SPV from the RAP Fund.
- **House Relocation Support Package provided prior to relocation** to cover title deed transfer costs, real estate agent service fee and allowance for other relocation related expenses such as utility subscription fees, registration, etc.
- **Assistance in searching a replacement residential house of equal or greater value or identifying suitable replacement land** for the construction of a new house at acceptable standards, including facilitation of coordination with relevant authorities, institutions and mukhtars, as needed, to help identify a suitable parcel on which the house can be built with security of tenure.
- **Allowance for moving and travel costs**
- Right granted to PAPs to **salvage recoverable building materials** from expropriated structure prior to demolition.

> ***Important Note to PAPs**: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Formal (tenants with formal tenancy agreements) and Informal Users of Affected House on Private Parcels**

In accordance with the Expropriation Law, no compensation is provided to tenants. However, the owner and tenant may reach a separate agreement based on the terms and conditions of the tenancy contract.

The formal users (tenants) of **affected houses** are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- Notification at least **three months in advance of the start of expropriation** (which is approximately six months before land entry).
- **House Relocation Support Package provided prior to relocation** to cover rental allowance (three-month rent allowance, based on the market rental rate of the replacement house to be rented), real estate agent service fee (equivalent to the market rental rate of the replacement house to be rented), allowance for other relocation related expenses such as utility subscription fees, tenancy registration, etc. and allowance for unforeseen expenses (such as fixed investments made by the renter)
- **Assistance in searching a replacement residential house**
- **Allowance for moving and travel costs** based on submitted evidence or documentation, at the time the expenses are incurred
- Right granted to PAPs to **salvage recoverable building materials** – if such materials belong to the tenant – from expropriated structure prior to demolition.

> ***Important Note to PAPs**: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Owners of Affected House (Informal Users) on Public Parcels (Treasury, Forest, Pasture or Non-registered Parcels)**

In accordance with the Expropriation Law, **no compensation** for **land** is provided to owners of informal houses. However, informal users – **excluding those occupying forest and pasture lands** – are eligible for compensation for trees and structures (e.g., fixed improvements/ investments) on the land they use informally at minimum material cost, in accordance with Article 19 of the Expropriation Law, provided they can demonstrate ownership of these assets. Informal users of **forest and pasture lands** are considered as illegal occupants, thus are not entitled to any form of legal compensation for either the land or the assets.

The owners of **affected houses** on public parcels (informal users) are entitled to receive the following compensation and assistance from the SPV under the RAP:

- **Notification** at least **three months in advance of the start of expropriation** (which is approximately six months before land entry).
- **Top-up compensation** by SPV in addition to the compensation paid by KGM – in order to reflect market value as KGM compensates only for the **minimum material cost** under Article 19 of the Expropriation Law (***for informal houses on treasury and non-registered parcels***)
- **Cash compensation at full replacement value** will be provided by the SPV from the RAP Fund to the structure owner (based on evidence of structure ownership) (***for informal houses on forest and pasture parcels***)
- **House Relocation Support Package provided prior to relocation** to cover allowance for other relocation related expenses such as utility subscription fees, registration, etc. as well as unforeseen costs such as fixed investments made by the informal house owner.
- **Assistance in searching a suitable replacement residential house** or **identifying suitable replacement land** (such as treasury, non-registered or other) for the construction of a new house at acceptable standards.
- **Assigning civil engineers and technicians from SPV and EPC teams to advise and supervise affected individuals who prefer to construct their own houses** (to provide guidance particularly on ensuring earthquake resistance, fire protection, and resilience against other natural hazards such as heavy rainfall and flooding; where necessary and appropriate, construction machinery and equipment may be temporarily provided to assist affected households during the construction of their replacement homes)**.**
- **Allowance for the moving and travel costs** based on submitted evidence or documentation, at the time the expenses are incurred
- Right granted to PAPs to **salvage recoverable building materials** from expropriated structure prior to demolition.
- **Access to livelihood restoration, improvement and assistance measures** (as outlined under Question 36) provided by SPV through RAP Fund, if the affected land – on which the impacted house is located – was used for agricultural purposes.

> ***Important Note to PAPs****: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Physically Displaced Households with Vulnerable Members**
  - **Individual information** about the Project, land acquisition, RAP entitlements, and the grievance mechanism and specific attention to vulnerable members during consultation, negotiation and post-resettlement monitoring processes.
  - **In-kind support** by SPV to be determined based on the type of vulnerability and Specific measures to be designed according to specific vulnerabilities of household members to ensure comfort during relocation.
  - **Provision of logistical and administrative support** to facilitate key processes through the Project CLOs and other appropriate in-house personnel, particularly during residency registration, school enrolment and education-related processes, access to health services through local family health centres, utility subscriptions and connections (electricity, water, gas, etc.)
  - **Facilitation of consultations with relevant governmental authorities** to identify alternative land for constructing replacement housing or to locate available housing options, with particular attention to the needs of elderly and women-headed households.
  - Priority to at least one member of households (who is looking for a job and meeting Project's employment criteria) in **Project employment during construction phase.**

33. What are the Specific RAP Entitlements specific for the Owners and Users of Affected Greenhouses?

- **Owners of the Greenhouses – who own the Land**

In accordance with the Expropriation Law, cash compensation for greenhouses is provided by KGM to the owner of the greenhouse. Depreciation is deducted. In this Project, for parcels containing **greenhouses**, the parcel may be expropriated fully if the remaining area is **less than 400 m²** – subject to application by the PAPs and evaluation by KGM.

The owners of affected greenhouses – who own the Land – are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- Notification of the crop owners at least **three** months in advance of land entry.
- Top-up cash compensation to cover the amount deducted for **depreciation**;
- If not included in the expropriation value provided by KGM, additional cash compensation at full replacement cost to cover the cost of fixed (non-movable) investments and improvements made by the greenhouse owner, such as irrigation, heating, drainage, lighting system and components, etc. – a third-party valuation expert commissioned by the SPV will determine the associated costs on market prices.

- Compensation for costs incurred by greenhouse owners – whose greenhouses are partially expropriated – to support repair and adjustment works on the remaining portions, such as the rearrangement of irrigation or drainage systems, repair of greenhouse nylon covers, and similar interventions.
- If land entry by the Project is required before the end of the harvesting period, **cash compensation for unharvested crops and products** (e.g., fruits) prior to land entry. If the greenhouse is partially affected, crop compensation will be provided for the affected part.
- Assistance in searching a replacement site for the relocation of the greenhouse, if such relocation is planned by the greenhouse owner.
- If requested by the PAPs, support for the preparation of the land where the greenhouse will be reestablished – this may include the provision of construction machinery and labour, land levelling, provision of suitable topsoil stripped from Project areas, infrastructure connections for electricity, water, other utilities, etc.
- Assistance for rearranging the greenhouse to ensure continuity of operations (rearrangement of irrigation system, drainage system, heating system, etc.), if requested, if the greenhouse is partially affected and the owner continues operations on the remaining land.
- Arranging the full relocation or reimbursement of the moving costs (disassembly-assembly) incurred by the greenhouse owners for their movable assets and infrastructure components (such as movable irrigation system components), through direct payment to vendors or based on submitted evidence or documentation, at the time the expenses are incurred.
- **Access to livelihood restoration, improvement and assistance measures** (as outlined under Question 36) provided by SPV through RAP Fund.
- Information of the landowners and shareholders about their right to apply for the acquisition of orphan land in accordance with the Expropriation Law and coordinating consultations with KGM to facilitate the acquisition of the remaining portion – subject to evaluation and approval by KGM.

- **Owners of the Greenhouses – who are formal user (tenant) of the Land**

In accordance with the Expropriation Law, cash compensation for greenhouses is provided by KGM to the greenhouse owner, provided that the greenhouse owner holds a formal tenancy agreement or has obtained formal consent from the landowner.

The owners of affected greenhouses – who are formal users (tenants) of the Land – are entitled to all relevant entitlements outlined for the "**Owners of the Greenhouse – who own the Land**".

They are further entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- **One-off transitional support equivalent to the 1-year rental fee (**including any transaction costs such as new tenancy registration, fees to the authorities, cost of transport, etc.) of the lost agricultural land with affected greenhouse.
- **For long-term formal tenants** who have paid rent in advance, guidance by the SPV regarding the legal procedures to follow to obtain a refund for the unused portion of the rental payment and if the unused portion of the rental payment cannot be obtained from the landowner, compensation of the outstanding amount by the SPV from the RAP Fund (such tenants and their tenancy agreement conditions will be determined by the SPV on a case-by-case basis during RAP implementation).
- **For long-term formal tenants** in cases where tenants are subject to fines under their lease agreements due to early termination, support or compensation by SPV to ensure that tenants are not disadvantaged (based on case-by-case review of the specifics of tenancy agreements).

> ***Important Note to PAPs**: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Formal Tenant of the Greenhouses on lands owned by others – not the owner of the greenhouse**

In accordance with the law, no compensation for greenhouses is provided to the tenants of the greenhouses on land owned by others. However, the greenhouse owner and tenant may reach a separate agreement based on the terms and conditions of the tenancy contract.

They are entitled to all relevant entitlements outlined for the "Owners of the Greenhouse – who are formal user (tenant) of the Land" **but not entitled to** any "Top-up Cash Compensation to achieve Full Replacement Value of the Structures".

- **Owners of the Greenhouses – who are informal users of Treasury Lands** (with no official documentation for land use but can prove their ownership of the structure)

As per Article 19 of the Expropriation Law, for buildings/structures on lands with title deeds belonging to others, lands which do not have owners, and/or lands not acquired by their possessors, minimum material cost of the structure is paid to the possessor.

They are entitled to all relevant entitlements outlined for the "**Owners of the Greenhouse – who own the Land**"

They are further entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- Top-up cash compensation to reflect market value and achieve full replacement cost of the assets, as KGM pays for minimum material cost as per Article 19 of the Expropriation Law – a third-party valuation expert commissioned by the SPV will determine the replacement cost at market value.
- **One-off transitional support equivalent to the 1-year rental fee (**including any transaction costs such as new tenancy registration, fees to the authorities, cost of transport, etc.) of the lost agricultural land with affected greenhouse

> ***Important Note to PAPs****: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

- **Owners of the Greenhouses – who are informal users of Forest and Pasture Lands or who cannot prove her/his ownership claim**

In accordance with the Expropriation Law, **no compensation** for land or structures is provided as informal users of forest and pasture lands are considered as illegal occupants and they are not entitled to any form of legal compensation for either the land or the assets.

They are entitled to all relevant entitlements outlined for the ""**Owners of the Greenhouse – who own the Land**" **but not entitled to** any "Top-up Cash Compensation to achieve Full Replacement Value of the Structures".

They are entitled to receive the following compensation and assistance from the SPV under the RAP:

- For greenhouses owned by informal users are on forestry and pasture lands, which are not subject to compensation by KGM, or if the greenhouse owner (informal land users) cannot prove her/his ownership claim, determination of the market value of the affected greenhouse by a **third-party valuation expert** commissioned by the SPV and provision of cash compensation reflecting this value by the SPV.
- **One-off transitional support equivalent to the 1-year rental fee (**including any transaction costs such as new tenancy registration, fees to the authorities, cost of transport, etc.) of the lost agricultural land with affected greenhouse

> ***Important Note to PAPs****: Regarding expenditures such as transaction or other costs, the Project will make direct payments to authorities or vendors where possible. If reimbursement is required, PAPs must submit evidence of expenditures to the SPV/EPC. For more information, please contact the Project CLOs using the details provided at the end of this GLAC.*

34. What specific RAP entitlements are available for people affected by construction impacts?

The SPV and construction (EPC) contractors (including subcontractors) will implement measures specified in the Project ESIA, ESMP and subject-specific management plans to avoid, and where avoidance is not possible minimise and/or compensate the impacts on people and environment.

PAPs may contact Project CLOs through contact information provided at the end of this GLAC to submit their construction-related grievances and feedback through Project's Grievance Mechanism.

The RAP entitlements to be provided by the SPV through implementation by the party causing the damages and losses that cannot be avoided during construction will be as below:

- **Private owners/shareholders of lands to be used temporarily during construction (including access restrictions)** will be provided with cash compensation for the use of land and any economic activity (cost of crops, trees, infrastructure etc. at market prices) based on mutual agreements /rental agreements.
- **Formal and informal users of public and private lands to be used temporarily during construction** will be compensated for crops, trees and structures, provided with 1-year rental support for the lost agricultural area and access to livelihood restoration measures defined under RAP.
- **Owners and formal/informal users of lands and assets damaged by construction** will be compensated at full replacement value for any damage on properties.

35. What Type of Assistance will be Provided to Vulnerable Groups and Individuals?

Households with vulnerable members will be provided by the SPV with special support and/or assistance on a case-by-case basis.

- **In-kind support** (e.g. agricultural input materials, tailored support packages) to vulnerable households identified during RAP preparation and implementation.
- **For vulnerable households affected by physical and/or economic displacement, priority** for all livelihood restoration, improvement, and assistance measures outlined in the RAP.
- Specific attention to vulnerable people during information, consultation, negotiation and post-resettlement monitoring processes through individually informing vulnerable PAPs about the Project, land acquisition process, RAP entitlements/support, and the grievance mechanism.
- Timely updates regarding expropriation status and court decisions, based on notifications received from KGM.
- Assistance with applications to KGM for acquisition of remaining, unusable land parcels (orphan lands), including help with documentation, communication, and logistics.
- Support in completing legal and administrative procedures to enable timely access to expropriation payments.
- Facilitation of access to legal advice and public institutions, including assistance with preparing and submitting required documentation.
- In case the vulnerable PAPs own non-residential structures affected by the Project (e.g. barns, sheds, etc.), in-kind support and assistance for reconstruction of the affected structure at an available location to be indicated by the vulnerable PAP
- Assistance in identifying and applying to existing government or third-party support programs targeting vulnerable individuals or households
- For physically displaced households with vulnerable members, logistical and administrative support to facilitate key processes, such as assistance with facilitating consultations with relevant governmental authorities to identify alternative land for constructing replacement housing or to locate available housing options, with particular attention to the needs of elderly and women-headed household, residency registration, school enrolment and education-related processes, access to health services through local family health centres, and utility subscriptions and connections (electricity, water, gas, etc.)
- Where needed or requested, support to individuals in opening bank accounts to facilitate direct access to compensation and support payments.
- Priority for unemployed female members of physically and/or economically displaced households who are actively seeking employment.
- Training programmes to be designed and delivered by the external Agricultural Consultancy Companies
- Women-specific training programmes

36. What types of Livelihood Restoration, Improvement, and Assistance Packages are available to Agricultural Land Users in relation to their affected lands?

Livelihood restoration, improvement, and assistance will be provided to people who use the affected agricultural lands – including both formal and informal users of open fields and greenhouses. These measures aim to help them return to their previous income levels, or improve their livelihoods where possible.

The support packages available to agricultural land users will include the following measures:

Livelihood Restoration, Improvement and Assistance Packages for Affected Lands					
Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**	**Package 6**
External Agricultural Consultancy Support (for 36 months)	Agricultural Training Programs	Distribution of Seedlings, Agricultural Inputs and Materials	Transitional (One-year) Rental Support for Replacement Land	Crop Payments	Priority in Project Employment

All individuals using the affected lands to generate agricultural income – including both formal and informal users, regardless of the total size of their productive agricultural area – will be eligible for the entitlements and livelihood restoration and improvement measures defined in the RAP.

As RAP implementation progresses, consultations between the SPV and affected individuals will continue on an ongoing basis.

Livelihood restoration and improvement measures will be updated as necessary.

Vulnerable households affected by physical and/or economic displacement will be prioritised for all livelihood restoration, improvement, and assistance measures outlined in the RAP. Tailored support and assistance for vulnerable households and individuals

37. How will eligible PAPs be identified, and which documents will be requested from them for eligibility evaluation and decision-making?

During RAP implementation, the SPV will proactively engage with the PAPs to identify potential eligible people and inform them about the livelihood restoration, improvement and assistance measures available to them and requested documents. The eligibility of PAPs to benefit from RAP entitlements – including livelihood restoration, improvement, and assistance packages – will be evaluated by the SPV on a case-by-case basis.

Important Note to PAPs: *PAPs may also contact the Project CLOs using the contact information provided at the end of this GLAC to request further information, share suggestions, or express their interest in participating in the relevant support packages.*

The documentation requested from PAPs for the evaluation of their eligibility for RAP entitlements may include, but is not limited to, the following. It should be noted that this list is not exhaustive, and the SPV reserves the right to request additional documentation at any stage of the eligibility assessment process:

Affected Agricultural Land Users	• Official documentation of ownership for the affected assets such as lands, greenhouses, etc. (e.g., land registry records/title deeds, inheritance documents, ownership documents) (*for owners*) • Documentation on the total productive area owned and/or used, both within and outside the expropriation corridor (*for owners, formal and informal users*) • Tenancy agreements (*for formal users*) • Evidence/confirmation of land use provided by settlement heads, community leaders, and other credible witnesses or third parties (*for informal users*) • Documentation on transaction costs (*for owners, formal and informal users*) • Evidence of expenditures made for fixed investments and improvements (*for greenhouse owners*)
Affected Houses	• Title deeds for affected land and structures (*for owners*) • Documentation on expenses such as moving and transaction costs, fees paid to authorities and service providers, and price quotes from vendors and other transaction costs (*for owners, formal and informal users*) • Evidence of expenditures made for fixed investments and improvements (*for owners, formal and informal users*) • Lease agreements and relevant documentation/confirmation from the structure owner, mukhtar or other credible witnesses (*for formal users - tenants*)

F. STAKEHOLDER ENGAGEMENT AND INFORMATION DISCLOSURE

38. How will PAPs and interested parties be engaged during the Disclosure Period and RAP implementation period?

The Project has a **Stakeholder Engagement Plan (SEP)** disclosed at the Project website (www.antalyaalanyaotoyolu.com.tr)

The RAP separately includes a detailed **Stakeholder Engagement Action Plan** for RAP disclosure and implementation phases. The following RAP specific disclosure activities are conducted:

- The RAP (including the GLAC) **will be published in English and Turkish on the SPV and Lenders' websites**, in line with their disclosure policies and timelines.
- This GLAC, explaining the entitlements and next steps clearly to all affected people and stakeholders, will be delivered to the offices of mukhtars and directly to affected people and vulnerable individual in each settlement.
- The **hard copies (in Turkish)** of the final RAP and GLAC will be made available at the following locations: Project Information Office in Serik, Project's Construction Camp Sites, and Offices of the settlement heads (mukhtars)
- The **SPV CLOs will engage individually with affected households that include vulnerable members** to distribute the GLAC and communicate the key information from the RAP, as applicable.
- Specifically for the disclosure of the RAP, the RAP Implementation Team will organise separate group and/or individual meetings and information sessions prior to Article 8 negotiation meetings. **Priority will be given to settlements where land was or will be expropriated in the 2025, as listed in the table below under the "**Priority Settlements to be covered during the Disclosure Period".
- Meetings in other settlements will continue throughout the first year of RAP implementation, in alignment with the expropriation and construction schedules.
- **The Project will continue engaging with affected people throughout the 36-month RAP implementation period** in line with the RAP Stakeholder Engagement Action Plan for RAP.

G. PROJECT GRIEVANCE MECHANISM

39. How can stakeholders submit complaints and feedback about land acquisition to KGM?

KGM, as the authority responsible for expropriation, collects and manages all complaints, objections, and feedback related to land acquisition in line with its official procedures.

Stakeholders can submit land acquisition-related complaints and feedback to KGM through **KGM's institutional grievance channels**, which operate **in parallel with the Project's own grievance mechanism**.

Complaints related to expropriation, valuations, or compensation procedures carried out by KGM can be submitted **directly to KGM** through official channels, including:

- Through KGM's online grievance system: https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Root/SikayetGeriBildirim.aspx
- Direct applications or petitions to **KGM 13th (Antalya) Regional Directorate** (Expropriation Department):
  - Mail or in-person application: Fabrikalar Mah. Gazi Bulvarı 07090, Kepez, Antalya, Türkiye
  - Phone: +90 242 320 70 00 Fax: +90 242 345 36 99
  - E-mail: bol13@kgm.gov.tr

In addition, stakeholders may submit grievances through the Presidency's Communication Centre (CIMER – https://www.cimer.gov.tr/ or 150). While CIMER is a national-level centralised communication platform, any land acquisition-related grievances submitted via CIMER are forwarded to and handled by KGM through internal coordination systems.

The grievances that fall under KGM's legal responsibility will be managed under **national administrative and legal procedures**, separate from the Project's grievance process.

The SPV does **not have a mandate to intervene** in grievances that fall under KGM's legal authority. If PAPs submit such complaints to the SPV, the SPV will guide them to the correct channels. When needed, the SPV will forward these complaints to KGM in writing.

40. Is there a Project-specific Grievance Mechanism and how can stakeholders submit their land acquisition-related complaints and feedback to SPV?

Yes, the **SPV has set up a Project-specific Grievance Mechanism** as part of the ESIA process, alongside the preparation of the RAP. This mechanism is used to collect and manage complaints and feedback related to the **SPV's areas of responsibility**, including RAP implementation and construction-related impacts.

This Mechanism is accessible to all stakeholders, including Project-Affected Persons (PAPs) and vulnerable individuals.

Grievances related to formal expropriation or compensation procedures under the legal responsibility of KGM and **must be submitted directly to KGM.**

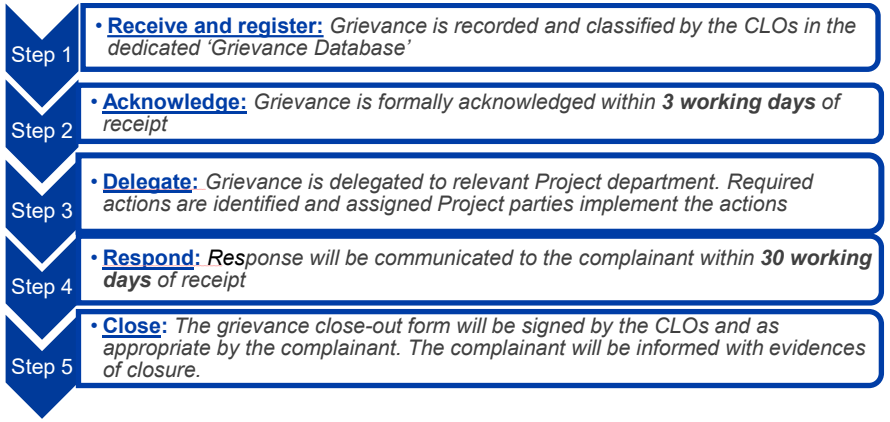
Through this mechanism, stakeholders can submit their concerns using the **channels listed below in Section H "CONTACT INFORMATION FOR STAKEHOLDERS"**

Any grievance and feedback (verbal or written) lodged or conveyed through different channels will be registered in the Project Grievance Database and managed as per the Project SEP, **by observing the requirements stipulated by the Law on the Protection of Personal Data (Law No. 6698, 2016).**

This Mechanism does not replace citizens' right to apply to other formal mechanisms including courts, CIMER) and Antalya Metropolitan Municipality's portal and call centre, among others.

41. What are the steps of the Project's Grievance Mechanism and how are complaints handled?

Key steps and timeframes of the Project Grievance Mechanism are presented below.



42. What appeal mechanisms are available if a grievance is not resolved to the satisfaction of the complainant?

If a grievance is not resolved to the satisfaction of the complainant, the Project offers an appeal mechanism. In such cases, the SPV will launch a second-tier review involving relevant authorities, third-party experts, or academics as independent parties. Based on their recommendations, the SPV will take appropriate action to resolve the grievance.

H. CONTACT INFORMATION FOR STAKEHOLDERS

Stakeholders can contact the Project and submit their questions, complaints, or feedback through the following communication channels:

Project website	**www.antalyaalanyaotoyolu.com.tr**
E-mail	**info@antalyaalanyaotoyolu.com**
Mail	**Ankara – Centre:** Kazım Özalp Mahallesi Hafta Sokak No:9, Çankaya, Ankara, Türkiye **Ankara – Office:** Söğütözü Cd. Koç Kuleleri No:2, A Blok, Kat 9, Daire 92, Çankaya, Ankara, Türkiye **Antalya Project Information Office:** Orta Belek Caddesi No:7, Kapi no: 9, Serik, Antalya, Türkiye
Phone (toll free line)	**+90 850 202 07 07**
Mobile Phone (SPV – CLOs)	**+90 530 978 78 42** **+90 539 935 16 46** **+90 536 345 39 23**
Grievance boxes and forms	Grievance and feedback boxes and forms are placed and maintained by the SPV in all affected settlements, at relevant work and mobilisation sites, and in mobile Project vehicles.
Social media	**Linkedin:** https://www.linkedin.com/company/antalyaalanyaotoyolu/ **Instagram:** https://www.instagram.com/antalyaalanyaotoyolu/ **Youtube:** https://www.youtube.com/@AntalyaAlanyaOtoyolu

ANTALYA ALANYA MOTORWAY

www.antalyaalanyaotoyolu.com.tr

ANNEX-5.C: GLAC – Affected Businesses

ANTALYA ALANYA MOTORWAY

ANTALYA – ALANYA MOTORWAY PROJECT

RESETTLEMENT ACTION PLAN (RAP)

GUIDE TO LAND ACQUISITION AND COMPENSATION (GLAC)

– AFFECTED BUSINESSES –



OCTOBER 2025

REVISION 1

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H.	CONTACT INFORMATION FOR STAKEHOLDERS

APPENDIX: GENERAL DIRECTORATE OF HIGHWAYS' (KGM) BOOKLET REGARDING PROCEDURAL STEPS IN EXPROPRIATION ACTIVITIES

A. INTRODUCTION

1. What is Antalya-Alanya Motorway Project?

The **Antalya-Alanya Motorway** Project (the "**Project**") is a Public-Private Partnership (PPP), with the **Public Partner** – being the Republic of Türkiye Ministry of Transportation and Infrastructure (MoTI), represented by the **Directorate General of Highways (KGM)**, and the **Private Partner** – being the **Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş.** (the Assigned Company).

Implemented under a **Build-Operate-Transfer (BOT)** model, the Project is one of two sub-projects that constitute the broader Afyonkarahisar-Alanya Motorway Project, which was initially tendered in 2010.

The Project is located in **Antalya province,** southern Türkiye and traverses the boundaries of **three districts** – **Serik, Manavgat and Alanya** – which are key touristic and commercial hubs of the country.



2. Who is the Granting Authority under the BOT Contract?

Within the context of the BOT Implementation Contract, the **Granting Authority** is the **Republic of Türkiye Ministry of Transportation and Infrastructure** (MoTI), represented by the **Directorate General of Highways (KGM)**. KGM is responsible for implementing the land acquisition and expropriation works required for the Project in accordance with the Expropriation Law of Türkiye.

3. Who is the Assigned Company under the BOT Contract?

The Company assigned under the BOT Implementation Contract is **Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş**. – a Special Purpose Vehicle (SPV) established by **Limak İnşaat Sanayi ve Ticaret A.Ş., an affiliate of Limak Holding**.

The Assigned Company is responsible for the **design, construction, financing, operation, and maintenance** of the Motorway until its transfer to KGM at the end of the BOT concession period.

4. How the Project is Financed and what are the Project's Applicable International Standards?

The Project is financed by international financial institutions (IFIs) and commercial banks. A Finance Agreement was signed between the Assigned Company and the Lenders on 6 October 2025.

The following international standards are applicable to the Project:

- **International Finance Corporation (IFC)** Performance Standards (PSs) (2012),
- **Equator Principles (EP) 4** (2020),
- **Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework** (2019), and

5. Why has a Resettlement Action Plan (RAP) been prepared, and how will it be implemented?

The land acquisition required for the Project results in risks and impacts related to both physical and economic displacement. Accordingly, a **Resettlement Action Plan (RAP)** has been prepared in line with applicable international standards, with the objective of developing and implementing measures to mitigate these risks and impacts on individuals owning and/or or using the affected lands and houses, as well as on the employers and employees of impacted businesses.

The entitlements, measures, and livelihood restoration and improvement programs under RAP are in addition to the compensation provided by KGM in accordance with the Expropriation Law. The additional costs associated with RAP implementation will be covered by the SPV **through the RAP Fund, which is allocated and managed by the SPV –** separate from KGM's Expropriation Budget.

The **RAP is a living document** and will be updated as necessary. It is disclosed in Turkish and English under the Project's ESIA Package at the Project website (www.antalyaalanyaotoyolu.com.tr).

The RAP will be implemented by the SPV in collaboration with KGM. The RAP implementation period will cover a duration of **36 months**, commencing from the singing of finance agreement, though **implementation of the key principles by the SPV has already commenced.**

6. What other Environmental and Social (E&S) studies have been undertaken for the Project?

The Project secured an **EIA Positive Decision** on 17 August 2018, in accordance with the Environmental Impact Assessment (EIA) Regulation in force at the time.

Additionally, an **Environmental and Social Impact Assessment (ESIA) package,** including a Non-technical Summary (NTS), Stakeholder Engagement Plan (SEP) and E&S Management Plans, compliant with the applicable international standards, has been prepared for the Project and disclosed in Turkish and English at the Project website (www.antalyaalanyaotoyolu.com.tr).

7. How the RAP has been reviewed independently?

Potential Lenders of the Project retained an independent **Environmental and Social Consultant (IESC)** in October 2024 to carry out an **Environmental and Social Due Diligence (ESDD)** review.

The purpose of the ESDD was to conduct an independent review of the Project's ESIA package – including the RAP – and to evaluate the compliance of land acquisition activities with the standards and requirements of the Lenders. Based on this review, the IESC also developed an **Environmental and Social Action Plan (ESAP).**

The RAP implementation will be periodically monitored by the **Lenders' IESC.**

8. Why this Guide to Land Acquisition and Compensation (GLAC) has been prepared?

This GLAC has been prepared to provide people affected by Project-related land acquisition ("Project Affected People" or "PAPs") with a clear and concise overview of **the expropriation process carried out by KGM** in accordance with the Expropriation Law, and summarize the **key principles of the RAP,** particularly regarding additional compensation and assistance measures that go beyond the legally mandated cash compensation to ensure alignment with international standards and Lender requirements.

In addition, this GLAC outlines how affected people can apply to the SPV to access RAP entitlements and convey their grievances, inquiries, and feedback to the Project parties.

There are three versions of the GLAC: (i) for affected lands, (ii) for affected houses, and (iii) for affected businesses. This version is the GLAC concerning affected lands.

B. PROJECT DESCRIPTION

9. What are the key Project Components?

The Project, designed as a **dual carriageway**, has a total length of **117.8 km**, encompassing both the main Motorway (84 km – 2x3 lanes) and connection roads (33.8 km – 2x2 lanes).

Other key Project components include **7** main interchanges, **5** tunnels, **16** viaducts, **22** bridges, **56** overpasses, **43** underpasses, and **308** culverts, with **auxiliary features** including an Operational and Maintenance (O&M) Centre, four Motorway Service Facilities, toll collection areas and temporary construction facilities.

10. Are there any associated facilities of the Project?

There are no additional associated facilities in the current design. Please refer to Question 15 for information regarding temporary facilities to be used during construction.

11. What is Motorway Expropriation Corridor?

The **expropriation corridor** defines the boundaries within which land acquisition, expropriation and all construction activities are carried out for the Motorway and associated connection roads.

The width of the expropriation corridor varies along the route, with the minimum and maximum widths as follows:

- **Minimum width: ~ 55 m**
- **Maximum width: ~450 m** (at the location of service areas)

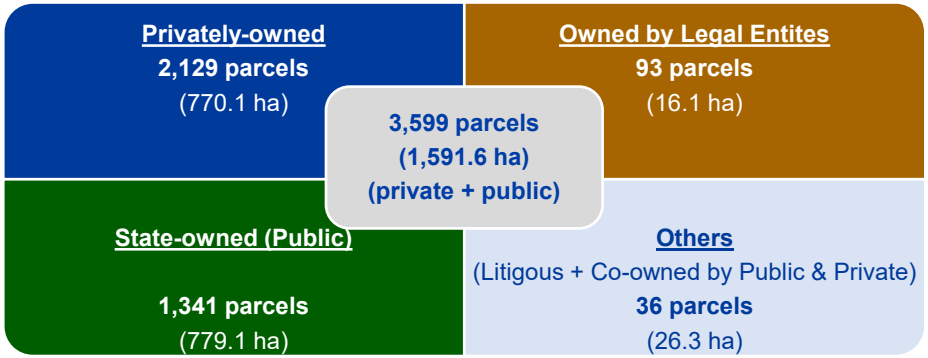
12. Which Settlements are affected within the Expropriation Corridor?

The land acquisition for the Project affects 3 districts and 57 neighbourhoods.

- **Serik (12 neighbourhoods):** Deniztepesi, Sariabali, Yukarikocayata, Asagikocayatak, Kayaburnu, Dikmen, Candir, Asagicatma, Cumali, Burmahanci, Urundu, Belpinar
- **Manavgat: (34 neighbourhoods):** Cakis, Tasagil, Gundogdu, Hocalar, Yavrudogan, Colakli, Seki, Kalemler, Evren, Ilica, Yenikoy, Siseler, Evrenleryahsi, Dolbazlar, Yukariisiklar, Dikmen, Bucakseyhler, Ulukapi, Asagisiklar, Demirciler, Karaoz, Aksaz, Haciali, Cevizler, Sulek, Haciisali, Haciobası, Kızılot, Uzunlar, Kadilar, Orensehir, Yalcidibi, Odaonu, Karakaya
- **Alanya (11 neighbourhoods):** Alara, Cakallar, Incekum, Avsallar, Akdam, Turkler, Payallar, Emisbeleni, Toslak, Telatiye, Elikesik

13. How many Parcels are Affected?

There are **3,599 private, legal entity, and public (state-owned)** parcels to be acquired **within Project's expropriation corridor.**



14. What is the land registry type of affected parcels?

The majority of the affected parcels are registered as **agricultural land**, **road**, and **forest**.

Number of Parcels per Land Registry Type (3,599 parcel)	Area of Parcels per Land Registry Type (1,591.6 ha parcel)
• **Agricultural** (2,507 parcel)	• **Agricultural** (825.6 ha)
• **Road** (258 parcel)	• **Forest** (553.5 ha)
• **Forest** (149 parcel)	• **Road** (53 ha)
• **Land with structures** (148 parcel)	• **Land with structures** (42.2 ha)
• **Constructible plot** (87 parcel)	• **Constructible plot** (9.1 ha)
• **Orchard** (101 parcel)	• **Orchard** (21.7 ha)
• **Raw soil** (83 parcel)	• **Raw soil** (15.8 ha)
• **Litigous** (13 parcel)	• **Litigous** (12.2 ha)
• **Pasture** (3 parcel)	• **Pasture** (0.2 ha)
• **Others** (250 parcel)	• **Others** (58.3 ha)

15. Which temporary facilities will be required during construction?

During the **construction phase**, the Project will utilise various temporary facilities, including **construction camp sites**, **production plants and facilities** (such as concrete batching plants, crushing/mechanical plants, and asphalt plants), as well as **quarries** and **excavated material storage sites**.

A list of planned facilities is included in the RAP.

Construction Camp Sites	• Temporary Construction Camp (KM 59+500) • Main Construction Camp Site (KM 64+500) • Manavgat Construction Camp Site (KM 87+500) • Alanya Construction Camp Site (124+300)
Plants and Facilities	• 7 concrete plants • 4 crushing/mechanical plants • 3 asphalt plants
Quarries	• 11 potential quarries
Excavated Material Storage Sites	• 20 potential excavated material storage sites

16. How is the private land for temporary facilities acquired by the Project?

Private parcels required for temporary facilities are acquired by the SPV/EPC through rental agreements, mutual protocols, or other similar arrangements made with the landowners or shareholders.

Upon completion of temporary use, the land is rehabilitated and returned to the owner in accordance with the agreed terms.

17. What are key milestones in the Project schedule?

No	Key Milestones / Tasks	Date
0	**BOT Contract Signing, Site Delivery**	14 October 2024
1	**Expropriation**	
1.1	Start of inventory of assets and valuation study commenced by appointed valuation contractor	November 2024
1.2	Start of expropriation procedures – through Article 8 negotiations – by KGM	February 2025
1.3	Completion of valuation	Q4 2025 (*target*)
1.4	Completion of Article 8 negotiations as part of expropriation procedures undertaken by KGM	
	Phase 1: KM 52 – 56; KM 74 – 104; KM ~64 (O&M Centre), KM ~80 (Concrete Plant)	February – August 2025 (***completed***)
	Phase 2: KM 56 – 74; KM 104 – 116; Connection Roads: Manavgat East, D-400, Serik	September 2025 – January 2026 (*target*)
	Phase 3: KM 116 – 141; Connections roads: Taşağıl, Manavgat, Alarahan and Konaklı	April 2026 (*target*)
2	**E&S Studies and Finance Agreement**	
2.1	Start of ESIA Package studies	March 2024
2.2	Start of RAP studies	April 2025
2.3	ESIA Package Disclosure by SPV, Lenders (60 days)	Q2 and Q3 2025
2.4	Finance Agreement Signing	6 October 2025
3	**Construction Works**	36 months after Signing
3.1	Land entry by the Project for design-related activities	November 2024
3.2	Site Mobilisation and Start of Construction	March 2025
3.3	Earthworks and Construction of Engineering Structures (incl. Connection Roads)	January 2028
	KM 52+000 – 80+000	November 2027 (*target*)
	KM 80+000 – 114+750	January 2028 (*target*)
	KM 114+750 – 141+705	November 2027 (*target*)
3.4	Tunnels, Viaducts, Superstructure, O&M Centre, Motorway Service Facilities (MSFs) and Other Secondary Works	March 2028
4.	**Motorway Commissioning**	Within 36 months from the date of signing the finance agreement

C. LAND ACQUISITION STATUS AND DISPLACEMENT IMPACTS

18. What is the status of land acquisition?

A **Public Benefit Decision** (No: 2023/371) for the Project was declared by the MoTI on **28 November 2023.**

A Presidential Decree (No. 9708) concerning the **Accelerated Expropriation** of certain immovable properties under the scope of the Project (located within the settlements covered by the Decree) by the KGM in line with **Article 27 of the Expropriation Law of Türkiye** (Law No. 2942, 1983) was published in the Official Gazette (No. 32857) on **30 March 2025.**

The **Expropriation Decisions** were taken for the Project by KGM between December 2024 and May 2025.

Pursuant to these decisions, **land acquisition activities for the Project commenced in February 2025**.

- Between February and August 2025, expropriation procedures were initiated for 22% of the **private parcels through Article 8 invitations and negotiation meetings.**
- KGM has resorted to the **accelerated expropriation** for **3%** of the **private parcels.**
- Forestry permits have been obtained for over 75% of the forest lands located within the Motorway's expropriation corridor.

Planned Schedule of Article 8 Negotiation Meetings

Negotiation Meeting Date	Settlements
Completed between February – September 2025	Serik: Deniztepesi, Sarıabalı
	Manavgat: Şişeler, Taşağıl, Aksaz, Cevizler, Demirciler, Hacıali, Hacıisalı, Hacıobası, Karaöz, Sülek, Aşağıışıklar, Bucakşeyhler, Dikmen, Ulukapı, Yukarıışıklar, Dolbazlar, Evrenleryavşi, Kalemler, Seki, Yeniköy, Şişeler
October 2025 *(planned)*	Manavgat: Kadılar, Karakaya, Odaönü, Örenşehir, Uzunlar, Yalçıdibi
November 2025 *(planned)*	Serik: Aşağıkocayatak, Çandır, Dikmen, Kayaburnu, Yukarıkocayatak
	Manavgat: Çakış, Çolaklı, Gündoğdu, Hocalar, Taşağıl, Yavrudoğan
November 2025 *(planned)*	Manavgat: Hacıobası, Kızılot
January – February 2026 *(planned)*	Serik: Deniztepesi, Sarıabalı, Üründü, Belpınarı, Burmahancı, Cumalı, Aşağıçatma
February – April 2026 *(planned)*	Manavgat: Evren, Ilıca
	Alanya: Alara, Çakallar, Akdam, İncekum, Avsallar, Türkler, Payallar, Emişbeleni, Toslak, Telatiye, Elikesik

19. What is the status of land entry and construction?

The site was officially delivered by KGM to the SPV in October 2024, following the signing of the BOT Contract.

After site delivery, design-related activities – including drilling operations– were initiated in **November 2024**.

site mobilisation for Project construction began in **March 2025**, financed through the Company's own equity.

Currently, **construction works are ongoing primarily on forest parcels**, for which forestry permits have been obtained.

As the expropriation of privately owned parcels is finalised, construction activities are also initiated by the SPV and EPC on those parcels following the compensation payments by KGM, in line with the national Expropriation Law, and the provision of additional support by the SPV under the RAP.

20. What are the potential displacement impacts of the Project and who would be affected?

Permanent or temporary land acquisition for the Project will lead to **physical or economic displacement** for the **owners and/or users (formal or informal)** of the affected lands and structures.

The land acquisition-related impacts are primarily classified under the following:

(i) **Affected lands** (may include non-residential and non-commercial structures)
(ii) **Affected houses** (299 building on 231 parcels with 341 households)
(iii) **Affected greenhouses** (599 greenhouse units on 347 parcels)
(iv) **Affected businesses** (29 businesses to be relocated + 8 roadside local product vendors operating on lands already expropriated by KGM)
(v) **Impacts on vulnerable people**
(vi) **Temporary losses/impacts during construction**, and
(vii) **Impacts during operation**

21. Will there be further land acquisition beyond the current expropriation Corridor?

The Project may require **further land acquisition** beyond the currently defined expropriation corridor, either during construction or, on a limited basis, after commissioning.

In case of future land acquisition requirements, the required land will be acquired by KGM in line with the Expropriation Law. Potential displacement impacts and access restrictions associated with such land acquisition or expropriation will be managed by the SPV – in collaboration with KGM – in accordance with the RAP principles.

22. What are the cumulative land acquisition and resettlement impacts of the Project?

Cumulative land acquisition impacts may arise when landowners or users are affected by multiple, overlapping land-related acquisitions linked to the Project or other developments in the region or directly to the Project.

During RAP implementation a field-based cumulative impact assessment study will be conducted by the SPV, with support from third-party technical consultants, to make parcel-based identification of affected owners and users, assess and address these impacts under the specific budget allocated by the SPV.

D. EXPROPRIATION PROCESS IN LINE WITH EXPROPRIATION LAW

23. What is the legal basis of the expropriation process?

In the Republic of Türkiye, expropriation is carried out in accordance with **Article 46 of the Constitution** and implemented through the provisions of **Expropriation Law (No. 2942).**

The **Directorate General of Highways (KGM)** is responsible for the expropriation of privately-owned parcels in accordance with Türkiye's Expropriation Law (No. 2942), as well as coordinating the allocation of public parcels.

According to the BOT Contract, the SPV is responsible for covering a portion of the expropriation costs for the Project. The amount to be covered by the SPV is specified in the BOT Contract. Any costs exceeding this specified amount will be covered by KGM.

24. Which procedures does KGM carry out under the Expropriation Law?

Land acquisition is conducted through either negotiated settlement (Article 8) or judicial expropriation.

For detailed information on the expropriation process carried out by the KGM and its procedural steps, please refer to the booklet titled *"**Procedural Steps in Expropriation Activities Conducted by the General Directorate of Highways**"*, which has been distributed by the SPV alongside this GLAC.

25. Who is eligible for compensation under the Expropriation Law?

Under national legislation, the following categories of PAPs are eligible for compensation:

Affected Asset	Eligible PAPs
Private Parcels	• **Owners** of lands, trees, crops, structures on affected lands • **Formal land users** (with official documentation) for trees, structures, crops on affected lands • **Informal land users who have evidence** of structure and tree ownership on affected lands (eligible under Exp. Law - Art. 19) • **Litigant owners/shareholders or formal and informal users of litigious parcels**
Public Lands	• **Formal public land users** (who have official documentation, e.g. adequate pay "ecrimisil", rental agreement) for trees, crops, and structure • **Informal public land users who have evidence** of structure and tree ownership on affected lands (eligible under Exp. Law - Art. 19)
Business Structures	• **Owners of affected business structures** • **Formal (tenants) or informal users affected business structures**

E. COMPENSATION AND ENTITLEMENTS UNDER RAP TO MEET INTERNATIONAL STANDARDS

26. What additional compensation and entitlements are provided by the SPV through RAP implementation, beyond those offered by KGM under the Expropriation Law?

In addition to the compensation provided by KGM in accordance with the Expropriation Law, **the SPV implements supplementary compensation and livelihood restoration measures under the RAP** for the affected businesses.

The SPV has established a dedicated **RAP Fund** for covering all costs arising from the implementation of additional measures beyond those required under national legislation. This Fund is allocated and managed by SPV, in coordination with KGM.

27. What are the Key Compensation and Assistance principles outlined in the RAP?

- Avoidance of Forced Eviction: The Project will not carry out forced evictions except in accordance with national legislation and the requirements of IFC PS5.
- Prioritisation of Purchase through Negotiated Settlement over Expropriation: KGM has prioritised negotiated settlements through Article 8 (purchase method) under this Project. Article 27 will be used by KGM as a last resort, only after Article 8 process.
- Compensation at Full Replacement Cost: All compensation to people affected by land acquisition will be provided at full replacement cost. This includes market value plus any applicable transaction costs, as required by Lenders.
- Livelihood Restoration and Assistance in addition to cash compensation: The SPV will provide livelihood restoration and assistance measures to eligible affected businesses, including their employers, and formal and informal employees, in accordance with the requirements of the Lenders.
- Early Consultations and Notification for Land Acquisition Process: The SPV will notify the owners and tenants of affected structures at least **three months** in advance of the commencement of expropriation, in alignment with KGM's expropriation programme. This is intended to avoid forced eviction and allow sufficient time (more than six months) for resettlement planning, including the relocation arrangements of affected businesses.

  In cases where expropriation has already been concluded, the SPV will inform property owners of the Project schedule. Each owner will be granted a six-month notice period to vacate the property following notification, unless a mutually agreed alternative timeframe is established.

28. What is Cut-off Date for Eligibility?

The **cutoff date** is the date after which any new structures, trees, crops, and other immovable assets will no longer be counted or measured for compensation purposes.

The cut-off dates are determined **based on the completion date of the census and asset inventory surveys** conducted in each respective settlement. Therefore, the cutoff is specific to each affected settlement.

The SPV posts the list of affected parcels along with a notice disclosing the applicable cut-off date and its conditions. These are posted in the offices of the mukhtars, local coffee houses, and other appropriate public venues within the respective affected settlements.

The affected businesses are also individually notified by the SPV.

29. Who is Eligible for Compensation and Assistance under RAP?

All people affected by the Project and owning and/or using (formally or informally) the affected lands and assets **before the cut-off dates** defined in the RAP are eligible for compensation and assistance under RAP.

Accordingly, **people who encroach on the Project area after the cut-off date** are **not** eligible for compensation or assistance provided through the implementation of the RAP.

Affected people who believe they have not been included in the process or are eligible for the entitlements can apply to the Project CLOs with the required documents and an application letter. Their eligibility for compensation and/or assistance will be evaluated by the SPV. After the evaluation, they will be informed of the outcome, and if deemed eligible, they will be granted access to the relevant compensation and/or assistance.

The eligibility categories for affected lands and businesses identified in the RAP are as follows:

Affected Lands	• Landowners (private parcels) • Owners and users of litigous properties • Owners of non-residential and secondary structures on affected lands (maybe formal or informal user of affected land) • Vulnerable landowners and land users
Affected Businesses	• Formal employers (owner or tenant at the affected business structure) • Informal employers (owner or tenant at the affected business structure) • Employees of the affected businesses (formal or informal) • Vulnerable employers and employees

30. What are the RAP entitlements specific for owners and users of affected private and public parcels?

For detailed information, please refer to the **GLAC for affected lands.**

31. What are the RAP Entitlements for Owners of Affected Businesses that will be permanently resettled?

- **Business owners (Employers) – who are "owners" of the relocated business structure**

In accordance with the Expropriation Law, cash compensation by KGM is provided to structure owners. Depreciation is applied. No compensation is provided by KGM for loss of income.

The owners of affected businesses are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- Notification at least **three months in advance of the start of expropriation** (which is approximately six months before land entry).
- **Top-up cash compensation** to cover the amount deducted for depreciation by KGM and achieve full replacement cost.
- **Pre-Location Financial Support Package for Business Owners** (to be provided by the SPV through a milestone-based payment approach as outlined in the RAP);
  - ❖ Cash Compensation to cover cost of fixed (non-movable) investments/improvements (for portion not covered by KGM).
  - ❖ Moving allowance to cover disassembly, transportation and assembly costs of movable assets (for portion not covered by KGM).
  - ❖ Business relocation support package to cover other business-specific relocation-related expenses such as real estate agent service fee, title deed transfer costs, potential transaction costs, subscription fees, permit renewal costs including preparation of relevant documentation, cost of approvals to be secured from related authorities, etc.
- **Post-relocation Financial Support Package for Business Owners** to compensate net income loss during the temporary business interruption period **up to 6 months** until successful reestablishment of the affected business – for eligible business owners, cash compensation support will be provided by the SPV on a monthly basis.

  ***(Important Note to PAPs:** Employers are required to provide financial and other relevant documentation upon the request of the SPV. These documents will be reviewed by the SPV to ensure a fair determination of the level and duration of support).*

- Access to **External Business Advisory Services** for 36 months.

- **Business owners (Employers) – who are "tenants" at the relocated business structure**

As per the Expropriation Law, cash compensation is provided to structure owners. If both the owner and the tenants provide their consent, tenants may be compensated by KGM for the non-movable and movable assets determined to be in their ownership. No compensation is provided by KGM for loss of income.

The owners of affected businesses employers are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- Notification at least **three months in advance of the start of expropriation** (which is approximately six months before land entry).
- **Pre-Location Financial Support Package for Tenant Business Owners** (to be provided by the SPV through a milestone-based payment approach as outlined in the RAP);
  - ❖ Cash Compensation to cover cost of fixed (non-movable) investments/improvements made by the tenants (for portion not covered by KGM).
  - ❖ Moving allowance to cover disassembly, transportation and assembly costs of movable assets (for portion not covered by KGM).
  - ❖ Business relocation support package to cover other business-specific relocation-related expenses including rental allowance (three-month rent allowance, based on the market rental rate of the replacement business structure to be rented), real estate agent service fee (equivalent to the market rental rate of the replacement business structure to be rented), and allowance for other relocation related expenses, which are specific to each business (such as environmental permits, H&S related permits and approvals, etc.).
- **Post-relocation Financial Support Package for Tenant Business Owners** to compensate net income loss during the temporary business interruption period **up to 6 months** until successful reestablishment of the affected business – for eligible business owners, cash compensation support will be provided by the SPV on a monthly basis. to affected business owners to compensate net income loss during the temporary business interruption period (**6 months**).

> ***Important Note to PAPs:*** *Employers are required to provide financial and other relevant documentation upon the request of the SPV. These documents will be reviewed by the SPV to ensure a fair determination of the level and duration of support.*

- Access to **External Business Advisory Services** for 36 months.

- **Business owners (Employers) Business owners – which would terminate operations (business shut-down) due to relocation**

As per the Expropriation Law, no compensation is provided by KGM for loss of income.

In cases where business termination is unavoidable and directly linked to relocation (this will be confirmed by the external Business Advisor(s) to be retained by the SPV), the SPV will provide **one-off** cash compensation support to the affected business owners. The external Business Advisor(s) will determine the valuation criteria and the appropriate level of support on a case-by-case basis, using official financial and accounting records (e.g. tax declarations, balance sheets from the previous year, etc.).

Affected business owners and their employees will be given priority consideration for employment opportunities generated by the Project and have access to the External Business Advisory Services to be arranged by the Project.

Employment will be contingent upon meeting relevant job requirements, and the RAP Implementation Team will assist in identifying suitable roles, supporting applications, and providing any necessary orientation or training.

32. What are the RAP Entitlements for Owners of Affected Businesses that will not relocate but face partial loss of structures at the existing premises?

As per the Expropriation Law, cash compensation is provided to structure owners. Depreciation is deducted.

The owners of affected businesses employers (owner or tenant at the affected structure) are entitled to receive the following **additional** compensation and assistance from the SPV under the RAP:

- **Top-up cash compensation** to cover the amount deducted for depreciation by KGM and achieve full replacement cost (only for structure owners)
- **Support through construction teams and vehicles** to prevent potential access restrictions to the site – such as at entry/exit gates, ramps, or for the reorganisation of the layout of movable structures, where appropriate.
- **Assistance for relocating affected movable structures and auxiliary facilities** to another location within the existing premises or nearby surroundings – in coordination and consultation with the business owner to minimise any interruption to business operations.
- Access to **External Business Advisory Services** for 36 months.
- **Monitoring requests and managing grievances** to identify any impact on the business (e.g. access restrictions caused by construction or during operation) and develop and implement corrective actions in consultation with the business owner.

33. What are the RAP Entitlements for the Formal and Informal Employees of Affected Businesses?

As per the Expropriation Law, no compensation is provided by KGM to formal or informal employees.

Employment status and conditions of employees will be identified by the SPV **three** months before start of expropriation.

They are entitled to receive following compensation and assistance from SPV under RAP:

- **Formal and Informal Employees** of relocated businesses affected by **temporary** income loss
    - **Gross salary support** (up to **three** months) to avoid temporary interruption of employee salary payments due to relocation (to be assessed and identified by the External Business Advisor(s) of SPV based on monitoring outcomes)

      If the RAP monitoring (internally by SPV and externally by IESC) proves that there is no adverse impact/interruption on the income of the employees, the SPV will **not** provide any gross salary support for the employees.
- **Formal and Informal Employees** affected by **permanent** income loss (due to business shut-down, dismissal, etc.)
    - **Review and evaluation of permanent income loss cases by External Business Advisor(s) of SPV** and provision of following support when it is verified that permanent income loss (that take place within 6 months after the relocation) is directly related/inevitable due to relocation of the business:
        - ❖ **For formal employees:** 3 months of gross salary support by SPV in addition to severance payments, unpaid annual leaves and other gained benefits to be provided by their official employers in line with the Labour Law.
        - ❖ **For informal employees:** 3 months of gross salary support by SPV plus priority for employment in the Project construction (if they meet the Project employment criteria) and other employee-specific measures to be developed by the SPV (e.g. specific skill trainings to increase opportunity for employment in similar or other sectors) and implemented by SPV on a case-by-case basis.)

34. What specific RAP entitlements are available for people affected by construction impacts?

The SPV and construction (EPC) contractors (including subcontractors) will implement measures specified in the Project ESIA, ESMP and subject-specific management plans to avoid, and where avoidance is not possible minimise and/or compensate the impacts on people and environment.

PAPs may contact Project CLOs through contact information provided at the end of this GLAC to submit their construction-related grievances and feedback through Project's Grievance Mechanism.

35. What Livelihood Restoration, Improvement, and Assistance Packages are available to the Owners of Affected Businesses (Employers) in related to their affected business operations?

Livelihood restoration, improvement, and assistance will be provided to both employers and employees – whether formal or informal – of businesses affected by the Project. These measures aim to support the successful re-establishment of relocated businesses at their new locations, reduce business interruptions during the transition and prevent potential shutdowns, and help restore (or where possible, improve) their income levels.

The support packages available to affected businesses will include the following measures:

Livelihood Restoration Improvement and Assistance Packages for Affected Businesses				
Package 1 External Business Consultancy Support for Relocation (for 36 months)	**Package 2** Pre-relocation Financial Support Package to Business Owners	**Package 3** Post-relocation Financial Support Package to Business Owners	**Package 5** Financial Support Package to Employees	**Package 6** Priority in Project Employment

The SPV will retain an external Business Consultancy Company (Business Consultant), comprising a team of experts specialised in business development and management for micro, small, and medium-sized enterprises (MSMEs). The consultancy services will be provided over a period of 36 months, aligning with the duration of RAP implementation.

36. How will eligible PAPs be identified, and which documents will be requested from them for eligibility evaluation and decision-making?

During RAP implementation, the SPV will proactively engage with the affected people, including businesses, to identify potential eligible people and inform them about the livelihood restoration, improvement and assistance measures available to them and requested documents.

The eligibility of affected business employers and employees to benefit from RAP entitlements will be evaluated by the SPV on a case-by-case basis.

Important Note to PAPs: *PAPs may also contact the Project CLOs using the contact information provided at the end of this GLAC to request further information, share suggestions, or express their interest in participating in the relevant support packages.*

The documentation requested from PAPs for the evaluation of their eligibility for RAP entitlements may include, but is not limited to, the following.

It should be noted that this list is not exhaustive, and the SPV reserves the right to request additional documentation at any stage of the eligibility assessment process:

Affected Businesses

- Title deeds for affected business structures (*for structure owners*)
- Lease agreements (*for formal users - tenants of land or business structure*)
- Legal company documentation for affected businesses (*for formal business owners*)
- Financial records, accounting documents, social security registration, permitting documentation, etc. (*for formal business owners*)
- Information and documentation on informal employees in relation to their informal employment terms and duration, salaries, residency or work related documentation of foreign workers, etc. (*for formal and informal business owners*)
- Documentation of moving and transaction costs, including fees paid to authorities and service providers, and price offers/quotes as requested by the SPV and other transaction costs (*for formal and informal business owners*)
- Evidence of expenditures made for fixed investments and improvements (*for formal and informal business owners*)

F. STAKEHOLDER ENGAGEMENT AND INFORMATION DISCLOSURE

37. How will PAPs and interested parties be engaged during the Disclosure Period and RAP implementation period?

The Project has a **Stakeholder Engagement Plan (SEP)** disclosed at the Project website (www.antalyaalanyaotoyolu.com.tr)

The RAP separately includes a detailed **Stakeholder Engagement Action Plan** for RAP disclosure and implementation phases. The following RAP specific disclosure activities are conducted:

- The RAP (including the GLAC) **will be published in English and Turkish on the SPV and Lenders' websites**, in line with their disclosure policies and timelines.
- This GLAC, explaining the entitlements and next steps clearly to all affected people and stakeholders, will be delivered to the offices of mukhtars and directly to affected people and vulnerable individual in each settlement.
- The **hard copies (in Turkish)** of the final RAP and GLAC will be made available at the following locations: Project Information Office in Serik, Project's Construction Camp Sites, and Offices of the settlement heads (mukhtars)
- The **SPV CLOs will engage individually with affected businesses that include vulnerable employers and employees** to distribute the GLAC and communicate the key information from the RAP, as applicable.
- Specifically for the disclosure of the RAP, the RAP Implementation Team will organise separate group and/or individual meetings and information sessions prior to Article 8 negotiation meetings.
- Meetings in other settlements will continue throughout the first year of RAP implementation, in alignment with the expropriation and construction schedules.
- **The Project will continue engaging with affected people throughout the 36-month RAP implementation period** in line with the RAP Stakeholder Engagement Action Plan for RAP.

G. PROJECT GRIEVANCE MECHANISM

38. How can stakeholders submit complaints and feedback about land acquisition to KGM?

KGM, as the authority responsible for expropriation, collects and manages all complaints, objections, and feedback related to land acquisition in line with its official procedures.

Stakeholders can submit land acquisition-related complaints and feedback to KGM through **KGM's institutional grievance channels**, which operate **in parallel with the Project's own grievance mechanism**.

Complaints related to expropriation, valuations, or compensation procedures carried out by KGM can be submitted **directly to KGM** through official channels, including:

- Through KGM's online grievance system: https://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Root/SikayetGeriBildirim.aspx
- Direct applications or petitions to **KGM 13th (Antalya) Regional Directorate** (Expropriation Department):
  - Mail or in-person application: Fabrikalar Mah. Gazi Bulvarı 07090, Kepez, Antalya, Türkiye
  - Phone: +90 242 320 70 00 Fax: +90 242 345 36 99
  - E-mail: bol13@kgm.gov.tr

In addition, stakeholders may submit grievances through the Presidency's Communication Centre (CIMER – https://www.cimer.gov.tr/ or 150). While CIMER is a national-level centralised communication platform, any land acquisition-related grievances submitted via CIMER are forwarded to and handled by KGM through internal coordination systems.

The grievances that fall under KGM's legal responsibility will be managed under **national administrative and legal procedures**, separate from the Project's grievance process.

The SPV does **not have a mandate to intervene** in grievances that fall under KGM's legal authority. If PAPs submit such complaints to the SPV, the SPV will guide them to the correct channels. When needed, the SPV will forward these complaints to KGM in writing.

39. Is there a Project-specific Grievance Mechanism and how can stakeholders submit their land acquisition-related complaints and feedback to SPV?

Yes, the **SPV has set up a Project-specific Grievance Mechanism** as part of the ESIA process, alongside the preparation of the RAP. This mechanism is used to collect and manage complaints and feedback related to the **SPV's areas of responsibility**, including RAP implementation and construction-related impacts.

This Mechanism is accessible to all stakeholders, including Project-Affected Persons (PAPs) and vulnerable individuals.

Grievances related to formal expropriation or compensation procedures under the legal responsibility of KGM and **must be submitted directly to KGM.**

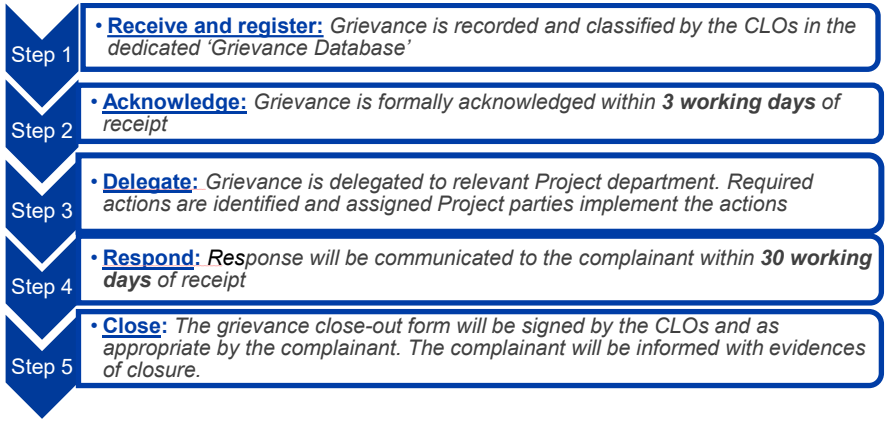
Through this mechanism, stakeholders can submit their concerns using the **channels listed below in Section H "CONTACT INFORMATION FOR STAKEHOLDERS"**

Any grievance and feedback (verbal or written) lodged or conveyed through different channels will be registered in the Project Grievance Database and managed as per the Project SEP, **by observing the requirements stipulated by the Law on the Protection of Personal Data (Law No. 6698, 2016).**

This Mechanism does not replace citizens' right to apply to other formal mechanisms including courts, CIMER) and Antalya Metropolitan Municipality's portal and call centre, among others.

40. What are the steps of the Project's Grievance Mechanism and how are complaints handled?

Key steps and timeframes of the Project Grievance Mechanism are presented below.



41. What appeal mechanisms are available if a grievance is not resolved to the satisfaction of the complainant?

If a grievance is not resolved to the satisfaction of the complainant, the Project offers an appeal mechanism. In such cases, the SPV will launch a second-tier review involving relevant authorities, third-party experts, or academics as independent parties. Based on their recommendations, the SPV will take appropriate action to resolve the grievance.

H. CONTACT INFORMATION FOR STAKEHOLDERS

Stakeholders can contact the Project and submit their questions, complaints, or feedback through the following communication channels:

Project website	**www.antalyaalanyaotoyolu.com.tr**
E-mail	**info@antalyaalanyaotoyolu.com**
Mail	**Ankara – Centre:** Kazım Özalp Mahallesi Hafta Sokak No:9, Çankaya, Ankara, Türkiye **Ankara – Office:** Maidan İş Yaşam Merkezi, Mustafa Kemal Mah. 2118. Cad. B Blok, Kat 10, Daire 105, Çankaya, Ankara, Türkiye **Antalya Project Information Office:** Orta Belek Caddesi No:7, Kapi no: 9, Serik, Antalya, Türkiye
Phone (toll free line)	**+90 850 202 07 07**
Mobile Phone (SPV – CLOs)	**+90 530 978 78 42** **+90 539 935 16 46** **+90 536 345 39 23**
Grievance boxes and forms	Grievance and feedback boxes and forms are placed and maintained by the SPV in all affected settlements, at relevant work and mobilisation sites, and in mobile Project vehicles
Social media	**Linkedin:** https://www.linkedin.com/company/antalyaalanyaotoyolu/ **Instagram:** https://www.instagram.com/antalyaalanyaotoyolu/ **Youtube:** https://www.youtube.com/@AntalyaAlanyaOtoyolu

ANTALYA ALANYA MOTORWAY

www.antalyaalanyaotoyolu.com.tr

Annex-10 ECOLOGY and BIODIVERSITY STUDIES and ASSESSMENTS FOR ANTALYA-ALANYA MOTORWAY PROJECT

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Legend for Flora and Fauna Tables

IUCN (International Union for Conservation of Nature) Red List of Threatened Species)	
1994 (ver. 2.3.)	**2001 (ver. 3.1)**
EX: Extinct	**EX:** Extinct
EW: Extinct in the wild	**EW:** Extinct in the wild
CR: Critically endangered	**CR:** Critically endangered
EN: Endangered	**EN:** Endangered
VU: Vulnerable	**VU:** Vulnerable
LR: Lower risk	
cd: conservation dependent	**NT:** Near Threatened
nt: near threatened	**LC:** Least Concern
lc: east concern	
DD: Data deficient	**DD:** Data deficient
NE: Not evaluated	**NE:** Not evaluated

BERN CONVENTION (for flora and fauna species)	
Annex 1	Protected Flora Species
Annex 2	Strictly Protected Fauna Species
Annex 3	Protected Fauna Species

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora	
Annex 1	Species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
Annex 2	Species not necessarily threatened with extinction, but their trade must be controlled to avoid utilization incompatible with their survival.
Annex 3	Species protected in at least one country, and their trading is under control by CITES

Turkish Red Data Book of Turkish Plants (TRDB; Appim et al., 2000) Based on IUCN Red List Categories and Criteria (ver. 2.3)	
EX	Extinct
EW	Extinct in the Wild
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
LR	Lower risk
cd	conservation dependent
nt	near threatened
lc	least concern
DD	Data Deficient
NE	Not evaluated

National Threat Categories	
E	Endangered
Ex	Extinct
I	In Determinate
K	Insufficient Known
nt	widespread
O	Out of Danger
R	Rare
V	Vulnerable

NATIONAL HUNTING STATUS (According to Central Hunting Commission, 2020-2021) (for fauna species)	
APP I	Includes game animals which are protected by the CHC
APP II	Includes game animals which are allowed to be hunted in seasons predefined by CHC

NATIONAL THREAT CATEGORIES (for bird species) (Kiziroğlu,İ., 2009. The Pocket Book for Birds of Türkiye, ISBN: 975-7460-01-X, Ankamat Matbaası, Ankara, 564 s	
Category A:	
A.1.2.	**(CR)** Critically endangered and breeding species in Türkiye
A.2.	**(EN)** Endangered and breeding species in Türkiye
A.3.	**(VU)** Vulnerable and breeding species in Türkiye
A.3.1.	**(D)** Declining, vulnerable and breeding species in Türkiye
A.4.	**(NT)** Near threatened. Breeding species do not face to risk now but are likely to qualify for threatened category in the near future in Türkiye
A.5.	**(LC)** Least Concern. Breeding species that are widespread in Türkiye
A.6.	**(DD)** Not Evaluated. Breeding species which have not been evaluated in Türkiye
A.7.	**(NE)** Critically endangered and non-breeding species in Türkiye
Category B:	
B.1.2.	**(CR)** Critically endangered and non-breeding species in Türkiye
B.2.	**(EN)** Endangered and non-breeding species in Türkiye
B.3.	**(VU)** Vulnerable and non-breeding species in Türkiye
B.3.1.	**(D)** Declining, vulnerable and non-breeding species in Türkiye
B.4.	**(NT)** Near threatened, non-breeding species do not face to risk now but are likely to qualify for threatened category in the near future in Türkiye
B.5.	**(LC)** Least Concern, non-breeding species that are widespread in Türkiye
B.6.	**(DD)** Data Deficient, non-breeding species on which there is deficient information in Türkiye
B.7.	**(NE)** Not Evaluated, non-breeding species which have not been evaluated in Türkiye
RELATIVE ABUNDANCE (based on observation)	
1	Very Rare
2	Rare
3	Moderate
4	Abundant
5	Very Abundant
ENDEMIZM (for flora species)	
R: Regional Endemic	
W: Widespread Endemic	

HABİTAT		
1	**E1.2**	Perennial calcareous steppes
2	**F5.2**	Maquis
3	**G3.7**	Pinus brutia forest
4	**G1.1**	Riparian and gallery woodland
5	**G3.F**	Plantation area of Pinus brutia
6	**D5.1**	Reedbeds normally without free-standing water
7	**G2.9**	Evergreen orchards and groves
8	**I1.1**	Intensive unmixed crops

Table.1. Flora and Fauna Sampling Points Coordinates

Survey Area Code	Closest Settlement	Coordinates (UTM WGS84)	
		X	Y
Flora Sampling Points			
Flora-1	Yukarıkocayatak	318198	4089516
Flora-2	Yukarıkocayatak	320461	4088851
Flora-3	Kayaburnu	322855	4088523
Flora-4	Cumalı	327769	4087898
Flora-5	Burmahancı	330115	4090101
Flora-6	Üründü	331486	4091862
Flora-7	Sarıabalı	335769	4093160
Flora-8	Sarıabalı	336307	4092909
Flora-9 (Uğurçay Quarry)	Çakış	338585	4093050
Flora-10	Taşağıl	340722	4092208
Flora-11 (Construction Site-1)	Taşağıl	344079	4087799
Flora-12	Yavrudoğan	350172	4083805
Flora-13	Yavrudoğan	351069	4082679
Flora-14 (Borrow Pit)	Sarılar	359436	4076495
Flora-15 (Borrow Pit)	Sarılar	358941	4076503
Flora-16	Evrenleryavşı	358986	4079277
Flora-17	Yukarıışıklar	359948	4078983
Flora-18 (Construction Site-2)	Bucakşeyhler	364686	4077797
Flora-19	Aksaz	369565	4072820
Flora-20	Hacıisalı	372608	4069075
Flora-21	Hacıobası	371961	4065664
Flora-22	Uzunlar	375610	4065733
Flora-23	Yalçıdibi	381893	4062593
Flora-24	Çakallar	386490	4060686
Flora-25	Akdam	394464	4055587
Flora-26	Soğukpınar	399276	4055128
Flora-27	Konaklı	401462	4048662
Flora-28	Deniztepesi	335259	4093731
Flora-29 (Çakış Quary)	Çakış	338820	4092398
Flora-30	Soğukpınar	398339	4055632
Flora-31	Avsallar	391566	4056270
Flora-32	İncekum	389481	4056358

Survey Area Code	Closest Settlement	Coordinates (UTM WGS84)	
		X	Y
Flora-33	Alara	385374	4061220
Flora-34	Bucakşeyhler	364220	4078144
Flora-35	Bucakşeyhler	363607	4080065
Flora-36	Çakış	339991	4090218
Fauna Sampling Points			
Fauna-1	Yukarıkocayatak	318198	4089516
Fauna-2	Yukarıkocayatak	320461	4088851
Fauna-3	Kayaburnu	322855	4088523
Fauna-4	Cumalı	327769	4087898
Fauna-5	Burmahancı	330115	4090101
Fauna-6	Üründü	331486	4091862
Fauna-7	Sarıabalı	335769	4093160
Fauna-8	Sarıabalı	336307	4092909
Fauna-9 (Uğurçay Quarry)	Çakış	338585	4093050
Fauna-10	Taşağıl	340722	4092208
Fauna-11 (Construction Site-1)	Taşağıl	344079	4087799
Fauna-12	Yavrudoğan	350172	4083805
Fauna-13	Yavrudoğan	351069	4082679
Fauna-14 (Borrow Pit)	Sarılar	359436	4076495
Fauna-15 (Borrow Pit)	Sarılar	358941	4076503
Fauna-16	Evrenleryavşı	358986	4079277
Fauna-17	Yukarıışıklar	359948	4078983
Fauna-18 (Construction Site-2)	Bucakşeyhler	364686	4077797
Fauna-19	Aksaz	369565	4072820
Fauna-20	Hacıisalı	372608	4069075
Fauna-21	Hacıobası	371961	4065664
Fauna-22	Uzunlar	375610	4065733
Fauna-23	Yalçıdibi	381893	4062593
Fauna-24	Çakallar	386490	4060686
Fauna-25	Akdam	394464	4055587
Fauna-26	Soğukpınar	399276	4055128
Fauna-27	Konaklı	401462	4048662
Fauna-28	Deniztepesi	335259	4093731
Fauna-29 (Çakış Quary)	Çakış	338820	4092398
Fauna-30	Soğukpınar	398339	4055632

Survey Area Code	Closest Settlement	Coordinates (UTM WGS84)	
		X	Y
Fauna-31	Avsallar	391566	4056270
Fauna-32	İncekum	389481	4056358
Fauna-33	Alara	385374	4061220
Fauna-34	Bucakşeyhler	364220	4078144
Fauna-35	Bucakşeyhler	363607	4080065
Fauna-36	Çakış	339991	4090218
Aquatic Sampling Points			
Aquatic-1	Hazne Creek	325903	4087849
Aquatic-2	Köprüçay River	338246	4093085
Aquatic-3	Karaboynuz Creek	346252	4085768
Aquatic-4	Kızıllar Creek	349633	4084052
Aquatic-5	Kargıçayı Creek	357350	4079689
Aquatic-6	Bezirgan Creek	359763	4078791
Aquatic-7	Değirmen Creek	362589	4079107
Aquatic-8	Yerköprü Creek	364071	4078337
Aquatic-9	Manavgat River	364696	4077760
Aquatic-10	Cevizler Creek	371571	4070349
Aquatic-11	Narpuz Stream	374937	4065967
Aquatic-12	Çenger Stream	375663	4065549
Aquatic-13	Alara (Ulugüney) Stream	385527	4061310
Aquatic-14	Kargı Stream	394516	4055575

Table.2. Bat Survey Locations

Survey Area Code	Closest Settlement	Coordinates (UTM WGS84)	
		X	Y
Bat Observation Points			
Bat Survey-1	Taşağıl	342090	4088067
Bat Survey-2	Bucakşeyhler	363444	4079092
Bat Survey-3	Kadılar	378556	4063649
Bat Survey-4	Karakaya	384590	4061801
Bat Survey-5	Akdam	393252	4055810
Bat Survey-6	Soğukpınar	399361	4057352

Table.3 Vascular Plant Elements Identified from the Area Within the Scope of the Project (L: Literature, O: Observation; Relative Abundance; 1: Rare, 2: Middle, 3: Abundant, 4: Very abundant)

Scientific Name	Local Name	Endemism	IUCN	CITES	BERN	Habitat Directive	Phytogeographic Region	Relative Abundance				Type of Detection
								1	2	3	4	
Amaranthaceae												
Chenopodium album subsp. *album* var. *album*	-	-	-	-	-	-	-			X		O+L
Noaea mucronata	Hölmezotu	-	-	-	-	-	-		X			L
Amaryllidaceae												
Narcissus tazetta	Nergis	-	-	-	-	-	-		X			O+L
Anacardiaceae												
Cotinus coggygria	Boyacısumağı	-	LC	-	-	-	-		X			O+L
Pistacia terebinthus subsp. *palaestiana*	Çöğre	-	-	-	-	-	-			X		O+L
Rhus coriaria	Sumak	-	-	-	-	-	-		X			O+L
Apiaceae												
Artedia squamata	Karabenek	-	-	-	-	-	-			X		O+L
Daucus carota	Yabani Havuç	-	LC	-	-	-	-		X			O+L
Daucus guttatus	Benekli Havuç	-	LC	-	-	-	-		X			O+L
Echinophora tournefortii	Dikenli Çördük	-	-	-	-	-	Irano-Turanien			X		L
Eryngium campestre	Kırsenet	-	-	-	-	-	-		X			O+L
Eryngium glomeratum	Top Boğadikeni	-	-	-	-	-	-		X			O+L
Eryngium kotschyi	Deveelması	Endemic	LC	-	-	-	-			X		L
Scandix stellata	Dağ Kişkişi	-	-	-	-	-	-			X		L
Torilis arvensis	Dercikotu	-	-	-	-	-	-			X		O+L
Apocynaceae												
Nerium oleander	Zakkum	-	-	-	-	-	-			X		O+L
Vincetoxicum canescens	Zilasur	-	-	-	-	-	-			X		O+L
Araceae												
Arisarum vulgare	Yılancıkotu	-	-	-	-	-	Mediterranean		X			O+L
Arum dioscoridis	Tirşikpancarı	-	-	-	-	-	-	X				O+L
Dracunculus vulgaris	Yılanbıçağı	-	LC	-	-	-	Mediterranean	X				O+L
Araliaceae												
Hedera helix	Duvarsarmaşığı	-	-	-	-	-	-			X		O+L
Asparagaceae												
Drimia maritima	Kumörümcekotu	-	-	-	-	-	-			X		O+L
Muscari neglectum	Arapüzümü	-	-	-	-	-	-		X			L

Prospero autumnale	Güzsümbülü	-	-	-	-	-	-			X		O+L
Ruscus aculeatus	Tavşanmemesi	-	LC	-	-	-	Europe-Siberia		X			O+L
Asteraceae												
Achillea millefolium subsp. *millefolium*	Civanperçemi	-	-	-	-	-	-		X			L
Antemisia campestris	Yavşan Otu	-	-	-	-	-	-		X			O+L
Anthemis cotula	Hozan Çiçeği	-	-	-	-	-	-		X			O+L
Arctium minus	Löşlek	-	-	-	-	-	Europe-Siberia		X			L
Bellis perennis	Koyungözü	-	-	-	-	-	Europe-Siberia		X			O+L
Centaurea solstitialis subsp. *solstitialis*	Çakırdikeni	-	-	-	-	-	-		X			O+L
Centaurea virgata	Acı Süpürge	-	-	-	-	-	Irano-Turanien		X			O+L
Chondrilla juncea	Karakavuk	-	LC	-	-	-	-		X			O+L
Cichorium intybus	Hindiba	-	LC	-	-	-	-		X			O+L
Cirsium arvense subsp. *vestitum*	Köygöçüren	-	-	-	-	-	-		X			L
Cirsium vulgare	Yaygın Kangal	-	-	-	-	-	-		X			O+L
Conyza canadensis	Selvi otu	-	-	-	-	-	-		X			O+L
Crepis sancta subsp. *obovata*	Yumurta Kıskısı	-	-	-	-	-	-		X			L
Crupina crupinastrum	Gelindöndüren	-	-	-	-	-	-		X			O+L
Cyanus depressus	Gökbaş	-	-	-	-	-	-			X		O+L
Echinops pungens var. *pungens*	-	-	-	-	-	-	Irano-Turanien			X		O+L
Echinops ritro	Topuz	-	-	-	-	-	-			X		L
Filago arvensis	Keçeotu	-	-	-	-	-	-			X		L
Inula viscosa	Sümenit	-	-	-	-	-	-			X		O+L
Lactuca serriola	Eşekhelvası	-	-	-	-	-	-			X		O+L
Logfia arvensis	Keçeotu	-	-	-	-	-	-			X		O+L
Picnomon acarna	Kılçıkdiken	-	-	-	-	-	Mediterranean			X		O+L
Senecio vernalis	Kanaryaotu	-	-	-	-	-	-		X			O+L
Silybum marianum	Devedikeni	-	LC	-	-	-	Europe-Siberia		X			O+L
Sonchus asper	Eşekgevreği	-	-	-	-	-	-		X			O+L
Tragopogon porrifolius	Yemlik	-	-	-	-	-	-		X			O+L
Xanthium spinosum	Pıtrak	-	-	-	-	-	-			X		L
Xeranthemum annuum	Kâğıtçiçeği	-	-	-	-	-	-			X		O+L
Boraginaceae												
Alkanna orientalis var. *orientalis*	-	-	-	-	-	-	Irano-Turanien		X			O+L
Anchusa azurea var. *azurea*	Sığırdili	-	-	-	-	-	-			X		L
Buglossoides arvensis	Tarla Taşkeseni	-	-	-	-	-	-		X			O+L
Cerinthe minor subsp. *auriculata*	Livarotu	-	-	-	-	-	-			X		L
Echium italicum	Kurtkuyruğu	-	-	-	-	-	Mediterranean		X			O+L
Heliotropium europaeum	Akrep Otu	-	-	-	-	-	Irano-Turanien		X			L
Heliotropium hirsutissimum	Aygünçiçeği	-	-	-	-	-	-			X		L
Lithodora hispidula	Ebruliçalısı	-	-	-	-	-	-			X		L
Myosotis ramosissima	Kuşgözü	-	-	-	-	-	-			X		L

Brassicaceae												
Alyssum desertorum	Dumanotu	-	-	-	-	-	-		X			O+L
Alyssum simplex	Sade Kuduzotu	-	-	-	-	-	-		X			L
Capsella bursa-pastoris	Çobançantası	-	LC	-	-	-	-			X		O+L
Crambe orientalis subsp. *orientalis*	Akyumak	-	-	-	-	-	-		X			O+L
Descurainia sophia	Sadırotu	-	-	-	-	-	-			X		O+L
Draba verna	Çırçırotu	-	-	-	-	-	-			X		L
Fibigia clypeata	Sikkeotu	-	-	-	-	-	-			X		L
Isatis glauca subsp. *glauca*	Soğutot	-	-	-	-	-	Irano-Turanien		X			L
Microthlaspi perfoliatum	Giyle	-	-	-	-	-	-		X			L
Neslia apiculata	Göçmen Hardalı	-	-	-	-	-	-		X			O+L
Raphanus raphanistrum	Eşek Turpu	-	-	-	-	-	-			X		G+L
Sinapis arvensis	Hardal	-	LC	-	-	-	-			X		O+L
Sisymbrium loeselii	Bülbülotu	-	-	-	-	-	-		X			O+L
Cactaceae												
Opuntuia ficus-barbarica	Firenkinciri	-	-	-	-	-	Mediterranean		X			O+L
Caprifoliaceae												
Scabiosa argentea	Yazı Süpürgesi	-	-	-	-	-	-		X			O+L
Capparaceae												
Capparis sicula	Delikarpuzu	-	-	-	-	-	-		X			O+L
Caryophyllaceae												
Herniaria Micrantha	Sık Atyaran	-	-	-	-	-	Mediterranean		X			L
Holosteum Umbellatum Var. *Umbellatum*	-	-	-	-	-	-	-		X			O+L
Silene Conoidea	Şıvananotu	-	-	-	-	-	-		X			O+L
Stellaria media	Kuşotu	-	LC	-	-	-	-		X			L
Velezia Rigida	Tığotu	-	-	-	-	-	-		X			L
Convolvulaceae												
Convolvulus arvensis	Tarla Sarmaşığı	-	-	-	-	-	-		X			O+L
Cistaceae												
Cistus creticus	Laden	-	-	-	-	-	-		X			O+L
Cistus salviifolius	Kartli	-	-	-	-	-	-		X			O+L
Crassulaceae												
Sedum hispanicum	Damkoruğu	-	-	-	-	-	-		X			L
Sedum sediforme	Yalıkoruğu	-	-	-	-	-	-		X			L
Cupressaceae												
Cupressus sempervirens	Servi	-	-	-	-	-	Mediterranean		X			O+L
Juniperus excelsa	Bozardıç	-	-	-	-	-	-		X			O+L
Juniperus oxycedrus	Katranardıcı	-	-	-	-	-	-		X			O+L
Juniperus phoenicea	Finike ardıcı	-	-	-	-	-	Mediterranean		X			O+L
Eleagnaceae												
Elaeagnus angustifolia	İğde	-	LC	-	-	-	-		X			O+L

Ephedraceae												
Ephedra major	Hum	-	LC	-	-	-	-		X			O+L
Ericaceae												
Erica arborea	Funda	-	LC	-	-	-	-		X			O+L
Erica manipuliflora	Püren	-	-	-	-	-	Mediterranean		X			O+L
Arbutus andrachne	Sandalağacı	-	-	-	-	-	-		X			L
Euphorbiaceae												
Euphorbia characias	Azman sütleğen	-	-	-	-	-	-		X			O+L
Euphorbia macroclada	Neblul	-	-	-	-	-	Irano-Turanien		X			O+L
Euphorbia falcata subsp. *falcata* var. *falcata*	Eğri Sütleğen	-	-	-	-	-	-		X			O+L
Mercurialis annua	Parşen	-	-	-	-	-	-			X		O+L
Fabaceae												
Alhagi maurorum	Ağulikeni	-	-	-	-	-	-			X		O+L
Astragalus schizopterus	Kediçomağı	-	-	-	-	-	Mediterranean			X		O+L
Bituminaria bituminosa	Asfaltotu	-	-	-	-	-	-			X		O+L
Calicotome villosa	Keçiboğan	-	-	-	-	-	Mediterranean		X			O+L
Ceratonia siliqua	Keçiboynuzu	-	-	-	-	-	Mediterranean		X			O+L
Cercis siliquastrum	Erguvan	-	-	-	-	-	-			X		O+L
Colutea cilicica	Patlangaç	-	-	-	-	-	-			X		O+L
Lotus corniculatus	Gazalboynuzu	-	LC	-	-	-	-		X			O+L
Medicago sativa	Karayonca	-	LC	-	-	-	-			X		L
Medicago x varia	Yaban Yoncası	-	-	-	-	-	-		X			L
Melilotus officinalis	Kokulu Yonca	-	LC	-	-	-	-			X		O+L
Onobrychis cornuta	Kuşkaçıran	-	-	-	-	-	Irano-Turanien		X			L
Ononis viscosa	Siyekdikeni	-	-	-	-	-	-		X			L
Robinia pseudoacacia	Yalancı Akasya	-	LC	-	-	-	-			X		O+L
Spartium junceum	Katırtırnağı	-	LC	-	-	-	-			X		O+L
Trifolium campestre	Üçgül	-	-	-	-	-	-			X		L
Trifolium repens var. *repens*	-	-	-	-	-	-	-			X		O+L
Vicia cracca subsp. *cracca*	Kuş Fiği	-	-	-	-	-	Europe-Siberia			X		O+L
Fagaceae												
Quercus coccifera	Kermes meşesi	-	-	-	-	-	-			X		O+L
Quercus infectoria	Mazı meşesi	-	-	-	-	-	-			X		O+L
Geraniaceae												
Erodium cicutarium	İğnelik	-	-	-	-	-	-		X			L
Geranium rotundifolium	Helilok	-	-	-	-	-	-		X			O+L
Geranium tuberosum	Çakmuz	-	-	-	-	-	Irano-Turanien		X			O+L
Hypericaceae												
Hypericum scabrum	Karahasançayı	-	-	-	-	-	Irano-Turanien		X			O+L
Hypericum triquetrifolium	Pırpırotu	-	-	-	-	-	-		X			O+L
Iridaceae												

Romulea tempskyana	Sarıboğaz	-	-	-	-	-	Mediterranean		X			O+L
Lamiaceae												
Ajuga chamaepitys	Acıgıcı	-	-	-	-	-	-		X			O+L
Lamium amplexicaule	Baltutan	-	-	-	-	-	-		X			O+L
Lamium purpureum	Ballıbaba	-	-	-	-	-	-		X			O+L
Marrubium parviflorum	Bozotu	-	-	-	-	-	-		X			O+L
Melissa oficinalis	Oğulotu	-	-	-	-	-	-		X			O+L
Micromeria myrtifolia	Boğumluçay	-	-	-	-	-	-		X			O+L
Phlomis leucophracta	Çalba	Endemic	-	-	-	-	Mediterranean		X			O+L
Phlomis lycia	Tüylü çalba	Endemic	LC	-	-	-	Mediterranean		X			O+L
Phlomis monocephala	Topuz çalba	Endemic	LC	-	-	-	Mediterranean		X			L
Phlomis nissolii	Öbek çalba	Endemic	-	-	-	-	Irano-Turanien		X			O+L
Salvia tomentosa	Şalba	-	LC	-	-	-	-		X			O+L
Salvia viridis	Zarif Şalba	-	-	-	-	-	-		X			O+L
Sideritis congesta	Başakçayı	Endemic	LC	-	-	-	Mediterranean		X			O+L
Sideritis montana subsp. *montana*	Karaçay	-	-	-	-	-	Mediterranean		X			O+L
Teucrium polium	Acıyavşan	-	-	-	-	-	-		X			O+L
Thymus sipyleus subsp. *sipyleus* var. *sipyleus*	Sipil Kekiği	-	-	-	-	-	-			X		O+L
Vitex agnus-castus	Hayıt	-	-	-	-	-	-			X		O+L
Ziziphora capitata	Anuk	-	-	-	-	-	-		X			O+L
Liliaceae												
Gagea fibrosa	Tellisarı	-	LC	-	-	-	-		X			O+L
Lythraceae												
Lythrum salicaria	Hevhulma	-	-	-	-	-	-		X			O+L
Punica granatum	Nar	-	-	-	-	-	-		X			O+L
Malvaceae									X			
Alcea pallida	Hatmi	-	-	-	-	-	-		X			O+L
Malva neglecta	Çobançöreği	-	LC	-	-	-	-			X		O+L
Moraceae												
Ficus carica	İncir	-	-	-	-	-	-			X		O+L
Morus alba	Akdut	-	-	-	-	-	-			X		O+L
Morus nigra	Karadut	-	-	-	-	-	-			X		O+L
Myrtaceae												
Eucalyptus camaldulensis	Sıtmaağacı	-	-	-	-	-	Mediterranean		X			O+L
Myrtus communis	Mersin	-	-	-	-	-	Mediterranean		X			O+L
Oleaceae												
Fontanesia phillyreoides	Cıbırtı	-	-	-	-	-	-		X			G+L
Olea europaea	Zeytin	-	-	-	-	-	-		X			G+L
Phillyrea latifolia	Akçakesme	-	-	-	-	-	-		X			G+L
Orchidaceae												
Barlia robertiana	Patpatanak	-	-	Ek-II	-	-	Mediterranean		X			G+L

Oxalidaceae												
Oxalis pes-caprae	Koca ekşiyonca	-	-	-	-	-	-		X			G+L
Papaveraceae												
Glaucium corniculatum var. *corniculatum*	Çömlekçatlatan	-	-	-	-	-	-		X			O+L
Papaver rhoeas	-	-	-	-	-	-	-			X		O+L
Pinaceae												
Pinus brutia	Kızılçam	-	LC	-	-	-	-			X		O+L
Plantaginaceae												
Plantago lanceolata	Damarlıca	-	LC	-	-	-	-		X			L
Plantago major subsp. *major*	Sinirotu	-	-	-	-	-	-		X			O+L
Veronica cymbalaria	Venüs çiçeği	-	-	-	-	-	Mediterranean		X			O+L
Platanacee												
Platanus orientalis	Çınar	-	-	-	-	-	-		X			O+L
Plumbaginaceae												
Acantholimon acerosum var. *acerosum*	Pişikkeveni	-	-	-	-	-	-		X			O+L
Poaceae												
Aegilops cylindrica	Kirpikli Ot	-	LC	-	-	-	Irano-Turanien		X			O+L
Aegilops triuncialis	Üçkılçık	-	LC	-	-	-	Irano-Turanien		X			L
Avena sativa	Yulaf	-	-	-	-	-	-		X			O+L
Bromus intermedius	Damiyeotu	-	-	-	-	-	-		X			L
Bromus japonicus subsp. *japonicus*	İyeotu	-	-	-	-	-	-		X			O+L
Bromus tectorum	Kır Bromu	-	-	-	-	-	-		X			O+L
Chrysopogon gryllus	Buzağıotu	-	-	-	-	-	-		X			O+L
Cynodon dactylon var. *dactylon*	Köpekdişi	-	-	-	-	-	-		X			L
Dactylis glomerata subsp. *glomerata*	Domuzayrığı	-	-	-	-	-	Europe-Siberia		X			O+L
Elymus repens	Sabankıran	-	-	-	-	-	-		X			O+L
Hordeum bulbosum	Boncuk Arpa	-	LC	-	-	-	-		X			O+L
Lolium persicum	Eres Çimi	-	-	-	-	-	Irano-Turanien			X		L
Phragmites austrialis	Kamış	-	-	-	-	-	-			X		O+L
Poa bulbosa	Yumrulu Salkım	-	-	-	-	-	-			X		O+L
Poa pratensis	Çayır Salkımotu	-	LC	-	-	-	-			X		O+L
Setaria verticillata var. *verticillata*	-	-	-	-	-	-	-		X			O+L
Sorghum halepense	Ekinsüpürgesi	-	-	-	-	-	-		X			O+L
Taeniatherum caput-medusae	Kılçık Arpası	-	-	-	-	-	-			X		O+L
Polygonaceae												
Rumex sanguineus	Kuzuuğlağı	-	-	-	-	-	-		X			O+L
Portulaceae												
Portulaca oleracea subsp. *oleracea*	Semizotu	-	LC	-	-	-	-		X			O+L
Primulaceae												
Anagallis arvensis	Farekulağı	-	LC	-	-	-	-		X			L
Ranunculaceae												

Anemone coronaria	Manisalalesi	-	-	-	-	-	Mediterranean		X			O+L
Ceratocephala falcata	Yelotu	-	-	-	-	-	-	X				L
Clematis cirrhosa	Baharsarmaşığı	-	-	-	-	-	Mediterranean		X			O+L
Consolida orientalis	Morçiçek	-	-	-	-	-	-		X			L
Ranunculus arvensis	Mustafaçiçeği	-	-	-	-	-	-		X			O+L
Resedaceae												
Resede lutea var. *lutea*	-	-	-	-	-	-	-		X			O+L
Rhamnaceae												
Paliurus spina-christi	Karaçalı	-	-	-	-	-	Mediterranean			X		O+L
Rosaceae												
Crataegus monogyna	Yemişen	-	LC	-	-	-	-			X		O+L
Persica vulgaris	Şeftali	-	-	-	-	-	-			X		O+L
Pyrus serikensis	Serik Armudu	Endemic	EN	-	-	-	Mediterranean			X		O+L
Rubus sanctus	Böğürtlen	-	-	-	-	-	-			X		O+L
Sanguisorba minor	Çayırdüğmesi	-	-	-	-	-	-			X		O+L
Sarcopoterium spinosum	Abdestbozan	-	-	-	-	-	-			X		O+L
Rubiaceae												
Galium verum	Boyalık	-	-	-	-	-	-		X			O+L
Rutaceae												
Citrus limon	Limon	-	-	-	-	-	Mediterranean		X			O+L
Citrus reticulata	Mandalina	-	-	-	-	-	Mediterranean		X			O+L
Citrus sinensis	Portakal	-	-	-	-	-	Mediterranean		X			O+L
Salicaceae												
Salix alba	Aksöğüt	-	-	-	-	-	-		X			O+L
Scrophulariaceae												
Verbascum cheiranthifolium var. *asperulum*	-	-	-	-	-	-	-		X			O+L
Verbascum mucronatum	Şapala	-	-	-	-	-	Mediterranean		X			L
Verbascum sinuatum	Bodanotu	-	-	-	-	-	-		X			O+L
Smilaceae												
Smilax excelsa	Dikenucu	-	-	-	-	-	-		X			O+L
Solanaecae												
Hyoscyamus reticulatus	Kumacıkotu	-	-	-	-	-	Irano-Turanien		X			L
Solanum americanum	İtüzümü	-	-	-	-	-	Mediterranean		X			L
Styracaceae												
Styrax officinalix	Ayıfındığı	-	-	-	-	-	Mediterranean		X			L
Tamaricaceae												
Tamarix smyrnensis	Ilgın	-	-	-	-	-	-		X			O+L
Thymelaeaceae												
Daphne sericea	Tavukbüzüğü	-	-	-	-	-	-		X			O+L
Xanthorrhoeaceae												
Asphodelus aestivus	Kirkiçökü	-	LC	-	-	-	-		X			O+L

Table.4. Fish Species Found and Likely to be Found in the Project Area and Its Immediate Surroundings and their Conservation Status (*: exotic species; UP: Under Protection; L: Literature, O: Observation)

Scientific Name	Common Name	Endemism	IUCN	CITES	BERN	Habitat Directive	CHCD	Wild Animal Species Protected by TOB	Distribution Range	Type of Detection
Anguillidae										
Anguilla anguilla (Linnaeus, 1758)	European Eel	-	CR	Annex-II	-	-	-	UP	Common	O+L
Cobitidae										
Cobitis battalgilae Bacescu, 1962	Battalgil Spined Loach	Endemic	LC	-	-	-	-	UP	Local	O+L
Nemacheilidae										
Oxynoemacheilus eregliensis (Banarescu & Nalbant, 1978)	Central Anatolian Loach	Endemic	VU	-	-	-	-	UP	Common	O+L
Cyprinidae										
Carassius gibelio (Bloch, 1782)*	Gibel Carp	-	-	-	-	-	-	UP	Common	O+L
Cyprinus carpio Linnaeus, 1758	Carp	-	VU	-	-	-	-	UP	Common	L
Capoeta antalyensis (Battalgil, 1943)	Antalya Barb	Endemic	VU	-	-	-	-	UP	Local	O+L
Capoeta caelestis Schöter, Özulug & Freyhof, 2009	Taurus Scraper	Endemic	LC	-	-	-	-	UP	Local	O+L
Gobionidae										
Pseudorasbora parva (Temminck & Schlegel, 1846)*	Stone Moroko	-	LC	-	-	-	-	UP	Common	O+L
Leuciscidae										
Alburnus baliki Bogutskaya, Küçük & Ünlü, 2000	Antalya Bleak	Endemic	EN	-	-	-	-	UP	Common	O+L
Alburnus escherichii Steindachner, 1897	Sakarya Bleak	Endemic	LC	-	-	-	-	UP	Common	L
Pseudophoxinus battalgilae Bogutskaya, 1997	Beysehir Minnow	Endemic	LC	-	-	-	-	UP	Local	O+L
Pseudophoxinus fahrettini Freyhof & Özulug, 2010	Pisidian Spring Minnow	Endemic	EN	-	-	-	-	UP	Common	O+L
Squalius anatolicus (Bogutskaya, 1997)	Beysehir Dace	Endemic	LC	-	-	-	-	UP	Local	L
Squalius fellowesii (Günther, 1868)	Aegean Chub	Endemic	LC	-	-	-	-	UP	Common	L
Vimba vimba (Linnaeus, 1758)	Baltic Vimba	-	LC	-	-	-	-	UP	Local	L
Clariidae										
Clarias gariepinus (Burchell, 1822)	North African Catfish	-	LC	-	-	-	-	UP	Common	L
Salmonidae										
Oncorhynchus mykiss (Walbaum, 1792)*	Rainbow Trout	-	-	-	-	-	-	UP	Common	L
Salmo ekmekciae Küçük, Kalaycı, Güçlü, Oral, & Turan, 2024	Trout	Endemic	-	-	-	-	-	UP	Local	L

Cichlidae										
Oreochromis aureus (Steindachner, 1864)*	Blue Tilapia	-	-	-	-	-	-	UP	Local	O
Atherinidae										
Atherina boyeri Risso, 1810	Big-Scale Sand Smelt	-	LC	-	-	-	-	UP	Local	O
Poeciliidae										
Gambusia holbrooki Girard, 1859*	Holbrook's Mosquitofish	-	LC	-	-	-	-	UP	Common	O+L
Cyprinodontidae										
Aphanius mento (Heckel, 1843)	Pearl-Spotted Killifish	-	LC	-	-	-	-	UP	Common	O+L
Mugilidae										
Chelon auratus (Risso, 1810)	Golden Grey Mullet	-	LC	-	-	-	-	UP	Common	O+L
Chelon labrosus (Risso, 1827)	Thicklip Grey Mullet	-	LC	-	-	-	-	UP	Common	O+L
Chelon ramada (Risso, 1827)	Thinlip Mullet	-	LC	-	-	-	-	UP	Common	O+L
Chelon auratus (Risso, 1810)	Flathead Mullet	-	LC	-	-	-	-	UP	Common	O+L
Blenniidae										
Salaria fluviatilis (Asso, 1801)	Freshwater Blenny	-	LC	-	-	-	-	UP	Common	O+L
Gasterosteidae										
Gasterosteus aculeatus Linnaeus, 1758	Three-Spined Stickleback	-	LC	-	-	-	-	UP	Common	O
Moronidae										
Dicentrarchus labrax (Linnaeus, 1758)	European Seabass	-	LC	-	-	-	-	UP	Common	L

Table.5 Location of sampling stations for fish

Station No	Sampling Point	Latitude	Longitude	Altitude (m)
1	Stream-8	31° 02' 43.68" N	36° 55' 14.16" E	7
2	Noprucay Stream	31° 10' 58.24" N	36° 58' 11.94" E	22
3	Stream -7	31° 16' 27.27" N	36° 54' 19.42" E	47
4	Stream -6	31° 18' 45.04" N	36° 53' 25.71" E	71
5	Stream -5	31° 23' 59.65" N	36° 51' 08.49" E	27
6	Stream -4	31° 25' 37.66" N	36° 50' 40.65" E	19
7	Stream -3	31° 27' 31.54" N	36° 50' 52.39" E	16
8	Stream -2	31° 28' 31.86" N	36° 50' 28.18" E	18
9	Manavgat River	31° 28' 57.45" N	36° 50' 09.80" E	17
10	Stream -1	31° 33' 39.41" N	36° 46' 12.82" E	35
11	Narpuz Stream	31° 35' 57.77" N	36° 43' 52.26" E	10
12	Çenger Stream	31° 36' 27.27" N	36° 43' 39.05" E	13
13	Alara (Ulugüney) Stream	31° 43' 07.14" N	36° 41' 26.00" E	28
14	Kargı Stream	31° 49' 12.11" N	36° 38' 23.65" E	33

Table.6. Distribution of Observed Fish Species According to Stations (L: Literature, O: Observation)

Scientific Name	Type of Detection	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Anguilla anguilla	O+L	-	+	-	-	-	-	-	-	+	-	+	+	+	+
Cobitis battalgilae	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxynoemacheilus eregliensis	O+L	-	+	-	-	-	-	-	-	+	-	-	-	-	-
Carassius gibelio	O+L	-	-	-	-	-	-	-	-	+	-	+	+	+	+
Cyprinus carpio	O+L	-	-	-	-	-	-	-	-	+	-	+	+	+	+
Capoeta antalyensis	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capoeta caelestis	O+L	-	-	-	-	-	-	-	-	+	-	+	+	+	+
Pseudorasbora parva	O+L	-	+	-	-	-	-	-	-	+	-	-	-	-	-
Alburnus baliki	O+L	-	+	-	-	-	-	-	-	+	-	-	-	-	-
Alburnus escherichii	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pseudophoxinus battalgilae	O+L	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Pseudophoxinus fahrettini	O+L	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Squalius anatolicus	L	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Squalius fellowesii	O+L	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Vimba vimba	O+L	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Clarias gariepinus	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oncorhynchus mykiss	O+L	-	+	-	-	-	-	-	-	+	-	-	+	+	-
Salmo ekmekciae	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oreochromis aureus	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atherina boyeri	O+L	-	+	-	-	-	-	-	-	+	-	+	+	+	+
Gambusia holbrooki	O+L	-	+	-	-	-	-	-	-	+	-	+	+	+	+
Aphanius mento	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelon auratus	O+L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelon labrosus	O+L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelon ramada	O+L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chelon auratus	O+L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Salaria fluviatilis	O+L	-	+	-	-	-	-	-	-	+	-	-	+	+	-
Gasterosteus aculeatus	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dicentrarchus labrax	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table.7. Amphibian Species Found and Likely to be Found in the Project Area and its Immediate Surroundings and their Conservation Status (*: exotic species; UP: Under Protection; L: Literature, O: Observation)

Table.8. Reptile Species Found and Likely to be Found in the Project Area and its Immediate Surroundings and their Conservation status (*: exotic species; UP:

Scientific Name	Common Name	Endemism	IUCN	CITES	BERN	Habitat Directive	CHCD	Wild Animal Species Protected by TOB	Distribution Range	Type of Detection
Salamandraidae										
Lyciasalamandra atifi (Başoğlu, 1967)	Atif's Lycian salamander	Endemic	EN	-	-	-	-	UP	Local	L
Ranidae										
Pelophylax bedriagae (Camerano, 1882)	Levantine frog, Levantine marsh frog	-	LC	-	Annex-III	-	-	UP	Common	O+L
Bufonidae										
Bufo verrucosissimus Pallas, 1814	Caucasian toad	-	LC	-	Annex-III	-	-	UP	Common	O+L
Bufotes viridis (Laurenti, 1768)	Green toad	-	NT	-	Annex-III	Annex-IV	-	UP	Common	O+L
Hylidae										
Hyla orientalis Bedriaga, 1890	Oriental tree frog, Green frog	-	LC	-	Annex-III	-	-	UP	Common	O+L

Under Protection; L: Literature, O: Observation)

Scientific Name	Common Name	Endemism	IUCN	CITES	BERN	Habitat Directive	CHCD	Wild Animal Species Protected by TOB	Distribution Range	Type of Detection
Testudinidae										
Testudo graeca Linnaeus, 1758	Mediterranean Spur-Thighed Tortoise	-	VU	Annex-II	Annex-II	Annex-IV	-	UP	Common	O+L

Geoemydidae										
Mauremys rivulata (Valenciennes, 1833)	Western Caspian Turtle	-	-	-	Annex-III	-	-	UP	Common	L
Gekkonidae										
Hemidactylus turcicus (Linnaeus, 1758)	Mediterranean House Gecko	-	LC	-	Annex-III	-	-	UP	Common	L
Mediodactylus danilewskii (Satrauch, 1887)	Bulgarian Bent-toed Gecko	-	-	-	Annex-III	-	-	UP	Common	L
Agamidae										
Laudakia stellio (Linnaeus, 1758)	Roughtail Rock Agama	-	LC	-	Annex-II	Annex-IV	-	UP	Common	O+L
Chamaeleonidae										
Chamaeleo chamaeleon (Linnaeus, 1758)	Common Chameleon	-	LC	Annex-II	Annex-II	Annex-IV	-	UP	Common	O+L
Anguidae										
Pseudopus apodus (Pallas, 1775)	European Glass Lizard	-	LC	-	Annex-II	Annex-IV	-	UP	Common	O+L
Lacertidae										
Anatololacerta ibrahimi (Eiselt & Schmidtler 1987)	Baran's Lizard	Endemic	-	-	Annex-III	-	-	UP	Common	L
Lacerta pamphylica Schmidtler, 1975	Pamphylian Green Lizard	Endemic	LC	-	Annex-III	Annex-IV	-	UP	Common	O+L
Ophisops elegans Ménétriés, 1832	Snake-Eyed Lizard	-	LC	-	Annex-II	Annex-IV	-	UP	Common	O+L
Phoenicolacerta laevis (Gray, 1838)	Syrian Lizard	-	LC	-	Annex-III	-	-	UP	Common	O+L
Scincidae										
Ablepharus anatolicus Schmidtler, 1997	Anatolian Snake-Eyed Skink	Endemic	-	-	Annex-II	-	-	UP	Common	O+L
Heremites auratus (Linnaeus, 1758)	Golden Grass Mabuya	-	LC	-	Annex-III	-	-	UP	Common	L
Heremites vittatus (Olivier, 1804)	Twin-Striped Skink	-	LC	-	Annex-III	-	-	UP	Common	L
Blanidae										
Blanus aporus Werner, 1898	Cilician Worm Lizard	Endemic	LC	-	Annex-III	-	-	UP	Common	L
Typhlopidae										
Xerotyphlops vermicularis (Merrem, 1820)	Worm Snake, Blind Snake	-	LC	-	Annex-III	-	-	UP	Common	L
Colubridae										
Dolichophis jugularis (Linnaeus, 1758)	Large Whip Snake	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Eirenis modestus Martin, 1838	Asia Minor Dwarf Racer	-	LC	-	Annex-III	Annex-IV	-	UP	Common	O+L
Hemorrhois nummifer (Reuss, 1834)	Coin-Marked Snake	-	LC	-	Annex-III	Annex-IV	-	UP	Common	L
Platyceps najadum (Eichwald, 1831)	Dahl's Whip Snake	-	LC	-	Annex-III	Annex-IV	-	UP	Common	O+L
Telescopus fallax (Fleischmann, 1831)	Cat-Eyed Snake	-	LC	-	Annex-III	-	-	UP	Common	L
Natricidae										
Natrix natrix (Linnaeus, 1758)	Grass Snake	-	LC	-	Annex-III	Annex-IV	-	UP	Common	O+L
Natrix tessellata (Laurenti, 1768)	Dice Snake, Tessellated Water Snake	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L

Psammophiidae										
Malpolon insignitus (Geoffroy De St-Hilaire, 1809)	Eastern Montpellier Snake	-	LC	-	Annex-II	-	-	UP	Common	O+L
Viperidae										
Montivipera xanthina (Gray, 1849)	Ottoman Viper	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L

Table.9. Bird Species Found and Likely to be Found in the Project Area and its Immediate Surroundings and their Conservation Status (*: exotic species; UP: Under Protection; WV: Winter Visitor; SV: Summer Visitor; N: Native; T: Transit Migrant; V: Vagrant; L: Literature, O: Observation)

Scientific Name	Common Name	Endemism	IUCN	CITES	BERN	Bird Directive	Wi- Animal Species Protected by TOB	CHCD	Migration	RDB	Type of Detection
Accipitridae											
Accipiter nisus (Linnaeus, 1758)	Eurasian Sparrowhawk	-	LC	Annex-II	Annex-III	-	UP	-	N	A.3	O+L
Aquila chrysaetos (Linnaeus, 1758)	Golden Eagle	-	LC	Annex-II	Annex-II	Annex-I	UP	-	N	A.1.2	L
Buteo buteo (Linnaeus, 1758)	Eurasian Buzzard	-	LC	Annex-II	Annex-III	-	UP	-	N	A.3	O+L
Buteo rufinus (Cretzschmar, 1827)	Long-Legged Buzzard	-	LC	Annex-II	Annex-III	Annex-I	UP	-	N	A.3	O+L
Circaetus gallicus (Gmelin, 1788)	Short-Toed Snake-Eagle	-	LC	Annex-II	Annex-II	Annex-I	UP	-	SV	A.4	O+L
Circus aeruginosus (Linnaeus, 1758)	Western Marsh-Harrier	-	LC	Annex-II	Annex-II	Annex-I	UP	-	N	A.3	O+L
Circus cyaneus (Linnaeus, 1766)	Hen Harrier	-	LC	Annex-III	Annex-III	Annex-I	UP	-	WV	A.1.2	L
Circus macrourus (Gmelin, 1770)	Pallid Harrier	-	NT	Annex-II	Annex-II	Annex-I	UP	-	T	A.1.2	L
Neophron percnopterus (Linnaeus, 1758)	Egyptian Vulture	-	EN	Annex-II	Annex-III	Annex-I	UP	-	T	A.3	L
Pandionidae											
Pandion haliaetus (Linnaeus, 1758)	Osprey	-	LC	Annex-II	Annex-II	Annex-I	UP	-	N	A.1.2	L
Scolopacidae											
Actitis hypoleucos Linnaeus, 1758	Common Sandpiper	-	LC	-	Annex-II	-	UP	-	SV	A.3	O+L
Tringa glareola Linnaeus, 1758	Wood Sandpiper	-	LC	-	Annex-II	-	UP	-	T	B.3	O+L
Upupidae											
Upupa epops Linnaeus, 1758	Common Hoopoe	-	LC	-	Annex-II	-	UP	-	SV	A.1.2	O+L
Apodidae											
Apus apus (Linnaeus, 1758)	Common Swift	-	LC	-	Annex-III	-	UP	-	T	A.3.1	O+L
Tachymarptis melba (Linnaeus, 1758)	Alpine Swift	-	LC	-	Annex-III	-	UP	-	SV	A.3.1	O+L
Ciconiidae											
Ciconia ciconia (Linnaeus, 1758)	White Stork	-	LC	-	Annex-II	Annex-I	UP	-	SV	A.3.1	O+L

Ciconia nigra (Linnaeus, 1758)	Black Stork	-	LC	Annex-II	Annex-II	Annex-I	UP	-	T	A.6	L
Columbidae											
Columba livia Gmelin, 1789	Rock Dove	-	LC	-	Annex-III	Annex-II/A	UP	Annex-I	N	B.6	O+L
Spilopelia senegalensis (Linnaeus, 1766)	Laughing Dove	-	LC	-	Annex-III	-	UP	Annex-II	N	A.4	O+L
Streptopelia decaocto FrivaULszky, 1838	Eurasian Collared-Dove	-	LC	-	Annex-III	Annex-II/B	UP	Annex-II	N	A.3.1	O+L
Streptopelia turtur (Linnaeus, 1758)	European Turtle-Dove	-	VU	-	Annex-III	Annex-II/B	UP	Annex-I	SV	A.3.1	O+L
Alcedinidae											
Alcedo atthis (Linnaeus, 1758)	Common Kingfisher	-	LC	-	Annex-II	-	UP	-	SV	A.2	O+L
Coraciidae											
Coracias garrulus Linnaeus, 1758	European Roller	-	LC	-	Annex-II	-	UP	-	T	A.2	O+L
Cuculidae											
Clamator glandarius (Linnaeus, 1758)	Great Spotted Cuckoo	-	LC	-	Annex-II	-	UP	-	SV	A.1.2	O+L
Cuculus canorus Linnaeus, 1758	Common Cuckoo	-	LC	-	Annex-II	-	UP	-	SV	A.2	L
Meropidae											
Merops apiaster Linnaeus, 1758	European Bee-Eater	-	LC	-	Annex-II	-	UP	-	T	A.3.1	O+L
Falconidae											
Falco columbarius Linnaeus, 1758	Merlin	-	LC	Annex-II	Annex-II	Annex-I	UP	-	WV	B.1.2	L
Falco peregrinus Tunstall, 1771	Peregrine Falcon	-	LC	Annex-I	Annex-II	Annex-I	UP	-	T	A.1.2	L
Falco subbuteo Linnaeus, 1758	Eurasian Hobby	-	LC	Annex-II	Annex-II	-	UP	-	T	A.3.1	L
Falco tinnunculus Linnaeus, 1758	Common Kestrel	-	LC	Annex-II	Annex-II	-	UP	-	N	A.2	O+L
Rallidae											
Gallinula chloropus (Linnaeus, 1758)	Common Moorhen	-	LC	-	Annex-III	-	UP	Annex-II	S	A.3.1	O+L
Acrocephalidae											
Acrocephalus arundinaceus (Temminck & Schlegel, 1847)	Great Reed-Warbler	-	LC	-	Annex-III	-	UP	-	SV	A.3	O+L
Acrocephalus melanopogon (Temminck, 1823)	Moustached Warbler	-	LC	-	Annex-III	-	UP	-	WV	A.2	L
Acrocephalus palustris (Bechstein, 1798)	Marsh Warbler	-	LC	-	Annex-III	-	UP	-	T	A.3	L
Acrocephalus schoenobaenus (Linnaeus, 1758)	Sedge Warbler	-	LC	-	Annex-III	-	UP	-	T	A.2	L
Acrocephalus scirpaceus (Hermann, 1804)	Common Reed-Warbler	-	LC	-	Annex-III	-	UP	-	SV	A.2	O+L
Hippolais icterina (Vieillot, 1817)	Icterine Warbler	-	LC	-	Annex-III	-	UP	-	T	A.3	L
Iduna pallida (Ehrenberg, 1833)	Olivaceous Warbler	-	LC	-	Annex-III	-	UP	-	SV	A.3	O+L
Alaudidae											
Calandrella brachydactyla (Leisler, 1814)	Greater Short-Toed Lark	-	LC	-	Annex-II	Annex-I	UP	-	N	A.3	O+L
Galerida cristata (Linnaeus, 1758)	Crested Lark	-	LC	-	Annex-III	-	UP	Annex-II	N	A.3	O+L
Lullula arborea (Linnaeus, 1758)	Woodlark	-	LC	-	Annex-III	Annex-I	UP	Annex-II	WV	A.3	L
Melanocorypha calandra (Linnaeus, 1766)	Calandra Lark	-	LC	-	Annex-II	-	UP	-	N	A.5	O+L
Corvidae											

Corvus corax Linnaeus, 1758	Common Raven	-	LC	-	Annex-III	-	UP	Annex-II	N	A.5	O+L
Corvus cornix Linnaeus, 1758	Hooded Crow	-	-	-	Annex-III	-	UP	Annex-I	N	A.5	O+L
Garrulus glandarius (Linnaeus, 1758)	Eurasian Jay	-	LC	-	-	Annex-II/B	UP	Annex-I	N	A.3.1	O+L
Emberizidae											
Emberiza caesia Cretzschmar, 1828	Cretzschmar's Bunting	-	LC	-	Annex-II	Annex-II/A	UP	-	SV	A.2	L
Emberiza calandra Linnaeus, 1758	Corn Bunting	-	LC	-	Annex-III	-	UP	Annex-II	S	A.4	O+L
Emberiza cia Linnaeus, 1766	Rock Bunting	-	LC	-	Annex-II	-	UP	-	WV	A.2	L
Emberiza hortulana Linnaeus, 1758	Ortolan Bunting	-	LC	-	Annex-III	-	UP	Annex-II	SV	A.3	L
Emberiza melanocephala Scopoli, 1769	Black-Headed Bunting	-	LC	-	Annex-II	-	UP	-	SV	A.4	L
Fringillidae											
Carduelis carduelis (Linnaeus, 1758)	European Goldfinch	-	LC	-	Annex-II	-	UP	-	N	A.3.1	O+L
Chloris chloris (Linnaeus, 1758)	European Greenfinch	-	LC	-	Annex-II	-	UP	-	N	A.3	O+L
Coccothraustes coccothraustes (Linnaeus, 1758)	Hawfinch	-	LC	-	Annex-II	-	UP	-	WV	A.3	L
Fringilla coelebs Linnaeus, 1758	Common Chaffinch	-	LC	-	Annex-III	-	UP	Annex-II	N	A.4	O+L
Fringilla montifringilla Linnaeus, 1758	Brambling	-	LC	-	Annex-III	-	UP	Annex-II	N	A.3	L
Linaria cannabina (Linnaeus, 1758)	Common Linnet	-	LC	-	Annex-II	-	UP	-	WV	A.3	L
Serinus serinus (Linnaeus, 1766)	European Serin	-	LC	-	Annex-II	-	UP	-	N	A.3	O+L
Serinus spinus (Linnaeus, 1758)	Eurasian Siskin	-	LC	-	Annex-II	-	UP	-	WV	A.3	L
Hirundinidae											
Cecropis daurica Linnaeus, 1771	Red-Rumped Swallow	-	LC	-	Annex-II	-	UP	-	SV	A.3	O+L
Delichon urbicum (Linnaeus, 1758)	Northern House Martin	-	LC	-	Annex-II	-	UP	-	SV	A.3	O+L
Hirundo rustica Linnaeus, 1758	Barn Swallow	-	LC	-	Annex-II	-	UP	-	SV	A.5	O+L
Riparia riparia Linnaeus, 1758	Collared Sand Martin	-	LC	-	Annex-II	-	UP	-	SV	A.5	O+L
Ptyonoprogne rupestris Scopoli, 1769	Eurasian Crag Martin	-	LC	-	Annex-II	-	UP	-	WV	A.5	L
Laniidae											
Lanius collurio Linnaeus, 1758	Red-Backed Shrike	-	LC	-	Annex-II	Annex-I	UP	Annex-I	SV	A.1.2	O+L
Lanius minor Gmelin, 1788	Lesser Grey Shrike	-	LC	-	Annex-II	Annex-I	UP	-	T	A.3	L
Lanius nubicus Lichtenstein, 1823	Masked Shrike	-	LC	-	Annex-II	Annex-I	UP	-	SV	A.2	O+L
Lanius senator Linnaeus, 1758	Woodchat Shrike	-	LC	-	Annex-II	-	UP	-	SV	A.2	O+L
Locustellidae											
Locustella fluviatilis (Wolf, 1810)	River Warbler	-	LC	-	Annex-II	-	UP	-	T	A.1.2	L
Locustella luscinioides (Savi, 1824)	Savi's Warbler	-	LC	-	Annex-II	-	UP	-	T	A.2	L
Locustella naevia (Boddaert, 1783)	Common Grasshopper-Warbler	-	LC	-	Annex-II	-	UP	-	T	A.1.2	L
Motacillidae											
Motacilla alba Linnaeus, 1758	White Wagtail	-	LC	-	Annex-II	-	UP	-	Y	A.3.1	O+L
Motacilla cinerea Tunstall, 1771	Grey Wagtail	-	LC	-	Annex-II	-	UP	-	WV	A.2	L

Motacilla citreola Pallas, 1776	Citrine Wagtail	-	LC	-	Annex-II	-	UP	-	T	A.2	L
Motacilla flava Linnaeus, 1758	Western Yellow Wagtail	-	LC	-	Annex-II	-	UP	-	SV	A.3.1	O+L
Anthus campestris Linnaeus, 1758	Tawny Pipit	-	LC	-	Annex-II	-	UP	-	T	A.2	L
Anthus cervinus Pallas, 1811	Red-Throated Pipit	-	LC	-	Annex-II	-	UP	-	WV	A.2	L
Anthus godlewskii Taczanowski, 1876	Blyth`S Pipit	-	LC	-	Annex-II	-	UP	-	T	A.7	L
Anthus pratensis Linnaeus, 1758	Meadow Pipit	-	LC	-	Annex-II	-	UP	-	WV	A.3	L
Anthus richardi Vieillot, 1818	Richard's Pipit	-	LC	-	Annex-II	-	UP	-	T	A.2	L
Anthus spinoletta Linnaeus, 1758	Water Pipit	-	LC	-	Annex-II	-	UP	-	WV	A.3	L
Anthus trivialis Linnaeus, 1758	Tree Pipit	-	LC	-	Annex-II	-	UP	-	T	A.3	L
Muscicapidae											
Luscinia luscinia (Linnaeus, 1758)	Thrush Nightingale	-	LC	-	Annex-II	-	UP	-	T	A.2	L
Luscinia megarhynchos (Brehm, 1831)	Common Nightingale	-	LC	-	Annex-II	-	UP	-	SV	A.2	O+L
Luscinia svecica (Linnaeus, 1758)	Bluethroat	-	LC	-	Annex-II	Annex-I	UP	-	WV	A.2	L
Monticola saxatilis (Linnaeus, 1776)	Rufous-Tailed Rock-Thrush	-	LC	-	Annex-II	-	UP	-	WV	A.1.2	L
Monticola solitarius (Linnaeus, 1758)	Blue Rock-Thrush	-	LC	-	Annex-II	-	UP	-	N	A.1.2	L
Oenanthe deserti (Temminck, 1825)	Desert Wheatear	-	LC	-	Annex-II	-	UP	Annex-II	T	A.1.2	L
Oenanthe finschii (Heuglin, 1869)	Finsch's Wheatear	-	LC	-	Annex-II	-	UP	-	T	A.1.2	L
Oenanthe hispanica (Linnaeus, 1758)	Black-Eared Wheatear	-	LC	-	Annex-II	-	UP	-	SV	A.2	O+L
Oenanthe isabellina (Temminck, 1829)	Isabelline Wheatear	-	LC	-	Annex-II	-	UP	-	SV	A.3	O+L
Oenanthe oenanthe (Linnaeus, 1758)	Northern Wheatear	-	LC	-	Annex-II	-	UP	-	T	A.3	O+L
Phoenicurus ochruros (Gmelin, 1774)	Black Redstart	-	LC	-	Annex-II	-	UP	-	WV	A.2	O+L
Phoenicurus phoenicurus (Linnaeus, 1758)	Common Redstart	-	LC	-	Annex-II	-	UP	-	SV	A.3	L
Saxicola rubetra (Linnaeus, 1758)	Whinchat	-	LC	-	Annex-II	-	UP	-	T	A.3	L
Saxicola torquatus (Linnaeus, 1766)	Common Stonechat	-	LC	-	Annex-II	-	UP	-	WV	A.3	O+L
Paridae											
Cyanistes caeruleus (Linnaeus, 1758)	Eurasian Blue Tit	-	LC	-	Annex-II	-	UP	-	N	A.2	L
Parus major Linnaeus, 1758	Great Tit	-	LC	-	Annex-II	-	UP	-	N	A.3.1	O+L
Periparus ater (Linnaeus, 1758)	Coal Tit	-	LC	-	Annex-II	-	UP	-	N	A.3	O+L
Passeridae											
Passer domesticus (Linnaeus, 1758)	House Sparrow	-	LC	-	-	-	UP	Annex-I	N	A.3.1	O+L
Passer hispaniolensis (Temminck, 1820)	Spanish Sparrow	-	LC	-	Annex-III	-	UP	Annex-II	T	A.3	L
Passer montanus (Linnaeus, 1758)	Eurasian Tree Sparrow	-	LC	-	Annex-III	-	UP	Annex-II	WV	A.3	L
Phylloscopidae											
Phylloscopus collybita (Vieillot, 1817)	Common Chiffchaff	-	LC	-	Annex-III	-	UP	-	N	A.3	O+L
Phylloscopus orientalis (Brehm, 1855)	Eastern Bonelli's Warbler	-	LC	-	Annex-III	-	UP	-	T	A.2	L
Phylloscopus sibilatrix (Bechstein, 1793)	Wood Warbler	-	LC	-	Annex-III	-	UP	-	T	A.2	L

Phylloscopus trochilus (Linnaeus, 1758)	Willow Warbler	-	LC	-	Annex-III	-	UP	-	T	A.3.1	O+L
Pycnonotidae											
Pycnonotus xanthopygos (Ehrenberg, 1833)	White-Spectacled Bulbul	-	LC	-	Annex-III	-	UP	-	N	A.2	O+L
Sittidae											
Sitta neumayer Michahelles, 1830	Western Rock Nuthatch	-	LC	-	Annex-II	-	UP	-	N	A.2	O+L
Scotocercidae											
Cettia cetti (Temminck, 1820)	Cetti's Warbler	-	LC	-	Annex-III	-	UP	-	S	A.2	O+L
Sturnidae											
Sturnus vulgaris Linnaeus, 1758	Common Starling	-	LC	-	-	Annex-II/B	UP	Annex-II	WV	A.3.1	O+L
Sylviidae											
Curruca cantillans (Pallas, 1764)	Subalpine Warbler	-	LC	-	Annex-II	-	UP	-	T	A.2	L
Curruca communis Latham, 1787	Common Whitethroat	-	LC	-	Annex-II	-	UP	-	T	A.3	O+L
Curruca crassirostris (Gmelin, 1789)	Eastern Orphean warbler	-	LC	-	Annex-II	-	UP	-	T	A.2	L
Curruca curruca (Linnaeus, 1758)	Lesser Whitethroat	-	LC	-	Annex-II	-	UP	-	T	A.2	O+L
Curruca melanocephala (Gmelin, 1789)	Sardinian Warbler	-	LC	-	Annex-II	-	UP	-	T	A.3	O+L
Curruca nisoria (Bechstein, 1795)	Barred Warbler	-	LC	-	Annex-II	-	UP	-	T	A.2	O+L
Sylvia atricapilla (Linnaeus, 1758)	Eurasian Blackcap	-	LC	-	Annex-II	-	UP	-	WV	A.2	O+L
Sylvia borin (Boddaert, 1783)	Garden Warbler	-	LC	-	Annex-II	-	UP	-	T	B.3	L
Turdidae											
Turdus merula Linnaeus, 1758	Eurasian Blackbird	-	LC	-	Annex-III	Annex-II/B	UP	-	N	A.3	O+L
Turdus philomelos Brehm, 1831	Song Thrush	-	LC	-	Annex-III	Annex-II/B	UP	-	WV	A.2	L
Strigidae											
Athene noctua (Scopoli, 1769)	Little Owl	-	LC	Annex-II	Annex-II	-	UP	-	N	A.6	O+L
Asio otus (Linnaeus, 1758)	Northern Long-Eared Owl	-	LC	Annex-II	Annex-II	-	UP	-	S	A.2	L
Otus scops (Linnaeus, 1758)	Eurasian Scops-Owl	-	LC	Annex-II	Annex-II	-	UP	-	SV	A.2	L
Strix aluco Linnaeus, 1758	Tawny Owl	-	LC	Annex-II	Annex-II	-	UP	-	S	A.2	L
Tyto alba (Scopoli, 1769)	Common Barn-Owl	-	LC	Annex-II	Annex-II	-	UP	-	S	A.1.2	L

Table.10. Mammal Species Found and Likely to be Found in the Project Area and its Immediate Surroundings and their Conservation Status (*: exotic species; UP: Under Protection; L: Literature, O: Observation)

Scientific Name	Common Name	Endemism	IUCN	CITES	BERN	Habitat Directive	CHCD	Wild Animal Species Protected by TOB	Distribution Range	Type of Detection
Canidae										
Canis aureus Linnaeus, 1758	Golden Jackal	-	LC	Annex-III	-	Annex-V	Annex-I	UP	Local	O+L
Canis lupus Linnaeus, 1758	Grey Wolf	-	LC	Annex-I/II	Annex-II	Annex-II/V	-	UP	Local	L
Vulpes vulpes (Linnaeus, 1758)	Red Fox	-	LC	-	-	-	Annex-I	UP	Common	O+L
Felidae										
Caracal caracal (Schreber, 1776)	Caracal	-	LC	Annex-I/II	Annex-II	-	-	UP	Local	O+L
Felis silvestris Schreber, 1777	Wild Cat	-	LC	Annex-II	Annex-II	Annex-IV	-	UP	Local	O+L
Lynx lynx (Linnaeus, 1758)	Eurasian Lynx	-	LC	Annex-II	Annex-II	Annex-IV	-	UP	Local	O+L
Mustelidae										
Lutra lutra (Linnaeus, 1758)	Eurasian Otter	-	NT	Annex-I	Annex-II	Annex-IV	-	UP	Local	L
Martes foina (Erxleben, 1777)	Beech Marten	-	LC	Annex-III	Annex-III	-	Annex-II	UP	Common	O+L
Martes martes (Linnaeus, 1758)	Pine Marten	-	LC	-	Annex-III	-	-	UP	Common	L
Meles meles (Linnaeus, 1758)	Eurasian Badger	-	LC	-	Annex-III	-	Annex-II	UP	Common	L
Mustela nivalis Linnaeus, 1758	Least Weasel	-	LC	-	Annex-III	-	Annex-II	UP	Common	L
Bovidae										
Capra aegagrus Erxleben, 1777	Wild Goat	-	NT	-	Annex-II	Annex-IV	-	UP	Rare	O+L
Suidae										
Sus scrofa Linnaeus, 1758	Wild Boar	-	LC	-	-	-	Annex-I	UP	Common	O+L
Molossidae										
Tadarida teniotis (Rafinesque, 1814)	European Free-Tailed Bat	-	LC	-	Annex-II	-	-	UP	Common	O+L
Pteropodidae										
Rousettus aegyptiacus (E. Geoffroy, 1810)	Egyptian Fruit Bat	-	LC	-	-	Annex-II/IV	-	UP	Common	O+L
Rhinolophidae										
Rhinolophus blasii Peters, 1867	Blasius's Horseshoe Bat	-	LC	-	Annex-II	Annex-II/IV	-	UP	Common	L
Rhinolophus euryale Blasius, 1853	Mediterranean Horseshoe Bat	-	NT	-	Annex-II	Annex-II/IV	-	UP	Common	L
Rhinolophus ferrumequinum (Schreber, 1774)	Greater Horseshoe Bat	-	LC	-	Annex-II	Annex-II/IV	-	UP	Common	L
Rhinolophus hipposideros (Bechstein, 1800)	Lesser Horseshoe Bat	-	LC	-	Annex-II	Annex-II/IV	-	UP	Common	L

Rhinolophus mehelyi Matschie, 1901	Mehely's Horseshoe Bat	-	VU	-	Annex-II	Annex-II/IV	-	UP	Common	L
Vespertilionidae										
Eptesicus anatolicus Felten, 1971	Anatolian Serotine	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Eptesicus serotinus Schreber, 1774	Serotine	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Myotis blythii (Tomes, 1857)	Lesser Mouse-Eared Myotis	-	LC	-	Annex-II	Annex-II/IV	-	UP	Common	L
Myotis capaccinii (Bonaparte, 1837)	Long-Fingered Bat	-	VU	-	Annex-II	Annex-II/IV	-	UP	Common	L
Myotis davidi (Peters, 1869)	David's Myotis	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Myotis emarginatus (É. Geoffroy, 1806)	Geoffroy's Bat	-	LC	-	Annex-II	Annex-II/IV	-	UP	Common	L
Myotis hoveli Harrison, 1964	Hovel's Myotis	-	-	-	Annex-II	Annex-IV	-	UP	Common	L
Myotis myotis (Borkhausen, 1759)	Greater Mouse-Eared Bat	-	LC	-	Annex-II	Annex-II/IV	-	UP	Common	L
Myotis nattereri (Kuhl, 1817)	Noctule	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Pipistrellus kuhlii (Kuhl, 1817)	Kuhl's Pipistrelle	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Pipistrellus nathusii (Keyserling & Blasius, 1839)	Nathusius' Pipistrelle	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Pipistrellus pipistrellus (Schreber, 1774)	Common Pipistrelle	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Plecotus kolombatovici Dulic, 1980	Kolombatovic's Long-Eared Bat	-	LC	-	Annex-II	Annex-IV	-	UP	Common	L
Erinaceidae										
Erinaceus concolor Martin, 1837	Southern White-Breasted Hedgehog	-	LC	-	-	-	-	UP	Common	O+L
Soricidae										
Neomys milleri Mottaz, 1907	Mediterranean Water Shrew	-	LC	-	Annex-III	-	-	UP	Common	O+L
Leporidae										
Lepus europaeus Pallas, 1778	European Hare	-	LC	-	Annex-III	-	Annex-I	UP	Common	O+L
Cricetidae										
Microtus anatolicus Krystufek & Kefioglu, 2002	Anatolian Vole	-	DD	-	-	-	-	UP	Common	L
Microtus guentheri (Danford & Alston, 1880)	Günther's Vole	-	LC	-	-	-	-	UP	Common	L
Hystricidae										
Hystrix indica Kerr, 1792	Indian Crested Porcupine	-	LC	-	-	-	-	UP	Local	O+L
Muridae										
Apodemus mystacinus (Danford & Alston, 1877)	Broad-Toothed Field Mouse	-	LC	-	-	-	-	UP	Common	L
Apodemus witherbyi (Thomas, 1902)	Steppe Field Mouse	-	LC	-	-	-	-	UP	Common	L
Mus macedonicus Petrov & Ruzic, 1983	Macedonian Mouse	-	LC	-	-	-	-	UP	Common	L
Mus musculus Linnaeus, 1758	House Mouse	-	LC	-	-	-	-	UP	Common	L
Rattus norvegicus (Berkenhout, 1769)	Brown Rat	-	LC	-	-	-	-	UP	Common	L

Rattus rattus (Linnaeus, 1758)	House Rat	-	LC	-	-	-	-	UP	Common	L
Sciuridae (Sincapgiller)										
Sciurus anomalus Gmelin, 1778	Caucasian Squirrel	-	NT	-	Annex-II	Annex-IV	-	UP	Common	O+L
Spalacidae (Kör faregiller)										
Nannospalax xanthodon (Nordman, 1840)	Nehring's Blind Mole Rat	-	DD	-	-	-	-	UP	Common	O+L

Table.11 Terrestrial Invertebrate Species Likely to be Found in the Project Area

Order	Family	*Species*	IUCN	Endemism	BERN	CITES
Diptera	Psychodidae	*Clogmia albipunctatus*	NE			
Diptera	Syrphidae	*Eristalinus taeniops*	NE			
Diptera	Syrphidae	*Eristalis tenax*	NE			
Lepidoptera	Pieridae	*Colias croceus*	NE			
Lepidoptera	Saturniidae	*Saturnia pyri*	NE			
Lepidoptera	Lycaenidae	*Celastrina argiolus*	NE			
Lepidoptera	Erebidae	*Utetheisa pulchella*	NE			
Lepidoptera	Lycaenidae	*Tarucus balkanica*	NE			
Lepidoptera	Lycaenidae	*Lampides boeticus*	LC			
Lepidoptera	Crambidae	*Herpetogramma licarsisalis*	NE			
Lepidoptera	Hesperiidae	*Gegenes pumilio*	LC			
Lepidoptera	Nymphalidae	*Hipparchia mersina*	LC			
Lepidoptera	Crambidae	*Antigastra catalaunalis*	NE			
Lepidoptera	Pieridae	*Pontia chloridice*	NE			

Lepidoptera	Nymphalidae	*Pararge aegeria*	NE			
Lepidoptera	Papilionidae	*Iphiclides podalirius*	NE			
Lepidoptera	Sphingidae	*Macroglossum stellatarum*	NE			
Lepidoptera	Lycaenidae	*Lycaena phlaeas*	NE			
Lepidoptera	Noctuidae	*Acontia lucida*	NE			
Lepidoptera	Pieridae	*Euchloe ausonia*	NE			
Lepidoptera	Lycaenidae	*Turanana endymion*	NE			
Lepidoptera	Lycaenidae	*Plebejus argus*	NE			
Lepidoptera	Lycaenidae	*Plebejus loewii*	NE			
Lepidoptera	Lycaenidae	*Aricia agestis*	NE			
Lepidoptera	Nymphalidae	*Limenitis reducta*	LC			
Lepidoptera	Nymphalidae	*Issoria lathonia*	LC			
Lepidoptera	Nymphalidae	*Libythea celtis*	LC			
Lepidoptera	Geometridae	*Scopula minorata*	NE			
Lepidoptera	Lycaenidae	*Pseudophilotes baton*	LC			
Lepidoptera	Elachistidae	*Elachista modesta*	NE			
Lepidoptera	Crambidae	*Palpita vitrealis*	NE			
Lepidoptera	Hesperiidae	*Thymelicus sylvestris*	LC			
Lepidoptera	Nymphalidae	*Polygonia c-album*	LC			
Lepidoptera	Lycaenidae	*Polyommatus daphnis*	LC			
Lepidoptera	Nymphalidae	*Thaleropis ionia*	LC			
Lepidoptera	Pieridae	*Gonepteryx cleopatra*	LC			
Lepidoptera	Sphingidae	*Theretra alecto*	NE			
Lepidoptera	Nymphalidae	*Coenonympha pamphilus*	LC			
Lepidoptera	Nymphalidae	*Charaxes jasius*	LC			
Lepidoptera	Nymphalidae	*Vanessa atalanta*	LC			

Lepidoptera	Nymphalidae	*Pseudochazara mniszechii*	LC			
Lepidoptera	Nymphalidae	*Melitaea trivia*	LC			
Lepidoptera	Nymphalidae	*Pseudochazara anthelea*	LC			
Lepidoptera	Nymphalidae	*Ypthima asterope*	LC			
Lepidoptera	Geometridae	*Rhodometra sacraria*	NE			
Lepidoptera	Hesperiidae	*Gegenes nostrodamus*	LC			
Lepidoptera	Hesperiidae	*Pyrgus serratulae*	LC			
Lepidoptera	Lycaenidae	*Satyrium abdominalis*	LC			
Lepidoptera	Pieridae	*Pieris napi*	LC			
Lepidoptera	Noctuidae	*Egira conspicillaris*	NE			
Lepidoptera	Notodontidae	*Peridea anceps*	NE			
Lepidoptera	Nymphalidae	*Maniola megala*	LC	Near Endemics (NrE)		
Lepidoptera	Noctuidae	*Autographa gamma*	NE			
Lepidoptera	Nymphalidae	*Coenonympha leander*	LC			
Lepidoptera	Nymphalidae	*Maniola telmessia*	LC			
Lepidoptera	Lycaenidae	*Polyommatus icarus*	LC			
Lepidoptera	Lycaenidae	*Cyaniris semiargus*	LC			
Lepidoptera	Pieridae	*Pontia edusa*	LC			
Lepidoptera	Lycaenidae	*Glaucopsyche alexis*	LC			
Lepidoptera	Pieridae	*Gonepteryx rhamni*	LC			
Lepidoptera	Nymphalidae	*Kirinia roxelana*	LC			
Lepidoptera	Hesperiidae	*Thymelicus hyrax*	LC			
Lepidoptera	Pieridae	*Pontia daplidice*	LC			
Lepidoptera	Sphingidae	*Daphnis nerii*	NE			
Lepidoptera	Sesiidae	*Pyropteron minianiformis*	NE			

Lepidoptera	Nymphalidae	*Hipparchia syriaca*	LC			
Lepidoptera	Pieridae	*Colias alfacariensis*	LC			
Lepidoptera	Papilionidae	*Papilio machaon*	LC			
Lepidoptera	Pieridae	*Pieris pseudorapae*	LC			
Lepidoptera	Papilionidae	*Zerynthia cerisy*	LC			
Lepidoptera	Nymphalidae	*Hipparchia fatua*	LC			
Lepidoptera	Hesperiidae	*Thymelicus acteon*	LC			
Lepidoptera	Noctuidae	*Spodoptera littoralis*	NE			
Lepidoptera	Hesperiidae	*Pelopidas thrax*	LC			
Lepidoptera	Nymphalidae	*Vanessa cardui*	LC			
Lepidoptera	Papilionidae	*Archon apollinus*	NT			
Lepidoptera	Crambidae	*Nomophila noctuella*	NE			
Lepidoptera	Nymphalidae	*Nymphalis polychloros*	LC			
Lepidoptera	Hesperiidae	*Erynnis tages*	LC			
Lepidoptera	Nymphalidae	*Polygonia egea*	LC			
Lepidoptera	Crambidae	*Spoladea recurvalis*	NE			
Lepidoptera	Lycaenidae	*Lycaena alciphron*	LC			
Lepidoptera	Nymphalidae	*Melanargia larissa*	LC			
Lepidoptera	Nymphalidae	*Satyrus ferula*	LC			
Lepidoptera	Noctuidae	*Heliothis peltigera*	NE			
Lepidoptera	Pieridae	*Aporia crataegi*	LC			
Lepidoptera	Papilionidae	*Parnassius mnemosyne*	LC			
Lepidoptera	Pieridae	*Gonepteryx farinosa*	LC			
Lepidoptera	Nymphalidae	*Hyponephele lycaon*	LC			
Lepidoptera	Nymphalidae	*Melitaea cinxia*	LC			
Lepidoptera	Lycaenidae	*Plebejidea loewi*	NE			

Lepidoptera	Lycaenidae	*Pseudophilotes bavius*	LC			
Lepidoptera	Hesperiidae	*Carcharodus alceae*	LC			
Lepidoptera	Lycaenidae	*Zizeeria karsandra*	LC			
Lepidoptera	Nymphalidae	*Danaus chrysippus*	LC			
Lepidoptera	Pieridae	*Pieris brassicae*	LC			
Lepidoptera	Lycaenidae	*Polyommatus cornelia*	LC	E		
Lepidoptera	Lycaenidae	*Leptotes pirithous*	LC			
Lepidoptera	Pieridae	*Anthocharis cardamines*	LC			
Lepidoptera	Pieridae	*Leptidea sinapis*	LC			
Lepidoptera	Papilionidae	*Papilio alexanor*	LC			
Lepidoptera	Noctuidae	*Mythimna vitellina*	NE			
Lepidoptera	Hesperiidae	*Pyrgus armoricanus*	LC			
Lepidoptera	Hesperiidae	*Pyrgus melotis*	LC			
Lepidoptera	Geometridae	*Scopula luridata*	NE			
Odonata	Libellulidae	*Sympetrum meridionale*	LC			
Odonata	Libellulidae	*Selysiothemis nigra*	LC			
Odonata	Aeshnidae	*Aeshna mixta*	LC			
Odonata	Libellulidae	*Libellula fulva*	LC			
Odonata	Libellulidae	*Libellula depressa*	LC			
Odonata	Lestidae	*Chalcolestes parvidens*	LC			
Odonata	Libellulidae	*Orthetrum cancellatum*	LC			
Odonata	Libellulidae	*Orthetrum sabina*	LC			
Odonata	Libellulidae	*Trithemis arteriosa*	LC			
Odonata	Libellulidae	*Orthetrum brunneum*	LC			
Odonata	Gomphidae	*Gomphus schneiderii*	LC			
Odonata	Calopterygidae	*Calopteryx splendens*	LC			

Odonata	Libellulidae	*Sympetrum fonscolombii*	LC			
Odonata	Libellulidae	*Crocothemis erythraea*	LC			
Odonata	Aeshnidae	*Anax imperator*	LC			
Odonata	Gomphidae	*Onychogomphus assimilis*	VU			
Odonata	Libellulidae	*Sympetrum striolatum*	LC			
Odonata	Calopterygidae	*Calopteryx virgo*	LC			
Odonata	Libellulidae	*Trithemis annulata*	LC			
Odonata	Coenagrionidae	*Ischnura elegans*	LC			
Odonata	Libellulidae	*Orthetrum chrysostigma*	LC			
Odonata	Aeshnidae	*Anax parthenope*	LC			
Odonata	Euphaeidae	*Epallage fatime*	LC			
Odonata	Libellulidae	*Trithemis festiva*	LC			
Odonata	Cordulegastridae	*Cordulegaster insignis*	LC			
Odonata	Libellulidae	*Orthetrum taeniolatum*	LC			
Odonata	Aeshnidae	*Caliaeschna microstigma*	LC			
Odonata	Aeshnidae	*Anax ephippiger*	LC			
Odonata	Libellulidae	*Diplacodes lefebvrii*	LC			
Odonata	Libellulidae	*Brachythemis fuscopalliata*	VU		Annex-II	
Odonata	Platycnemididae	*Platycnemis pennipes*	LC			
Odonata	Coenagrionidae	*Erythromma viridulum*	LC			
Odonata	Coenagrionidae	*Erythromma lindenii*	LC			

➢ Annex-1/B Photographs of Terrestrial-Aquatic Habitats and Species

- **Terrestrial Flora Species of the Project Area**
- **Fish Species of the Sampling Points**
- **Terrestrial Fauna Photographs of the Project Area**

Terrestrial Flora Species of the Project Area



Figure 1 *Opuntia ficus-barbarica* (Photo Ferhat Celep)



Figure 2 *Cupressus sempervirens* (Photo Ferhat Celep)



Figure 3. *Sarcopoterium spinosum* (Photo Ferhat Celep)



Figure 4. *Pyrus boissieriana* (Photo Ferhat Celep)



Figure 5. *Juniperus phoenicea* (Photo Ferhat Celep)



Figure 6. *Quercus coccifera* (Photo Ferhat Celep)



Figure 7. *Vitex agnus-castus* (Photo Ferhat Celep)



Figure 8. *Eucalyptus camaldulensis* (Photo Ferhat Celep)



Figure 9. *Olea europaea* (Photo Ferhat Celep)



Figure 10. *Myrtus communis* (Photo Ferhat Celep)



Figure 11. *Punica granatum* (Photo Ferhat Celep)

Fish Species of the Sampling Points



Figure 12 *Alburnus baliki* (Antalya Bleak; Photo Erdoğan Çiçek)



Figure 13 *Capoeta caelestis* (Taurus Scraper; Photo Erdoğan Çiçek)



Figure 14 *Oncorhynchus mykiss* (Rainbow Trout; Photo Erdoğan Çiçek)



Figure 15 *Squalius anatolicus* (Beysehir Dace; Photo Erdoğan Çiçek)



Figure 16 *Anguilla anguilla* (European Eel; Photo Erdoğan Çiçek)



Figure 17 *Salaria fluviatilis* (Freshwater Blenny; Photo Erdoğan Çiçek)



Figure 18 *Gambusia holbrooki* (Holbrook's Mosquitofish; Photo Erdoğan Çiçek)



Figure 19 *Carassius gibelio* (Gibel Carp; Photo Erdoğan Çiçek)



Figure 20 *Oxynoemacheilus atili* (Lake Beysehir Loach; Photo Erdoğan Çiçek)

Terrestrial Fauna Photographs of the Project Area



Figure 21 *Pelophylax bedriagae* (Levantine Marsh Frog; Photo Mert Karış)



Figure 22 *Bufo bufo* (Common Toad; Photo Mert Karış)

Terrestrial Fauna Photographs of the Project Area



Figure 23 *Hyla orientalis* (Oriental Tree Frog; Photo Mert Karış)



Figure 24 *Bufotes viridis* (Variable Toad; Photo Erdoğan Çiçek)

Terrestrial Fauna Photographs of the Project Area



Figure 25. *Pseudopus apodus* (European Glass Lizard; Photo Erdoğan Çiçek)



Figure 26 *Malpolon insignitus* (Eastern Montpellier Snake; Photo Erdoğan Çiçek)

Terrestrial Fauna Photographs of the Project Area



Figure 27 *Dolichophis caspius* (Caspian Whipsnake; Photo Erdoğan Çiçek)



Figure 28 *Ophisops elegans* (Snake-Eyed Lizard; Photo Erdoğan Çiçek)



Figure 29 *Laudakia stellio* (Roughtail Rock Agama; Photo Mert Karış)



Figure 30 *Chamaeleo chamaeleon* (Common Chameleon; Photo Erdoğan Çiçek)



Figure 31 *Testudo graeca* (Mediterranean Spur-Thighed Tortoise; Photo Erdoğan Çiçek)



Figure 32 *Calandrella brachydactyla* (Greater Short-Toed Lark; Photo Hakan Karaardıç)



Figure 33 *Pycnonotus xanthopygos* (White-Spectacled Bulbul)



Figure 34 *Parus major* (Great Tit; Photo Hakan Karaardıç)



Figure 35 *Periparus ater* (Coal Tit; Photo Hakan Karaardıç)



Figure 36 *Fringilla coelebs* (Common Chaffinch; Photo Hakan Karaardıç)



Figure 37 *Phoenicurus ochruros* (Black Redstart; Photo Hakan Karaardıç)



Figure 38 *Sitta neumayer* (Western Rock Nuthatch; Photo Hakan Karaardıç)



Figure 39 *Corvus corax* (Common Raven; Photo Hakan Karaardıç)



Figure 40 *Serinus serinus* (European Serin; Photo Hakan Karaardıç)



Figure 41 *Motacilla alba* (White Wagtail; Photo Hakan Karaardıç)



Figure 42 *Carduelis carduelis* (European Goldfinch; Photo Hakan Karaardıç)



Figure 43 *Saxicola torquatus* (Common Stonechat; Photo Hakan Karaardıç)



Figure 44 *Buteo buteo* (Eurasian Buzzard; Photo Hakan Karaardıç)



Figure 45 *Buteo rufinus* (Long-Legged Buzzard; Photo Hakan Karaardıç)



Figure 46 *Athene noctua* (Little Owl; Photo Hakan Karaardıç

ANTALYA ALANYA MOTORWAY

ANTALYA-ALANYA MOTORWAY PROJECT

BIODIVERSITY MANAGEMENT PLAN



OCTOBER 2025

encon

REVISION HISTORY

Rev.	Date of Issue	Issue Reason	Prepared by	Reviewed by	Approved by
1	May 2025	First submission	O.K.	N.D.Y.	T.B.
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3	October 2025	Third submission	B.A.	N.D.Y.	T.B.

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LIST OF ABBREVIATIONS

AoI	Area of Influence
AZE	Alliance for Zero Extinction
CEKUL	Foundation for the Protection and Promotion of the Environment and Cultural Heritage
CIMER	Presidency's Communication Center
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DSI	General Directorate of State Hydraulic Works
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EFPIs	Equator Principles Financial Institutions
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Programme
ENCON	ENCON Environmental Consultancy Co.
ESF	Environmental and Social Framework
ESHS	Environmental, Social Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Monitoring Report
ESMS	Environmental and Social Management System
EU	European Union
GBV	Gender-Based Violence
GHG	Green House Gas
GIIP	Good international Industry Practice
GIS	Geographical Information System
GP	Good Practices
GRM	Grievance Redress Mechanism
IAPCR	Industrial Air Pollution Control Regulation
IBA	Important Bird Area
IFC	International Finance Corporation
IPA	Important Plant Area
IPCC	Intergovernmental Panel on Climate Change
ISKUR	General Directorate of Turkish Employment Agency
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas

KGM	General Directorate of Highways
MoAF	Ministry of Agriculture and Forestry
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoLSS	Ministry of Labor and Social Security
MTA	General Directorate of Mineral Research and Exploration
NGOs	Non-Governmental Organizations
O&M	Operations and Maintenance
OHS	Occupational Health and Safety
OP	Operational Policies
PAP	Project Affected Person
PIF	Project Introduction File
PIU	Project Implementation Unit
PMU	Project Management Unit
PS	Performance Standard
SCM	Stakeholder Consultation Meeting
SEP	Stakeholder Engagement Plan
SEPA	Special Environmental Protection Areas
The Project	Antalya-Alanya Motorway Project
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
US EPA	United States Environmental Protection Agency
WB	World Bank
WBG	World Bank Group

I. PURPOSE AND SCOPE

This Biodiversity Management Plan ("the Plan") has been prepared by ENCON Environmental Consultancy Co. ("ENCON" or "ESIA Consultant") as part of the Environmental and Social Impact Assessment (ESIA) studies for the Antalya-Alanya Motorway Project ("the Project").

The purpose of this Plan is to identify impacts on biodiversity and outline mitigation, control, and monitoring measures to minimize adverse environmental and social impacts during the construction phase.

The Plan has been developed in alignment with applicable national legislation and relevant international standards, including the requirements of international financial institutions. It outlines actions that should be done to manage biodiversity effectively across construction-related activities and facilities. This plan will provide mitigation alternatives and an impact monitoring schedule in accordance with Turkish and international regulations and standards.

This Plan will be applied by all parties involved in the construction phase, including the Project Sponsor, Antalya-Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş. (AAOİAŞ), the Main Contractor, and all subcontractors. Responsibilities for implementation, monitoring, and reporting biodiversity related issues will be clearly assigned. Necessary updates to the Plan will be considered in case of changes in project design, construction methodology, or regulatory requirements. This Management Plan is part of the overall suite of Management Plans developed for the Project and as described in the ESMS Framework Document.

Summary of BMP Aims:

1. Avoidance: Minimise footprint, restrict access, schedule work outside sensitive periods.
2. Mitigation: Dust/noise control, wildlife corridors, nest/roost protection, speed limits, invasive species management.
3. Translocation procedure will be prepared as a separate document by the third-party consultant prior to any translocation activity.
4. Restoration: Replanting with native species, topsoil reuse, habitat restoration post-construction.
5. Monitoring & KPI: Surveys, inspections, mapping, water/soil/noise monitoring; compliance thresholds set.
6. Corrective Actions: Immediate halt of harmful activities, relocation/translocation, restoration, retraining, and ESMS documentation.

II. LEGISLATIVE FRAMEWORK AND REFERENCE STANDARDS

This Management Plan has been structured to align with both national and international requirements, including legislation, guidelines, and sectoral standards that define biodiversity standarts. Accordingly, the following sources of reference will be used to guide the implementation and compliance procedures:

II.1. National Requirements

The following Turkish laws and regulations will be used as the legal basis for managing biodiversity during construction:

- Regulation on Wildlife Protection and Wildlife Enhancement Areas (Official Gazette: 08.11.2004 – No. 25637)
- Forestry Law (Official Gazette: 31.08.1956 – No. 6831)
- Law on Fisheries (Official Gazette: 04.04.1971 – No. 1380)
- Law on National Parks (Official Gazette: 09.08.1983 – No. 2873)
- Law for the Protection of Cultural and Natural Assets (Official Gazette: 23.07.1983 – No. 2863)
- Decree-Law Establishing the Special Environmental Protection Agency (Official Gazette: 19.10.1989 – No. 383)
- Regulation on Fisheries (Official Gazette: 10.03.1995; – No. 22223)
- Regulation for Implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Official Gazette: 27.12.2001 – No. 24623)
- Terrestrial Hunting Law (Official Gazette: 01.07.2003 – No. 4915)
- Regulation for the Protection of Wetlands (Official Gazette: 04.04.2014 – No. 28962)
- Law for the Protection of Animals (Official Gazette: 24.06.2004 – No. 5199)
- Regulation on Wildlife Protection and Wildlife Enhancement Areas (Official Gazette: 08.11.2004 – No. 25637)
- Law on Protection of Soil and Land Use (No: 5403) (Official Gazette: 19.07.2005 – No. 25880)
- Regulation on the Implementation of the Law on Protection of Soil and Land Use (Official Gazette: 15.12.2005 – No. 26024)
- Regulation on the Collection, Production and Exportation of Natural Flower Bulbs (Official Gazette: 19.07.2012 – No. 28358)

II.2. International Standards and Conventions

In addition to national requirements, the following international guidelines and agreements will be considered to ensure alignment with best practices and financial institution requirements:

- IFC Performance Standards (2012), specifically:
  - Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- IFC Guidance Notes (2012)
- Equator Principles IV (2020)

The Project is committed to implementing the IFC Performance Standards (PS) in order to manage social and environmental risks and impacts. IFC PS6 covers areas of biodiversity conservation, ecosystem services and sustainable management of living resources, which are all fundamental to achieve sustainable development. The objectives of PS6 are outlined as follows:

- To protect and conserve biodiversity.
- To maintain the benefits from ecosystem services; and
- To promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.

These references will be used to guide the implementation, monitoring, and performance evaluation of biodiversity and mitigation measures on-site throughout the construction phase.

II.3. Project Standarts

Critical Habitat Assessment Process

Critical habitats are areas with high biological diversity value. Their identification is based on the following key criteria:

- i) Habitats supporting Critically Endangered and/or Endangered species.
- ii) Habitats of significance for endemic and/or range-restricted species.
- iii) Habitats that support globally important populations of migratory species and/or are crucial for migratory corridors.
- iv) Highly threatened and/or unique ecosystems.
- v) Areas associated with key evolutionary processes.

These criteria are essential for determining critical habitats and ensuring their protection and conservation within the scope of ecosystem assessments and environmental management planning.

The criteria for critical habitats are defined according to IFC PS6, 2012, as follows:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species
- Criterion 2: Endemic and/or restricted-range species
- Criterion 3: Migratory and/or congregation species
- Criterion 4: Highly threatened and/or unique ecosystems
- Criterion 5: Key evolutionary processes

Projects located in areas with high biological diversity value, recognized at the national and/or international level, may require a critical habitat assessment. These areas include IUCN Protected Areas, Key Biodiversity Areas (KBA) and Important Bird and Biodiversity Areas (IBA).

A critical habitat assessment is essential for ensuring that project activities do not negatively impact these ecologically significant areas, and that conservation measures are integrated into project planning and implementation.

Mitigation Hierarchy

According to IFC PS6, the project is required to fully implement the mitigation hierarchy (Figure II.1). To apply this hierarchy in line with Performance Standard 6, an evaluation of the project's Area of Influence within the existing landscape -along with any related facilities- can help guide the identification, screening, and design of alternatives as part of the avoidance process. Mitigation measures will be developed or reviewed by qualified biodiversity and engineering experts to ensure their optimization in accordance with the hierarchy.

Avoidance	Actions taken to prevent the irreversible loss of biodiversity or essential ecosystem services. This may involve alternatives such as site selection, design modifications, and scheduling changes.
Minimization	Efforts to reduce or limit the duration, intensity, and/or extent of impacts that cannot be avoided. Alternatives include physical controls, operational adjustments, and abatement measures.
Restoration	When biodiversity or ecosystem services have been impacted, remediation involves efforts such as rehabilitation and restoration. Alternatives may include re-establishing habitats, restoring biodiversity values, and revitalizing ecosystem services.
Offset	Measures taken to compensate for any residual impacts that cannot be avoided, minimized, or remedied on-site. This can include restoration offsets and averted loss offsets.

Figure II.1 Mitigation Hierarchy

No Net Loss and Loss-Gain Assesment

Biodiversity Net Gain (BNG) is a metric used to assess the impact of a development project on biodiversity. The goal is to ensure that, as a result of the development process, biodiversity achieves a net positive outcome compared to its initial state. If biodiversity is lost, it is considered a net loss.

The principle of biodiversity balance is based on achieving no net loss of biodiversity. This means that the biodiversity gains from conservation efforts must offset the biodiversity losses caused by a specific project. In this approach:

- No Net Loss occurs when the biodiversity gains from conservation activities are equal to the biodiversity losses caused by the project, ensuring no overall decline in species, population sizes, or habitat conditions.
- Net Loss refers to a situation where biodiversity and its components are in a worse state than before the project.
- Net Gain occurs when the biodiversity benefits surpass the biodiversity losses, leading to an overall improvement in biodiversity.

This BNG framework is crucial for sustainable development and ecological compensation strategies, ensuring that biodiversity conservation are integrated into project planning and implementation.

III. LINKAGE WITH OTHER PROJECT PLANS AND PROCEDURES

This Plan is supported by other management plans and procedures developed under the Environmental and Social Management System (ESMS) of the Project. The following plans and procedures are particularly relevant and will be implemented in coordination with the Biodiversity Management Plan:

- Air Pollution and Emissions Management Plan
- Solid Waste Management Plan

- Environmental Accident and Spill Response Management Plan
- Traffic Management Plan
- Community Health and Safety Management Plan
- Training Management Plan
- Environmental and Social Management and Monitoring Plan (ESMMP)
- Biodiversity Action Plan (BAP)

The effective integration of these plans should be ensured to maintain compliance with national regulations and international standards and to minimize the cumulative environmental and social impacts of construction activities.

IV. ROLES AND RESPONSIBILITIES

This section outlines the capacity for implementing the Biodiversity Management Plan (BMP) and the corresponding measures to be undertaken. To ensure the effective execution of the action plans, the Project Owner will designate qualified personnel who will be responsible for addressing and managing biodiversity-related matters.

Biodiversity management roles and responsibilities for the AAMP include but are not limited to:

- Development of procurement conditions regarding biodiversity management
- Professional training of its representative on site
- Surveillance and control
- Management cooperation in case of environmental accident
- Management of pollution from its own operations
- Update and implementation of the BMP during the operations phase

The roles and responsibilities specifically related to the implementation, monitoring, and reporting requirements of this Plan is outlined in Table IV.1. The table clarifies the functional duties of each party involved in ensuring the effective execution of the measures described herein and reinforces accountability across all relevant units.

Table IV.1. Allocation of Roles and Responsibilities for Plan Implementation

Roles	Responsibilities
General Manager	• Ensure the provision of necessary resources for the preparation, revision, and implementation of this Plan in line with company policies. • Ensure the provision of sufficient budget and resources for the implementation of environmental and social management plans. • Oversee compliance with this Plan during project implementation observations.
Project Manager	• Ensure the preparation, revision, and implementation of this Plan in accordance with company policies. • Ensure that all employees comply with the conditions and obligations specified in this Plan during project activities. • Monitor whether the Project is being implemented in accordance with this Plan during project implementation observations. • In case of non-compliance, ensure that corrective and preventive actions are taken in coordination with the, Environmental and Social Interaction Manager, Cultural Heritage Chief, Environmental Chief/Engineer, and Public Relations Chief/Specialist. • Communicate this Plan to all Contractors/Subcontractors and supervise their compliance with the Plan. • Make decisions regarding the provision of project resources, budget determination, and effective use of resources. • Coordinate internal management intervention in the event of an emergency. • Ensure that all project personnel receive the necessary training and approve site inspections.

Roles	Responsibilities
Biodiversity Specialists	• Conduct baseline biodiversity assessments to understand and document existing habitats, species, and ecosystem conditions in and around the project footprint. • Monitor biodiversity risks during construction activities, ensuring sensitive habitats, critical species, and ecological corridors are not adversely affected. • Ensure compliance with national environmental legislation and international biodiversity standards. • Implement Biodiversity Action Plan (BAP) and Biodiversity Management Plan (BMP) and associated mitigation measures in coordination with the Environmental Engineer and E&S Manager. • Implement ecological mitigation measures (e.g., habitat restoration, species relocation, buffer zones) by contractors and subcontractors. • Train construction and environmental teams on biodiversity protection requirements and promote awareness of key species and habitats on-site. • Monitor biodiversity indicators and report findings in line with project performance monitoring systems and environmental management plans. • Ensure corrective actions are taken promptly when biodiversity-related non-compliances are observed. • Liaise with local environmental authorities, consultants, and NGOs on biodiversity matters as required. • Support environmental inspections and audits related to biodiversity performance. • Maintain biodiversity records and contribute to periodic reports and updates to the E&S Manager and Project Director. • Assist with community awareness activities related to biodiversity conservation in collaboration with the Community Liaison Officer when relevant. • Ensure integration of biodiversity considerations into site planning, construction methods, and landscape rehabilitation. • Review contractor/subcontractor method statements and work plans to confirm inclusion of biodiversity mitigation measures. is accurately collected, analyzed, and applied to improve mitigation strategies.
Field Personnel / Contractor Field Personnel	• Follow this Plan and all related Plans and Procedures, and carry out all activities in accordance with the requirements of this Plan. • In case of any non-compliance related to the implementation of this Plan, report it first to the Environmental & Public Relations Team and the Biodiversity Specialists, Contractor Environmental & Public Relations Team, or Environmental & Public Relations Specialist. • Participate in relevant trainings. • Ensure self-sufficiency in the implementation of this Plan.
All Personnel (including Contractor/Subcontractor Personnel)	• Participate in relevant trainings. • Fulfill and ensure the implementation of the requirements of this Plan.

V. BIODIVERSITY MANAGEMENT AND IMPLEMENTATION APPROACH

The Biodiversity Management Plan (BMP) is intended to be a live and adaptive document, subject to ongoing refinement and enhancement throughout the lifecycle of the Project. As the Project progresses, unforeseen biodiversity impacts that were not identified in the Environmental and Social Impact Assessment (ESIA) may arise. In such cases, appropriate mitigation measures will be developed and incorporated into the BMP accordingly.

V.1. Monitoring and Reporting

A comprehensive Biodiversity Monitoring and Evaluation Programme (BMEP) was developed to evaluate the effectiveness of the mitigation and enhancement measures implemented throughout the Project. The BMEP focused on monitoring the condition and ecological health of affected habitats, assessing the success of restoration activities, and tracking the impacts on species populations.

The results of biodiversity monitoring activities and the progress of mitigation measures will be communicated to stakeholders on a regular basis, ensuring transparency and enabling ongoing feedback and adaptive management

V.2. Mitigation Measures

All mitigation measures must be designed and implemented in accordance with the mitigation hierarchy, prioritising:

- Avoidance of impacts wherever possible,
- Minimisation or reduction of unavoidable impacts,
- Restoration or rehabilitation of affected environments,
- Offsetting as a last resort for residual impacts that cannot be otherwise addressed.

A core assumption underpinning the BMP is that during the construction phase, the Project will ensure the presence of suitably qualified and trained personnel on site. These individuals, operating under the direction and oversight of the Biodiversity Supervisor, will be responsible for actively monitoring, verifying, and supporting the correct implementation of all biodiversity mitigation measures.

Avoidance includes activities that change or stop actions before they take place to prevent their expected negative impacts on biodiversity and decrease the overall potential impact of an operation. For example, adjusting the location, scope or timing of development could avoid negative impacts on a vulnerable species or sensitive ecosystem. Mitigation measures determined in this scope are explained in detail in this BMP.

Minimisation measures are taken to reduce the duration, intensity, extent and/or likelihood of impacts that cannot be completely avoided. Mitigation measures determined in this scope are explained in detail in this BMP.

Restoration involves altering an area in such a way as to re-establish an ecosystem's composition, structure, and function, usually bringing it back to its original (pre-disturbance) state or a healthy state close to the original. This holistic process aims to return an ecosystem to its former natural condition and restore ecological function.

All disturbed temporary areas will be rehabilitated. Mitigation measures determined in this scope are explained in detail in this BMP.

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate avoidance, minimisation and restoration measures have been taken.

VI. FINDINGS OF BIODIVERSITY BASELINE

VI.1. Protected Areas

Internationally recognized areas are situated in the vicinity of the Project Area, which spans the provinces of Antalya and Mersin. These include Key Biodiversity Areas (KBAs) and Important Bird Areas (IBAs), both of which are identified as critical for supporting biodiversity. A total of 16

internationally recognized areas have been identified; however, no RAMSAR sites are located within or near the Project Area. Studies have shown that parts of the Antalya Plains (designated as both a KBA and IBA), Belek SEPA (nationally protected area), and Köprüçay Basin Natural Protected Area falls within the boundaries of the Project Area.

VI.2. Habitats

As part of the ESIA, the extent of both natural and modified habitats was evaluated. The Critical Habitat Assessment utilized the relevant Ecologically Appropriate Area for Analysis (EAAA) for the various habitats and species considered.

- C2 - Surface running waters
- J1 - Buildings of cities, towns and villages
- G1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix
- T3 - Coniferous forest
- T1.4 - Mediterranean and Macaronesian riparian forest
- S7.211 - Aegean Sarcopoterium phrygana
- S6 - Garrigue
- S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub
- V1 - Arable land and market gardens

The results indicated that habitats within the expropriation corridor and its surrounding area (400 m buffer zone) were primarily classified as modified habitats.

VI.3. Flora and Fauna Species

A total of 221 plant species from 60 families were identified, including seven endemic species to Türkiye. Only one species, *Pyrus serikensis* (Endangered – EN), is classified as threatened under IUCN criteria. No other plant species recorded are considered threatened.

Five amphibian species were documented. *Lyciasalamandra atifi* (EN) is listed as threatened due to its strict habitat requirements; however, it was not detected during spring surveys, the optimal period for observation.

The study recorded 25 reptile species, including the threatened species *Testudo graeca* (Vulnerable – VU), which has a broad national distribution and does not trigger critical habitat designation. Four lizard species are endemic, with *Lacerta pamphylica* showing a more restricted range and occurring within the Project area.

A total of 124 bird species were identified. Two species are IUCN-listed as threatened: *Neophron percnopterus* (EN) and *Streptopelia turtur* (VU).

46 mammal species are potentially present, including a high diversity of bats. Two bat species, *Rhinolophus mehelyi* and *Myotis capaccinii* (both VU), are listed as threatened, though not detected in field surveys.

29 fish species were recorded. Five species are IUCN-listed as threatened:

- *Anguilla anguilla* (Critically Endangered – CR)
- *Alburnus baliki* and *Pseudophoxinus fahrettini* (Endangered – EN)

- *Cyprinus carpio* and *Capoeta antalyensis* (Vulnerable – VU)

The presence of *Anguilla anguilla* is linked to the catadromous nature of local rivers that drain into the sea.

VII. NOTABLE BIODIVERSITY AND CRITICAL HABITAT FEATURES

VII.1. Selection Criteria for Notable Habitats and Species

Based on the evaluations conducted during the Ecological Assessment and monitoring studies carried out within the scope of the Project, habitats and species of high priority and conservation significance were identified in this section. Earlier sections of this report outlined various national and international criteria used to assess the conservation status and threat levels of habitats and species. Accordingly, all biodiversity assessments were carried out in alignment with one or more of these criteria, as applicable to their respective contexts.

VII.2. Critical Habitat Features

Based on the findings of the Critical Habitat Assessment carried out for the Project, the following features provided in Table VII.1 have been identified as meeting the criteria to be classified as Critical Habitat.

Table VII.1. Critical Habitat Assessment Results

Criteria	Species / habitat triggered
Criterion 1: Critically endangered and/or endangered species	Maquis, arboreal matorral, and thermo-mediterranean scrub (EUNIS code S5) • *Pyrus serikensis*

VII.3. Habitats and Species of Conservation Importance

As a result of the comprehensive assessments conducted during the biodiversity studies, the selection criteria for habitats and species to be addressed in the biodiversity conservation action plans - developed as part of this document- were defined as follows.

Species of conservation concern, for the purposes of this assessment, are defined according to the following criteria:

- Species classified as Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) on the IUCN Red List;
- Species that are globally, nationally, or regionally threatened;
- Endemic species to the area;
- Species listed under Resolution No. 6 of the Bern Convention;
- Range-restricted species;
- Migratory species for which the local population represents more than 1% of the global population.

It is important to note that, as Turkey is not a member state of the European Union, Priority Biodiversity Features and Critical Habitat (CH) associated with the EU Habitats and Birds Directives are not applicable in this context.

The subsections below present the species of conservation concern identified as potentially occurring within the Study Area, based on the outcomes of the Environmental and Social Impact Assessment (ESIA) and according to the criteria outlined above.

Habitat types and species identified as having high priority and conservation importance listed in Table VII.2. The conservation of these species required specific actions to be implemented within the scope of the Project.

Table VII.2. Priority habitats and species of conservation importance

Biodiversity Component		**Status**
Habitats	Critical Habitats S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub	Natural habitats that qualify as Critical Habitat.
	Natural Habitats G1.1 - Riparian and gallery woodland, with dominant *Alnus*, *Betula*, *Populus* or *Salix* T3 - Coniferous forest T14 - Mediterranean and Macaronesian riparian forest S7.211 - Aegean *Sarcopoterium phrygana* S6 - Garrigue C2 - Surface running waters	Natural habitats that do not qualify as Critical Habitat.
Species	*Pyrus serikensis*	Regional endemic and EN category in the IUCN Red List
	Lyciasalamandra atifi	EN category in the IUCN Red List
	Lacerta pamphylica	Local endemic
	Testudo graeca	VU category in the IUCN Red List
	Neophron percnopterus	EN category in the IUCN Red List
	Streptopelia turtur	VU category in the IUCN Red List
	Myotis capaccinii	VU category in the IUCN Red List
	Rhinolophus mehelyi	VU category in the IUCN Red List
	Alburnus baliki	Endemic and EN category in the IUCN Red List
	Capoeta antalyensis	Regional Endemic and VU category in the IUCN Red List
	Oxynoemacheilus eregliensis	VU category in the IUCN Red List
	Pseudophoxinus fahrettini	Regional Endemic and EN category in the IUCN Red List

VIII. IMPACT ASSESSMENT ON ECOLOGY

The construction and operation of the Motorway Project will involve a wide range of activities that have the potential to affect the ecology. Impacts of project activities can be further divided into the target group of terrestrial and aquatic biological elements. Important impacts of motorway construction and operation activities on the biological environment are mainly habitat fragmentation. Habitat fragmentation can be described as splitting natural habitats and ecosystems into smaller, more isolated patches. The process of fragmentation is connected to many different factors, of which the direct loss and isolation of natural habitat are the most important.

VIII.1. Potential Impacts on Critical Habitats

The Project area comprises mainly maquis vegetation and agricultural lands, with scattered degraded forest patches. While impacts in agricultural zones are expected to be minimal, some alteration of maquis vegetation and use of forest areas for soil deposition may occur. These impacts will be addressed through targeted post-construction habitat restoration to prevent permanent vegetation loss.

- Habitat fragmentation is a key concern, but the project design—featuring viaducts, bridges, and at-grade crossings—leverages the natural topography and hydrology to maintain ecological connectivity. Although no significant migratory routes are present, additional wildlife passages (e.g. culverts) will be installed to further reduce fragmentation risks.
- Water pollution risks stem from excavation, blasting, and channel modifications, particularly in coastal river sections. These activities may degrade aquatic habitats and water-dependent species. Mitigation measures must be implemented to prevent turbidity, habitat loss, and the decline of aquatic ecosystems.
- Noise and dust pollution during construction may disturb local fauna, particularly mammals, though these effects are expected to be temporary, with species likely to reoccupy the area post-construction.

While the Project is expected to have localized impacts on critical habitats—particularly through vegetation disturbance, habitat fragmentation, and potential water pollution—these impacts can be effectively managed through the application of targeted mitigation measures and good construction practices. The integration of ecological structures, post-construction habitat rehabilitation, and strict controls on water quality and site activities will be essential to minimizing biodiversity loss.

Given the limited presence of continuous habitats, the absence of major migratory corridors, and the incorporation of natural features such as viaducts and at-grade crossings, the overall risk to habitat connectivity and species movement is considered manageable. With proper implementation, monitoring, and adaptive management, the Project is not anticipated to result in significant or irreversible impacts on critical habitats.

IX. MEASURES, MONITORING REQUIREMENTS, AND KEY PERFORMANCE INDICATORS

This BMP was designed to be adaptive and open-ended, allowing for updates and improvements based on ongoing research and the evolving nature of the Project. The mitigation hierarchy was strictly followed, ensuring that all necessary avoidance, minimization, and mitigation measures were implemented. Where required, additional offsets beyond those defined in this document were also considered throughout the life cycle of the Project.

The scope of the ESMS Management Plans has been determined to be construction phase, however BMP includes mitigation and monitoring actions to be taken for both construction and operation phases and mentions the long-term commitments but since the BAP includes operational measures the BAP will discuss both the construction and operation phases and will have greater detail on long-term mitigation measures for the project.

Pre-construction measures will be identified and implemented for each component of the project individually, to ensure site-specific biodiversity considerations and potential impacts are adequately addressed in accordance with IFC PS6. This is emphasizes site-specific impact management and proactive planning.

In accordance with the IFC PS6 mitigation hierarchy and the thresholds described under each Critical Habitat criterion in GN6, the incorporation of tunnels, culverts, and viaducts is recommended where technically and environmentally feasible. When strategically located, these structures can function as avoidance measures by maintaining habitat connectivity and preventing direct impacts on ecologically sensitive features such as Critical Habitats, wildlife corridors, and aquatic ecosystems. Due to the linear configuration and engineering constraints of the Project, however, complete avoidance of impacts is not always possible. In such cases, measures are applied primarily as minimization tools to reduce the extent, intensity, and fragmentation of unavoidable impacts.

For aquatic ecosystems in particular, viaducts and overpasses are regarded as avoidance measures where they fully maintain hydrological continuity and prevent disruption of aquatic habitats, while in situations where some disturbance remains they serve as minimization measures by reducing the severity of impacts compared to conventional embankments or culverts. The outcomes of these design considerations, together with predicted levels of habitat loss, are reviewed against PS6 requirements to confirm compliance and ensure that residual impacts are addressed through restoration and offset measures to achieve No Net Loss or Net Gain.

Table IX.1 Summary of Ecology and Biodiversity Assessments

Impacted Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts	Reason for Decrease in Significance
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude					
Land Preparation and Construction														
Terrestrial Habitats	S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub	Habitat loss and habitat fragmentation Vegetation and topsoil removal Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	High	High (B3)	• The intrusion of any invasive flora species into the Project Area and its surroundings will be prevented. For this purpose, vehicles used for vegetation clearance and/or plant transfer will be checked beforehand. • Project workers will not be allowed to bring any live animals or plants into the construction site to avoid the risk of pest/invasive species establishing in the Project Area. • Measures to reduce noise, dust, and air quality will be taken. • Project construction sites and access roads will be separated from other areas with appropriate KGM approved signboards, signs, and fences. Therefore, staff and vehicle access to the area will be limited to the construction site. • Construction waste generated due to project activities will be stored at designated storage areas, and then disposed of solid waste will not be allowed to be left in natural habitats. • Vegetation clearance will take place gradually, so fauna elements will be allowed to leave construction sites. • Topsoil storage and reuse for vegetation reinstatement. • Conduct post-construction rehabilitation to restore the natural structure of affected maquis and forest habitats. • Ecological restoration of disturbed areas post construction • Collect seeds from endemic species and deliver to a seed bank for ex-situ conservation. • Minimize human-induced disturbances and adhere to conservation guidelines throughout the Project Area.	Medium (B2)	Mitigation measures (invasive species control, phased clearance, fencing, waste management, topsoil reuse, and replanting) reduce disturbance and ensure restoration, making impacts temporary and localized.
	G1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix T3 - Coniferous forest T14 - Mediterranean and Macaronesian riparian forest S7.211 - Aegean *Sarcopoterium phrygana* S6 - Garrigue	Habitat loss and habitat fragmentation Vegetation and topsoil removal Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	Medium	Medium (B2)		Low (B1)	Mitigation measures (invasive species control, phased clearance, fencing, waste management, topsoil reuse, and replanting) reduce disturbance and ensure restoration, making impacts temporary and localized. Therefore, significance is reduced from Medium to Low..
	J1 - Buildings of cities, towns and villages V1 - Arable land and market gardens	Habitat loss and habitat fragmentation Vegetation and topsoil removal Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	Low	Low (B1)		Low	Impacts are already minor by nature. Mitigation keeps them controlled and ensures they do not escalate, so the rating stays Low.
Aquatic Habitats	C2 - Surface running waters	Habitat loss and habitat fragmentation Water pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	Medium	Medium (B2)	• During construction, mixing any chemical substances that is used in the construction area, in aquatic ecosystems will be prevented • Excavation materials will not be dumped onto riverbeds	Low (B1)	Risk of water contamination and habitat alteration reduced throuh strict waste/chemical controls and no dumping policy. Impacts become limited and reversible.
(Flora)	*Pyrus serikensis*	Vegetation and topsoil removal Habitat loss and habitat fragmentation Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	High	High (B3)	• Seeds of the species will be collected and delivered to the Seed Gene Bank. • Monthly monitoring between April and August will be conducted in the flowering period for these species	Medium (B2)	Mitigation reduces the risk of permanent loss. Lowering significance from High to Medium.
	Eryngium kotschyi *Phlomis leucophracta* *Phlomis lycia* *Phlomis monocephala* *Phlomis nissolii* *Sideritis congesta* *Barlia robertiana*	Vegetation and topsoil removal Habitat loss and habitat fragmentation Noise and dust pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Moderate (B)	Low	Low (B1)		Low	Impacts are already minor, mitigation ensures they remain controlled, so the rating stays low.

Impacted Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts	Reason for Decrease in Significance
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude					
(Amphibians)	*Lyciasalamandra atifi*	Habitat loss and habitat fragmentation	Adverse	Widespread	Long	Low	Irreversible	One-off	Moderate (B)	High	High (B3)	• Due to habitat loss, noise, dust formation, and vehicle-human traffic, construction activities will be carried out gradually to provide birds and mobile fauna species with time and energy to leave the area. • At-grade crossings will be established to facilitate movement between the fragmented habitats. • The construction sites will be fenced to prevent the entry of fauna species. In addition, traffic will be restricted in the Project Area, except for pre-designed roads, to avoid animal destruction. • Construction activities involving ground disturbance will ideally be scheduled outside the hibernation period or conducted with caution in areas where hibernating reptiles may be present. • Warning signs will be used along the Motorway with the approval of KMG. • To prevent collisions of insects the use of sodium lights will be used. • Bird nests, and moist habitats will be monitored during the construction and operation phases, and additional measures will be determined if necessary. • Monitoring will be done during the construction and operation. • Project personnel will be informed and trained in the aquatic environment. • Confirming species presence for *Lacerta pamphylica*, relocating individuals pre-construction.	Medium (B2)	Gradual works, safe crossings, fencing, restricted traffic and monitoring reduce mortality and habitat fragmentation, lowering significance from High to Medium.
(Reptiles)	*Testudo graeca*	Vegetation and topsoil removal Habitat loss and habitat fragmentation	Adverse	Widespread	Long	Low	Irreversible	One-off	Moderate (B)	Medium	Medium (B2)		Low (B1)	Mitigation limits disturbance and ensures impacts remain localized and reversible, reducing significance from Medium to Low.
	Lacerta pamphylica									High	High (B3)		Low (B2)	Scheduling, fencing, and species-specific measures reduce long-term risks. Considering species population being stable and IUCN category being “LC”, these measures are bringing significance down from High to Low.
	Anatololacerta ibrahimi *Ablepharus anatolicus* *Blanus aporus*									Low	Low (B1)		Low	Already minor; mitigation ensures no escalation, so significance remains Low.
(Birds)	*Neophron percnopterus*	Vegetation and topsoil removal Habitat loss and habitat fragmentation	Adverse	Widespread	Long	Low	Irreversible	One-off	Moderate (B)	High	High (B3)		Low (B2)	Targeted measures (crossings, fencing, monitoring) effectively reduce major risks, lowering significance from High to Low.
	Streptopelia turtur		Adverse	Widespread	Long	Low	Irreversible	One-off	Minor (C)	Medium	Low (C2)		Low (C1)	Impacts are already small; controls and monitoring reduce them further, shifting significance from Low (C2) to Low (C1).
	Accipiter nisus *Aquila chrysaetos* *Buteo buteo* *Buteo rufinus* *Circaetus gallicus* *Circus aeruginosus* *Circus cyaneus* *Circus macrourus* *Ciconia ciconia* *Ciconia nigra* *Falco columbarius* *Falco peregrinus* *Falco subbuteo* *Falco tinnunculus*								Minor (C)	Low	Low (C1)		Low	Impact is negligible; mitigation maintains low level with no change.
(Mammals)	*Myotis capaccinii* *Rhinolophus mehelyi*	Vegetation and Topsoil Removal Habitat Loss and Habitat Fragmentation	Adverse	Widespread	Long	Low	Irreversible	One-off	Moderate (B)	Medium	Medium (B2)		Low (B1)	Mitigation minimizes extent and duration of impacts, reducing significance from Medium to Low.

Impacted Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts	Reason for Decrease in Significance
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude					
(Freshwater species)	*Anguilla anguilla* *Alburnus baliki* *Capoeta antalyensis* *Pseudophoxinus fahrettini* *Pseudophoxinus battalgilae*	Habitat Loss and Habitat Fragmentation Water Pollution	Adverse	Widespread	Long	Medium	Irreversible	One-off	Minor (C)	High	Medium (C3)	• Excavation materials will not be dumped onto a riverbed. • Mixing any chemical substances used in the construction area, waterbed, and/or aquatic ecosystems will be prevented. • The natural structure of the riparian vegetation will be preserved, which forms the spawning and sheltering area for many aquatic organisms. • Especially during the breeding season of fish species (April and May), any intervention on riverbeds will be prevented. Viaduct or bridge construction activities will be conducted in months other than April-May, as turbidity can have lethal effects on fish eggs. If the activity has to be carried out, it will be done after determining whether there are breeding fish species in the area. • Sediment traps will be used to prevent the negative impact of the sediment that construction activities will generate. • Strengthening works will be done with certain rock blocks to ensure the stability of the coast. • Project activities will be limited to designated areas to avoid direct impacts. • Monitoring will be done during the construction and operation. • Project personnel will be informed and trained in the aquatic environment.	Low (C2)	Strict controls on waste, chemicals, and sediment, plus seasonal restrictions and riparian protection, significantly reduce risks to aquatic habitats, lowering significance from High to Low.
	Cyprinus carpio *Capoeta caelestis* *Cobitis battalgilae* *Oxynoemacheilus eregliensis* *Alburnus escherichii* *Squalius anatolicus* *Squalius fellowesii* *Salmo ekmekciae*									Medium	Low (C2)		Low (C1)	Mitigation limits pollution and disturbance, protecting aquatic species and spawning areas, reducing significance from Medium to Low.
Operation														
Terrestrial Habitats	S5 - Maquis, arborescent matorral and thermo-Mediterranean scrub	Noise and pollution Alteration of soil chemistry	Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	High	High (B3)	• Maintaining vegetation buffers to reduce noise/light disturbance • Monitor and control of any invasive species • Ecological restoration of disturbed areas post construction • Topsoil storage and reuse for vegetation reinstatement	Medium (B2)	Vegetation buffers and invasive species control reduce disturbance, lowering significance from High to Medium.
	G1.1 - Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix T3 - Coniferous forest T14 - Mediterranean and Macaronesian riparian forest S7.211 - Aegean *Sarcopoterium phrygana* S6 - Garrigue	Noise and pollution Alteration of soil chemistry	Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	Medium	Medium (B2)		Low (B1)	Noise/light impacts are localized and controlled by vegetation buffers, reducing significance to Low.
	J1 - Buildings of cities, towns and villages V1 - Arable land and market gardens	Noise and pollution Alteration of soil chemistry	Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	Low	Low (B1)		Low (B1)	Already minor; mitigation maintains impacts at Low.
Aquatic Habitats	C2 - Surface running waters	Water pollution	Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	Medium	Medium (B2)	• Prevent chemical runoff	Low (B2)	Runoff prevention minimizes water pollution risk, keeping impacts Low.
(Amphibians)	*Lyciasalamandra atifi*	Mortality due to vehicle collision Light and noise disturbance	Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	High	High (B3)	• Installing culverts, underpasses, overpasses, viaducts, and bridges for safe crossing and fences to prevent fauna to enter the motorway • Warning signs will be used along the Motorway with the approval of KMG. • To prevent collisions of insects the use of sodium lights will be used. • Bird nests, and moist habitats will be monitored	Low (B2)	Culverts, fencing, and monitoring reduce collision risk and habitat fragmentation, lowering significance from High to Low.
(Reptiles)	*Testudo graeca*	Mortality due to vehicle collision	Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	Medium	Medium (B1)		Low (B2)	Culverts, fencing, and monitoring reduce collision risk and habitat fragmentation, lowering significance from Medium to Low.

Impacted Ecosystem Component		Definition of Potential Impact	Type of Impact	Impact Magnitude						Sensitivity/ Value of Resource /Receptor	Impact Significance (Before Mitigation)	Measures to be Taken	Significance of Residual Impacts	Reason for Decrease in Significance
				Geographic Extent	Duration	Magnitude	Reversibility	Frequency	Overall Magnitude					
	Lacerta pamphylica		Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	High	High (B3)	during the construction and operation phases, and additional measures will be determined if necessary. • Monitoring will be done during the construction and operation.	Low (B2)	Safe crossing structures and fencing minimize severe risks, reducing significance from High to Low.
	Anatololacerta ibrahimi *Ablepharus anatolicus* *Blanus aporus*		Adverse	Widespread	Long	Low	Irreversible	Continuous	Moderate (B)	Medium	Medium (B2)		Low (B1)	Crossing measures reduce residual mortality and fragmentation, lowering significance to Low.
(Birds)	*Neophron percnopterus*	Mortality due to vehicle collision Disturbance from light/noise	Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	High	High (B3)		Low (B1)	Use of sodium lights prevents insect attraction and by this, preventing birds attraction and reduces disturbance, lowering significance to Low.
	Streptopelia turtur		Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	Low	Low (B1)		Low (B1)	Use of sodium lights prevents insect attraction and by this, preventing birds attraction and reduces disturbance, keeping the significance Low.
	Accipiter nisus *Aquila chrysaetos* *Buteo buteo* *Buteo rufinus* *Circaetus gallicus* *Circus aeruginosus* *Circus cyaneus* *Circus macrourus* *Ciconia ciconia* *Ciconia nigra* *Falco columbarius* *Falco peregrinus* *Falco subbuteo* *Falco tinnunculus*								Minor (C)	Low	Low (C1)		Low	Already minor; culverts and fencing maintain low-level impacts.
(Mammals)	*Myotis capaccinii* *Rhinolophus mehelyi*	Mortality due to vehicle collision Light pollution Noise pollution	Adverse	Widespread	Long	Medium	Irreversible	Continuous	Minor (C)	Medium	Medium (C2)	• Installing culverts and/or underpasses for safe crossing • Monitoring of bat species populations • Usage of sodium lights • Reporting of fauna casualties	Low (C1)	Crossing structures, monitoring, and lighting reduce collision and disturbance risks, lowering significance from Low (C2) to Low (C1).
(Freshwater species)	*Anguilla anguilla* *Alburnus baliki* *Capoeta antalyensis* *Pseudophoxinus fahrettini* *Pseudophoxinus battalgilae*	Water Pollution	Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	Low	Low (C1)	• Prevent chemical runoff	Low (C1)	Runoff prevention avoids water pollution, maintaining already minor impacts at Low.
	Cyprinus carpio *Capoeta caelestis* *Cobitis battalgilae* *Oxynoemacheilus eregliensis* *Alburnus escherichii* *Squalius anatolicus* *Squalius fellowesii* *Salmo ekmekciae*		Adverse	Widespread	Long	Low	Irreversible	Continuous	Minor (C)	Medium	Low (C2)	• Prevent chemical runoff	Low (C1)	Preventing chemical runoff further reduces pollution risks, shifting significance from Low (C2) to Low (C1).

IX.1. Biodiversity Risks, Monitoring Requirements, and Mitigation Framework

Construction-related impacts may occur either directly, such as habitat clearance resulting in loss or fragmentation, wildlife disturbance from noise, vibration and lighting, and accidental mortalities during site preparation and earthworks, or indirectly through habitat degradation that can alter species distribution, abundance and ecological functions.

During the operational phase, impacts are primarily associated with vehicle traffic, including wildlife collisions leading to increased mortalities, particularly for medium and large mammals, reptiles, amphibians, and ground-nesting birds.

Additional impacts result from chronic noise and light disturbance along the motorway, the barrier effect restricting wildlife movement and dispersal, and the potential spread of invasive or feral species facilitated by road corridors. Over the long term, these impacts may contribute to reduced habitat quality and landscape connectivity within the wider project area.

To address and mitigate potential impacts, Table IX.2 presents identified biodiversity risks associated with the Project, along with corresponding mitigation measures, assigned responsibilities, monitoring requirements, performance indicators, verification methods, and corrective actions.

The figures showing the current design of viaducts, tunnels, bridges, culverts, underpasses, and overpasses combined with the habitat map that causes the least amount of fragmentation is provided in the ESIA Annex 11C figures. Biodiversity specialist will review these figures during the construction period Figures including sensitive biodiversity location maps are presented in ESIA Findings for Ecology and Biodiversity section.

Locations for pre-construction surveys for bats is given in Figure IX.1.

Table IX.2 Biodiversity Management Plan for Construction and Operation Phase

Type of Habitat/Type of Species	Impact	Sensitive Habitat Location	Mitigation and Monitoring Measure	Responsibility for Mitigation Measure	Monitoring Parameter	Timing of Monitoring and Frequency	Monitoring Location	KPI (variable, Threshhold Aim)	Means of Verification	Corrective action
Natural Critical	• Habitat fragmentation and edge effects • Creation of barriers to movement	• Project footprint • Sensitive habitats (Culverts to be Constructed for the Motorway are detailed within Table IX.3)	**Minimisation** • Off-road driving is strictly prohibited; all vehicles must remain on designated access routes at all times. • Vehicle movement near sensitive habitats shall be restricted using physical barriers. • If operational or biodiversity monitoring identifies a previously unknown migration corridor, the EPC Contractor / Biodiversity Specialist shall conduct a rapid assessment and prepare a supplementary mitigation plan within 14 days, subject to approval by the Project's Environmental Manager. **Monitoring** • Monthly inspection of access roads by site supervisors. • Monthly walkover surveys by the Biodiversity Specialist to confirm compliance. • Wildlife–vehicle collision records maintained and reviewed quarterly.	• EPC Contractor • Biodiversity Specialist	• Number and length of access roads vs. approved design • Number of off-road driving incidents • Number of wildlife vehicle collisions	• Weekly during construction phase • Quarterly during operation	• All temporary access road alignments • Construction sites, staging areas, • Sensitive habitat boundaries	• Habitat connections created by culverts. • No unauthorized roads • Wildlife-vehicle collision incidents < 5 incidents per km per month	• Site walkover inspection records • Records of new access roads	• Update GIS records for any unauthorized access roads. • Report closures and rehabilitation actions to the Biodiversity Specialist. • Immediately stop work in the affected area in case of off-road driving/parking incidents. • Rehabilitate disturbed habitat within 7 days. • Conduct mandatory refresher training for drivers within 48 hours. • Remove repeat offenders from driving duties. • During construction implement speed restrictions (≤20 km/h) and install warning signage within 7 days if wildlife–vehicle collision rate exceeds 5incidents/km/month. • Identify collision hotspots and install permanent mitigations (culverts, crossings) within 3 months. • Ensure that if migration corridors are obstructed, the Biodiversity Specialist proposes remedial measures within 14 days. • Implement remedial measures by the EPC Contractor within 3 months. • Record all wildlife collision incidents, where necessary, additional measures such as additional signage or fencing adjustments will be made. • Document all incidents, actions taken, and outcomes in the Environmental and Social Management System (ESMS). • Verify effectiveness of corrective actions through follow-up monitoring.

Natural Critical	• Loss or degradation of Habitats and Flora • Reduction of area of fauna and flora habitat available	• Natural habitats within the project area	**Avoidance** • Micro-site project facilities to avoid sensitive receptors; project footprint minimised. **Minimisation** • Ground disturbance limited to approved construction footprint. • Pre-clearance surveys for flora and fauna conducted by a qualified biodiversity specialist, not earlier than 7 days prior to clearing. Surveys include breeding sites, underground burrows, tree nests, and micro-habitats under rocks, logs, and bark. • Cutting of grasslands avoided during flowering/fruiting of sensitive plant species. • Topsoil stripped and stored separately from subsoil. Topsoil storage includes measures to maintain fertility and prevent invasive species colonisation if storage > 3 months. **Restoration** • Topsoil returned to its original habitat location immediately after excavation or at latest within the same construction season. • Revegetation implemented during the next spring season using only native, non-invasive species. • Tree cutting recorded; 5 replacement trees planted per felled tree under a signed Ministry of Forestry protocol. More details are presented in BAP	• EPC Contractor • Biodiversity Specialist • SPV	• Pre-clearance survey records • Number of trees felled and planted • Area of habitat restored (ha) • Topsoil storage records	• Pre-clearence before consturction works; • Continuous during construction; • Restoration monitoring annually for 5 years	• All construction footprints • Borrow areas • Storage areas	• No disturbance to biodiversity outside the approved operational footprint • Record of the restoration vegetation planting. • All temporarily disturbed habitats will be restored to their pre-construction state within five years following the completion of the restoration works • No IAS invasion on soil stockpiles	• Site walkover inspection records • Construction site layout plan • Post-reinstatement inspection records • Pre-clearance check-lists • Topsoil storage records	• Stop work and reinstate unauthorized disturbance using stored topsoil; verify by Biodiversity Specialist. • Conduct immediate pre-clearance survey if missed before clearing. • Replace or remediate mismanaged topsoil; apply protection to prevent fertility loss/invasive species. • Accelerate habitat restoration using native species; monitor until KPI met. • Information regardingthe plantation is within the BAP • Remove invasive species promptly; implement prevention and monthly monitoring. • Suspend vehicle access and retrain drivers; install signage/barriers if off-road driving occurs.
Natural Critical Modified Fauna species	• Noise and Vibration Disturbance	• Project construction footprint	**Minimisation** • Where possible, high-impact noise (e.g., blasting) will be limited to daylight hours. • Pre-construction biodiversity monitoring will be conducted, • Unnecessary revving of engines will be avoided and switched off equipment when not in use. • During the night work activities high impact noise and vibration activities will be avoided.	• EPC Contractor • Biodiversity Specialist	• Noise monitoring results • Training coverage (%)	• Monthly during construction and prior to blasting	• Construction areas near sensitive fauna habitats	• Records of monitoring schedule and result of environmental noise • Training attendance sheets and transcript of the presentation	• Site walkover inspection records; complaint records	• If noise exceeds thresholds, investigate within 48 hours and implement additional mitigation measures (e.g., noise barriers, equipment adjustments) within 7 days. Verify through follow-up monitoring. • If training attendance coverage falls below 90%, conduct make-up sessions within 2 weeks and track attendance until target is met. • All incidents and corrective actions must be recorded in the Environmental and Social Management System and verified through follow-up inspections.

Natural Critical Modified Fauna Species	• Light disturbance	• Construction sites and camp areas (Table IX.6)	**Minimisation** • Lighting for construction and security purposes will be inward and downward facing to minimise light pollution in remote areas, and to minimize the disturbance to nocturnal wildlife, birds and invertebrates. • Artificial light will be limited to areas where it is essential. • Fewer lights will be preferable to more lights and lighting design will be prevented from affecting the sky as much as possible. • LEDs will be preferred than HPS to lighting • During the night work activities high impact noise and vibration activities will be avoided.	• EPC Contractor • Biodiversity Specialist	• Number of wildlife incidents linked to light • Compliance with lighting design	• Monthly during, construction and operation	• Worksites, security lighting zones	• Records of incidents with wildlife due to light pollution	• Incident reports; lighting design records	• If wildlife incidents occur due to lighting, immediately adjust lighting (direction, intensity, shielding) and document actions. • If lighting does not comply with design specifications, correct installation within 7 days and verify compliance through inspection. • Review lighting layout if repeated incidents occur and implement additional measures (e.g., motion sensors, timers) within 14 days. • All incidents and corrective actions must be recorded in the Environmental and Social Management System and verified during follow-up inspections.
Natural Critical Modified Flora Species	• Increase in dust	• Access roads • Construction areas	**Avoidance** • Induction training will be used to raise awareness of staff operating motor vehicles that includes instruction on the need to comply with speed limits to respect all forms of wildlife. Speed limits will be reduced. Note that speed limit is 20 km/s. • On-site personnels will be informed about important habitat and species. **Minimisation** • Dust emission will be minimised by performing irrigation on access roads.	• EPC Contractor • Biodiversity Specialist	• Number of complaints • Visual dust levels • Irrigation frequency	• Weekly during construction	• Access roads, sensitive habitats • Adjacent settlements	• Site walkover inspection records • Records of complaint of stakeholders	• Pre-clearance checklists; walkover inspection records	• If dust complaints are received, immediately increase frequency of road irrigation and implement temporary dust suppression measures (e.g., water spraying, covering stockpiles) within 24–48 hours. • If visual dust levels exceed acceptable thresholds, adjust speed limits and enforce vehicle driving rules immediately; document corrective action. • If staff fail to comply with dust minimisation procedures, provide refresher induction/training within 7 days. • All incidents, actions, and follow-up verification must be recorded in the Environmental and Social Management System and confirmed during site inspections.
Natural Critical Modified	• Invasive-alien distribution risk:	• All project sites	**Avoidance** • Construction machines and equipment will be washed by pressure wash before the entrance of the construction sites. • Wheels of the construction machines will be checked regularly. • Parking areas and camp sites will be kept clean against spreading of invasive species. **Minimisation** • There will be regular inventories of invasive species within the AoI, if any are identified, eradication measures will be developed and implemented.	• EPC Contractor • Biodiversity Specialist	• Number of IAS identified • implementation of cleaning records	• Pre-entry and quarterly inspections	• Site entry points • Storage areas • Camp sites	• No IAS infestation recorded	• Pre-clearance check-lists • Site walkover inspection records • Construction site layout plan • Post-reinstatement inspection records	• If IAS are detected on site, implement immediate containment and eradication measures within 7 days and report to Biodiversity Specialist. • If machinery or equipment is found not to have been cleaned, halt its operation until proper cleaning is completed; document the incident. • If IAS are spreading despite preventive measures, review and update cleaning and site hygiene procedures within 14 days. • All IAS-related incidents, mitigation measures, and follow-up verification must be recorded in the Environmental and Social Management System (ESMS) and confirmed during follow-up inspections.

Natural Critical Modified Fauna species Flora species	• Accidental loss of fauna • Disturbance to fauna • Killing/injuring fauna • Displacement of fauna • Accidental loss of flora	• Construction footprint	**Avoidance** • Herbicide and fire will not be permitted as a means to clear vegetation to ensure a minimal impact footprint during habitat clearance and to reduce the risk of mortality and injury to wildlife. • Construction sites will be surveyed before and during construction period. • Pre-blasting biodiversity monitoring for burrowing and nesting species will be conducted, and the nests will be marked with fences and signboards (if found any) • If there are any active nests on construction site, a biodiversity specialist in consultation with an ornitologist will decide if it is safe to proceed with the works as planned, OR if the works close to the nest area will be postponed until the offspring fledges, OR if the nest will be relocated • Tree cutting activities will not be carried out as much as possible during the bird breeding season, otherwise it will be carried out under the supervision of an ornithologist. • Regular trainings will be held in order to raise awareness associated with the natural assets & importance of the site and protection of the natural structure including legislative framework, related conventions and their requirements as in line with the Environmental & Social Management System. **Minimisation** • Removal of topsoil and vegetation will be implemented to ensure no individuals are killed or no galleries are destructed, and populations of the species continue to survive in the area. • Environmental incidents will be recorded to monitor the need for additional preventative measures to be implemented alongside the current animal exclusion methods. • A ban on hunting and fishing by construction and operation staff • Induction training will be used to raise awareness of staff operating motor vehicles that includes instruction on the need to comply with speed limits to respect all forms of wildlife. • Speed limits will be reduced. Note that speed limit for vehicles during construction is 20 km/h	• EPC Contractor • Biodiversity Specialist	• Translocation records • Number of nests affected • Number of fauna incidents	• Pre-clearance before works; • Continuous during construction	• Entire project footprint; • Access roads	• No nest/offspring lost; no fauna killed during clearance; • Vehicle speed compliance	• Walkover survey reports • Training records • Incident logs	• If fauna is injured, killed, or nests/offspring affected, halt works immediately and notify Biodiversity Specialist; implement rescue, relocation, or mitigation measures within 24–48 hours and document the action. • If staff fail to comply with speed limits or wildlife protection procedures, issue retraining and enforce compliance immediately; repeat offenders removed from operation duties. • If tree cutting occurs during breeding season without supervision, halt works and consult ornithologist; remedial measures implemented within 7 days. • Record all incidents, corrective actions, and follow-up verification in the Environmental and Social Management System; verify effectiveness through continuous monitoring and walkovers.

Natural Critical Modified	• Environmental pollution risk	• Construction and camp sites • Waste storage • Aquatic habitats	**Avoidance** • Organic waste will be managed in a way to prevent wildlife access to it. • **Minimisation** • Waste storage outside of the landfill will be situated in bins with lids secured. • Waste oils and/or hazardous substances and domestic waste outside landfill/waste-storage facility will be kept in temporary hazardous waste areas. Preventing wildlife access to it. • Proper waste disposal will be provided avoiding natural habitats. • Prevent will be ensured wastewater discharge into aquatic habitats, especially in breeding seasons. • Accidental release of pollutants and potentially contaminated sediments will be controlled.	• EPC Contractor • Biodiversity Specialist	• Waste storage condition • Number of pollution incidents • Wastewater discharge records	• Daily during, pre-construction, construction and operation	• Waste storage areas • Work camps • Aquatic habitats	• Number of non-compliance related to waste and pollution incidents <5	• Walkover inspection records; waste storage logs; incident reports	• If waste is found unsecured, immediately secure bins and review staff procedures within 24 hours; document action. • If a pollution incident occurs (e.g., wastewater discharge, chemical spill), stop the source immediately, contain and remediate within 48 hours, and notify the Biodiversity Specialist. • If improper waste disposal is observed, retrain responsible personnel within 7 days and monitor compliance until resolved. • All incidents, remedial actions, and follow-up verification must be recorded in the Environmental and Social Management System (ESMS) and confirmed through inspections.
Natural Critical (Special importance for S5 - Maquis, Arboreal Matorral, and Thermo-mediterranean Scrub due to determined as Critical Habitat)	• Habitat loss/degradation resulting from clearing and permanent removal of the vegetation in the process of construction of the motorway as well as clearing vegetation to secure access to locations. • Motorway construction will affect the edge of the maquis near Serik district which are determined as Critical Habitats. Therefore possible impacts on these particular habitats will be mitigated and no net loss will apply.	• Edges of maquis near Serik district • Critical Habitat areas identified in the EAAA	• Map critical maquis areas before construction. • Restrict construction during flowering, breeding, and hibernation periods. • In sensitive areas, minimise noise during excavation and construction works (demolition, earth moving, vehicle disturbance) from October to June. • Limit unnecessary land use. • Prefer existing access roads and facilities during design and construction. • Reuse stored topsoil and rocks for restoration. • Reintroduce native vegetation.	• EPC Contractor • Biodiversity Specialist • Local Communities	• Area of Critical Habitat mapped • Compliance with construction timing restrictions • Noise levels near sensitive habitats • Use of existing access roads vs. new roads • Area of topsoil/rocks reused for restoration • Area re-vegetated with native species	• Pre-construction • Routine site inspections during construction • After restoration, (annually for 5 years) • Flowering period for S5 Habitat (March - June) • Breeding period for S5 Habitat (April - June)	• Construction footprint • Critical maquis edges • Restoration sites	• No unplanned clearing in Critical Habitat • Noise within acceptable limits • 100% reuse of stored topsoil and rocks • Restoration success ≥90% native vegetation cover	• Site walkover reports • Construction logs • Noise monitoring records • Restoration monitoring reports	• If unplanned clearing occurs, halt works immediately and rehabilitate within 14 days; notify Biodiversity Specialist. • If construction occurs during flowering/breeding/hibernation periods, suspend works in that area and implement mitigation within 7 days. • If noise exceeds thresholds, implement additional measures (e.g., barriers, machinery adjustments) within 48 hours. • If existing access roads are not used, document deviation and correct immediately. • If restoration is incomplete or vegetation survival <90%, implement supplementary planting and monitor until target achieved. • All incidents, corrective measures, and monitoring results must be recorded in ESMS and verified through follow-up inspections.

Pyrus serikensis Determined as Critical Habitat trigger species (IUCN Status - EN)	• Habitat loss • Soil disturbance • Plant destruction during construction	• Identified Critical Habitats	• Conduct pre-construction surveys to identify critical habitats. • Investigate areas to be affected prior to works (April–July) to locate Pyrus serikensis individuals. • Translocate detected trees to suitable habitat.* • Contracting a third party expert in regards to translocation • Remove and store topsoil with seeds for reuse. • Rehabilitate disturbed areas using local plant species.	• EPC Contractor • Biodiversity Specialist • SPV	• Number of trees surveyed and mapped • Number of trees translocated • Area of topsoil and seeds preserved • Area of successful rehabilitation	• Pre-construction surveys • During construction (annually) • Post-rehabilitation (annually for 5 years)	• Identified critical habitats • Construction sites impacting *Pyrus serikensis*	• 100% of trees identified and protected • All trees requiring translocation successfully moved • All stored topsoil and seeds reused • ≥90% survival of rehabilitated plants	• Pre-construction survey reports • Translocation records • Site walkover and restoration monitoring reports	• Before corrective actions, as per the results of the pre-construction surveys, if any *Pyrus serikensis* trees are found in addition to the baseline studies, the biodiversity specialist will initiate the translocation procedures. • If any other *Pyrus serikensis* trees are found during construction besides the ones from baseline or pre-construction surveys, halt works in the area immediately, contact the Biodiversity Specialist and initiate the translocation procedures. (*Translocation procedure will be prepared as a separate document by the third-party consultant)* • If topsoil or seeds are lost or not stored properly, implement corrective collection and storage within 48 hours. • If rehabilitation survival rate falls below 90%, conduct supplementary planting and monitor until target achieved. • All surveys, translocations, and rehabilitation actions must be recorded in ESMS and verified through follow-up inspections.
Endemic Plants Local endemic plant species in the AoI *Eryngium kotschyi* *Phlomis leucophracta* *Phlomis lycia* *Phlomis monocephala* *Phlomis nissolii* *Sideritis congesta*	• Habitat loss • Soil disturbance • Plant destruction during construction	• At the flora sampling point 11 (X: 344079,Y: 4087799) for *Sideritis congesta*, • sampling point 11 (X: 344079,Y: 4087799) and 25 (X: 394464,Y: 4055587) for *Phlomis leucophracta*, • sampling point 25 (X: 394464,Y: 4055587for *Phlomis lycia*, • sampling point 28 (X: 335259,Y: 4093731) for *Phlomis nissolii*	• Conduct pre-construction surveys to identify species presence habitats • Investigate areas to be affected prior to construction (April–July) to locate endemic plants • Remove and store topsoil with seeds for reuse • Restore topsoil post-construction. • Rehabilitate disturbed areas using local plant species • Monitor restoration success for a minimum of 3 years	• EPC Contractor • Biodiversity Specialist • SPV	• Area of topsoil and seeds stored • Area of restoration • Restoration success rate (%)	• Pre-construction surveys • During construction • Post-construction monitoring for 3 years	• Identified species habitats • Construction sites impacting endemic plants • Restoration areas	• 100% of plants identified and protected • All stored topsoil and seeds reused • ≥90% survival of rehabilitated plants over 3 years	• Pre-construction survey reports • Site walkover records • Restoration monitoring reports • ESMS logs	• Before corrective action, as per the results of the pre-construction surveys, if any endemic plants are found in addition to the baseline studies, the biodiversity specialist will initiate translocation procedures and/or mitigation measures. • If any other endemic plants are found during construction besides the ones from baseline or pre-construction surveys, halt works in the area immediately, contact the Biodiversity Specialist and initiate the translocation or protection procedures. • If topsoil or seeds are lost or not stored properly, implement corrective collection and storage within 48 hours. • If restoration survival is <90%, implement supplementary planting and monitor until target is achieved. • All surveys, restoration, and corrective actions must be recorded in ESMS and verified through follow-up inspections.

Lyciasalamandra atifi	• Habitat loss • Noise • Dust	• Suitable habitats in T3 Coniferous forests above 200 m elevation • Road sides near T3 Coniferous forests	• Conduct pre-construction habitat surveys to locate active populations • Identification and mapping of areas occupied by species prior to the commencement of clearance • The sectors overlapping the suitable habitats (T3 Coniferous forests) of above 200 m elevation will be searched by Biodiversity Specialists immediately prior to start of works. • The translocation of specimens identified in work zone into favourable habitat areas identified adjacent to the works. Checks to be conducted by Biodiversity Specialists ahead of the excavation. • Implement dust and noise controls • Create wildlife corridors in fragmented areas (T3 Coniferous Forests)	• EPC Contractor • Biodiversity Specialist	• Number of active populations mapped • Number of specimens translocated (if found near AoI) • Dust and noise levels near habitats • Presence/continuity of wildlife corridors	• Pre-construction surveys • During construction • Post-construction monitoring	• T3 Coniferous forests above 200 m • Work zones • Wildlife corridor areas	• Survival of all translocated individuals • Number of non-conformaties related to dust and noise < 5 • Wildlife corridors maintained by culverts	• Survey and mapping reports • Translocation records • Dust and noise monitoring reports • Site inspection reports	• Before corrective action, as per the results of the pre-construction surveys, if any *Lyciasalamandra atifi* individuals are found in in the project footprint, the biodiversity specialist will initiate translocation procedures. • If populations are detected during works, halt activity in affected area immediately; conduct translocation within 7 days and document. • If dust or noise exceed thresholds, implement additional mitigation (e.g., water spraying, noise barriers) within 48 hours. • If wildlife corridors are blocked or fragmented, restore connectivity within 14 days. • All incidents, mitigation measures, and follow-up verification must be recorded in ESMS and verified through inspections.
Reptiles Especially considering the Turtle (*Testudo graeca*)	• Habitat loss • Noise • Dust • Disturbance during hibernation	• Project footprint	• Conduct pre-construction habitat surveys to locate active populations (including old run-down places/ buildings, crevices) • The working areas will be carefully searched by the Biodiversity Specialists prior to the commencement of the work; any individuals found will be carefully transported outside risk areas in habitats matching their ecological requirements; • Any individuals found on site will be relocated to favourable habitats • Implement dust and noise controls • Create wildlife corridors in fragmented areas	• EPC Contractor • Biodiversity Specialist	• Number of individuals located and translocated • Dust and noise levels • Continuity of wildlife corridors	• Pre-construction surveys • During construction (annually) • Post-construction monitoring (annually for 5 years)	• Construction areas • Wildlife corridor areas	• 100% of individuals identified and safely relocated • Number of non-conformities related to dust and noise < 5 • Wildlife corridors maintained by culverts	• Survey and relocation records • Dust and noise monitoring reports • Site inspection reports	• Before corrective action, as per the results of the pre-construction surveys, if any *Testudo graeca* individuals are found in in the project footprint, the biodiversity specialist will initiate translocation procedures • If *Testudo graeca* individuals are detected during works, halt activity in affected area immediately and relocate individuals within 24–48 hours; document all actions. • If construction occurs during hibernation, construction works in the affected area will be minimized until period ends. • If dust or noise exceed thresholds, implement immediate mitigation (e.g., barriers, water spraying) and verify effectiveness. • If wildlife corridors are blocked or fragmented, restore connectivity within 14 days. • All incidents, mitigation actions, and follow-up verification must be recorded in ESMS and confirmed during inspections.

Bats	• Habitat loss • Light and noise pollution • Roosting site disturbance	• Rocky areas, caves and flight corridors within the AoI, especially at the location of quarries (Km 56+500, Km 58+500, Km 104+750, Km 105+000, Km 106+000, Km 114+200, Km 117+000, Km 119+500, Km 134+000)	• Conduct pre-construction surveys to identify roosting and hibernation sites (including old run-down places/ buildings, crevices) • Any tree above 100mm in diameter to be checked by the Biodiversity Specialist for the potential of roosting bats prior to removal (i.e the presence of potential roosting features). If bats are found, the roost will be left undisturbed until vacated by bats. • All felled trees with evidence of roosting bats (i.e. with suitable cavities showing signs of occupation (droppings, feeding remains, grease markings), including those which could not be inspected by the Biodiversity Specialist will be left in situ (on the ground) for 24 hours to allow any bats to move • Use low-intensity, non-UV lighting • Restore disturbed habitats post-construction • Protect roosting structures	• EPC Contractor • Biodiversity Specialist	• Number of roosting/hibernation sites identified • Number of trees checked prior to felling • Number of roosting structures protected • Compliance with lighting and noise limits	• Pre-construction surveys • During construction (annually) • Post-construction monitoring (annually for 5 years)	• Roosting and hibernation sites • Trees with potential roosts • Disturbed habitat areas • Rocky areas, caves and flight corridors within the AoI, especially at the location of quarries	• 100% of roosting sites identified and protected • No disturbance to occupied roosts • Lighting and noise within thresholds • Disturbed habitats successfully restored • No mortality in individuals	• Survey and inspection reports • Tree check and roost monitoring records • Post-construction habitat restoration reports	• Before corrective action, as per the results of the pre-construction surveys, if any bat individuals are found, the biodiversity specialist will initiate translocation procedures. • If bats are discovered during tree removal or works,cut trees will be left undisturbed for 24 hours until individuals leave roost site • If felled trees with bats are moved prematurely, re-establish on site and monitor for 24 hours. • If construction occurs near roosts during hibernation, construction works will be minimized until period ends. • If lighting or noise exceed thresholds, implement immediate mitigation (e.g., barriers, reduced intensity) within 48 hours. • Record all incidents, mitigation actions, and follow-up verification in ESMS and verify during inspections.
Freshwater Fishes	• Habitat loss; • Water pollution	• River streams and aquatic habitats	• Conduct habitat surveys pre-construction to locate active populations • Avoid disruption of the riverbed • Implement dust and noise controls • Implement measures for surface water pollution	• EPC Contractor • Biodiversity Specialist	• Compliance with timing restrictions • Water quality parameters (turbidity, pollutants) • Number of riverbed disturbances	• Pre-construction surveys • During construction (annually) • Post-construction monitoring (annually for 3 years)	• Rivers and streams within AoI • Bridge/viaduct construction sites	• Water quality within acceptable limits • No riverbed disruption	• Survey reports • Construction logs • Water quality monitoring records • Site inspection reports	• If water quality is compromised, implement immediate mitigation (e.g., silt curtains, pollution containment) and monitor until restored. • If riverbed disturbance occurs, restore substrate and habitat within 7 days. • Record all incidents, mitigation actions, and verification in ESMS and confirm through follow-up inspections.

** EPC will contract with a third-party contractor for the translocation (translocation procedure will be prepared as a separate document by the third-party consultant). The translocation will be carried out after expert opinion is obtained, portability is assessed, and suitable areas is determined, again with the help of third-party expert opinion.*

The project component locations relevant to the Biodiversity Management Plan are detailed in accompanying tables. The figures showing the current design of viaducts, tunnels, bridges, culverts, underpasses, and overpasses combined with the habitat map that causes the least amount of fragmentation is provided in the ESIA Annex-11C. Maps for the location of the sensitive biodiversity is presented in ESIA Chapter IX – Ecology and Biodiversity section IX.5.5 Locations of Sensitive Biodiversity Flora-Fauna, Figures IX.27 to IX.31.

Table IX.3. Culverts to be Constructed for the Motorway

Culverts	Dimensions (m x m)	Location on the Route (Motorway Km)
Culvert	2.00 x 2.00	Km 52+731, Km 52+940, Km 53+180, Km 53+324, Km 53+458, Km 54+180, Km 56+361, Km 56+614, Km 58+201, Km 59+602, Km 59+713, Km 60+306, Km 60+456, Km 60+750, Km 60+899, Km 63+433, Km 65+010, Km 66+697, Km 2+225, Km 2+408, Km 2+717, Km 67+550, Km 67+901, Km 69+076, Km 69+389, Km 69+775, Km 69+869, Km 70+859, Km 71+605, Km 71+912, Km 72+711, Km 73+426, Km 73+920, Km 74+170, Km 75+098, Km 75+608, Km 75+832, Km 76+012, Km 76+167, Km 76+862, Km 77+086, Km 77+357, Km 77+630, Km 78+675, Km 79+826, Km 79+946, Km 82+095, Km 83+125, Km 83+527, Km 2+808, Km 3+659, Km 4+046, Km 4+265, Km 4+384, Km 6+274, Km 6+572, Km 6+650, Km 6+695, Km 6+755, Km 6+780, Km 6+870, Km 83+790, Km 84+751, Km 85+060, Km 86+893, Km 87+032, Km: 89+718, Km 89+899, Km 90+156, Km 90+950, Km 91+829, Km 92+863, Km 93+379, Km 94+005, Km 95+016, Km 95+258, Km 97+186, Km 99+222, Km 99+709, Km 100+396, Km: 100+632, Km 100+987, Km 1+854, Km 2+077, Km 2+279, Km 2+478, Km 2+821, Km 101+918, Km 102+139, Km 102+222, Km 103+600, Km 103+953, Km 105+792, Km 106+003, Km 107+317, Km 107+456, Km 108+915, Km 109+059, Km 109+948, Km 110+162, Km 110+405, Km 110+654, Km 111+327, Km 111+570, Km 111+856, Km 112+662, Km 114+550, Km 114+808, Km 115+690, Km 2+503, Km 2+393, Km 2+150, Km 1+884, Km 1+224, Km 0+937, Km 0+880, Km 116+950, Km 117+296, Km 0+068, Km 117+848, Km 118+447, Km: 118+774, Km 119+007, Km 119+091, Km 120+013, Km 121+239, Km 122+613, Km 123+683, Km 124+119, Km 124+247, Km 124+445, Km 125+452, Km 125+675, Km 126+700, Km 127+238, Km 128+375, Km 129+353, Km 129+593, Km 129+770, Km 129+944, Km 130+369, Km 130+508, Km 130+760, Km 131+046, Km 131+291, Km 131+450, Km 131+530, Km 131+877, Km 132+071, Km 132+174, Km 132+423, Km 132+534, Km 133+243, Km 133+395, Km 133+607, Km 134+419, Km 135+207, Km 135+438, Km 135+709, Km 135+906, Km 136+099, Km 136+490, Km 137+034, Km 138+586, Km 138+790, Km 139+348, Km 139+728, Km 140+250, Km 140+971, Manavgat K-2, Lane-1, Km 67+000 (Taşağıl K-1, Lane-2), (Taşağıl K-1, Lane-3), (Taşağıl K-1, Lane-4), Taşağıl State Highway, (Manavgat Access Road)*2, Manavgat K-3, Kol-2, Manavgat K-2, Lane-3, Manavgat K-2, Lane-2, Manavgat K-5, Lane-1, (Manavgat K-5, Lane-2)x2, Manavgat K-5, Lane-3, Manavgat K-5, Lane-7, (K1, Manavgat East K-1)
	2.50 x 2.50	Km 58+585, Km 3+432, Km 3+515, Km 68+538, Km 72+181, Km72+969, Km 75+757, Km 81+670, Km 84+525, Km 0+326, Km 91+515, Km 92+527, Km 100+331, Km 112+217, Km 112+418, Km 124+750, Km 133+678, Km 138+150, (Taşağıl K2, Lane-3)
	3.00 x 3.00	Km 67+296, Km 75+418, Km 112+934, Km 113+607, Km 123+058, Km 126+224
	4.00 x 4.00	Km 53+772, Km 64+152, Km 65+968, Km 66+057, Km 68+910, Km 82+425, Km 3+218, Km: 107+812, Km 0+635 Km 67+000(Taşağıl K-1, Lane-1), (Manavgat East K-2, Lane-2)x2
	5.00 x 5.00	Km 62+691, Km 62+983, Km 63+297, Km 74+930, Km 82+830, Km 90+387, Km 113+815, Km 117+458, Km 137+618, Km 140+609
	5.00 x 3.00	Km 3+152

Culverts	Dimensions (m x m)	Location on the Route (Motorway Km)
	7.00 x 5.00	Km 1+895, Km 109+171
	7.00 x 3.00	Km 2+884, Km 6+429, Km 7+672
	10.00 x 4.00	Km 4+620, Km 1+450
	10.00 x 5.00	Km 0+000
	15.00 x 6.00	Km 119+452

Table IX.4. Viaducts to be Constructed for the Motorway

Viaducts		Length (m)	Location on the Route (Motorway Km)		Associated Habitat Type
			Start Location	End Location	
Viaduct-1	Left	789.38	Km 55+456.830	Km 56+246.208	C2, S5, T14
	Right	799.27	Km 55+437.903	Km 56+237.175	
Viaduct-2	Left	548.39	Km 56+775.071	Km 57+323.460	C2, S5, T14, T3
	Right	511.00	Km 56+814.978	Km 57+325.979	
Viaduct-3		376.80	Km 71+132.710	Km 71+509.510	T14
Viaduct-4		416.00	Km 77+899.168	Km 78+315.169	S5, S6
Viaduct-5		596.30	Km 85+310.190	Km 85+906.486	C2, S6
Viaduct-6		382.24	Km 86+384.330	Km 86+766.574	S7.211, T14
Viaduct-7		243.61	Km 87+221.500	Km 87+465.106	S7.211, T14
Viaduct-8		460.85	Km 88+128.443	Km 88+589.296	C2, S6, S7.211, T14
Viaduct-9		167.00	Km 94+316.000	Km 94+483.000	S7.211,T14
Viaduct-10		416.00	Km 96+200.000	Km 96+616.000	-
Viaduct-11	Left	166.30	Km 96+851.550	Km 97+017.850	S5
	Right	198.40	Km 96+841.550	Km 97+979.000	
Viaduct-12		240.50	Km 97+738.500	Km 97+979.000	S5
Viaduct-13		480.00	Km 98+482.648	Km 98+962.648	S6
Viaduct-14		124.98	Km 104+100.000	Km 104+224.984	C2
Viaduct-15		330.00	Km 127+730.926	Km 128+060.926	T3
Viaduct-16		338.95	Km 134+420.858	Km 134+759.809	-

Table IX.5 Tunnels to be Constructed for the Motorway

Tunnels		Length (m)	Location on the Route (Motorway Km)		Associated Habitat Type
			Start Location	End Location	
T 1	Left	1049	Km 54+327.000	Km 55+376.000	S5
	Right	1065	Km 54+311.000	Km 55+376.000	
T 2	Left	532	Km 57+366.000	Km 57+898.000	S5, T3
	Right	597	Km 57+388.000	Km 57+985.000	
T 3	Left	1554	Km 60+923.000	Km 62+477.000	S5, S6, T3

	Right	1527	Km 60+950.000	Km 62+477.000	
T 4	Left	344	Km 70+131.000	Km 70+475.000	T3
	Right	344	Km 70+131.000	Km 70+475.000	
T 5	Left	865	Km 88+676.000	Km 89+544.000	S6, T14
	Right	873	Km 88+671.000	Km 89+544.000	

The table below lists the locations of borrow pits, quarries, and plants that are required for pre-construction surveys and related activities.

Table IX.6. Locations of the Borrow Pits/Quarries and Plants

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)	Capacity Information / Operation Period
Km 53+800	Antalya	Serik	Sarıabalı	Sarıabalı (AO-1) Borrow Pit	249,000	375 m³/hour
						36 months
Km 55+450	Antalya	Serik	Sarıabalı	Concrete Plant-1	13,946	140 m³/hour
						36 months
Km 56+500	Antalya	Manavgat	Çakış	Çakış (TOY4a) Quarry	250,000	375 m³/hour
						36 months
Km 58+500	Antalya	Manavgat	Taşağıl	Kuruçay (TOY4b) Quarry	243,000	375 m³/hour
						36 months
Km 59+400	Antalya	Manavgat	Taşağıl	Concrete Plant-2	66,450	140 m³/hour
						36 months
				Mechanical Plant-1		550 tonnes/hour
						16 months
				Asphalt Plant-1		240 tonnes/hour
						16 months
Km 64+400	Antalya	Manavgat	Taşağıl	Construction Camp Site-1 (Main)	-	
Km 80+400	Antalya	Manavgat	Yeniköy	Concrete Plant-3	15,000	140 m³/hour
						36 months
Km 83+000	Antalya	Manavgat	Sarılar	Dikmen Borrow Pit	245,000	375 m³/hour
						36 months
Km 87+500	Antalya	Manavgat	Bucakşeyhler	Construction Camp Site-2	-	
Km 87+700	Antalya	Manavgat	Bucakşeyhler	Concrete Plant-4	42,371	140 m³/hour
						36 months
				Mechanical Plant-2		550 tonnes/hour
						16 months
				Asphalt Plant-2		240 tonnes/hour
						16 months
Km 89+700	Antalya	Manavgat	Ulukapı	Concrete Plant-4a	11,665	140 m³/hour
						36 months
Km 99+200	Antalya	Manavgat	Sülek	Concrete Plant-5	11,977	140 m³/hour

Location	Province	District	Nearest Neighborhood	Description of the Site / Plant	Area (m²)	Capacity Information / Operation Period
						36 months
Km 104+750	Antalya	Manavgat	Gençler	Bademliyar (TO2) Quarry	179,000	375 m^3/hour
						36 months
Km 105+000	Antalya	Manavgat	Uzunlar	Çengel Stream Material Quarry	190,000	375 m^3/hour
						36 months
Km 106+000	Antalya	Manavgat	Uzunlar	Uzunlar (TOY5) Quarry	247,000	375 m^3/hour
						36 months
Km 114+200	Antalya	Manavgat	Karakaya	Karakaya Quarry	250,000	375 m^3/hour
						36 months
Km 117+000	Antalya	Alanya	Saburlar	Saburlar Quarry	250,000	375 m^3/hour
						36 months
Km 119+500	Antalya	Alanya	Karamanlar	Karamanlar Quarry	250,000	375 m^3/hour
						36 months
Km 124+300	Antalya	Alanya	İncekum	Construction Camp Site-3	-	
				Concrete Plant-6	85,000	140 m^3/hour
						36 months
				Mechanical Plant-3		550 tonnes/hour
						16 months
				Asphalt Plant-3		550 tonnes/hour
						16 months
Km 134+000	Antalya	Alanya	Soğukpınar	Soğukpınar Quarry	251,000	375 m^3/hour
						36 months

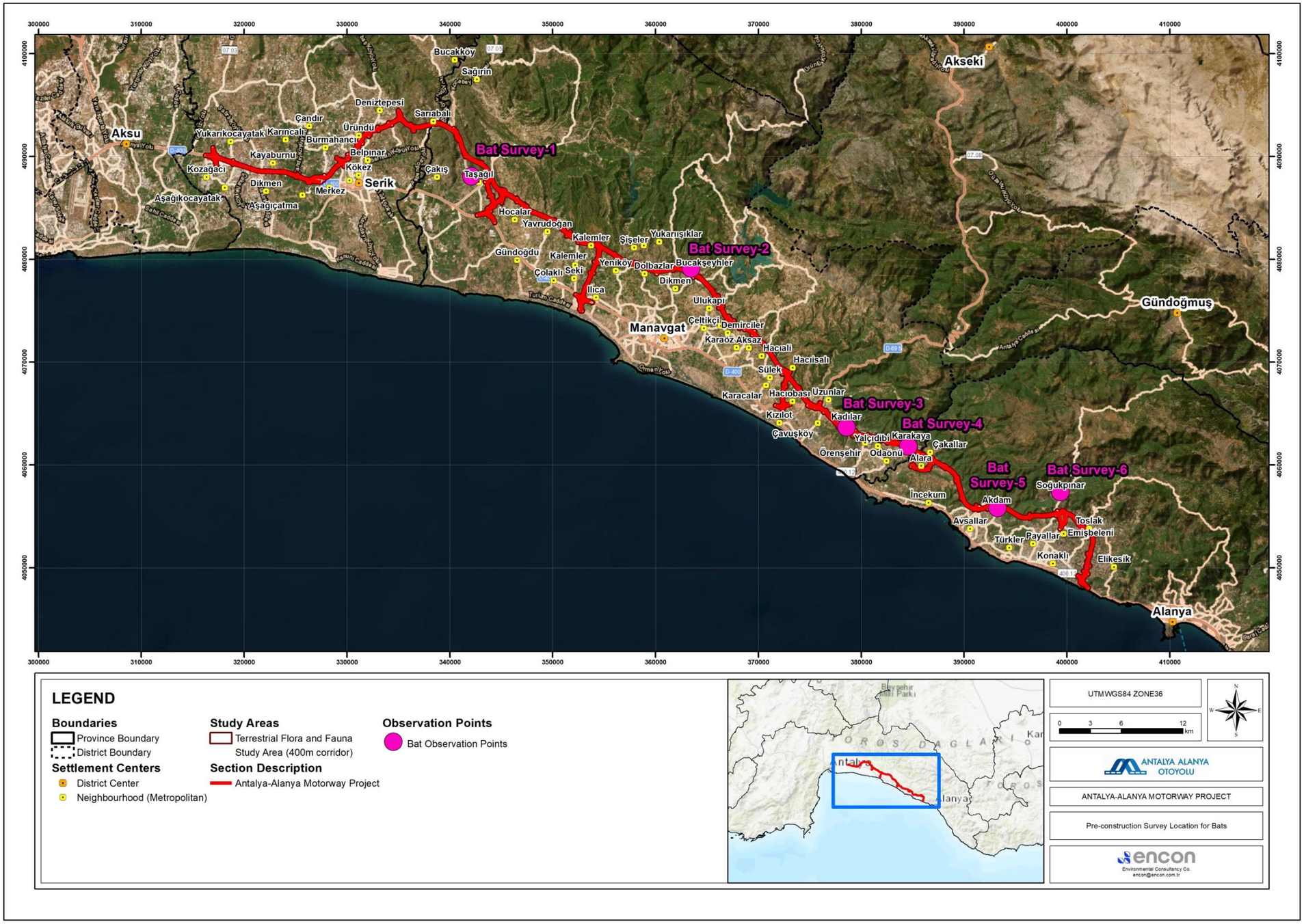

Figure IX.1 Pre-Construction Survey Locations for Bats

X. SUMMARY OF KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) will be monitored, verified, and evaluated.

Table X.1 Summary of Key Performance Indicators

Monitoring Parameter / Performance Indicator	Target	Monitoring Measure	Responsible Party
Number and length of access roads vs. approved design;	No unauthorized roads	Routine site inspections ; Walkover surveys;	EPC Contractor Biodiversity Specialist
Wildlife-vehicle collisions	<5 collisions/km/month	Collision record review	EPC Contractor Biodiversity Specialist
Pre-clearance survey records	100% pre-clearance	Pre-clearance checks; Continuous monitoring during works;	EPC Contractor, Biodiversity Specialist
Number of trees felled/planted	5:1 tree replacement	Annual restoration monitoring	SPV
Area of habitat restored	All disturbed habitats restored within 5 years	Annual restoration monitoring	SPV
Topsoil storage	No IAS in stockpiles	Continuous monitoring during works;	EPC Contractor, Biodiversity Specialist
Noise monitoring results	Number of non-conformaties related to noise < 5	Regular noise monitoring;	EPC Contractor, Biodiversity Specialist
Training coverage	≥90% staff trained	Training attendance tracking	EPC Contractor, Biodiversity Specialist
Wildlife incidents linked to lighting	Wildlife mortality from lighting < 5 monthly	Incident report reviews monthly	EPC Contractor, Biodiversity Specialist
Compliance with lighting design	100% compliance with design	Monthly inspections of light installations	EPC Contractor, Biodiversity Specialist
Dust levels;	Number of non-conformaties related to dust < 5;	Regular dust inspections;	EPC Contractor , Biodiversity Specialist
Complaints; Irrigation frequency	Zero unresolved complaints	Complaint log review	EPC Contractor , Biodiversity Specialist
IAS presence	No IAS infestations	Quarterly IAS inventories	EPC Contractor , Biodiversity Specialist
Cleaning of machinery	100% machinery cleaned	Pre-entry inspections	EPC Contractor , Biodiversity Specialist
Fauna incidents;	Zero fauna mortality during clearance	Pre-clearance fauna surveys; Continuous construction monitoring	EPC Contractor, Biodiversity Specialist
Nests affected;	No nest/offspring loss	Walkover survey reports	EPC Contractor, Biodiversity Specialist
Waste storage condition	Number of non-compliance related to waste < 5	Daily waste inspections	EPC Contractor, Biodiversity Specialist
Pollution incidents	Number of non-compliance related to pollution incidents < 5	Incident report checks	EPC Contractor, Biodiversity

			Specialist
Area of Critical Habitat mapped;	100% mapped	Pre-construction surveys;	EPC Contractor, Biodiversity Specialist
Restoration cover	≥90% restoration success	Annual restoration surveys	SPV
Pyrus serikensis surveys,	100% individuals identified	Pre-construction survey;	EPC Contractor , Biodiversity Specialist
Translocation, restoration	≥90% survival of restored plants	Annual restoration monitoring (5 years)	EPC Contractor , Biodiversity Specialist
Endemic plant records;	100% identified/protected;	Pre-construction surveys;	EPC Contractor , Biodiversity Specialist
Restoration success	≥90% restoration success	Annual restoration monitoring (3 years)	SPV
Lyciasalamandra translocations records	100% individual translocated (if identified)	Pre-construction surveys; Continuous construction monitoring	EPC Contractor, Biodiversity Specialist
Tortoise (*Testudo graeca*) translocation records	100% individuals relocated (if identified)	Pre-construction surveys; Continuous construction monitoring	EPC Contractor , Biodiversity Specialist
Bat roosts and hibernation sites; Lighting/noise compliance	100% roosts identified and protected; No disturbance to occupied roosts	Pre-construction surveys; Continuous construction monitoring (3 years)	EPC Contractor , Biodiversity Specialist
Water quality;; Timing of works	Number of non-compliance related to water quality; No spawning disruption;	Pre-construction habitat surveys; continuous construction monitoring (3 years)	EPC Contractor, Biodiversity Specialist
Riverbed disturbance	No bed disturbance	Continuous construction monitoring (3 years)	EPC Contractor , Biodiversity Specialist

XI. SUMMARY OF MONITORING

Table XI.1 Summary of Monitoring

Monitoring Parameter / Performance Indicator	Timing of Monitoring and Frequency	Monitoring Measure	Monitoring Location	Corrective Actions
• Number of off-road driving incidents • Number of wildlife vehicle collisions	• Weekly during construction phase • Quarterly during operation	Monthly road inspections; Walkover surveys; Collision record review	All temporary access road alignments Construction sites, staging areas, Sensitive habitat boundaries	• During construction implement speed restrictions (≤20 km/h) and install warning signage within 7 days if wildlife–vehicle collision rate exceeds 5 incidents/km/month. • Record all wildlife collision incidents, where necessary, additional measures such as additional signage or fencing adjustments will be made.
• Pre-clearance survey records • Topsoil storage records	• Pre-clearance before construction works; • Continuous during construction;	Pre-clearance checks; Continuous monitoring during works	All construction footprints Borrow areas Storage areas	• Conduct immediate pre-clearance survey if missed before clearing. • Replace or remediate mismanaged topsoil; apply protection to prevent fertility loss/invasive species.

• Noise monitoring results • Training coverage (%)	Monthly during construction and prior to blasting	Monthly noise monitoring; Training attendance tracking	Construction areas near sensitive fauna habitats	• If noise exceeds thresholds, investigate within 48 hours and implement additional mitigation measures (e.g., noise barriers, equipment adjustments) within 7 days. Verify through follow-up monitoring. • If training attendance coverage falls below 90%, conduct make-up sessions within 2 weeks and track attendance until target is met.
• Number of wildlife incidents linked to light • Compliance with lighting design	Monthly during, construction and operation	Monthly inspections of light installations; Incident report reviews	Worksites, security lighting zones	• If wildlife incidents occur due to lighting, immediately adjust lighting (direction, intensity, shielding) and document actions. • If lighting does not comply with design specifications, correct installation within 7 days and verify compliance through inspection.

• Number of complaints • Visual dust levels • Irrigation frequency	Weekly during construction	Weekly dust inspections; Complaint log review	Access roads, sensitive habitats Adjacent settlements	• If dust complaints are received, immediately increase frequency of road irrigation and implement temporary dust suppression measures (e.g., water spraying, covering stockpiles) within 24–48 hours. • If visual dust levels exceed acceptable thresholds, adjust speed limits and enforce vehicle driving rules immediately; document corrective action.
• Number of IAS identified • implementation of cleaning records	Pre-entry and quarterly inspections	Pre-entry inspections; Quarterly IAS inventories	Site entry points Sorage areas Camp sites	• If IAS are detected on site, implement immediate containment and eradication measures within 7 days and report to Biodiversity Specialist. • If machinery or equipment is found not to have been cleaned, halt its operation until proper cleaning is completed; document the incident.

• Translocation records • Number of nests affected • Number of fauna incidents	• Pre-clearance before works; Continuous during construction	Pre-clearance fauna surveys; Continuous construction monitoring	Entire project footprint; Access roads	• If fauna is injured, killed, or nests/offspring affected, halt works immediately and notify Biodiversity Specialist; implement rescue, relocation, or mitigation measures within 24–48 hours and document the action.
• Waste storage condition • Number of pollution incidents • Wastewater discharge records	Daily during, pre-construction, construction and operation	Daily waste inspections; Incident report checks	Waste storage areas Work camps Aquatic habitats	• If waste is found unsecured, immediately secure bins and review staff procedures within 24 hours; document action. • If a pollution incident occurs (e.g., wastewater discharge, chemical spill), stop the source immediately, contain and remediate within 48 hours, and notify the Biodiversity Specialist. • If improper waste disposal is observed, retrain responsible personnel within 7 days and monitor compliance until resolved.

• Area of Critical Habitat mapped • Noise levels near sensitive habitats • Use of existing access roads vs. new roads • Area of topsoil/rocks reused for restoration • Area re-vegetated with native species	• Pre-construction • Weekly during construction • After restoration, (annually for 5 years) • Flowering period for S5 Habitat (March - June) Breeding period for S5 Habitat (April - June)	Pre-construction surveys; Weekly site checks; Annual restoration surveys	Construction footprint Critical maquis edges Restoration sites	• If noise exceeds thresholds, implement additional measures (e.g., barriers, machinery adjustments) within 48 hours. • If existing access roads are not used, document deviation and correct immediately. • If restoration is incomplete or vegetation survival <90%, implement supplementary planting and monitor until target achieved.
• Number of trees surveyed and mapped • Number of trees translocated • Area of topsoil and seeds preserved • Area of successful rehabilitation	• Pre-construction surveys • During construction (annually) Post-rehabilitation (annually for 5 years)	Pre-construction survey; Annual restoration monitoring (5 years)	Identified critical habitats Construction sites impacting *Pyrus serikensis*	• If Pyrus serikensis trees are found during construction, halt works in the area immediately and translocate or protect trees within 7 days. • All surveys, translocations, and rehabilitation actions must be recorded in ESMS and verified through follow-up inspections.

• Number of plants surveyed and mapped • Area of topsoil and seeds stored • Area of restoration • Restoration success rate (%)	• Pre-construction surveys • During construction Post-construction monitoring for 3 years	Pre-construction surveys; Annual restoration monitoring (3 years)	Identified species habitats Construction sites impacting endemic plants Restoration areas	• If endemic plants are found during construction, halt works immediately and protect or translocate within 7 days. • If topsoil or seeds are lost or not stored properly, implement corrective collection and storage within 48 hours.
• Number of active populations mapped for *Lyciasalamandra atifi* • Number of specimens translocated (if found near AoI) • Dust and noise levels near habitats • Presence/continuity of wildlife corridors	• Pre-construction surveys • During construction Post-construction monitoring	Pre-construction surveys; Continuous construction monitoring	T3 Coniferous forests above 200 m Work zones Wildlife corridor areas	• If populations are detected during works, halt activity in affected area immediately; conduct translocation within 7 days and document. • If dust or noise exceed thresholds, implement additional mitigation (e.g., water spraying, noise barriers) within 48 hours.
• Number of individuals located and translocated for *Testudo graeca* • Dust and noise levels • Continuity of wildlife corridors	• Pre-construction surveys • During construction (annually) Post-construction monitoring (annually for 5 years)	Pre-construction surveys; Annual monitoring (5 years)	Construction areas Wildlife corridor areas	• If turtles are detected during works, halt activity in affected area immediately and relocate individuals within 24–48 hours; document all actions. • If dust or noise exceed thresholds, implement immediate mitigation (e.g., barriers, water spraying) and verify effectiveness.

• Number of roosting/hibernation sites identified • Number of trees checked prior to felling • Number of roosting structures protected • Compliance with lighting and noise limits	• Pre-construction surveys • During construction (annually) Post-construction monitoring (annually for 5 years)	Pre-construction surveys; Annual monitoring (5 years)	Roosting and hibernation sites Trees with potential roosts Disturbed habitat areas Rocky areas, caves and flight corridors within the AoI, especially at the location of quarries	• If bats are discovered during tree removal or works,cut trees will be left undisturbed for 24 hours untill individuals leave roost site • If construction occurs near roosts during hibernation, consturction works will be minimized until period ends.
• Compliance with timing restrictions • Water quality parameters (turbidity, pollutants) • Number of riverbed disturbances	• Pre-construction surveys • During construction (annually) Post-construction monitoring (annually for 3 years)	Pre-construction habitat surveys; Annual water monitoring (3 years)	Rivers and streams within AoI Bridge/viaduct construction sites	• If water quality is compromised, implement immediate mitigation (e.g., silt curtains, pollution containment) and monitor until restored.

XII. BAP OFFSETS

The 3 offsets are detailed in BAP under section I.24.

Offset 1 has been designed as a roadside plantation. The plantation will be established along 117.5 km of the motorway corridor, with a designated planting strip of approximately 1.5 meters on each side..

Offset 2 has been specifically developed to achieve a Net Gain for Critical Habitat (CH) by safeguarding populations of the endangered endemic species, *Pyrus serikensis*.

Offset 3 delivers afforestation in a 5:1 ratio. The Project Sponsor will pay the cost and the afforestation itself and management will be carried out by the Ministry of Forestry, as part of their protocol.

XIII. AUDIT AND REVIEW

The implementation of this Plan will be regularly monitored and reviewed in accordance with the ESMMP. All labor-related incidents and non-conformities willbe documented and reported as outlined in the Plan. Contractors and subcontractors will be subject to audits conducted by the Project Sponsor within the scope and schedule defined in the Contractor and Subcontractor Management Plan. These audits and the associated records will be managed in compliance with the Project's established human resources and labor-related procedures. Observations and deficiencies identified during audits will be recorded in formal audit reports, and all findings requiring improvement will be registered under Corrective Actions. Project management will review audit outcomes and corrective action records, follow up on progress, and ensure that additional measures are implemented where necessary to ensure full compliance with labor legislation and international standards.

XIV. REPORTING

Regular reporting will be conducted to ensure the effective implementation and continuous monitoring of biodiversity management activities throughout the construction phase of the Project. Reporting will be structured to address both internal monitoring and auditing outcomes, as well as external compliance obligations and stakeholder engagement requirements.

Based on monitoring results, necessary corrective and preventive actions will be identified and the required updates will be incorporated into this Plan. The training program will also be revised accordingly to address any observed gaps. Regular audits and visual inspections will be conducted to verify that all activities are being undertaken in accordance with the provisions of this Plan.
Reports will be prepared using data gathered through biodiversity monitoring activities defined under this Plan. The results and supporting evidence of these monitoring activities will be documented in detail within appropriate reporting formats.

All data, together with the results of inspections and audits, will be summarized in the dedicated Ecology and Biodiversity chapter of the Environmental and Social Monitoring Report prepared on a quarterly basis. This report will include any non-compliances identified, corrective actions taken, and any recommended time-bound corrective measures. These will be supported with documentary evidence such as photographs and field logs.

XV. TRAINING

The Project Company is responsible for ensuring that all Project personnel and sub-contractors are knowledgeable about the biodiversity values and conservation priorities. As part of this effort, the Project staff members are required to undergo training that covers various aspects of BMP implementation, site-specific measures, compliance with environmental plans, the Project standarts, and protocols based on their specific roles.

A general framework for a training on biodiversity will include the following elements:

- **Introduction to Biodiversity:** Construction workers need to have a basic understanding of biodiversity and its importance in construction projects. An overview of what biodiversity is and its importance for ecosystems and human well-being are provided in training materials.
- **Policies:** Training will cover legal requirements and policies related to biodiversity conservation specific to the location and project type.
- **Biodiversity Values and Conservation Priorities:** Presenting the distinct biodiversity attributes and conservation priorities within the Project area involves critical species, habitats, and ecological processes. Additionally, it will be considered general insights into habitats and species of significant conservation interest, along with relevant visual representations (Protected areas, forests, flora species, nests, raptors, migratory species etc).
- **Roles and Responsibilities:** Clarifying the roles and responsibilities and strong emphasis on adhering to this BMP and other environmental strategies.
- **Site-specific Measures:** Detailing the specific measures that need to be taken at the Project site to minimize impacts on biodiversity, such as habitat restoration, protected species management, and invasive species control. Methods to be followed in responding incidents related to biodiversity features (collision, electrocution, invasive management etc).
- **Environmental Plans, Standards, and Protocols:** Introducing participants to the environmental plans, project standards, and protocols related to biodiversity conservation, emphasizing their significance and the necessity of adherence
- **Case Studies and Best Practices:** Sharing case studies and best practices from similar Projects or industries to illustrate successful approaches to biodiversity conservation and to inspire participants.
- **Monitoring and Reporting:** Providing guidance on the monitoring and reporting requirements related to biodiversity, including data collection methods, record-keeping, and reporting protocols.
- **Q&A and Discussion:** Allowing participants to ask questions, seek clarifications, and engage in discussions to enhance their understanding of the training content.
- **Evaluation and Assessment:** Conducting evaluations or assessments to gauge participants' comprehension of the training material and identify areas for improvement.
- **Refresher Training:** Highlighting the importance of regular refresher training sessions to ensure ongoing awareness and compliance with biodiversity conservation measures. It's important to note that the specific content and structure of the training may vary depending on the Project's context, local regulations, and specific biodiversity considerations.

ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

CRITICAL HABITAT ASSESSMENT



AUGUST 2025

encon

REVISION HISTORY

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1	May 2025	First submission	O.K.	N.D.Y.	T.B.
2	September 2025	Second submission	B.A.	N.D.Y.	T.B.

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LIST OF ABBREVIATIONS

AFAD	Disaster and Emergency Management Presidency
AoI	Area of Influence
AZE	Alliance for Zero Extinction
CEKUL	Foundation for the Protection and Promotion of the Environment and Cultural Heritage
CIMER	Presidency's Communication Center
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DSI	General Directorate of State Hydraulic Works
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EFPIs	Equator Principles Financial Institutions
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Programme
ENCON	ENCON Environmental Consultancy Co.
ESF	Environmental and Social Framework
ESHS	Environmental, Social Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Monitoring Report
ESMS	Environmental and Social Management System
EU	European Union
EUAS	General Directorate of Electricity Generation Corporation
GBV	Gender-Based Violence
GHG	Green House Gas
GIIP	Good international Industry Practice
GIS	Geographical Information System
GP	Good Practices
GRM	Grievance Redress Mechanism
IAPCR	Industrial Air Pollution Control Regulation
IBA	Important Bird Area
IFC	International Finance Corporation
ILO	International Labor Organization
IPA	Important Plant Area
IPCC	Intergovernmental Panel on Climate Change
ISKUR	General Directorate of Turkish Employment Agency
IUCN	International Union for Conservation of Nature

KBA	Key Biodiversity Areas
KGM	General Directorate of Highways
LACRP	Land Acquisition, Compensation, and Resettlement Plan
LARPF	Land Acquisition and Resettlement Policy Framework
LRP	Livelihood Restoration Plan
MoAF	Ministry of Agriculture and Forestry
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoLSS	Ministry of Labor and Social Security
MTA	General Directorate of Mineral Research and Exploration
NGOs	Non-Governmental Organizations
O&M	Operations and Maintenance
OHS	Occupational Health and Safety
OP	Operational Policies
PAP	Project Affected Person
PIF	Project Introduction File
PIU	Project Implementation Unit
PM_{10}	Particulate matters with aerodynamic diameter smaller than 10µm
$PM_{2.5}$	Particles with aerodynamic diameter smaller than 2.5µm
PMU	Project Management Unit
PS	Performance Standard
RP	Resettlement Plan
RAP	Resettlement Action Plan
SAoI	Social Area of Influence
SCM	Stakeholder Consultation Meeting
SEA/SH	Sexual Exploitation and Abuse / Sexual Harassment
SEP	Stakeholder Engagement Plan
SEPA	Special Environmental Protection Areas
TEIAS	General Directorate of Electricity Transmission Company
The Project	Antalya-Alanya Motorway Project
TURKSTAT	Turkish Statistical Institute, TUİK
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
US EPA	United States Environmental Protection Agency
WB	World Bank
WBG	World Bank Group

EXECUTIVE SUMMARY

This Critical Habitat Assessment (CHA) has been prepared in accordance with the requirements of the IFC Performance Standard 6 (IFC PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources. The purpose of this assessment is to evaluate the potential presence of critical habitats within the area of influence of the proposed motorway project, and to determine the associated risks and mitigation obligations in line with international best practices. The assessment identifies and characterizes biodiversity features of concern—such as threatened species, endemic species, and ecologically significant habitats—and evaluates whether the project area meets the criteria for critical habitat designation under PS6. The findings aim to inform project planning and decision-making to ensure that the development proceeds in a manner that avoids or minimizes adverse impacts on biodiversity and ecosystem services, while enabling compliance with international environmental safeguards.

The project area encompasses a variety of ecologically sensitive habitats, including rocky cliffs, Mediterranean scrublands (maquis), wetlands, and agricultural lands, which support a high diversity of flora and fauna, including several endemic, migratory, and threatened species. Of particular significance is the maquis habitat, which has been assessed as critical habitat under IFC PS6 criteria due to its ecological importance and the presence of regionally endemic species such as *Pyrus serikensis* and *Lyciasalamandra atifi*. The CHA aims to inform project planning and mitigation strategies by identifying biodiversity features of conservation concern and evaluating the project's potential impacts on these critical ecosystems.

I. INTRODUCTION

I.1. Purpose of the CHA

The Antalya-Alanya Motorway Project (hereinafter “the Project”) is planned to be financed through a Project Finance structure involving multiple international lenders. In recognition of this, the Project aims to comply with relevant international environmental and social standards, including the International Finance Corporation (IFC) Performance Standard 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources.

The purpose of this Critical Habitat Assessment Report is to evaluate the presence and extent of Critical Habitat and other High Conservation Value Biodiversity Features that may be impacted by the Project. These areas and features represent key biodiversity values of global or national significance.

Under IFC PS6, the Project is required to avoid adverse impacts on Critical Habitat and, where avoidance is not feasible, to apply the mitigation hierarchy to minimize, restore, and offset impacts. The standard emphasizes the achievement of no net loss or, preferably, a net gain of biodiversity values associated with Critical Habitat, ensuring the long-term conservation of these ecologically important areas.

This report provides the basis for identifying biodiversity risks, guiding mitigation measures, and supporting compliance with IFC PS6 throughout project planning and implementation.

I.2. Project Description

Antalya-Alanya Motorway Project (the Project) is one of the two sub-projects that constitute the Afyonkarahisar-Alanya Motorway Project and is designed to connect Serik and Alanya districts through Manavgat district of Antalya province (Figure I.1). The Project will enhance the existing transportation network services with surrounding provinces (Burdur, Muğla, Konya, Isparta, Karaman and Mersin). Various environmental, social, and technical studies have been conducted along the initial route of the Project tendered by the KGM.

According to the current design (as of July, 2024), total length of the Motorway, which will be a dual carriageway of mostly 3 and partially 2 lanes (3x2 and 2x2) in each direction, is 117.8 kilometers including the main carriageway and the access roads.

Table I.1 provides the approximate distances of the Motorway according to the current design.

Table I.1. Information of the Motorway

Start Location	End Location	Main Road (Motorway)	Access Roads	Total
Km 52+000	Km 136+000	84+000	33+800	117+800

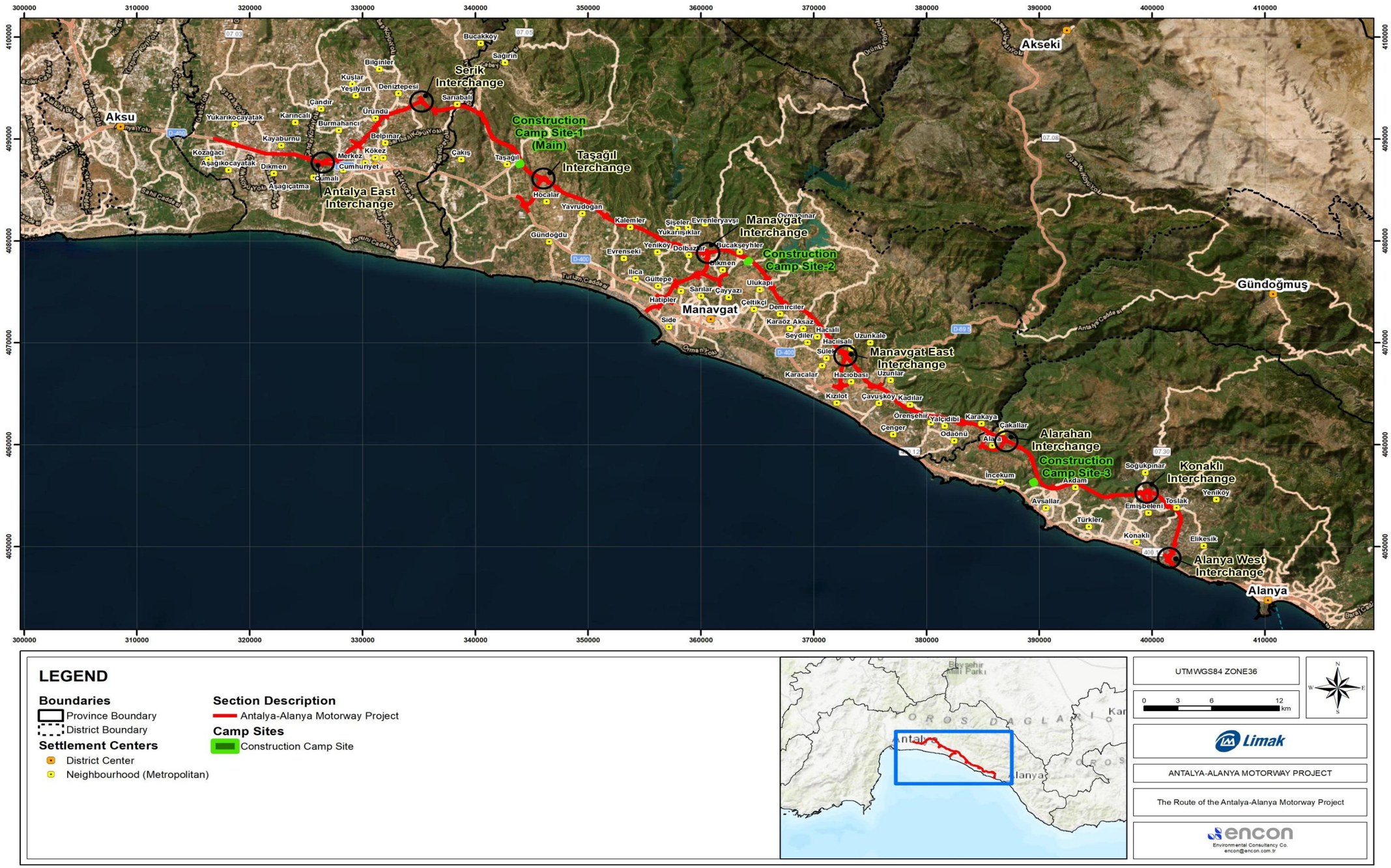

Figure I.1. The Route of the Antalya-Alanya Motorway Project

II. METHODOLOGY

The Critical Habitat Assessment (CHA) was conducted in accordance with the International Finance Corporation (IFC) Performance Standard 6 (PS6) and Guidance Note 6 (2019), focusing on biodiversity conservation and the sustainable management of living natural resources.

An Ecologically Appropriate Area of Analysis (EAAA) was defined to evaluate biodiversity features within a spatial context relevant to the ecological needs of species and ecosystems potentially affected by the project. This included consideration of the project's area of influence and broader landscape processes.

The methodology included the following steps:

- ***Screening and Scoping***

  Identification of biodiversity features of concern was conducted based on a review of international, national, and regional data sources.

- ***Data Collection***

  Both secondary data from international and national databases and targeted field surveys were used, supported by expert consultation, to confirm species presence, ecosystem types, and habitat conditions. No IBAT report was generated for this Project, as the data collection and assessments methodology already incorporates World Database on Protected Areas, IUCN Red List of Threatened Species, World Database of Key Biodiversity Areas along with other international and national databases (e.g. public biodiversity databases such as eBird, Trakus, Bizimbitkiler, iNaturalist etc.).

- ***Application of PS6 Criteria***

  Biodiversity features against the five PS6 critical habitat criteria were evaluated, using quantitative thresholds from IFC GN6 and the IUCN KBA Standard as guidance.

- ***Determination of Critical Habitat***

  Species populations, habitat quality, and ecological viability within the EAAA to confirm critical habitat presence were assessed.

II.1. Selection Criteria for Notable Habitats and Species

Based on the findings from the ecological assessment and baseline monitoring studies conducted as part of the Project, as well as the targeted analyses carried out under this Critical Habitat Assessment, key habitats and species of high conservation value have been identified within the defined Ecologically Appropriate Area of Analysis (EAAA).

The primary objective of this assessment is to identify species and ecosystems that meet one or more of the IFC Performance Standard 6 (PS6) critical habitat criteria, and to determine whether these features trigger critical habitat designation. In ESIA report detail the national and international frameworks used to evaluate the conservation status and vulnerability of biodiversity features, including the IUCN Red List, Key Biodiversity Areas (KBA), and relevant national conservation lists.

All biodiversity assessments were conducted in accordance with these recognized criteria, ensuring a robust and standardized approach to identifying biodiversity values that may be at risk from project activities. Special attention was given to those species and habitats that require targeted

management, due to their restricted distribution, threatened status, or functional importance in maintaining ecological processes.

II.2. Critical Habitat Assessment Process

Critical habitats are areas with high biological diversity value. Their identification is based on the following key criteria:

i. Habitats supporting Critically Endangered and/or Endangered species.
ii. Habitats of significance for endemic and/or range-restricted species.
iii. Habitats that support globally important populations of migratory species and/or are crucial for migratory corridors.
iv. Highly threatened and/or unique ecosystems.
v. Areas associated with key evolutionary processes.

These criteria are essential for determining critical habitats and ensuring their protection and conservation within the scope of ecosystem assessments and environmental management planning.

Projects located in areas with high biological diversity value, recognized at the national and/or international level, may require a critical habitat assessment. These areas include:

- IUCN Protected Area Categories: Ia (Strict Nature Reserves), Ib (Wilderness Areas), and II (National Parks).
- Key Biodiversity Areas (KBA) and Important Bird and Biodiversity Areas (IBA).

A critical habitat assessment is essential for ensuring that project activities do not negatively impact these ecologically significant areas, and that conservation measures are integrated into project planning and implementation.

To facilitate decision-making, numerical thresholds have been defined for the first four critical habitat criteria:

- Critically Endangered (CR) / Endangered (EN) species, endemic or range-restricted species.
- Migratory species or species forming large aggregations.
- Threatened ecosystems.
- Unique ecosystems.

These quantitative thresholds help assess whether an area qualifies as a critical habitat and guide the appropriate conservation measures needed to mitigate potential impacts from project activities.

The threshold values are derived from the globally standardized numerical thresholds published in the IUCN Global Standard for Key Biodiversity Area Identification. These thresholds serve as indicators and are intended only as guidance for decision-making. There is no universally accepted or automatic formula for critical habitat identification.

The involvement of external experts and project-specific assessments are crucial, especially in cases where data availability is limited, which is often the case in biodiversity evaluations.

The thresholds defined for each criterion are outlined below, based on IFC, 2019 GN6. The critical habitat assessment for species identified within the Project Area has been conducted in accordance with these criteria.

Table II.1. Quantitave thresholds for triggering Critical Habitat for Criteria 1-4

Criteria	Quantitative Thresholds
1. CR / EN Species	(a) Areas that support globally important concentrations of an IUCN Red-Listed EN or CR species (≥ 0.5% of the global population and ≥ 5 reproductive units of a CR or EN species. (b) Areas that support globally important concentrations of an IUCN Red-Listed VU species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a). (c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.
2. Endemic / Restricted Range Species	(a) Areas that regularly hold ≥10% of the global population size and ≥10 reproductive units of a species
3. Migratory / Congregatory Species	(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle. (b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress
4. Highly Threatened / Unique Ecosystems	(a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. (b) Other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.

Criterion 1: Critically Endangered and Endangered Species

a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population and ≥ 5% of reproductive units of a CR or EN species).
b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds.
c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.

Criterion 2: Endemic and Restricted-range Species

a) Areas that regularly hold ≥10% of the global population size and ≥10% of reproductive units of a species.

Criterion 3: Migratory and Congregator Species

a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1% of the global population of a migratory or congregator species at any point of the species' lifecycle.
b) Areas that predictably support ≥10% of the global population of a species during periods of environmental stress.

Criterion 4: Highly Threatened or Unique Ecosystems

a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.
b) Other areas not yet assessed by IUCN but determined to be highly prioritized for conservation by regional or national systematic conservation planning.

Criterion 5: Key Evolutionary Processes

For Criterion 5, there are no numerical thresholds. Best available scientific information and expert opinion will be used to guide decision-making with respect to the relative "criticality" of a habitat in these cases. For illustrative purposes, some potential examples of spatial features associated with evolutionary processes are as follows:

- Landscapes with high spatial heterogeneity are a driving force in speciation, as species are naturally selected based on their ability to adapt and diversify.
- Environmental gradients, also known as ecotones, produce transitional habitat, which has been associated with the process of speciation and high species and genetic diversity.
- Edaphic interfaces are specific juxtapositions of soil types (for example, serpentine outcrops, limestone, and gypsum deposits), which have led to the formation of unique plant communities characterized by both rarity and endemism.
- Connectivity between habitats (for example, biological corridors) ensures species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from "crest to coast."

II.2.1.1. Ecologically Appropriate Area of Analysis

To comply with IFC Performance Standard 6 (PS6) requirements and to conduct a critical habitat assessment, an ecologically reasonable analysis unit has been defined for each biodiversity component using Ecologically Appropriate Area of Analysis (EAAA).

Ecologically Appropriate Area of Analysis (EAAA) defines geographical boundaries based on the natural distribution and interaction areas of species, habitats and ecosystems to assess the potential impacts of a project.

This area is not limited to the physical boundaries of the project site, but encompasses a meaningful area at the ecological level where direct, indirect and cumulative impacts may occur. The reasons for preparing an EAAA in accordance with IFC PS6 can be written as follows;

- Taking into account the ecological context of the species in order to properly understand project impacts.
- Focusing only on the project area is inadequate, especially for mobile species (e.g. birds, mammals) or systems with extensive habitat connectivity.
- When conducting a Critical Habitat Assessment (CHA), the EAAA provides a framework consistent with the species' life cycle and habitat continuity.

In this context, data collection carried out with surveys within the study area and along the motorway route. Thus, in addition to the assessments made, EAAA for each species have been defined taking into account the following criteria:

a) Ecological Range of Target Species
- Breeding, feeding, sheltering and migration areas of species are taken into account.
- For example, for a bat species, not only the cave area but also the feeding sites are included.

b) Natural Distribution of Habitats
- Environmental continuity of the habitat type and its distribution in the region are taken into account.
- Similar habitat mosaics that may be affected by the Project are included in the EAAA.

c) Cumulative Impact Assessment Area
- Other projects and human activities (roads, power lines, agriculture) that may have an impact on the same species or habitat are considered.

d) Protected Areas and Biodiversity Priority Areas
- National or international protected areas such as Ramsar sites, Natura 2000, Key Biodiversity Areas (KBA), Important Bird Areas (IBA) may be included in the EAAA.

e) Ecological Integrity at Landscape Level
- Landscape-scale structures such as species mobility, habitat connectivity and ecological corridors are taken into account.

Within the scope of this project, the impact of the construction and operation of the motorway on the species and habitats considered in the biodiversity assessment was examined not only in the project area where the impacts will be direct, but also in a wider ecological impact area where they may be indirect and cumulative.

Using Geographic Information Systems (GIS)-supported analysis, the EAAA of each species was defined. These areas provide an ecologically meaningful scale at which project impacts can be assessed in terms of species life cycle and habitat continuity.

III. CRITICAL HABITAT FEATURES

III.1. Internationally Recognized Areas

Internationally recognized conservation areas are located in the vicinity of the Project Area, which spans the provinces of Antalya and Mersin. These areas include Key Biodiversity Areas (KBAs), Important Bird Areas (IBAs), and Important Plant Areas (IPAs). KBAs are designated as critical sites based on their significant biological value. A total of 33 internationally recognized areas have been identified near the project, with no RAMSAR sites present within or adjacent to the Project Area.

Studies indicate that a portion of the Antalya Plains KBA and IBA falls within the Project Area boundaries. Table III.1 provides the total extent of this KBA/IBA and the portion encompassed within the Project's Study Area.

Table III.1. Internationally Recognized Areas and Nationally Protected Areas within the Region of the Project Area

Internationally Recognized Areas	Total Area (ha)	with in the Study Area (400 m corridor)	
		ha	%
Antalya Plains KBA, IBA	27.039	277	1.02
Nationally Protected Areas	**Total Area (ha)**	**Within the Study Area (400 m corridor)**	
		ha	**%**
Belek SEPA	11.173	140.06	1.25
Köprüçay Basin Natural Protected Area	4,019	47.44	1.18

The portion of the Antalya Plains KBA/IBA intersecting the Project Area comprises exclusively modified habitats, which have been significantly altered by human activities and generally support lower biodiversity value compared to natural habitats. According to IFC Performance Standard 6, areas of modified habitat present low biodiversity sensitivity, and thus, the risk of significant adverse impacts on biodiversity values is reduced.

Given that the habitats within the project footprint do not include natural ecosystems or habitats critical for threatened or endemic species, the project's potential impacts on the biodiversity values of this protected area are expected to be minimal.

Based on a review of available data and field assessments, this portion does not trigger Critical Natural Habitat or Critical Modified Habitat under PS6, as it does not support concentrations of endangered, endemic, or migratory species, nor does it represent a significant ecological feature of the broader KBA. The habitat portion within the project footprint are not considered natural or critical for sustaining biodiversity features of concern. This assessment is further supported by expert opinion, confirming low biodiversity value in the intersecting area of the project and Antalya Plains.

Therefore the project is considered to be compliant with PS6, which guide projects located in or near protected and internationally recognized areas. The approach taken ensures alignment with the mitigation hierarchy, avoids degradation of biodiversity values, and supports long-term conservation objectives of the wider KBA/IBA.

The Project also intersects with a portion of Belek SEPA. However this portion only consists of modified habitats such as agricultural lands and access roads, which makes about 44.5% of Belek SEPA's area. Belek SEPA is considered a nationally protected area due to it's natural beaches that *Caretta caretta* and *Chelonia mydas* species uses for nesting. It is not expected that the Project will have any impact on these areas. *Pyrus serikensis* which is also an important species for Belek SEPA is already considered and evaluated for this project, there are no individuals in the area that the

Project and Belek SEPA intersects, however this species is present in other areas of the Projects area of impact.

Based on a review of available data and field assessments, this portion does not trigger Critical Natural Habitat or Critical Modified Habitat conditions under PS6.

An evaluation has been carried out for Köprüçay Basin, as a viaduct is planned to be built above this nationally protected area. It's been determined that the extinction from the drilling works that will be carried out for the viaduct piers is 5 meters. Considering the nearest pier is 15 meters to the basin riverside. This distance provides a sufficient buffer to avoid direct disturbance of the aquatic environment. Based on these design parameters, the potential impacts of drilling on the Köprüçay Basin are expected to be minimal, with no significant alteraiton anticipated to the river flow, water quality, or ecological integrity of the protected area. Based on a review of available data and field assessments, this portion does not trigger Critical Habitat conditions under PS6.

While the risk of significant adverse impacts is low, the project acknowledges its proximity to a recognized area and has incorporated precautionary mitigation measures to avoid indirect effects (e.g., dust, noise, runoff). These include implementing good construction practices, maintaining buffer zones where feasible, and ongoing biodiversity monitoring during project implementation to confirm that no residual impacts emerge.

III.2. Critical Habitat Assessment

For each potential trigger species, an Ecologically Appropriate Area of Analysis (EAAA) was delineated to provide the spetial framework for evaluating the presence of Critical Habitat. The EAAA was defined based on the known distribution of the species bot within and, where relevant, beyond the Project's Area of Influence (AoI), as well as the ecological processes, features, and functions necessary to support the species' persistence. Species-spesific boundaries were determined in line with ecological considerations, which in some cases encompassed catchments, tiver systems, or other relevant landscape features. This ensured that the EAAA captured the functional scale required for robust assessment against Critical Habitat criteria and thresholds.

The evaluation was undertaken againsts the IFC PS6 Critical Habitat criterias (Criterion 1-5), with the results presented below. Each section includes the species assessed, their IUCN Red List status, endemism status, Extent of Occurrence, and EAAA. Potential trigger species were identified using a combination of literature review, field survey data, international and national up-to-date databases. Where quantitative information on local populations was unavailable, a precautionary approach was applied. For criteria 1-3, Extent of Occurrence (EOO), derived from the IUCN Red List database, was used as a proxy for local population data. Local distribution information was obtained from bizimbitkiler.org and TÜBİVES (Turkish Plants Data Service). In some instances, species presence within the AoI was inferred on the basis of habitat suitability; where species presence was confirmed, the AoI was considered part of the species' overall range. This conservative approach ensured that potential Critical Habitat is not underestimated. For threatened ecosystems, the assessment was constrained by limited data on extent and condition at both local and regional scales; in these cases, conservative assumptions were applied.

In total, 6 species for Criterion 1, 23 species for Criterion 2, and 16 species for Criterion 3 were screened against the relevant criteria thresholds to determine if they trigger Critical Habitat requirements to be applied.

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III.2.1.1. Criterion 1: Critically endangered and/or endangered species

For Criterion 1, CR, EN and VU species were examined whether the Project area supports more than 0.5% globally important concentrations of these species or whether the Project could lead to a decrease in population of species categorized as VU. In cases where a global IUCN assessment was not available (e.g., Not Evaluated, NE or Data Deficient, DD), national threat assessments (e.g. Red Data Book for Turkish Plants) were taken into account. These categories were re-evaluated by an expert based on the most recent and available information on species distribution. The global population, the EOO and the Project area were considered to estimate the global range of species in AoI to assign Critical Habitat trigger status of species based on Criterion 1.

Among the 221 plant taxa identified in the region, only one species, *Pyrus Serikensis*, currently have a global assessment as “VU” according to IUCN Red List Database. However, according to the Red Data Book of Turkish Plants (Ekim et al., 2000), *Pyrus serikensis* is listed as **Endangered (EN)** at the national level due to its highly restricted distribution and population decline.

This national threat status was reviewed and confirmed by a botanical expert during field assessments. Given the assessment date of “01 January 1998” and annotations as “Needs updating” at the IUCN Red List of Threatened Species database, the national “EN” listing has been considered for the purposes of the Critical Habitat Assessment, in line with IFC PS6, which allows the use of national assessments where global data is lacking.

No other plant species in the area are considered threatened. *Pyrus serikensis* is distributed within the maquis ecosystem in and around the Project Area, with reported populations located near the Serik district. Therefore, it meets Criterion-1, which states that "areas hosting ≥5% of the global reproductive unit of an EN category species" are considered critical habitats. Consequently, maquis habitats along the project route where *Pyrus serikensis* is present have been designated as Critical Habitat. The EAAA of *Pyrus serikensis is* given in Figure III.1.

Five amphibian species are distributed within the Project Area, one of which, *Lyciasalamandra atifi*, is classified as Endangered (EN). *Lyciasalamandra atifi* has not been observed within the Project Area. Monitoring studies conducted during the spring season, which provides the most favorable climatic conditions for observing the species. Although suitable habitats for the species exist at elevations above 190 meters and more than 1 km from the Project Area, these areas have not been designated as critical habitats. This is because no species have been observed within the Study Area, and there is no overlap between the EAAA and the Project Area. Monitoring studies should be continued for this species, and if the presence of the species is confirmed within the Project Area, the habitats where the species inhabits should be designated as critical habitats. The EAAA of *Lyciasalamandra atifi is* given in Figure III.2.

Birds represent the most diverse vertebrate group in the Project Area, with 124 identified species. Among them, one species, *Neophron percnopterus*, is classified as EN. However, this species does not meet Criterion-1 based on EAAA, and population density in the vicinity of the area.

A total of 29 fish species belonging to 10 orders and 16 families identified. Among these, there are three species in the threatened categories (CR, EN); one species of CR (*Anguilla anguilla*) and two species of EN (*Alburnus baliki* and *Pseudophoxinus fahrettini*).

All vulnerable (VU) species identified as potentially present within the study area possess very wide distribution ranges, therefore it is considered unlikely that any of these species would meet the thresholds established under Criterion 1.

A summary of the evaluation of species falling under Criterion-1 is provided in

Table III.2. Species that could trigger critical habitat, but are considered only potentially present based on literature sources and/or for which insufficient data are available, are classified as triggering 'Potential Critical Habitat' (PCH). In contrast, where the presence of critical habitat has been confirmed on at least one occasion, it is designated as 'Critical Habitat'. Species that do not trigger Criterion-1 are classified as “Not Critical Habitat”.

Table III.2 Critical Habitat Assessment According to Criterion-1

Species	IUCN	End.	EOO (km^2)	EAAA (km^2)	0.5% EOO	EAAA > 0.5% EOO	Evaluation	Critical Habitat Assessment
Pyrus serikensis	EN	Endemic	986.77	83.55	4.93	yes	This species was observed during field surveys, and the population in the project area represents a significant portion of its global distribution. Consequently, the species meets Criterion 1a and Criterion 1c and therefore designated as Critical Habitat.	CH
Lyciasalamandra atifi	EN	Endemic	3169.00	30.02	15.85	yes*	This species qualifies under Criterion-1c, however, it was not observed during field studies, and the Project Area lacks suitable habitat conditions for it however the distribution and population abundance and possibility of species presence. Therefore, it is considered Potential Critical Habitat trigger species	PCH
Neophron percnopterus	EN	-	266846.82	270.40	1334.23	no	This species is not considered a critical habitat trigger as it was not observed during field studies. Altough EAAA contains suitable habitat, it does not meet the thresholds of Criterion-1a or Criterion 1c and is therefore treated as Not CH.	Not Critical Habitat
Anguilla anguilla	CR	-	742787.86	0.01	3713.94	no	This species was observed within the study area but the proportion for the EAAA is not sufficient to trigger Critical Habitat. Species population in the area does not meet the threshold of criterion 1a or criterion 1c and is therefore treated as Not CH.	Not Critical Habitat
Alburnus baliki	EN	Endemic	6482.67	0.01	32.41	no	This species was observed within the study area but the proportion for the EAAA is not sufficient to	Not Critical Habitat

							trigger Critical Habitat. Species population in the area does not meet the threshold of criterion 1a or criterion 1c and is therefore treated as Not CH.	
Pseudophoxinus fahrettini	EN	Endemic	2638.52	0.01	13.19	no	This species was observed within the study area but the proportion for the EAAA is not sufficient to trigger Critical Habitat. Species population in the area does not meet the threshold of criterion 1a or criterion 1c and is therefore treated as Not CH.	Not Critical Habitat

* EAAA of *Lyciasalamandra atifi* does not overlap with the Project Area

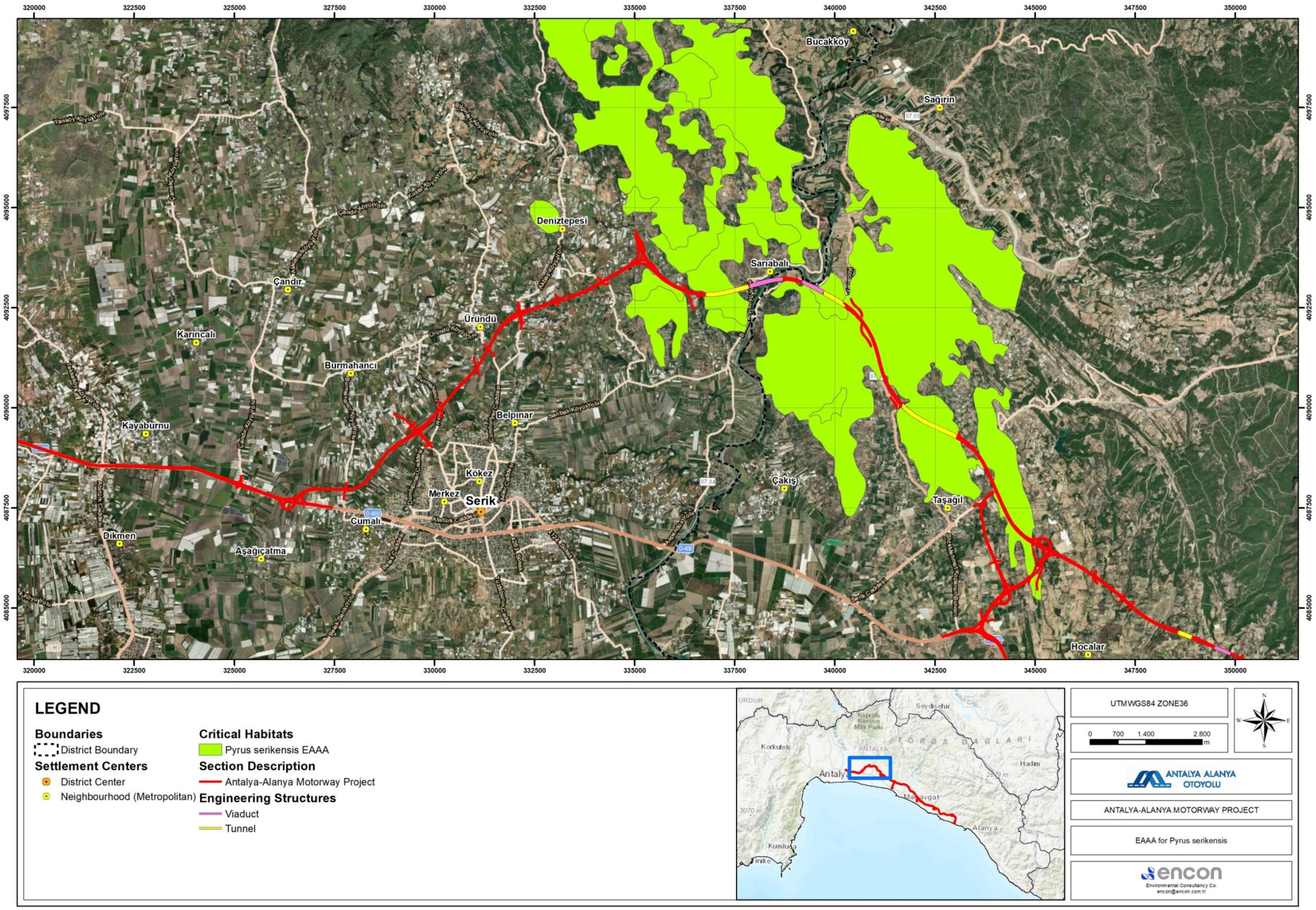

Figure III.1. EAAA of *Pyrus serikensis*

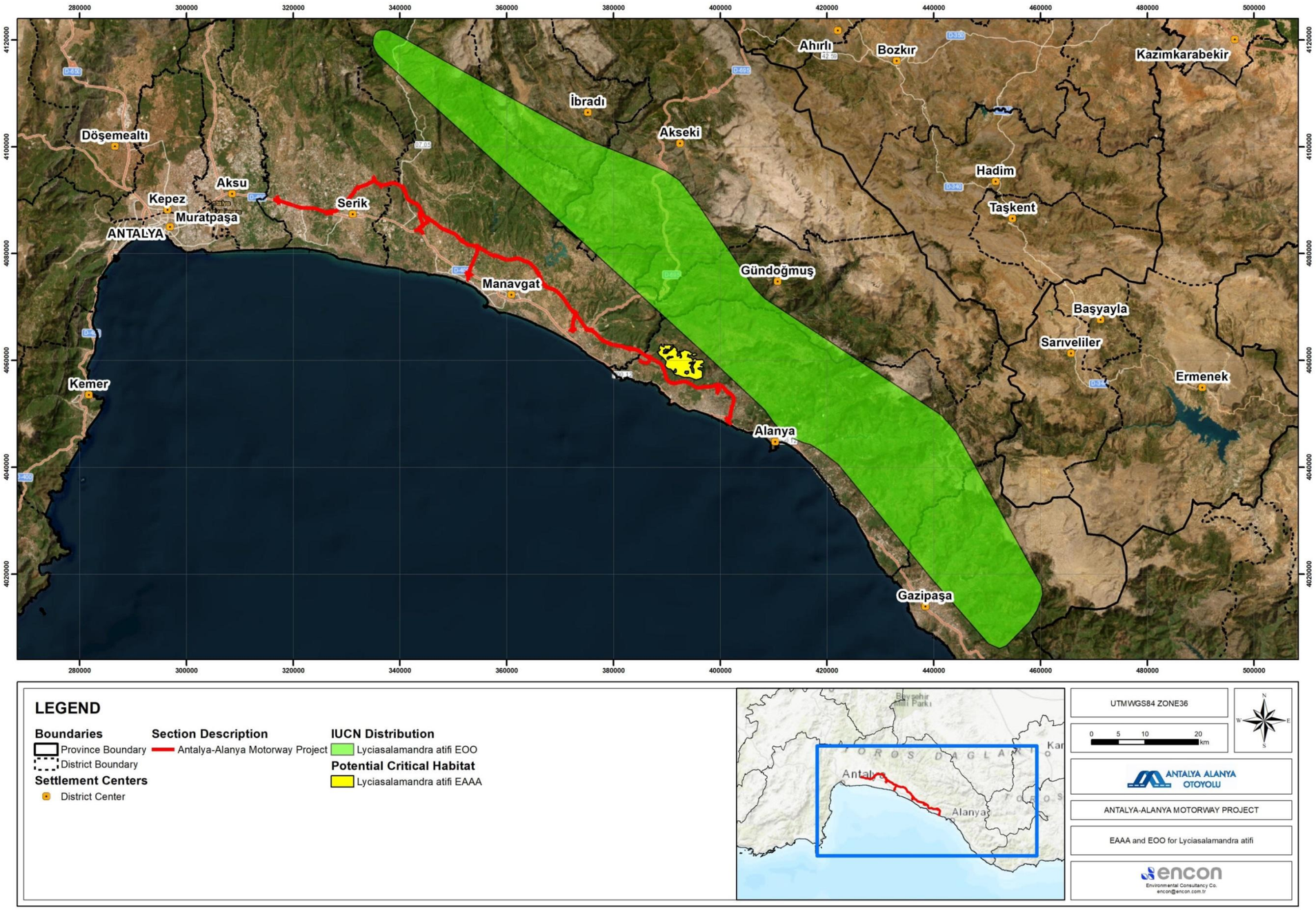

Figure III.2. EAAA and EOO of *Lyciasalamandra atifi*

III.2.1.2. Criterion 2: Endemic and/or restricted-range species

For criterion 2, the assessment considered the presence of endemic or restricted-range species—defined as those with an extent of occurrence (EOO) of less than 50,000 km² for terrestrial vertebrates and plants, or a global range of 500 km or less in linear geographic span for coastal, riverine, and other aquatic species that do not exceed 200 km in width at any point.

A total of 221 plant taxa belonging to 60 families have been identified within the Project Area. Among these, seven species (*Eryngium kotschyi*, *Phlomis leucophracta*, *Phlomis lycia*, *Phlomis monocephala*, *Phlomis nissolii*, *Pyrus serikensis*, and *Sideritis congesta*) are endemic to Türkiye. Except for *Pyrus serikensis*, the identified endemic species are relatively widespread. *Pyrus serikensis* meets Criterion-2, which states that "areas containing ≥10% of the global population or ≥10% of the reproductive population of any species" qualify as critical habitats. Therefore, maquis areas along the project route, where this species is distributed, have not been triggered by criterion 2.

Five amphibian species have been recorded in the Project Area, with *Lyciasalamandra atifi* being the only endemic species. This species is distributed between Antalya and Alanya, with a known lower elevation limit of 190 meters. The highest elevation in the Project Area is around 160 meters. Despite surveys conducted in February-March under optimal climatic conditions in spring, the species was not observed within the Project Area. The closest recorded individuals were found in suitable forested habitats approximately 1 km north of the project site. However, since *Lyciasalamandra atifi* remains inactive under unfavorable climatic conditions and was characterized by dry and mild weather, the possibility of its absence due to these factors should not be disregarded. Continuation of monitoring studies is recommended. If the species is observed in the Project Area, the critical habitat analysis will be reassessed and may trigger criterion 2.

Species of the *Lyciasalamandra* genus are typically found in rainy seasons or areas with groundwater sources. The primary reason for *Lyciasalamandra atifi* being classified as EN by the IUCN is its specific habitat, climatic, and hydrological requirements. Changes in hydrological conditions due to human activities and global climate change pose a significant threat to this species.

Since *Lyciasalamandra* species are active only in ecologically favorable periods and regions, it is believed that their absence in surveys conducted during summer, autumn, and winter along the project route is due to unsuitable conditions. Therefore, the most appropriate period for field studies is during the rainy season in spring, when conditions for salamander activity are optimal.

Among the reptiles, there are four endemic lizard species (*Ablepharus anatolicus*, *Anatololacerta ibrahimi*, *Lacerta pamphylica*, and *Blanus aporus*). Among these endemic species, *Lacerta pamphylica* has a relatively narrower and more localized distribution. The Project Area lies within the distribution range of *Lacerta pamphylica*. However, considering the overall distribution ranges of all endemic species, there is no critical habitat within the Project Area as defined by Criterion-2.

Among the 29 fish species identified in the Project Area, 11 are endemic (*Cobitis battalgilae*, *Oxynoemacheilus eregliensis*, *Capoeta antalyensis*, *Capoeta caelestis*, *Alburnus baliki*, *Alburnus escherichii*, *Pseudophoxinus battalgilae*, *Pseudophoxinus fahrettini*, *Squalius anatolicus*, *Squalius fellowesii*, and *Salmo ekmekciae*). *Capoeta antalyensis*, *Pseudophoxinus battalgilae*, and *Pseudophoxinus fahrettini* are regionally distributed endemic species, while the remaining nine are more widely distributed. However, regardless of their distribution range, none of these species meet Criterion-2 based on population density along the project route. As a result, no critical habitat has been designated for fish species.

A summary of the evaluation of species falling under Criterion-1 is provided in Table III.3.

Table III.3 Critical Habitat Assessment According to Criterion-2

Species	IUCN	End.	EOO (km^2)	EAAA (km^2)	10% EOO	EAAA > 10% EOO	Evaluation	Critical Habitat Assessment
Eryngium kotschyi	LC	Endemic	42422.31	14.66	4242.23	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Phlomis leucophracta	-	Endemic	99470.89	14.66	9947.09	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Phlomis lycia	LC	Endemic	26034.84	14.66	2603.48	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Phlomis monocephala	LC	Endemic	99470.89	14.66	9947.09	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Phlomis nissolii	LC	Endemic	152307.52	133.06	15230.75	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Pyrus serikensis	EN	Endemic	986.77	83.55	98.67	no	The species was observed during field studies. While suitable habitat is present within the EAAA, its range and local occurrence do not meet the thresholds required under Criterion 2. Although it qualifies under Criterion 1 and triggers Critical Habitat, the available information is insufficient to trigger Critical Habitat under Criterion-2; therefore, the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Sideritis congesta	LC	Endemic	27386.85	133.94	2738.69	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Lyciasalamandra atifi	EN	Endemic	3169.00	30.02	31.69	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Anatololacerta ibrahimi	-	Endemic	775.55	14.17	77.55	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Ablepharus anatolicus	-	Endemic	775.55	14.17	77.55	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this	Not Critical Habitat

Species	IUCN	End.	EOO (km^2)	EAAA (km^2)	10% EOO	EAAA > 10% EOO	Evaluation	Critical Habitat Assessment
							species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	
Blanus aporus	LC	Endemic	3490.55	26.18	349.06	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Lacerta pamphylica	LC	Endemic	3599.72	120.10	359.97	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Cobitis battalgilae	LC	Endemic	3111.27	0.04	311.13	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Oxynoemacheilus eregliensis	NT	Endemic	3111.27	0.04	311.13	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Capoeta antalyensis	VU	Endemic	13296.87	0.04	1329.69	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Capoeta caelestis	LC	Endemic	13296.87	0.04	1329.69	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Alburnus baliki	EN	Endemic	6482.67	0.04	648.27	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Alburnus escherichii	LC	Endemic	6482.67	0.04	648.27	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Pseudophoxinus battalgilae	LC	Endemic	2638.52	0.04	263.85	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Pseudophoxinus fahrettini	EN	Endemic	2638.52	0.04	263.85	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not	Not Critical Habitat

Species	IUCN	End.	EOO (km^2)	EAAA (km^2)	10% EOO	EAAA > 10% EOO	Evaluation	Critical Habitat Assessment
							triggering Critical Habitat.	
Squalius anatolicus	LC	Endemic	97407.67	0.04	9740.77	no	The species is not considered as critical habitat trigger species as it was not observed during field studies. Given that the EAAA contains suitable habitat conditions for this species to support, but range and local occurrence do not meet the thresholds required under Criterion-2, this species is assessed as not triggering critical habitat.	Not Critical Habitat
Squalius fellowesii	LC	Endemic	97407.67	0.04	9740.77	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Salmo ekmekciae	-	Endemic	97407.67	0.04	9740.77	no	The species was observed during field studies.Although suitable habitat is present within the EAAA, the available information indicates that the species' range and local occurrence do not meet the thresholds required under Criterion-2; therefore the species is assessed as not triggering Critical Habitat.	Not Critical Habitat

III.2.1.3. Criterion 3: Habitats supporting globally significant migratory or congregatory species

The assessment considered whether there are any Key Biodiversity Areas (KBAs), Important Bird and Biodiversity Areas (IBAs) for congregatory species, or Ramsar Wetlands of International Importance listed under criteria 5 or 6.

The Antalya Plains (KBA/IBA) is the only internationally important area located within the project's study area. However, *Halcyon smyrnensis* and *Prinia gracilis*—species that contribute to the qualification of this KBA/IBA—were not recorded during surveys conducted within the project study area and its surrounding environment.

Among the amphibian, reptile, and mammal species in the Project Area, no migratory or herd-forming species have been identified. Therefore, no critical habitat has been designated under Criterion-3 for these groups.

The Project Area is not located on a primary or secondary migration route used by soaring migratory birds in the Mediterranean region. However, based on both field surveys and BirdLife International records, 20 different species of soaring, broad-winged birds have been recorded in the Project Area and its surroundings.

Considering the population densities of migratory bird species present in the area, it has been determined that their populations are not at a level that meets Criterion-3. Consequently, no critical habitat has been designated for birds within the Project Area.

Fish species that spend their growth and development stages in freshwater before migrating back to the marine environment to spawn are classified as catadromous migrators. Since the rivers in the Project Area discharge into the sea, the catadromous species *Anguilla anguilla* (European eel) inhabits these waters and falls under Criterion-3. However, since this species does not meet the two specific sub-criteria defined under Criterion-3, no critical habitat has been designated.

A summary of the evaluation of species falling under Criterion-3 is provided in Table III.4.

Table III.4 Critical Habitat Assessment According to Criterion-3

Species	IUCN	EOO (km^2)	EAAA (km^2)	Global Population	Local Population	1% EOO	EAAA > 1% EOO	1% of Global Population	Local pop. > 1% Global pop.	Evaluation	Critical Habitat Assessment
Accipiter nisus	LC	266903.35	270.40	2000000-3200000	3	2669.03	no	20000-32000	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus the EAAA should support 20000 individuals considering its global population. Estimated individuals throughtout the year is 200, considering 3 individuals were observed in the field studies, it is likely the EAAA could not support 20000 individuals on a year-round basis. Hence, the species could not be considered as CH-qualifying species.	Not Critical Habitat
Aquila chrysaetos	LC	205934.05	270.40	85000-160000	-	2059.34	no	850-1600	no	The species was not observed in the field studies, and the proportion of global range in EAAA is not sufficient to trigger Critical Habitat in terms of Criterion 3. Due to species data only being available as presence/absence in the studies and uncertainty regarding field observation vs literature, and given the species' unknown national conservation status, long life cycle, availability of nesting habitat, and demonstrated heightened vulnerability to being effected by the Motorway, species was designated as Does Not Trigger Critical Habitat..	Not Critical Habitat
Buteo buteo	LC	266488.95	270.40	2000000-3500000	8	2664.89	no	20000-35000	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus the EAAA should support 20000 individuals considering its global population. Estimated individuals throughtout the year is 300, considering 8 individuals were observed in the field studies, it is likely the EAAA could not support 20000 individuals on a year-round basis. Hence, the species could not be considered as CH-qualifying species	Not Critical Habitat
Buteo rufinus	LC	266488.95	270.40	100000-499999	5	2664.89	no	1000-4999	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus the EAAA should support 1000 individuals considering its global population. Estimated individuals throughtout the year is 300, considering 5 individuals were observed in the field studies, it is likely the EAAA could not support 1000 individuals on a year-round basis. Hence, the species could not be considered as CH-qualifying species	Not Critical Habitat
Circaetus gallicus	LC	767347.13	270.40	50000-99999	-	7673.47	no	500-999	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus the EAAA should support 500 individuals considering its global population. Estimated individuals throughtout the year is 4, It is likely the EAAA could not support 500 individuals on a year-round basis. Hence, the species could not be considered as CH-qualifying species	Not Critical Habitat
Circus aeruginosus	LC	43449.19	270.40	600000-1100000	-	434.49	no	6000-11000	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus the EAAA should support 6000 individuals considering its global population. Estimated individuals throughtout the year is 6, It is likely the EAAA could not support 6000 individuals on a year-round basis. Hence, the species could not be considered as CH-qualifying species	Not Critical Habitat
Circus cyaneus	LC	778040.52	270.40	330000-512000	-	7780.41	no	3300-5120	no	The species was not observed in the field studies, and the proportion of global range in EAAA is not sufficient to trigger Critical Habitat in terms of Criterion 3. Due to species data only being available as presence/absence in the studies and uncertainty regarding field observation vs literature, and given the species' unknown national conservation status, long life cycle, availability of nesting habitat, and demonstrated heightened vulnerability to being effected by the Motorway, species was designated as Does Not Trigger Critical Habitat	Not Critical Habitat
Circus macrourus	LC	778034.24	270.40	18000-30000	-	7780.34	no	180-300	no	The species was not observed in the field studies, and the proportion of global range in EAAA is not sufficient to trigger Critical Habitat in terms of Criterion 3. Due to species data only being available as presence/absence in the studies and	Not Critical Habitat

										uncertainty regarding field observation vs literature, and given the species' unknown national conservation status, long life cycle, availability of nesting habitat, and demonstrated heightened vulnerability to being effected by the Motorway, species was designated as Does Not Trigger Critical Habitat	
Neophron percnopterus	EN	266846.82	270.40	12400-36000	-	2668.47	no	120-360	no	The species was not observed during field surveys, and the proportion of its global range within the EAAA is insufficient to trigger Criterion-3. Thus the EAAA should support 120 individuals considering its global population. Estimated individuals throughout the year is 2. It is likely the EAAA could not support 120 individuals in a yearly basis. Although suitable nesting habitat may exist in the wider landscape, no active nests were identified in the Project Area, or wider components. Given limited data, long life cycle, and sensitivity to disturbance, the species is assessed as not triggering Critical Habitat.	Not Critical Habitat
Ciconia ciconia	LC	778028.66	270.40	700000-704000	9	7780.29	no	7000-7040	no	Although the species was observed in the field studies, the EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus, the EAAA should support 7000 individuals, considering its global population. Estimated individual throughout the year is 200, considering that 9 individuals were observed in the field studies, thus, it is not likely that the EAAA supports 7000 individuals on a year-round basis. Hence the species could not be considered as CH-qualifying species	Not Critical Habitat
Ciconia nigra	LC	778034.24	270.40	24000-44000	-	7780.34	no	240-440	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus, the EAAA should support 240 individuals, considering its global population. Estimated individual throughout the year is 4, considering the species was not observed during field studies, it is not likely that the EAAA supports 240 individuals on a year-round basis. Hence the species could not be considered as CH-qualifying species	Not Critical Habitat
Falco columbarius	LC	616863.12	270.40	250000-3200000	-	6168.63	no	2500-32000	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus, the EAAA should support 2500 individuals, considering its global population. Estimated individual throughout the year is 4, considering the species was not observed during field studies, it is not likely that the EAAA supports 2500 individuals on a year-round basis. Hence the species could not be considered as CH-qualifying species	Not Critical Habitat
Falco peregrinus	LC	266909.42	270.40	100000-499999	-	2669.09	no	1000-4999	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus, the EAAA should support 1000 individuals, considering its global population. Estimated individual throughout the year is 162, considering that the species was not observed during the field studies, it is unlikely that the EAAA supports 1000 individuals on a year-round basis. Hence the species could not be considered as CH-qualifying species	Not Critical Habitat
Falco subbuteo	LC	266909.42	270.40	900000-1500000	-	2669.09	no	9000-15000	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus, the EAAA should support 9000 individuals, considering its global population. Estimated individual throughout the year is 162, considering that no individuals were observed during the field studies, it is unlikely that the EAAA supports 9000 individuals on a year-round basis. Hence the species could not be considered as CH-qualifying species	Not Critical Habitat
Falco tinnunculus	LC	266909.42	270.40	4300000-6700000	2	2669.09	no	43000-67000	no	The EAAA should support at least 1% of global population of species to have critical habitat trigger species based on Criterion-3. Thus, the EAAA should support 43000 individuals, considering its global population. Estimated individual throughout the year is 100, considering that 2 individuals were observed during the field studies, it is unlikely that the EAAA supports 9000 individuals on a year-round basis. Hence the species could not be considered as CH-qualifying species.	Not Critical Habitat

Anguilla anguilla	CR	742787.86	0.01	-	20	7427.88	no	-	no	The species was observed during field surveys, however no global population data are available to assess its proportional representation within the EAAA. Based on current knowledge and the limited scale of occurrence in the Project Area, the species is assessed as not triggering Critical Habitat.	Not Critical Habitat

III.2.1.4. Criterion 4: Highly-threatened and unique ecosystems

The application of Criterion 4, recommends the use of the IUCN Red List of Ecosystems (RLE) where formal assessments have been conducted. However, no such evaluations have been carried out in Türkiye, as confirmed by the IUCN RLE Database. Therefore, the RLE framework cannot be applied in this context. Instead, the 'European Red List of Habitats' (European Union, 2016) was utilized to identify threatened ecosystems.

The habitats identified in the Project Area are not among the priority habitats under Annex I of the Habitats Directive. Also None of these habitats are protected according to the "European Red Habitat List" prepared by the European Union.

None of the EUNIS habitats identified within the Local Study Area (LSA) through desktop photointerpretation, mapping, and field ground-truthing are considered unique ecosystems or classified as Critically Endangered (CR) or Endangered (EN) according to the European Red List of Habitats. Furthermore, no unique or threatened ecosystems were reported by experts.

The rivers along the Motorway corridor will be crossed by bridges. In the areas where the bridges will be constructed, it is estimated that there will be an impact only during construction works. However, as a result of the measures to be taken, the Project is not expected to impact river habitats.

The Project Area lies along the Western Mediterranean Coast of Türkiye. The corridor where the Motorway will be constructed does not have habitat features with unique characteristics to meet the biological needs of endemic, rare or threatened species such as breeding, wintering and feeding. It is concluded that the Project Area cannot be evaluated within this scope according to the items specified under Criterion-4.

III.2.1.5. Criterion 5: Key evolutionary processes

This criterion considers the presence of areas with landscape features that may be associated with evolutionary processes or with species populations that are particularly distinct. Such populations may warrant special conservation attention due to their unique evolutionary history.

Considering the habitats in the Project Area, landscapes with high spatial heterogeneity, edaphic interfaces and areas of proven importance in terms of adaptation to climate change were not identified. Moreover, the area is not considered to be of demonstrated importance for climate change adaptation or as a biological corridor. Therefore, it is concluded that the habitats within the Study Area do not exhibit the characteristics defined under Criterion 5.

III.3. Confirmed Species Triggering Critical Habitat

- ***Pyrus serikensis*** (Critical Habitat Trigger Species)
  Serik Pear Tree (Endemic tree species) was identified within the “S5 - Maquis, Woody Matorral, and Thermo-Mediterranean Scrub” habitats. This species occurs both within and adjacent to the project footprint and is of critical ecological importance due to its restricted distribution.

These findings verify the existence of Critical Habitat (CH) as defined under IFC Performance Standard 6 (PS6), thereby necessitating the implementation of targeted conservation and mitigation measures. Mitigation and implementation measures for designated Critical Habitats are outlined in detail in the Biodiversity Action Plan (BAP). Critical habitats, natural and modified habitats are shown in Figure III.3.

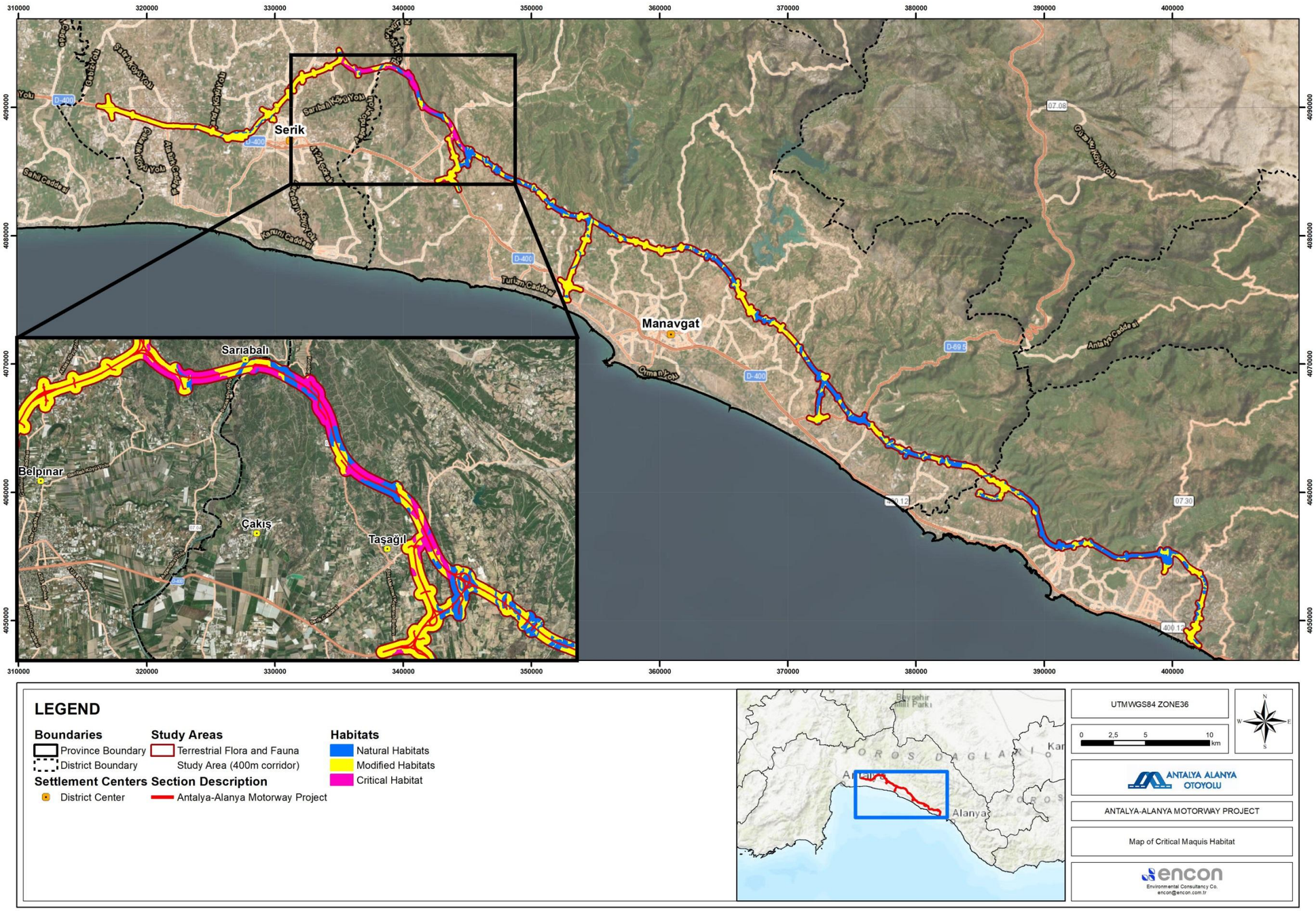

Figure III.3. Critical, Natural and Modified Habitats in the Study Area

IV. CONCLUSION

The Critical Habitat Assessment (CHA) for the Antalya-Alanya Motorway Project was conducted in line with the IFC Performance Standard 6 (PS6) to ensure biodiversity conservation and sustainable natural resource management. The assessment aimed to identify critical habitats and high-conservation-value species within the project's ecological area of influence, considering both direct and cumulative impacts. It applied PS6's five criteria to evaluate species and ecosystems, utilizing field surveys, expert input, and GIS-based spatial analysis. The findings confirmed that the maquis habitat type, home to the endemic and endangered *Pyrus serikensis*, qualifies as a critical habitat under PS6 Criteria 1. Although other potentially significant species were noted—such as *Lyciasalamandra atifi* and various endemic reptiles and fish—most did not meet the strict thresholds required for critical habitat designation.

The assessment concludes that while only one species (*Pyrus serikensis*) triggers critical habitat status and amphibian species *Lyciasalamandra atifi* requires ongoing monitoring due to their ecological sensitivity and limited distribution. The project area includes diverse ecosystems such as scrublands, wetlands, and rivers, but none meet the definitions of highly threatened or unique ecosystems (Criterion 4) or areas essential for key evolutionary processes (Criterion 5). Moreover, migratory species observed in the area do not reach the population thresholds necessary to designate the region as critical under Criterion 3. The report emphasizes the need for mitigation strategies, continuous monitoring, and targeted conservation measures to ensure that biodiversity impacts are minimized and aligned with international environmental standards.

The critical habitats and triggered species identified in the CHA report will form a baseline for net loss calculations and measure actions under the Biodiversity Action Plan (BAP).

ANTALYA ALANYA MOTORWAY PROJECT

ANNEX 11C

EUNIS HABITAT TYPES AND LOCATIONS OF VIADUCTS, TUNNES, BRIDGES, UNDERPASSES, OVERPASSES, AND CULVERTS MAPS ANNEX

OCTOBER 2025

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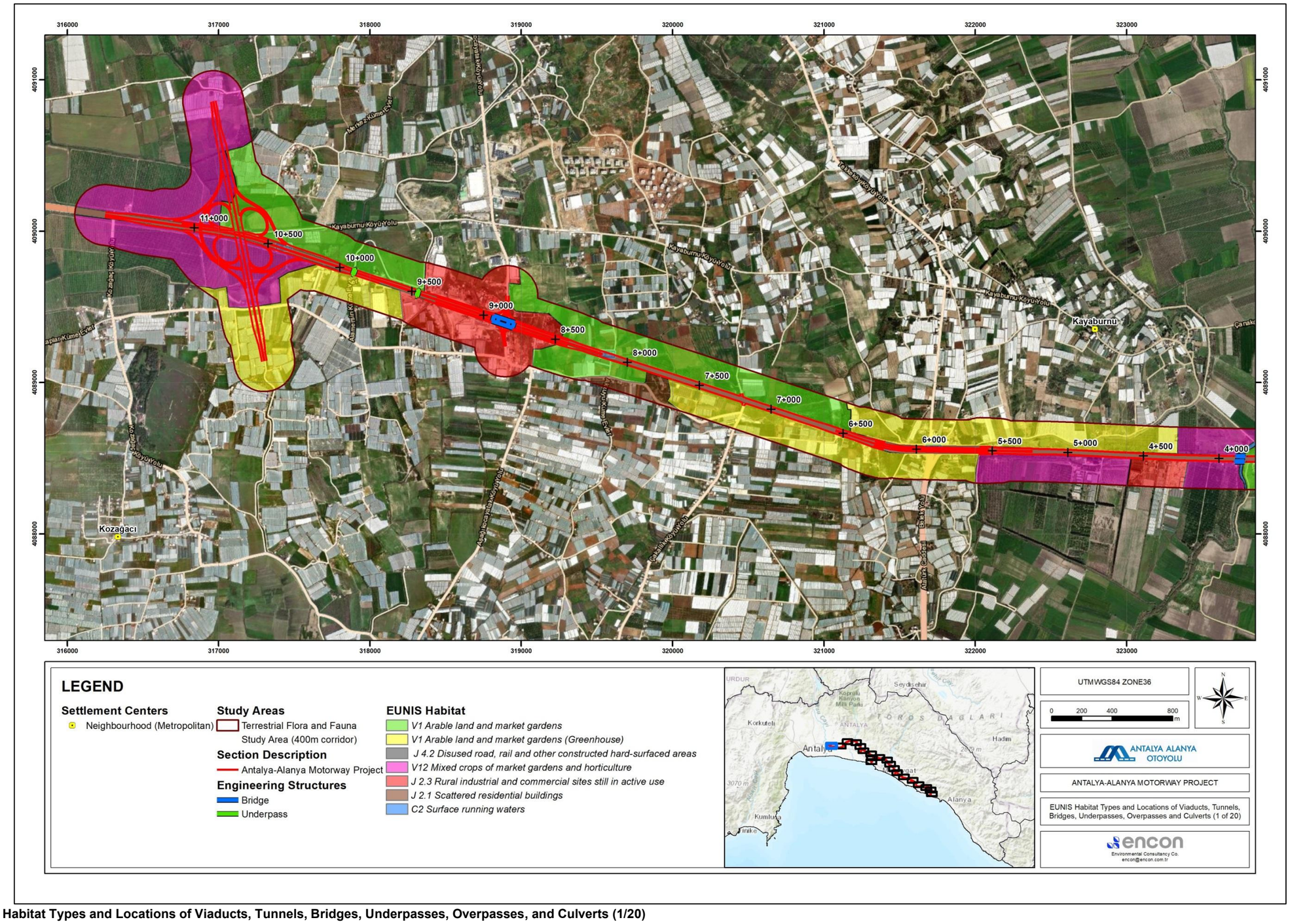


Figure 1 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (1/20)

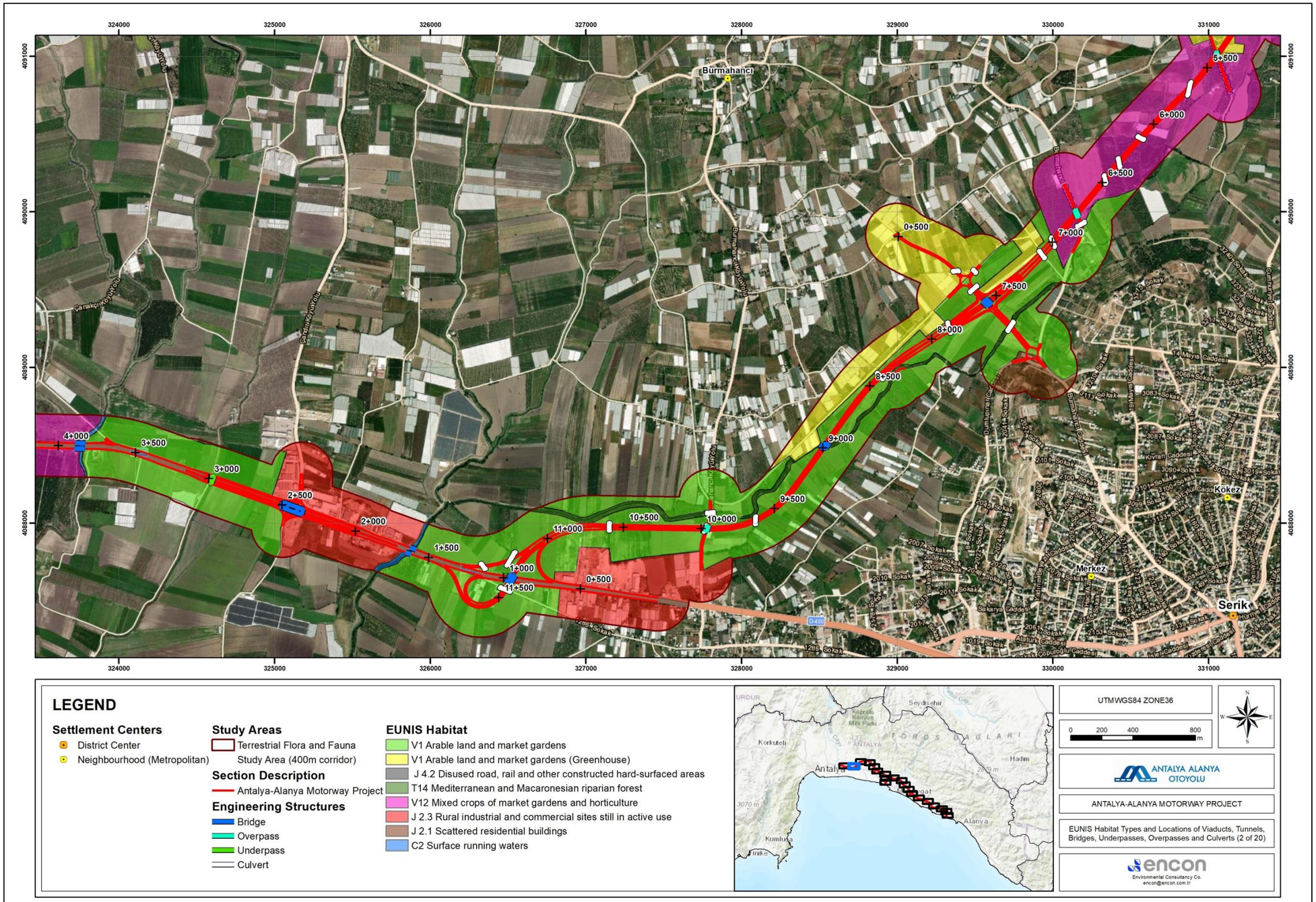


Figure 2 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (2/20)

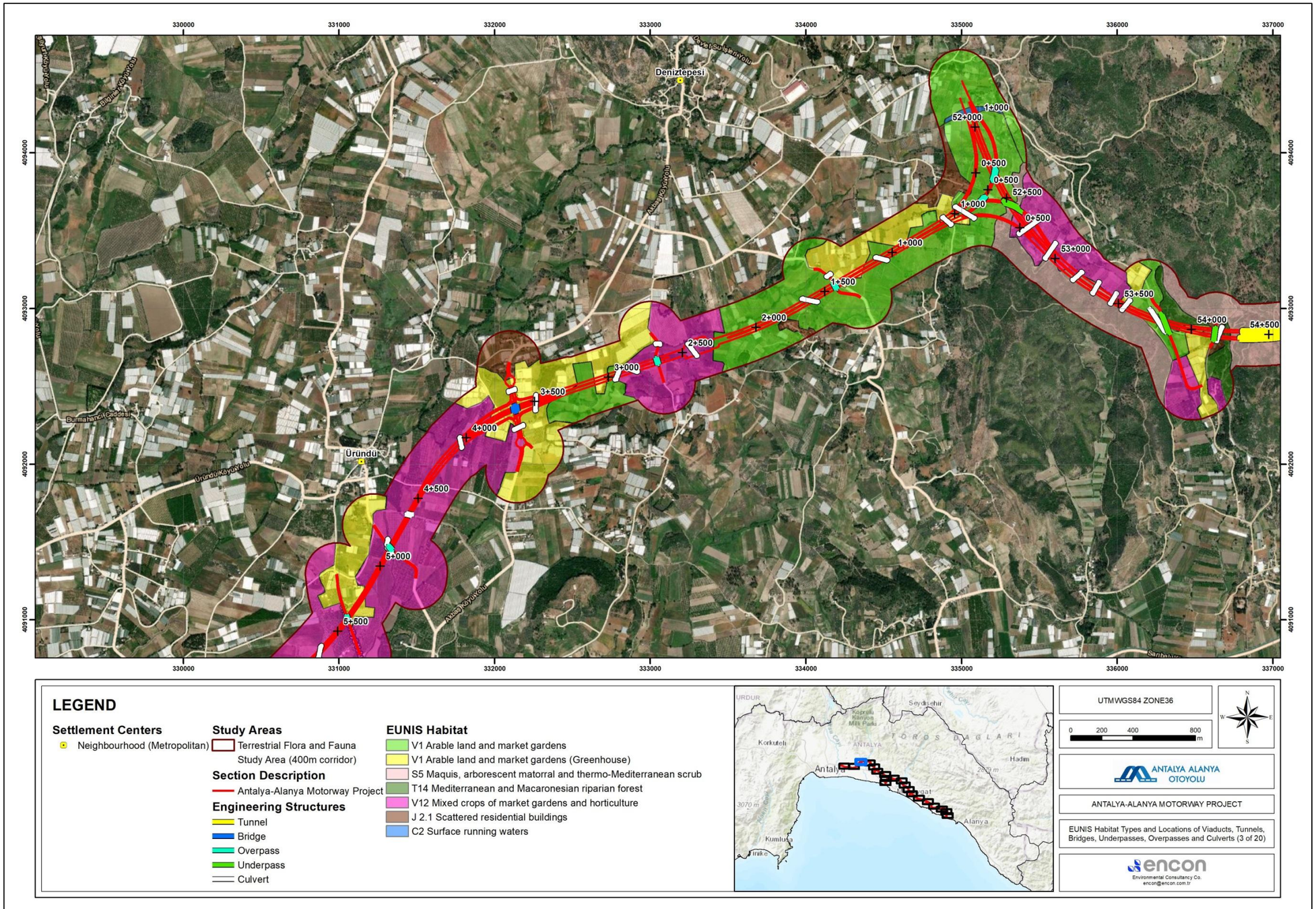


Figure 3 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (3/20)

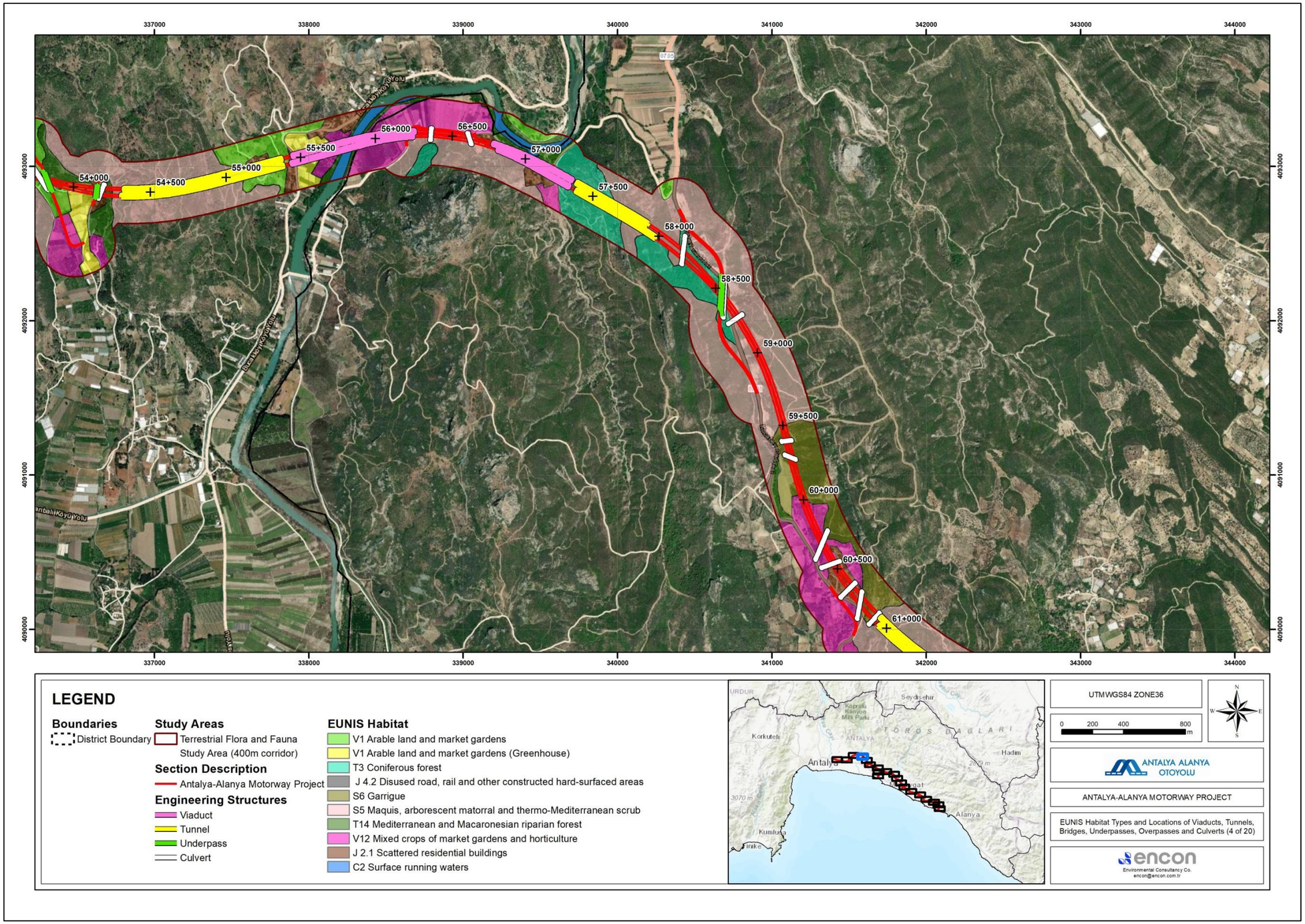


Figure 4 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (4/20)

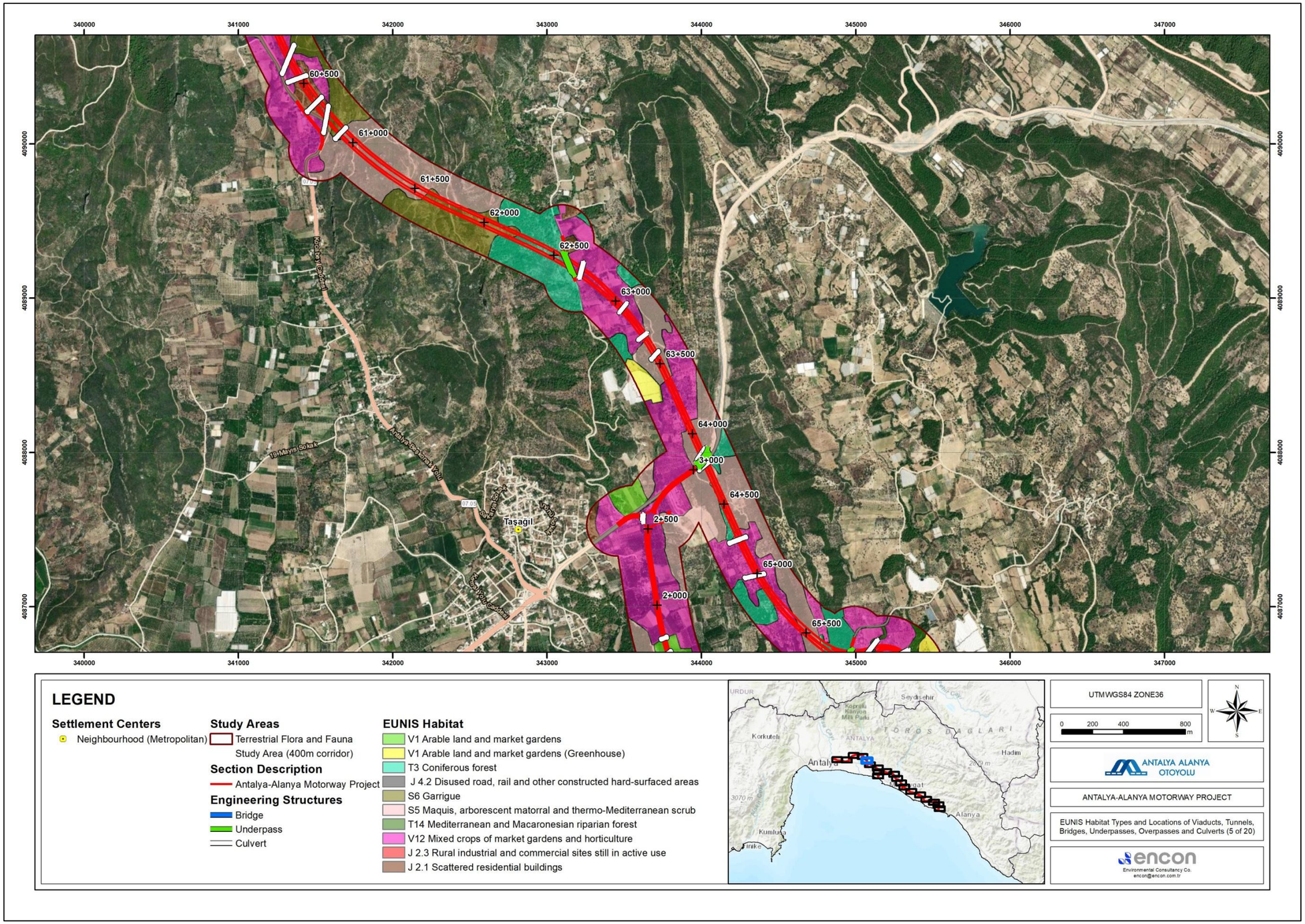


Figure 5 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (5/20)

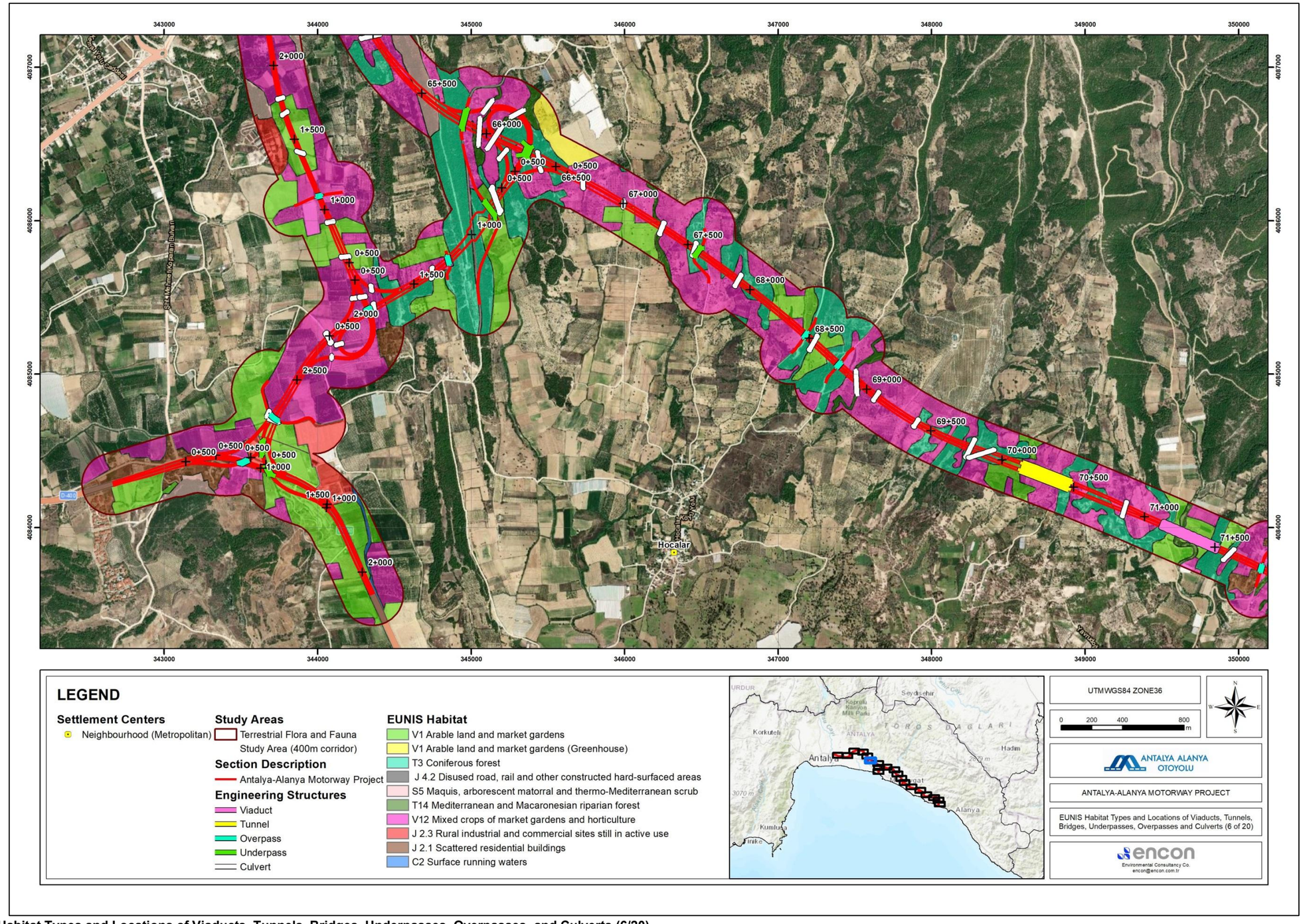


Figure 6 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (6/20)

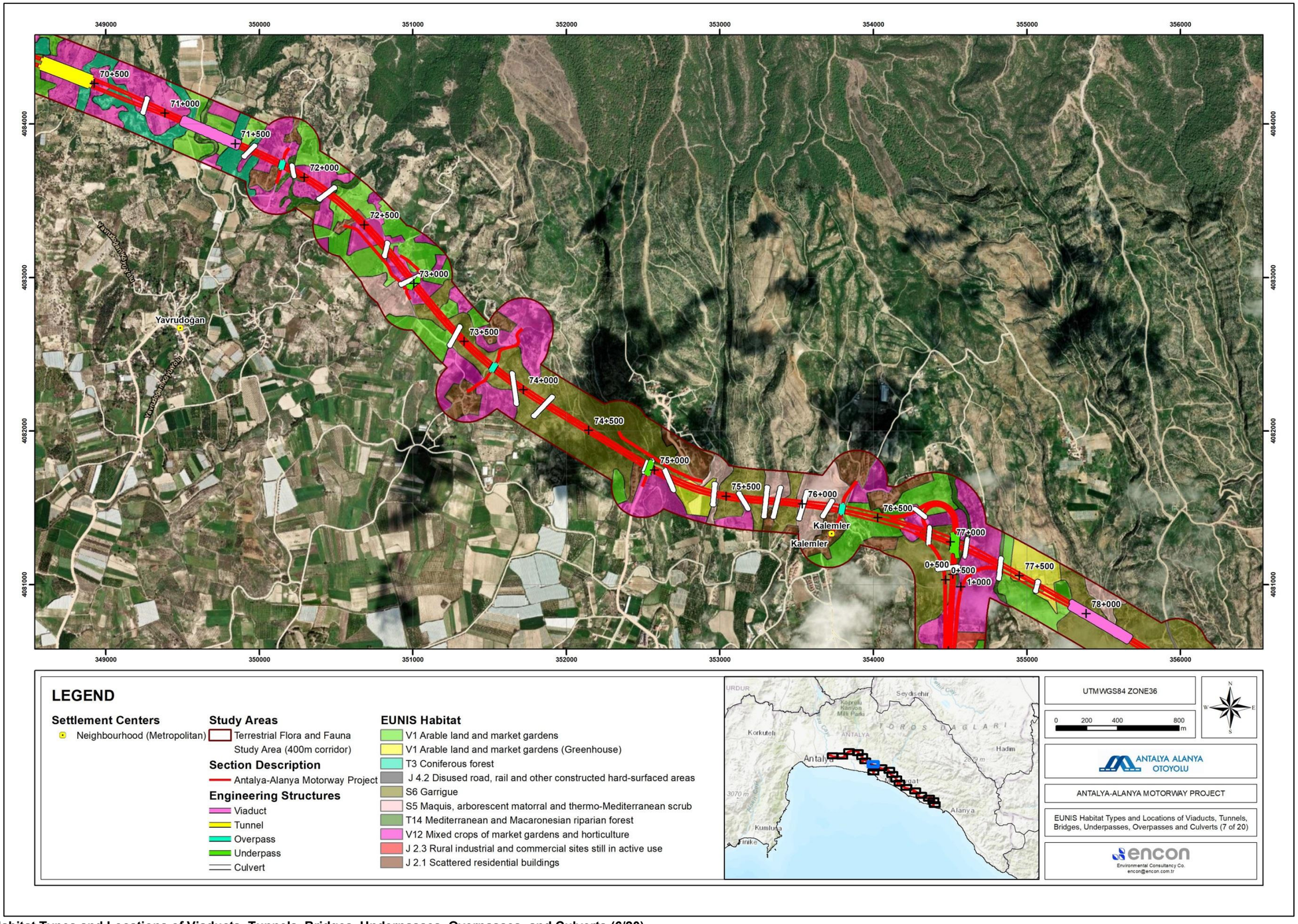


Figure 7 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (6/20)

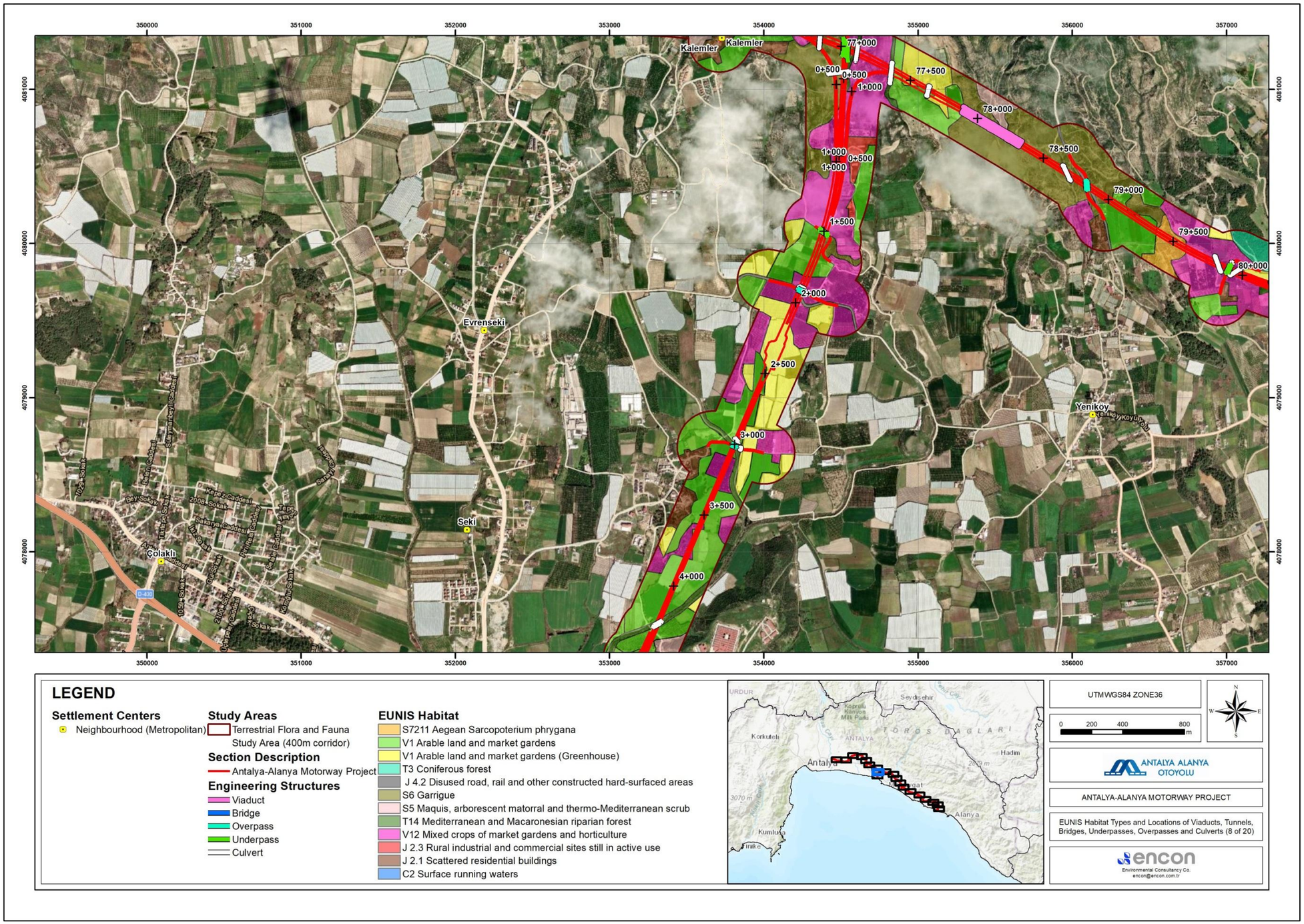


Figure 8 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (8/20)

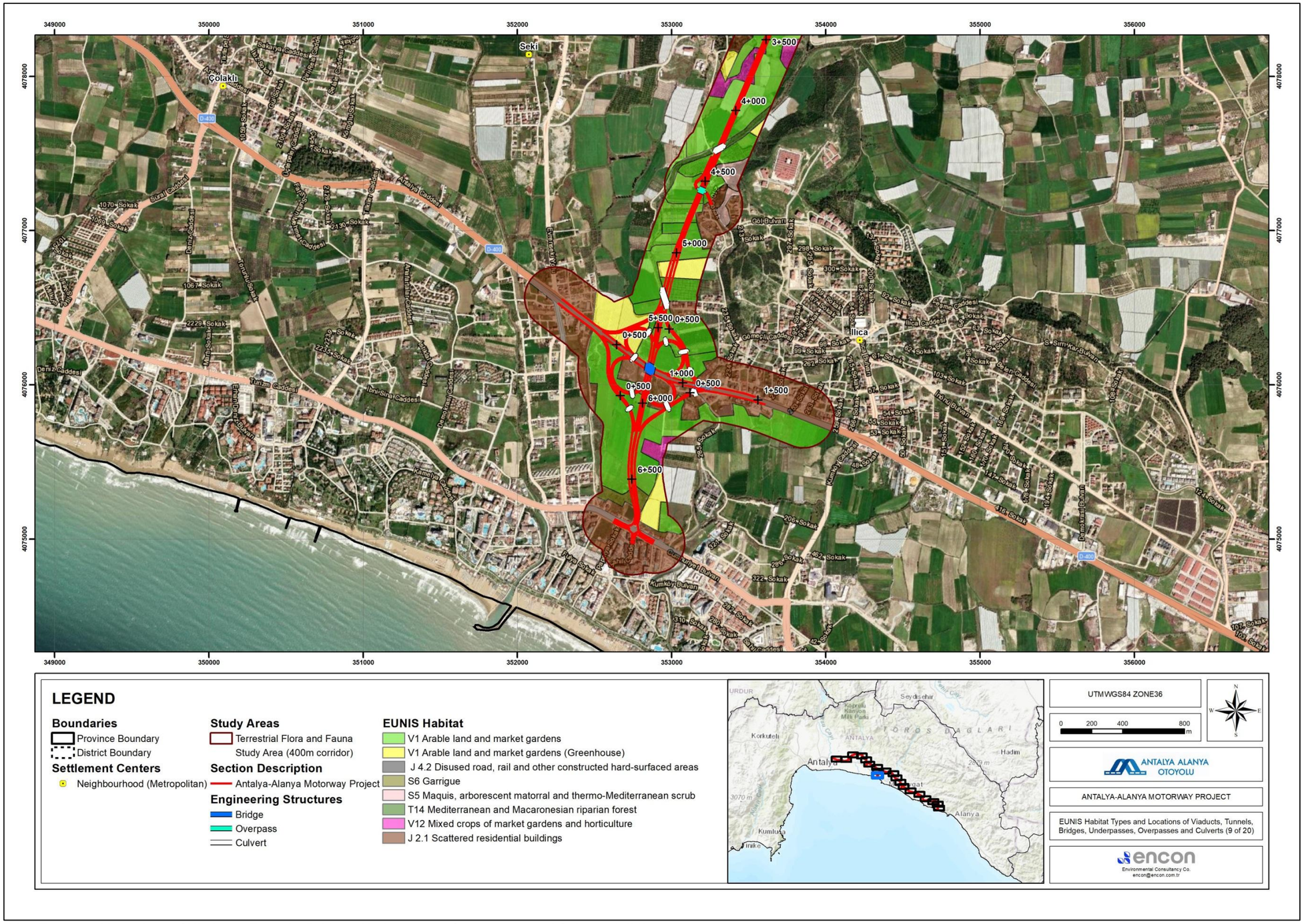


Figure 9 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (9/20)

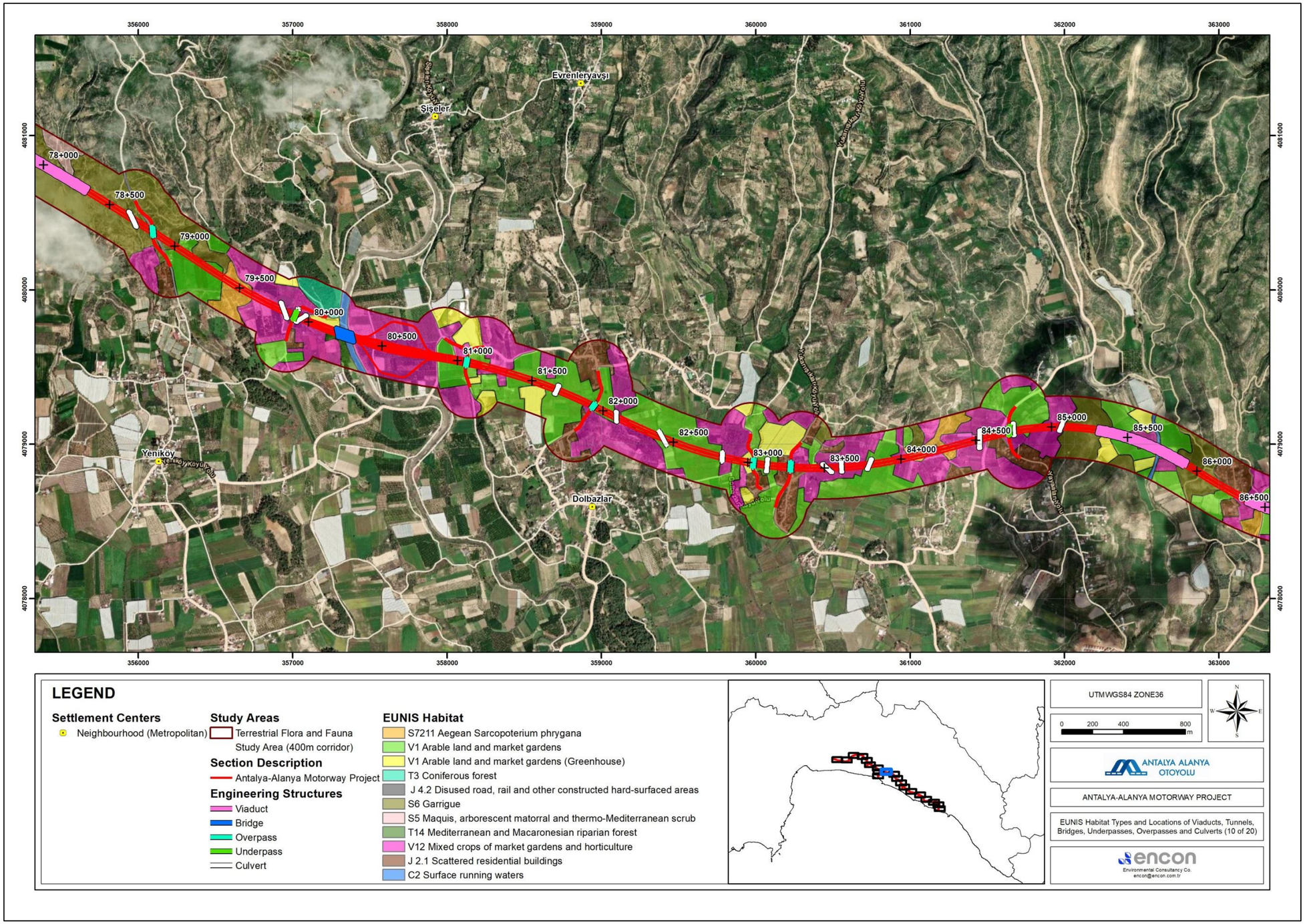


Figure 10 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (10/20)

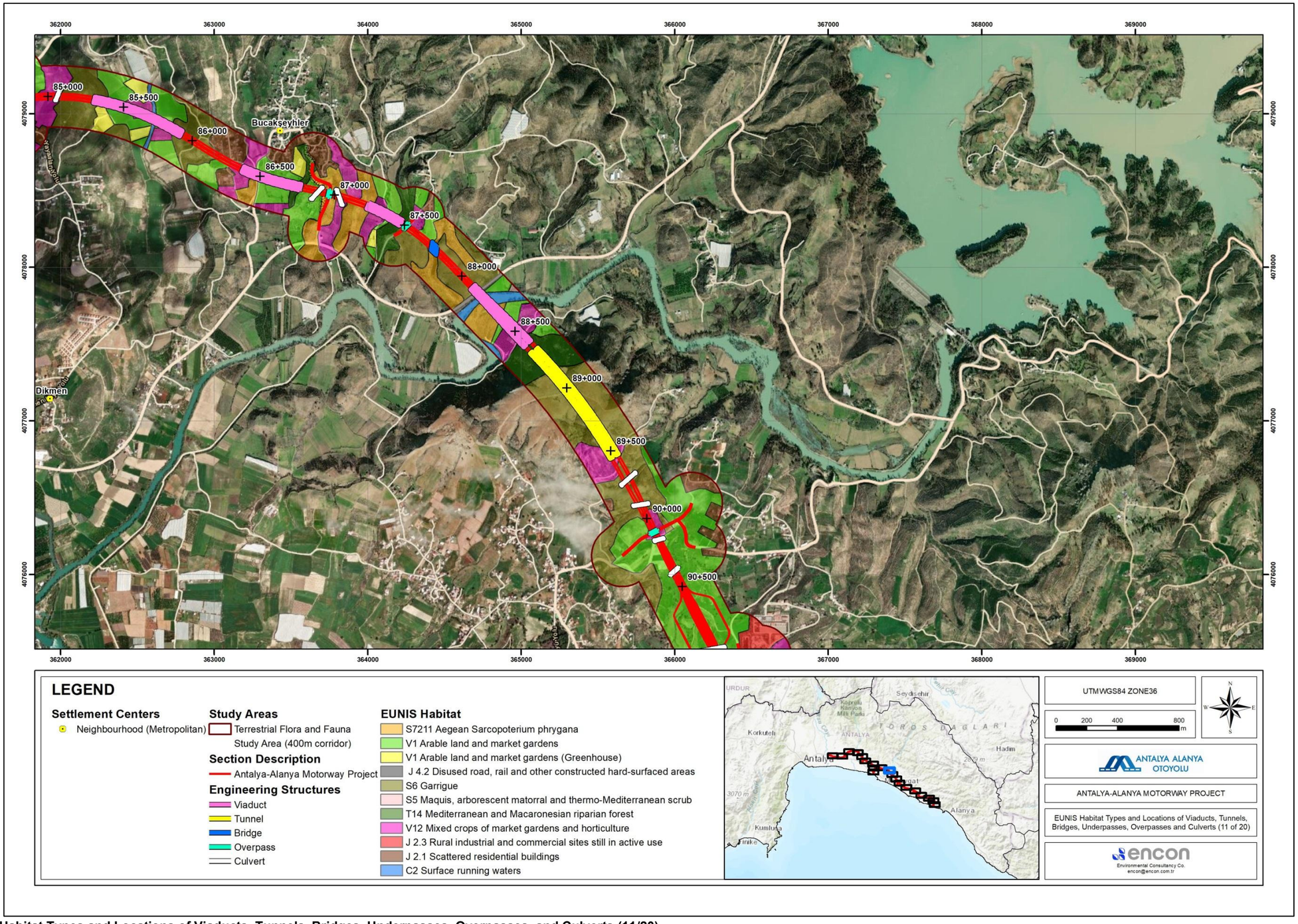


Figure 11 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (11/20)

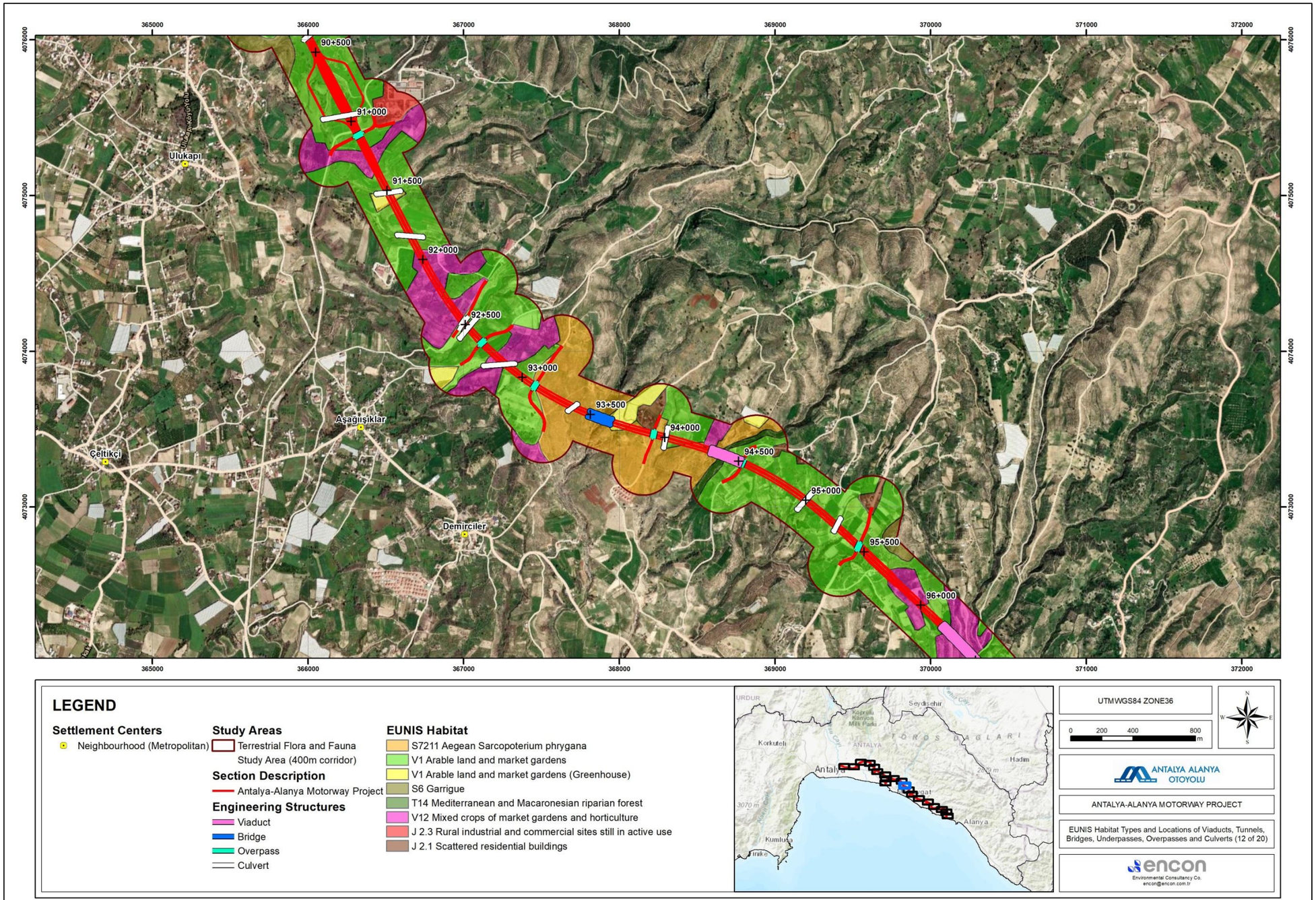


Figure 12 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (12/20)

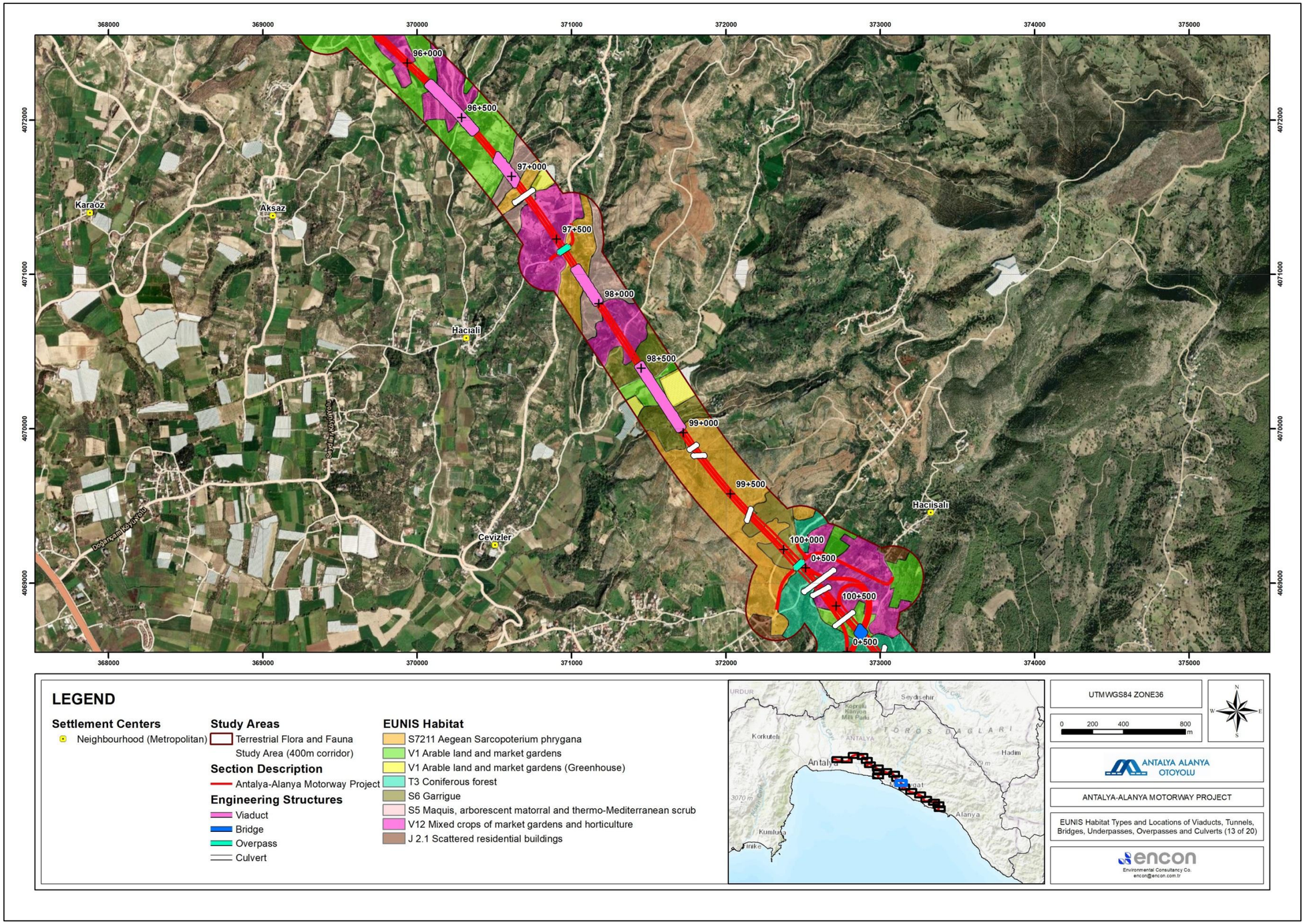


Figure 13 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (13/20)

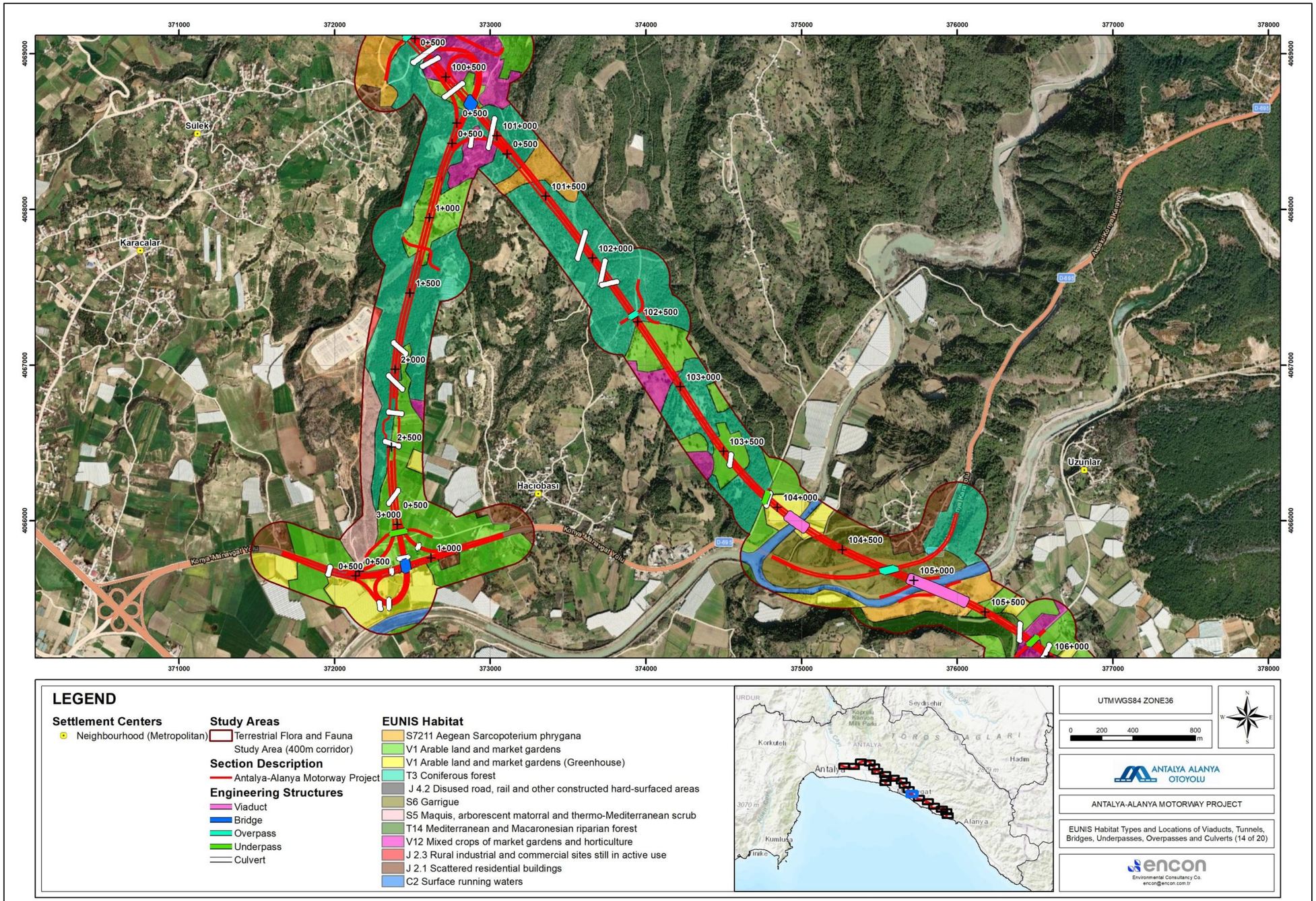


Figure 14 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (14/20)

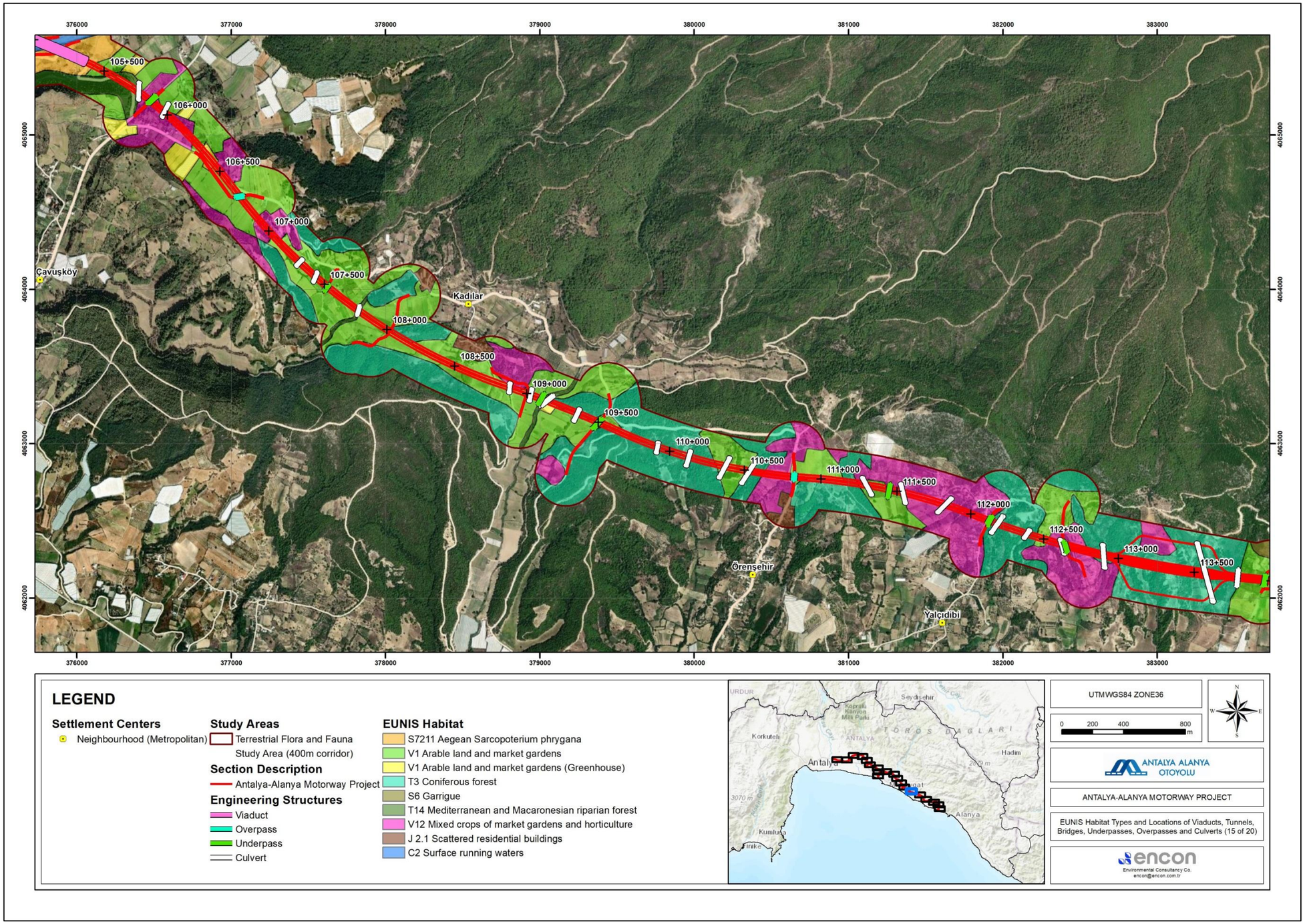


Figure 15 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (15/20)

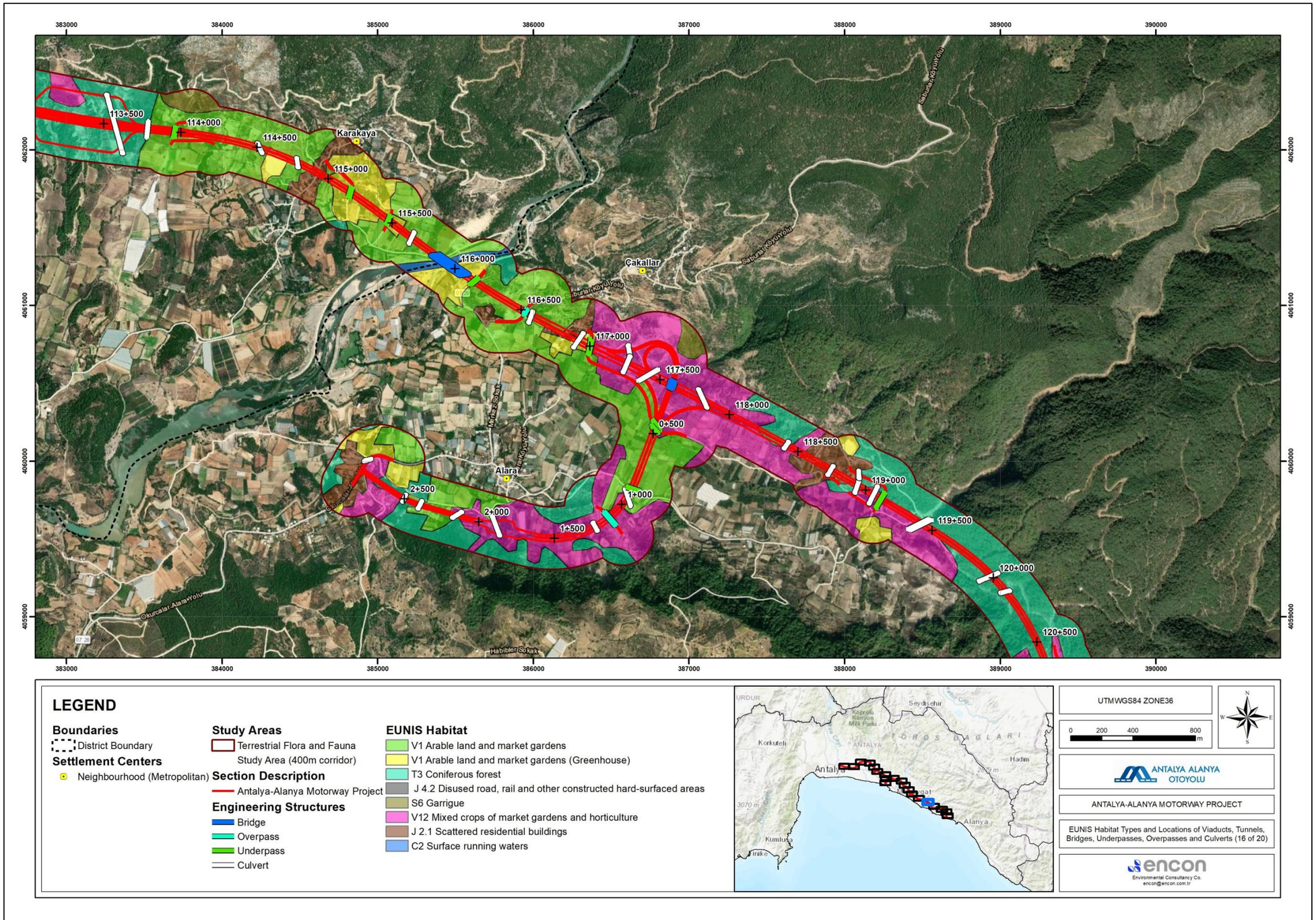


Figure 16 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (16/20)

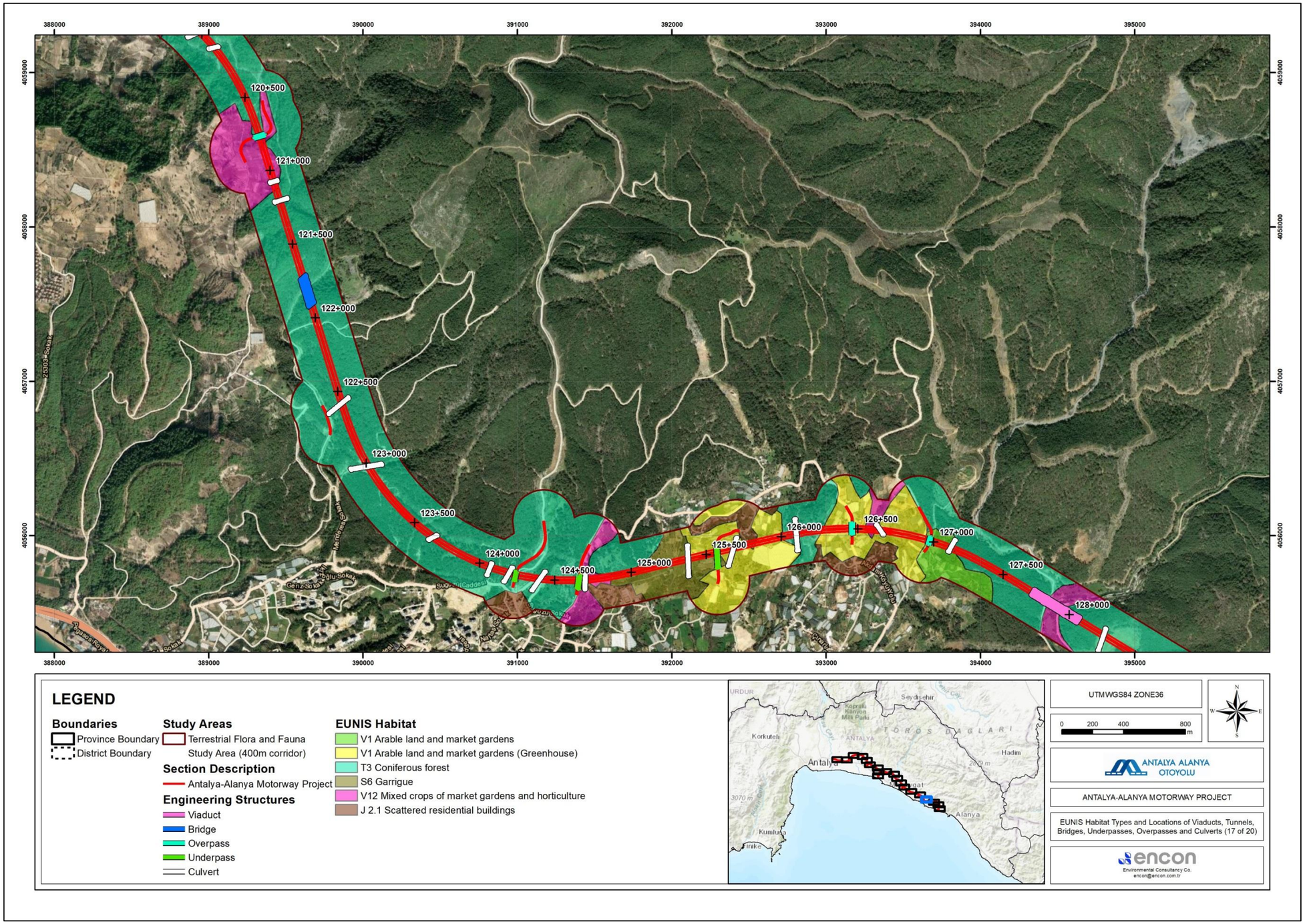


Figure 17 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (17/20)

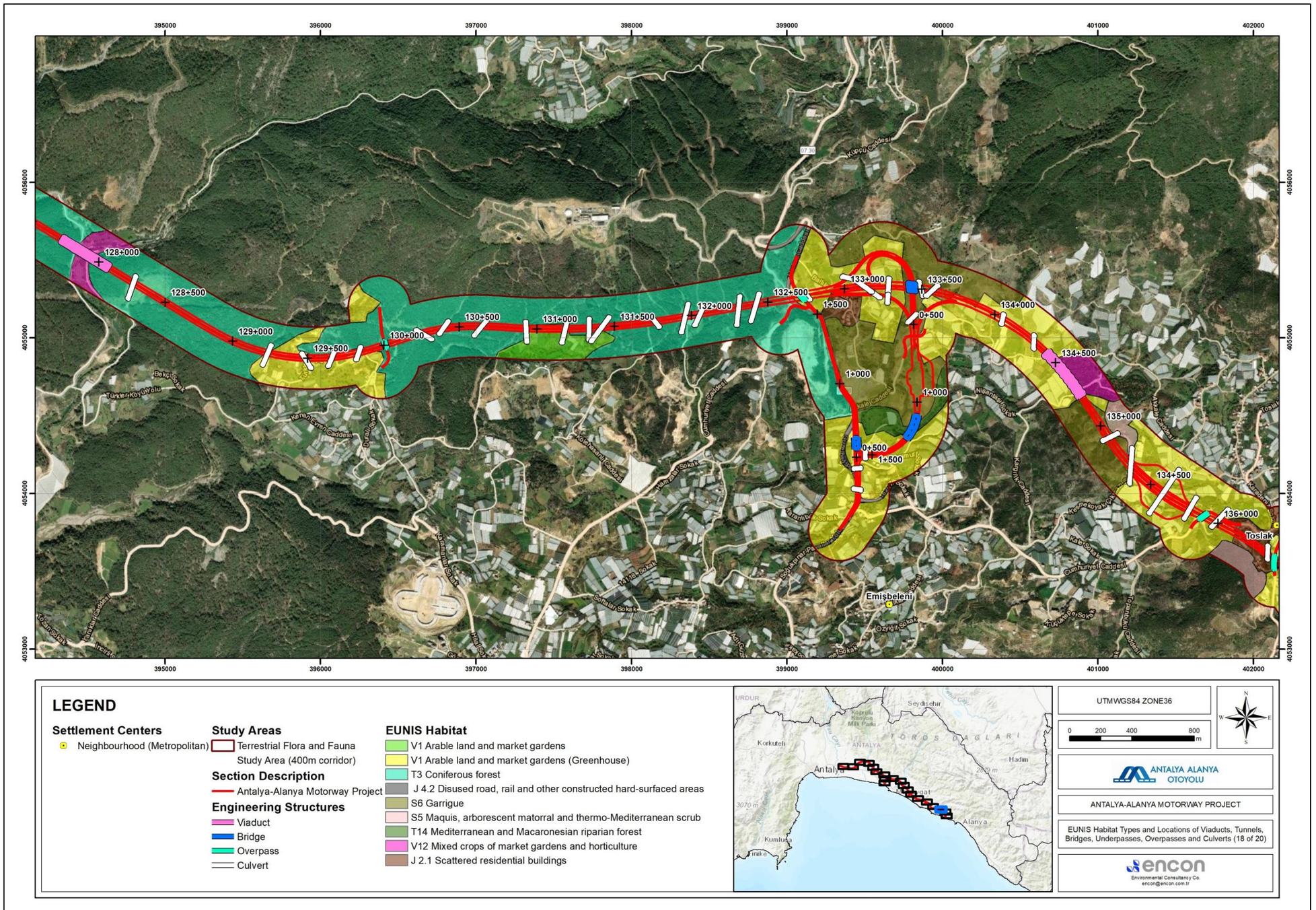


Figure 18 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (18/20)

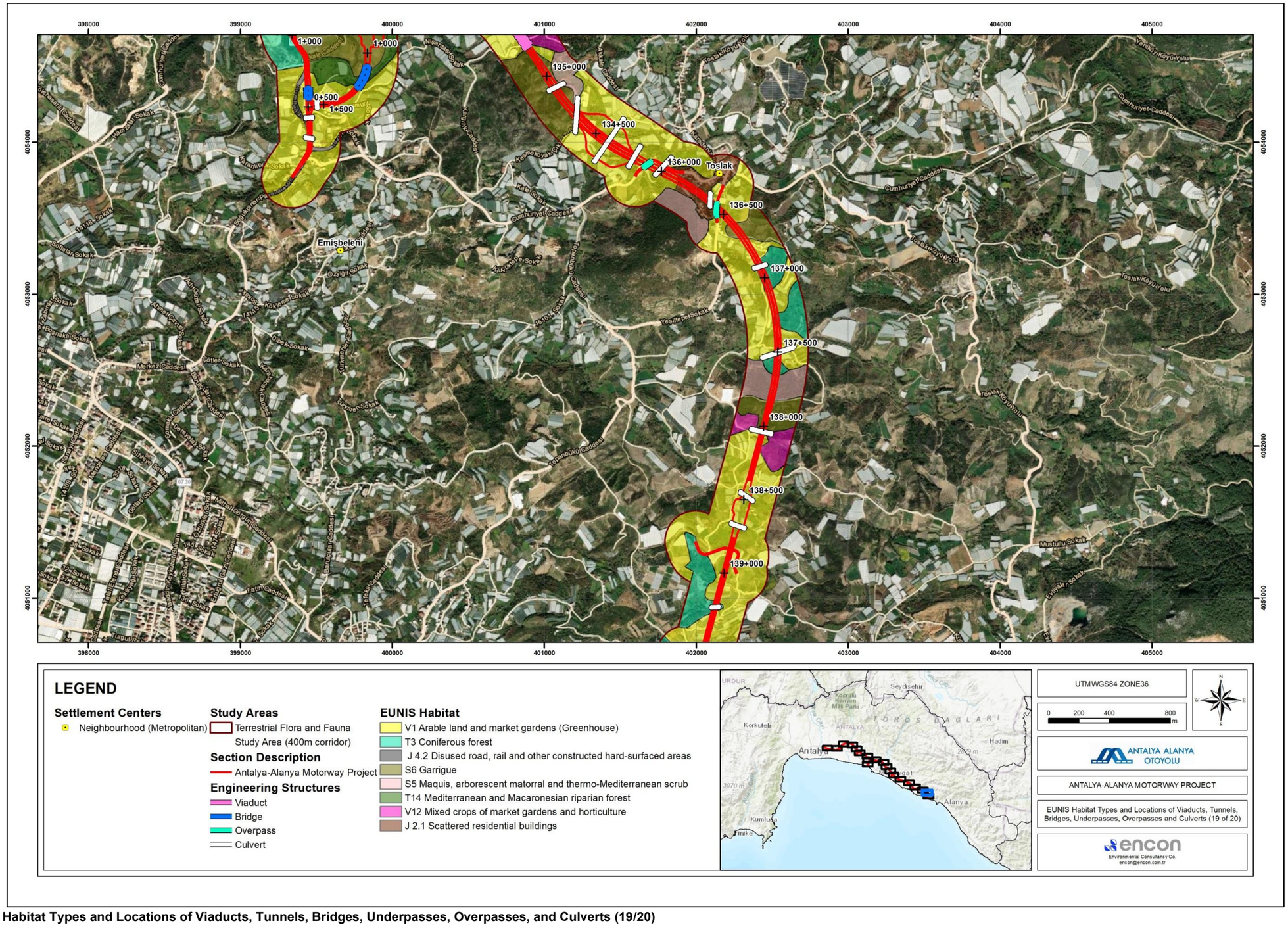


Figure 19 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (19/20)

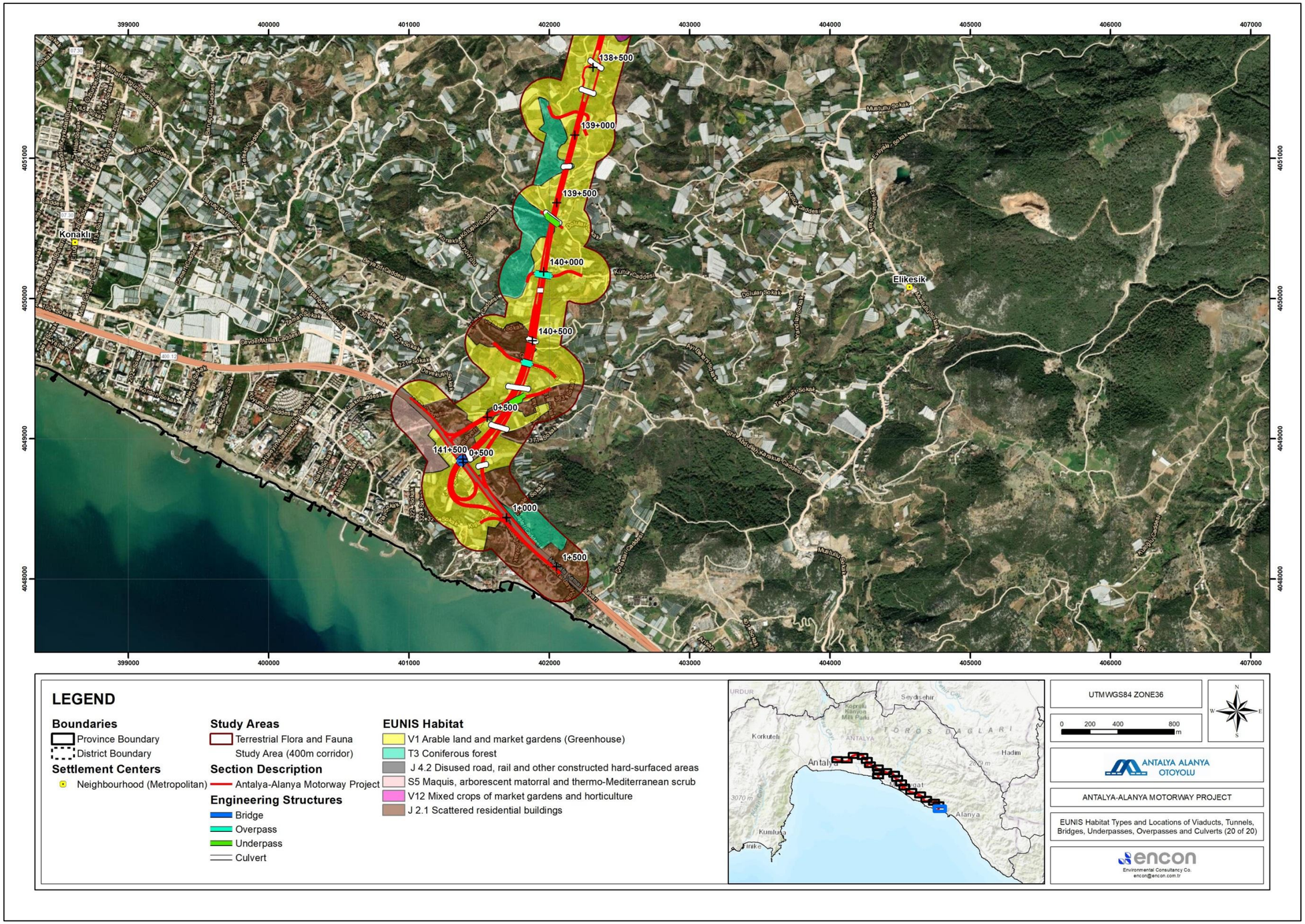
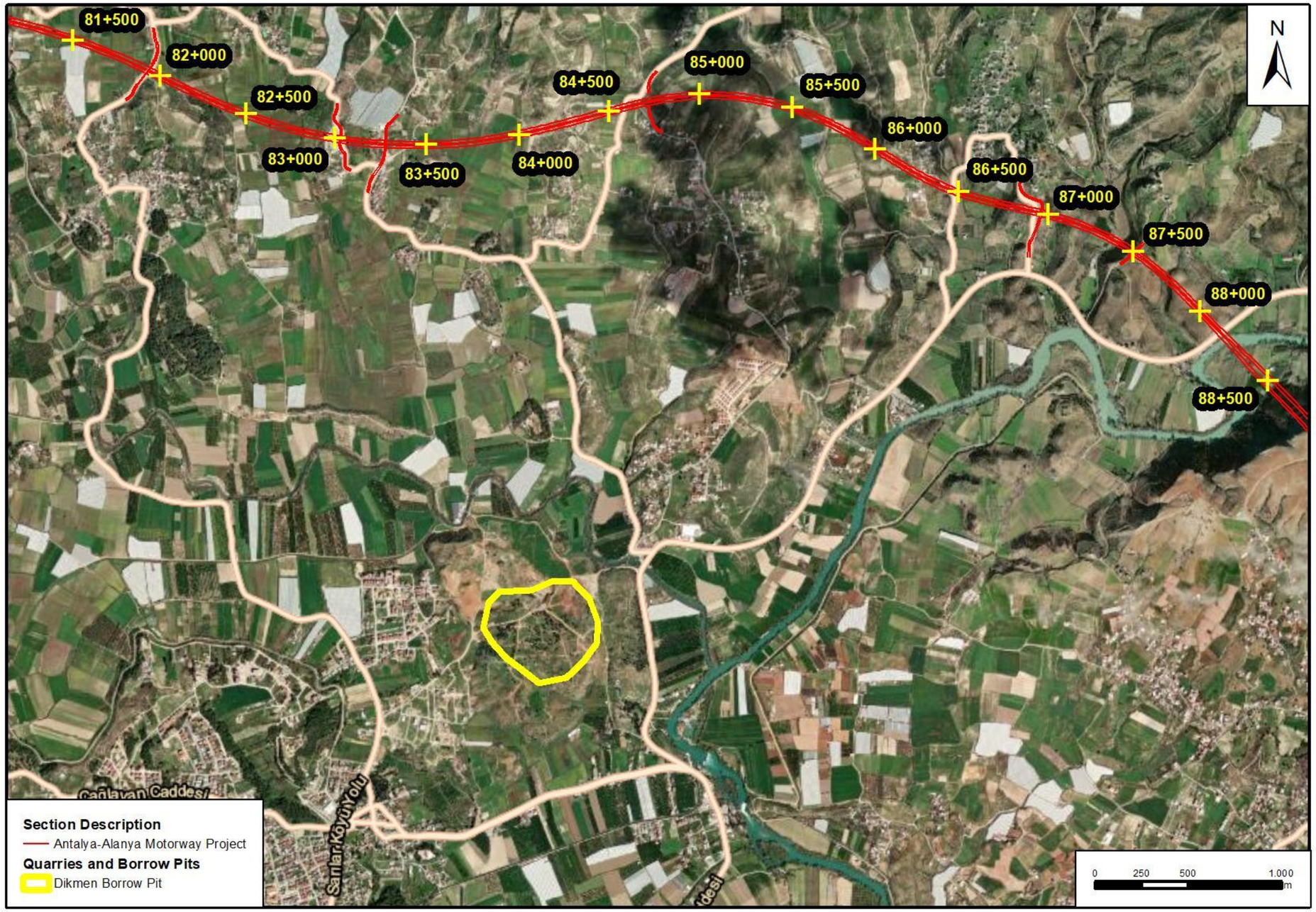


Figure 20 EUNIS Habitat Types and Locations of Viaducts, Tunnels, Bridges, Underpasses, Overpasses, and Culverts (20/20)



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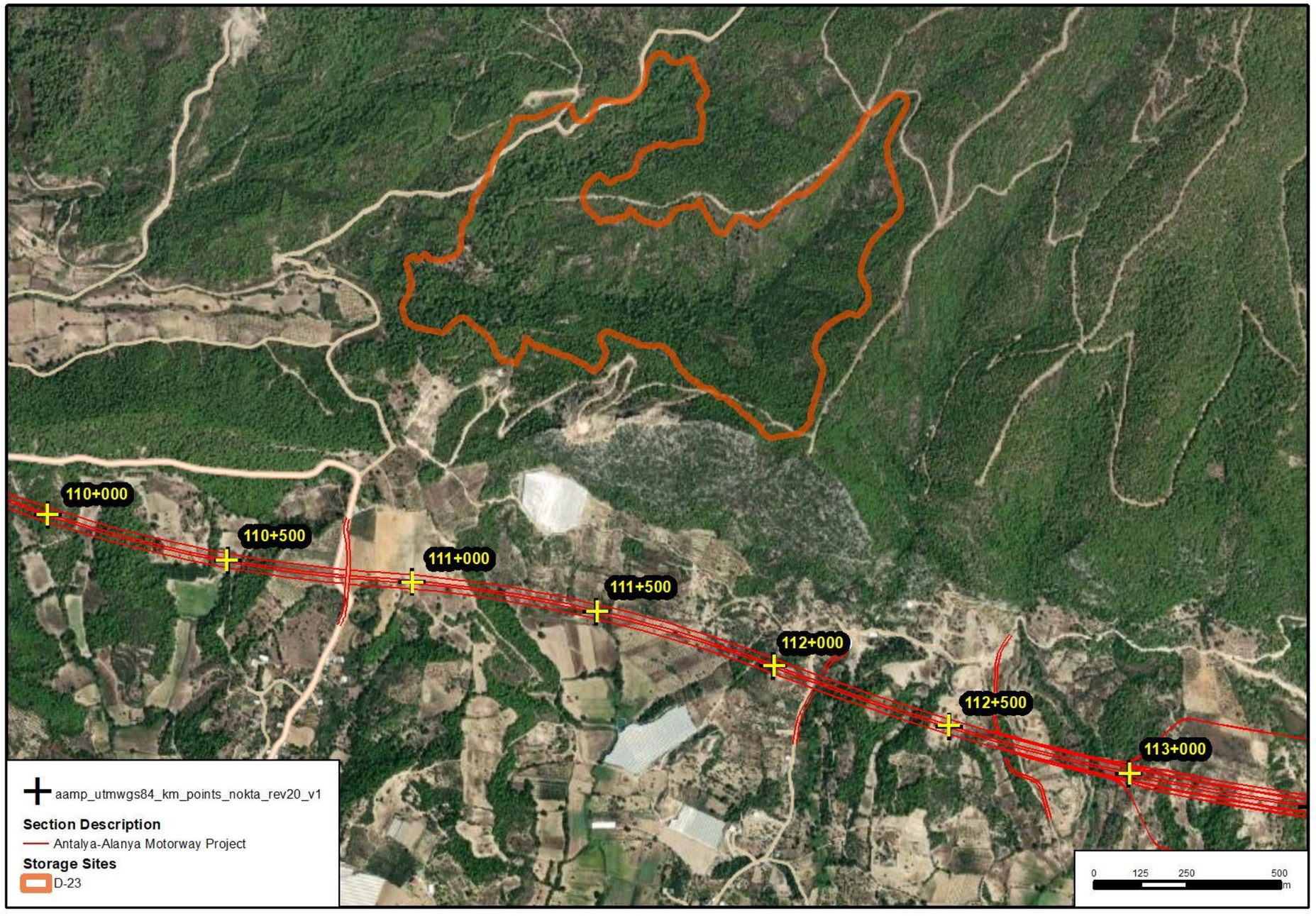

Figure 22 Location of Storage Area D-23



TRAFFIC DUE DILIGENCE REPORT

Alanya-Antalya Motorway

DRAFT

VERSION 0

OCTOBER 8, 2024

PREPARED FOR

Deutsche Bank

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Glossary

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AC / Assigned Company	Also referred to as the Borrower. Not yet formed
Administration/KGM	General Directorate of Highways of the Republic of Turkey (Karayolları Genel Müdürlüğü)
AID	Automatic Incident Detection
ave.	Average
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CCTV	Closed Circuit Television
CPI	Customer Price Index
DBOT	Design-Build-Operate-Transfer
DGV	Dangerous Goods Vehicles
EBIT	Earnings before interest and tax
EBITDA	Earnings before interest, tax, depreciation and amortization
EPC	Engineering, Procurement and Construction
EPC Contract	The Engineering, Procurement and Construction Contract
EPC Contractor	Not yet determined
ESIA	Environmental and Social Impact Assessment
EU	European Union
EUR	Euro
FDI	Foreign Direct Investment
FX	Foreign Exchange
GDP	Gross Domestic Product
GRP	Gross Regional Product
HM	Heavy Maintenance
HMW	Heavy Maintenance Works
hr	hour
IC	Implementation Contract
k	thousand
Lenders	The finance parties acting as Lenders under the Facility Agreement
LOS	Level of Service
LPI	Logistics Performance Index
Motorway	Antalya Alanya Motorway
MSF	Motorway Service Facilities

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MSFA Contract	Motorway Service Facilities Assignment Contract
MTP	Medium-term Economic Program
NTMP2017	National Transport Master Plan 2017, MoTMC/EU
O&M	Operation and Maintenance
O&M Company	Not yet determined
O&M Contract	The operation and maintenance contract
OIZ	Organized Industrial Zone
OPEX	Operational Expenditure
p.a.	Per annum
PAX	Passengers
pcu	Passenger Car Unit
PPP	Public Private Partnership
Project	The design, construction, completion, operation, maintenance and repair of the Antalya Alanya Motorway
SPV	Special Purpose Vehicle Company
SWOT	Strengths, Weaknesses, Opportunities and Threats
TCDD	Turkish State Railways
TCR	Traffic Control Room
TEM	Trans-European Motorway
TEU	Twenty-foot Equivalent Unit (used for describing capacity of container ships)
TIA	Total Investment Amount
TL	Turkish Lira
TUIK	Turkish Statistical Institute
USD / US$	US Dollar

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1.0 *Executive Summary*

This traffic due diligence report assesses projected traffic demand on the Antalya-Alanya Motorway Project (hereafter, "the Project"), a planned 122-kilometer motorway along Türkiye's Mediterranean. The Project aims to establish a high-speed, high-capacity (2x3 lanes) connection between the cities of Antalya and Alanya procured through a Build-Operate-Transfer (BOT) model as defined in Law No. 3996.

Representing one of two sub-projects comprising the larger Afyonkarahisar-Alanya Motorway, the Antalya-Alanya segment specifically connects the Serik and Alanya districts within the Antalya province. The estimated total investment for this project is approximately €2.3 billion.

The traffic forecasts presented in this report cover a 12-year period. The analysis assumes the motorway will become operational in 2028. Traffic projections are based on 2028 as the base year and consider four key future years: 2028, 2032, 2036, and 2040.

The project includes a traffic guarantee ("MRG"), specifying a minimum number of vehicles (expressed in automobile equivalents, or passenger car units) that are expected to use the motorway in both directions. (Article 29 of IC) For the Antalya-Alanya Motorway Project (122 Km of motorway length subject to guarantee), the total guaranteed AADT in Automobile Equivalents in both directions is 100,000 Automobile Equivalents/Day. Traffic Guarantee is indexed to IC Effective Date and expected to hoover around c.EUR730K/day in IC Effective Date real terms.

According to the 2053 Logistic Master Plan, Turkey's motorway density is at the level of 4.5 km/1,000 km². This figure is considerably below the level of developed countries (24.25 km per 1,000 km² in Japan; 48.83 km in South Korea; 37.54 km in Germany; 34.56 km in Spain; 22.62 km in France). Increasing Turkey's motorway density is considered a realistic solution for providing a fast and safe transportation infrastructure. By implementing motorway projects planned for the 2021-2023 and 2023-2035 periods, it is projected that the motorway density can be increased to 10 km/1,000 km². While traffic congestion is generally less pronounced in Türkiye compared to more densely populated European countries, certain sections of the state road network experience significant traffic volumes, particularly around major urban centers and seasonally around tourism destinations, Antalya-Alanya alignment hits both these marks.

The Antalya-Alanya Motorway project strategically addresses pressing transportation needs in a region experiencing rapid growth in both tourism and local traffic. Tourism and agriculture represent the two main economic activity in the project catchment zone, which comprise some of the most populated cities in Turkiye and representative of a substantial proportion of GDP generated. Specifically, Antalya is experiencing a significant surge in tourism, with foreign tourist arrivals reaching over 20.6 million in 2023. This growth aligns with a broader trend of increased tourism revenue in the region (EY Tourism Update 2023). Overnight stays in Antalya's accommodations also reached a record high of 94 million in 2023, indicating both increased visitor numbers and potentially longer stays.

The current D400 highway, characterized by its passage through numerous settlements, exhibits traffic patterns akin to urban environments, leading to congestion and reduced travel speeds. (Environmental Impact Assessment, 2018) This situation is further exacerbated by the heavy traffic flow between Antalya International Airport and popular tourist destinations along the coast. It is therefore evaluated that the new motorway will not only provide a faster and more direct connection between key points but also significantly alleviate congestion on the D400, improving travel times and road safety for both residents and tourists.

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In this study, we have primarily utilized publicly available KGM traffic data and counts. We supported the data collection with TomTom data acquired through private channels and utilized our algorithms to estimate Origin-Destination ("OD") matrices. We have used satnav and other digital sources to estimate duration, distance and congestion levels especially in review of the existing state road service levels.

We have made use of reputable national and international databases to collate socioeconomic data, including population, GDP, and tourism statistics. We have included salient points informing our forecasts within the body of this report, specifically under Section 3 and 4. We note that the region's positive economic outlook, rising car ownership rates, and continuous growth in both domestic and international tourism contribute to a favorable demand environment for the motorway.

We have calibrated our traffic model using historical data and considering key socioeconomic drivers. We utilized the Tamin and Willumsen (1989) method in modeling capture rates based on generalized time considerations.

1.1 Key Findings

In review, we forecast that the total Average Annual Daily Traffic (AADT) on the Motorway will be c.25K passenger car equivalent units (pcu) in 2028, rising to c.60K pcu by 2040.

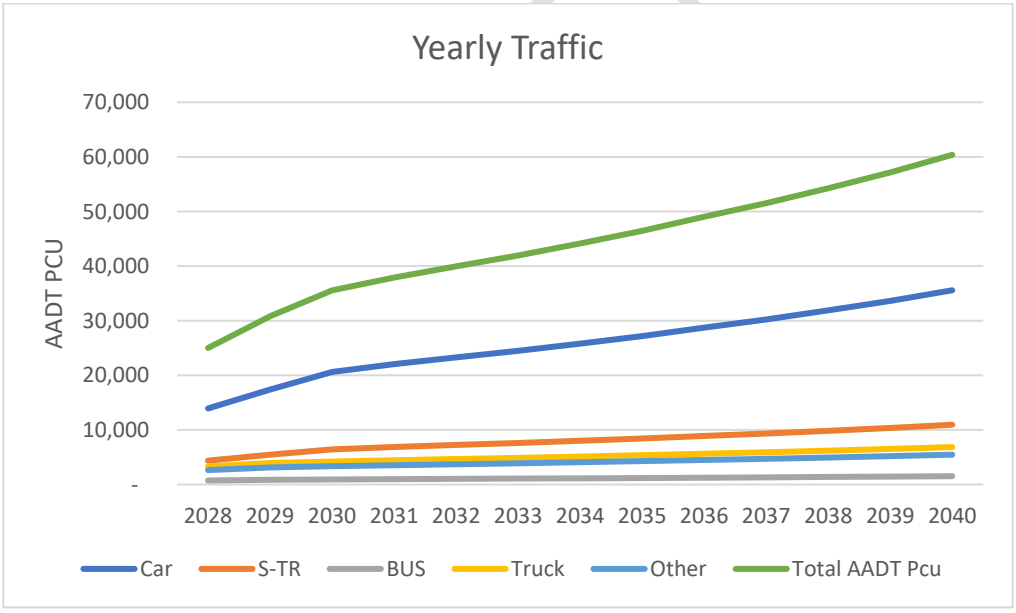

Figure 1. Yearly Traffic of the Motorway

As can be observed in Figure 1, light vehicle growth is projected to outpace truck growth, leading to a further decline in heavy-vehicle representation which is forecasted at 27% in 2028, and this is projected to fall to 22% in 2040.

Average capture rate at the beginning of the operation is forecasted to be 44%. On the other hand, the total traffic of state road in 2040 will be c.23K AADT PCU while it will be c.60K AADT PCU in the motorway resulting in an average diversion rate of c.72% at the end of the concession term.

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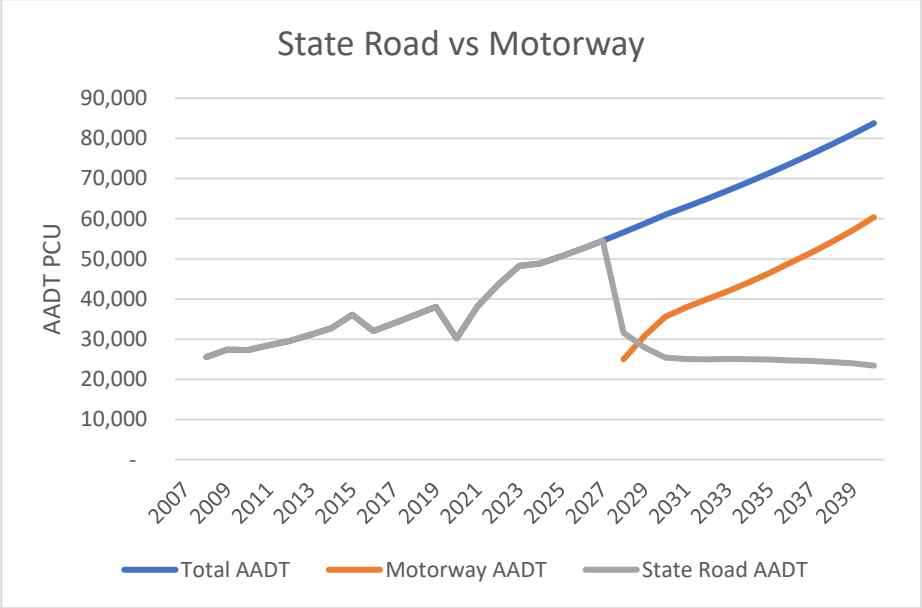

Figure 2. State Road vs Motorway Capture

Further details of our findings can be found under Section 5 of this report. Sensitivity tests have not been carried out at this stage but will be included in Section 6 of this report.

1.2 Opportunities And Risks

Within the traffic demand forecasting exercise, we carried out a market review and evaluated opportunities and risks surrounding the traffic demand and need for the Project. The market review also informs the traffic forecast parameters, therefore has been a critical element of the forecasting process. The main opportunities and risks associated with the Project can be summarized as follows.

Strong Government Support: The Antalya-Alanya Motorway has received strong endorsement from the Turkish government, recognizing its significance in supporting economic growth, particularly in the tourism sector. (12th Turkiye Development Plan, 2023)

Strategic Location: The project's location along Türkiye's Mediterranean coast, a prime tourist destination, positions it to capitalize on the region's existing tourism infrastructure and anticipated future growth. (EY Tourism Update, 2023)

Traffic Guarantee: The inclusion of a traffic guarantee in the concession contract provides a level of revenue certainty for the project, mitigating the risk of lower-than-expected traffic volumes. (Implementation Contract, Article 29)

Environmental Impacts: The construction of a new motorway through a sensitive coastal environment will inevitably raise environmental concerns. The project's Environmental Impact Assessment (2018) must thoroughly address potential impacts on biodiversity, water resources, and air quality, and propose robust mitigation measures to minimize adverse effects.

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Competition from Existing Road: The existing D400, despite its limitations, offers a toll-free alternative to the motorway. The traffic model must accurately estimate the proportion of drivers willing to pay for the time savings and convenience offered by the new motorway.

Economic Uncertainty: Global economic volatility, particularly in relation to tourism, could impact traffic volumes and revenue projections. The sensitivity analysis must incorporate scenarios that account for potential economic downturns.

We have carried out a SWOT analysis based on the market review completed in the catchment area of the Project.

The salient points evaluated to contribute to the Project SWOT can be summarized as follows:

Table 1. SWOT Analysis

Strength	Weakness
➢ Strategic Location in a Thriving Tourism Corridor: The motorway's location along the Mediterranean coast, connecting two major tourist destinations, positions it to capture significant tourism-related traffic. ➢ Strong Government Support and Public-Private Partnership Model: The project benefits from government commitment and a well-established PPP framework, providing financial stability and expertise. Guaranteed income will be monthly basis. ➢ Potential for Induced Demand and Regional Development: The motorway's improved accessibility can stimulate new economic activity and generate additional traffic beyond initial projections.	➢ Dependence on the Tourism Sector: The project's reliance on tourism revenue makes it vulnerable to fluctuations in global tourism trends and potential economic downturns. ➢ Competition from Existing and Planned Alternative Routes: The existing D400 state road and planned improvements present competition, potentially diverting some traffic away from the motorway. ➢ Exposure to Currency Fluctuations and Inflation: The depreciation of the Turkish Lira against the Euro, coupled with potential inflation risks, can impact construction costs, financing arrangements, and toll affordability.
Opportunities	**Threats**
➢ Integration with Other Transportation Modes: Developing seamless connections to airports, ports, and railway stations can enhance the motorway's attractiveness and generate multi-modal traffic. ➢ Leveraging Technology for Enhanced Efficiency and Safety: Implementing intelligent transportation systems (ITS) and exploring innovative toll collection methods can improve traffic flow, enhance safety, and reduce operational costs. ➢ Promoting Sustainable Transportation Practices: Integrating environmental considerations into project design and operation, such as measures for climate resilience and promoting electric vehicle charging infrastructure, can enhance the project's sustainability profile.	➢ Global Economic Slowdown or Geopolitical Instability: Unforeseen global events could negatively impact tourism and overall economic activity in the region, affecting traffic volumes. ➢ Delays in Construction or Cost Overruns: Project delays or unexpected cost increases can strain financing arrangements and impact the project's financial viability. ➢ Changes in Government Policy or Regulations: Shifts in government policy or regulations related to toll rates, environmental standards, or transportation could impact the project's profitability and long-term outlook.

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2.0 *Introduction*

2.1 Project Description

This traffic due diligence report assesses the Antalya-Alanya Motorway Project (hereafter, "the Project"), a planned 122-kilometer motorway along Türkiye's Mediterranean. The Project aims to establish a high-speed, high-capacity (2x3 lanes) connection between the cities of Antalya and Alanya procured through a Build-Operate-Transfer (BOT) model as defined in Law No. 3996. This report analyzes the project's traffic potential, assessing key assumptions and risks, and provides insights to support lender decision-making.

Representing one of two sub-projects comprising the larger Afyonkarahisar-Alanya Motorway, the Antalya-Alanya segment specifically connects the Serik and Alanya districts within the Antalya province. The estimated total investment for this project is approximately €2.3 billion.



Figure 3. Current Motorway Network of Turkey (KGM 2023) and Antalya – Alanya Motorway

The contract has been awarded to Limak on December 15th, 2023, outlines a build-operate-transfer model with a total duration of 15 years. This period includes a 3-year construction phase followed by a 12-year operational phase. Project routing is shown in Figure 4.

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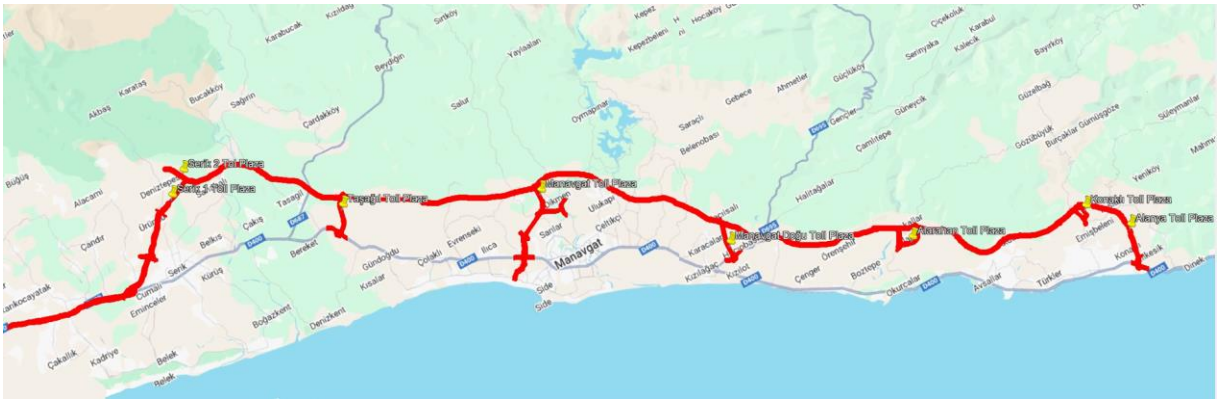

Figure 4: The Project Route

In traffic review and analysis motorway entry and exit points constitute model nodes. Therefore, corresponding distances and associated time and cost are critical factors in review. We understand the conceptual design segmental distances are as follows. Any substantial changes following detailed design may need to be reflected in the modeling exercise thus could impact forecast results. The current nodes and associated distances are presented in Table 2 and current locations of planned tolling stations are depicted in Figure 4.

Table 2. Antalya Alanya Motorway Distance Km between Toll Stations

		Exit Toll							
	Station	Serik 1	Serik 2	Taşağıl	Manavgat	Manavgat Doğu	Alarahan	Konaklı	Alanya
Entry Toll	Serik 1	x	x	17.9	34.2	52.7	68.9	83.8	88.4
	Serik 2	x	x	16.2	32.5	51.0	67.2	82.1	86.7
	Taşağıl	17.9	16.2	x	18.7	37.2	53.4	68.3	72.9
	Manavgat	34.2	32.5	18.7	x	20.1	36.3	51.2	55.8
	Manavgat Doğu	52.7	51.0	37.2	20.1	x	20.6	35.5	40.1
	Alarahan	68.9	67.2	53.4	36.3	20.6	x	18.1	22.7
	Konaklı	83.8	82.1	68.3	51.2	35.5	18.1	x	5.8
	Alanya	88.4	86.7	72.9	55.8	40.1	22.7	5.8	x

- These distances include connection roads between the main line and the connection roads.
- These distances may change according to the upcoming design changes. This table is created according to the data received on August 14, 2024.

2.2 Key Project Inputs

The analysis presented in this report is based on several key project inputs derived from the Implementation Contract (IC) and associated documents:

- **Contract Period:** The total contract period, encompassing both construction and operation phases, is 15 years, with a 3-year Construction Period and a 12-year Operation Period. (Article 5 of IC)

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- **Total Investment Amount:** The investment amount, excluding VAT and the Construction Period Financing Cost but including the cost of financing, is specified in the Priced Quantity Schedule (Form No-2) attached to the Letter of Offer. (Article 38 of IC)

- **Equity:** The Designated Company will contribute a minimum of 30% of the total investment amount as equity. (Article 8 of IC)

- **Financing:** The project will be financed through a combination of equity and loans, with the Designated Company responsible for securing all financing. (Article 8 of IC)

- **Toll Rates:** The initial toll rates, excluding VAT, are determined through a competitive bidding process based on a discount over the Ceiling Fee set by the Administration (Winning bid is 0.0598 Euro/km). (Articles 9 of IC)

- **Traffic Guarantee:** The project includes a traffic guarantee ("MRG"), specifying a minimum number of vehicles (expressed in automobile equivalents, or passenger car units) that are expected to use the motorway in both directions. (Article 29 of IC) For the Antalya-Alanya Motorway Project (122 Km of motorway length subject to guarantee), the total guaranteed AADT in Automobile Equivalents in both directions is 100,000 Automobile Equivalents/Day. Traffic Guarantee is indexed to IC Effective Date and shall be calculated using the following formula;

$$Gn_1 = FTL\,n_1 \times Ln \times Sn_1$$

Where;

Sn1= Total number of guaranteed vehicle passes (car equivalent) on a monthly basis in the First Operating Semester (100,000 Automobile Equivalents/Day in both directions)

$FTLn_1$ = Toll in TL for the First Operational Half of the Operational Year ;

Ln = Guaranteed length of motorway (km) (122 km).

Gn_1 = Guaranteed revenue (TL) on monthly basis for the First Operational Half

Further details on the principles of the monthly top up mechanism as it applies to the MRG can be found in Article 9 of the IC. Based on the formulation provided, the daily MRG amount as at the date of IC Effective Date shall be c.EUR730K/day.

$$Gn_1 * = 0.0598\ EUR/km \times 122\ km \times 100{,}000 = 729{,}560\ EUR/day$$

Expropriation: The Assigned Company is responsible for paying 500,000,000 TL towards the expropriation costs of the project site, with the remaining costs covered by the Administration. (Article 13 of IC)

- **Procurement:** Limak was awarded the tender contract to build-operate-transfer the Antalya-Alanya Motorway on December 15, 2023.

- **Early Completion:** If the construction period is completed ahead of schedule, the operational period will start with construction completion; however, the total concession period of 15 years will remain unchanged. This effectively increases the operation term by the same amount construction term may be expedited.

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2.3 Methodology

2.3.1 DATA SOURCES AND LIMITATIONS

Key data sources include historical traffic volume reports from the General Directorate of Highways (KGM) dating back to 2007, as well as relevant socioeconomic and demographic data.

It is important to acknowledge limitations inherent in relying on data exclusively from 2007 onwards. While this timeframe offers valuable insights, it may not fully capture long-term traffic patterns spanning several decades.

Seasonality: While the initial scope of work outlined the need for site visits and traffic surveys, these tasks will not be undertaken within the current project timeline. This decision stems from the understanding that comprehensive traffic data collection, particularly vehicle counts, necessitates observations across all four seasons to account for potential variations in traffic patterns. Given the time constraints of the current engagement, conducting such an extensive study would not be feasible. The analysis and subsequent findings presented in this report will therefore primarily utilize existing traffic data and relevant historical trends.

Locality: It is important to acknowledge the limitations of directly applying historical traffic data from the existing state road to the projected traffic volume on the planned toll motorway. While the existing road serves as a primary point of reference, its traffic patterns encompass a significant portion of local traffic traveling between the numerous small towns along its route. This localized traffic is not expected to fully transition to the toll motorway, as users traveling between these towns are likely to opt for the shorter and more direct route offered by the existing road. Consequently, relying solely on historical data from the existing road could lead to an overestimation of potential traffic on the new motorway. The traffic model and projections presented in this report will strive to address this limitation by factoring in the distinct traffic behaviors of local and through-traffic and relies on Origin-Destination ("OD") matrices developed using digital and public sources.

2.3.2 FORECAST HORIZON

The traffic forecasts presented in this report cover a 12-year period. The analysis assumes the motorway will become operational in 2028. Traffic projections are based on 2028 as the base year and consider four key future years: 2028, 2032, 2036, and 2040.

2.3.3 DATA COLLECTION

We have primarily utilized publicly available KGM traffic data and counts. We supported the data collection with TomTom data acquired through private channels and utilized our algorithms to estimate OD matrices. We have used satnav and other digital sources to estimate duration, distance and congestion levels especially in review of the existing state road service levels.

We have made use of reputable national and international databases to collate socioeconomic data, including population, GDP, and tourism statistics. Below list has been developed to present data availability and usage in our traffic forecast;

- General Directorate of Highways 2023 or 2022 Roadside Surveys (separated by seasons or months) - Requested directly from KGM but was not made available.
- 2019-2023 Monthly Traffic Data has been requested from KGM and received. Seasonality has been prorated based on this data and we consider this to be accurate. The data correlates with other comparative motorway deals we worked on in the domestic market.
- OD matrices have been generated according to TomTom Database October 2022 data and modified according to the KGM traffic data further to our mathematical modeling.

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- Ministry of Transport and Infrastructure Transport and Logistics Master Plan, 2053 full report and annexes.
- Gasoline Liter Price Forecast – Historical gasoline prices has been obtained from Petrol Ofisi A.Ş. Future prices in EUR has been forecasted by using Heat Roadmap Europe Analysis.
- Exchange rate (€/TRY) forecast – Sponsor's forecast has been used.
- GDP Real Growth Rate – for base case, IMF forecast has been used. For the sensitivity analysis, OECD and Oxford Economic Forecasts has been used.
- Population forecast (Both Turkey and Antalya) – TUIK historical and TUIK forecasts have been used.
- GDP/per capita USD forecast – It is a combination of IMF and TUIK forecasts.
- Inflation forecast in TL and EUR – Sponsor's forecast has been used.
- Country and province vehicle number forecast (car, truck, bus, other) - TUIK and other publicly available sources used.
- KGM regional directorate's planned underpass projects on state roads in the next 15 years – Turkiye 2053 Logistics Plan has been referred to.
- Hotel capacities, hotel bed capacity, accommodation statistics in the region - publicly available sources used
- Airport Passengers in the region - publicly available sources used.

All the background matrices have been merged with data collected for the above work, which is the basis of the model.

We directly communicated with KGM to request the monthly distribution of State Road traffic data, roadside survey data, and existing traffic analyses conducted in the region. However, we were informed that only the monthly distribution of traffic data related to State Roads could be provided, as the other data sets are not shared outside the organization.

2.3.4MARKET SEGMENTATION

The traffic analysis employs a market segmentation approach considering primary vehicle categories: cars, small trucks, buses, trucks and other vehicles. This segmentation allows for a nuanced understanding of traffic composition and its implications for toll revenue projections.

The traffic model forecasts traffic demand for different market segments separately. This is critical for the model to consider route-choice preferences between differing group conditions, costs, travel times, and determinants of market growth.

Toll vehicle classification in the project are depicted in Table 3, which comprise the pcu conversion factors we used in our reporting outcomes.

Table 3: Vehicle Class Type and Conversion Factors (IC)

Class Type	Description	Coefficient	Review Class
1	Standard Automobile	1.00	LV - Cars
2	Two axle automobile, if distance between axles greater or equal to 3.2 meter	1.60	LV – Small Trucks

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Class Type	Description	Coefficient	Review Class
3	Vehicle having 3 axles	1.90	HV - Buses
4	Vehicle having 4 or 5 axles	2.52	HV - Trucks
5	Vehicle having 6 axles	3.18	HV – Other Vehicle
6	Motorcycle	0.25	Not projected

In Turkey Class 1 and 2 present similar growth patterns and much like Class 1, light vehicle traffic, thus are projected based on passenger matrices or GDP/capita. It has been modelled as a function of car ownership, which is a function of GDP growth and population growth.

Classes 3, 4 and 5 traffic demand follow a heavy vehicle demand pattern based on GDP growth (real), on the other hand, heavy vehicles in the Project have a low representation on the overall traffic AADT and most of the traffic on the Project is driven by light vehicle traffic.

2.3.5TRAFFIC FORECASTING APPROACH

1. Traffic Generation: This stage estimates the total vehicle trips *generated* within the study area. The model analyzes historical data (2007-2023) to establish relationships between traffic volume and key socioeconomic drivers. These drivers include:
    - *Provincial Factors:* Antalya's population growth, hotel bed capacity, and tourist arrivals.
    - *District-Level Factors:* Population and tourism indicators for districts surrounding the corridor.
    - *Economic Indicators:* GDP per capita for both Antalya province and Turkey as a whole.
    - *Car Ownership:* This is part related to GDP, on the other hand car ownership also has an elasticity to GDP in Turkey. Trends in the total number of vehicles in Turkey inform this variable.
2. Trip Distribution & Assignment: This stage determines how generated traffic will be *distributed* across the existing state road and the proposed motorway. Key aspects of this stage include:
    - Target Origin Matrix: A matrix representing travel patterns between origin and destination zones is developed according to TomTom Database and KGM historical traffic data.
    - Probabilistic Route Choice Model: A probabilistic/econometric model is employed to simulate driver route choice between the state road and the motorway. The model is based on the following formula:

$$Pm = e^{(-Cm)} / (e^{(-Cm)} + e^{(-Ch)})$$

Where:

- Pm: Probability of choosing the motorway
- Cm: Generalized cost of using the motorway
- Ch: Generalized cost of using the highway

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- Generalized Cost Components: The generalized cost for each route considers factors beyond just travel time, aiming to reflect the overall driver experience. These components include:

$C = k1*Cf + k2*Cl + k3*Ct$

Where

- Cf: Fuel cost - calculated based on distance, fuel efficiency, and projected fuel prices.
- Cl: Toll fee - using the proposed toll rates for the motorway.
- Ct: Time cost - determined by multiplying travel time by the value of time (VoT). VoT varies by vehicle type, reflecting the higher opportunity cost of time for commercial vehicles.
- k1, k2, k3 = Coefficients representing the relative weights of each cost component (calibrated based on observed driver behavior)

Calibration Process: The model undergoes a rigorous calibration process to ensure its accuracy in replicating observed traffic patterns. This iterative process involves adjusting model parameters and comparing estimated traffic volumes to actual data from KGM reports. The calibrated model is then tested for its ability to explain current traffic demand and the statistical significance of the included variables.

2.4 Findings

Our findings in summary form are presented in this section.

2.4.1 BASE CASE FINDINGS

In review, we forecast that the total Average Annual Daily Traffic (AADT) on the Motorway will be c.25K passenger car equivalent units (pcu) in 2028, rising to c.60K pcu by 2040.

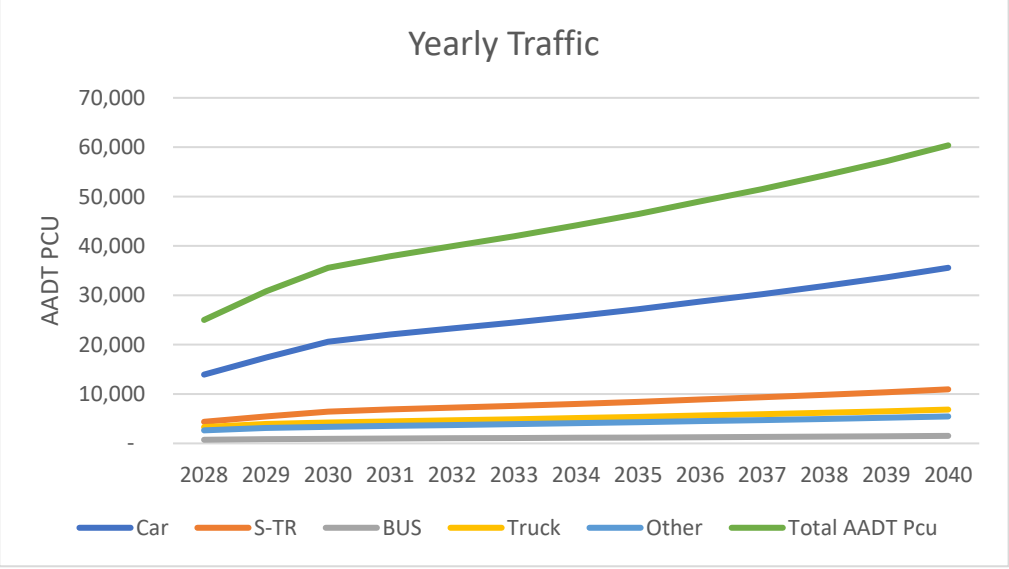

Figure 5. Yearly Traffic of the Motorway

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As can be observed in Figure 5, light vehicle growth is projected to outpace truck growth, leading to a further decline in heavy-vehicle representation which is forecasted at 27% in 2028, and this is projected to fall to 22% in 2040.

Average capture rate at the beginning of the operation is forecasted to be 44%. On the other hand, the total traffic of state road in 2040 will be c.23K AADT PCU while it will be c.60K AADT PCU in the motorway resulting in an average diversion rate of c.72% at the end of the concession term.

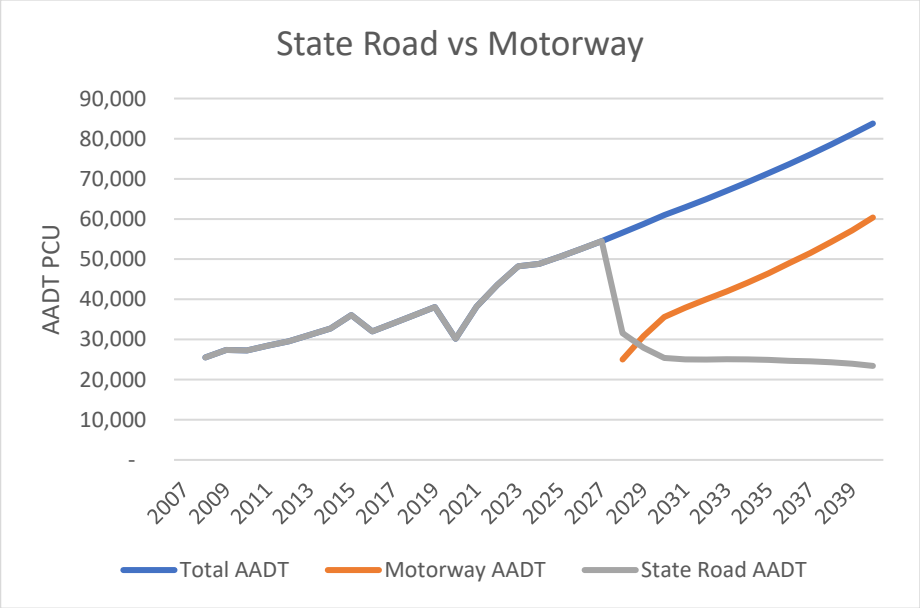

Figure 6. State Road vs Motorway Capture

Further details of our findings can be found under Section 5.5 of this report.

2.4.2 SENSITIVITY FINDINGS

[NTD: We will run sensitivity testing following initial engagement with the Lenders and present our findings in summary form under this heading.]

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3.0 *Macroeconomic and Socioeconomic Context*

Turkey acts as the crossroads between Europe and Asia and has a central position on the transportation networks connecting Middle Eastern, Caucasian and Central Asian countries with Europe. With 27 border crossings with the 8 neighboring countries, Turkey is situated to be a natural transport hub connecting the East, West and South. This view is also supported through the Belt and Road Initiative where countries to the East of Turkey continues to expand and converge with Western markets at a brisk pace requiring a short, safe and fast way to transport cargo, passengers and services. As the accessibility to efficient highways systems increases, Turkey will be able to generate more foreign investment from transportation.

Surrounded by three seas, Turkey has a large variety of climates and landscapes. The tourism industry is one of the faster growing sectors of the economy along with infrastructure and agriculture. Further developing the transportation networks within Turkey will have positive knock-on effects to other industries within the economy.

The population of Turkey has continuously been rising, from around 13.5 million in 1927 to over 85.4 million in 2023. Urban population has been increasing steadily since 1950, mostly due to rural migration. Approximately 71% of the country's population was living in urban areas by year 2016. The need for urban and inter-urban transport infrastructure has dramatically increased following fast urban development and urban spiral.

Antalya, a major city and transportation hub, anchors the western end of the Project corridor. Recognized as a global tourism destination, Antalya boasts a vast network of accommodation facilities, ranging from luxury resorts to budget-friendly hotels, and welcomes millions of international tourists annually. (EY Tourism Update 2023). The city's proximity to Antalya International Airport , a major international gateway, further amplifies its significance in the tourism sector, generating substantial passenger traffic.

Alanya, situated at the eastern end of the corridor, is another prominent tourist destination, known for its stunning beaches, historic castle, and vibrant nightlife. Similar to Antalya, Alanya's economy is heavily reliant on tourism, with numerous hotels, resorts, and tourist attractions catering to both domestic and international visitors. (EY Tourism Update 2023).

Beyond tourism, the Project corridor encompasses several agricultural hubs specializing in the production of key agricultural commodities. Serik, located approximately midway along the route, is renowned for its extensive greenhouse cultivation, producing a variety of vegetables and fruits year-round. Manavgat, situated closer to Alanya, is another important agricultural center, known for its production of citrus fruits, primarily oranges and lemons. These agricultural centers contribute significantly to regional freight traffic, with trucks transporting produce to both domestic and international markets. (Ministry of Transport Master Plan, 2022).

The Antalya-Alanya Motorway is ideally positioned to capitalize on this robust mix of tourism and agriculture, providing the following strategic advantages:

- Enhanced Tourism Connectivity: The motorway will significantly improve connectivity between Antalya International Airport and key tourist destinations along the coast, reducing travel times and enhancing the overall tourist experience. This enhanced accessibility is particularly crucial for attracting high-spending tourists who place a premium on time and convenience. (EY Tourism Update 2023).
- Efficient Freight Transportation: The motorway will facilitate the efficient movement of agricultural goods from production centers like Serik and Manavgat to both local and national markets. Reduced transportation costs and improved logistics infrastructure are expected to boost the competitiveness of the region's agricultural sector. (Ministry of Transport Master Plan, 2022).

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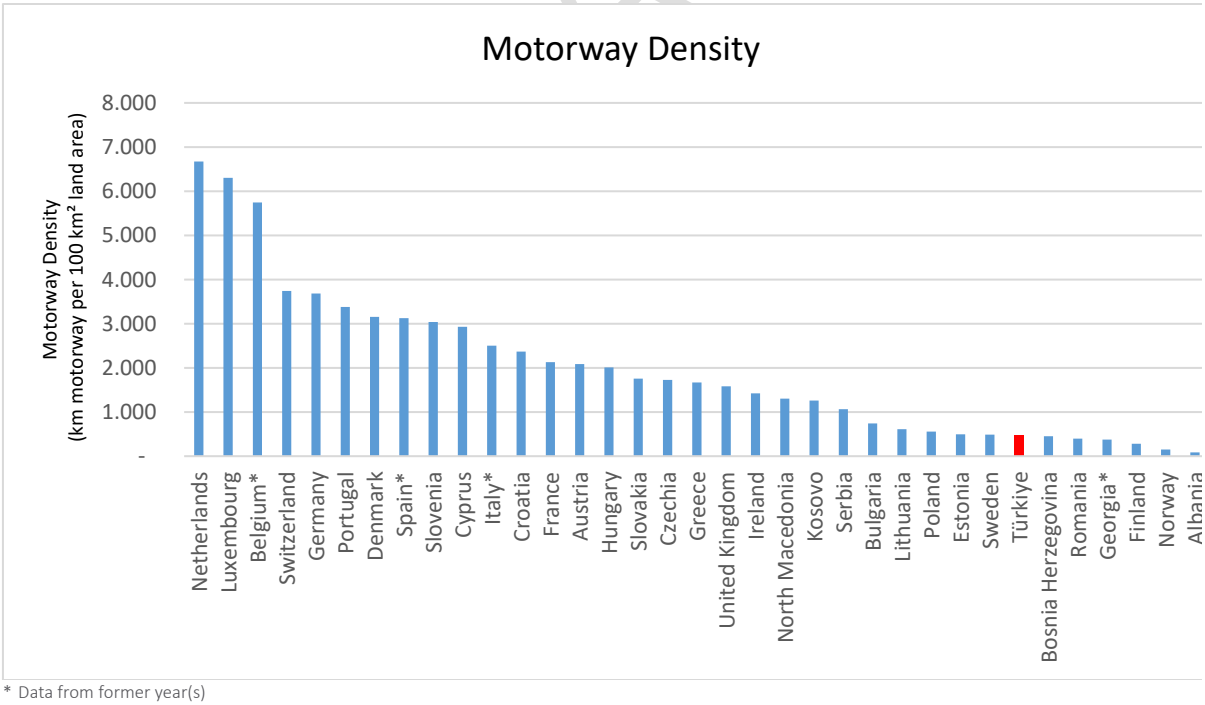
- **Stimulating Regional Development:** The motorway, by enhancing connectivity and reducing travel times, is expected to unlock the economic potential of towns and villages along the route, encouraging new investments and job creation.
- **Reduced Congestion on Existing Road:** By diverting through-traffic from the congested D400, the motorway will improve traffic flow and safety on the existing highway, benefiting local communities and businesses. (Environmental Impact Assessment, 2018).

The Antalya-Alanya Motorway project is a crucial infrastructure investment that will significantly enhance connectivity, boost economic activity, and improve the quality of life for residents and visitors alike. Its strategic location, catering to both tourism and agricultural needs, makes it a pivotal component of Türkiye's long-term development strategy for the Akdeniz Region.

3.1 Roads and Highways in Turkey and Where the Project Fits in

Comprised of 3,726 km of motorways (5.4%), 30,864 km of state highways (45%) and 34,064 km of provincial roads (49.6%), the extent of the Turkish main highway network has reached a total length of 68,654 km as of January 2024 according to KGM.

According to the latest set of data published by EuroStat for 2022, Turkey is the 6th country in Europe, in terms of total length of Motorways, following Spain, Germany, France, Italy and UK. However, in terms of motorway density (i.e. km of motorways per 100 km^2 of land area), Turkey is still lagging far behind many EU countries. The same evaluation can also be made for state highways of Turkey. However, the definition of road types varies from country to country and therefore, the data are not comparable (European Union Road Federation, 2017).



* Data from former year(s)

Figure 7. Total Length of Motorways in 2022 for European Countries (EuroStat)

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Since 2001, Turkey has maintained a strong commitment to infrastructure development, significantly expanding its motorway network to enhance connectivity and support economic growth. According to the 2053 Logistic Master Plan, Turkey's motorway density is at the level of 4.5 km/1,000 km². This figure is below the level of developed countries (24.25 km per 1,000 km² in Japan; 48.83 km in South Korea; 37.54 km in Germany; 34.56 km in Spain; 22.62 km in France). Increasing Turkey's motorway density is considered a realistic solution for providing a fast and safe transportation infrastructure. By implementing motorway projects planned for the 2021-2023 and 2023-2035 periods, it is projected that the motorway density can be increased to 10 km/1,000 km².

According to the 2053 Logistic Master Plan, the construction of 5,839 km of new motorways is projected in Turkey by 2053. In addition to motorways, a total of 13,951 km of road widening and 795 km of new divided road projects are also planned.

While traffic congestion is generally less pronounced in Türkiye compared to more densely populated European countries, certain sections of the state road network experience significant traffic volumes, particularly around major urban centers and seasonally around tourism destinations, Antalya-Alanya alignment hits both these marks.

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Figure 8: Current Motorway Network of Turkey (KGM 2023)

As of 2023, Türkiye's motorway network, while still under development, has expanded significantly, providing key connections between major cities and economic centers. The concentration of operational motorways in the western and southern regions, particularly around Istanbul and along the Mediterranean coast, reflects the country's economic and population distribution, with those areas generating the highest traffic volumes and demanding greater transport infrastructure investment.

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Figure 9. Transport and Logistics Mater Plan 2053 - Ports

The 2053 Green (Sustainable) Scenario envisions a significant expansion of port and logistics infrastructure across Türkiye, supporting increased trade and economic activity. The Antalya-Alanya Motorway can play a crucial role in connecting the numerous ports planned along the southern coast to inland regions, facilitating efficient movement of goods and strengthening the motorway's strategic importance as a key freight corridor. Furthermore, the development of inland logistics centers, particularly in the vicinity of Denizli, Karaman and Konya, will further enhance the motorway's role in facilitating seamless integration of road and rail transport for the efficient distribution of goods.

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Figure 10. Transport and Logistics Mater Plan 2053 - Airports

Türkiye's 2053 Green (Sustainable) Scenario envisions a substantial increase in the number of airports across the country, enhancing regional connectivity and supporting economic growth, particularly in the tourism sector. The Antalya-Alanya Motorway's proximity to existing airports, including Antalya International Airport and Gazipaşa Airport, will facilitate convenient access for tourists and improve the region's overall attractiveness as a destination. This increased accessibility, driven by the seamless integration of air and road transport, will be crucial in capturing a greater share of the anticipated growth in domestic and international tourism and air travel.

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Figure 11. Transport and Logistics Mater Plan 2053 - Roads

The Turkish government's ambitious 2053 Green (Sustainable) Scenario prioritizes a substantial expansion of the national road network, particularly the development of new motorways, aiming to enhance connectivity and facilitate economic growth. The completion of the Afyonkarahisar-Alanya Motorway, which incorporates the Antalya-Alanya section, will create a crucial high-speed corridor linking central Anatolia to the Mediterranean coast, significantly reducing travel times and unlocking economic potential in the region. This enhanced connectivity will facilitate both tourism and freight transport, making the Antalya-Alanya Motorway a vital component of this strategic transportation network.

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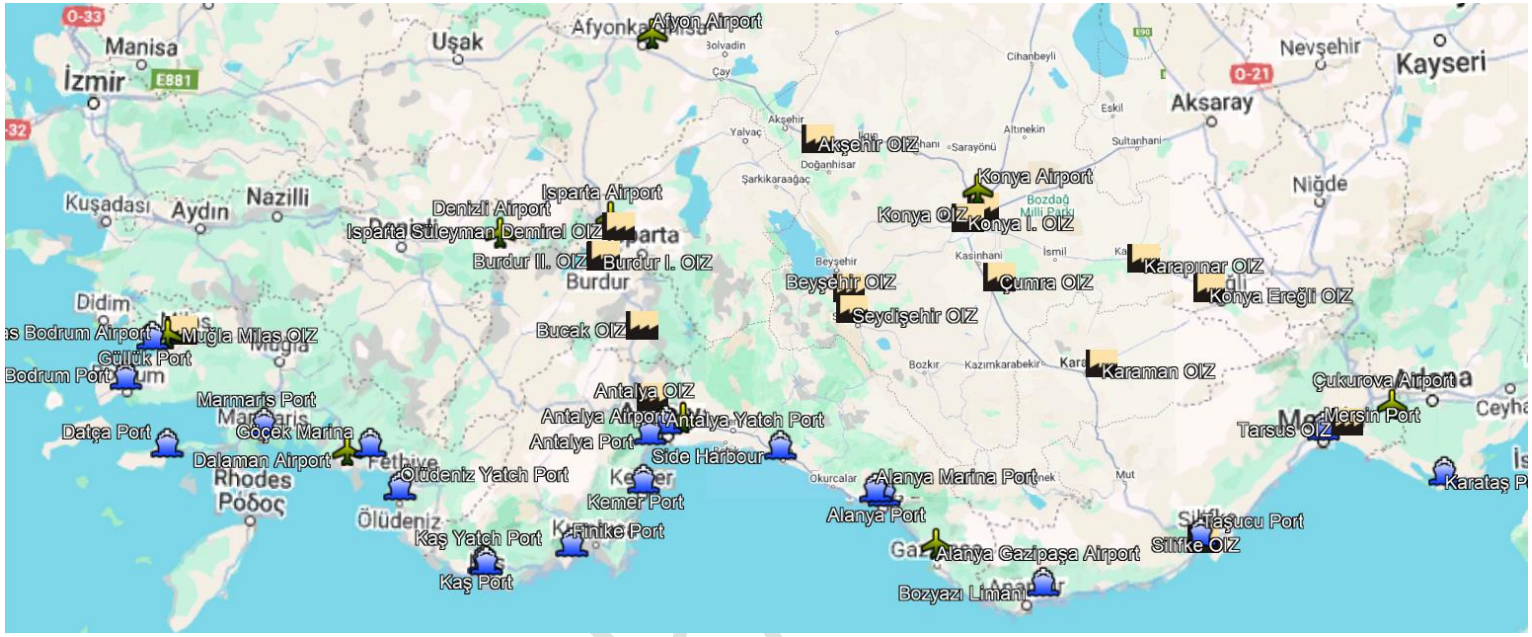

Figure 12. Existing Airports, Ports and Industrial Zones In Catchment Area

The map highlights the existing airports, sea ports and industrial infrastructure within the Antalya-Alanya Motorway's catchment area, emphasizing the region's reliance on tourism and the presence of key industrial clusters. The concentration of ports and marinas along the coastline, stretching from Antalya to Alanya, underscores the region's strong maritime orientation, primarily driven by tourism and the transportation of agricultural goods. The Antalya-Alanya Motorway will not only enhance access to these coastal hubs but also facilitate the movement of goods and people between these points and inland regions, bolstering regional economic activity.

Furthermore, the presence of several Organized Industrial Zones (OIZs), particularly in Antalya, Isparta, Burdur, and Denizli, highlights the potential for the motorway to generate substantial freight traffic. These OIZs are home to a diverse range of industries, including manufacturing, agriculture, and textiles. The motorway, by providing a fast and reliable connection between these industrial hubs, can reduce transportation costs and enhance the region's overall industrial competitiveness. The development of the Antalya-Alanya Motorway, therefore, represents a strategic investment that aligns with the region's existing economic strengths and its future growth potential in both the tourism and industrial sectors.

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3.2 Catchment Area Definition

The project's catchment area encompasses a vital segment of Türkiye's Mediterranean coast, known for its thriving tourism industry and significant agricultural activity. The Antalya-Alanya Motorway is strategically positioned to capitalize on and further stimulate growth in both sectors.

Below figure shows the inner and outer catchment area of the project.



Figure 13. Catchment Area

It's important to recognize that the Antalya-Alanya Motorway is not a standalone project but a critical section of the larger planned Afyonkarahisar-Alanya Motorway. This broader context significantly expands the project's potential catchment area, extending its reach deep into central Anatolia in the long term, further amplifying the motorway's importance in connecting diverse regions and stimulating economic activity across a wider geographic area.

Representing one of two sub-projects comprising the larger Afyonkarahisar-Alanya Motorway, the Antalya-Alanya segment specifically connects the Serik and Alanya districts within the Antalya province.

Overall, the Antalya-Alanya Motorway benefits from a strategically advantageous location within a region poised for significant economic growth. The inner catchment zone, encompassing Antalya province, is already a prominent tourism hub. The outer catchment zone, which includes the provinces of Muğla, Burdur, Isparta, Konya, Karaman, Mersin, Denizli, and Afyonkarahisar, represents a mix of developing regions with considerable potential for expansion in sectors such as agriculture, industry, and logistics.

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The inner catchment zone is defined as the province the Motorway directly crosses which is Antalya. The outer catchment, on the other hand, covers the bordering provinces which are Muğla, Burdur, Isparta, Konya, Karaman and Mersin. Also Denizli and Afyonkarahisar are also included in the outer catchment area.

3.3 Project Market Overview

3.3.1SOCIO-ECONOMIC INDICATORS (POPULATION GROWTH, CAR OWNERSHIP RATES)

The Antalya region, with its strong focus on tourism, benefits from a dynamic demographic profile characterized by a relatively young population and an increasing middle class. This demographic trend, coupled with rising income levels, has fueled a growing demand for travel and leisure activities, contributing to the region's vibrant tourism industry. (EY Tourism Update, 2023) Furthermore, car ownership rates in the region are on the rise, further indicating increased disposable income and a potential shift towards private transportation, making the Antalya-Alanya Motorway an even more attractive alternative to the existing state road. (Environmental Impact Assessment, 2018)

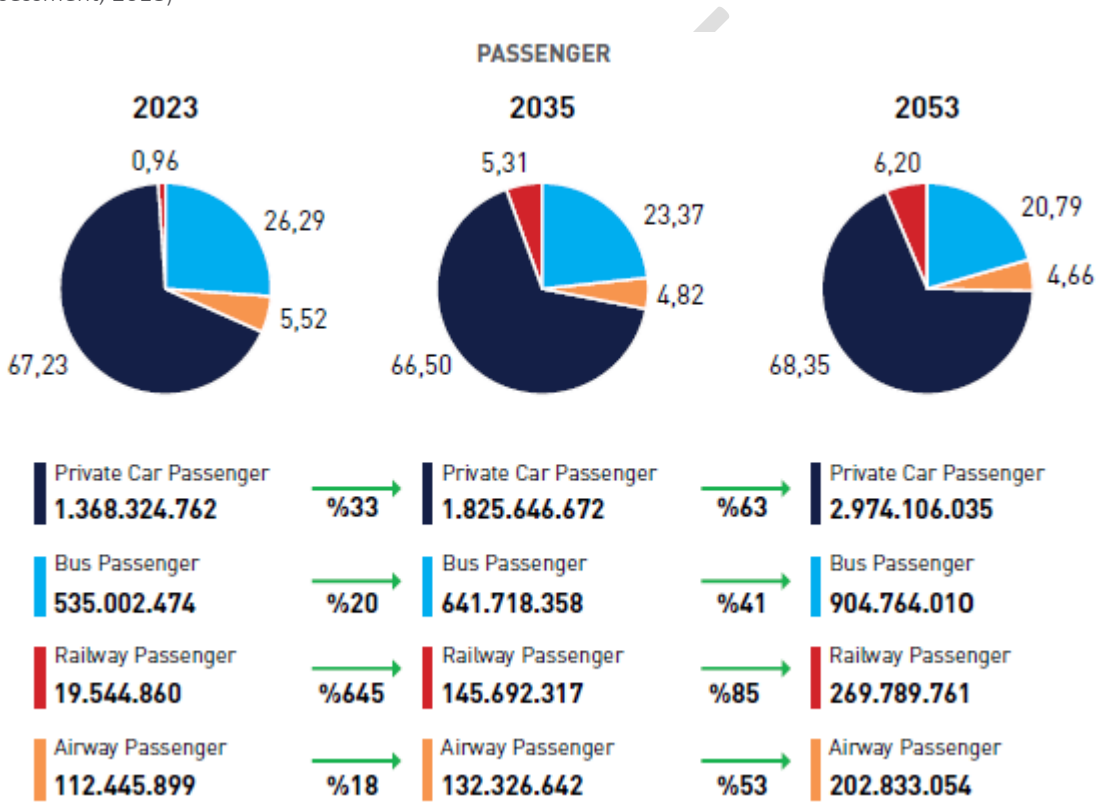

Figure 14. Passenger Projection in Turkey (2053 Transportation and Logistics Master Plan)

Above figure illustrates the projected shift in passenger transportation modes within Turkey through 2053. While car travel currently dominates, representing 67.23% of passenger trips in 2023, the model predict that it will be 68.35% in 2053. Although number of passenger will increase in air travel, the percentage in overall will decrease from 5.52% in 2023 to 4.66% in 2053. The projected rise in railway passengers from a negligible 0.96% in 2023 to

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a more substantial 6.2% in 2053 signals the potential impact of planned railway improvements. While competition from rail may impact car traffic projections, the motorway, by offering a faster and more convenient alternative to the existing state road, can still capture a significant share of car passengers seeking to bypass congested areas and reduce travel times.

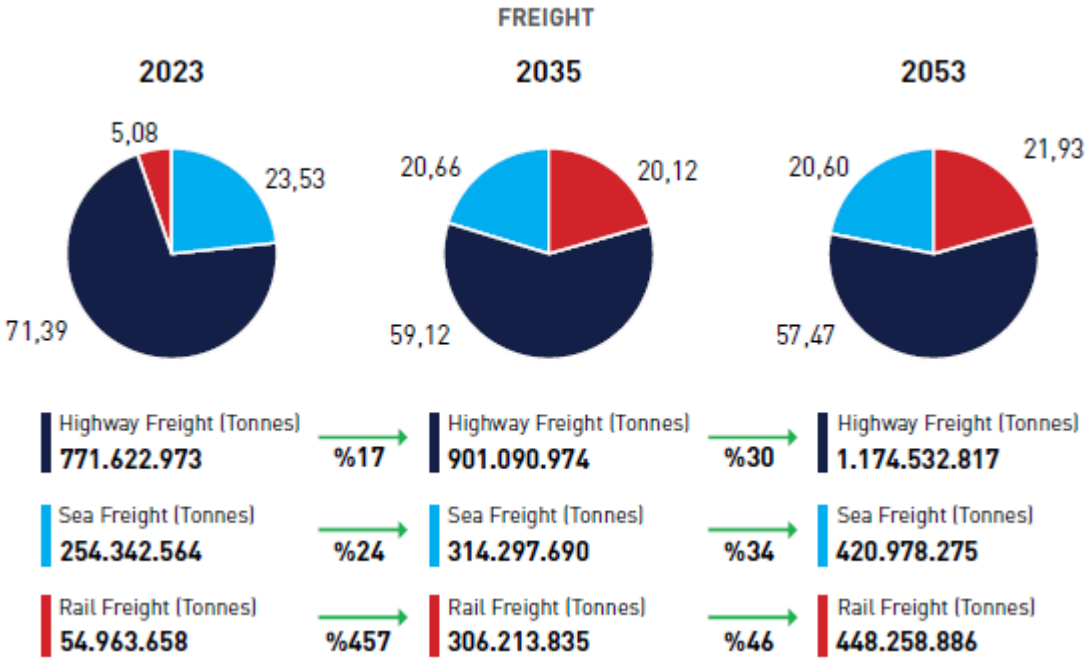

Figure 15. Freight Projection in Turkey (2053 Transportation and Logistics Master Plan)

Similar to the passenger projections, above figure illustrates the projected shift in freight transportation modes within Turkey through 2053. While highway freight currently dominates, representing 71.39% of all freight transportation in 2023, the model predict that it will be 57.47% in 2053. However, the transported freight amount will increase from 771M Tonnes to 1,174M Tonnes. The projected rise in rail freight from a negligible 5.08% in 2023 to a more substantial 21.93% in 2053 signals the potential impact of planned railway improvements. While competition from rail may impact freight transportation on highways, increase in the amount of freight can still capture a significant share of heavy vehicles.

Vehicle Ownership in Turkey

Vehicle type and ownership are drivers of traffic density. The status quo for car type and ownership has shifted over years. As seen in Figure 16, the total number of vehicles that are registered in Turkey has increased from over 19 million to 29 million in the past 10 years (from 2014 to 2024). In 2024, cars represented 52% of the total vehicles, followed by small trucks at 15%, motorcycles at 19%, tractors at 7%, trucks at 3%, minibuses at 2%, busses at 1% and special purpose vehicles (e.g. ambulances, fire trucks, funeral vehicles, etc.) at less than 1%. As in Figure 18, Turkey is still lagging far behind many EU countries in terms of passenger car per capita.

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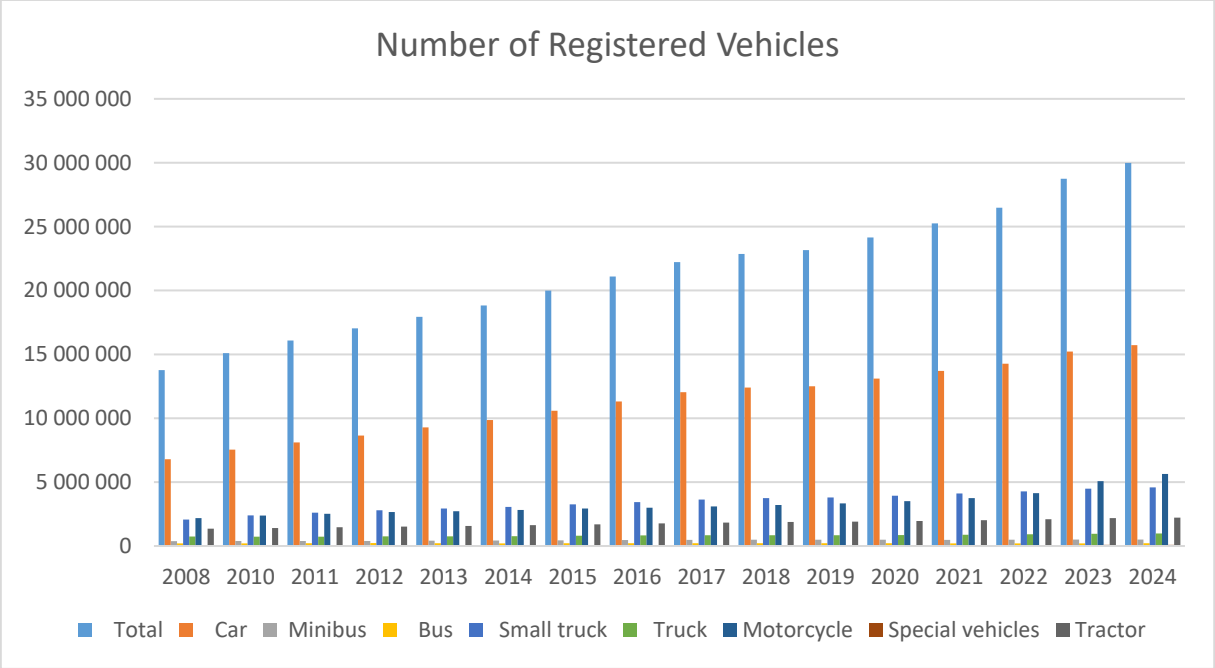

Figure 16. Number of Registered Vehicles in Turkey by Vehicle Type (TUIK 2024 June)

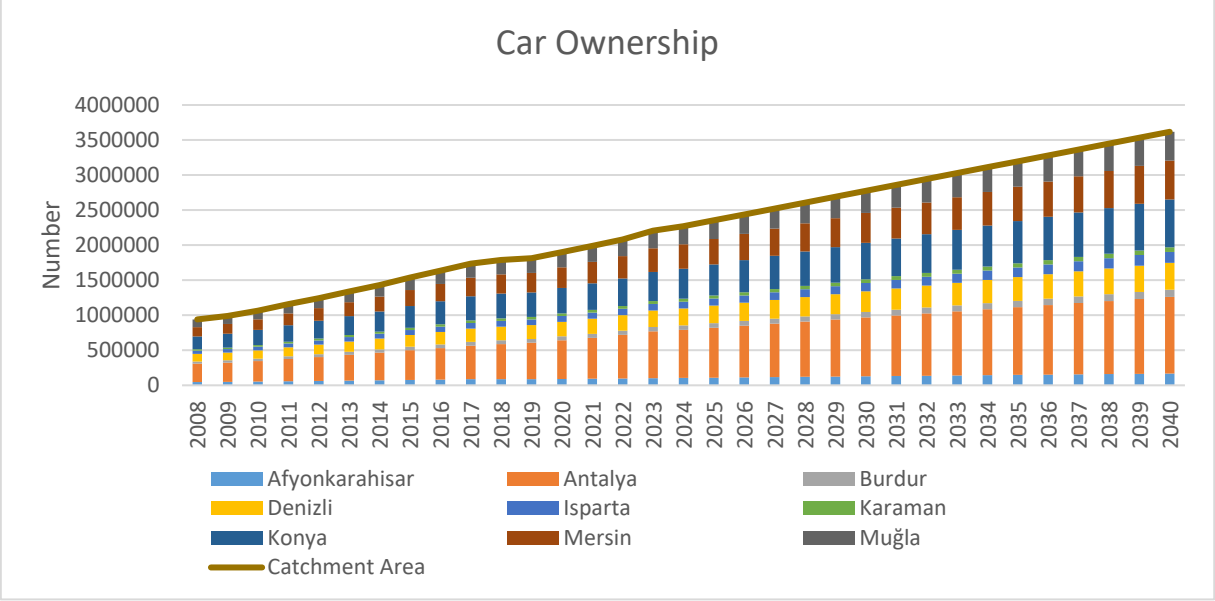

Figure 17. Car Ownership in Catchment Area by Province

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As can be seen in the above figure, the increase in number of registered vehicles in motorway provinces and in Turkey are comparable. The annual growth in vehicle ownership has increased at an average of 4.8% in Turkey and also comparably at 4.8% in motorway provinces over ten years period. According to the trendline, Antalya car ownership could increase from 686K in 2024 to 1.1M in 2040 and catchment are car ownership could increase from 2.3M in 2024 to 3.6M in 2040.

We note that the average car ownership growth rate has been greater than the growth rate of GDP, GDP per capita and population. This would infer that there has been a cultural shift in the importance and acceptance of vehicles into the Turkish lifestyle and we can expect more car owners to inflate traffic volumes in future years.

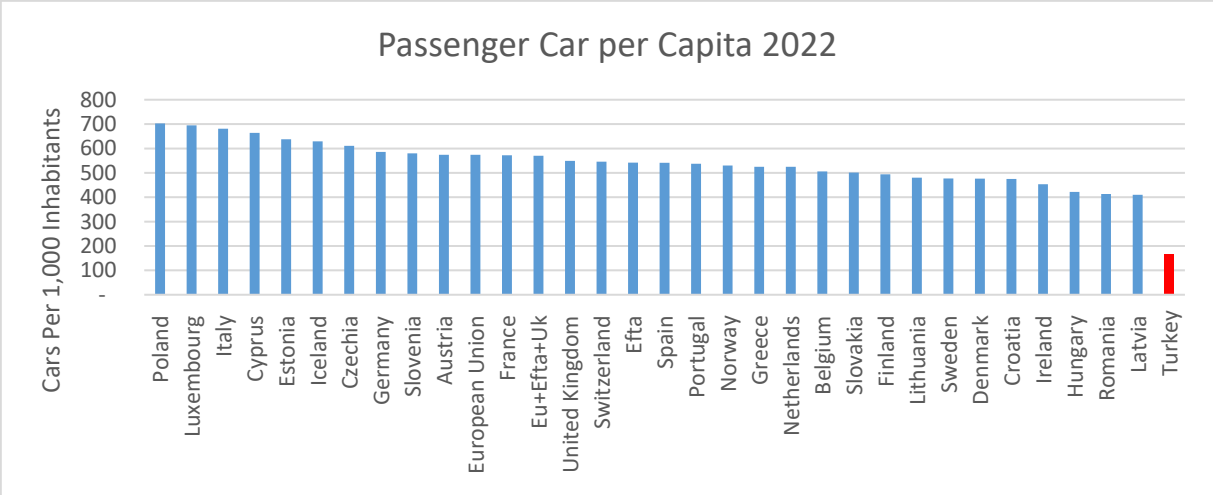

Figure 18. Passenger Car Per 1,000 Inhabitants in 2022 for European Countries (ACEA Report, 2023)

Finally, Turkey lags behind its European counterparts in passenger car ownership therefore we are able to explain ever increasing vehicle ownership levels even through financial downturn in recent years while GDP/capita has been steady or reducing.

Population Overview

Below, Figure 19 represents each catchment provinces' population. The Project's inner catchment zone constitute some of the most densely populated regions in Turkey.

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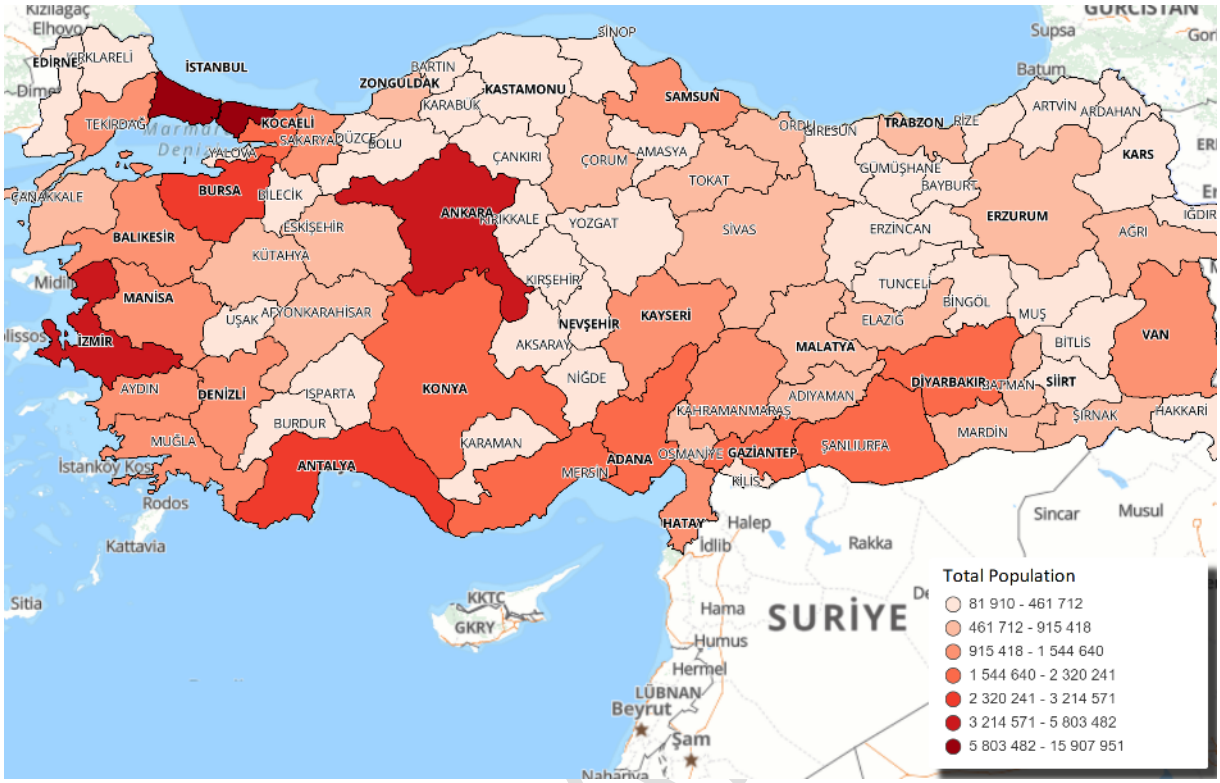

Figure 19. Population Map of Turkey (TUIK 2023)

According to TUIK Population forecast for Turkey until 2100 is shown below;

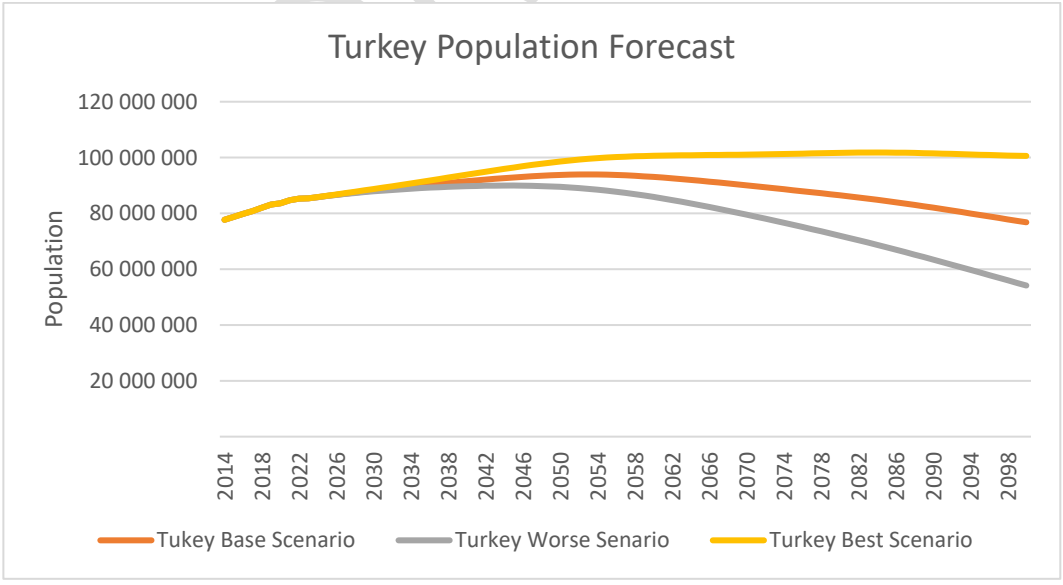

Figure 20. Turkey Population Forecast

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According to Base Scenario, Turkey population growth will continue until 2054 and reach 93.9M at peak and start decreasing. According to Worse Scenario, Turkey population growth will continue until 2045 and reach 89.9M at peak and start decreasing. According to Best Scenario, Turkey population growth will continue until 2085 and reach 101.8M at peak and starts decreasing.

TUIK provides provincial population forecasts only until 2030. Below figure shows the TUIK's province base forecast until 2030. After 2030, we applied TUIK's Turkey base scenario growth rates for each province that are considered in the catchment zone.

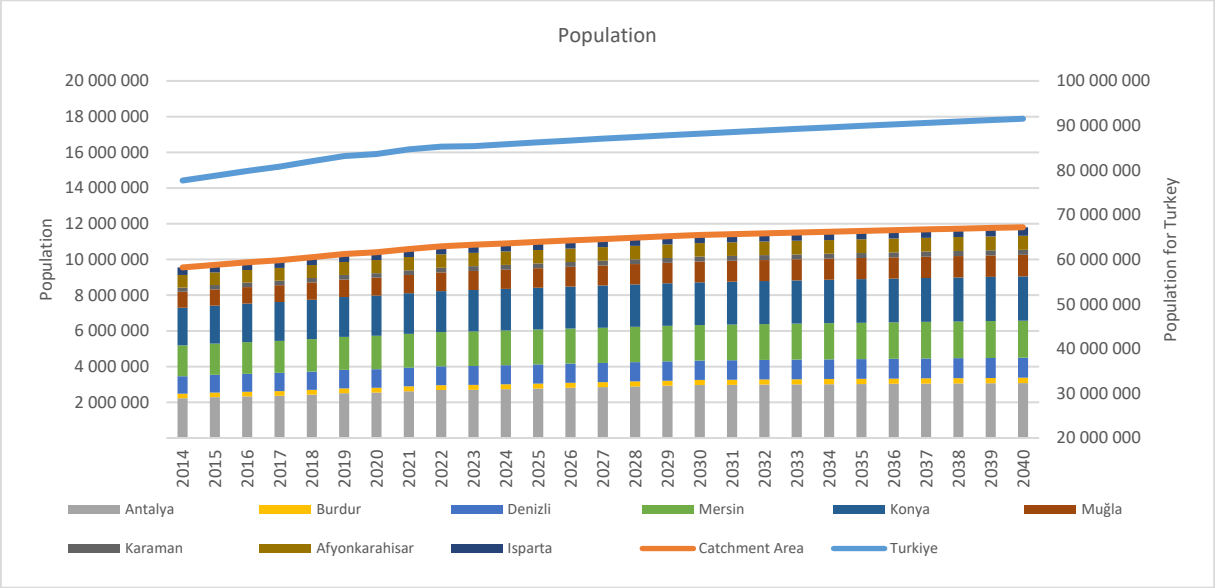

Figure 21. Population Forecast

As can be seen in the table, the population of inner catchment provinces increased by approximately 1.3M in the past 10 years according to the data provided by TUIK. According to the population forecast study, population of Antalya will increase from 2.7M to 3.1M until 2040 and overall catchment area population will increase from 10.8M to 11.8M until 2040. Population of Antalya equals to 3.16% of Turkey's population while the catchment area's population equals to 12.68% of Turkey's population as of 2023.

For 10 years, the average annual population growth rate of 1.4% in the motorway provinces and 2.2% in Antalya are significantly higher than the national growth rate of 1.1%. Population growth has a direct relationship with traffic generation, therefore, will increase AADT as the population grows.

Table 4. Population Growth Rate (TUIK 2024 June)

Population Growth Rate	2015	2016	2017	2018	2019	2020	2021	2022	2023
Turkey	1.35%	1.36%	1.25%	1.48%	1.40%	0.55%	1.27%	0.71%	0.11%
Catchment Area	1.50%	1.49%	1.17%	1.74%	1.71%	1.02%	1.68%	1.42%	0.84%
Antalya	2.96%	1.75%	1.54%	2.62%	3.52%	1.46%	2.81%	2.60%	0.31%

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Population growth has a positive impact on traffic demand which has been factored into the CAGR in the O-D matrices of the traffic modelling.

3.3.2MACRO-ECONOMIC DATA (GDP, INFLATION, TOLL RATE CHANGES)

Below figures shows the GDP and GDP per capita according to TUIK.

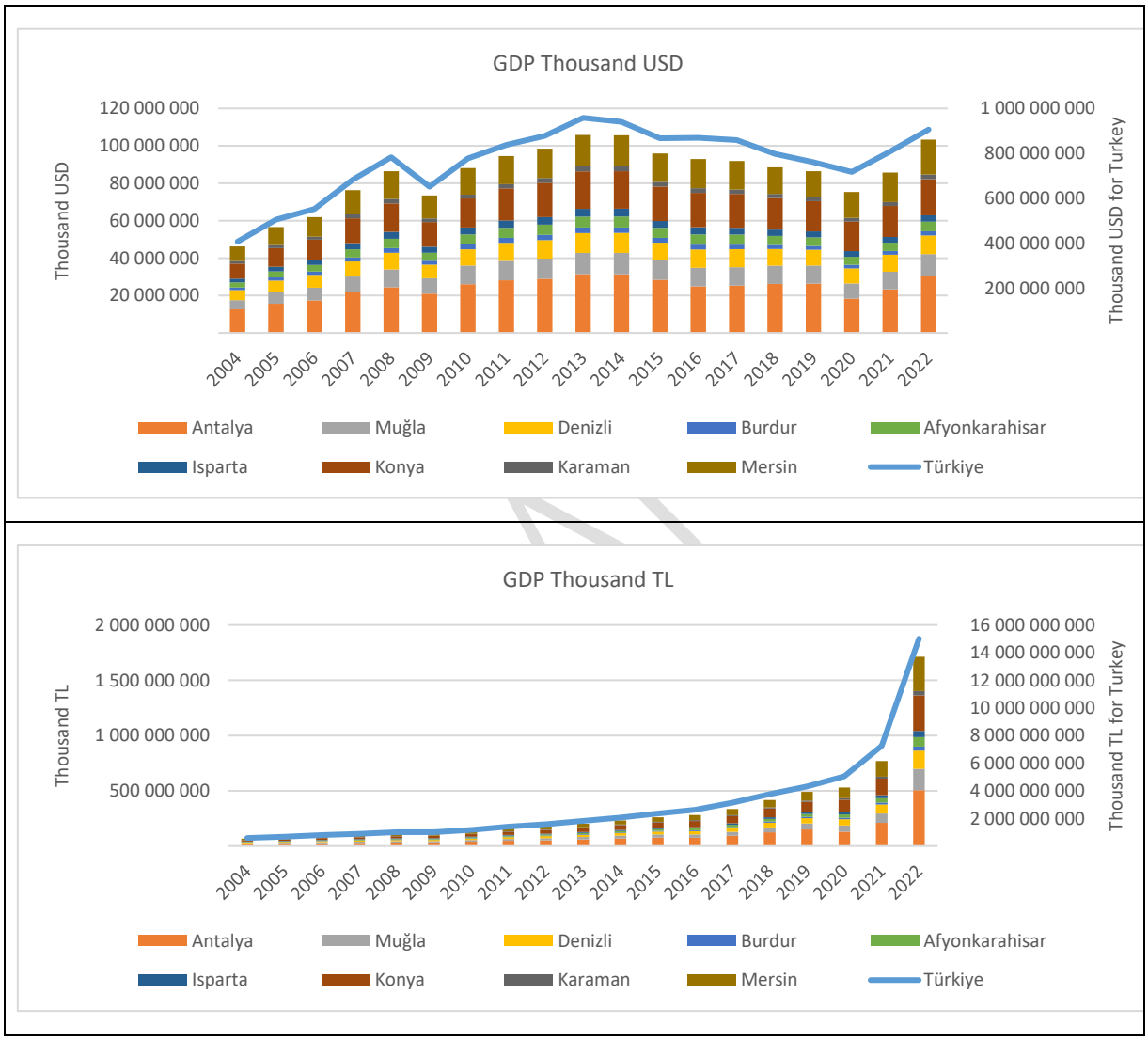

Figure 22. GDP for Turkey and Catchment Area

Above GDP charts illustrate the consistent GDP growth of Türkiye and the provinces within the Antalya-Alanya Motorway's catchment area between 2004 and 2022. While all provinces have experienced economic expansion, Antalya exhibits the most significant growth, consistently outpacing the national average, indicating a strong and dynamic regional economy. This robust economic performance suggests a positive outlook for future traffic demand on the Antalya-Alanya Motorway, driven by increased commercial activity and rising personal incomes.

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Turkey's GDP in 2023 is 1.1 trillion USD (26.3 trillion TL) according to the latest published TUIK data which doesn't show GDP of each province for 2023.

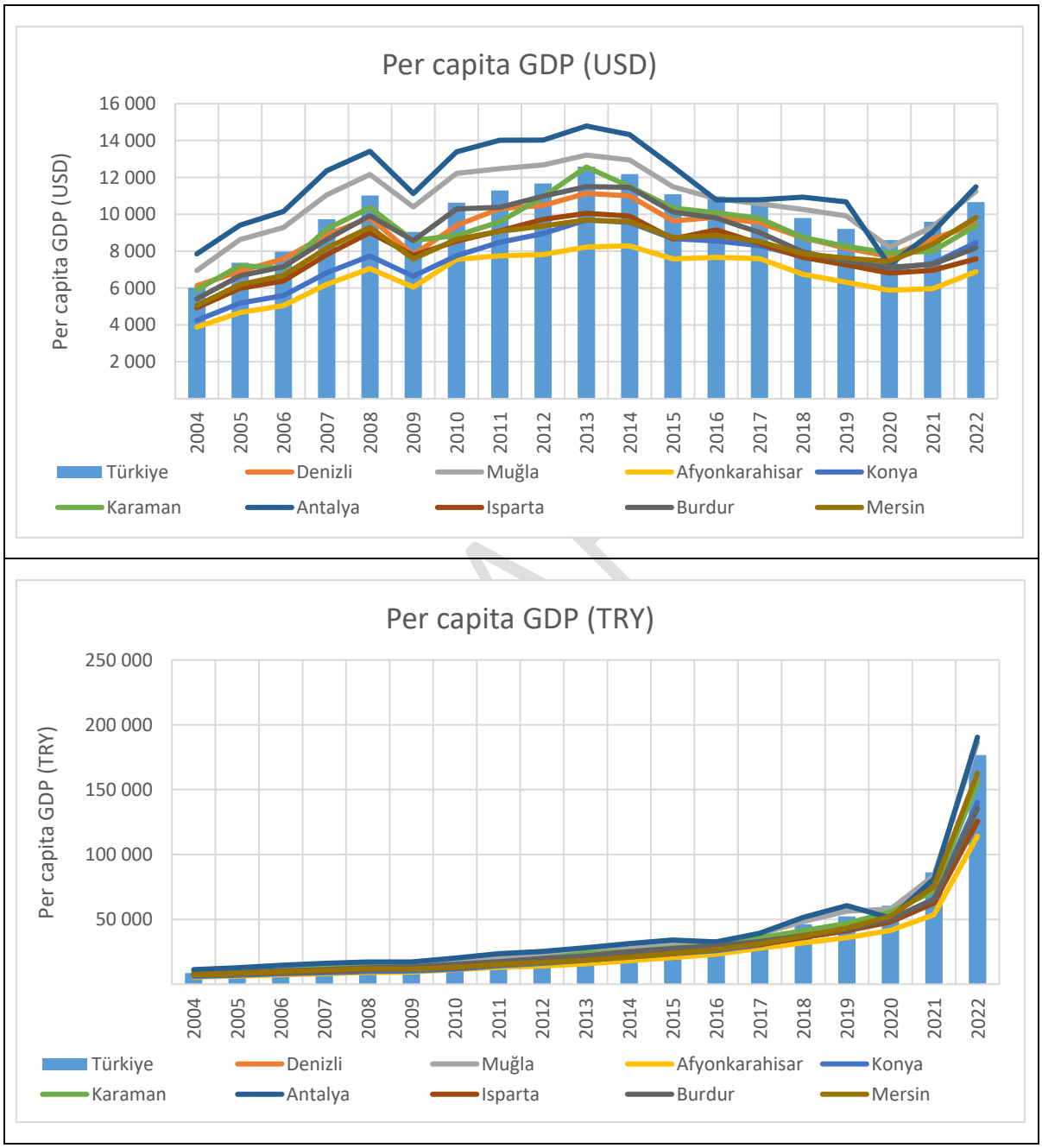

Figure 23. GDP per capita for Turkey and Catchment Area

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Above charts depicts per capita GDP trends for Türkiye and the provinces within the Antalya-Alanya Motorway's catchment area from 2004 to 2022. While exhibiting some fluctuations, per capita GDP has generally increased across the region and nationally, indicating a trend of rising incomes and improved living standards. This positive trend suggests a potential for continued growth in car ownership and travel demand, factors that will be critical for the success of the Antalya-Alanya Motorway. Among the catchment area provinces, Antalya has the highest GDP per capita with 11,495 USD (190,499 TL) in 2022 while Turkey's average GDP per capita is 10,659 USD (176,651 TL).

IMF only provides forecasts for Turkey until 2029. Below figure shows the IMF's forecast until 2029. After 2029, we applied trendline of the forecasted years.

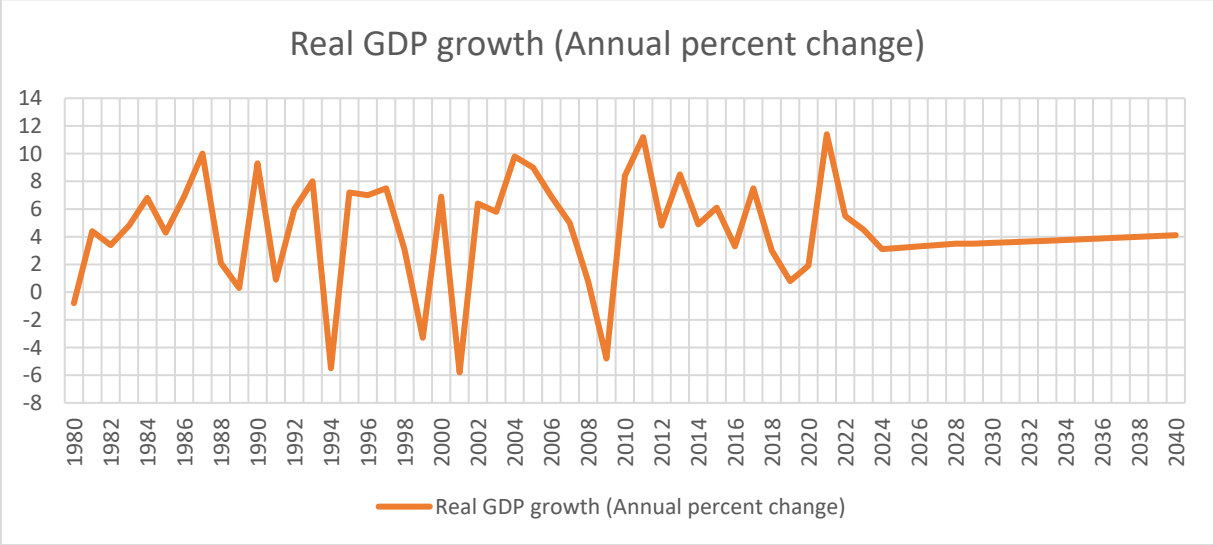

Figure 24. IMF Real GDP Growth for Turkey

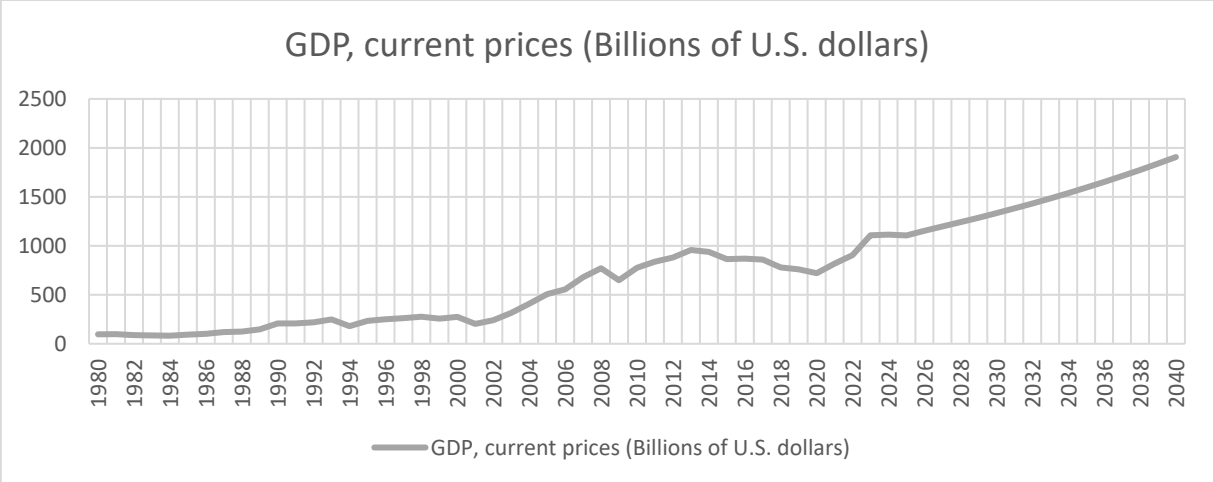

Figure 25. IMF GDP Current Prices (USD) for Turkey

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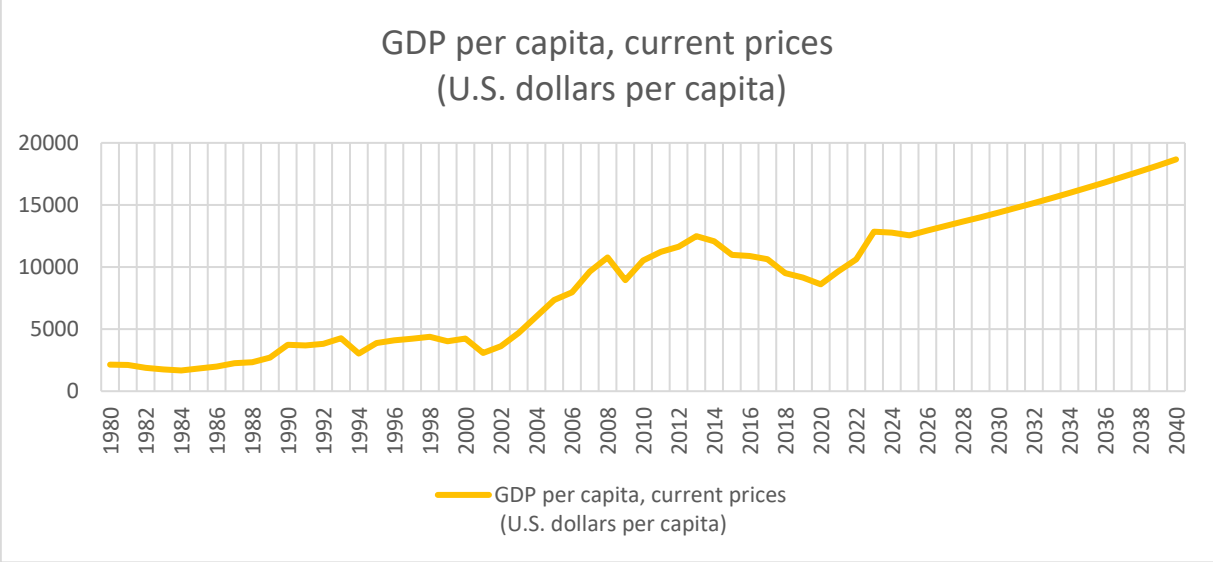

Figure 26. IMF GDP per capita Current Prices (USD) for Turkey

Türkiye's real GDP growth has exhibited significant volatility in past decades, experiencing periods of both robust expansion and sharp contractions. However, IMF projections through 2029, coupled with a trendline analysis, suggest a period of relative stability in the coming years, with real GDP growth hovering around a moderate 4%. This stable growth outlook, while not as dynamic as some previous periods, is still favorable for the Antalya-Alanya Motorway project, as it indicates continued economic activity and potential for increased travel demand in the long term. According to this forecast, Turkey's GDP can reach up to 1.9 trillion USD in 2040 and GDP per capita can reach up to 18,669 USD in 2040.

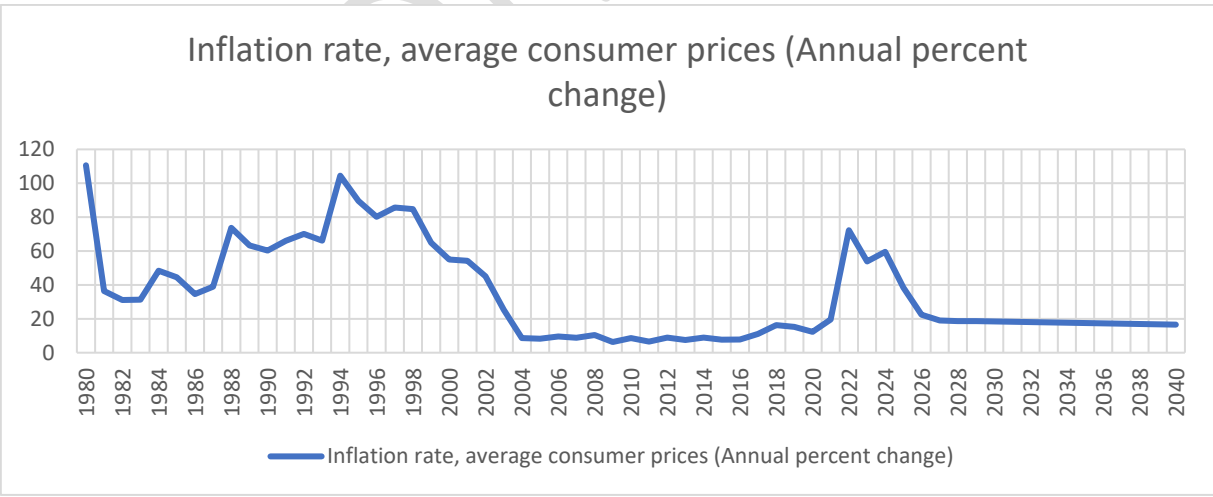

Figure 27. IMF Inflation Rate for Turkey

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Türkiye has a history of fluctuating inflation rates, with periods of sharp increases and relative stability. While recent years have seen elevated inflation, the IMF forecasts a downward trend towards a more moderate level, approaching 18% by 2029. Maintaining this trajectory of declining inflation will be crucial for the long-term success of the Antalya-Alanya Motorway, as high inflation can erode consumer purchasing power and potentially impact the affordability of toll fees.

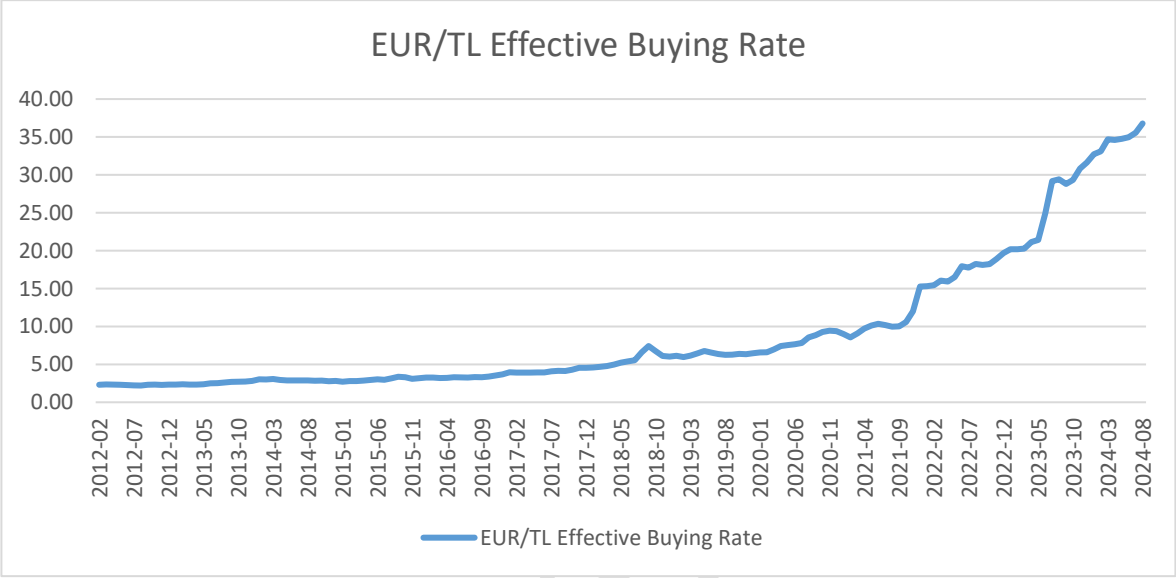

Figure 28. EUR/TL Effective Buying Rate

According to the Turkey Central Bank Data, above figure shows the historical data of EUR/TL Effective Buying Rate. Above chart depicts the steady depreciation of the Turkish Lira (TL) against the Euro (EUR) from 2012 to 2024. The significant weakening of the TL, particularly in recent years, has implications for the Antalya-Alanya Motorway project as it can impact construction costs, financing arrangements, and the affordability of toll fees, which are likely to be denominated in EUR.

According to the Sponsor's FM inputs, below figures shows the forecasted Turkish CPI, Eurozone CPI, EUR/TL Rates.

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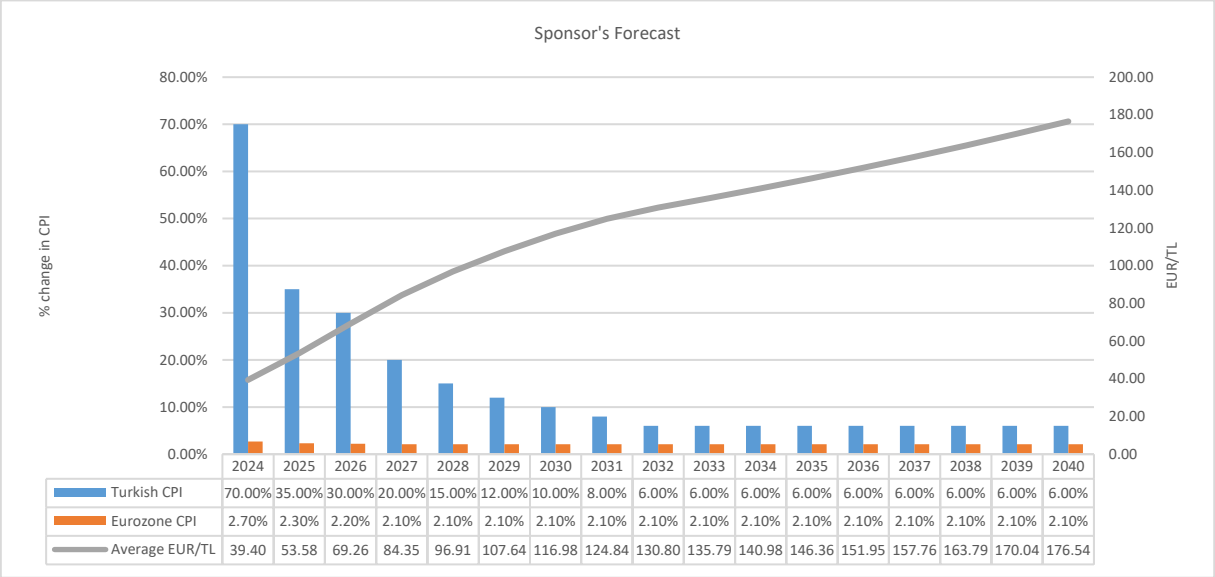

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Turkish CPI	70.00%	35.00%	30.00%	20.00%	15.00%	12.00%	10.00%	8.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
Eurozone CPI	2.70%	2.30%	2.20%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%	2.10%
Average EUR/TL	39.40	53.58	69.26	84.35	96.91	107.64	116.98	124.84	130.80	135.79	140.98	146.36	151.95	157.76	163.79	170.04	176.54

Figure 29. Sponsor's Financial Forecast for CPI and EUR/TL Exchange Rate (Received August 9, 2024)

The Sponsor's financial model anticipates a sharp decline in Turkish CPI from 70% in 2024 to 6% in 2032, stabilizing at that level through 2040. In contrast, Eurozone CPI is projected to remain relatively stable at 2.1% over the same period. The EUR/TL exchange rate, currently at 39.40, is forecasted to appreciate steadily, reaching 176.54 by 2040, indicating continued weakening of the Turkish Lira. This divergence in inflation and exchange rate trends highlights the potential volatility and risk associated with the project's financial performance, particularly as toll rates are denominated in EUR.

Instead of utilizing the IMF data provided above, the Sponsor's forecasts for inflation and the EUR/TL exchange rate have been incorporated as inputs into our model.

3.3.3 CORRELATION BETWEEN TRAFFIC TRENDS AND SOCIO-ECONOMIC/MACRO-ECONOMIC FACTORS

Since 2001, Turkey maintained a long-term focus on implementing ambitious reforms in many financial and fiscal areas. This was initially aligned with the financial reforms adopted as part of an IMF program, agreed for implementation following a major domestic financial crisis in 2001. With the program and the extensive reforms implemented as part of it, as well as harmonizing many laws and regulations with European Union (EU) standards, the country's economic fundamentals were strengthened, leading to an era of strong growth, averaging more than 6% annually until 2008. Further to the reforms, a well laid out and rapid privatization program also contributed to country's strong economic outlook, reducing state involvement in industry, banking, transport, power generation, and communication sectors. Turkey also urbanized dramatically during this time. The significant growth trend reversed in 2008 due to the 2008/2009 global economic crisis and bounced back after 2010. However, since 2016, reforms in several areas slowed down, and a number of economic vulnerabilities and risks reversed some of the progress. Most importantly, current account deficit means the country has to rely on external investments to finance growth, making it vulnerable to external shocks. Furthermore, unemployment and inflation have been rising in current years, with the Turkish Lira continuously depreciating against the US dollar (CIA, 2019) (OECD, 2018) (World Bank, 2020). Recognizing the need for sustained growth and the limitations of an aging transportation system, the Turkish government has prioritized infrastructure investment, with a significant

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emphasis on expanding the motorway network, recognizing its role in stimulating economic activity and enhancing regional connectivity.

GDP and GDP per capita growth are key indicators of long-term traffic generation potential. An analysis of regional and national economic data reveals the following trends relevant to the Antalya-Alanya Motorway Project:

- National GDP in 2022, the last available data year from TurkStat, is around 15,011 billion TRY or 906 billion USD. Although Turkey's GDP in USD terms experienced a decline after 2013, it has shown a resurgence since 2020. Notably, the GDP increased by 13% in 2021, followed by a further 12% rise in 2022, indicating a return to a growth trajectory.
- Shift Towards Services and Tourism: Türkiye is experiencing a shift towards a service-oriented economy, with tourism playing a crucial role. The Akdeniz Region, encompassing the Antalya-Alanya corridor, is a major beneficiary of this trend, with tourism contributing significantly to regional GDP growth. (EY Tourism Update 2023).
- GDP per capita for 2022 is 10,659 USD. As is the case with GDP, GDP per capita has also been increasing after 2020.
- The share of Motorway Catchment provinces' total regional GDP in total GDP of Turkey is c.11.4% since 2004. Antalya have the largest share among the other motorway catchment provinces.
- While Turkey demonstrates strong performance in areas like accessing Direct Foreign Investment (ranked 33th globally) and protecting minority investors (21st), challenges remain in aspects such as starting a business (77th) and resolving insolvency (120th). These areas highlight opportunities for continued improvement in streamlining business processes and strengthening the legal framework for investors.
- Labour productivity is strong as the economy shifts from low-cost production driven economy to focusing on productivity driven investments such as skilled labour and innovation.
- Labour flexibility has been improving, with employers providing part-time employment opportunities and severance payments.

Enhanced economic activity is directly related to traffic generation. The Antalya-Alanya Motorway Project is strategically positioned within the Akdeniz Region, a dynamic area experiencing a surge in both tourism and agricultural activity. While national GDP growth has faced challenges in recent years, the tourism sector, a key driver for the Antalya-Alanya corridor, has demonstrated remarkable resilience and growth. (EY Tourism Update, 2023). The combined GDP contribution of the catchment provinces (Antalya, Muğla, Denizli, Burdur, Afyonkarahisar, Isparta, Konya, Karaman, and Mersin) to Türkiye's annual GDP in 2022 was 11%, reflecting increasing economic significance for these provinces. If these trends continue, the region is expected to experience a surge in traffic, driven by both tourism-related activities and the movement of agricultural goods, benefitting the Antalya-Alanya Motorway

3.4 Catchment Area Economic Outlook

While Türkiye has historically demonstrated robust economic growth, recent years have been marked by significant challenges. The country's economic growth in the 2019-2023 period was noticeably subdued compared to previous years, influenced by factors such as currency fluctuations, global trade tensions, and the COVID-19 pandemic. The devastating earthquakes in Kahramanmaraş and Hatay in February 2023 further strained the economy, leading to a downward revision of growth projections for the year. (12. Turkey Development Plan, 2023) However, the government's commitment to infrastructure investment, including the Antalya-Alanya Motorway Project, is expected to stimulate economic activity and contribute to a rebound in growth over the medium to long term. (2053 Transportation and Logistics Master Plan, 2022)

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Antalya is known as the tourism capital of Turkey and is one of the most visited regions of the country. Thanks to its location on the Mediterranean coast and its history and natural beauties, it is considered one of Turkey's gateways to the outside world. It is also an important center in many fields such as agriculture, trade, logistics and education:

- Trade: Antalya stands out with its trade in agricultural products and tourism services. Especially citrus fruits, cotton, wheat and corn are produced and exported. In addition to agricultural products, Antalya Port also plays an important role in maritime trade. Antalya Free Zone serves as a production and export center for various industrial products, especially yacht production.
- Tourism: Antalya is one of the most important tourism destinations in the world. It attracts millions of tourists annually and this constitutes an important part of the provincial economy. According to 2023 data, approximately 14-16 million foreign tourists and 4-5 million domestic tourists visited Antalya. These statistics make Antalya the 2nd most visited city in Turkey after Istanbul and the 10th most visited city in the world.
- Education: As of 2024, there are a total of 6 universities in Antalya, 2 of these universities are public universities while 4 of them are private universities.
- Hospital: Antalya is a highly developed city in terms of health services and offers comprehensive health services with various hospitals. There are over 30 hospitals in the city in total. 15 of these hospitals are public hospitals, while the rest are private hospitals and university hospitals. Antalya also has many medical centers, polyclinics and specialty hospitals. Antalya is also an important center for health tourism and offers a wide range of health services for both locals and tourists.
- Industry: Antalya has an important position in industrial production and there are 3 Organized Industrial Zones (OIZ) in the city, namely Antalya OIZ, Antalya Free Zone and Alanya OIZ. Food processing, furniture production, textiles, construction materials and construction materials are the prominent industries in the province. In addition, yacht production and agricultural machinery production are also among the important industrial branches.
- Logistics: Antalya's location is quite advantageous in terms of logistics. Antalya Port is an important trade gateway to the Mediterranean Sea and is a critical point for both domestic and foreign trade. It is also easily accessible by road to other parts of Turkey, especially to the Mediterranean, Aegean and Central Anatolia regions. Antalya is also an important logistics center for the shipment of tourism and agricultural products.
- Airports: Antalya Airport is one of the airports with the busiest air traffic in Turkey. Millions of local and foreign tourists enter Antalya through this airport every year. It has very busy traffic especially in the summer months due to the tourism season. Within the scope of the expansion projects initiated at the airport in 2022, terminal buildings, runways and apron areas were renovated, and capacity was increased in order to meet this high demand. With these works, the airport's annual passenger capacity was increased from 35 million to 50 million. Apart from this, Gazipasa-Alanya Airport is also located in the east of the city and serves regions such as Alanya and Gazipasa. Airports are one of the important elements that increase Antalya's tourism and trade potential. According to DHMI statistics, monthly total passenger traffic for each airport for 2023 is presented in the figure below. The table comparing the cumulative passenger numbers in 2022 and 2023 as of the ends of years is given below.

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Table 5. Airport Passenger Traffic 2019

Airports	End of 2022	End of 2023	Increase Rate
Antalya	31,108,181	35,538,387	12.47%
Gazipaşa Alanya	682,654	868,003	21.35%
Muğla Dalaman	4,535,600	5,247,488	13.57%
Muğla Milas-Bodrum	3,898,527	4,056,447	3.89%
Denizli Çardak	391,112	441,360	11.38%
Isparta Süleyman Demirel	72,410	82,692	12.43%
Konya	801,033	899,498	10.95%

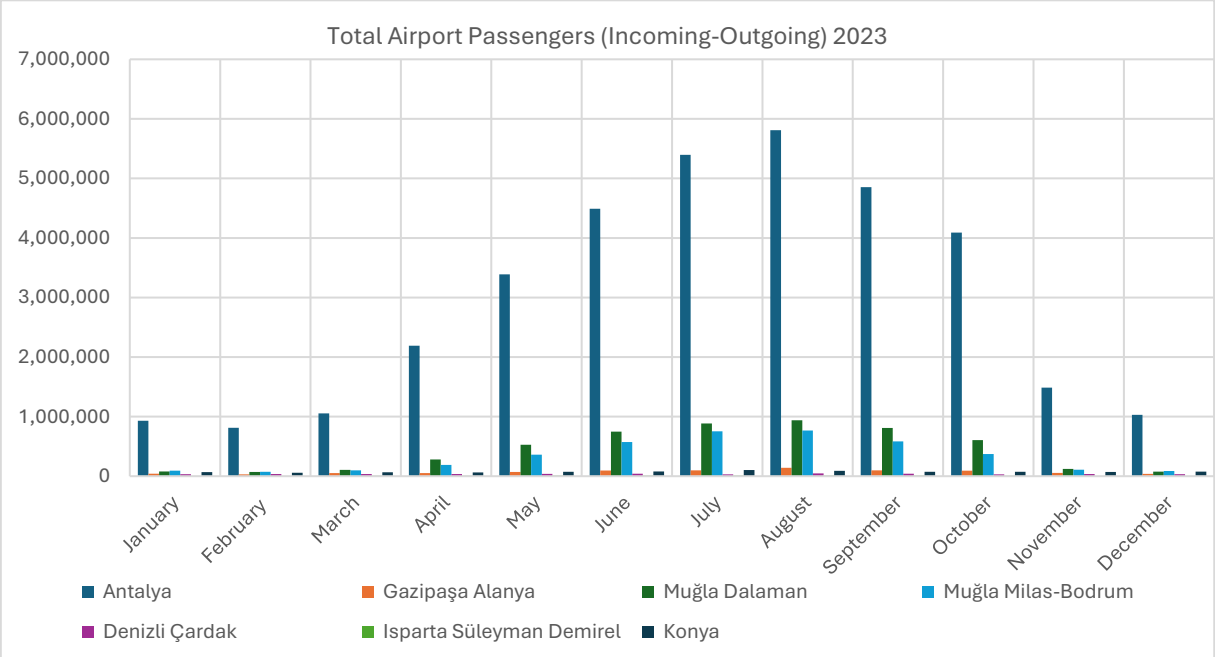

Figure 30. Airport Passenger Traffic 2023

Catchment provinces of the Motorway are expected to grow significantly in the future in terms of industry, trade, tourism, services and logistics potential. Only Antalya contributed approximately 3.4% of the entire Country's GDP in 2022 and all catchment area contributed approximately 11.4% of the entire Country's GDP in 2022.

Tourism, both international and domestic, drives the Turkish economy, and the Antalya-Alanya corridor is a prime beneficiary. Antalya boasts renowned coastal destinations like Belek, Side, and Kemer, attracting millions of tourists annually. These destinations offer a range of accommodation options, from all-inclusive resorts to charming boutique hotels, catering to diverse preferences and budgets. (EY Tourism Update 2023). Domestic tourism flourishes during the summer months, as residents from nearby provinces, including Denizli, Burdur, Afyonkarahisar, Isparta, Konya, and Karaman, flock to the coastline. The Antalya-Alanya Motorway will offer a safe and efficient alternative to the congested D400, facilitating seamless travel for tourists and residents alike.

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The city of Antalya, renowned for its resorts and vibrant tourism sector, holds a prime position within the Turkish tourism landscape. Antalya secured the second position among the most visited cities by tourists in FY 2022, following Istanbul. İstanbul welcomed 16.02 million foreign visitors in 2022, while the other cities in Türkiye welcomed 28.55 million. Antalya, located on the Mediterranean coast and well known for its resorts, followed İstanbul with 12.82 million foreign visitors in 2022.

The Ministry of Culture and Tourism highlights Antalya's dominance in the tourism sector:

Accommodation Capacity: As of May 2023, Antalya leads Turkish cities in tourism operation licenses, boasting an impressive 228,394 rooms.

Investment Attractiveness: Antalya also leads in tourism investment licenses, indicating continued growth in the sector, with 15,642 rooms under development.

From January 2019 to May 2023, please note that Antalya showcases the following metrics, compared to other major cities in Türkiye

• Occupancy rates – Following a dip in 2019-2020 due to the COVID-19 pandemic, Antalya has a 47% occupancy rate (as of May 2023)

• Daily room rate – Antalya has the second highest average daily room rate, following Istanbul (EUR 101.00 per night as of May 2023)

• Revenue per available room – Antalya has the second highest average revenue per available room (EUR 48.00 as of May 2023)

The motorway will also enhance connectivity within the broader catchment area, linking key agricultural and industrial centers. Antalya, Denizli, and Burdur are significant agricultural producers, supplying citrus fruits, vegetables, and textiles to both domestic and international markets. (Ministry of Transport Master Plan, 2022). The motorway will facilitate the efficient movement of these goods, reducing transportation costs and enhancing regional competitiveness. Furthermore, the project aligns with the planned expansion of the Turkish motorway network, connecting with future motorways that will extend eastward toward Konya and Karaman, further amplifying its importance in facilitating regional trade and tourism. (Ministry of Transport Master Plan, 2022).

Antalya International Airport (AYT) serves as the primary air travel hub for the region, offering numerous domestic and international connections. The airport's capacity is continually expanding to accommodate the growing influx of tourists, making it a vital gateway to the region. (EY Tourism Update 2023).

The Antalya-Alanya Motorway will provide a convenient and direct link between AYT and major tourist destinations, streamlining travel for international and domestic tourists arriving by air.

The Antalya-Alanya Motorway's strategic alignment with the region's economic engines, coupled with its role in expanding the Turkish motorway network and facilitating efficient transportation, positions it to become a critical artery for economic growth, increased tourism, and improved quality of life in the region.

3.5 Tourism in Antalya Province and Akdeniz Region

Tourism plays a crucial role in the Turkish economy. In 2022, Türkiye attracted 51M of the 963M tourists globally representing c.5% of global tourism. (EY Tourism Update 2023). The country witnessed a strong rebound in tourism receipts, reaching USD 46.5 billion in 2022, a 19% increase compared to pre-pandemic levels in 2019. Average tourist expenditure in Türkiye reached USD 905 per capita in 2022, marking a 21% rise from 2019. Notably, Germany and the United Kingdom were among the top three countries of origin for visitors to Türkiye.

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Table 6. Ministry of Culture and Tourism of Turkey - Tourism Business Certificated Accommodation Statistics

	Number Of Arrivals to The Facility			Overnight Stay			Average Duration			Occupancy Rate (%)		
Years	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total	Foreign	Local	Total
2023	20,662,085	4,680,542	25,342,627	81,577,296	12,453,693	94,030,989	3.95	2.66	3.71	56.53	8.63	65.16
2022	19,147,515	3,939,694	23,087,209	75,667,328	10,603,223	86,270,551	3.95	2.69	3.74	57.43	8.05	65.48
2021	12,989,618	3,669,437	16,659,055	50,537,706	10,066,394	60,604,100	3.89	2.74	3.64	40.32	8.03	48.35
2020	5,835,903	2,460,169	8,296,072	21,540,134	6,333,719	27,873,853	3.69	2.57	3.36	17.53	5.15	22.68
2019	16,077,147	3,060,162	19,137,309	73,772,317	8,624,957	82,397,274	4.59	2.82	4.31	62.53	7.31	69.84
2018	12,960,549	3,655,224	16,615,773	62,928,381	10,760,725	73,689,106	4.86	2.94	4.43	57.45	9.82	67.27
2017	10,039,062	3,813,811	13,852,873	44,922,472	11,174,350	56,096,822	4.47	2.93	4.05	49.36	12.28	61.64
2016	6,440,920	4,887,490	11,328,410	41,621,666	14,978,938	56,600,604	6.46	3.06	5.00	34.39	12.38	46.77
2015	11,257,311	3,256,199	14,513,510	61,418,288	9,108,898	70,527,186	5.46	2.80	4.86	51.86	7.69	59.55
2014	11,944,480	2,712,991	14,657,471	62,739,573	7,606,770	70,346,343	5.25	2.80	4.80	53.26	6.46	59.71
2013	10,827,654	2,966,418	13,794,072	57,691,550	8,685,148	66,376,698	5.33	2.93	4.81	53.13	8.00	61.13
2012	10,183,562	2,603,361	12,786,923	60,373,209	7,664,494	68,037,703	5.93	2.94	5.32	56.10	7.12	63.22
2011	9,454,362	2,272,239	11,726,601	50,978,182	6,836,384	57,814,566	5.39	3.01	4.93	51.50	6.91	58.41
2010	8,695,231	2,257,463	10,952,694	49,264,226	6,626,632	55,890,858	5.67	2.94	5.10	51.60	6.94	58.54
2009	6,968,975	1,871,527	8,840,502	38,418,577	5,408,876	43,827,453	5.51	2.89	4.96	51.63	7.27	58.90
2008	6,174,161	1,371,459	7,545,620	35,857,931	3,949,280	39,807,211	5.80	2.90	5.30	57.08	6.29	63.37

The Antalya region, renowned for its extensive tourism infrastructure, boasts nearly 900 accommodation facilities offering approximately 500,000 beds as of 2023. The Project's strategic location will significantly enhance accessibility and connectivity within this vital tourism hub.

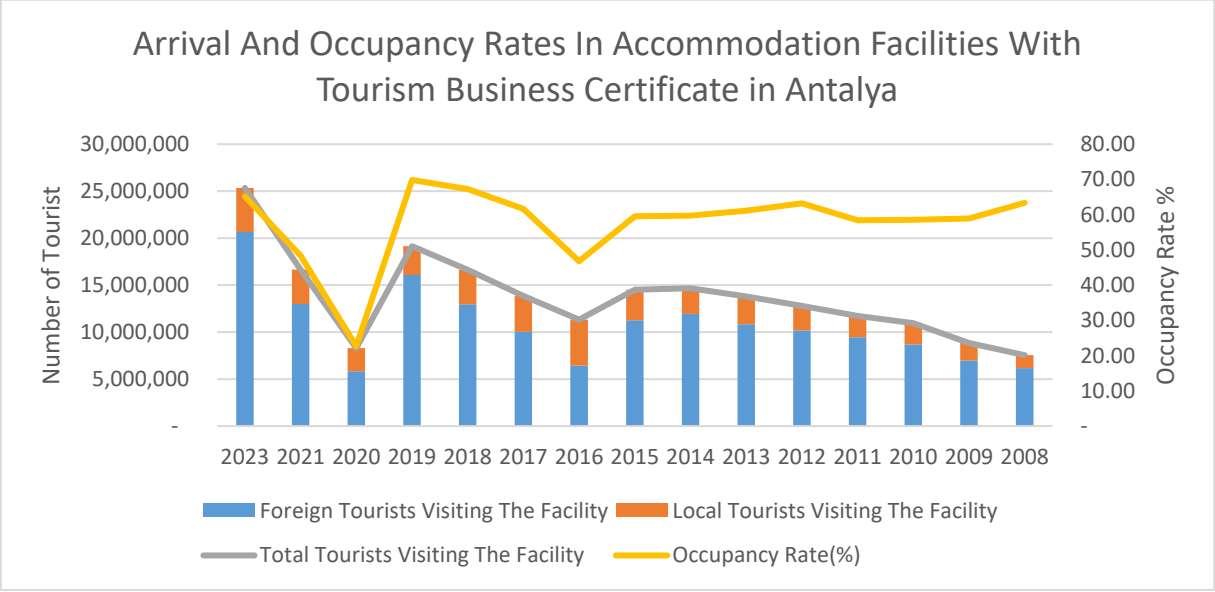

Figure 31. Ministry of Culture and Tourism of Turkey - Tourism Business Certificated Accommodation Statistics.

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Antalya is experiencing a significant surge in tourism, with foreign tourist arrivals reaching over 20.6 million in 2023. This growth aligns with a broader trend of increased tourism revenue in the region (EY Tourism Update 2023). Overnight stays in Antalya's accommodations also reached a record high of 94 million in 2023, indicating both increased visitor numbers and potentially longer stays.

While the average length of stay for foreign tourists has shifted slightly in recent years, Antalya continues to attract a diverse range of visitors. The Antalya-Alanya Motorway is well-positioned to support this growth by:

- **Improving accessibility:** The motorway will enhance access to key tourism hubs and reduce travel times, catering to the growing influx of tourists.
- **Enhancing visitor experience:** By facilitating smoother travel, the motorway will allow tourists to explore more of the region, potentially extending their stays and boosting local economies.
- **Accommodating evolving travel patterns:** The motorway caters to both longer and shorter journeys, reflecting the changing preferences of both domestic and international tourists.

Antalya's Growing Tourism Infrastructure

Antalya boasts a robust tourism infrastructure, with over 800 hotels currently in operation, including a significant number of four- and five-star establishments (Anadolu Ajansi, 2024). This, combined with the city's commitment to diverse and luxury accommodations, showcases its ability to attract a wide range of tourists.

Diversification of Tourism Markets

Importantly, Antalya is experiencing a diversification of its tourism source markets. European tourists, particularly from Germany, are becoming increasingly prominent, reducing reliance on any single nationality. This diversification enhances the resilience of the Antalya-Alanya Motorway Project to potential fluctuations in specific tourism markets.

Beyond Sun and Sea

Antalya is actively diversifying its tourism offerings beyond traditional "sun-and-sea" tourism. The development of golf resorts, cycling-friendly facilities, and sports tourism infrastructure aligns with the motorway's goal of facilitating access to a broader range of experiences.

Conclusion

The Antalya-Alanya Motorway Project is strategically positioned to support Antalya's thriving tourism industry. By improving connectivity, accommodating evolving travel patterns, and facilitating access to a diverse range of attractions, the motorway will play a crucial role in the continued growth and diversification of Antalya's tourism sector.

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4.0 *The Project*

This section is geared towards an analysis of the transportation market in Project's catchment area by providing historical, demographical, and socio-economic analysis and a prediction of the possible future outlook towards identifying traffic patterns.

4.1 Alternate route – State Road Information

The existing D400 state highway, while serving as the primary connection between Antalya and Alanya, suffers from significant drawbacks that hinder efficient and reliable transportation:

- Urban Traffic Congestion: The D400 passes through numerous settlements, leading to traffic patterns characteristic of urban environments. Frequent stop-and-go conditions and increased congestion result in reduced travel speeds, impacting travel times and efficiency.
- Tourism-Related Traffic: Antalya International Airport, a major entry point for tourists, is located near the project's starting point. The existing D400 experiences substantial traffic volumes due to tourists traveling to popular destinations like Side, Manavgat, and Alanya. This heavy traffic flow further exacerbates congestion and underscores the need for an alternative route.

The Antalya-Alanya Motorway offers a solution to the shortcomings of the existing infrastructure:

- Enhanced Connectivity: The motorway will provide a faster and more direct connection between Antalya city center, Antalya International Airport, and the eastern tourism hubs of Antalya province.
- Reduced Congestion: By diverting through-traffic from the D400, the motorway will alleviate congestion on the existing highway, benefiting both local commuters and those traveling longer distances.
- Improved Safety: The motorway's modern design, including safety features and controlled access points, is expected to significantly enhance road safety compared to the existing D400.

The Antalya-Alanya Motorway project strategically addresses pressing transportation needs in a region experiencing rapid growth in both tourism and local traffic. The current D400 highway, characterized by its passage through numerous settlements, exhibits traffic patterns akin to urban environments, leading to congestion and reduced travel speeds. (Environmental Impact Assessment, 2018) This situation is further exacerbated by the heavy traffic flow between Antalya International Airport and popular tourist destinations along the coast. The new motorway will not only provide a faster and more direct connection between key points but also significantly alleviate congestion on the D400, improving travel times and road safety for both residents and tourists.

We calculated that the Motorway will likely result in c. 30 min of travel time savings for long distance users of the Motorway, while local traffic is likely to continue using the existing state road.

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Figure 32. Competing Route

4.2 Economic Growth vs. Traffic

It is typical to expect increased traffic with positive economic growth. We have selected a total of 11 points along the state roads that constitute alternatives to the Project route and investigated change in traffic density based on the historical average daily traffic data provided by KGM and the Turkish GDP data provided by TurkStat.

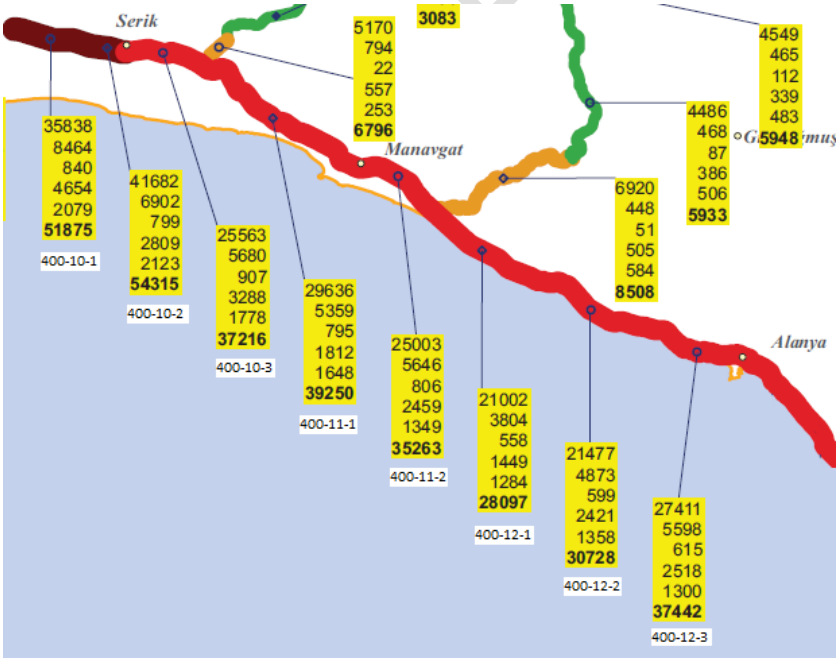

Figure 33. KGM Traffic Volume Map

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Control Section	Segment Number	Length Km	Total	Car	Medium Goods Vehicle	Bus	Truck	Articulated Truck
2023								
400-10	1	10	51,875	35,838	8,464	840	4,654	2,079
400-10	2	5	54,315	41,682	6,902	799	2,809	2,123
400-10	3	10	37,216	25,563	5,680	907	3,288	1,778
400-11	1	26	39,250	29,636	5,359	795	1,812	1,648
400-11	2	12	35,263	25,003	5,646	806	2,459	1,349
400-12	1	17	28,097	21,002	3,804	558	1,449	1,284
400-12	2	17	30,728	21,477	4,873	599	2,421	1,358
400-12	3	14	37,442	27,411	5,598	615	2,518	1,300

Figure 34. KGM Annual Average Daily Traffic Data

We converted the vehicle counts from various counting points on the State Road, provided by KGM, into Passenger Car Unit (PCU) values by applying the corresponding Vehicle Equivalent Coefficients. Subsequently, we calculated the Average Annual Daily Traffic (AADT) in PCU. To generate an average traffic data for the State Road, we multiplied these AADT values by the lengths of the sections where the counts were conducted, summed the results, and then divided by the total length of the State Road. As a result of these calculations and comparing them with the Antalya GDP in USD, we created below figure.

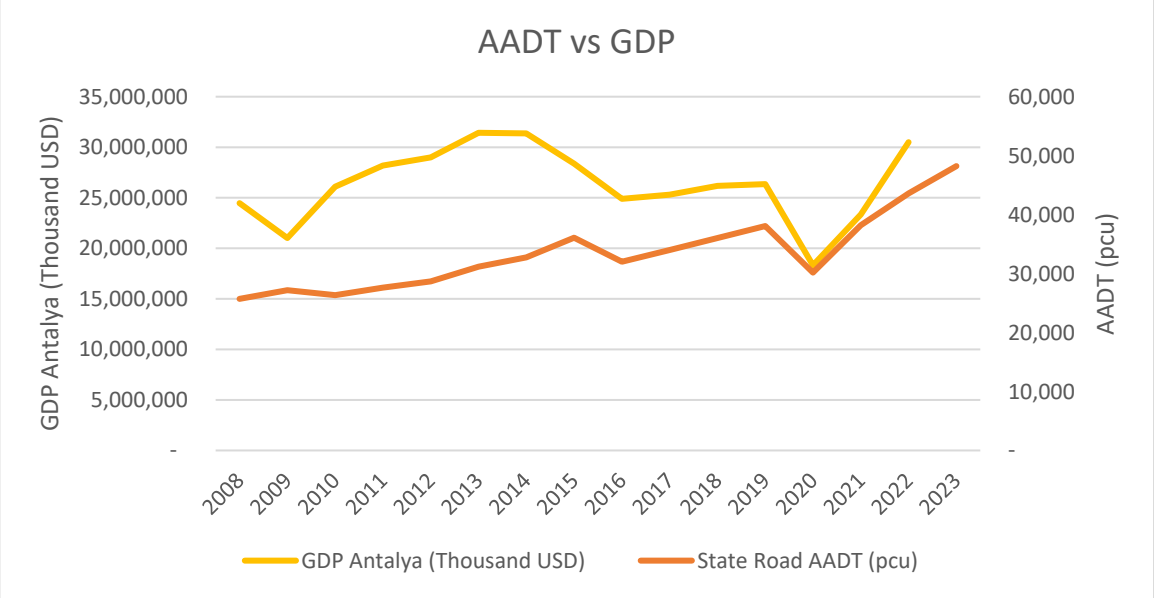

Figure 35. State Road Annual Average Daily Traffic and Antalya GDP over the Years

As visualised in above figure, we found there is a high level correlation between the total traffic and regional economic performance. This is logical as there is a relationship between vehicular activity, vehicle ownership and economical performance, as seen through many large metropolitan cities across the world.

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4.3 Catchment Area Traffic Analysis

According to TomTom Traffic Index 2023, travel time increased in Antalya last year. The data suggests that average time of travel 10 km road increased by 30 seconds in the City Center and 10 seconds in metropolitan area compared to 2022. World rank of Antalya in 2023 is 123 in city center and 74 in metropolitan area.

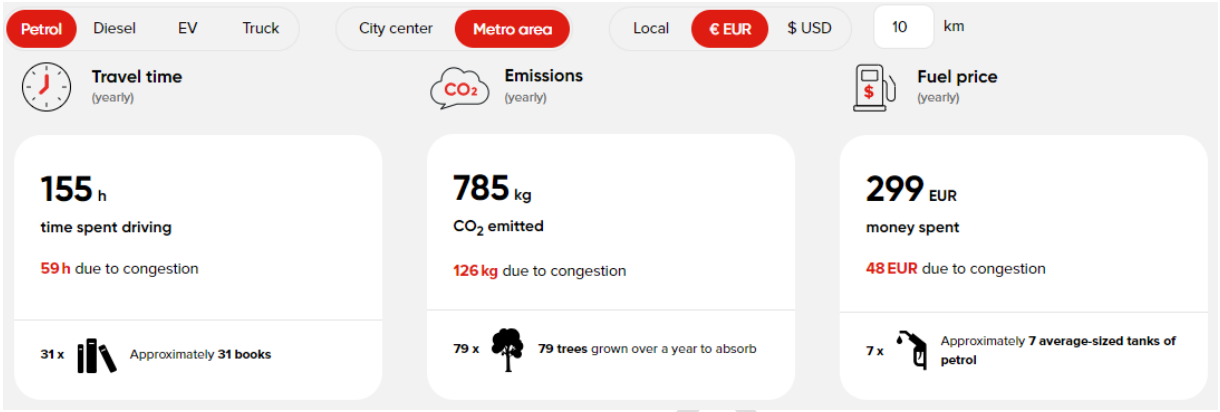

Figure 36. Cost of Driving for Antalya (TomTom Traffic Index 2023)

Travel Time and Congestion

The TomTom Traffic Index reveals that drivers in Antalya's metropolitan area spend a significant amount of time behind the wheel, with an average of 155 hours annually dedicated to driving for a one-way 10km commute. Notably, traffic congestion accounts for a substantial portion of this time, with drivers losing 59 hours per year due to delays caused by traffic. This lost time underscores the existing challenges of traffic congestion in Antalya and the need for infrastructure improvements to enhance travel efficiency and reduce the economic and personal costs associated with time spent in traffic.

CO2 Emissions and Environmental Impact

The environmental impact of traffic congestion in Antalya is also significant. According to the TomTom Traffic Index, petrol car usage for a 10km one-way commute in the metropolitan area results in the emission of 785 kg of CO2 annually for cars which uses petrol. Congestion contributes to an additional 126 kg of CO2 emissions per year, highlighting the environmental burden associated with traffic delays. The Antalya-Alanya Motorway Project, by alleviating congestion and promoting more efficient traffic flow, can contribute to a reduction in CO2 emissions in the region, supporting efforts to mitigate the impacts of climate change.

Fuel Costs and Congestion-Related Expenses

Traffic congestion also places a financial burden on drivers in Antalya. The TomTom Traffic Index estimates that drivers spend 299 EUR per year on fuel for a one-way 10km commute in petrol cars. Congestion adds an additional 48 EUR to fuel expenses, highlighting the direct financial cost of traffic delays. The Antalya-Alanya Motorway, by providing a faster and more efficient route, can help drivers save both time and money on fuel, further strengthening the project's economic benefits for users.

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Travel time

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
12:00 AM	14 min 20 s	13 min 20 s	13 min 20 s	13 min 30 s	13 min 40 s	13 min 30 s	13 min 50 s
	13 min 40 s	12 min 40 s	12 min 50 s	13 min	13 min	12 min 50 s	13 min 10 s
02:00 AM	13 min 10 s	12 min 20 s	12 min 30 s	12 min 40 s	12 min 30 s	12 min 30 s	12 min 40 s
	12 min 50 s	12 min	12 min 10 s	12 min 10 s	12 min 10 s	12 min 10 s	12 min 20 s
04:00 AM	12 min 20 s	11 min 30 s	11 min 30 s	11 min 40 s	11 min 40 s	11 min 40 s	11 min 50 s
	11 min 30 s	11 min	11 min	11 min 10 s	11 min 10 s	11 min 10 s	11 min 20 s
06:00 AM	12 min	12 min 20 s	12 min 30 s	12 min 30 s	12 min 30 s	12 min 20 s	12 min 10 s
	12 min 10 s	14 min 40 s	14 min 50 s	14 min 50 s	14 min 40 s	14 min 30 s	13 min 20 s
08:00 AM	12 min 30 s	18 min 50 s	18 min 40 s	18 min 30 s	18 min 20 s	18 min	14 min 20 s
	13 min	17 min 20 s	17 min	17 min	16 min 50 s	16 min 30 s	14 min 40 s
10:00 AM	13 min 10 s	15 min 50 s	15 min 40 s	15 min 40 s	15 min 30 s	15 min 30 s	14 min 40 s
	13 min 30 s	15 min 50 s	15 min 40 s	15 min 40 s	15 min 30 s	15 min 30 s	15 min 10 s
12:00 PM	14 min 10 s	16 min	16 min	16 min	15 min 50 s	15 min 50 s	16 min
	15 min	16 min 40 s	16 min 30 s	16 min 30 s	16 min 30 s	16 min	17 min 10 s
02:00 PM	15 min 50 s	17 min 40 s	17 min 30 s	17 min 40 s	17 min 20 s	17 min 40 s	17 min 50 s
	16 min	18 min 10 s	18 min	18 min	17 min 50 s	18 min 20 s	17 min 50 s
04:00 PM	16 min 10 s	18 min 40 s	18 min 20 s	18 min 40 s	18 min 20 s	18 min 50 s	17 min 40 s
	16 min 20 s	21 min	21 min	21 min 10 s	20 min 40 s	21 min 10 s	18 min 10 s
06:00 PM	16 min 20 s	21 min 50 s	22 min	22 min 10 s	21 min 40 s	22 min 20 s	18 min 20 s
	16 min	18 min 30 s	19 min	19 min 10 s	18 min 50 s	19 min 30 s	17 min 50 s
08:00 PM	15 min 50 s	16 min 20 s	16 min 30 s	16 min 40 s	16 min 40 s	17 min	16 min 50 s
	15 min 40 s	15 min 30 s	15 min 40 s	15 min 50 s	15 min 50 s	16 min	16 min 20 s
10:00 PM	15 min 20 s	15 min 10 s	15 min 30 s	15 min 30 s	15 min 30 s	15 min 40 s	16 min
	14 min 40 s	14 min 30 s	14 min 40 s	14 min 40 s	14 min 40 s	15 min	15 min 20 s

per 10 km

Figure 37. Travel Time Driving Patterns for Antalya (TomTom Traffic Index 2023)

Antalya's metropolitan area experiences significant fluctuations in travel time throughout the day and week, with peak congestion occurring during the morning and evening rush hours, particularly between 08:00 AM and 10:00 AM and 04:00 PM to 06:00 PM. The longest travel times, exceeding 20 minutes for a 10km journey, are observed on weekday evenings, highlighting the need for transportation solutions to address peak-hour congestion.

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Speed

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
12:00 AM	42 km/h	45 km/h	45 km/h	44 km/h	44 km/h	44 km/h	43 km/h
	44 km/h	47 km/h	47 km/h	46 km/h	46 km/h	47 km/h	46 km/h
02:00 AM	46 km/h	48 km/h	48 km/h	47 km/h	48 km/h	48 km/h	47 km/h
	47 km/h	50 km/h	50 km/h	49 km/h	49 km/h	49 km/h	49 km/h
04:00 AM	49 km/h	52 km/h	52 km/h	52 km/h	52 km/h	52 km/h	51 km/h
	52 km/h	55 km/h	54 km/h	54 km/h	54 km/h	54 km/h	53 km/h
06:00 AM	50 km/h	48 km/h	48 km/h	48 km/h	48 km/h	48 km/h	49 km/h
	49 km/h	41 km/h	41 km/h	41 km/h	41 km/h	41 km/h	45 km/h
08:00 AM	48 km/h	32 km/h	32 km/h	32 km/h	33 km/h	33 km/h	42 km/h
	46 km/h	35 km/h	35 km/h	35 km/h	36 km/h	36 km/h	41 km/h
10:00 AM	46 km/h	38 km/h	38 km/h	39 km/h	39 km/h	39 km/h	41 km/h
	44 km/h	38 km/h	38 km/h	38 km/h	39 km/h	39 km/h	40 km/h
12:00 PM	42 km/h	37 km/h	38 km/h	38 km/h	38 km/h	38 km/h	38 km/h
	40 km/h	36 km/h	36 km/h	36 km/h	37 km/h	38 km/h	35 km/h
02:00 PM	38 km/h	34 km/h	34 km/h	34 km/h	34 km/h	34 km/h	34 km/h
	37 km/h	33 km/h	33 km/h	33 km/h	34 km/h	33 km/h	34 km/h
04:00 PM	37 km/h	32 km/h	33 km/h	32 km/h	33 km/h	32 km/h	34 km/h
	37 km/h	29 km/h	29 km/h	28 km/h	29 km/h	28 km/h	33 km/h
06:00 PM	37 km/h	27 km/h	27 km/h	27 km/h	28 km/h	27 km/h	33 km/h
	38 km/h	33 km/h	32 km/h	31 km/h	32 km/h	31 km/h	34 km/h
08:00 PM	38 km/h	37 km/h	36 km/h	36 km/h	36 km/h	35 km/h	35 km/h
	38 km/h	39 km/h	38 km/h	38 km/h	38 km/h	38 km/h	37 km/h
10:00 PM	39 km/h	40 km/h	39 km/h	39 km/h	39 km/h	38 km/h	37 km/h
	41 km/h	42 km/h	41 km/h	41 km/h	41 km/h	40 km/h	39 km/h

Figure 38. Travel Speed Driving Patterns for Antalya (TomTom Traffic Index 2023)

Traffic speeds in Antalya's metropolitan area generally peak during the late night and early morning hours when traffic volumes are lowest. Weekday mornings between 04:00 AM and 06:00 AM consistently see the highest speeds, often exceeding 50 km/h. However, speeds drop significantly during peak commuting hours, falling below 30 km/h on weekday evenings between 06:00 PM and 08:00 PM, indicating periods of heavy congestion.

In addition to congestion in the cities, traffic volume maps and data provided by KGM for state roads were also reviewed to identify the intercity traffic conditions along roads that constitute alternatives to the Project route. KGM categorises traffic volume on state roads based on total number of vehicles passing daily from road sections. On KGM's scale, which is divided to 6 levels of traffic volume, the alternative road for the motorway which is the state road have very high, high or moderate to high traffic volumes: Over 50,000 daily vehicles indicates very high traffic volume, 20,000 to 49,999 daily vehicles indicates high traffic volume and 10,000 to 19,999 indicates moderate to high traffic volume.

The level of service measures the traffic congestion which will define the growth potential of the road network and the attractiveness of each road asset driven by time savings offering.

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Table 7. LOS Classification

Level of Service (LOS)	Description	Volume / Capacity	
		2+2/3+3	4+4
A	Free-flow conditions with unimpeded manoeuvrability	0.01 - 0.32	0.01 - 0.42
B	Reasonably unimpeded operations with slightly restricted manoeuvrability. Presence of other vehicles becomes noticeable.	0.33 - 0.50	0.43 - 0.60
C	Influence of traffic density becomes marked. Ability to manoeuvre within traffic stream is affected by other vehicles	0.51 - 0.72	0.61 - 0.82
D	Ability to manoeuvre is severely restricted due to traffic congestion. Travel speed is reduced by the increasing volume.	0.73 - 0.92	0.83 - 0.92
E	Represents operations at or near capacity, an unstable level. Vehicles are operating with minimum spacing for maintaining uniform flow.	0.93 - 1.00	0.93 - 1.00
F	Represents forced or breakdown flow. Occurs when vehicles arrive at a rate greater than the rate at which they are discharged or when the forecast demand exceeds capacity.	> 1.00	> 1.00



Source: HCM

Figure 39. LOS Classification

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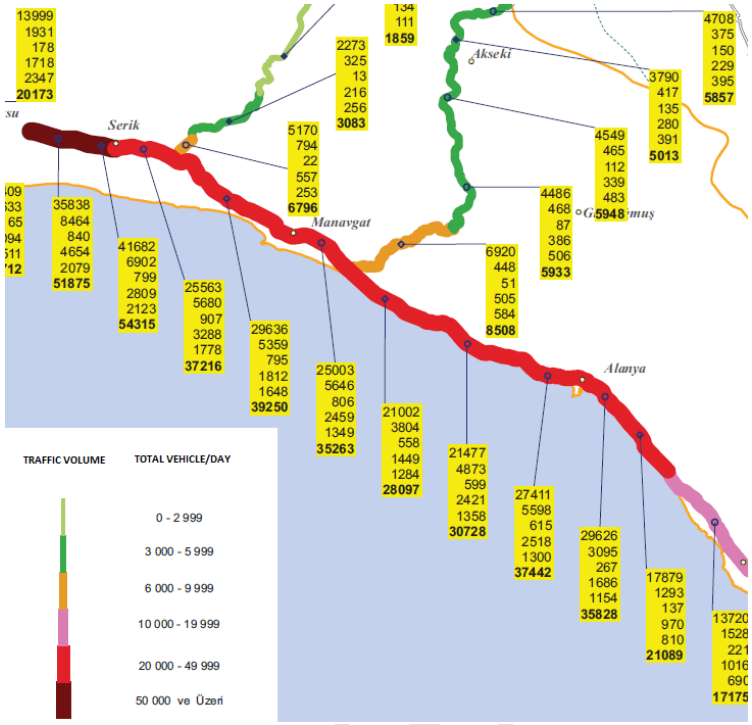

Figure 40. KGM Traffic Volume Data for State Road

The competing route to the Project at most of the sections are running at LOS C or D. Additionally, there are certain sections of the existing KGM roads with poor roadway safety and municipal crossings with multiple traffic signals, thus have reduced and limited traffic flow.

We expect LOS classifications to worsen in the upcoming years with reduced maintenance on the state highways and increased traffic; therefore, conclude that the Project will be benefiting from serving a safer and faster pathway

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4.4 Traffic Volume and Composition Analysis

Analyzing historical traffic trends forms the foundation for understanding current traffic patterns and projecting future demand. This analysis utilizes historical traffic data from KGM reports spanning from 2007 to 2023, focusing on the existing state road that runs parallel to the planned motorway.

Two key indicators are used to assess traffic patterns:

1. **Traffic Volume at a Cross-Section:** This indicator represents the number of vehicles passing a specific point on the road over a given time period. While valuable for capacity planning and level-of-service assessments, it does not provide a complete picture of traffic demand along the entire corridor, especially considering the multiple entry/exit points of the planned motorway.

2. **Vehicle Kilometers Traveled (VKT):** This measure provides a more comprehensive view of traffic load by considering both the number of vehicles and the distance they travel within the corridor. VKT is calculated for each vehicle category (cars, trucks, buses, etc.) using the following formula:

$$\text{VKT (Vehicle Type)} = \text{Traffic Volume (Vehicle Type)} * \text{Segment Length}$$

The sum of VKT values across all segments and vehicle categories represents the total corridor traffic load. Total length of the segments (400-10-1 and 400-12-3) of the state road is 111km according to the KGM data.

Table 8. Total Volume of the State Road

Year	Car-VKT	Small Truck-VKT	Bus-VKT	Truck-VKT	Other VKT	Total VKT PCU
2007	1,613,113	178,871	83,288	276,246	38,286	2,875,443
2008	1,612,092	181,126	77,930	256,370	43,190	2,833,357
2009	1,557,207	206,158	94,248	323,099	50,738	3,041,687
2010	1,524,729	209,005	97,205	320,202	55,082	3,025,896
2011	1,663,076	208,684	88,242	313,540	64,190	3,158,875
2012	1,756,097	214,550	80,404	313,808	74,601	3,280,172
2013	1,788,367	228,616	84,651	332,585	94,438	3,453,417
2014	1,924,829	225,175	92,365	340,193	99,289	3,633,628
2015	2,157,486	260,914	90,087	366,315	105,645	4,005,179
2016	2,140,514	194,547	61,924	267,537	97,401	3,553,373
2017	2,184,902	304,514	69,779	256,466	100,956	3,772,039
2018	2,288,679	417,133	80,460	215,680	108,703	3,998,155
2019	2,428,850	444,908	80,855	223,906	114,786	4,223,590
2020	2,079,828	281,132	39,397	159,859	107,219	3,348,295
2021	2,475,536	421,934	58,508	220,662	132,623	4,239,605
2022	2,669,621	552,675	73,462	261,729	153,094	4,839,875
2023	2,998,889	608,917	80,086	271,127	171,335	5,353,405

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4.5 Traffic Determinants

4.5.1FUTURE PROJECTS

The proximity of several established industrial zones to the Antalya-Alanya Motorway project route highlights the potential for the motorway to stimulate economic activity and freight traffic. The Serik Industrial Zone, situated a mere 6.6 kilometers from the motorway, and the Manavgat Industrial Zone, located just 4 kilometers away, are likely to benefit from enhanced accessibility and reduced transportation costs, potentially leading to increased production and freight movements. This suggests a promising prospect for the motorway to capture a substantial share of commercial traffic, contributing to its overall traffic and revenue performance. The motorway's strategic location, facilitating the efficient movement of goods between these industrial zones and other regional/national markets, reinforces its significance in supporting economic development in the Antalya-Alanya corridor.

Table 9. Distance of Industrial Zones to Project Route (Environmental Impact Assessment (2018))

No	Name of Industrial Zone	Distance
1	Antalya Industrial Zone	24 km
2	Serik Industrial Zone	6.6 km
3	Manavgat Industrial Zone	4 km
4	Alanya Industrial Zone	2.7 km

According to the 2053 Transportation and Logistic Master Plan, planned projects between 2023-2053 is shown below;

Table 10. Planned Motorway Projects in Turkey (2053 Transportation and Logistic Master Plan)

Project Name	Planned Year
Ankara - Kırıkkale - Delice Motorway	2029
Ankara - Sivrihisar Motorway	2029
Antalya - Alanya Motorway	2029
Aydın - Denizli Motorway	2029
Sapanca - Afyonkarahisar Motorway	2029
Mersin-Erdemli-Silifke-Taşucu Motorway (Çeşmeli-Kızkalesi Section)	2029
Dörtyol Hassa Motorway	2029
Kınalı - Tekirdağ - Çanakkale - Savaştepe Motorway (Malkara-KINALI Section)	2029
Kuzey Marmara Motorway Nakkaş - Başakşehir Section	2029
Samsun- Mersin Motorway	2029
Trabzon - Habur Motorway	2035
Afyon-Burdur Motorway	2035
Alanya-Silifke Motorway	2035
Delice - Samsun Motorway	2035
Ankara-İzmir Motorway (Sivrihisar-İzmir Section)	2035
Bozüyük-Afyonkarahisar Motorway	2035
Çeşmeli-Erdemli-Silifke-Taşucu Motorway (Kızkalesi-Taşucu Section)	2035

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Project Name	Planned Year
Denizli-Burdur-Antalya Motorway	2035
Gerede-Merzifon-Gürbulak Motorway	2035
Kınalı-Tekirdağ-Çanakkale-Savaştepe Motorway - Çanakkale -Savaştepe Section	2035
Sivrihisar-Bursa Motorway	2035
Şanlıurfa-Habur Motorway (Including Diyarbakır Connection Road)	2035

Table 11. Planned Divided Road Projects in Turkey (2053 Transportation and Logistic Master Plan)

Project Name	Planned Year
Akhisar Ring Road	2019-2023
Amasya Ring Road	2019-2023
Antalya Ring Roads	2019-2023
Bergama Ring Road	2019-2023
Beyşehir Ring Road	2019-2023
Çivril Ring Road	2019-2023
Hayrabolu Ring Road	2019-2023
Karaman Ring Road	2019-2023
Malazgirt Ring Road	2019-2023
Van Ring Road	2019-2023
Adana Southern Ring Road	2024-2029
Afyonkarahisar Southern Ring Road	2024-2029
Balıkesir Eastern Ring Road	2024-2029
Kahramanmaraş Ring Road	2024-2029
Kanal Istanbul Connection Roads	2024-2029
Kayseri Southern Ring Road	2024-2029
Lüleburgaz Ring Road	2024-2029
Midyat Ring Road	2024-2029
Tokat Ring Road	2024-2029
Uşak Ring Road	2024-2029
Kırşehir Ring Road	2024-2029
Konya Ring Road	2024-2029
Bolu Southern Ring Road	2024-2029
Isparta Eastern Ring Road	2030-2035
Malatya Northern Ring Road	2030-2035
Manisa Southern Ring Road	2030-2035
Ordu Giresun Southern Road	2030-2035
Aydın Northern Ring Road	2036-2053
Denizli Ring Road	2036-2053
Dinar Northern Ring Road	2036-2053

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Project Name	Planned Year
Düzce Western Ring Road	2036-2053
Muğla Northern Ring Road	2036-2053

Table 12. Planned High-Speed Train Routes in Turkey (2053 Transportation and Logistic Master Plan)

Project Name	Planned Year
Ankara - Sivas YHT	2019-2023

Table 13. Planned Fast Train Routes in Turkey (2053 Transportation and Logistic Master Plan)

Project Name	Planned Year	Project Name	Planned Year
İzmir-Ankara HT (Ankara - Afyon Section)	2019-2023	Sivas-Çetinkaya HT	2024-2029
Bursa-Osmaneli HT	2019-2023	Aksaray-Konya HT	2024-2029
Halkalı – Kapıkule HT (Kapıkule - Çerkezköy Section)	2019-2023	Halkalı – Kapıkule HT (Çerkezköy - Halkalı Section)	2024-2029
Konya-Karaman HT	2019-2023	Gaziantep-Şanlıurfa HT	2024-2029
Adana-İncirlik-Toprakkale HT	2019-2023	Afyon-Burdur HT	2030-2035
İzmir-Ankara HT (İzmir - Afyon Section)	2024-2029	Burdur-Antalya HT	2030-2035
Istanbul Airport-Çatalca HT	2024-2029	Kayseri-Aksaray HT	2030-2035
Adapazarı-Gebze-YSS-Halkalı HT	2024-2029	Çorum-Merzifon HT	2030-2035
Karaman-Ulukışla HT	2024-2029	Merzifon-Samsun HT	2030-2035
Toprakkale-Bahçe-Nurdağ-Başpınar HT	2024-2029	Delice-Kırşehir HT	2030-2035
Aksaray-Ulukışla HT	2024-2029	Kırşehir-Aksaray HT	2030-2035
Ulukışla-Yenice HT	2024-2029	Aksaray-Şereflikoçhisar HT	2030-2035
Bandırma-Bursa HT	2024-2029	Nurdağ-Kahramanmaraş HT	2030-2035
Adana-Mersin HT	2024-2029	Şanlıurfa-Mardin HT	2030-2035
Sivas-Erzincan HT	2024-2029	Erzincan-Erzurum HT	2030-2035
Yerköy-Kayseri HT	2024-2029	Erzurum-Kars HT	2030-2035
Bursa-Gemlik HT	2024-2029	Malatya-Elazığ HT	2030-2035
Mürşitpınar-Şanlıurfa HT	2024-2029	Elazığ-Diyarbakır HT	2030-2035
Aliağa-Çandarlı-Bergama HT	2024-2029	Kars-Dilucu HT	2030-2035
Selçuk-Ortaklar-Aydın HT	2024-2029	Nusaybin-Cizre-Silopi-Habur HT	2036-2053
Aydın-Denizli HT	2024-2029	Siirt-Kurtalan HT	2036-2053
Çetinkaya-Malatya HT	2024-2029	Adıyaman-Gölbaşı-Kahta HT	2036-2053
Konya-Seydişehir-Antalya HT	2024-2029	Erzurum-Rize HT	2036-2053
Delice-Çorum HT	2024-2029	Erzincan-Trabzon HT	2036-2053
Bandırma-Balıkesir	2024-2029	Tokat-Turhal HT	2036-2053
Balıkesir-Bergama	2024-2029		

Table 14. Planned Conventional Railway Routes in Turkey (2053 Transportation and Logistic Master Plan)

Project Name	Planned Year
Akçagöze-Başpınar Conventional Route	2019-2023
Köseköy-Gebze Conventional Route	2019-2023
Diyarbakır-Mazıdağı Conventional Route	2019-2023
Sincan-Yenikent-Kazan-Soda Conventional Route	2019-2023
Ödemiş-Kiraz Conventional Route	2024-2029
Railway Connections to Mines Phase 1	2024-2029

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Project Name	Planned Year
Railway Connections to Industrial Zones Phase 1	2024-2029
Railway Connections to Factories Phase 1	2024-2029
Railway Connections to Ports	2024-2029
Railway Connections to Mines Phase 2	2030-2035
Railway Connections to Industrial Zones Phase 2	2030-2035
Railway Connections to Factories Phase 2	2030-2035
Railway Connections to Ports	2030-2035

Below list shows the planned projects according to the 2053 Transportation and Logistic Master Plan that fall within the Antalya-Alanya Motorway catchment area:

Motorways:

- Antalya - Alanya Motorway
- Aydın - Denizli Motorway
- Afyon-Burdur Motorway
- Alanya-Silifke Motorway
- Denizli-Burdur-Antalya Motorway
- Sapanca-Afyonkarahisar Motorway

Divided Roads (Çevre Yolu):

- Antalya Çevre Yolları (Antalya Ring Roads)
- Afyonkarahisar Güney Çevreyolu (Afyonkarahisar Southern Ring Road)
- Karaman Çevre Yolu (Karaman Ring Road)
- Konya Çevre Yolu (Konya Ring Road)
- Isparta Doğu Çevreyolu (Isparta Eastern Ring Road)
- Denizli Çevreyolu (Denizli Ring Road)
- Muğla Kuzey Çevreyolu (Mugla Northern Ring Road)
- Aydın Kuzey Çevreyolu (Aydın Northern Ring Road)
- Dinar Kuzey Çevreyolu (Dinar Northern Ring Road)

High-Speed Train:

- Konya-Seydişehir-Antalya High-Speed Train

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Positive Impacts:

- Afyon-Burdur Motorway: This project will extend the motorway network from Afyonkarahisar, a major junction in central Türkiye, to Burdur, directly connecting with the Antalya-Alanya Motorway. This will likely increase traffic from central Anatolia, including tourism and freight traffic to/from Antalya, benefitting the motorway.
- Denizli-Burdur-Antalya Motorway: This project will create a direct high-speed link between Denizli, a significant industrial and agricultural center, and Antalya, bypassing the existing state road. This is likely to increase both passenger and freight traffic on the Antalya-Alanya Motorway.
- Alanya-Silifke Motorway: This eastward extension from Alanya will enhance connectivity to Mersin, a major port city. It could generate additional traffic on the Antalya-Alanya Motorway, particularly for those traveling beyond Alanya.
- Konya-Seydişehir-Antalya High-Speed Train: This planned rail line could have a synergistic effect with the motorway. While potentially drawing some passengers away, it may also stimulate regional development and tourism, generating overall higher traffic volumes, some of which could benefit the motorway.
- Sapanca-Afyonkarahisar Motorway: Upon completion of the Afyon-Burdur and Denizli-Burdur-Antalya motorways, the Sapanca-Afyonkarahisar Motorway will establish a direct high-speed link between the heavily populated and industrialized northwest region of Türkiye (including Istanbul and the surrounding areas) and the Antalya-Alanya corridor. This improved connectivity could generate substantial additional traffic on the Antalya-Alanya Motorway, particularly from tourists and businesses seeking efficient transportation routes to the southern coast.

Neutral Impacts:

- Projects Outside the Catchment Area: Projects like the Ankara-Kırıkkale-Delice Motorway and others not directly connecting to the Antalya-Alanya corridor are unlikely to have a significant direct impact on its traffic. However, they could contribute to overall economic growth and traffic demand in Türkiye, indirectly benefitting the motorway.

Additional Considerations:

- Integration with Other Modes: The success of the Antalya-Alanya Motorway will also depend on its efficient integration with other transportation modes. Seamless connections to airports, ports, and railway stations will be crucial for attracting passengers and freight traffic.

The model considered future projects and new points of interests that are expected to drive traffic growth on the project assets in foreseeable future. To verify the this claim about the future projects and traffic drivers, we considered a multitude of governmental data sources, reports, news articles and strategy documents were utilized, with National Transportation Master Plan developed by the Ministry of Transport and Infrastructure constituting the basis for all transportation projects. In this respect, we identified attraction and traffic generation points, referred to as future projects. Although the current plans create this timeline, we researched future projects and that they may or may not happen at the assumed timelines.

Completion of future projects could significantly increase the achievable traffic volume of the Antalya-Alanya Motorway, potentially leading to an upward impact on traffic projections.

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It is anticipated that future projects may increase regional economic activities and thus the traffic demand of the highway. New industrial zones, logistics centers and tourism investments may lead to an increase in both passenger and freight transportation.

It can be challenging to accurately measure the traffic impact of future projects because the timelines and scopes of these projects are subject to change. Therefore, it is more appropriate to include the traffic impacts of these projects in the upside scenario.

4.5.2LAND DEVELOPMENT PROJECTS ALONG THE MOTORWAY

Future land development along the Motorway at locations closer to the provincial ring roads and smaller towns along the western coastal line. GDP and population growth factors have an allowance for future developments along the Motorway. On the other hand, an in depth review of future land development projects have not been carried out and this item can be considered as an upside to the traffic demand forecasted, if can be quantified.

The planned land development projects along the highway route have been examined. A mass housing and landscaping project with 357 houses is being implemented by the Housing Development Administration of Turkey (TOKİ) in Kocayatak Neighborhood, Serik District of Antalya. The project is planned to be completed by the end of 2024 . Once the project is realized, it can be considered as a increase to traffic demand.

4.5.3OTHER POTENTIAL PROJECTS

A research has been conducted on other ongoing projects in the region and the information on the identified projects is given below.

- Antalya Airport Expansion Project: Antalya Airport, which is currently being operated by TAV Airports at its maximum capacity, has undergone a comprehensive expansion project to increase its capacity in order to be prepared for future periods. The project will be completed in 3 phases in total, phase 1 will be realized between 2022-2025, phase 2 between 2028-2029 and phase 3 between 2038-2039, and the majority of the works to be completed within the scope of the expansion will be carried out in the first phase. Within the scope of Antalya Airport expansion and enlargement project investments, the Terminal 2 Building, which currently serves international flights, will be transformed into a new terminal building of 223 thousand square meters. At the same time, the Domestic Terminal building, which is currently 37 thousand square meters, will be enlarged to 75 thousand square meters. In 2038, a new international terminal of 70 thousand square meters will be built.
- Hotel Construction: Antalya Province, which is the 2nd most visited city in Turkey in terms of tourism, stands out as a destination that hosts millions of domestic and foreign tourists every year. The new hotels planned to be built in the region for this dynamic tourism sector aim to increase Antalya's tourism capacity and contribute to the regional economy. From luxury hotels to boutique hotels, new hotel projects are planned every year, especially along the coastline. There are 10 hotel projects planned to be completed in Antalya Province by the end of 2024

4.6 Conclusion

In review, we note that Turkey is strategically located at the cross-roads of Europe and Asia with a growing population and a thriving economy. The Project is also strategically located in some of the most densely populated and economically advanced areas of Turkey.

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The existing D400 state road, while serving as the primary connection between Antalya and Alanya, faces significant challenges related to urban traffic congestion and heavy tourism-related traffic, leading to reduced travel speeds and extended journey times. The Antalya-Alanya Motorway directly addresses these shortcomings by providing a faster, safer, and more efficient alternative route, enhancing connectivity between key tourism hubs and supporting the region's overall economic development.

The motorway is expected to reduce travel times for long-distance users by approximately 30 minutes compared to the existing state road.

Analysis of historical data reveals a correlation between traffic volume on the existing state road and Antalya's GDP. This suggests that economic growth in the region will likely translate into increased traffic demand, benefitting the Antalya-Alanya Motorway.

The TomTom Traffic Index highlights significant congestion on Antalya's existing road network, particularly during peak hours. This, coupled with the presence of industrial zones along the Motorway's route, underscores the need for improved connectivity and efficient transportation solutions.

Several planned infrastructure projects, including new motorways, high-speed rail lines, and ring roads, are expected to significantly impact the region's transportation landscape.

Ongoing and planned land development projects, particularly those focused on tourism and housing, will further contribute to traffic demand along the Motorway corridor.

The ongoing expansion of Antalya Airport, a major driver of tourism in the region, will significantly increase passenger capacity and likely generate additional traffic on the Motorway.

The Antalya-Alanya Motorway is strategically positioned to capitalize on the region's projected economic and population growth. By providing a faster, safer, and more efficient transportation alternative, the Motorway is well-positioned to attract a significant share of both passenger and freight traffic. While the precise impact of future projects and developments remains subject to various factors, the overall outlook for traffic demand on the Antalya-Alanya Motorway is positive. The findings presented in this section provide a strong foundation for traffic and revenue forecasting, highlighting the Motorway's significant potential as a infrastructure asset for the region's continued growth and prosperity.

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5.0 *Traffic Analysis*

5.1 Introduction

This section describes the traffic model approach and assumptions of the traffic demand forecast.

5.2 Traffic Demand Criteria

Motorway vehicle demand/traffic demand (load) is estimated by employing demand estimation models that consist of the following stages:

- Analysis and understanding of the composition of existing traffic on the existing corridor (state road) by vehicle (cars, small trucks, trucks, buses, other)
- Annual trends of vehicle volumes in the current corridor (D-400 highway) (2007-2023) (It is recommended to examine at least 30-year trends in time series analyses. However, reliable data for population and socio-economic variables have not been provided in Turkey since 2007, highway volumes are collected for 2007-2023.
- Trends of total vehicle traffic demand/load per vehicle type in the existing corridor (D-400 highway) by types (vehicle.km) (*vehicle kilometres travelled: VKT*) (2007-2023).

There are two basic indicators of D-400 highway traffic demand/load:

- Vehicle volume on a specific section: Although this is an important demand indicator, it is used for capacity planning and demand analysis in specific sections like bridges, and entrances. It is a basic indicator in feasibility studies on bridge crossings or estimating entries for specific toll collection points. However, it is not enough to predict the demand only in a certain section of a highway corridor. The number of vehicles in the section is a variable used in capacity planning and level of service measurement.
- Vehicle kilometre travelled: Traffic demand/volume on several sections/segments of a highway corridor varies. In that case, each road segment accommodates a certain traffic but, total traffic demand can be measured as an aggregate demand indicator. If there are many entrances/exits on the highway corridor and tolls are charged about the distance, the number of vehicles that travel on each segment is estimated separately. In the current state, the volume of each segment is measured for each vehicle type. Multiplying the volume and the section length (for vehicle type) gives the traffic demand/load which is represented by vehicle-kilometre travelled (VKT) measure for a specific road section. The result is car-kilometre travelled, bus-kilometre travelled, truck-kilometre travelled and other vehicle-kilometre travelled). The sum of vehicle kilometres of sections gives the corridor traffic demand/load.

Travel demand models, in principle, specify independent variables that contribute to traffic demand, represent the current state by equations, and employ the equations to estimate future demand.

Data are obtained for independent variables that may have a significant role/impact, like population, income per capita, number of vehicles, tourism, production, and hotel's bed capacity.

The conventional methods employ multiple regression equations. Statistical analysis provides selecting of explanatory variables and coefficients.

Significant variables influencing/generating traffic volume/demand are used to estimate traffic demand in the future.

Some of the variables/factors that contribute to traffic generation are as follows:

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- Local population, and growth trend (2007-2023), population growth trends of the districts around the corridor (2007-2023)
- Bed capacity (hotels/accommodation facilities) in the province (2007-2023)
- Hotel/accommodation facility bed capacities and visitor numbers in the districts around the corridor (2007-2023)
- Average income per capita in the province (*GDP per capita, Antalya province)*
- Number of vehicles (by type) in Antalya Province (2007-2023)

Antalya province is one of the most important tourist destinations in Turkey. Antalya is also an important agricultural production region. It is an important consumption center due to its population and economic development. For these reasons, the traffic in the Antalya-Alanya corridor is not only generated by local activities. The country's population, economy, and tourism activities contribute to the traffic generation. Therefore, some factors at the national level may be explanatory variables of the Antalya-Alanya highway corridor.

- Average national income per capita in Turkey (2007-2023) (*GDP per capita , Turkey*)
- Türkiye population (2007-2023)
- Number of foreign visitors to Türkiye (2007-2023)
- Number of vehicles in Türkiye (2007-2023)

5.2.1MOTORWAY USERS

Most of the traffic crossing between Serik and Alanya on the D400 is a mix of local and long-distance trips, with the motorway carrying a significant portion of the longer-distance traffic, particularly those connecting Antalya with Alanya and beyond. The motorway also serves as a critical section of the broader Afyonkarahisar-Alanya Motorway, positioning it as a vital link that not only supports the local tourism-driven economy within Antalya province but also extends its influence deep into central Anatolia. The strategic location of the Antalya-Alanya Motorway within a region poised for substantial economic growth further amplifies its importance. As a result, the motorway is expected to stimulate economic activity across a wide geographic area, including the outer catchment zones of Muğla, Burdur, Isparta, Konya, Karaman, Mersin, Denizli, and Afyonkarahisar, all of which have significant potential for growth in sectors such as agriculture, industry, and logistics.

5.2.2RAMP UP

The ramp-up period refers to the initial phase following the road's opening, during which there is a slight delay in drivers adjusting their travel patterns to utilize the new road fully, especially in terms of the time it takes for induced demand to materialize. The ramp-up factors are obtained from the previous projects. It is found that potential demand is attracted 3 years after the opening.

Table 15. Ramp Up Assumptions

Duration	Light Vehicles	Heavy Vehiicles
Year 1	85%	90%
Year 2	95%	100%
Year 3	100%	100%

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5.2.3INDUCED TRAFFIC

The Antalya-Alanya Motorway Project (Project) is expected to generate induced demand, attracting additional traffic volume due to improved accessibility and reduced travel times. This phenomenon occurs when drivers perceive the new motorway as a more attractive option, leading to changes in travel patterns, including:

Increased Trip Frequency: Existing users of the D400 may opt to travel more frequently between Antalya and Alanya, or to destinations along the route, due to the time savings offered by the motorway.

Shift in Destination Choice: Travelers may choose destinations within the Project corridor that were previously considered less accessible due to longer travel times or congestion on the existing road network.

Generation of New Trips: The improved connectivity provided by the motorway may lead to entirely new trips that were not previously considered feasible or convenient, as drivers take advantage of the reduced travel times and enhanced accessibility.

Estimation Methodology:

Estimating induced demand for the Antalya-Alanya Motorway requires a nuanced approach that considers the unique characteristics of the region and the project itself. While traditional methodologies, such as those outlined in the UK Department for Transport (DOT) guidelines, provide valuable insights, they may need to be adapted to account for local factors. These guidelines typically establish a relationship (elasticity) between induced demand and reductions in travel time, offering a range of elasticities (minimum, maximum, and medium) based on project characteristics.

Factors Influencing Induced Demand:

Several factors will influence the magnitude of induced demand for the Project:

- Magnitude of Time Savings: The extent to which the motorway reduces travel times compared to the existing D400 will be a key driver of induced demand. Larger time savings are likely to result in higher levels of induced demand.
- Toll Rates: The motorway's toll rates, relative to fuel costs and perceived value of time, will influence driver choices. Higher toll rates may dampen induced demand, particularly for price-sensitive users.
- Land Use and Economic Development: Induced demand is often linked to new development spurred by improved accessibility. The extent to which the motorway triggers new residential, commercial, or industrial development along the corridor will influence long-term traffic growth.
- Competition from Alternative Modes: The availability and quality of alternative transportation options, such as existing and planned rail services, will influence the attractiveness of the motorway and, consequently, induced demand.

Benchmarking and Calibration:

To ensure a realistic estimate of induced demand, it is essential to benchmark against similar motorway projects, particularly those that have demonstrated significant induced demand following their completion.

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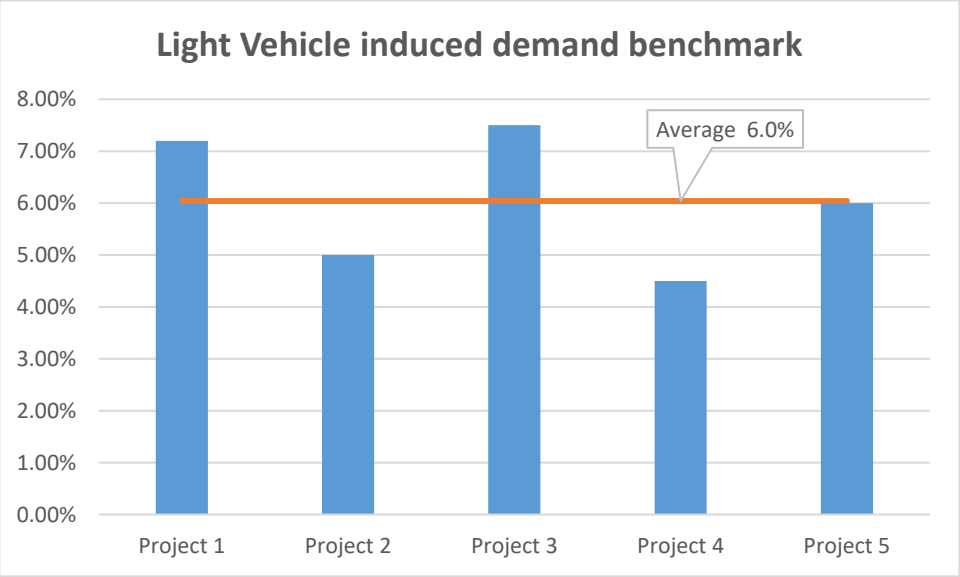

Figure 41. Light Vehicle Induced Demand Benchmark

This approach involves analyzing historical traffic data and identifying the portion of traffic attributable to induced demand, considering factors such as the magnitude of time savings, toll rates, and land use changes.

It is crucial to conduct sensitivity analyses to assess the impact of varying induced demand levels on the project's traffic and revenue projections. This analysis will explore different elasticity values (minimum, maximum, and medium) based on the chosen methodology, as well as scenarios considering variations in toll rates, economic growth, and the development of alternative transportation modes.

By adopting a comprehensive approach that incorporates these considerations, this traffic due diligence report will provide a robust and realistic assessment of induced demand for the Antalya-Alanya Motorway Project, contributing to informed decision-making for lenders and project stakeholders. Observations reveal that induced trips by car are much higher than bus and truck.

Table 16. Induced Demand Assumptions

Duration	Light Vehicles	Heavy Vehiicles
Year 1	4,8%	1.6%
Year 2	0.9%	0.3%
Year 3	0.3%	0.1%

5.2.4CONTINUITY

Travellers often make their route choice decisions at the origin of their trips by considering the entire travel from the origin to the destination. It is often less likely that a long-distance travel starting on a motorway to switch to local roads. According to researchers in literature, unless there is a problem on the existing road in terms of condition etc., the capture rate of the new road is not expected to change drastically.

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5.2.5VALUE OF TIME

The Value of Time (VoT) is a critical parameter in traffic modeling as it quantifies the monetary value drivers assign to time saved during their journey. This parameter is crucial for understanding the trade-off drivers make between using the toll road (with higher costs but potentially faster travel times) and opting for alternative, toll-free routes.

Accurately estimating VoT is essential for Traffic Forecasting. VoT is a key input for the traffic model, influencing the proportion of drivers choosing the toll motorway versus alternative routes. VoT directly affects the project's revenue potential, as it determines the trade-off drivers make between toll costs and time savings. Sensitivity analysis of VoT variations will help assess the project's financial resilience to changes in driver behavior and economic conditions.

Methodology:

Given the project's context and drawing upon international best practices, a combination of methodologies will be employed to estimate VoT for the Antalya-Alanya Motorway Project:

- Percentage of Hourly Wage Rate: VoT for light vehicles will be estimated as a percentage of the average hourly wage rate in the region. This method aligns with the US Department of Transportation (USDOT) guidelines, which recommend using 50%, 70%, and 100% of the hourly wage rate for local, intercity, and business trips, respectively. (USDOT, 2016).
- Calibration and Benchmarking: To ensure a realistic estimate, the initial VoT derived from the hourly wage rate method will be further calibrated based on benchmarking against recent studies in Türkiye. Additionally, international benchmarks from similar projects in countries with comparable GDP per capita, such as Mexico and Greece, will be considered.

Data Sources:

The following data sources will be utilized:

- Average Hourly Wage Rate: With the decision of the Minimum Wage Determination Commission dated 27.12.2023 and numbered 2023/2, published in the Official Gazette dated 30.12.2023, the minimum wage for one day of normal work has been determined as 666.75 Turkish liras. The net amount of this amount is 566.74 TL per day. The daily minimum wage is calculated based on legal working hours. Accordingly, the working hours are 45 hours per week. These 45 hours are distributed equally to the other days, assuming that there is 1.5 days off per week. According to this calculation, the daily working hours are 7 hours and 30 minutes. The hourly gross minimum wage in 2024 is calculated as 88.90 TL. The hourly minimum net wage is 75.56 TL.
- According to TUIK Earnings Structure Statics results, November 2022 as reference, the total number of hours worked as a monthly wage was 201.3. The average monthly gross wage-salary per person in 2022 was $600 in total. The average hourly gross wage-salary was $3 in total. The average monthly per person earnings were $670 in total. The annual average gross earnings in 2022 were $7763.
- However, GDP per capita was $10,622 in 2022 and GPD per capita $12,849 in 2023.
- Previous Studies and Benchmarks: We reviewed VoT values and methodologies from similar projects and studies. According to NMH Traffic Study, VoT was estimated as 6.5 USD/hr in 2015. According to Çanakkale Motorway Traffic Study done in 2019, VoT was estimated as 12.4 USD/hr. Kınalı Malakara

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Motorway traffic study done in 2023 estimated 11 USD/hr. Nakkaş Başakşehir Motorway Traffic Study estimated 4.5, 6.4 and 6.8 USD/hr for light vehicles short, long and business demand segments in 2021.

- Value of Time in TR is c.US$7/hr as has been calculated and reported in the NTMP2017, completed in 2017 through EU funding. The literature on this refers to a wide range of VoT used for modelling purposes. 40% to 50% of average wage rates seems to be widely accepted for non-"business" trips ("business" trips are those made during employers' time). The latter tend to be valued at higher rates of up to 80%-100% of the wage rate.

Future VoT Projections:

VoT is expected to increase over time due to rising income levels. The projected growth in VoT will be linked to the forecasted growth in GDP per capita, using an elasticity value based on historical trends and benchmarking against comparable projects.

Value of Time growth to GDP/capita elasticity is considered 0.5 to 1. Some scholars expect the car ridership to be included in the VoT calculations. We believe this should be driven by who is paying the bills. In other words, this could be appropriate for business makers traveling since ultimately a company is paying for wages and vehicle operating and maintenance and the toll. On the other hand, in case of leisure travel or independent people traveling, the mode choice is solely driven by the driver and therefore, the drivers' VoT is key.

National Highway Institute concludes that the elasticity of highway travel with respect to users' generalized cost (travel time and financial expenses) is typically -0.5 (NHI 1995).

For 2023, value of time was determined as 8.24 USD/hr (7.72 EUR/hr) by using GPD per capita and average working hours in one year. This is assumed to increase in future years based on an elasticity to income (using GDP per capita) of 0.8.

To ensure currency consistency, we converted Value of Time (VoT) values from USD to EUR using a projected average EUR/USD exchange rate of 1.012, based on The Economy Forecast Agency's prediction for 2028, and applied this rate through 2040 in our base case modeling exercise. Using a fixed EUR/USD exchange rate for projections until 2040 introduces risk due to potential volatility, as economic and geopolitical factors can significantly influence currency fluctuations. We have carried scenarios with varying EUR/USD rates to assess the impact on the model's outputs further to sensitivity testing carried out within the scope of this review.

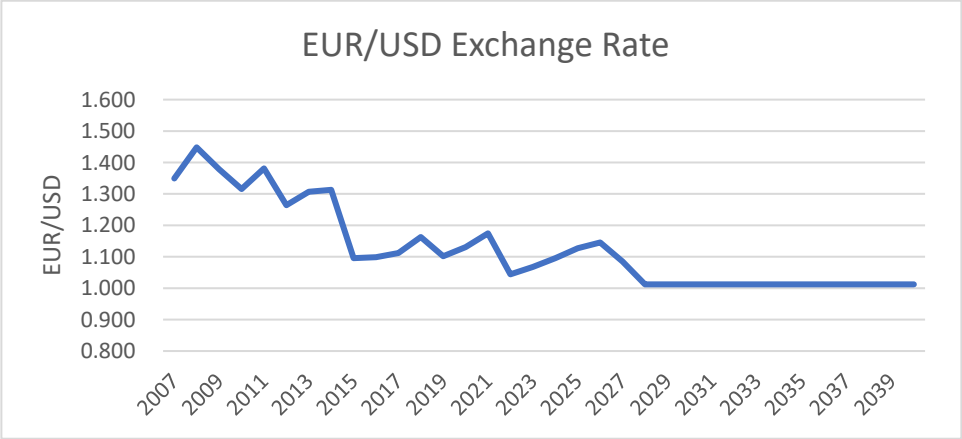

Figure 42. EUR/USD Exchange Rate Forecast

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Value of time is a function of travelers' income (GDP per capita).

Table 17. Value of Time Assumptions

	2023	2028	2040
GDP per capita	12,849 USD	13,656 USD	18,669 USD
VoT	8.24 USD/hr 7.72 EUR/hr	9.86 USD/hr 9.74 EUR/hr	13.13 USD/hr 12.96 EUR/hr

5.2.6VEHICLE MIX

Approximately 15% of the current traffic of state road is generated by heavy vehicles.

NTMP 2017 predicts that "the immense growth in person car trips in the next two decades (from 2023 to 2042) is driven by the significant increase in GDP per capita driving car ownership and consequently person car trip ends."

NTMP2017 states that "the development of freight transport is based upon the economic activity, import/export performance, and tourism activities. These trends and developments are crucial for future freight traffic.

The heavy vehicle ratio will either remain steady or reduce in the forecast horizon.

5.2.7GDP/CAR OWNERSHIP IMPACT

The background traffic growth projections are derived from socioeconomic indicators, which serve as input data. Due to the differing characteristics of light vehicles (LV) and heavy vehicles (HV), separate methodologies have been used for modeling each:

- HV traffic growth is tied to future real GDP growth.
- LV traffic growth is modeled as a function of car ownership, which is itself influenced by both GDP growth and population growth.

A panel regression analysis of HV traffic growth against key economic indicators, including normalization of the trend to adjust for irregularities in the dataset, yielded a statistically significant elasticity of 0.85 with respect to GDP.

For LV traffic demand growth, we have utilized a car ownership model. This approach assumes that an increase in car ownership translates into a corresponding increase in traffic on the project. Dargay and Gately (2001) developed a car ownership model using historical data on car ownership and GDP per capita across multiple countries, including Turkey. Their model operates on the premise that GDP per capita growth, as a proxy for rising disposable income, is the primary driver of car ownership growth.

The results of their study provide the model structure and relevant coefficients. We have calibrated these coefficients using observed car ownership rates published by TUIK, as illustrated in the adjacent figure. Future car ownership growth will be determined by the calibrated parameters of this curve and the projected real GDP per capita growth.

Our analysis is based on forecasted real GDP growth rates and population projections for Turkey, assuming similar growth trends for Antalya. Given its proximity to a major city, we have applied a conversion rate of 1.25 from car ownership growth to traffic growth, calibrated against observed data.

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5.2.8SEASONALITY

For Seasonality, we requested the traffic measurements made on the State Road between 2019-2023 on a monthly basis with an official letter from KGM. The data is categorized into five distinct vehicle groups: Automobiles, Medium-Loaded Commercial Vehicles, Buses, Trucks, and "Truck + Trailer, Tractor + Semi-Trailer." An analysis of these counts has enabled us to determine the monthly distribution of annual traffic for each vehicle type.

The results indicate that for Automobiles, which represent the majority of the total traffic load, the lowest traffic volume occurs in January, with traffic falling approximately 25% below the annual average. In contrast, the highest volume is observed in July, where traffic exceeds the annual average by approximately 40%.

Although Buses constitute a smaller proportion of the total traffic, they exhibit the highest variability in seasonal patterns. The lowest bus traffic occurs in December, with traffic levels 43% below the annual average, while the highest levels are recorded in August, where traffic surges to approximately 60% above the annual average.

The results provide key insights into the traffic behavior and its impact on overall road usage, aiding in a more accurate forecasting of annual traffic flows.

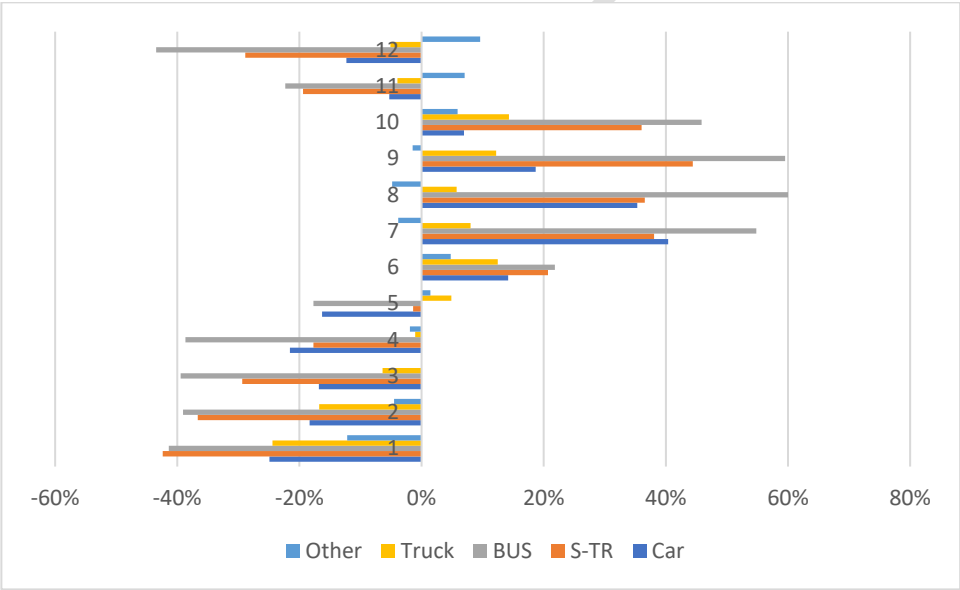

Figure 43. Seasonality

5.2.9CAPTURE RATES

Capture rates are a function of the diverted traffic over time into the project from other routes. There are multiple factors leading to diversion of traffic into this project, resulting in forecasted capture rates. The traffic models estimate the amount of this traffic based upon the analysis of comparative generalised costs of making a given trip by different routes or modes.

Current capture rates specific sections of motorways in Turkey;

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Table 18. Capture Rate Benchmark in Turkey

Project	Light Vehicle	Heavy Vehicle	Total	L.State Road	L.Motor way	H.State Road	H.Motor way	T.State Road	T.Motor way
Çorlu - Çerkezköy	12,622	4,873	17,495	56.9%	43.1%	33.2%	66.8%	52.2%	47.8%
Germencik - Şevketiye	21,191	6,500	27,691	54.7%	45.3%	27.6%	72.4%	50.3%	49.7%
Tahtaliçay - Torbali	38,561	10,480	49,041	50.2%	49.8%	21.3%	78.7%	46.0%	54.0%
Mersin-Serbest Bölge	27,800	5,618	33,418	44.4%	55.6%	49.3%	50.7%	45.3%	54.7%
Adana Doğu-Ceyhan	21,179	7,977	29,156	44.0%	56.0%	43.6%	56.4%	43.9%	56.1%
Tarsus-Çamtepe	26,249	10,137	36,386	48.4%	51.6%	25.3%	74.7%	43.5%	56.5%
Bolu Doğu - Yeniçağa	21,239	8,973	30,212	46.7%	53.3%	21.4%	78.6%	41.1%	58.9%
Serbest Bölge-Tarsus	28,143	8,680	36,823	37.3%	62.7%	42.8%	57.2%	38.7%	61.3%
Pozanti-Tekir	10,177	7,696	17,873	32.2%	67.8%	43.2%	56.8%	37.4%	62.6%
Zeytinler - Alaçati	14,747	1,456	16,203	21.8%	78.2%	12.7%	87.3%	21.1%	78.9%
Çamalan-Yenice	11,379	7,495	18,874	22.2%	77.8%	16.1%	83.9%	19.9%	80.1%
Şehitlik - Seferihisar	56,359	4,003	60,362	19.6%	80.4%	8.0%	92.0%	18.9%	81.1%

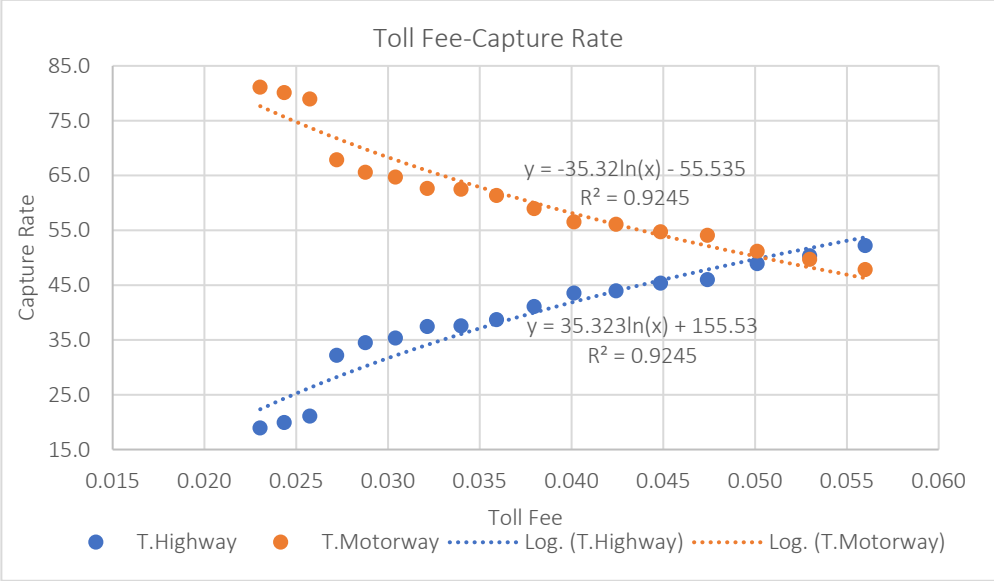

Figure 44. Toll Fee vs Capture Rate

This table and figure provide an analysis of toll fee capture rates for various motorway projects in Türkiye, showcasing the relationship between toll fees and the percentage of traffic choosing to use the toll motorway versus existing state roads. The figure highlights that for projects with lower toll fees, the capture rate for motorway is high, indicating a strong preference for the toll-free option. However, for projects with higher toll fees, the capture rate for motorway is lower.

The accompanying figure visually depicts this relationship, showing a clear negative correlation between toll fees and capture rates for both light and heavy vehicles. As toll fees increase, the percentage of traffic opting for the toll motorway decreases. This analysis is essential for understanding driver sensitivity to toll fees and informing toll rate setting for the Antalya-Alanya Motorway Project. The findings suggest that higher toll fees may result in lower

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capture rates, particularly for light vehicles, emphasizing the need to balance revenue generation with traffic volume objectives.

5.3 Comparison with Competing Routes

This stage is one of the most critical stages in the traffic load estimation required for the feasibility study. Depending on vehicle type and income, drivers choose between motorway and highway taking several factors such as fuel consumption, tolls, time, and accident risk.

The following results were found in previous field studies (literature survey, and case studies):

- Car drivers are more sensitive to travel time in direct proportion to their income. However, the degree of sensitivity varies between countries and regions. It is understood that the most important reasons for this are factors such as the relatively high incomes of car users, the short journey time that makes them prefer cars instead of buses, time being more valuable, and the high-speed limit on highways (130 km/h).
- Truck drivers are more sensitive to trip costs (fuel consumption and toll). However, the degree of sensitivity varies between countries and regions. Reasons such as reducing fuel and transit costs for competition in transportation, not having a big difference between D-400 highway and highway travel times due to low-speed limits (80 km/h), adjusting departure time according to arrival time, explaining the low rates of truck drivers' preference for highways.
- Bus drivers are sensitive to both trip cost (fuel consumption and toll) and trip time. However, the degree of sensitivity varies according to countries, regions and bus terminal locations. Although passengers are sensitive to time when choosing a company, reasons such as companies' preference to reduce fuel and toll costs for competition, no significant difference between the two options due to speed limits, and the necessity of entering and exiting more than one terminal on the route cause highway preference rates to remain low.
- Since the share of other vehicle types in total traffic is low, it is difficult to obtain statistically significant results. Since most of them are local traffic vehicles and prefer the highway, it is understood that their sensitivity to time is low and sensitivity to fuel consumption is high.

It is necessary to examine the base year (2023) traffic and measure the *elasticity* of current demand according to cost and time. However, it is not possible to test flexibility as there is currently only a highway between Antalya and Alanya and there are no options for drivers. However, driver preferences and flexibility are similar across the country depending on certain variables (income, vehicle type, distance, duration, cost). In this context, examining and modelling (explaining with equations) the demand in corridors with similar characteristics can be used in demand forecasting for the Antalya-Alanya highway corridor and can provide reliable results. Both highway and highway corridors serve between Bursa-İzmir, Niğde-Ankara, Ankara-Konya, Mersin-Adana, Adana-İskenderun. The level of sensitivity of drivers between the two options, depending on which variable, will be measured using the General Directorate of Highways Transportation and Traffic Data in 2023 and, if necessary, in the previous period. Accordingly, it will be determined at what rate which of the two options is preferred for each vehicle type, and the choice and demand elasticity between time and cost will be measured according to vehicle types.

In the literature and in practice, the urban traffic assignment phase is carried out according to various models and assumptions. *Probabilistic/econometric* models are used in traffic assignments in regional corridors. In these models, the choice between two options (state road and motorway) is explained by a probability function.

While a direct comparison with an existing competing motorway is not feasible for this project, the model incorporates a probabilistic/econometric approach to simulate route choice behavior. This approach utilizes a

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probability function to estimate the likelihood of drivers choosing the new motorway versus the existing state road, based on a comparison of generalized costs.

The probability function is expressed as:

Pm = e^(-Cm) / (e^(-Cm) + e^(-Ch))

Where:

- *Pm* = Probability of choosing the motorway
- *e* = Exponent (mathematical constant)
- *Cm* = Total generalized cost of using the motorway
- *Ch* = Total generalized cost of using the existing highway

The generalized costs for both routes are calculated using the following equation:

C = k1*Cf + k2*Cl + k3*Ct

Where:

- *C* = Total generalized cost
- *Cf* = Fuel cost (influenced by distance and fuel efficiency)
- *Cl* = Toll fee (motorway only)
- *Ct* = Time cost (value of time x travel time)
- *k1, k2, k3* = Coefficients representing the relative weights of each cost component (calibrated based on observed driver behavior)

This probabilistic approach provides a realistic estimate of traffic diversion to the new motorway, considering the factors influencing driver route choices.

Historical gasoline prices has been obtained from Petrol Ofisi A.Ş. Future prices in EUR has been forecasted by using Heat Roadmap Europe Analysis.

Table 19. Europe Fuel Forecast (Heat roadmap Europe Analysis)

Energy Source (EUR/MWH)	Price Scenario	2015	2030	2050
OIL	REFERENCE	40.14	49.15	58.85
	HIGH PRICES	50.31	69.29	75.32
	LOW PRICES	37.92	42.46	38.94

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Table 20. Fuel Price Forecast

Year	Fuel Price TL	Fuel Price USD	Fuel Price EUR
2011	4.23	2.53	1.83
2012	4.53	2.53	2.00
2013	4.80	2.53	1.93
2014	4.95	2.26	1.72
2015	4.52	1.66	1.52
2016	4.56	1.51	1.37
2017	5.34	1.46	1.32
2018	6.31	1.31	1.13
2019	6.90	1.22	1.11
2020	6.56	0.94	0.83
2021	8.08	0.91	0.78
2022	20.69	1.25	1.20
2023	28.57	1.20	1.13
2024	43.25	1.20	1.10
2025	65.61	1.38	1.22
2026	93.59	1.55	1.35
2027	124.67	1.60	1.48
2028	155.51	1.62	1.60
2029	186.38	1.75	1.73
2030	217.37	1.88	1.86
2031	234.27	1.90	1.88
2032	247.85	1.92	1.89
2033	259.81	1.94	1.91
2034	272.32	1.96	1.93
2035	285.40	1.97	1.95
2036	299.09	1.99	1.97
2037	313.41	2.01	1.99
2038	328.38	2.03	2.00
2039	344.05	2.05	2.02
2040	360.42	2.07	2.04

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Generalized Time ("GT") is the combined effect of time spent travelling and the cost of travel. Cost of travel is divided by the VoT to transform it to corresponding hours.

The GT for vehicles is made from the following elements:

- in-vehicle time (hr);
- vehicle operating costs ("VoC") (€/km*km); and
- tolls or other user charges (€).

VoC only includes fuel costs for non-business trips, that being the only cost that is actually 'perceived' by the user, in his travel decision-making process. It includes other non-fuel elements of vehicle costs (e.g. maintenance) for.

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For both alternatives, we estimated total travel times, distances, required fuel, price for fuel, and fees presented in the table below.



Figure 45. Competing Route for Serik to Alanya

We selected locations and calculated probability of choice behavior for each road as follows;

Probability of choice behavior for 2028;

Table 21. Capture Rate Probability of Choice Behavior 2028

WEST- SERIK	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	6.70	0.67	0.62	0.00	1.29	0.5477
State Road	5.70	0.60	1.17	0.00	1.77	0.4523

WEST MANAVGAT	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	53.70	5.35	4.98	2.29	12.62	0.3501
State Road	40.10	3.93	7.15	0.00	11.08	0.6499

WEST EAST	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	104.40	10.40	9.69	6.12	26.20	0.3820
State Road	93.80	9.01	15.99	0.00	25.00	0.6180

SERIK MANAVGAT	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	51.20	5.10	4.75	2.29	12.14	0.3826
State Road	35.30	3.69	7.26	0.00	10.95	0.6174

SERIK EAST	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	102.10	10.17	9.47	6.12	25.76	0.2713
State Road	88.60	8.45	14.84	0.00	23.29	0.7287

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MANAVGAT EAST	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	71.50	7.12	6.64	3.94	17.69	0.2998
State Road	54.00	5.41	10.16	0.00	15.57	0.7002

Probability of choice behavior for 2040;

Table 22. Capture Rate Probability of Choice Behavior 2040

WEST- SERIK	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	6.70	0.82	0.87	0.00	1.68	0.5629
State Road	5.70	0.76	1.56	0.00	2.32	0.4371

WEST MANAVGAT	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	53.70	6.54	6.96	2.29	15.80	0.3738
State Road	40.10	5.00	9.51	0.00	14.51	0.6262

WEST EAST	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	104.40	12.72	13.53	6.12	32.37	0.5359
State Road	93.80	11.47	21.26	0.00	32.73	0.4641

SERIK MANAVGAT	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	51.20	6.24	6.64	2.29	15.17	0.4187
State Road	35.30	4.69	9.66	0.00	14.35	0.5813

SERIK EAST	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	102.10	12.44	13.23	6.12	31.79	0.3725
State Road	88.60	10.75	19.73	0.00	30.49	0.6275

MANAVGAT EAST	Distance	Fuel Cost (EUR)	Time Cost (EUR)	Toll Fee (EUR)	Total Cost (EUR)	Share
Motorway	71.50	8.71	9.27	3.94	21.92	0.3527
State Road	54.00	6.89	13.51	0.00	20.40	0.6473

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5.4 Traffic Modeling and Forecasting

The purpose of traffic modelling is to predict the private vehicle, light trucks/van, bus, truck, and other vehicle traffic between the settlements (zones). We followed a four-step model approach for this study.

The model was calibrated for the base year of 2023 and the horizon years of 2028 (start date) and 2040 (end year). The model considers the following main variables when establishing traffic route selection:

- Toll Rate;

- Route length;
- Average Speed;
- Value of Time;
- Travel time
- Toll fee
- Travel cost

Following the calibration, the base year traffic forecast model is employed for the concession term (2028-2040). Furthermore, a thorough review and validation of the data have been completed using historical patterns and considering externalities.

The traffic model assumes trips are produced at an origin and attracted to a destination. They are directly proportional to the total trip productions at the origin and the total attractions at the destination. A friction factor represents the reluctance of persons to make trips of various durations or distances. Generally, as travel time increases the drivers are less likely to make trips, therefore, the friction factor increases. The friction factor is also treated as a socioeconomic factor, total trip costs, total production, and attraction for a study area.

The current zones of the traffic model are based on the catchment areas as described in previous sections of this report. The centroids refer to center of the population of zones and GDP per capita per zone and have been loaded to the traffic model.

The catchment area used for the model starts from at west of Serik and ends at the west of Alanya. whereas the Road Network, represented as a connection of the links of the model consisting of Motorways and state roads.

Attributes of the links are given as factors to traffic flow, such as speed and capacity, if the road link has no tolls. The toll rates are assigned on the related links. Toll rates comprise one of the most important parameters in decision making regarding trips because it has direct cost impact.

The Project's overall connectivity to main arterials was commissioned in stages which resulted in lower accessibility and usage of the Project at the initial stages. Additionally, initial usage is expected to be proportioned by the public awareness for the Project which is expected to pick up in future. We note the limitation on the projected traffic growth accuracy from effects of public awareness and connectivity due to limited data. That is to say, the Antalya-Alanya Motorway was fully operational only since 2028 and the data made available by the SPV was used to establish the weighted traffic contribution for these factors. Traffic forecasting on toll roads typically diverges due to elasticities concerned with the actual setting and since each motorway has a unique usage profile and value proposition. Assumptions of the forecast have been provided throughout the report and the results may differ based on road-specific elasticities that are yet to be observed.

5.4.1FORECASTED TRAFFIC

Building upon the historical traffic analysis, this section presents the forecasted traffic volumes on the proposed Antalya-Alanya motorway. We employ a mathematical traffic forecasting model that leverages multiple regression analysis and considers key socioeconomic drivers.

Our methodology defines forecasted traffic as the combination of Start-up traffic at the base date and traffic growth into future years:

$$Forecasted\ Traffic = Start\ up\ Traffic + Traffic\ Growth$$

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Start-up traffic is the sum of induced traffic, diverted traffic and existing traffic:

$$Startup\ Traffic = Induced\ Traffic + Diverted\ Traffic + Existing\ Traffic$$

- Existing traffic is considered as "0" due to the Project's greenfield nature.
- Diverted traffic is a function of the capture rate of the newly built or improved carriageway facility from the in-scope traffic based on the cost, travel time, and comfort advantages of the newly constructed road.
- Induced traffic is the increase in total travel resulting from a reduced travel times and costs in favor of the Motorway, or improved, means of transportation whereas diverted demand is the equivalent reduction in travel demand from the state road due to increased travel times and costs.

Traffic growth is a function of organic growth and development growth.

$$Traffic\ Growth = Organic\ Growth + Development\ Growth$$

Within this scope, we note the following:

- In terms of diverted traffic, the Model suggests that after the Motorway project the state road traffic will decrease by about 50%, diverted to the motorway.
- The opening of the motorway will generate additional traffic (induced traffic) demand due to the improvement in accessibility it provides and further to the suppressed traffic in recent years based on the lack of capacity in the existing infrastructure.
- Organic growth can be analyzed based on macroeconomic trends and regional demographics such as population growth, leading to car ownership thus traffic demand. Similarly, freight transportation as a function of truck numbers (in relation to GDP) leads to increased transportation with heavy vehicles.
- A very important element that could not be modelled in the traffic forecasts is that the increased accessibility to be provided by the motorway is likely to have considerable impacts on the land-use pattern in the project area. This is a very common land use impact of major transportation projects in Turkey. The resulting increases in traffic demand are estimated by the model (traffic demand of the population and economic activities). In addition traffic generators and attractors such as additional hotels, organized industrial zones and other facilities.
- Another consideration of importance that cannot be quantified and therefore not included in the model is the social response towards projects of this scale. West-Southern Turkish regions and Turkey in general had seen an initial mixed positive and negative response to multiple large-scale transport infrastructure projects, which in time shifted partially towards a more positive view once people experienced the advantages first hand, such as time efficiency and safety, contributing gradually to increased usage.

Traffic demand forecast was initiated to estimate traffic volumes on the road sections. Model results proved that traffic demand is influenced by economic, demographic factors. Therefore, HV traffic growth is tied to future real GDP growth and LV traffic growth is modeled as a function of car ownership, which is itself influenced by both GDP growth and population growth.

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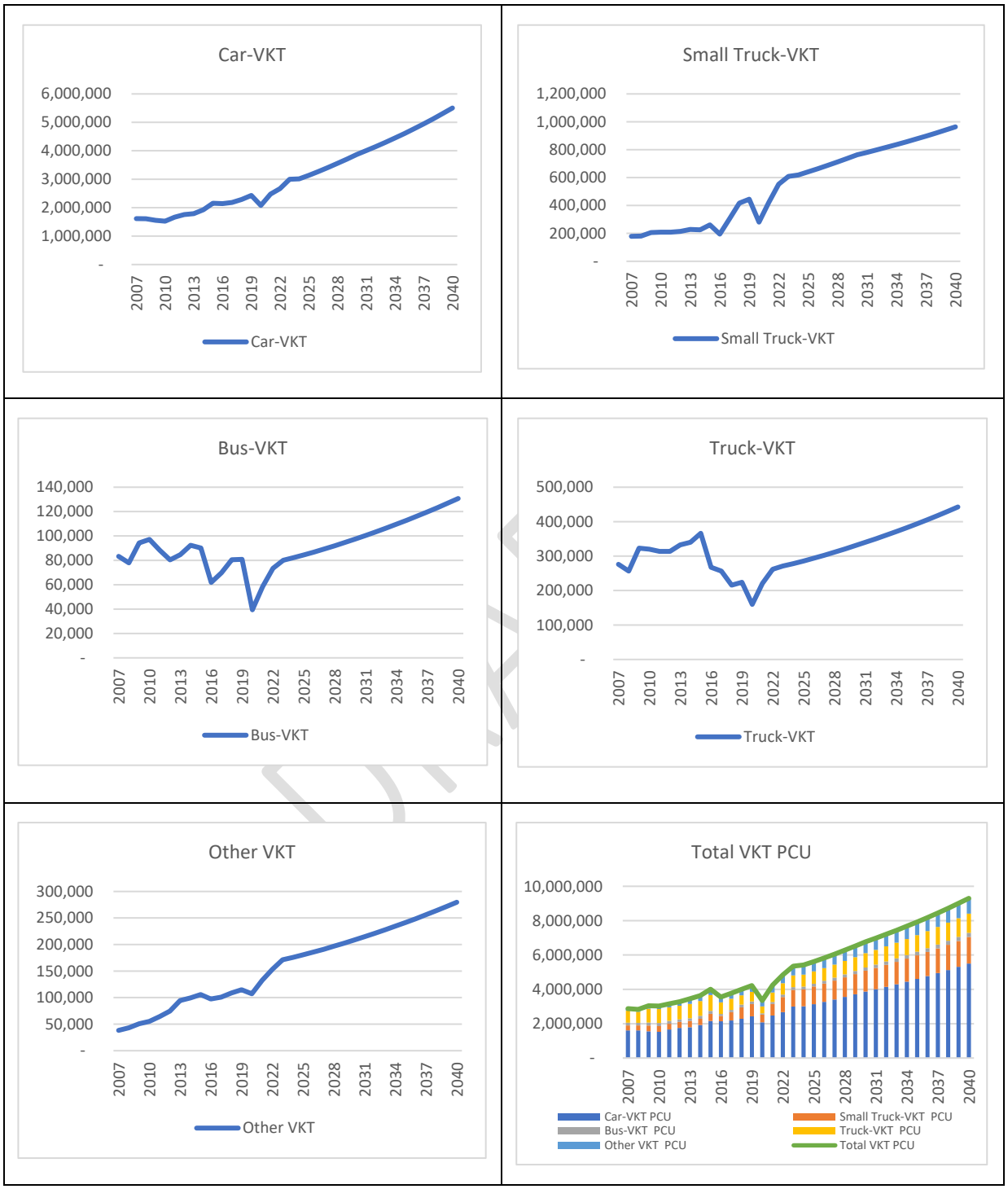

Figure 46. Traffic Volume Forecast for the State Road

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5.4.2TRAFFIC MODEL CALIBRATION AND OD MATRICES

The traffic model utilizes historical traffic data and socioeconomic indicators as inputs to establish relationships between traffic demand and its influencing factors. Through the calibration process, the model's parameters are estimated and calculated to ensure it accurately reflects observed traffic patterns.

This calibration involves:

- Total Traffic and Observed Demand: Total traffic demand is measured by vehicle kilometer traveled by cars, buses, vans, trucks, and other vehicles. Vehicle volume at the western and eastern sections provide row and column total of the corresponding zones. In this stage simulated and actual traffic volumes and vehicle kilometers traveled are compared with the actual case. The calibration process is run by iterations until a significant and consistent results are obtained.
- Segment Volume Validation: The model's estimated traffic volumes for specific motorway segments are compared to observed volumes to further refine its accuracy.
- The traffic forecasting model leverages multiple regression analysis to establish a relationship between historical traffic load (VKT) and key independent variables, including:
    - Population
    - GDP
    - Hotel bed capacity
    - Number of vehicles
    - Other relevant socioeconomic indicators
- Identification and understanding of the sources of state road traffic demand (transit, local traffic). Measurement/estimation of vehicle entry/exit at each entrance/section (or district).
- Estimating the total vehicle traffic generation in the corridor (between Antalya and Alanya) (estimating the number of cars, trucks, buses, and other vehicle entries.
- Estimating the current state (2023) origin/destination OD matrix (trip distribution) and testing its accuracy/consistency. Estimating the number of vehicles traveling between the starting and ending points of the journey and obtaining the parameters/coefficients that determine/affect this traffic are used to estimate the vehicle traffic between these points in the future.

Development of a trip distribution model that describes the destination resource matrix. Equation variables/coefficients that determine vehicle distribution matrices in the model are obtained. These matrices are developed separately for cars, buses, trucks and other vehicles. The main purpose of the distribution model is the deterrent effect of distance on the distribution of travel between settlements and cities. High travel demand is expected between close settlements (for example, between Antalya and Serik) and low travel demand between distant settlements.

In the literature, instead of the deterrent effect of distance, the deterrent effect of travel time is also used as a variable. Since time and fuel consumption are functions of distance in intercity trips, the distance variable was used in trip distribution estimation (what proportion of vehicles will travel from district i to district j). On the other hand, both time and fuel consumption variables were used together according to vehicle types in estimating the traffic demand in the corridor, the volume in the sections and the vehicle load.

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We assigned the vehicle volume (between source/target) in the matrix to the corridor. With this assignment, vehicle volumes are estimated in the sections in the corridor.

We directly communicated with KGM to request roadside survey data and existing traffic analyses conducted in the region. However, we were informed that data sets are not shared outside the organization.

A matrix representing travel patterns between origin and destination zones is developed according to TomTom Database and KGM historical traffic data.

Calibration of the distribution matrix obtained by TomTom is ensured by comparing the estimated cutting volumes with the observed General Directorate of Highways 2023 vehicle volume data.

According to the TomTom, the passenger category is mainly data derived from smartphones, PNDs, and specific car brands that manufacture passenger vehicles. The fleet category is related to some truck manufacturers, taxi/delivery services, and other sources categorized as a "fleet" company. Our assumption is that the passenger distribution is Light Vehicle (car + small truck) and the fleet distribution is Heavy Vehicle (bus + truck + other).

Calibrated matrices (flows between each origin and destination pair) by vehicle type are calculated. According to TomTom Traffic Database, in October 2022, the OD Matrix for the state road is calculated as follows;

Table 23. OD Matrix from TomTom Traffic Database for Passenger and Fleet

Passenger							
Origins\Destinations	Serik	Taşağıl	Manavgat	Manavgat Doğu	Alarahan	Konaklı	Alanya
Serik	0.00%	4.98%	9.49%	2.04%	1.25%	0.48%	2.69%
Taşağıl	6.03%	0.00%	2.95%	0.27%	0.20%	0.07%	0.26%
Manavgat	8.38%	2.11%	0.00%	4.86%	1.79%	0.46%	1.86%
Manavgat Doğu	2.04%	0.40%	5.42%	0.00%	2.10%	0.47%	1.43%
Alarahan	1.21%	0.18%	1.60%	1.49%	0.00%	2.58%	4.72%
Konaklı	0.49%	0.05%	0.43%	0.33%	2.64%	0.00%	6.48%
Alanya	2.31%	0.32%	1.49%	0.99%	4.08%	6.59%	0.00%
Fleet							
Origins\Destinations	Serik	Taşağıl	Manavgat	Manavgat Doğu	Alarahan	Konaklı	Alanya
Serik	0.00%	5.02%	13.91%	2.55%	1.71%	1.05%	6.50%
Taşağıl	5.69%	0.00%	1.28%	0.10%	0.07%	0.04%	0.30%
Manavgat	13.84%	1.20%	0.00%	2.67%	1.19%	0.43%	2.31%
Manavgat Doğu	2.93%	0.14%	2.51%	0.00%	0.64%	0.26%	1.07%
Alarahan	1.74%	0.06%	1.04%	0.57%	0.00%	1.30%	3.41%
Konaklı	1.16%	0.05%	0.41%	0.25%	1.43%	0.00%	4.24%
Alanya	6.18%	0.30%	1.89%	1.00%	3.19%	4.36%	0.00%

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Table 24. OD Matrix from TomTom Traffic Database Combined

Combined							
Origins\Destinations	Serik	Taşağıl	Manavgat	Manavgat Doğu	Alarahan	Konaklı	Alanya
Serik	0.00%	5.00%	12.07%	2.34%	1.52%	0.81%	4.91%
Taşağıl	5.83%	0.00%	1.97%	0.17%	0.13%	0.06%	0.29%
Manavgat	11.57%	1.58%	0.00%	3.59%	1.44%	0.44%	2.13%
Manavgat Doğu	2.56%	0.25%	3.72%	0.00%	1.25%	0.35%	1.22%
Alarahan	1.52%	0.11%	1.27%	0.95%	0.00%	1.83%	3.95%
Konaklı	0.88%	0.05%	0.42%	0.28%	1.93%	0.00%	5.17%
Alanya	4.57%	0.31%	1.72%	1.00%	3.56%	5.29%	0.00%

The calibration process is based on the estimation matrix (estimated matrix) is the process of reciprocal iteration process which adjust the simulated matrix with reference to the observed one (origin destination table).

After this stage, the coefficients of the calibrated matrix and the deterrent effect of the distance determining production/attraction are determined (car βc , small trucks βs, truck βt , bus βb and other vehicles βo). In the next stage, demand forecast matrices for cars, trucks, buses and other vehicles based on the estimated population, average national income per capita, number of vehicles variables and target/source traffic production volumes in target years (from 2028 to 2040) are estimated.

In this method the following equation explains the traffic demand on a corridor:

- Tij =Pi* Aj *e $\beta^{Dij,}$ where Tij is the trips between I an j, Pi is produced trips by a settlement, Bj is the attracted trips by a settlement, and *B* is the impedance coefficient.

Estimating origin-destination (OD) matrices in complex urban networks is a challenging task, as noted by Tamin and Willumsen (1989). However, since regional highway networks are generally simpler than urban networks, their method can be adapted for use in corridor studies.

Together with the KGM historical traffic data and the Probability of Choice Behavior Analysis, we modified the OD matrix as follows;

Table 25. Adjusted OD Matrix for Light Vehicle

Light Vehicle							
Origins\Destinations	Serik	Taşağıl	Manavgat	Manavgat Doğu	Alarahan	Konaklı	Alanya
Serik	0.00%	2.45%	9.82%	9.82%	3.96%	3.00%	6.01%
Taşağıl	2.45%	0.00%	5.34%	1.34%	0.47%	0.75%	1.42%
Manavgat	9.82%	5.34%	0.00%	0.00%	0.84%	0.84%	2.51%
Manavgat Doğu	2.45%	1.34%	0.00%	0.00%	0.84%	0.84%	2.51%
Alarahan	3.96%	0.47%	0.84%	0.84%	0.00%	0.42%	1.26%
Konaklı	1.50%	0.75%	0.84%	0.84%	0.42%	0.00%	0.00%
Alanya	6.01%	1.42%	2.51%	2.51%	1.26%	0.00%	0.00%

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Table 26. Adjusted OD Matrix for Heavy Vehicle

Heavy Vehicle							
Origins\Destinations	Serik	Taşağıl	Manavgat	Manavgat Doğu	Alarahan	Konaklı	Alanya
Serik	0.00%	3.03%	12.11%	12.11%	4.69%	3.32%	6.64%
Taşağıl	3.03%	0.00%	4.07%	1.02%	0.34%	0.83%	1.02%
Manavgat	12.11%	4.07%	0.00%	0.00%	0.52%	0.52%	1.55%
Manavgat Doğu	3.03%	1.02%	0.00%	0.00%	0.52%	0.52%	1.55%
Alarahan	4.69%	0.34%	0.52%	0.52%	0.00%	0.26%	0.77%
Konaklı	1.66%	0.83%	0.52%	0.52%	0.26%	0.00%	0.00%
Alanya	6.64%	1.02%	1.55%	1.55%	0.77%	0.00%	0.00%

5.4.3TOLL ELASTICITY

Toll elasticity is an indicator to estimate diverted traffic from state road to motorway. It is observed that a revenue stream based on a motorway toll to traffic demand elasticity is about -0.5 (-0.45 to -0.55), which we consider reasonable based on previous research on the subject, noting that location and project specificity would have a direct implication on the accuracy of this assumption. Based on tender year tolling level of €0.0598, the base case is a reasonable assumption.

Toll rate elasticity is related to the driver income and total travel costs. Elasticity is a generalized average of all drivers.

5.4.4CAPACITY OF MOTORWAY SECTIONS

Coping with the traffic demand in multifunctional regions (tourism, agriculture, commerce) is a complicated work. Accordingly, there are significant changes in travel demand at different hours of the day, days of the month, and months of the year. Studies and observations have shown that the road network in tourism regions has to accommodate intensive traffic flows at certain periods of the year (Rosselló and Saenz-de Miera, 2011). Such problems cause time losses, therefore some visitors may choose different destinations for their future holidays.

When the capacity utilization rate exceeds 0.40 (AADT/Daily Capacity) travel speed declines. The annual average capacity utilization rate between 0.20 and 0.40 implies the efficient use of the road. CUR less than 0.20 implies an underutilized roadway. A range of 0.20-0.40 can be considered the optimal usage level. In that case, road sections are used at full capacity at certain time intervals due to seasonal, monthly, daily, and hourly peaks (monthly, daily, and hourly peak factors). Peak season, day and hour factors (coefficients) vary in regions. Therefore, if the annual average capacity utilization rate (AADT/ daily capacity) is higher than 0.40, insufficiencies may be observed on peak days, and peak hours of the tourism season. Theoretically, the volume/capacity ratio can be at most 1.00. However, in practice, if the highway demand is higher than the capacity, queuing and congestion problems occur on the highway.

According to the Highway Capacity Manual (HCM, 2010) method, the one-way capacity of the motorway is calculated as 5,400 vehicles/hour (1,800 personal car equivalent units of vehicles (p.c.u)/lane).

According to the Highway Capacity Manual (HCM, 2010) method, the one-way capacity of the state road (highway) is calculated as 2,540 vehicles/hour (1,800 p.c.u/lane).

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5.4.5MAIN ASSUMPTIONS FOR TRAFFIC MODEL

Several key assumptions underpin the traffic forecasting model and are crucial for interpreting the projected traffic volumes:

- Driver Behavior: The model assumes that drivers make rational route choices based on a combination of factors, including travel time, fuel costs, toll fees, and perceived safety.
- Sensitivity to Time and Cost: Recognizing the varying sensitivities among different vehicle types, the model incorporates elasticity parameters to account for the impact of toll fees, fuel costs, and travel time on route choice. For instance:
    - Car drivers are assumed to be more sensitive to travel time due to factors like higher income levels and a greater value placed on time savings.
    - Truck drivers are expected to be more sensitive to travel costs (fuel and tolls) to minimize operational expenses and remain competitive.
    - Bus drivers demonstrate sensitivity to both time and cost, balancing passenger preferences for shorter travel times with the need to control operational costs.
- Existing Alternative Route: As there is currently no alternative motorway route between Antalya-Alanya, directly observing route choice elasticity is not possible. To overcome this limitation, the model draws insights from similar corridors in Turkey (Bursa-Izmir, etc.) where both state road and motorway options exist. By analyzing traffic patterns in those corridors, the model estimates elasticity parameters for different vehicle types based on observed driver behavior in comparable contexts.

Traffic and revenue forecasts included in the report are based on certain assumptions and forecast of future economic growth, population and other factors, which are ultimately subject to some level of uncertainty.

5.4.6THE PROJECTED TRAFFIC WITH BASE ASSUMPTIONS

Using the calibrated model and considering the projected values for key socioeconomic indicators, we estimate base-case traffic volumes for the motorway for each target year.

5.5 Conclusions of the Traffic Forecast

We ran regression tests for each of the vehicle type for each district through which the state road passes. As a result of the regression analysis, we deduced the below points;

- The traffic demand of the eastern Antalya region is proportional to population growth, vehicle ownership, and tourism activities. LV traffic growth is modeled as a function of car ownership, which is itself influenced by both GDP growth and population growth.
- Small truck/van traffic demand shows similarities with car traffic.
- Bus traffic has declined in the last decades due to several factors. Such as, increased car ownership. Reduced air transportation costs have likely diverted traffic to air. Income and travel time value have increased therefore people do not prefer traveling by bus. On the other hand, HV traffic growth is tied to future real GDP growth in our observations.
- Truck traffic shows a fluctuating pattern. Although the truck number has increased gradually, the demand declined. Several factors can explain this trend. Declining commodity weights and fluctuating economic

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activity as well as e-commerce and last mile freight are largely unstudied topics in the locality. However, HV traffic growth is tied to future real GDP growth in our observations.

- In the last decades the number of other vehicles and traffic has increased gradually.

After getting the overall volume of the traffic in the region, we used modified OD Matrixes to distribute the traffic together with the capture rates calculated with the Probability of Choice Behavior Analysis.

We calculated toll to toll traffic demand together with seasonality and applied Induced Demand and Ramp-up assumptions discussed previously to the forecasted results.

Monthly and Yearly traffic demand forecast outputs are shown below;

Table 27. Traffic Model Outputs for Motorway Yearly

Type (pcu)	2028	2029	2030	2031	2032	2033	2034
Car	13,937	17,406	20,614	22,047	23,278	24,473	25,792
S-TR	4,375	5,453	6,445	6,880	7,251	7,610	8,007
BUS	738	876	939	989	1,040	1,088	1,141
Truck	3,314	3,932	4,215	4,443	4,669	4,886	5,125
Other	2,643	3,135	3,361	3,542	3,723	3,896	4,086
Total AADT Pcu	25,007	30,802	35,574	37,902	39,961	41,952	44,151

Type (pcu)	2035	2036	2037	2038	2039	2040
Car	27,188	28,730	30,230	31,886	33,639	35,574
S-TR	8,427	8,891	9,342	9,841	10,369	10,952
BUS	1,197	1,259	1,318	1,383	1,451	1,526
Truck	5,376	5,652	5,917	6,209	6,516	6,854
Other	4,286	4,507	4,718	4,951	5,196	5,465
Total AADT Pcu	46,474	49,039	51,525	54,269	57,170	60,372

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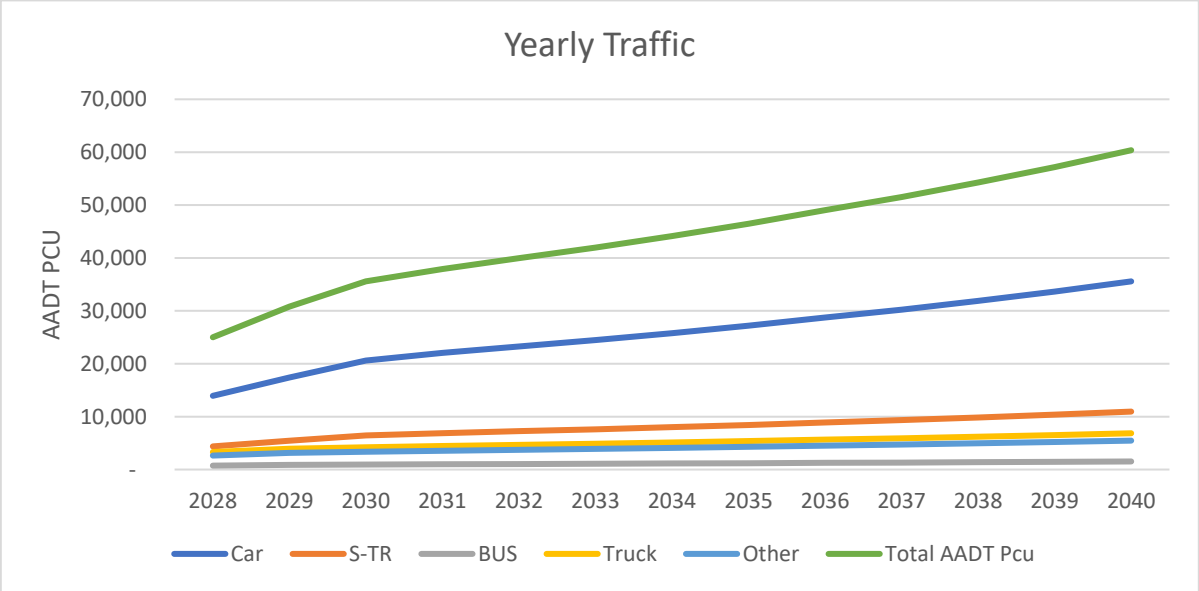

Figure 47. Traffic Model Outputs Yearly

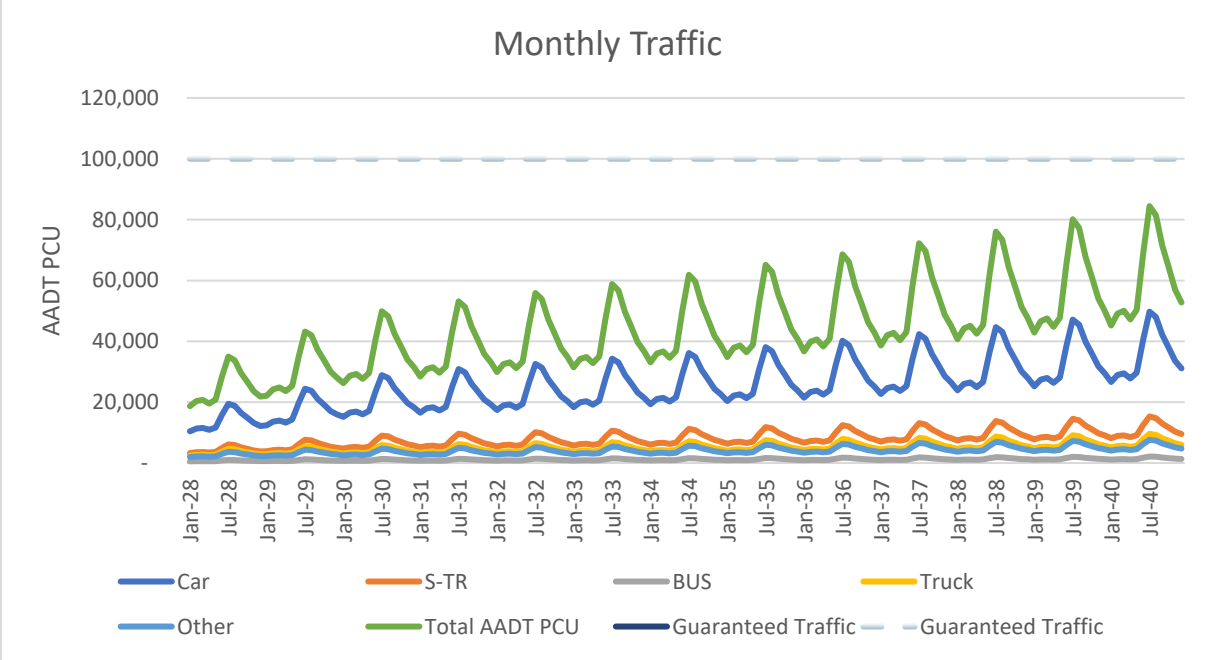

Figure 48.Traffic Model Outputs Monthly

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The traffic model projects a significant increase in traffic volume on the Antalya-Alanya Motorway from its opening in 2028 to 2040. The model predicts a steady rise in Average Annual Daily Traffic (AADT) from 25,007 Passenger Car Units (PCU) in 2028 to 60,372 PCU in 2040. This growth is primarily driven by several factors.

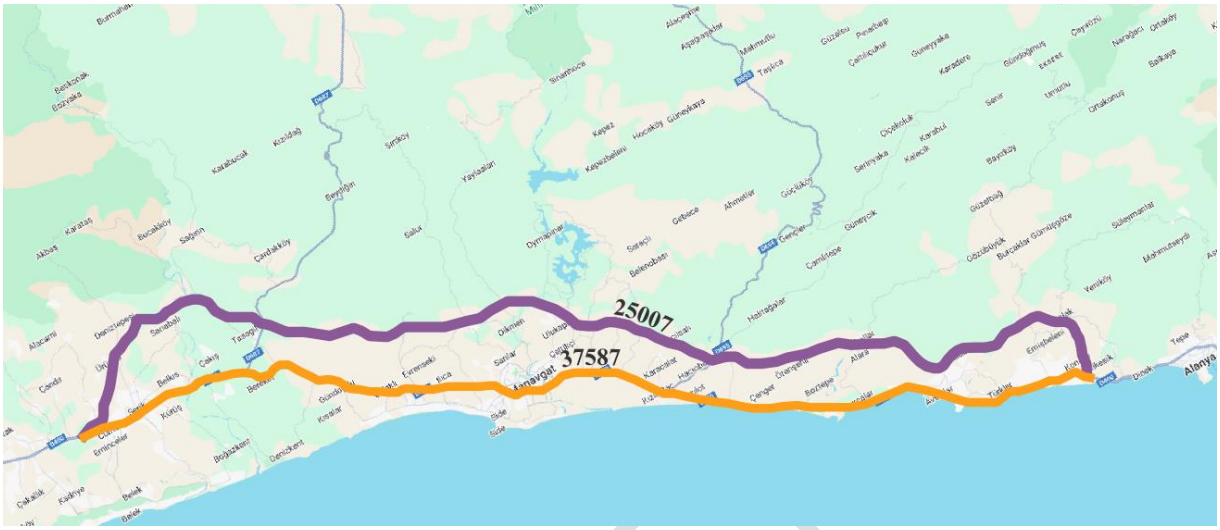

Figure 49. State Road and Motorway AADT PCU in 2028.

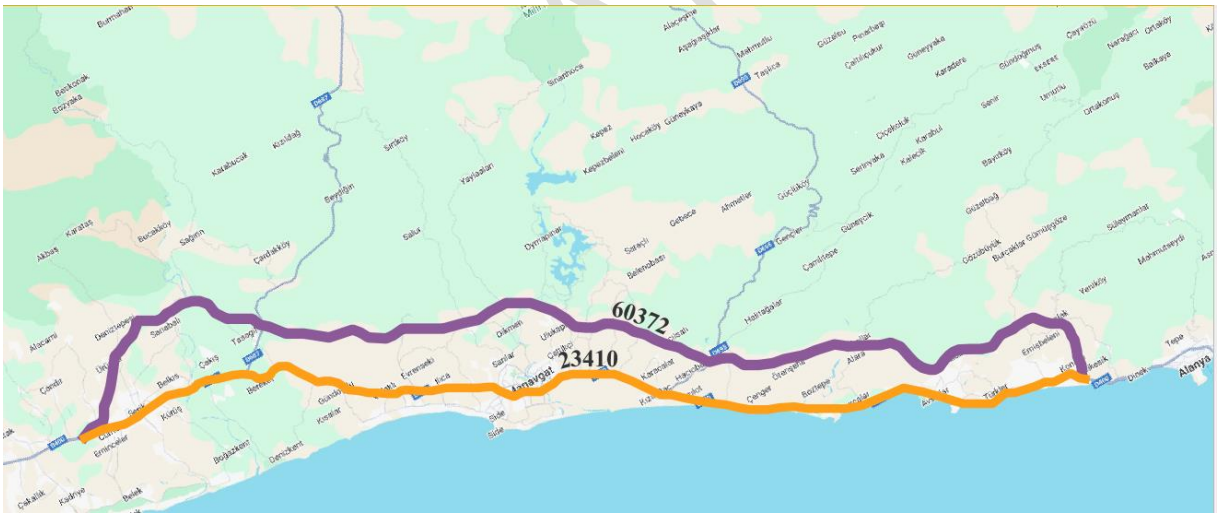

Figure 50. State Road and Motorway AADT PCU in 2040

However, the monthly traffic forecast suggests that the guaranteed traffic amount of 100,000 AADT PCU will not be achieved within the analyzed timeframe.

Several assumptions underpin this forecast, including:

- Induced Demand: The model accounts for induced demand, assuming a higher initial impact in the first three years after the Motorway's opening, gradually decreasing over time.

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- Ramp-Up Period: A ramp-up period is incorporated, reflecting the gradual increase in traffic as road users become familiar with the new Motorway and adjust their travel patterns.
- Value of Time (VoT) Projection: The model considers the evolving VoT, assuming an increase in line with rising GDP per capita.
- Capture Rate Measurement and Estimation: The calculations for capturing traffic from competing routes consider factors like VoT and fuel prices, which are projected to increase over time.
- HV traffic growth is tied to future real GDP growth.
- LV traffic growth is modeled as a function of car ownership, which is itself influenced by both GDP growth and population growth.

The model utilizes forecasts from reputable organizations:

- GDP Growth Rate: Forecasts from the IMF are used to project future economic growth in the region.
- Population Growth: Population projections from TUIK (Turkish Statistical Institute) inform the model's estimates of future traffic demand.
- Forecast for EUR/TL exchange rate is sourced from the project sponsor
- Forecast for EUR/USD exchange rate is sourced from The Economy Forecast Agency.
- European fuel prices are sourced from the project sponsor Heat Roadmap Europe Analysis.

While these forecasts provide a robust foundation for the traffic model, it is crucial to acknowledge potential uncertainties. The actual traffic volume on the Antalya-Alanya Motorway may deviate from the projections due to unforeseen economic fluctuations, changes in government policies, or shifts in travel behavior. Continuous monitoring of key economic and demographic indicators, along with periodic reviews and adjustments to the model, will be essential to ensure the accuracy of future traffic projections.

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6.0 *Sensitivity Scenarios and Stress Tests*

[NTD: We will run sensitivity testing following initial engagement with the Lenders and present our findings under this heading.]

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7.0 *Reliance on Report*

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We note that the findings established in this report are based off historical trends and macroeconomic assumptions presented in this report. We reserve the right to update its content without notice to anyone, including the Potential Investors.

Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of this report as a whole and in consultation with BTY. The contents of this report do not provide legal, insurance, investment or tax advice or opinion.

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8.0 *References*

[NTD: We will provide in the next version of the report}

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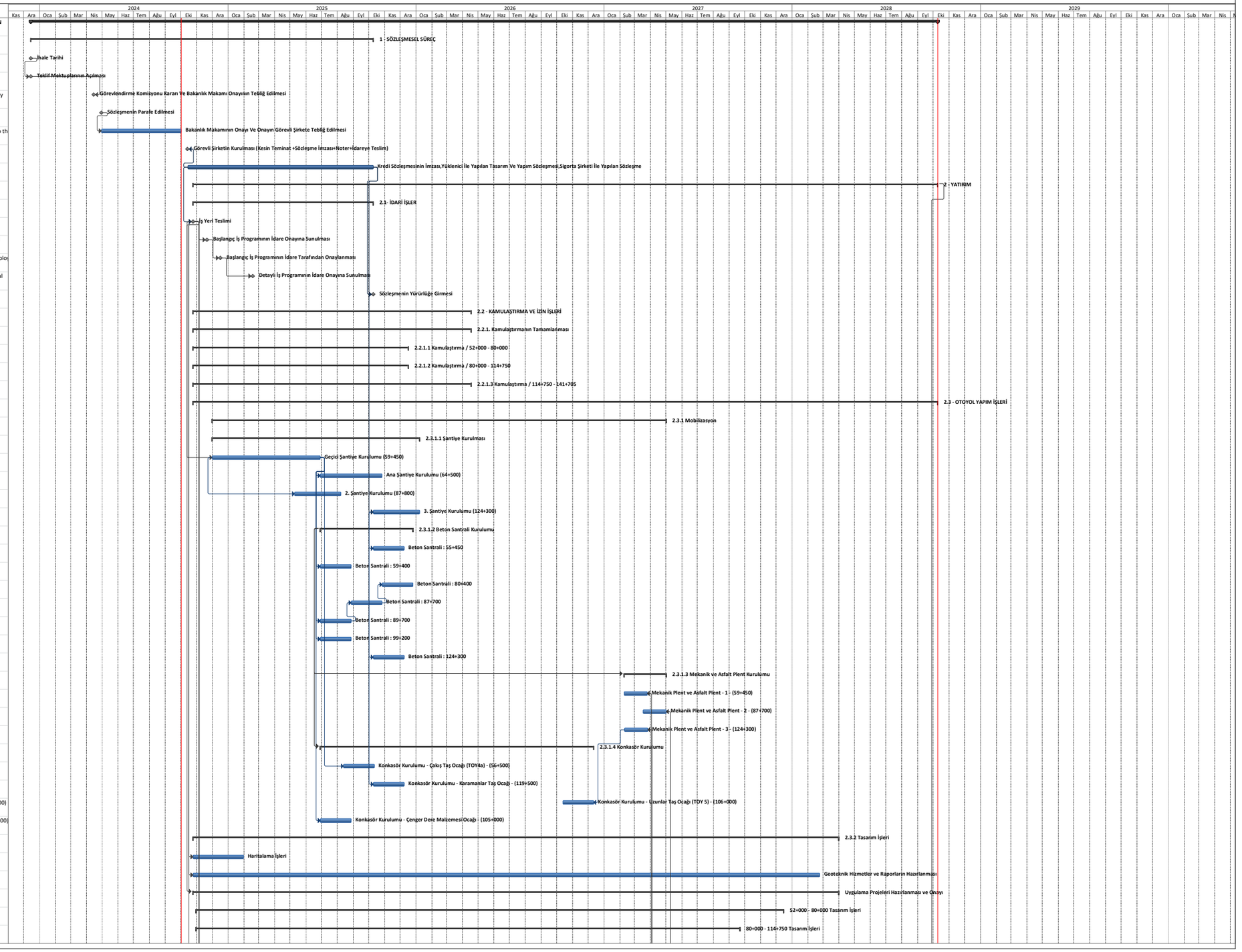
T.C ULAŞTIRMA VE ALTYAPI BAKANLIĞI

Karayolları Genel Müdürlüğü

ANTALYA - ALANYA OTOYOLU PROJESİ İNŞAATI

Kimlik	Ad	Task Name
1	**ANTALYA - ALANYA OTOYOLU PROJESİ İNŞAATI**	**ANTALYA - ALANYA MOTORWAY PROJECT CONSTRUCTION**
2	**1 - SÖZLEŞMESEL SÜREÇ**	**1 - CONTRACTUAL PROCESS**
3	İhale Tarihi	Tender Date
4	Teklif Mektuplarının Açılması	Opening of Bid Letters
5	Görevlendirme Komisyonu Kararı Ve Bakanlık Makamı Onayının Tebliğ Edilmesi	Notification of Assignment Committee Decision and Ministry Approval
6	Sözleşmenin Parafe Edilmesi	Initiallization of the Contract
7	Bakanlık Makamının Onayı Ve Onayın Görevli Şirkete Tebliğ Edilmesi	Approval of the Ministry and Notification of the Approval to th
8	Görevli Şirketin Kurulması (Kesin Teminat +Sözleşme İmzası+Noter+İdareye Teslim)	Establishment of the Responsible Company (Performance Guarantee + Contract Signature + Notary + Delivery to the
9	Kredi Sözleşmesinin İmzası,Yüklenici İle Yapılan Tasarım Ve Yapım Sözleşmesi,Sigorta Şirketi İle Yapılan Sözleşme	Signature of the Loan Agreement, Design and Construction Agreement with the Contractor, Agreement with the
10	**2 - YATIRIM**	**2 - INVESTMENT**
11	**2.1- İDARİ İŞLER**	**2.1- ADMINISTRATIVE AFFAIRS**
12	İş Yeri Teslimi	Delivery of Workplace
13	Başlangıç İş Programının İdare Onayına Sunulması	Submission of Initial Work Program to Employer's Approval
14	Başlangıç İş Programının İdare Tarafından Onaylanması	Administration Approval of Initial Work Program by the Emplo
15	Detaylı İş Programının İdare Onayına Sunulması	Submission of Detailed Work Program to Employer Approval
16	Sözleşmenin Yürürlüğe Girmesi	Entry into Force of Contract
17	**2.2 - KAMULAŞTIRMA VE İZİN İŞLERİ**	**2.2 - Expropriation Works**
18	**2.2.1. Kamulaştırmanın Tamamlanması**	**2.2.1. Expropriation by the Employer**
19	**2.2.1.1 Kamulaştırma / 52+000 - 80+000**	**2.2.1.1 Expropriation / 52+000 - 80+000**
66	**2.2.1.2 Kamulaştırma / 80+000 - 114+750**	**2.2.1.2 Expropriation / 80+000 - 114+750**
125	**2.2.1.3 Kamulaştırma / 114+750 - 141+705**	**2.2.1.3 Expropriation / 114+750 - 141+705**
156	**2.3 - OTOYOL YAPIM İŞLERİ**	**2.3 - HIGHWAY CONSTRUCTION WORKS**
157	**2.3.1 Mobilizasyon**	**2.3.1 Mobilization**
158	**2.3.1.1 Şantiye Kurulması**	**2.3.1.1 Construction Site Establishment**
159	Geçici Şantiye Kurulumu (59+450)	Temporary Construction Site Establishment (59+450)
160	Ana Şantiye Kurulumu (64+500)	Main Construction Site Establishment (64+500)
161	2. Şantiye Kurulumu (87+800)	2nd Construction Site Establishment (87+800)
162	3. Şantiye Kurulumu (124+300)	3rd Construction Site Establishment (123+900)
163	**2.3.1.2 Beton Santrali Kurulumu**	**2.3.1.2 Concrete Plant Establishment**
164	Beton Santrali : 55+450	Concrete Plant: 55+450
165	Beton Santrali : 59+400	Concrete Plant: 59+400
166	Beton Santrali : 80+400	Concrete Plant: 80+400
167	Beton Santrali : 87+700	Concrete Plant: 87+700
168	Beton Santrali : 89+700	Concrete Plant: 89+700
169	Beton Santrali : 99+200	Concrete Plant: 99+200
170	Beton Santrali : 124+300	Concrete Plant: 123+900
171	**2.3.1.3 Mekanik ve Asfalt Plent Kurulumu**	**2.3.1.3 Mechanical and Asphalt Plant Establishment**
172	Mekanik Plent ve Asfalt Plent - 1 - (59+450)	Mechanical Plant and Asphalt Plant - 1 - (59+450)
173	Mekanik Plent ve Asfalt Plent - 2 - (87+700)	Mechanical Plant and Asphalt Plant - 2 - (87+700)
174	Mekanik Plent ve Asfalt Plent - 3 - (124+300)	Mechanical Plant and Asphalt Plant - 3 - (123+900)
175	**2.3.1.4 Konkasör Kurulumu**	**2.3.1.4 Crusher Installation**
176	Konkasör Kurulumu - Çakış Taş Ocağı (TOY4a) - (56+500)	Crusher Installation - Çakış Rock Quarry (TOY4a) - (56+500)
177	Konkasör Kurulumu - Karamanlar Taş Ocağı - (119+500)	Crusher Installation - Karamanlar Rock Quarry - (119+500)
178	Konkasör Kurulumu - Uzunlar Taş Ocağı (TOY 5) - (106+000)	Crusher Installation - Uzunlar Rock Quarry (TOY 5) - (106+000)
179	Konkasör Kurulumu - Çenger Dere Malzemesi Ocağı - (105+000)	Crusher Installation - Çenger River Material Quarry - (105+000)
180	**2.3.2 Tasarım İşleri**	**2.3.2 Design Works**
181	Haritalama İşleri	Mapping Works
182	Geoteknik Hizmetler ve Raporların Hazırlanması	Geotechnical Services and Preparation of Reports
183	**Uygulama Projeleri Hazırlanması ve Onayı**	**Preparation and Approval of Implementation Projects**
184	**52+000 - 80+000 Tasarım İşleri**	**52+000 - 80+000 Design Works**
201	**80+000 - 114+750 Tasarım İşleri**	**80+000 - 114+750 Design Works**

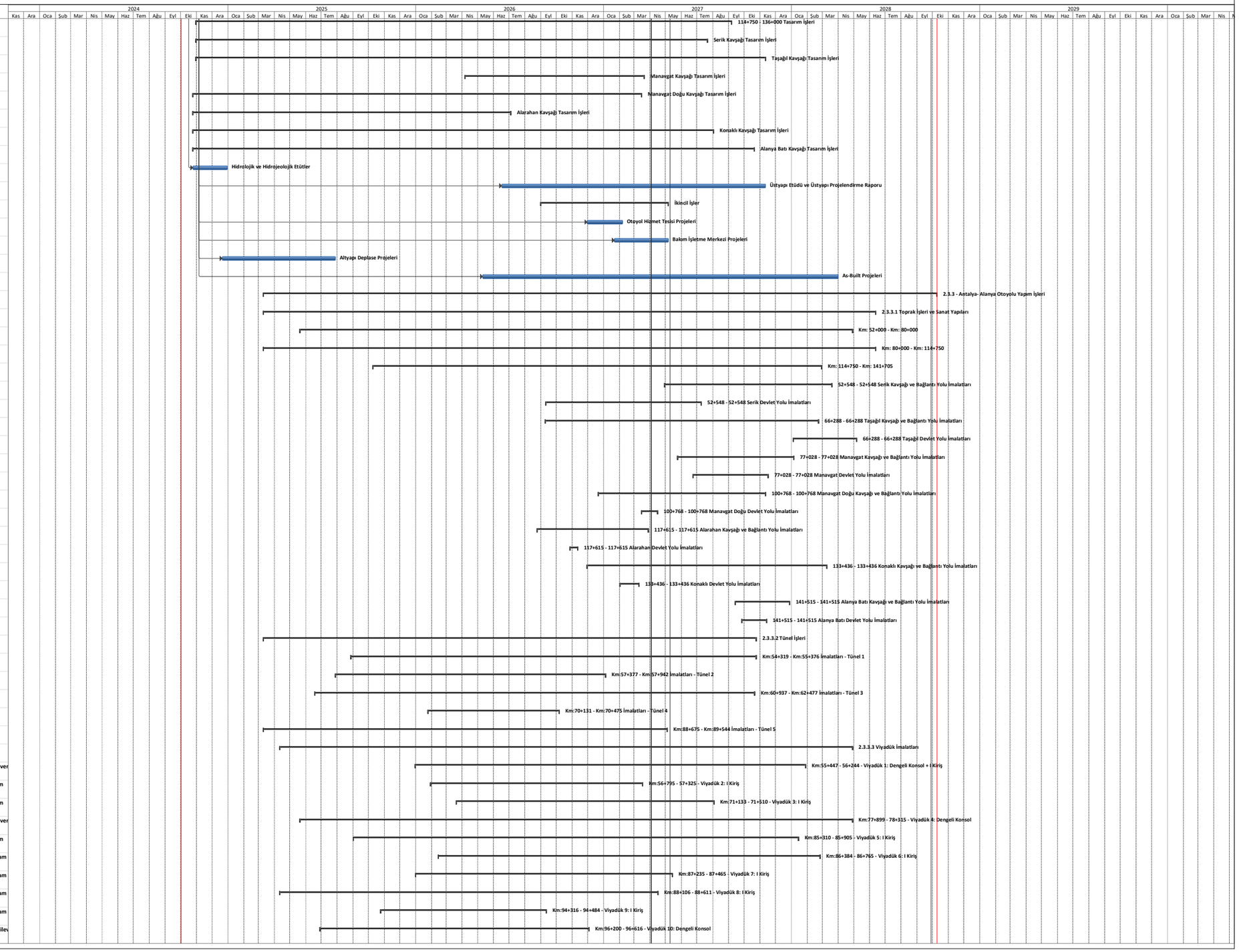


T.C ULAŞTIRMA VE ALTYAPI BAKANLIĞI

Karayolları Genel Müdürlüğü

ANTALYA - ALANYA OTOYOLU PROJESİ İNŞAATI

Kimlik	Ad	Task Name
219	**114+750 - 136+000 Tasarım İşleri**	**114+750 - 141+705 Design Works**
236	**Serik Kavşağı Tasarım İşleri**	**Serik Intersection Design Works**
249	**Taşağıl Kavşağı Tasarım İşleri**	**Taşağıl Intersection Design Works**
254	**Manavgat Kavşağı Tasarım İşleri**	**Manavgat Intersection Design Works**
259	**Manavgat Doğu Kavşağı Tasarım İşleri**	**Manavgat East Intersection Design Works**
264	**Alarahan Kavşağı Tasarım İşleri**	**Alarahan Intersection Design Works**
270	**Konaklı Kavşağı Tasarım İşleri**	**Konaklı Intersection Design Works**
274	**Alanya Batı Kavşağı Tasarım İşleri**	**Alanya West Intersection Design Works**
281	Hidrolojik ve Hidrojeolojik Etütler	Hydrological and Hydrogeological Studies
282	Üstyapı Etüdü ve Üstyapı Projelendirme Raporu	Pavement Design and Report
283	**İkincil İşler**	**Secondary Works**
289	Otoyol Hizmet Tesisi Projeleri	Service Facility Projects
290	Bakım İşletme Merkezi Projeleri	Maintenance Operation Center Projects
291	Altyapı Deplase Projeleri	Utility Relocation Project
292	As-Built Projeleri	As-Built Projects
293	**2.3.3 - Antalya- Alanya Otoyolu Yapım İşleri**	**2.3.3 - Antalya- Alanya Motorway Construction Works**
294	**2.3.3.1 Toprak İşleri ve Sanat Yapıları**	**2.3.3.1 Earthworks and Engineering Structures**
295	**Km: 52+000 - Km: 80+000**	**Km: 52+000 - Km: 80+000**
410	**Km: 80+000 - Km: 114+750**	**Km: 80+000 - Km: 114+750**
569	**Km: 114+750 - Km: 141+705**	**Km: 114+750 - Km: 141+705**
689	**52+548 - 52+548 Serik Kavşağı ve Bağlantı Yolu İmalatları**	**52+548 - 52+548 Serik Intersection Works**
727	**52+548 - 52+548 Serik Devlet Yolu İmalatları**	**52+548 - 52+548 Serik State Road Works**
766	**66+288 - 66+288 Taşağıl Kavşağı ve Bağlantı Yolu İmalatları**	**66+288 - 66+288 Taşağıl Intersection Works**
791	**66+288 - 66+288 Taşağıl Devlet Yolu İmalatları**	**66+288 - 66+288 Taşağıl State Road Works**
799	**77+028 - 77+028 Manavgat Kavşağı ve Bağlantı Yolu İmalatları**	**77+028 - 77+028 Manavgat Intersection Works**
825	**77+028 - 77+028 Manavgat Devlet Yolu İmalatları**	**77+028 - 77+028 Manavgat State Road Works**
831	**100+768 - 100+768 Manavgat Doğu Kavşağı ve Bağlantı Yolu İmalatları**	**100+768 - 100+768 Manavgat East Intersection Works**
843	**100+768 - 100+768 Manavgat Doğu Devlet Yolu İmalatları**	**100+768 - 100+768 Manavgat East State Road Works**
850	**117+615 - 117+615 Alarahan Kavşağı ve Bağlantı Yolu İmalatları**	**117+615 - 117+615 Alarahan Intersection Works**
863	**117+615 - 117+615 Alarahan Devlet Yolu İmalatları**	**117+615 - 117+615 Alarahan State Road Works**
869	**133+436 - 133+436 Konaklı Kavşağı ve Bağlantı Yolu İmalatları**	**133+436 - 133+436 Konaklı Intersection Works**
883	**133+436 - 133+436 Konaklı Devlet Yolu İmalatları**	**133+436 - 133+436 Konaklı State Road Works**
889	**141+515 - 141+515 Alanya Batı Kavşağı ve Bağlantı Yolu İmalatları**	**141+515 - 141+515 Alanya West Intersection Works**
899	**141+515 - 141+515 Alanya Batı Devlet Yolu İmalatları**	**141+515 - 141+515 Alanya West State Road Works**
905	**2.3.3.2 Tünel İşleri**	**2.3.3.2 Tunnel Works**
906	**Km:54+319 - Km:55+376 İmalatları - Tünel 1**	**Km:54+319 - Km:55+376 Works - Tunnel 1**
915	**Km:57+377 - Km:57+942 İmalatları - Tünel 2**	**Km:57+377 - Km:57+942 Works - Tunnel 2**
924	**Km:60+937 - Km:62+477 İmalatları - Tünel 3**	**Km:60+937 - Km:62+477 Works - Tunnel 3**
933	**Km:70+131 - Km:70+475 İmalatları - Tünel 4**	**Km:70+131 - Km:70+475 Works - Tunnel 4**
939	**Km:88+675 - Km:89+544 İmalatları - Tünel 5**	**Km:88+675 - Km:89+544 Works - Tunnel 5**
948	**2.3.3.3 Viyadük İmalatları**	**2.3.3.3 Viaduct Construction**
949	**Km:55+447 - 56+244 - Viyadük 1: Dengeli Konsol + I Kiriş**	**Km:55+447 - 56+244 - Viaduct 1: BSY-94 : Balanced Cantilever**
1328	**Km:56+795 - 57+325 - Viyadük 2: I Kiriş**	**Km:56+795 - 57+325 - Viaduct 2: BSY-95 : Prestressed Beam**
1482	**Km:71+133 - 71+510 - Viyadük 3: I Kiriş**	**Km:71+133 - 71+510 - Viaduct 3: BSY-97 : Prestressed Beam**
1596	**Km:77+899 - 78+315 - Viyadük 4: Dengeli Konsol**	**Km:77+899 - 78+315 - Viaduct 4: BSY-98 : Balanced Cantilever**
1914	**Km:85+310 - 85+905 - Viyadük 5: I Kiriş**	**Km:85+310 - 85+905 - Viaduct 5: BSY-99 : Prestressed Beam**
2083	**Km:86+384 - 86+765 - Viyadük 6: I Kiriş**	**Km:86+384 - 86+765 - Viaduct 6: BSY-100 : Prestressed Beam**
2197	**Km:87+235 - 87+465 - Viyadük 7: I Kiriş**	**Km:87+235 - 87+465 - Viaduct 7: BSY-101 : Prestressed Beam**
2278	**Km:88+106 - 88+611 - Viyadük 8: I Kiriş**	**Km:88+106 - 88+611 - Viaduct 8: BSY-102 : Prestressed Beam**
2414	**Km:94+316 - 94+484 - Viyadük 9: I Kiriş**	**Km:94+316 - 94+484 - Viaduct 9: BSY-103 : Prestressed Beam**
2473	**Km:96+200 - 96+616 - Viyadük 10: Dengeli Konsol**	**Km:96+200 - 96+616 - Viaduct 10: BSY-104 : Balanced Cantilev**

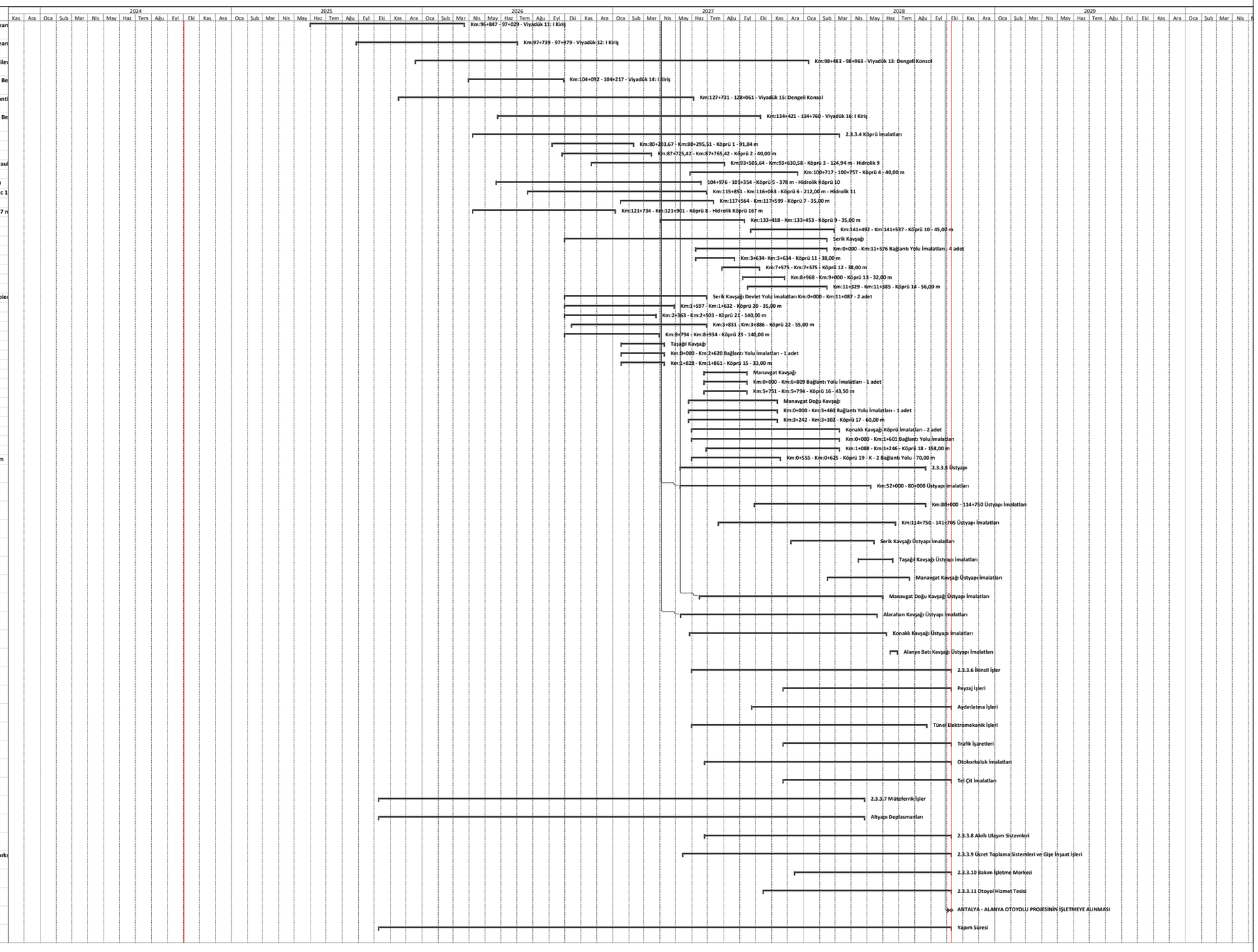


T.C ULAŞTIRMA VE ALTYAPI BAKANLIĞI

Karayolları Genel Müdürlüğü

ANTALYA - ALANYA OTOYOLU PROJESİ İNŞAATI

Kimlik	Ad	Task Name
2791	**Km:96+847 - 97+029 - Viyadük 11: I Kiriş**	**Km:96+847 - 97+029 - Viaduct 11: BSY-105 : Prestressed Bean**
2856	**Km:97+739 - 97+979 - Viyadük 12: I Kiriş**	**Km:97+739 - 97+979 - Viaduct 12: BSY-106 : Prestressed Bean**
2937	**Km:98+483 - 98+963 - Viyadük 13: Dengeli Konsol**	**Km:98+483 - 98+963 - Viaduct 17: BSY-107 : Balanced Cantilev**
3291	**Km:104+092 - 104+217 - Viyadük 14: I Kiriş**	**Km:104+092 - 104+217 - Viaduct 14: BSY-108 : Prestressed Be**
3339	**Km:127+731 - 128+061 - Viyadük 15: Dengeli Konsol**	**Km:127+731 - 128+061 - Viaduct 15: BSY-110 : Balanced Canti**
3588	**Km:134+421 - 134+760 - Viyadük 16: I Kiriş**	**Km:134+421 - 134+760 - Viaduct 16: BSY-111 : Prestressed Be**
3691	**2.3.3.4 Köprü İmalatları**	**2.3.3.4 Bridge Works**
3692	**Km:80+203,67 - Km:80+295,51 - Köprü 1 - 91,84 m**	**Km:80+203,67 - Km:80+295,51 - Bridge 1 - 91,84 m**
3739	**Km:87+725,42 - Km:87+765,42 - Köprü 2 - 40,00 m**	**Km:87+725,42 - Km:87+765,42 - Bridge 8 - 40,00 m**
3764	**Km:93+505,64 - Km:93+630,58 - Köprü 3 - 124,94 m - Hidrolik 9**	**Km:93+505,64 - Km:93+630,58 - Bridge 3 - 124,94 m - Hydraul**
3811	**Km:100+717 - 100+757 - Köprü 4 - 40,00 m**	**Km:100+717 - 100+757 - Bridge 4 - 40,00 m**
3836	**104+976 - 105+354 - Köprü 5 - 378 m - Hidrolik Köprü 10**	**104+976 - 105+354 - Bridge 5 - 378 m - Hydraulic Bridge 10**
3949	**Km:115+851 - Km:116+063 - Köprü 6 - 212,00 m - Hidrolik 11**	**Km:115+851 - Km:116+063 - Bridge 6 - 212,00 m - Hydraulic 1**
4018	**Km:117+564 - Km:117+599 - Köprü 7 - 35,00 m**	**Km:117+564 - Km:117+599 - Bridge 7 - 35,00 m**
4043	**Km:121+734 - Km:121+901 - Köprü 8 - Hidrolik Köprü 167 m**	**Km:121+734 - Km:121+901 - Bridge 8 - Hydraulic Bridge 167 m**
4101	**Km:133+418 - Km:133+453 - Köprü 9 - 35,00 m**	**Km:133+418 - Km:133+453 - Bridge 9 - 35,00 m**
4126	**Km:141+492 - Km:141+537 - Köprü 10 - 45,00 m**	**Km:141+492 - Km:141+537 - Bridge 10 - 45,00 m**
4151	**Serik Kavşağı**	**Serik Intersection**
4152	**Km:0+000 - Km:11+576 Bağlantı Yolu İmalatları - 4 adet**	**Km:0+000 - Km:11+576 Link Road Bridge Works - 4 pieces**
4153	**Km:3+634- Km:3+634 - Köprü 11 - 38,00 m**	**Km:3+634- Km:3+634 - Bridge 11 - 38,00 m**
4178	**Km:7+575 - Km:7+575 - Köprü 12 - 38,00 m**	**Km:7+575 - Km:7+575 - Bridge 12 - 38,00 m**
4203	**Km:8+968 - Km:9+000 - Köprü 13 - 32,00 m**	**Km:8+968 - Km:9+000 - Bridge 13 - 32,00 m**
4228	**Km:11+329 - Km:11+385 - Köprü 14 - 56,00 m**	**Km:11+329 - Km:11+385 - Bridge 14 - 56,00 m**
4264	**Serik Kavşağı Devlet Yolu İmalatları Km:0+000 - Km:11+087 - 2 adet**	**Serik State Road Bridge Works Km:0+000 - Km:10+784 - 2 piec**
4265	**Km:1+597 - Km:1+632 - Köprü 20 - 35,00 m**	**Km:1+597 - Km:1+632 - Bridge 20 - 35,00 m**
4282	**Km:2+363 - Km:2+503 - Köprü 21 - 140,00 m**	**Km:2+363 - Km:2+503 - Bridge 21 - 140,00 m**
4340	**Km:3+831 - Km:3+886 - Köprü 22 - 55,00 m**	**Km:3+831 - Km:3+886 - Bridge 22 - 55,00 m**
4368	**Km:8+794 - Km:8+934 - Köprü 23 - 140,00 m**	**Km:8+794 - Km:8+934 - Bridge 23 - 140,00 m**
4426	**Taşağıl Kavşağı**	**Taşağıl Intersection**
4427	**Km:0+000 - Km:2+620 Bağlantı Yolu İmalatları - 1 adet**	**Km:0+000 - Km:2+620 Link Road Bridge Works - 1 piece**
4428	**Km:1+828 - Km:1+861 - Köprü 15 - 33,00 m**	**Km:1+828 - Km:1+861 - Bridge 15 - 33,00 m**
4453	**Manavgat Kavşağı**	**Manavgat Intersection**
4454	**Km:0+000 - Km:6+809 Bağlantı Yolu İmalatları - 1 adet**	**Km:0+000 - Km:6+609 Link Road Bridge Works - 1 piece**
4455	**Km:5+751 - Km:5+794 - Köprü 16 - 43,50 m**	**Km:5+751 - Km:5+794 - Bridge 16 - 43,50 m**
4480	**Manavgat Doğu Kavşağı**	**Manavgat Doğu Intersection**
4481	**Km:0+000 - Km:3+460 Bağlantı Yolu İmalatları - 1 adet**	**Km:0+000 - Km:3+460 Link Road Bridge Works - 1 piece**
4482	**Km:3+242 - Km:3+302 - Köprü 17 - 60,00 m**	**Km:3+242 - Km:3+302 - Bridge 17 - 60,00 m**
4518	**Konaklı Kavşağı Köprü İmalatları - 2 adet**	**Konaklı Intersection Bridge Works - 2 pieces**
4519	**Km:0+000 - Km:1+601 Bağlantı Yolu İmalatları**	**Km:0+000 - Km:1+601 Link Road Bridge Works**
4520	**Km:1+088 - Km:1+246 - Köprü 18 - 158,00 m**	**Km:1+088 - Km:1+246 - Bridge 18 - 158,00 m**
4578	**Km:0+555 - Km:0+625 - Köprü 19 - K - 2 Bağlantı Yolu - 70,00 m**	**Km:0+555 - Km:0+625 - Bridge 19 - K - 2 Link Road - 70,00 m**
4602	**2.3.3.5 Üstyapı**	**2.3.3.5 Pavement Works**
4603	**Km:52+000 - 80+000 Üstyapı İmalatları**	**Km:52+000 - 80+000 Pavement Works**
4608	**Km:80+000 - 114+750 Üstyapı İmalatları**	**Km:80+000 - 114+750 Pavement Works**
4613	**Km:114+750 - 141+705 Üstyapı İmalatları**	**Km:114+750 - 141+705 Pavement Works**
4618	**Serik Kavşağı Üstyapı İmalatları**	**Serik Intersection Pavement Works**
4623	**Taşağıl Kavşağı Üstyapı İmalatları**	**Taşağıl Intersection Pavement Works**
4628	**Manavgat Kavşağı Üstyapı İmalatları**	**Manavgat Intersection Pavement Works**
4633	**Manavgat Doğu Kavşağı Üstyapı İmalatları**	**Manavgat East Intersection Pavement Works**
4638	**Alarahan Kavşağı Üstyapı İmalatları**	**Alarahan Intersection Pavement Works**
4643	**Konaklı Kavşağı Üstyapı İmalatları**	**Konaklı Intersection Pavement Works**
4648	**Alanya Batı Kavşağı Üstyapı İmalatları**	**Alanya West Intersection Pavement Works**
4653	**2.3.3.6 İkincil İşler**	**2.3.3.6 Secondary Works**
4654	**Peyzaj İşleri**	**Landscaping**
4658	**Aydınlatma İşleri**	**Illumination Works**
4662	**Tünel Elektromekanik İşleri**	**Tunnel Electromechanical Works**
4669	**Trafik İşaretleri**	**Traffic Signs**
4673	**Otokorkuluk İmalatları**	**Guardrail Works**
4677	**Tel Çit İmalatları**	**Fencing Works**
4681	**2.3.3.7 Müteferrik İşler**	**2.3.3.7 Miscellaneous Works**
4682	**Altyapı Deplasmanları**	**Utility Relocation Works**
4687	**2.3.3.8 Akıllı Ulaşım Sistemleri**	**2.3.3.8 Intelligent Transportation Systems**
4692	**2.3.3.9 Ücret Toplama Sistemleri ve Gişe İnşaat İşleri**	**2.3.3.9 Toll Collection Systems and Booth Construction Works**
4701	**2.3.3.10 Bakım İşletme Merkezi**	**2.3.3.10 Maintenance Operation Center**
4703	**2.3.3.11 Otoyol Hizmet Tesisi**	**2.3.3.11 Service Facility**
4708	ANTALYA - ALANYA OTOYOLU PROJESİNİN İŞLETMEYE ALINMASI	Commissioning of Antalya-Alanya Motorway
4709	**Yapım Süresi**	**Construction Period**



T.C.
TARIM VE ORMAN BAKANLIĞI
Devlet Su İşleri Genel Müdürlüğü
13. Bölge Müdürlüğü
Havza Yönetimi, İzleme ve Tahsisler Şube Müdürlüğü

2025 AİLE YILI

Sayı : E-89404551-622.03-5891588
Konu : Bilgi ve Belge Talepleri

DAĞITIM YERLERİNE

İlgi : Limak İnşaat Sanayi ve Ticaret Anonim Şirketi'nin 12.05.2025 tarihli ve 3 sayılı yazısı.

İlgi yazıda; Antalya-Alanya Otoyolu Projesi kapsamında Manavgat İlçesi, Taşağıl Mahallesi sınırları dahilinde, 66.449.77 m^2 lik alanda 1000 kişilik çalışanın bulunduğu şantiye alanı için planlanan 200 m^3/günlük evsel nitelikli atıksu arıtma tesisi çıkış sularının deşarj edileceği nokta için Kurum görüşümüz istenmektedir.

Bahse konu deşarj noktası incelenmiş olup, yapılması planlanan atıksu arıtma tesisinden çıkacak arıtılmış atıksuyun 31.12.2004 tarih ve 25687 sayılı "Su Kirliliği Kontrol Yönetmeliği'nde" belirtilen alıcı ortam deşarj standartlarının sağlanması kaydıyla belirtilen noktadan Kaymazboğazı Deresi'ne deşarj edilmesi Bölge Müdürlüğümüzce uygun bulunmaktadır.

Bilgilerinizi ve gereğini rica ederim.

Oğuzhan KARABULUT
Bölge Müdürü a.
Bölge Müdür Yardımcısı

Ek: Harita

Dağıtım:

LİMAK İNŞAAT SANAYİ VE TİCARET
ANONİM ŞİRKETİNE
Hafta Sokak No: 9 Gaziosmanpaşa ÇANKAYA /
ANKARA
Antalya Çevre, Şehircilik ve İklim Değişikliği İl
Müdürlüğüne

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: 0FA40ECE-B560-4EA0-9D48-3FC4C4908BC2 Doğrulama Adresi: https://www.turkiye.gov.tr/devlet-su-isleri-ebys

DSİ 13. Bölge Müdürlüğü Barış Mah. Halide Edip Adıvar Cad. 07080 ANTALYA
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KEP Adresi : dsi.gnlmud@hs01.kep.tr

Bilgi için:Emel ACAR
Başmühendis

CUMHURBAŞKANI KARARI

Karar Sayısı: 9708

Antalya-Alanya Otoyolu (Serik ile Alanya Arası) ve Bağlantı Yolları Projesi kapsamında bazı taşınmazların Karayolları Genel Müdürlüğü tarafından acele kamulaştırılmasına ilişkin ekli Kararın yürürlüğe konulmasına, 2942 sayılı Kamulaştırma Kanununun 27 nci maddesi gereğince karar verilmiştir.

29 Mart 2025

Recep Tayyip ERDOĞAN
CUMHURBAŞKANI

29/3/2025 TARİHLİ VE 9708 SAYILI CUMHURBAŞKANI KARARININ EKİ
KARAR

MADDE 1- (1) Antalya-Alanya Otoyolu (Serik ile Alanya Arası) ve Bağlantı Yolları Projesi (km:52+000-136+000) kapsamında, ekli krokide gösterilen güzergâh üzerinde bulunan Antalya İli;

a) Serik İlçesi, Deniztepesi, Sarıabalı, Üründü, Belpınarı, Burmahancı, Cumalı, Aşağıçatma, Çandır, Kayaburnu, Aşağıkocayatak, Yukarıkocayatak ve Abdurrahmanlar mahalleleri,

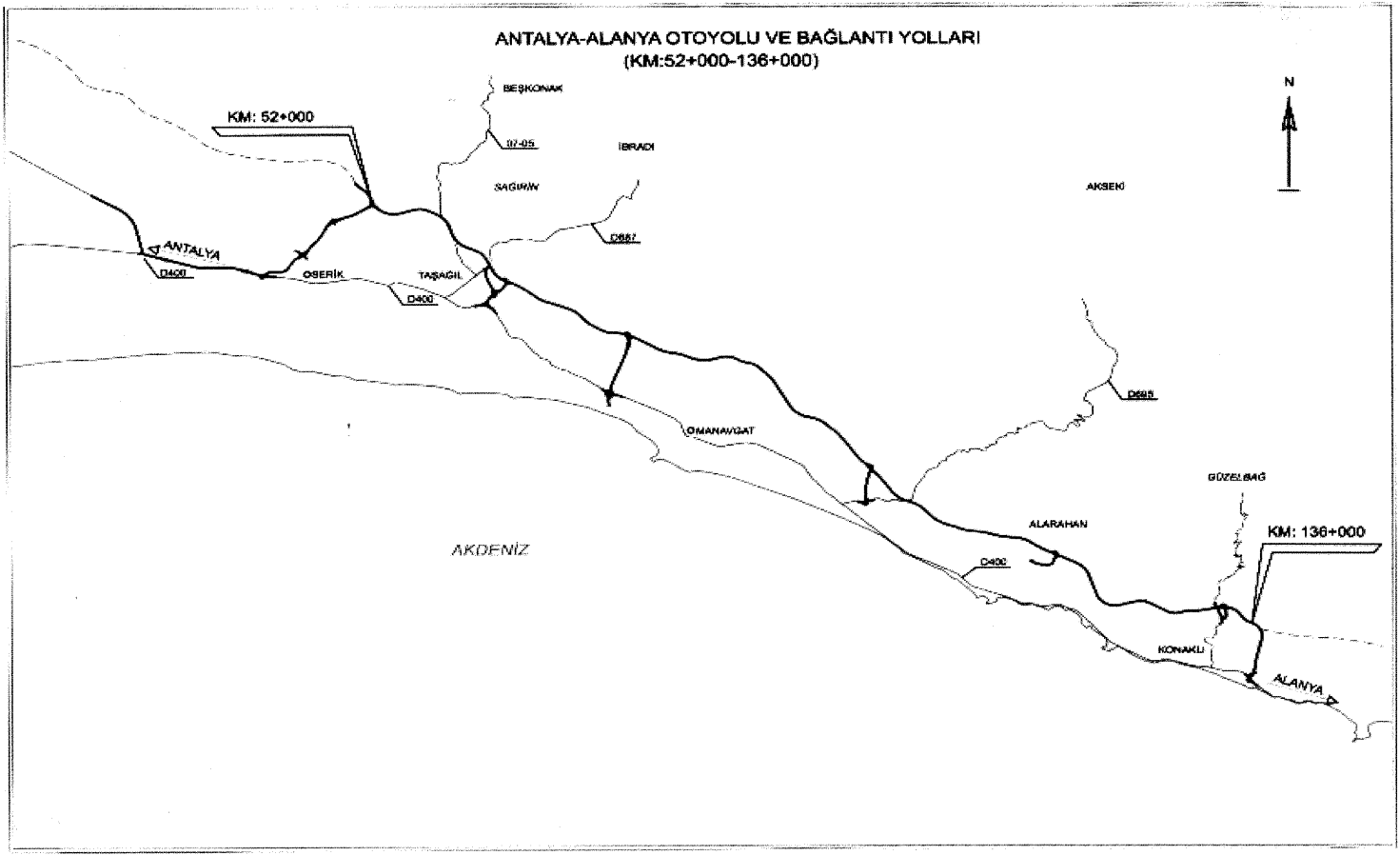
b) Manavgat İlçesi, Çakış, Taşağıl, Hocalar, Gündoğdu, Yavrudoğan, Çolaklı, Seki, Kalemler, Yeniköy, Şişeler, Evrenleryavşi, Dolbazlar, Yukarışıklar, Dikmen, Evrenseki, Ilıca, Kızılot, Bucakşeyhler, Ulukapı, Aşağışıklar, Demirciler, Karaöz, Aksaz, Hacıali, Cevizler, Sülek, Hacıisalı, Hacıobası, Uzunlar, Kadılar, Örenşehir, Yalçıdibi, Odaönü ve Karakaya mahalleleri,

c) Alanya İlçesi, Alara, Çakallar, İncekum, Avsallar, Akdam, Türkler, Payallar, Emişbeleni, Toslak, Elikesik ve Telatiye mahalleleri,

sınırları içerisinde söz konusu Proje güzergahına rastlayan kesimde araziye girilebilmesi ve yol yapım çalışmalarının yürütülmesi ile şantiye, yol bakım hizmetleri, otoyol hizmet tesisleri, malzeme ocakları, plent ve döküm sahaları ve benzeri sahaların yapımı için ihtiyaç duyulan taşınmazlar ve üzerlerindeki müştemilatın Karayolları Genel Müdürlüğü tarafından acele kamulaştırılmasına karar verilmiştir.

MADDE 2- (1) Bu Karar yayımı tarihinde yürürlüğe girer.

MADDE 3- (1) Bu Karar hükümlerini Ulaştırma ve Altyapı Bakanı yürütür.


ANTALYA-ALANYA OTOYOLU VE BAĞLANTI YOLLARI
(KM:52+000-136+000)
N
KM: 52+000
BEŞKONAK
07-05
İBRADI
SAĞIRLI
AKSEKİ
D687
ANTALYA
D400
OSERİK
TAŞAĞIL
D400
D685
OMANAVGAT
GÜZELBAĞ
ALARAHAN
KM: 136+000
AKDENİZ
D400
KONAKLI
ALANYA

T.C.
ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI
Çevresel Etki Değerlendirmesi, İzin ve Denetim Genel Müdürlüğü

Sayı :81195450-220.01-E.145796
Konu :(Ankara-İzmir)Ayr.-Afyonkarahisar-Antalya-Alanya Otoyolu ve Malzeme Ocakları Projesi ÇED Olumlu Kararı

DAĞITIM YERLERİNE

Antalya İli, Kepez, Aksu, Döşemealtı, Alanya, Manavgat, Serik İlçeleri Mevkii'nde, T.C. Ulaştırma ve Altyapı Bakanlığı Karayolları Genel Müdürlüğü tarafından yapılması planlanan "(Ankara-İzmir) Ayr.-Afyonkarahisar-Antalya-Alanya Otoyolu ve Malzeme Ocakları (Antalya-Alanya Kesimi) Projesi" ile ilgili olarak Bakanlığımıza Çevrimiçi ÇED süreci Yönetim Sisteminden sunulan ÇED Raporu, İnceleme Değerlendirme Komisyonu tarafından incelenmiş ve değerlendirilmiştir.

"(Ankara-İzmir) Ayr.-Afyonkarahisar-Antalya-Alanya Otoyolu ve Malzeme Ocakları (Antalya-Alanya Kesimi) Projesi" hakkında ÇED Yönetmeliğinin 14. maddesi gereğince Bakanlığımızca "Çevresel Etki Değerlendirmesi Olumlu" Kararı verilmiş olup, Antalya Valiliği (Çevre ve Şehircilik İl Müdürlüğü) tarafından kararın halka duyurulması gerekmektedir.

Söz konusu projeye ait Nihai ÇED Raporu ve eklerinde belirtilen hususlar ile 2872 sayılı Çevre Kanununa istinaden yürürlüğe giren yönetmeliklerin ilgili hükümlerine uyulması, mer'i mevzuat uyarınca ilgili kurum/kuruluşlardan gerekli izinlerin alınması, projede yapılacak Yönetmeliğe tabi değişikliklerin de Bakanlığımıza veya Antalya Valiliği (Çevre ve Şehircilik İl Müdürlüğü) 'ne iletilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ve rica ederim.

Muhammet ECEL
Bakan a.
Genel Müdür

Ek : ÇED Olumlu Belgesi

Dağıtım:

ENERJİ VE TABİİ KAYNAKLAR
BAKANLIĞINA
(Maden İşleri Genel Müdürlüğü)(Ek konulmadı)
ENERJİ VE TABİİ KAYNAKLAR
BAKANLIĞINA
(Maden Tetkik ve Arama Genel Müdürlüğü)(Ek konulmadı)
ENERJİ VE TABİİ KAYNAKLAR
BAKANLIĞINA
(Türkiye Petrolleri Anonim Ortaklığı Genel Müdürlüğü)(Ek konulmadı)
ENERJİ VE TABİİ KAYNAKLAR
BAKANLIĞINA
(Boru Hatları İle Petrol Taşıma Anonim Şirketi Genel Müdürlüğü)(Ek konulmadı)

Not: 5070 sayılı Elektronik İmza Kanunu gereği bu belge elektronik imza ile imzalanmıştır.

Mustafa Kemal Mahallesi Eskişehir Devlet Yolu (Dumlupınar Bulvarı) 9. km No:278
Çankaya /ANKARA Telefon No: (0312) 410 10 00 Faks:(0312) 419 21 92

Bilgi için:Aylin KONCA
Yüksek Şehir Plancısı

T.C.
ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI
Çevresel Etki Değerlendirmesi, İzin ve Denetim Genel Müdürlüğü

Sayı :81195450-220.01-E.145796
Konu :(Ankara-İzmir)Ayr.-Afyonkarahisar-Antalya-Alanya Otoyolu ve Malzeme Ocakları Projesi ÇED Olumlu Kararı

ENERJİ VE TABİİ KAYNAKLAR BAKANLIĞINA
(Türkiye Elektrik İletim Anonim Şirketi Genel Müdürlüğü)(Ek konulmadı)
ULAŞTIRMA VE ALTYAPI BAKANLIĞINA
(Karayolları Genel Müdürlüğü)
ULAŞTIRMA VE ALTYAPI BAKANLIĞINA
(Altyapı Yatırımları Genel Müdürlüğü)(Ek konulmadı)
ULAŞTIRMA VE ALTYAPI BAKANLIĞINA
(Türkiye Cumhuriyeti Devlet Demiryolları İşletmesi Genel Müdürlüğü)(Ek konulmadı)
ULAŞTIRMA VE ALTYAPI BAKANLIĞINA
(Devlet Hava Meydanları İşletmesi Genel Müdürlüğü)(Ek konulmadı)
ULAŞTIRMA VE ALTYAPI BAKANLIĞINA
(Sivil Havacılık Genel Müdürlüğü)(Ek konulmadı)
TARIM VE ORMAN BAKANLIĞINA
(Doğa Koruma ve Milli Parklar Genel Müdürlüğü)(Ek konulmadı)
TARIM VE ORMAN BAKANLIĞINA
(Devlet Su İşleri Genel Müdürlüğü)(Ek konulmadı)
TARIM VE ORMAN BAKANLIĞINA
(Orman Genel Müdürlüğü)(Ek konulmadı)
MİLLİ SAVUNMA BAKANLIĞINA(Ek konulmadı)
KÜLTÜR VE TURİZM BAKANLIĞINA
(Yatırım ve İşletmeler Genel Müdürlüğü)(Ek konulmadı)
ANTALYA KÜLTÜR VARLIKLARINI KORUMA BÖLGE KURULU MÜDÜRLÜĞÜNE(Ek konulmadı)
SANAYİ VE TEKNOLOJİ BAKANLIĞINA
(Sanayi Bölgeleri Genel Müdürlüğü)(Ek konulmadı)

1EF-74F-F2

Not: 5070 sayılı Elektronik İmza Kanunu gereği bu belge elektronik imza ile imzalanmıştır.

Mustafa Kemal Mahallesi Eskişehir Devlet Yolu (Dumlupınar Bulvarı) 9. km No:278
Çankaya /ANKARA Telefon No: (0312) 410 10 00 Faks:(0312) 419 21 92

Bilgi için:Aylin KONCA
Yüksek Şehir Plancısı

T.C.
ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI
Çevresel Etki Değerlendirmesi, İzin ve Denetim Genel Müdürlüğü

Sayı :81195450-220.01-E.145796
Konu :(Ankara-İzmir)Ayr.-Afyonkarahisar-Antalya-Alanya Otoyolu ve Malzeme Ocakları Projesi ÇED Olumlu Kararı

ANTALYA VALİLİĞİ
(Çevre ve Şehircilik İl Müdürlüğü)(Ek konulmadı)
ANTALYA VALİLİĞİNE
(İL TARIM VE ORMAN MÜDÜRLÜĞÜ)(Ek konulmadı)
ANTALYA VALİLİĞİNE
(İl Afet Ve Acil Durum Müdürlüğü)(Ek konulmadı)
MEKANSAL PLANLAMA GENEL MÜDÜRLÜĞÜNE(Ek konulmadı)
ÇEVRE YÖNETİMİ GENEL MÜDÜRLÜĞÜNE
(Hava Yönetimi Dairesi Başkanlığı)(Ek konulmadı)
TABİAT VARLIKLARINI KORUMA GENEL MÜDÜRLÜĞÜNE(Ek konulmadı)
ANTALYA BÜYÜKŞEHİR BELEDİYE BAŞKANLIĞINA(Ek konulmadı)
DÖŞEMEALTI BELEDİYE BAŞKANLIĞINA(Ek konulmadı)
KEPEZ BELEDİYE BAŞKANLIĞINA(Ek konulmadı)
AKSU BELEDİYE BAŞKANLIĞINA(Ek konulmadı)
SERİK BELEDİYE BAŞKANLIĞINA(Ek konulmadı)
MANAVGAT BELEDİYE BAŞKANLIĞINA(Ek konulmadı)
ALANYA BELEDİYE BAŞKANLIĞINA(Ek konulmadı)
AGREGA VE DOĞALTAŞ MADENLER ŞUBE MÜDÜRLÜĞÜNE(Ek konulmadı)
DOKAY-ÇED ÇEVRE MÜHENDİSLİĞİ LTD. ŞTİ.NE(Ek konulmadı)

1FE-74F-F2

Not: 5070 sayılı Elektronik İmza Kanunu gereği bu belge elektronik imza ile imzalanmıştır.

Mustafa Kemal Mahallesi Eskişehir Devlet Yolu (Dumlupınar Bulvarı) 9. km No:278
Çankaya /ANKARA Telefon No: (0312) 410 10 00 Faks:(0312) 419 21 92

Bilgi için:Aylin KONCA
Yüksek Şehir Plancısı

T.C.

ÇEVRE ve ŞEHİRCİLİK BAKANLIĞI

Çevresel Etki Değerlendirmesi, İzin ve Denetim Genel Müdürlüğü

ÇED OLUMLU BELGESİ

25.11.2014 tarih ve 29186 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren Çevresel Etki Değerlendirmesi Yönetmeliği'nin 14. maddesi gereğince; **"(Ankara-İzmir) Ayr.- Afyonkarahisar - Antalya - Alanya Otoyolu ve Malzeme Ocakları (Antalya-Alanya Kesimi)"** projesi hakkında **"Çevresel Etki Değerlendirmesi Olumlu"** kararı verilmiştir.

Muhammet ECEL
Bakan a.
Genel Müdür

Karar Tarihi : 17-08-2018
Karar No : 5180
Proje Sahibi : T.C. Ulaştırma ve Altyapı Bakanlığı Karayolları Genel Müdürlüğü
Proje Yeri : Antalya İli, Kepez Aksu Dösemealtı Alanya Manavgat Serık İlçeleri, -

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11578041
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-3 Sahası)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Manavgat İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-3 Sahası" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20E-D31-08

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: 4B31F765-5300-41DA-AFBF-7EBA401BCE66 Doğrulama Adresi: https://www.turkiye.gov.tr

Meltem Mah. Dumlupınar Bulv. No:175 07030 Muratpaşa /ANTALYA
Tel: 0.242.2370010 Faks:0.242. 2370016 E-Posta:antalya@csb.gov.tr
WEB:https://antalya.csb.gov.tr/
KEP Adresi : antalyacevrevesehircilik@hs01.kep.tr
Bilgi için:Yunus UÇAR
Çevre Mühendisi

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11570123
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-7 Sahası)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız.

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Manavgat İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-7 Sahası" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20F-D30-A3

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: 39F4BE5A-8221-4C80-8941-FA51C8D5956E Doğrulama Adresi: https://www.turkiye.gov.tr

Meltem Mah. Dumlupınar Bulv. No:175 07030 Muratpaşa /ANTALYA
Tel: 0.242.2370010 Faks:0.242. 2370016 E-Posta:antalya@csb.gov.tr
WEB:https://antalya.csb.gov.tr/
KEP Adresi : antalyacevrevesehircilik@hs01.kep.tr

Bilgi için:Yunus UÇAR
Çevre Mühendisi

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11577414
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-16 Sahası)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Manavgat İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-16 Sahası" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20-D31-63

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: 60B2B9CC-D8DC-466E-A631-2075F6CE86E1 Doğrulama Adresi: https://www.turkiye.gov.tr

Meltem Mah. Dumlupınar Bulv. No:175 07030 Muratpaşa /ANTALYA
Tel: 0.242.2370010 Faks:0.242. 2370016 E-Posta:antalya@csb.gov.tr
WEB:https://antalya.csb.gov.tr/
KEP Adresi : antalyacevrevesehircilik@hs01.kep.tr

Bilgi için:Yunus UÇAR
Çevre Mühendisi

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11577972
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-17 Sahası)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Manavgat İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-17 Sahası" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20FD30BC

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: 8D27AF44-F8CA-4595-829C-399B4E6A5A20 Doğrulama Adresi: https://www.turkiye.gov.tr

Meltem Mah. Dumlupınar Bulv. No:175 07030 Muratpaşa /ANTALYA
Tel: 0.242.2370010 Faks:0.242. 2370016 E-Posta:antalya@csb.gov.tr
WEB:https://antalya.csb.gov.tr/
KEP Adresi : antalyacevrevesehircilik@hs01.kep.tr

Bilgi için:Yunus UÇAR
Çevre Mühendisi

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11577865
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-18 ve Depo-19 Sahası)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Manavgat İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-18 ve Depo-19 Sahası" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (2 Sayfa)

20FD31AF

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Doğrulama Kodu: 0FCB9C6C-4CA9-46BA-8F7B-E83E508AB1A8 Doğrulama Adresi: https://www.turkiye.gov.tr

Meltem Mah. Dumlupınar Bulv. No:175 07030 Muratpaşa /ANTALYA
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WEB:https://antalya.csb.gov.tr/
KEP Adresi : antalyacevrevesehircilik@hs01.kep.tr
Bilgi için:Yunus UÇAR
Çevre Mühendisi

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11577178
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-22 Sahası ve Bağlantı Yolu)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Manavgat İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-22 Sahası ve Bağlantı Ulaşım Yolu" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20E-D30-72

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: 13BFA76C-7E8E-4693-BC21-1387213D84C6 Doğrulama Adresi: https://www.turkiye.gov.tr

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WEB:https://antalya.csb.gov.tr/
KEP Adresi : antalyacevrevesehircilik@hs01.kep.tr
Bilgi için:Murat Emre ŞAHİN
Çevre Mühendisi

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11576997
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-23 Sahası)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Manavgat İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-23 Sahası" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20E-D30-81

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: D10F05C4-E30B-4954-B39B-DA7C62CFFA92 Doğrulama Adresi: https://www.turkiye.gov.tr

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Bilgi için:Murat Emre ŞAHİN
Çevre Mühendisi

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11577057
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-24 Sahası ve Bağlantı Yolu)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Manavgat İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-24 Sahası ve Bağlantı Ulaşım Yolu" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20-D30-EF

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: 13E8D186-9941-401A-B146-1BC9C637761E Doğrulama Adresi: https://www.turkiye.gov.tr

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Bilgi için:Murat Emre ŞAHİN
Çevre Mühendisi

T.C.
ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11576722
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-26 Sahası)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Alanya İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-26 Sahası" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20F-D3188

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Doğrulama Kodu: 7FA7AFB5-8B38-4A8F-9172-58103361EF5D Doğrulama Adresi: https://www.turkiye.gov.tr

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ANTALYA VALİLİĞİ
Çevre, Şehircilik ve İklim Değişikliği İl Müdürlüğü

Sayı : E-23822202-220.03-11577129
Konu : ÇED Kapsam Dışı Kararı Hak. (Depo-28 Sahası)

KARAYOLLARI 13. BÖLGE MÜDÜRLÜĞÜNE

İlgi : 20.01.2025 tarihli ve E.10097279-611-1726764 sayılı yazınız. ("210065" Referans Nolu Başvuru).

Antalya-Alanya Otoyol Projesi (Serik-Alanya Kesimi) kapsamında, yapım çalışmaları sırasında oluşabilecek kazı fazlası malzemenin depolanması amacı ile, Antalya İli, Alanya İlçesi sınırları içerisinde, ekte verilen koordinatlar dahilinde, Karayolları 13. Bölge Müdürlüğü tarafından yapılması planlanan "Depo-28 Sahası" faaliyeti, 29.07.2022 tarih ve 31907 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği Listelerinde yer almadığından kapsam dışı olarak değerlendirilmiştir.

Ancak, planlanan yatırım ile ilgili olarak, 5491 sayılı kanunla değişik 2872 sayılı Çevre Kanunu ile bu Kanuna istinaden çıkarılan Yönetmeliklerin ilgili hükümlerine uyulması ve diğer mer'i mevzuat çerçevesinde öngörülen gerekli izinlerin alınması, ekolojik dengenin bozulmamasına, çevrenin korunmasına ve geliştirilmesine yönelik tedbirlere riayet edilmesi gerekmektedir.

Bilgilerinizi ve gereğini arz ederim.

Mehmet AKIN
İl Müdürü a.
İl Müdür Yardımcısı

Ek: Koordinat Listesi (1 Sayfa)

20F-D30-D6

Bu belge, güvenli elektronik imza ile imzalanmıştır.
Doğrulama Kodu: F40BBEEE-0F65-43A0-8F72-C9292362A5C2 Doğrulama Adresi: https://www.turkiye.gov.tr

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WEB:https://antalya.csb.gov.tr/
KEP Adresi : antalyacevrevesehircilik@hs01.kep.tr
Bilgi için:Murat Emre ŞAHİN
Çevre Mühendisi

CODE OF CONDUCT

Purpose and Scope:

Antalya Alanya Otoyolu İnşaat Yatırım ve İşletme A.Ş ("AAOİAS") Code of Conduct articulates the principles that all employees, offıcers, and directors of the AAOİAS, as well as contractors and other third parties who conduct business on AAOİAS's behalf (collectively "individuals and entities associated with AAOİAS") must follow.

Responsibilities:

Ali individuals and entities associated with AAOİAS are required to read the Code of Conduct, familiarize themselves with the Code of Conduct, and act accordingly with rules, principles, and values set forth in the Code of Conduct. Of utmost importance, all individuals and entities associated with AAOİAS will adhere to these principles when interacting with government entities, customers, shareholders, suppliers, business partners and other employees.

Of utmost importance, all individuals and entities associated with AAOİAS will adhere to the principles defined below when interacting with government entities, customers, shareholders, suppliers, business partners and other employees. Compliance with this Code of Conduct shall also constitute a contractual obligation for contractors, subcontractors and third parties engaged in the Project.

Principles:

- √ **Non Discrimination**

AAOİAS explicitly prohibits decisions made on any attributes of its employees which are unrelated to the said personnel's performance and qualifications. Such unrelated issues may relate to race, ethnicity, color, gender, religion, associations, age, disability, political beliefs, marital status, sexual orientation and family responsibilities. AAOİAS also expects that its personnel shall abide by these rules, and treat each other fairly, equally and never based on any of the grounds defined, without limitation, above.

- √ **Adherence to the Law**

All individuals and entities associated with AAOİAS will execute all of their activities and transactions in compliance with the laws and regulations of the Republic of Türkiye and any applicable international law or norm.

- ✓ **Ethics, Integrity and Respect**

AAOİAS values truth, honesty, and integrity. It believes in good corporate citizenship. All individuals and entities associated with AAOİAS will conduct their business honorably, with honesty, integrity and respect for others.

AAOİAS will strive to meet the highest possible standards of ethical business conduct. All individuals and entities associated with AAOİAS will conduct business without any expectation of personal benefit.

- ✓ **Environmental Impact**

AAOİAS conducts its activities in accordance with high environmental standards. To that effect, all operational resolutions must be in line with applicable environmental laws and be applied with the principle that the impact of our business on the natural environment and human communities are minimum.

- ✓ **Sustainable Profıts**

AAOİAS seeks consistent, balanced, and sustainable growth. To accomplish this, AAOİAS will avoid taking on unmanageable risks. AAOİAS will act in a fiscally disciplined manner, manage its resources productively, and focus its investments on sectors where AAOİAS can sustainably grow and profıt.

- ✓ **A Healthy Work Place**

AAOİAS promises its employees a safe, healthy, and fair working environment. AAOİAS will not tolerate substance abuse, violence, threats, harassment, or intimidation in the workplace.

AAOİAS recognizes that creating a healthy work environment goes further than prohibited behavior in the workplace. AAOİAS will be attentive to the personal growth and improvement of its employees, and will encourage its employees to voluntarily participate in educational, social, and community activities.

AAOİAS also strictly prohibits any form of Gender-Based Violence and Harassment (GBVH). This includes, without limitation, sexual harassment, sexual exploitation, bullying, intimidation, or any other form of gender-based misconduct. Such behaviours are explicitly deemed unacceptable under this Code of Conduct.

- ✓ **Customer Responsibility**

AAOİAS will be responsive to the needs and demands of its clients and customers. In doing so, AAOİAS and all individuals and entities associated with AAOİAS will consistently endeavor to satisfy customer needs and demands in a timely manner.

√ Responsibility to Suppliers and Business Partners

AAOİAS treats both suppliers and business partners with the same fairness and respect as it treats its employees and customers. All individuals and entities associated with AAOİAS will always endeavor to fulfil their agreements on time, at cost, and at the level of quality demanded by AAOİAS's high standards. In working with suppliers and business partners, all individuals and entities associated with AAOİAS will diligently protect the confidential information of the entities and people they do business with. Not only will all individuals and entities associated with AAOİAS not violate confidentiality, they will not accept confidential information that they are not entitled to receive.

√ Anti-Bribery and Corruption

AAOİAS understands that the culture and environment in which it operates may sometimes necessitate, as a social norm, the giving and receiving of small gifts, tokens or related business courtesies by the employees to and from third parties. With this kept in mind, AAOİAS has a zero-tolerance policy for bribery, influence peddling or any crime which may fall afoul of its Policy governing full compliance with any and all applicable anti-bribery and corruption rules. In that respect, all AAOİAS personnel are prohibited from extending gifts or business courtesies that are not strictly within the scope of the Turkish Public Officials Act to, or receiving gifts or business courtesies from Public Officials in the course of the performance of their duties as AAOİAS personnel.

All employees are reminded that any breach of AAOİAS's anti-bribery and corruption Policy shall give grounds to AAOİAS to terminate an employment contract with direct effect, without compensation, for just reasons.

All employees are directed to cooperate to the fullest extent with the compliance officers for any investigation, routine or directed, pursued by the compliance officers to ensure AAOİAS's compliance with the applicable laws.

√ Public Officials

Public Officials are persons who oversee the functioning of state services, services for the benefit of the public, as well as persons who represent associations or foundations for public benefit, vocational organizations, and publicly listed companies. As such, these persons directly contribute to the proper functioning, administration and good governance of the Republic of Türkiye and AAOİAS operates. Accordingly, all AAOİAS personnel are directed to treat all Public Officials with the utmost respect and dignity that is due to a public servant, regardless of his or her capacity, powers or status, and similarly, to treat all the representatives of international institutions and organizations in the same manner as he or she would treat a Public Official in Türkiye.

✓ **Money Laundering**

Money laundering is the process of concealing illicit funds or making them look as they are legitimate, including with the pw-pose of fınancing criminal or terrorist activities. AAOİAS prohibits money laundering which means that AAOİAS and its employees shall always comply with anti-money laundering provisions under applicable laws.

✓ **Antitrust Breach**

Competition legislation prohibits agreements or actions that might impede competition. All AAOİAS employees are obliged to (i) leave or physically distance themselves from any conversations during or outside working hours which they suspect may relate to the breach of competition legislation; and (ii) distance themselves from any electronic correspondence which they suspect may relate to the breach of competition legislation.

✓ **Assets and Confidential Information**

AAOİAS assets - including physical and intellectual property - can only be used in accordance with the authority provided by management. Company assets are not to be used for personal use or to be provided to third parties for their use unless specifıcally authorized. All our equipment and any equipment provided for AAOİAS's use by third parties must be treated with respect and care.

Our confidential or proprietary information is a valuable asset and it must not be shared with any third parties unless there is a legitimate business reason for doing so and the third party has a legitimate need to know the information. Accordingly, our employees have to protect our confidential and proprietary information and are forbidden to disclose it to any person other than in the proper discharge of their duties.

Fully cognizant of the fact that all employees live in a world defıned by the social media, all Employees are neveı1heless encouraged never to discuss business related with AAOİAS or any of its business partners on the internet, and reminded that their duties of confıdentiality extend to the network as well.

✓ **Consequences of Violations**

Any violation of this Code of Conduct, including but not limited to bribery, corruption, harassment, violence, and Gender-Based Violence and Harassment (GBVH), shall be subject to disciplinary measures:

- For AAOİAS employees: disciplinary action up to and including suspension or termination of employment for just cause and without compensation.

- For contractors and subcontractors: removal from the Project site, termination of the relevant contract, and ineligibility for future work with AAOİAS.

- For all individuals and entities associated with AAOİAS: where applicable, violations will also be reported to competent legal authorities in line with national and international law.

✓ **Whistleblowing and Reporting Channels**

AAOİAS encourages all employees and stakeholders to report any suspected or actual violations of this Code of Conduct, including GBVH, bribery, corruption, or any other misconduct. Reports may be made confidentially and without fear of retaliation through the following channels:

E-mail: .....@aaoias.com.tr

Phone (confidential line): +90 (XXX) XXX XX XX

Mail: AAOİAS Office

All reports will be treated with strict confidentiality. Retaliation against individuals who make reports in good faith is strictly prohibited.

General Manager

Alper ALEMDAROĞLU