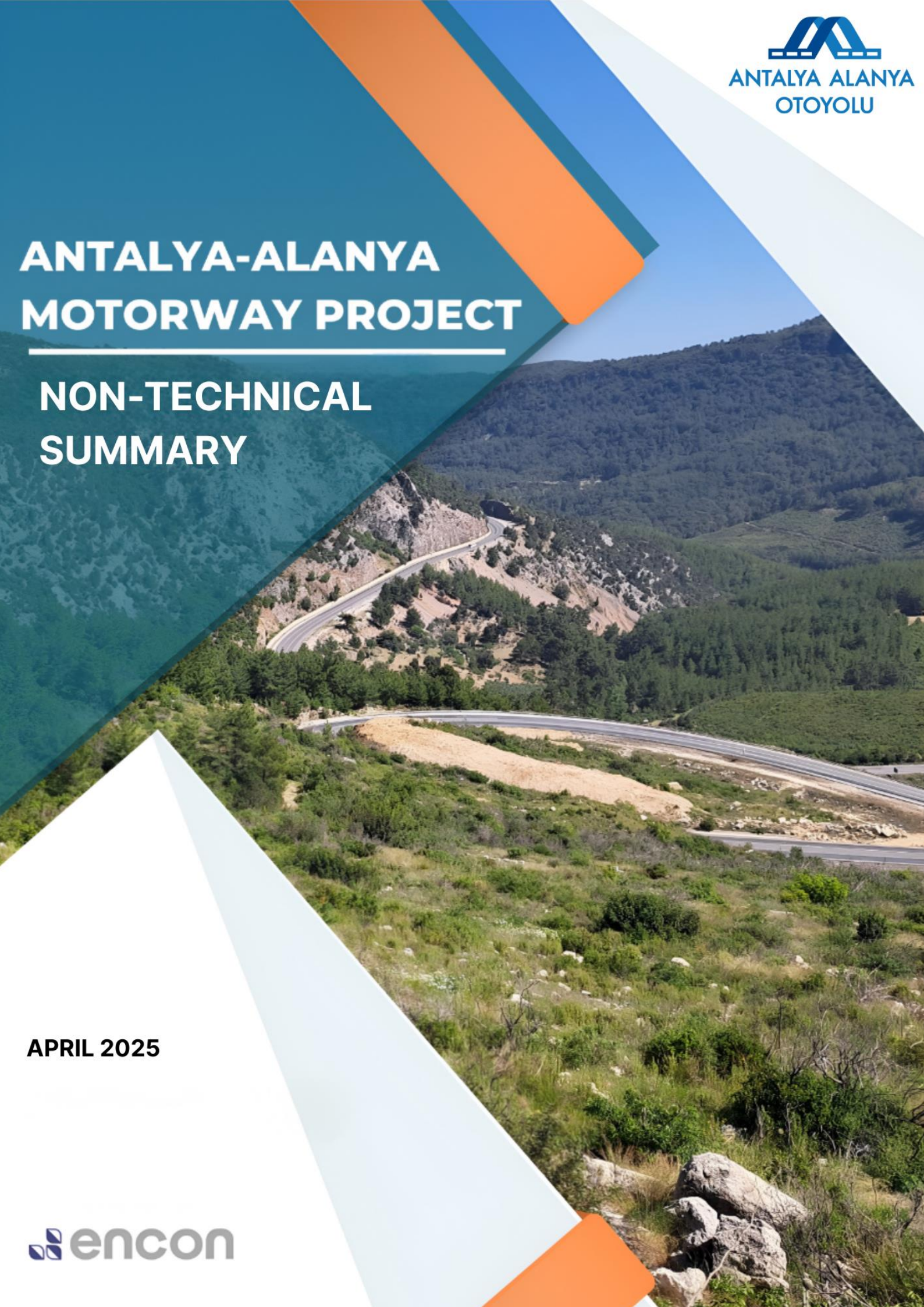
ANTALYA ALANYA OTOYOLU

ANTALYA-ALANYA MOTORWAY PROJECT

NON-TECHNICAL SUMMARY



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LIST OF ABBREVIATIONS

AAOİAŞ	Antalya-Alanya Otoyol İşletme A.Ş.
BAP	Biodiversity Action Plan
BOT	Build, Operate and Transfer
CIA	Cumulative Impact Assessment
DSİ	State Hydraulic Works
EHS	Environmental, Health and Safety Guidelines
EIA	Environmental Impact Assessment
ENCON	ENCON Environmental Consultancy Co.
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
IBAs	Important Bird Areas
IESMC	Independent Environmental and Social Monitoring Consultant
IFC	International Finance Corporation
ILO	International Labor Organization
KGM	General Directorate of Highways
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoTI	Ministry of Transport and Infrastructure
OHS	Occupational Health and Safety
PCMs	Public Consultation Meetings
PPE	Personal Protective Equipment
RBPCNA	Regional Board for the Preservation of Cultural and Natural Assets
RENC	Turkish Regulation on Environmental Noise Control
SEP	Stakeholder Engagement Plan
TKN	Total Kjeldahl Nitrogen
VECs	Valued Ecosystem Components
WHO	World Health Organization

I. INTRODUCTION

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), the Turkish Ministry of Transport and Infrastructure, General Directorate of Highways ("KGM" or "the Administration"), has tendered a contract for the implementation of the Antalya-Alanya Motorway Project ("the Project"). 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. The main contractor for the Project has been designated as Limak and will henceforth be referred to as the Contractor.

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 Project.

The Project is strategically aligned with Türkiye's national priorities to alleviate traffic congestion, enhance road safety, and stimulate economic growth by improving logistics and regional accessibility. By diverting long-distance and freight traffic away from densely populated urban centers, it is expected to reduce travel times and elevate safety standards across the corridor. In doing so, the Project also contributes to Türkiye's broader efforts to lower the environmental and economic toll of road traffic accidents and inefficiencies within the current transport network.

As a subcomponent of the larger Afyonkarahisar–Alanya Motorway, the Project is planned to establish a direct link between the districts of Serik and Alanya, passing through Manavgat in Antalya province. The alignment begins at the Serik Interchange and proceeds eastward to the Alanya West Interchange, where it connects with the D400 state road. The route primarily runs along the foothills of the Taurus Mountains. Figure 1 presents a map illustrating the entire Project route.

This motorway initiative addresses the critical need for modernized transport infrastructure in the Akdeniz Region, a key center for both tourism and agricultural production. The region welcomes millions of international tourists annually and is known for its year-round cultivation of citrus fruits and greenhouse crops. By improving the movement of people and goods, the Project is expected to catalyze regional economic development and integration. It also aims to enhance transportation connectivity with neighboring provinces including Burdur, Muğla, Konya, Isparta, Karaman, and Mersin, reinforcing the region's role in Türkiye's economic landscape.

According to the current design, the Project spans a total of approximately 117.8 kilometers, consisting of 84 kilometers of main 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. The alignment starts at Km: 52+000 near the Serik interchange and ends at Km: 136+000 at the Alanya West Interchange. The access roads will connect key junctions including Serik, Taşağıl, Manavgat, Manavgat East, Alarahan, Konaklı, and Alanya West, ensuring broad regional accessibility along the corridor.

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

The ESIA process, which began in May 2024, follows a structured methodology aligned with Turkish legislation as well as international standards including the Equator Principles, IFC Performance Standards, and the World Bank Environmental and Social Framework. It encompasses initial screening, scoping, and evaluation of alternatives, baseline data collection, impact identification and analysis, stakeholder engagement, and the formulation of mitigation measures. The Project has been classified as a "Category A" investment due to its potential for significant environmental and social impacts, requiring a comprehensive ESIA.

The findings of the scoping and inception stages have been documented in respective reports dated July 2024. These initial steps were instrumental in defining the ESIA scope and establishing the methodologies and fieldwork required for a thorough analysis. The resulting ESIA Report is structured into 20 chapters, each dedicated to a specific environmental or social component, with supplementary annexes. The structure of the ESIA Report is outlined as follows:

- Chapter 1 Introduction
- Chapter 2 Institutional and Legal Framework
- Chapter 3 Project Description
- Chapter 4 ESIA Methodology
- Chapter 5 Land Use and Property
- Chapter 6 Topography, Soils and Geology
- Chapter 7 Use of Resources and Waste Management
- Chapter 8 Water Resources
- Chapter 9 Ecology and Biodiversity
- Chapter 10 Air Quality and Climate Change
- Chapter 11 Noise and Vibration
- Chapter 12 Protected Areas, Landscape and Visual Environment
- Chapter 13 Archaeological and Immovable Cultural Heritage
- Chapter 14 Socio-economic Environment
- Chapter 15 Community Health and Safety
- Chapter 16 Labor and Working Conditions
- Chapter 17 Cumulative Impact Assessment
- Chapter 18 Analysis of Alternatives
- Chapter 19 Public Consultation
- Chapter 20 Environmental and Social Management System

The ESIA assessments are based on the most recent Project design which is detailed in Chapter 3 (“Project Description”). The route selection has been developed concurrently with the ESIA studies. Design and/or optimization of certain Project components are still ongoing. Since detailed engineering studies have not been finalized yet, Project optimization (e.g. change in the number, characteristic and locations of the engineering structures) may continue in the next phases of the construction.

In the event of any subsequent design changes, the Environmental and Social Management System (ESMS) will be activated, and the Change Management Procedure will be followed, as detailed in the ESIA annexes.

The expropriation plans for the current route are still under preparation, and the land use permit processes have been initiated 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.

II. INSTITUTIONAL AND LEGAL FRAMEWORK

Türkiye's administrative system operates under a dual structure comprising central and local administrations. The central administration organizes the national territory into provinces, which are further subdivided into districts, municipalities, and villages or neighborhoods. This structure reflects geographic and socio-economic factors, as well as the need for effective public service delivery. Ministries constitute the primary units of central governance, with local branches organized as provincial and district directorates reporting to the respective governors. At the local level, mayors and neighborhood/village heads (mukhtars) serve as the principal representatives of the administrative framework.

The institutional and legal framework governing the Project is shaped by this administrative structure, as well as national and international legislation. Central and local government institutions play distinct roles in environmental and social oversight throughout the project lifecycle. The Ministry of Transport and Infrastructure (MoTI), through the KGM, is the primary authority responsible for the implementation of the Project. The Ministry of Environment, Urbanization and Climate Change (MoEUCC) serves as the central body in charge of regulating environmental protection, climate strategy, and sustainability policies at the national level. As such, coordination between MoTI, KGM, and MoEUCC is fundamental to ensuring the Project's compliance with legal and environmental requirements.

At the central level, various ministries contribute to sectoral oversight. These include the Ministry of Agriculture and Forestry, Ministry of Culture and Tourism, Ministry of Health, Ministry of Energy and Natural Resources, and the Ministry of Labor and Social Security. Each ministry, through its relevant general directorates, supports governance in areas such as land use, biodiversity, cultural heritage, public health, and occupational safety. Local implementation is supported by the provincial and regional branches of these ministries, which function under the authority of the Governorates. Within the Project area, this includes the 13th and 6th Regional Directorates of the State Hydraulic Works (DSİ), the 132nd and 133rd Regional Directorates of KGM, and the provincial directorates of MoEUCC and other ministries based in Antalya.

In addition to central and provincial administrations, local governments such as the Antalya Metropolitan Municipality, district municipalities, and village/neighborhood administrations (mukhtarlıks) are involved in permitting, stakeholder engagement, and community-level coordination. Given the Project's route through the Antalya province, jurisdictional collaboration at all administrative levels are required.

Environmental management for the Project is conducted under a comprehensive national legal framework, the cornerstone of which is the Environmental Law (Law No. 2872). This law, along with a wide range of supporting regulations and sector-specific legislation, governs the protection of natural resources, pollution control, land use planning, and public health. These include laws related to forestry, agriculture, mining, groundwater, air and water quality, waste management, occupational safety, and the conservation of cultural and natural assets.

As the Project is subject to both national and international financing mechanisms, compliance with international environmental and social standards is also essential. These include the Equator Principles, IFC Performance Standards, and the World Bank Environmental and Social Framework. In cases where national and international standards diverge, the more stringent requirement will be applied to ensure best practice implementation.

The Environmental Impact Assessment (EIA) process in Türkiye is guided by the EIA Regulation (most recently updated in 2022), which classifies infrastructure projects according to their potential impact. Projects such as motorways fall under Annex-1 of the EIA Regulation, requiring the preparation of a full EIA Report. The EIA process involves a detailed assessment of environmental impacts, review by a commission, and approval by the MoEUCC.

An EIA Report for the Project was prepared in 2016 and received a positive decision from the MoEUCC in 2018. This approval remains valid for a period of seven years, provided construction commences within that timeframe. The approved scope of the EIA covers the main alignment and

access roads; however, it does not include associated facilities such as quarries, borrow pits, asphalt plants, and construction camps. For these components, separate clearance letters must be obtained from the MoEUCC. As of July 2024, such clearances are being requested for new segments or facilities added to the Project since the original EIA.

Land acquisition for the Project is conducted under the provisions of the Turkish Expropriation Law (Law No. 2942) and related legislation. Expropriation is managed by the KGM, in coordination with the Project Sponsor under the BOT contract. The process includes the declaration of public interest, preparation of expropriation plans, valuation of affected properties, and negotiated settlements or legal proceedings as needed. The effective implementation of land acquisition is essential to enable timely access to construction areas and to ensure compliance with social safeguard principles.

In conclusion, the institutional and legal framework for the Project integrates national administrative responsibilities with a robust legislative foundation, supported by international environmental and social standards. The Project's success will depend on the coordinated implementation of regulatory processes, the acquisition of necessary permits, and the timely engagement of relevant authorities and stakeholders.

III. PROJECT DESCRIPTION

According to the current design (interim 2), the total length of the Project is approximately 117.8 kilometers, consisting of 84 kilometers of main motorway and 33.8 kilometers of access roads. The main carriageway will be constructed as a dual carriageway with 3 lanes in each direction (2x3), while access roads will follow a 2x2 lane configuration. The motorway is designed to support a travel speed of 140 km/h, whereas the design speed for access roads is set at 110 km/h. All engineering specifications adhere to Turkish national and international highway standards.

To address the topographic and geotechnical challenges of the project area, a variety of complex engineering structures have been integrated into the design. According to the current plan, the Project includes 16 viaducts, 22 bridges, 305 culverts, 25 interchanges, 56 overpasses, 43 underpasses, and 5 tunnels.

The Project includes various permanent and temporary auxiliary facilities such as toll collection areas, service areas, maintenance centers, and construction camp sites. Additionally, borrow pit areas have been planned to support the construction process.

The Motorway's route alignment was determined through a three-stage route optimization process described in detail in Chapter 18. These stages considered a wide range of environmental, social, and technical criteria to avoid ecologically sensitive areas, cultural heritage zones, and densely populated settlements. Realignments were made at various points to address constraints such as protected forests, archaeological sites, mining licenses, and slope instability.

Design optimization also considered integration with existing infrastructure, such as the D400 state road and connecting regional roads. Key intersections, including those in Serik, Manavgat, and Alanya districts, have been designed with interchanges that facilitate smooth traffic flow and accessibility. These interchanges are complemented by access roads serving settlements not directly adjacent to the main route.

Construction is expected to take approximately 36 months, during which several phases of earthworks, structural installation, paving, and auxiliary facility development will be completed. The ESMPs include provisions for minimizing dust and noise, managing excavation and fill material, and restoring disturbed areas after completion.

The Motorway's operational phase will include toll collection, routine and periodic maintenance, and safety monitoring. The Project Sponsor will operate the Motorway under a BOT contract, after which ownership will revert to the KGM in accordance with national legislation.

IV. ESIA METHODOLOGY

The ESIA methodology adopted for the Project follows a comprehensive and systematic approach aligned with both Turkish regulations and international standards, including the Equator Principles, IFC Performance Standards, and the World Bank Environmental and Social Framework.

The objective of the ESIA is to ensure that potential environmental and social risks and impacts are identified, assessed, and appropriately managed throughout the project lifecycle. In this regard, the Project has been classified as a "Category A" investment, indicating the potential for significant adverse environmental and social impacts.

The ESIA process commenced with a screening phase, followed by detailed scoping to define key areas of concern. Baseline data was collected through a combination of desk-based research and field surveys to establish environmental and social conditions prior to project implementation. Impact assessment activities included the identification, prediction, and evaluation of impacts, as well as the development of mitigation measures to avoid, reduce, or compensate for adverse effects. Residual impacts remaining after mitigation were also assessed. The process is iterative in nature, with findings integrated into project planning to inform design and management decisions.

To ensure consistency and coverage across environmental and social topics, specific study areas and Areas of Influence (AoIs) were determined for each assessment component. The scope of the study area was defined based on the anticipated spatial extent of project-related impacts. These values were established in accordance with national guidelines and best practices in the sector. Table 1 summarizes the proposed study areas and AoIs for the Project.

Table 1. 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.*

V. LAND USE AND PROPERTY

The development of the Project requires the acquisition of land along its approximately 117.8-kilometer route, including both the main carriageway and associated access roads. The entire study corridor (covering the maximum expropriation corridor of 350 meters) covers an area of 6,856 hectares. A detailed assessment of land cover and ownership types has been conducted to evaluate land use changes and potential socio-economic impacts associated with the Project.

The key findings of the analyses done based on CORINE database (2018) are summarized below:

- A considerable part (76.06%; 5,214.46 ha) of the entire study corridor is covered by agricultural areas consisting of arable lands, permanent crops, and heterogeneous agricultural areas.
- Complex cultivation patterns alone represent a substantial share (43.04%; 2,950.48 ha) of land use along the project route.
- Permanently irrigated land accounts for a notable portion (15.19%; 1,041.51 ha) of the corridor, reflecting the importance of irrigated agriculture in the region.
- Land principally occupied by agriculture with significant natural vegetation makes up 10.00% (685.75 ha) of the area, indicating mixed land use in some sections.
- Fruit tree and berry plantations are present across 2.46% (168.38 ha) of the total route, contributing to the agricultural diversity.
- Forests and semi-natural areas collectively cover 22.68% (1,554.82 ha) of the corridor, primarily consisting of coniferous forest (10.38%; 711.44 ha), transitional woodland/shrub (9.14%; 626.73 ha), and natural grasslands (2.61%; 178.96 ha).
- Artificial surfaces occupy a relatively small portion (0.69%; 47.58 ha), with industrial or commercial units covering 0.13% (9.18 ha) and sport and leisure facilities covering 0.56% (38.41 ha).
- Inland water bodies, including water courses and still water bodies, make up 0.57% (39.27 ha) of the land cover along the alignment.

Ownership within the expropriation corridor includes privately-owned parcels, lands registered to legal entities, state-owned properties, and public-use lands such as forests and riverbeds. Forest lands are managed by the General Directorate of Forestry and require permitting processes in line with the Forestry Law (No. 6831). Unregistered lands such as riverbeds and existing roads will also be subject to acquisition procedures in line with relevant legislation. The Expropriation Law (No. 2942), Pasture Law (No. 4342), and other applicable legislation will guide the valuation and compensation processes. Expropriation will be conducted by the KGM.

The GDRS database has also been used to identify the land use capability classes of soils within the study area. Class I–III lands, classified as high-quality agricultural soils, are present and require special consideration. However, most of the lands affected are composed of mixed-use or lower-quality soils.

Permanent impacts will arise from the conversion of agricultural, pasture, and forest lands into motorway infrastructure. The corridor generally spans 100 meters in width, with wider sections near interchanges and service areas. Design strategies have been applied to avoid fragmentation of land and maintain access. Agricultural underpasses, culverts, and local access roads have been incorporated into the engineering design to allow continued use of lands that are not subject to expropriation.

The Project's land use impacts will be minimized through alignment optimization and the integration of mitigation strategies. Compensation for landowners and users will be based on fair market value, and those with residual land that becomes unusable may request full acquisition. Where appropriate, livelihood restoration and support measures will be provided in line with international standards.

In conclusion, while the Project entails notable changes in land use—particularly in agriculture and forestry—the design and management strategies in place aim to reduce long-term impacts. With the application of appropriate compensation, access provisions, and stakeholder engagement, the land acquisition process is expected to proceed equitably and in compliance with legal and environmental obligations.

VI. TOPOGRAPHY, SOILS AND GEOLOGY

The Antalya–Alanya Motorway traverses a diverse topographical and geological landscape, which includes steep mountainous terrains, river valleys, and coastal plains. To evaluate the existing conditions and inform the environmental and engineering design of the Project, comprehensive baseline studies were undertaken to assess topography, soils, and geological structure, seismicity, and geotechnical risks within the 400-meter-wide study corridor covering approximately 6,856 hectares.

The topography along the route is characterized by steep and rugged terrain. According to the slope classification, approximately 49% of the corridor consists of areas with slopes greater than 20%, while only 26% falls under gentle slopes (less than 10%). These variations necessitate careful engineering design, particularly in relation to slope stability and erosion control. In terms of elevation, the corridor ranges from coastal lowlands to inland highlands, affecting construction methodologies and drainage planning.

Soil groups in the study corridor were categorized using national soil classification standards. The predominant soil group is rendzinas, comprising 33.3% of the area. This is followed by brown forest soils (23.2%), alluvial soils (20.8%), non-calcareous brown forest soils (11.8%), colluvial soils (5.5%), and red Mediterranean soils (4.4%). The diverse soil composition reflects the region's complex geomorphology and climatic conditions, with agricultural and forested lands particularly dependent on the productivity and integrity of these soils.

Soil erosion presents a significant concern along the route. Approximately 57% of the corridor is classified as having severe erosion potential (Level 3), with an additional 2% at very severe risk (Level 4). This is attributed to steep slopes, loss of vegetation cover, and unsustainable land practices such as overgrazing and slope ploughing. Erosion control measures, including sediment barriers, geotextiles, and slope stabilization, will be implemented during construction to prevent soil loss and sedimentation of nearby waterways.

Geologically, the project corridor is situated within the tectonically active Anatolides-Taurides zone. The regional geology is shaped by complex interactions among the Anatolian, Arabian, and African plates. Units exposed in the area include formations from the Mesozoic to Quaternary periods, such as the Belkıs Conglomerate, Geceleme Marl, Aksu Formation, Eskiköy Formation, and alluvial deposits. These units indicate a geological evolution from marine shelf conditions to terrestrial and fluvial environments, and directly influence the selection of foundation and tunneling techniques.

From a seismic perspective, the corridor intersects a 1st Degree Earthquake Zone, necessitating strict compliance with national seismic codes. Structural geology studies indicate the presence of faults and fractured lithologies, particularly in limestone-travertine units, which may present water ingress risks during tunneling and deep excavations. Engineering precautions will include dewatering, reinforcement, and adaptive excavation methods in susceptible zones.

Geotechnical investigations along the corridor include borehole drilling, test pits, field and laboratory tests. As of 2024, a total of 417 boreholes and 88 test pits were planned, although some remain pending due to access limitations. Terrain models have been developed, and slope and fill designs are aligned with national highway regulations to minimize instability risks.

To mitigate adverse impacts on topography and soils, the Project will implement a comprehensive set of erosion and sediment control measures, topsoil management practices, and re-vegetation protocols. These measures include limiting exposed surface areas to a maximum of 30,000 m² at any given time, applying erosion-reducing techniques such as mulching, slope contouring, and temporary drainage systems, and ensuring the prompt restoration of topsoil and vegetation following the completion of construction activities.

The reinstatement of topsoil will follow specific depth guidelines (e.g., 15 cm for general areas and deeper for planted zones) and will ensure the combined thickness of topsoil and vegetative growth layer matches surrounding undisturbed areas.

In conclusion, the topographical, soil, and geological assessments provide a comprehensive understanding of the physical landscape and associated risks. The Project's design integrates these findings to ensure safe construction, minimize environmental degradation, and enhance long-term land stability through best-practice erosion control, topsoil restoration, and geotechnical safety protocols.

VII. USE OF RESOURCES AND WASTES

The construction of the Project will involve the use of significant quantities of natural materials such as limestone, basalt, sandstone, aggregates, asphalt, and concrete. During the operational phase, resource consumption will be relatively limited, primarily associated with maintenance activities conducted along the motorway, service areas, and associated facilities. Chemical substances and construction materials will also be used throughout the Project lifecycle in accordance with national and international environmental and safety standards.

Various types of waste will be generated during the land preparation, construction, and operation phases of the Project. These include hazardous, non-hazardous, and inert wastes resulting from material usage, site operations, and personnel needs. Waste generation will be most prominent during the construction phase due to the scale of works and concentration of labor. In the operation phase, waste generation is expected to decline, limited mainly to routine maintenance and service operations.

If not properly managed, project-related waste may pose environmental and health risks. These include contamination of soil and water bodies, degradation of local ecosystems, and exposure risks to both the public and the workforce. Visual nuisances and pressures on existing waste infrastructure are also potential concerns. To mitigate these impacts, the Project will implement a robust waste management approach that aligns with Turkish legislation and international good practice, particularly the waste management hierarchy.

The waste management hierarchy prioritizes prevention and minimization at the source. Where waste generation is unavoidable, on-site reuse and recovery options will be explored. If further treatment or recovery is not feasible, waste will be transferred to licensed recycling or disposal facilities. In all cases, the transportation and disposal of waste will be conducted by contractors holding the necessary licenses and permits issued by the Ministry of Environment, Urbanization and Climate Change.

Waste types expected during the construction phase include municipal solid waste, packaging waste, wastewater sludge, excavation spoil, construction debris, hazardous chemical residues, and used oils. The Project Sponsor has identified several raw material extraction sites, construction camps, asphalt and concrete plants, and storage sites where most of these wastes will be generated. On-site management, including the use of package wastewater treatment plants and appropriate temporary storage, will form the foundation of construction-phase waste management.

During operation, waste volumes will be substantially lower. Generated waste will largely consist of routine maintenance residues, operational waste from service areas, and periodic hazardous waste such as oils and vehicle-related fluids. All operational waste streams will be managed according to applicable regulations, and disposal or treatment will be documented in compliance with Environmental and Social Management Plan procedures.

Training sessions will be provided to Project personnel to ensure waste management protocols are effectively implemented. Detailed instructions for handling each waste category are outlined in the Project's Solid Waste Management Procedure. Continuous monitoring will ensure compliance, and coordination with local municipalities and licensed operators will facilitate integration into the regional waste infrastructure.

VIII. WATER RESOURCES

The Antalya-Alanya Motorway route traverses the Antalya Basin, one of the richest regions of Türkiye in terms of surface and groundwater resources. The Project intersects several important streams including Köprüçay, Manavgat, Alara, Karpuz, and Kargı, and passes through multiple sub-basins such

as Manavgat, Aksu, and Dim. These water bodies, both flowing and standing, are of ecological, agricultural, and socio-economic significance, necessitating a detailed assessment of potential impacts during construction and operation phases.

Baseline conditions of water resources were established through an extensive sampling and laboratory analysis program conducted in September and December 2024. Surface water and groundwater samples were collected from 20 sampling stations strategically located along and near the motorway corridor. The analysis was performed in accordance with the Surface Water Quality Regulation of Türkiye, harmonized with EU standards. Sampling focused on identifying parameters indicative of organic pollution, nutrient loads, and chemical pollutants. Results indicate that the overall water quality of surface water bodies intersected by the Project falls under Class III. The primary determinants of this classification include elevated concentrations of oil and grease, sulphur, and Total Kjeldahl Nitrogen (TKN), all of which suggest diffuse agricultural runoff and localized domestic inputs as the likely sources.

Key rivers such as the Köprüçay and Manavgat display steady flow regimes year-round, supporting ecosystems and human activities including tourism and irrigation. However, they are also subjected to pollution pressures including domestic wastewater discharge, agricultural runoff, and operational tourism infrastructure. Similar pressure factors were identified for Alara and Karpuz streams, particularly from agricultural use and sediment extraction. Protection measures are especially critical near Alanya Dim Dam, the only identified source of drinking water in the Project vicinity. The Project has been designed to ensure that no construction activities encroach upon the designated protection zones for this reservoir.

Groundwater is another critical resource within the Antalya Basin, particularly given its role in supporting domestic use at construction camps and agriculture in the surrounding areas. Groundwater sampling revealed varying degrees of quality, with some exceedances in conductivity, sulphur, and oil and grease parameters. These findings reinforce the need for strict control of construction practices, including fuel storage, wastewater management, and the avoidance of pollutant infiltration.

Based on pressure analyses from the Basin Protection Action Plan, the major risks to water quality in the region stem from agricultural practices, untreated wastewater, and material extraction from riverbeds. In response, mitigation measures will be implemented including the use of sediment traps, erosion control structures, and spill prevention protocols. In addition, compliance with the Regulation on the Protection of Drinking and Utility Water Basins will be ensured, particularly in areas near drinking water reservoirs.

Overall, with effective implementation of proposed mitigation strategies, impacts on surface and groundwater resources can be managed to remain within acceptable thresholds. Ongoing monitoring will be conducted at regular intervals during construction and operation to ensure water quality is preserved and that the Project complies with national and international environmental standards.

IX. ECOLOGY AND BIODIVERSITY

The ecological assessment for the Project was conducted to establish baseline biodiversity conditions, identify sensitive habitats, and evaluate potential ecological impacts along the proposed motorway corridor. The studies were carried out in accordance with IFC Performance Standard 6, which promotes biodiversity conservation and the sustainable management of natural resources. Between July 2024 and March 2025, extensive seasonal surveys, desktop analyses, literature reviews, and species identification efforts were undertaken. Terrestrial and aquatic field surveys were conducted by expert teams at 36 terrestrial and 14 aquatic sampling locations within a 400-meter buffer surrounding the project alignment.

Sampling sites were strategically selected to reflect the diversity of ecosystems along the route, encompassing both terrestrial habitats and aquatic environments. The selection process prioritized ecological sensitivity and habitat representativeness. In addition to primary field data, expert judgment, satellite imagery, and published literature were used to determine species' conservation statuses and to guide the assessment of potential impacts. All ecological data collection and analysis complied with relevant national legislation and international conservation frameworks.

The information gathered included:

- Biological components on terrestrial environment,
- Terrestrial habitats and ecosystems
  - Flora
- Terrestrial fauna components
  - Amphibians and reptiles,
  - Birds
  - Mammals,
- Biological components on aquatic environment,
- Areas of international conservation importance
- Potential sensitive areas.

Based on the habitat structure in and around the Project Area, the site was found to support 221 plant species, 29 fish species, five amphibians, 25 reptiles, 124 bird species (both resident and migratory), and 46 mammal species, reflecting the regional biodiversity.

A Critical Habitat Assessment was conducted in line with IFC PS6, which defines critical habitats as areas of high biodiversity value that support endangered species, endemic species, large migratory populations, highly threatened ecosystems, or areas important for evolutionary processes. Under Criterion-1 (critically endangered/endangered species), Pyrus serikensis (EN) was observed within the maquis ecosystem and designated as critical habitat. Lyciasalamandra atifi (EN) may also meet this criterion if its presence is confirmed through further monitoring. Criterion-2 (endemic/restricted-range species) was also triggered by Pyrus serikensis, while other endemic plants, reptiles, and fish did not meet the population thresholds. Criterion-3 (migratory/congregatory species) was not triggered, as neither migratory bird densities nor Anguilla (CR) reached qualifying levels. No habitats were found to meet the thresholds for Criterion-4 (highly threatened/unique ecosystems) or Criterion-5 (key evolutionary processes). Thus, aside from specific maquis zones, the Project Area does not qualify as critical habitat under IFC criteria.

A large portion of the project route crosses agricultural lands with limited or heavily modified vegetation. Therefore, minor substantial contraction of natural habitats in the surrounding area is anticipated. As a result, some habitat loss for species dependent on native vegetation for shelter or food is expected.

Given the ecological characteristics of the Project Area, most of the identified flora and fauna are not strictly dependent on the project corridor and are generally species with wide regional distributions with some endemic and endangered species present. Due to the similarity of the habitats along the motorway with the surrounding landscape, the Project is not expected to impede the movement, breeding, or feeding behaviors of these species. This similarity offers alternative habitats for mobile fauna, which are likely to relocate in response to disturbance. To mitigate habitat fragmentation caused by highway construction, the implementation of wildlife crossings has been proposed.

Impact significance was assessed based on the sensitivity of ecological receptors and the anticipated magnitude of disturbances. Temporary habitat loss during construction emerged as the primary impact. However, the mobility of most species allows for movement to adjacent, undisturbed habitats. For less mobile or specialized species, focused mitigation will be essential to reduce risks.

Certain sections of the highway pass through degraded or intact maquis and forested areas, leading to inevitable biodiversity impacts. Mitigation measures have been developed to address these potential effects on habitats and species. A comprehensive mitigation strategy has been formulated to manage potential ecological impacts. Key actions include establishing buffer zones around ecologically sensitive areas, implementing sediment control structures, constructing wildlife crossings, and restoring native vegetation following construction.

While some degree of biodiversity loss is expected, it has been determined that a net loss will occur. To offset this, a combination of mitigation and biodiversity offset strategies must be adopted and implemented in accordance with scientific standards and good international industry practice.

The Project is committed to applying internationally accepted mitigation strategies. These include enforcing seasonal restrictions on construction activities, protecting habitat corridors, engaging in reforestation, and executing biodiversity offset programs when impacts cannot be fully avoided. All of these actions are structured under the Biodiversity Action Plan (BAP), which forms part of the ESMP.

Monitoring activities will begin prior to construction and continue throughout construction and into the early operational phase. These efforts will include repeated ecological surveys, monitoring of key indicator species, and adaptive management based on results. The ESMP outlines clear roles, responsibilities, and procedures for implementing corrective measures as needed.

In conclusion, the ecological and biodiversity assessments provide a detailed understanding of the Project Area's environmental sensitivities. Through the application of robust mitigation measures and offsetting, and adherence to both national legislation and international conservation standards, the Project is expected to prevent irreversible ecological harm and contribute positively to long-term biodiversity conservation goals.

X. AIR QUALITY AND CLIMATE CHANGE

The Project has the potential to affect local air quality during both construction and operation phases due to emissions from construction machinery, material transportation, dust-generating activities, and increased traffic. The assessment of air quality impacts has been carried out in accordance with Turkish regulations, the World Bank's Environmental, Health, and Safety Guidelines, and IFC Performance Standards.

Baseline air quality conditions were evaluated using 2022 data from the Turkish National Air Quality Monitoring Network. The nearest stations—Alanya, Serik, and Antalya—were used to analyze concentrations of key pollutants including particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and ozone (O_3). The monitoring results indicated that ambient air quality across the Project area is generally compliant with Turkish standards and WHO guidelines, with occasional exceedances of PM_{10} values recorded at Alanya and Serik.

Construction activities are expected to generate dust and emissions due to excavation, material stockpiling, vehicle movement, and asphalt production. Key sources include unpaved roads, concrete batching plants, and crushing-screening operations. The Project's construction-phase air emissions were modeled using the AERMOD software. Results show that, while short-term PM_{10} concentrations may increase near work sites, the impacts are expected to remain within regulatory thresholds if recommended mitigation measures are implemented.

In the operational phase, the primary source of emissions will be vehicular traffic. Traffic projections provided by the KGM were used to estimate future emissions. CO and NO_2 levels are anticipated to increase slightly, particularly at busy intersections and toll plazas. However, pollutant concentrations are not expected to exceed ambient air quality limits due to planned green buffers and alignment with regional air flow patterns.

To mitigate potential impacts on air quality, a set of best practice control measures will be implemented throughout the Project lifecycle. These include water spraying on haul roads, covering of trucks transporting materials, timely removal of waste, maintenance of construction machinery, and installation of emission control systems at plants. Vegetation buffers will be planted along the route to reduce dust dispersion, particularly near sensitive receptors.

Monitoring of air quality will be conducted during both construction and operation, including continuous and periodic measurements at key locations. The ESMP includes an Air Quality and Emissions Management Plan detailing mitigation, monitoring, and reporting obligations. This plan will ensure that air emissions remain within acceptable limits and that corrective actions are promptly implemented if thresholds are exceeded.

In conclusion, the Project's air quality and climate-related impacts are manageable with the application of prescribed mitigation measures and regular monitoring. By maintaining compliance with

national and international air quality standards, the Project is expected to avoid significant adverse effects on local air quality and contribute to sustainable development goals in the region.

XI. NOISE AND VIBRATION

Baseline noise conditions for the Project were established through 24-hour measurements at 21 locations in September 2024. These measurements, conducted in both weekday and weekend periods, prioritized sensitive receptors such as settlements, agricultural facilities, educational institutions, and high-traffic roadways. The results indicated that existing ambient noise levels were close to or exceeded the thresholds specified in both the Turkish Regulation on Environmental Noise Control (RENC) and the IFC Environmental, Health and Safety (EHS) Guidelines, particularly in locations near major transportation corridors and settlements.

For both noise and vibration assessments covering the construction and operation phases, a 2-km-wide corridor—extending 1 km on each side of the motorway centerline—was used as the primary study area.

Noise levels are expected to increase during both the construction and operation phases of the Project. To assess these potential impacts, noise modeling was conducted using the SoundPLAN V9.0 software. The modeling aims to predict noise levels from construction equipment and traffic during the operation phase, determine exceedances of relevant standards, and identify where mitigation measures are required. Construction modeling assumed simultaneous operation of 426 equipment units working in two daily 10-hour shifts, based on the Project Sponsor's construction plan.

During construction, potential impacts include temporary noise increases from excavation, paving, and machinery use near settlements. Mitigation measures include prioritizing quieter equipment, enforcing vehicle maintenance and speed restrictions, using silencers and acoustic barriers, scheduling high-noise activities away from nighttime hours, and informing local communities of anticipated disturbances through a community consultation program. Noise monitoring will be conducted regularly, and corrective actions will be triggered when exceedances are detected.

For the operational phase, noise impacts will be mitigated through landscape design and structural buffers. A green buffer strip will be established between the motorway and service areas using dense vegetation resistant to air and noise pollution. Additionally, natural topography will be utilized to the extent possible to shield nearby communities. Annual noise monitoring will be conducted at critical receptors identified through modeling. If noise thresholds are approached or exceeded, noise barriers will be considered and implemented upon approval by the KGM. Further mitigation such as additional landscaping or design adjustments may follow.

Vibration impacts during construction may result from piling, blasting, and use of vibratory machinery. Although such activities typically do not reach levels that damage structures, they can cause short-term disturbances in nearby communities. Mitigation will include adherence to equipment-specific minimum working distances, timing of blasting operations to avoid sensitive hours, and community notification. Any complaints related to vibration will be addressed through the Project’s Grievance Mechanism, which ensures timely investigation and response.

During the operation phase, if vibration-related complaints are received, these will also be managed through the Grievance Mechanism and further technical assessments will be undertaken. Residual impacts from both noise and vibration are expected to range from low to medium, depending on proximity to the motorway and the type of receptor. Continued monitoring, community engagement, and adaptive management will form the basis of long-term noise and vibration impact control.

XII. PROTECTED AREAS, LANDSCAPE AND VISUAL ENVIRONMENT

To evaluate the Project’s interaction with protected areas, a comprehensive desktop assessment was conducted using national databases and international conservation frameworks. The analysis referred to Annex-5 of the Turkish EIA Regulation (Official Gazette No. 31907, dated July 29, 2022), which provides a list of sensitive areas protected under national and international legislation.

Data were gathered from sources such as the Ministry of Agriculture and Forestry's General Directorate of Nature Conservation and National Parks, the Ministry of Culture and Tourism, and the General Directorate of Cultural Heritage and Museums. Geographic data were integrated using Google Earth and official spatial files (kml/kmz) of the Project area.

The study area was defined as a 400-meter-wide corridor along the motorway axis (200 meters on each side). Within this corridor, no officially designated protected areas were identified based on national or international protection status. However, one significant exception exists: the Belek Specially Protected Environment Area partially overlaps with the southern section of the Project Area. This area is recognized for its ecological importance and will require specific attention during construction and operational phases to minimize environmental disturbance.

The broader region of Antalya includes several legally protected areas. The locations and distances of these sites relative to the Project corridor were mapped and evaluated for potential indirect impacts. Furthermore, relevant international conventions to which Türkiye is a signatory—such as the Bern Convention, the Barcelona Convention, and the RAMSAR Convention—were also reviewed. No overlap was found between the Project corridor and protected areas established under these international frameworks. Likewise, there are no World Heritage Sites, Important Bird Areas (IBAs), or Ramsar-listed wetlands in the immediate vicinity.

Nationally protected areas—including National Parks, Nature Parks, Nature Monuments, and Nature Conservation Areas—were assessed as well, and none are located within the main alignment of the Project. While the landscape is primarily characterized by agricultural and modified land, segments near natural vegetation and forested zones may have higher visual sensitivity.

Although most of the Project avoids designated conservation zones, environmental mitigation measures will be implemented. These include protection of existing vegetation, visual screening where appropriate, and careful planning in areas with elevated natural and scenic value.

XIII. ARCHAEOLOGICAL AND IMMOVABLE CULTURAL HERITAGE

The Project traverses a region of significant historical and cultural value. To evaluate the potential impact of the Project on archaeological and immovable cultural heritage assets, a comprehensive assessment has been carried out in line with Turkish legislation and international standards, including IFC PS 8.

The study of archaeological and immovable cultural heritage within the Antalya–Alanya Motorway Project has been conducted under the coordination of HERMES Archeology & Environmental and Social Consultancy Company between 26 August and 8 September, 2024. The assessment focused on a 400-meter-wide corridor (200 meters on each side of the Motorway centerline), following a four-phase methodology: pre-fieldwork and desktop studies, field surveys, impact assessment, and reporting.

Field investigations were carried out through systematic walking surveys along the route, supported by high-resolution satellite imagery and 1/25,000 scaled topographical maps for inaccessible zones. All findings were recorded using UTM ED50 or WGS systems and documented in kmz format for spatial analysis. These studies aimed to identify registered and unregistered cultural assets, such as cemeteries, settlement remains, tumulus, aqueducts, and other architectural features. Each finding was evaluated in terms of its historical significance and the potential impact from the Project. Particular sites—such as 1st Degree Archaeological Sites, cemeteries from the Early Republican period, and hilltop settlements—were flagged for special attention.

During construction, all findings must be reported to the Antalya Regional Board for the Preservation of Cultural and Natural Assets (RBPCNA), and any work in proximity to these sites must comply with the Board's decisions. It is recommended that archaeological monitoring be conducted within sensitive areas.

Construction activities in regions containing or adjacent to archaeological features should take place under the supervision of qualified archaeologists. Identified sites should be registered in the

Project's constraint maps and marked with visible "Critical Area" warnings to prevent accidental disturbance.

The Project will also implement a Chance Find Procedure in accordance with Law No. 2863 on the Conservation of Cultural and Natural Assets. This procedure outlines the actions to be taken in case of discovery of archaeological material during construction, including immediate cessation of work and notification of authorities.

With the effective implementation of these mitigation measures, potential impacts on archaeological and cultural heritage are expected to be reduced to low levels. Cooperation with the RBPCNA, application of the Chance Find Procedure, and archaeological monitoring are crucial during the land preparation and construction phases.

These measures are not only preventive but may also contribute to expanding the cultural and archaeological inventory of Türkiye. The ESIA process, through interdisciplinary archaeological studies and responsible project planning, has the potential to uncover valuable historical information and ensure its protection for future generations. In addition to its cultural significance, the discovery and preservation of such assets may also generate touristic interest and associated economic benefits for the region.

XIV. SOCIO-ECONOMIC ENVIRONMENT

The Project is anticipated to affect the socio-economic conditions of communities located along its planned alignment. To evaluate potential impacts, both desktop research and field-based studies were conducted. These focused on land acquisition, livelihood patterns, access to infrastructure and public services, and the presence of vulnerable population groups. The analysis considers the construction and operation phases of the Project separately.

Socio-economic data were gathered through a combination of desktop and field studies. Insights from initial desk research and site visits informed the planning and implementation of a social field study, which was carried out along the proposed motorway route between June 3 and June 6, 2024. Additionally, data from field research conducted with WSP on February 25, 2025, were utilized.

The assessment aimed to identify potentially affected settlements and examine their demographic, economic, and social profiles. Data sources included national statistics and stakeholder interviews. Key areas of focus included land use, population structure, agricultural and livestock-related economic activities, and the availability of essential services such as education, healthcare, electricity, water supply, and road connectivity.

Settlements located along the Project corridor are predominantly rural, with livelihoods largely dependent on agriculture, greenhouse cultivation, and small-scale animal husbandry. While most communities have access to basic infrastructure such as electricity and roads, deficiencies were noted in areas such as solid waste management, public transport, and healthcare access. Residents highlighted the seasonal nature of their incomes and the importance of agricultural land and pasture areas for sustaining their livelihoods.

Vulnerable groups were identified through interviews with local headmen and community representatives. These include elderly residents, women-headed households, individuals with disabilities, and persons in need of continuous care. The largest vulnerable groups identified in the 11 neighborhoods surveyed were people in need of charity and women-headed households. According to key informant and focus group interviews, the total number of vulnerable individuals in these neighborhoods is 1,192—representing approximately 2% of the population covered in the field study.

Potential socio-economic impacts of the Project include temporary disruptions to access roads, agricultural activities, and public infrastructure during construction. Although large-scale displacement is not expected, households engaged in livestock activities may face longer-term impacts due to reduced access to pasturelands.

To mitigate these risks, a set of measures will be implemented, including timely and fair compensation for land acquisition, support for livelihood restoration, infrastructure rehabilitation, and

continued engagement with affected communities. Special attention will be given to vulnerable groups to ensure that they receive adequate and equitable support throughout Project implementation.

With the effective application of these mitigation strategies and the Project's broader social management plans, the socio-economic impacts of the Antalya–Alanya Motorway are expected to be minimized and managed in a fair, inclusive, and sustainable manner.

XV. COMMUNITY HEALTH AND SAFETY

The Project entails community health and safety risks common to large-scale infrastructure projects. During the construction phase, impacts will include dust, noise, vibration from machinery, and a significant increase in traffic due to construction vehicles. These impacts are expected to be short-term and can be effectively managed with good environmental and social practices. In the operation phase, risks such as pedestrian and traffic safety, emergency preparedness, and exposure to air and noise pollution will need to be carefully monitored.

Construction activities may lead to disturbances from blasting operations, material transport, and temporary traffic diversions, particularly in settlements close to the route. The behavior and training of machinery operators and truck drivers will be critical for mitigating accident risks. Additionally, noise and vibration generated by construction activities, especially in dry periods, may pose temporary disturbances for nearby residents.

Health risks related to communicable or airborne diseases are considered limited, as most construction workers will be housed in campsites with adequate sanitation, waste management, and food services. Campsites will be located away from sensitive areas and equipped to accommodate the incoming workforce. Public health concerns from wastewater generated at these campsites will be mitigated by on-site treatment facilities and permitted discharges into water bodies not used for drinking.

The influx of construction labor may increase pressure on local services and raise concerns about gender-based violence and harassment. Preventive measures include code of conduct training for workers and restricted access policies for work zones and campsites. Security personnel hired for the Project will be unarmed and subject to behavioral screening, monitoring, and training to prevent misconduct.

During the operation phase, the motorway is expected to carry a substantial volume of vehicles, including heavy trucks, increasing traffic-related risks. However, improved road standards are anticipated to enhance overall traffic safety. Structural integrity of engineering works, pedestrian infrastructure, and emergency response mechanisms will be prioritized to ensure safety for road users and communities along the corridor.

Emergency preparedness has been addressed through a dedicated plan covering events such as fires, accidents, geotechnical issues, and natural disasters. With proper implementation, emergency events can be contained without significant offsite impacts.

Ultimately, community health and safety risks associated with the Project can be minimized through effective planning, adherence to mitigation measures, and proactive engagement with stakeholders. Continuous monitoring and response protocols will ensure that both construction and operational risks are managed in line with international standards.

XVI. LABOR AND WORKING CONDITIONS

The implementation of Project will require a considerable workforce throughout its construction phase, with anticipated labor demands to be met through both local and non-local recruitment. The workforce will include direct employees, contracted workers, and third-party service providers. Given the size and duration of the Project, ensuring fair labor practices and adequate working conditions is a priority.

Labor and working conditions associated with the Project have been assessed in accordance with Turkish national labor laws and international standards, including the IFC Performance Standard 2 on Labor and Working Conditions and the International Labor Organization (ILO) conventions ratified by Türkiye. These frameworks guide labor-related practices to promote decent work, equal opportunity, non-discrimination, and health and safety in the workplace.

During the construction period, employment generation will be one of the primary socio-economic benefits. The Project is expected to employ a significant number of workers through the main contractor and its subcontractors. While many employment opportunities are likely to benefit the local population, some technical and managerial roles may require workers from outside the project region. Measures will be taken to ensure the fair and transparent recruitment of both local and non-local workers, including subcontracted labor.

Key considerations in managing labor and working conditions for the Project include compliance with applicable national employment legislation, ensuring timely and fair payment of wages, provision of contracts and working hour regulations, and addressing occupational health and safety requirements. Additionally, the Project will enforce regulations prohibiting child labor and forced labor in any form.

Workers will be housed in accommodation facilities that comply with Turkish regulations and international standards, with attention to hygiene, space, privacy, safety, and access to basic services. Particular focus will be given to preventing any discrimination or harassment within worker camps and ensuring equitable treatment across the workforce.

The Project will establish a formal Grievance Mechanism (GM) for workers. This will allow all employees, including subcontracted and temporary workers, to raise concerns confidentially and without fear of retaliation. The GM will be clearly communicated to all workers upon induction and will be accessible in a culturally appropriate and understandable format.

To ensure effective implementation of labor-related commitments, a Human Resources and Labor Management Plan has been developed. This document outlines responsibilities, monitoring indicators, training requirements, and reporting mechanisms to manage employment practices throughout the life of the Project. Labor-related commitments also include compliance monitoring, third-party audits, and mechanisms for continuous improvement in labor practices.

Occupational Health and Safety (OHS) is a central component of the labor management approach. The Project commits to identifying potential risks associated with construction activities—such as those arising from equipment use, excavation, transportation, and working at heights—and mitigating them through training, personal protective equipment, signage, and supervision. Safety briefings and toolbox talks will be conducted regularly, and workers will be trained in emergency response procedures and first aid.

In addition to standard OHS practices, the Project will implement proactive measures to reduce the risks of communicable diseases, particularly in worker accommodation camps. Preventive health services, including routine health checks and awareness-raising campaigns, will be established to maintain workforce well-being.

Efforts will be made to support gender equality and inclusion within the labor force. While the construction sector typically presents gender imbalances, the Project will promote equal opportunity through gender-sensitive recruitment and address specific needs such as women’s access to sanitary facilities and grievance mechanisms.

In summary, the Project will create a substantial number of employment opportunities. Through a comprehensive labor management approach aligned with both national and international requirements, the Project aims to foster fair, safe, and respectful working environments for all workers involved.

XVII. CUMULATIVE IMPACT ASSESSMENT

Cumulative impacts are defined as the “impacts 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.” Several stand-alone developments with individually minor impacts may together result in significant cumulative effects.

Cumulative Impact Assessment (CIA) is defined by the IFC as the process of analyzing the potential impacts and risks of proposed developments in the context of other human activities and environmental or social drivers, focusing on Valued Ecosystem Components (VECs)—environmental and social attributes considered important for assessing risks. The CIA also proposes mitigation strategies to avoid or reduce such impacts over time.

In accordance with the methodology specified in IFC’s CIA Good Practice Handbook, the main steps of the Cumulative Impact Assessment to be done for the Project comprised;

- 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

VECs were identified based on the environmental and social baseline established in the ESIA. These include physical features, habitats, and wildlife populations (such as biodiversity), ecosystem services, natural processes like water and nutrient cycles or microclimate regulation, social conditions including health and economic activity, and cultural elements such as traditional spiritual practices. To assess potential cumulative impacts on these components, a 10-kilometer-wide corridor (5 km on each side of the motorway axis) was defined, providing sufficient coverage to capture the spatial extent of both direct and indirect influences from regional infrastructure projects.

A review of other existing, planned, or reasonably foreseeable developments within this corridor was conducted to identify interactions with the Antalya–Alanya Motorway Project. The key developments identified include the Manavgat–Antalya–Anamur Natural Gas Pipeline, which is currently in the design phase, and two operational energy transmission lines: the Kasımlar Hydroelectric Power Plant Electricity Transmission Line (ETL) and the Varsak–Serik–Belek ETL. Of these, only the natural gas pipeline is expected to overlap with the Motorway in both location and construction timing, creating the potential for cumulative effects.

Baseline information for each VEC was established from the ESIA studies, encompassing current ecological conditions, land use distribution, water resource availability, air quality, socio-economic indicators, and cultural heritage sensitivity. These baseline conditions formed the reference point against which cumulative changes could be evaluated.

The assessment found that the cumulative impact potential of the Project in combination with nearby developments is generally low. This conclusion is primarily due to the limited number of overlapping projects and the manageable scale of the identified interactions. Specifically, the only potential overlap of concern is with the Manavgat–Antalya–Anamur Natural Gas Pipeline, which may exert localized pressure on land use and ecological resources during construction. No significant cumulative interactions were found with the operational energy transmission lines, given their limited physical footprint and differing environmental profiles.

In conclusion, cumulative impacts associated with the Project are expected to remain limited and manageable under current development scenarios. Continued coordination with local authorities, close monitoring of regional project developments, and the effective implementation of environmental and social mitigation measures will be essential to maintaining this outcome. Through ongoing

stakeholder engagement and adaptive management, the Project is committed to ensuring that cumulative effects are addressed proactively and that its contribution to regional infrastructure remains sustainable and responsible.

XVIII. ANALYSIS OF ALTERNATIVES

In line with national environmental legislation and international environmental and social assessment standards, the Project includes a thorough evaluation of alternatives. The assessment considered several scenarios including the “No Project” case, alignment alternatives, construction methodologies, and technical options, all with the goal of minimizing environmental and social impacts while meeting regional transportation needs.

The “No Project” scenario was evaluated as a baseline alternative to understand the potential implications of not proceeding with the motorway. Under this scenario, existing road infrastructure between Antalya and Alanya would continue to serve increasing traffic volumes, leading to higher congestion, accident risks, greenhouse gas emissions, and travel time delays. The analysis demonstrated that the current D400 state road is already under significant stress, especially during peak tourism seasons. Thus, not implementing the Project would have long-term negative consequences on regional connectivity, economic development, road safety, and environmental quality due to traffic-induced emissions and land-use inefficiencies.

The Project is part of the broader Afyonkarahisar–Antalya–Alanya Motorway development and is designed to enhance regional connectivity across the Serik, Manavgat, and Alanya districts of Antalya Province. The route selection and design process have evolved through a comprehensive, multi-phase assessment, incorporating technical, economic, social, and environmental considerations. The overall objective has been to determine the most viable route while minimizing impacts on communities and sensitive areas.

Route selection for the Project was conducted in three stages. The first stage involved initial alignment planning by the KGM during the feasibility and tender process. This phase evaluated alternatives based on a range of environmental, technical, and socio-economic criteria. The following considerations were taken into account, provided they conformed to the required geometric and physical standards of a motorway:

- 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.

Following the awarding of the BOT contract, the Project Sponsor undertook a second stage of refinement. This phase involved optimizing the alignment and engineering structures such as viaducts,

interchanges, culverts, and underpasses to ensure technical feasibility, cost-efficiency, and environmental compatibility. Realignments were made in response to site-specific constraints such as licensed mining areas, cultural heritage sites, and overlapping zoning boundaries. This iterative process was supported by field surveys, geotechnical evaluations, and consultations with relevant authorities.

A third stage of alignment evaluation is ongoing and will continue throughout the construction phase. Adjustments may be made in response to new findings, particularly cultural heritage discoveries. To manage this, a Project archaeologist has been appointed to supervise construction activities in sensitive areas. A comprehensive archaeological field survey will be completed before major land preparation begins. Any proposed route changes at this stage must receive formal approval from KGM, ensuring consistency with regulatory and technical standards.

In addition to route alignment, the motorway's design parameters have been optimized. The Project conforms to both Turkish and international engineering standards, featuring a dual carriageway configuration of 2x3 lanes on the main route and 2x2 lanes on access roads. The design speeds are set at 140 km/h for the main motorway and 110 km/h for the access roads. Engineering solutions such as viaducts, bridges, overpasses, and tunnels were incorporated to accommodate challenging topography and reduce land take and disruption in sensitive areas.

The comprehensive evaluation of alternatives—encompassing environmental, technical, and socio-economic dimensions—has significantly contributed to impact minimization and Project sustainability. Through the integration of stakeholder feedback, field-based data, and expert assessments, the Project's final design achieves a balanced outcome that supports national infrastructure goals while mitigating adverse effects. This strategic and flexible approach will continue through construction, enabling adaptive management as new information becomes available.

XIX. PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT ACTIVITIES

The stakeholder engagement process for the Project has been carefully designed to ensure that affected communities, local authorities, and other relevant institutions are continuously informed and consulted throughout the ESIA process. This process has been conducted in alignment with Turkish regulatory requirements as well as international standards, particularly those outlined in the IFC Performance Standards and the World Bank Environmental and Social Framework. The overall engagement strategy aims to ensure transparency, foster inclusive participation, and address stakeholder concerns and expectations in a timely and responsive manner.

Engagement activities began at the early stages of Project development and continued throughout the preparation of the ESIA. These efforts encompassed a wide array of methods including site visits, formal consultation meetings, key informant interviews, and focus group discussions, as well as one-on-one dialogues with public officials and community representatives. Special emphasis was placed on identifying and involving vulnerable populations, and gender-sensitive approaches were adopted to promote equitable participation from all stakeholder groups.

The first round of engagement activities was initiated in March 2016, when the Project team contacted the Antalya Provincial Directorate of Environment and Urbanization, as well as district-level municipalities and governorships, to coordinate stakeholder engagement as part of the national EIA process. In this context, three Public Participation Meetings were organized and held on April 7, 2016, in Ekşili (Döşemealtı District), Çıplaklı (Alanya District), and Manavgat. These meetings were publicly announced through national and local newspapers and provided a platform for stakeholders to learn about the Project and voice their views on anticipated environmental and social impacts.

As the ESIA process progressed, a more targeted consultation strategy was implemented. Eleven neighborhoods situated along the proposed motorway route were selected based on their proximity to the alignment and their likelihood of being affected by the construction and land acquisition activities. Between June 3rd and June 6th, 2024, key informant interviews and focus group meetings were held in these settlements. The sessions took place in local venues such as muhtar offices and village halls and involved a broad cross-section of the community, including women, youth, farmers, and elderly residents.

During these sessions, several recurring themes emerged. Chief among the concerns were the potential loss of access to pastureland, disruption of agricultural and livestock-based livelihoods, dust and noise pollution, and safety risks, particularly for children and the elderly. Participants also expressed uncertainty around compensation procedures and the timeline of expropriation. On the other hand, many residents expressed optimism that the new motorway would improve access to services, reduce travel times, and enhance local and regional economic opportunities.

To better understand the differentiated needs and concerns of community members, separate focus group discussions were held specifically for women in selected locations. Topics raised in these meetings included disruptions to household routines, access to healthcare and education, and personal safety during construction. Vulnerable groups—such as elderly residents, persons with disabilities, and individuals reliant on social assistance—were identified through muhtar consultations and community feedback and were actively considered in the development of mitigation strategies.

A more comprehensive program of Public Consultation Meetings (PCMs) was initially scheduled for December 2024. 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. As part of the Antalya–Alanya Motorway Project ESIA studies, a total of four PCMs are planned along the corridor, covering areas from the Serik district to the Alanya district. The selected meeting locations are Merkez (Serik), Ulukapı (Manavgat), Karakaya (Manavgat), and Konaklı (Alanya). 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.

In parallel, a series of additional PCMs will be held during the formal ESIA disclosure phase. These events will also take place at key points along the motorway alignment, with the same locations identified. The scheduling of these meetings will depend on progress in land acquisition activities to ensure that they are timely and effective. During these sessions, stakeholders will be informed of the findings of the ESIA, the planned environmental and social management measures, and the engagement mechanisms available during construction.

To ensure transparency and outreach, the meetings will be publicized through local newspapers and coordinated with district and provincial administrations. Mukhtars of all neighborhoods within a 4-kilometer corridor (2 kilometers on each side of the motorway axis) will be contacted directly. A Project Information Brochure summarizing the ESIA findings and proposed mitigation actions will be distributed in advance to facilitate informed participation. Each PCM will be thoroughly documented, including participant lists, meeting minutes, and summaries of key issues discussed.

Overall, feedback gathered during the various consultation stages has played a key role in shaping the final ESIA Report and the development of appropriate mitigation measures. Requests for infrastructure such as animal underpasses, pedestrian crossings, and noise barriers were considered and incorporated into preliminary engineering designs where technically feasible. Similarly, stakeholder input helped to identify location-specific issues that guided the development of targeted environmental and social measures.

To maintain ongoing communication, a Stakeholder Engagement Plan (SEP) has been developed for the Project. This plan establishes procedures for continued engagement, defines roles and responsibilities, and provides a roadmap for future consultation activities throughout the construction and operational phases. The SEP also outlines the Grievance Mechanism to be implemented, which enables all stakeholders to lodge complaints or provide feedback through accessible, transparent, and confidential channels.

In conclusion, the stakeholder engagement and public consultation process for the Antalya–Alanya Motorway Project reflects best practices in participatory planning and inclusive communication. From the early national EIA consultations to focused fieldwork during ESIA preparation and the forthcoming disclosure events, stakeholder voices have been actively considered in shaping Project design and mitigation strategies. Continued dialogue and accountability will remain essential throughout the Project lifecycle, ensuring that community needs and environmental concerns are addressed with transparency and respect.

XX. ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

The Environmental and Social Management System (ESMS) developed for the Project establishes a comprehensive framework for managing environmental, social, occupational health and safety, and community health and safety risks throughout the entire project lifecycle. The system has been designed in accordance with Turkish regulatory requirements and aligned with international best practices, particularly those outlined in the IFC Performance Standards, Equator Principles, and the World Bank Environmental and Social Framework.

The ESMS builds on the findings of the ESIA and translates the assessment results into actionable management tools through the ESMP. The ESMP functions as the cornerstone of the Project's environmental and social performance and integrates detailed procedures, mitigation measures, and monitoring systems to ensure compliance and sustainability during construction.

Central to the ESMS is the development of topic-specific environmental and social management sub-plans. These plans provide detailed guidance tailored to the specific activities and risks associated with the Project and are consistent with the overarching ESMP framework:

- Air Quality and Emissions Management Plan
- Construction Camp Site Management Plan
- Change Management Plan
- Community Health and Safety Management Plan
- Hazardous Materials Management Plan
- Human Resources and Labor Management Plan
- Noise and Vibration Management Plan
- Occupational Health and Safety Management Plan
- Security Management Plan
- Solid Waste Management Plan
- Environmental Accident and Spill Response Management Plan
- Sub-contractor Management Plan
- Traffic Management Plan
- Training and Communication Management Plan
- Water Quality, Wastewater and Storm Water Management Plan

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-6 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 (SEP), including the Grievance Mechanism,
    - Resettlement Action Plan and a Livelihood Restoration Plan (or a Land Acquisition, Compensation, and Resettlement Plan that covers both)
    - Chance Find Procedure.

In addition, an Emergency Preparedness and Response Plan was prepared as part of the ESIA Report and is submitted as an annex to the ESIA.

Each of these plans outlines specific objectives, responsibilities, mitigation and monitoring requirements, and indicators to measure compliance. The ESMP includes not only environmental controls but also social safeguard mechanisms, labor and working condition protocols, stakeholder engagement provisions, and emergency preparedness strategies. For example, plans related to health and safety detail measures for risk prevention, use of protective equipment, incident response procedures, and continuous training for workers and subcontractors.

The implementation of the ESMS will be overseen by the Environmental and Social Interaction Department of the Project Sponsor, AAOİAŞ. This department holds responsibility for coordinating day-to-day ESMP activities, delivering internal and external trainings, managing contractor performance, and ensuring overall compliance with ESIA commitments. The ESMS mandates adequate allocation of human and financial resources to support the execution of all mitigation and monitoring tasks.

Clear lines of responsibility have been defined for all stakeholders involved in the Project. Contractors and subcontractors are required to adhere to the same environmental and social standards as AAOİAŞ and will be subject to regular monitoring and audits. Compliance will be ensured through contractual obligations and documented through monthly reporting templates, checklists, and inspection forms designed in line with ESMP requirements.

To track the effectiveness of the ESMS, a structured Environmental and Social Monitoring Plan (ESMP) has been integrated into the system. This plan outlines both internal and third-party monitoring procedures for each impact category. Internal monitoring will be conducted by the ESIA Consultant and AAOİAŞ teams through regular site inspections, audits, and progress reports. External monitoring will be undertaken by an Independent Environmental and Social Monitoring Consultant (IESMC), who will review implementation progress and compliance with national legislation and international environmental and social standards.

Monitoring data will be consolidated in semi-annual ESMP performance review reports, which will be shared with relevant authorities, lenders, and stakeholders. These reports will include environmental indicators (e.g., emissions, waste generation), social indicators (e.g., grievances, community engagement outcomes), and occupational health and safety metrics (e.g., incidents, trainings completed). Corrective and preventive actions will be developed where necessary, and their implementation tracked in follow-up monitoring cycles.

The ESMS also establishes a dynamic revision process, allowing for adaptive management in response to evolving project conditions. Revisions may be triggered by design modifications, regulatory updates, or unforeseen environmental or social issues. All updates to the ESMS will be recorded and submitted to the Lenders for review, and the revised measures will be communicated across all implementation levels.

Stakeholder engagement and grievance redress are embedded into the ESMS structure. The SEP ensures that community feedback is continuously gathered and integrated, while the Grievance

Mechanism enables all stakeholders—including workers and local residents—to raise concerns through accessible, transparent, and confidential channels. Grievances will be acknowledged, investigated, and resolved in a timely manner, with periodic summaries disclosed as part of the Project's commitment to accountability.

Toward the end of the BOT contract period, the Project Sponsor will support the KGM in preparing to assume long-term operational responsibility. This will include the transfer of monitoring data, capacity-building for KGM personnel, and a handover strategy that maintains environmental and social performance standards.

In conclusion, the Environmental and Social Management System for the Project provides a robust and structured framework for ensuring environmental and social sustainability. By establishing clear procedures, defined roles, transparent monitoring, and responsive engagement, the ESMS supports the Project's long-term success and alignment with national and international commitments. Through its diligent application, the Project aims to mitigate adverse impacts, promote responsible development, and protect the wellbeing of communities and ecosystems along the motorway corridor.