REPUBLIC OF TURKEY
MINISTRY OF TRANSPORT
AND INFRASTRUCTURE

AYGM
Altyapı Yatırımları Genel Müdürlüğü

ÇINAR®
ENGINEERING
CONSULTANCY INC.

Istanbul North Rail Crossing Project (INRAIL)
Inception Report
CNR-RP-INRAIL-INC-001
July 2025
Final

Official Use Only

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DOCUMENT REVISION HISTORY

Rev.	Date	Prepared by	Checked by	Approved by	Description
00	21.04.2025	Ali YILMAZ Serkan MURATLI Özge ÇELİK Furkan ÖZBAŞ	Ayşe CANBAZ AKKURT İlksen ÖZÇAKMAK	Ayşe CANBAZ AKKURT	Draft
01	30.04.2025	İlksen ÖZÇAKMAK Ali YILMAZ	Ali YILMAZ Ayşe CANBAZ AKKURT	Ayşe CANBAZ AKKURT	First Revision
02	05.06.2025	Ali YILMAZ	Ali YILMAZ	Ayşe CANBAZ AKKURT	Second Revision
03	27.06.2025	Ali YILMAZ	Ali YILMAZ	Ayşe CANBAZ AKKURT	Third Revision
04	07.07.2025	Özge ÇELİK	İlksen ÖZÇAKMAK	Ayşe CANBAZ AKKURT	Fourth Revision
05	08.07.2025	Özge ÇELİK	İlksen ÖZÇAKMAK	Ayşe CANBAZ AKKURT	Fifth Revision

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ABBREVIATIONS

ABPRS	Address Based Population Registration System
AFAD	Disaster and Emergency Management Presidency
AIIB	Asian Infrastructure Investment Bank
ATP	Automatic Train Protection
AYGM	Directorate-General of Infrastructure Investments
BGR	Federal Institute for Geosciences and Natural Resources (Bundesanstalt für Geowissenschaften und Rohstoffe)
CHIA	Cultural Heritage Impact Assessment
CHMP	Cultural Heritage Management Plan
CHS	Community Health and Safety
CHSMP	Community Health and Safety Management Plan
CIMP	Construction Impact Management Plan
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CLS	Community Level Survey
cm	centimeter
D+B	Design-Build
DKMP	General Directorate of Nature Conservation and National Parks
DSİ	General Directorate of State Hydraulic Works
DVIG	Disadvantaged/Vulnerable Individuals or Groups
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
e-ÇED	Online EIA Process Management System
EHS	Environmental, Health, and Safety
EHSG	Environmental, Health, and Safety Guideline
EIA	Environmental Impact Assessment
EPA	U.S. Environmental Protection Agency
EPFI	Equator Principles Financial Institutions
ERMTS	European Rail Traffic Management System
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
ETCS	European Train Control System
ETL	Energy Transmission Line
EU	European Union
Eurostat	European Statistics Office
GBV	Gender-Based Violence
GDP	Gross Domestic Product
GIIP	Good International Industry Practice
GIS	Geographic Information System
IAH	International Association of Hydrogeologists
IEMA	Institute of Environmental Management and Assessment
IFC	International Finance Corporation
IHME	International Hydrogeological Map of Europe
ILO	International Labor Organization
IMM	Istanbul Metropolitan Municipality
INRAIL (or "Project")	Istanbul North Rail Crossing Project
IsDB	Islamic Development Bank
İSKİ	Istanbul Water and Sewerage Administration
ISTKA	Istanbul Development Agency
IUCN	International Union for Conservation of Nature and Natural Resources
km	kilometer
KP	Kilometer point

LMP	Labor Management Procedures
m	meter
MARKA	Eastern Marmara Development Agency
mg	milligram
ml	milliliters
MoEUCC	Ministry of Environment, Urbanization, and Climate Change
MoTI	Ministry of Transport and Infrastructure
MTA	General Directorate of Mineral Research and Exploration
NATM	New Austrian Tunneling Method
NCD	Non-Communicable Diseases
NGO	Non-Governmental Organizations
NPAA	National Programmes for the Adoption of the European Union Acquis
NUTS	The Nomenclature of Territorial Units for Statistics
OHS	Occupational Health and Safety
OIP	Other Interested Parties
PAP	Project-Affected Parties
PGA	Peak Ground Acceleration
PIU	Project Implementation Unit
PPP	Purchasing Power Parity
RF	Resettlement Framework
RICAP	Regulation on Control of Industrial Air Pollution (27277)
RP	Resettlement Plan
SEA/SH	Sexual exploitation, abuse, and harassment
SEP	Stakeholder Engagement Plan
SNH	Scottish Natural Heritage
TBM	Tunnel Boring Machine
TCFD	Task Force on Climate-related Financial Disclosures
ToR	Terms of Reference
TÜRKAK	Turkish Accreditation Agency
UK	United Kingdom
UN	United Nations
UNGP	UN Guiding Principles on Business and Human Rights
USD	United States Dollar
WB	World Bank
WBG	World Bank Group
WDA	Wildlife Development Area
YSS	Yavuz Sultan Selim

1 INTRODUCTION

1.1 Project Background

Türkiye achieved impressive economic growth (5.4% annually) and significant poverty reduction between 2003 and 2023, outperforming comparable upper-middle-income countries. Poverty rates dropped markedly—from over 20% in 2007 to under 10% by 2021. However, future growth is projected to slow to an average of 3.3% annually between 2023 and 2029, which is lower than Türkiye's historical performance and the expected growth rates of its peers (excluding South Africa). To maintain progress, Türkiye must increase productivity, which has contributed less to growth in recent years than it did in the past.

Boosting productivity can be achieved through trade-oriented investments in logistics. Turkish firms involved in exports or global value chains are more productive. Türkiye's strategic location enhances its role in global logistics, with plans to become a logistics hub in the Trans-Caspian Middle Corridor and develop new rail routes. This will support low-carbon, multimodal logistics, aligning with Türkiye's 2053 net-zero goal.

As part of this vision, Türkiye is prioritizing rail infrastructure investments along the Middle Corridor to improve cross-border connectivity. Key upgrades are being made at outdated border crossings, such as the Halkalı–Kapıkule line to the European Union (EU), funded by the EU, Asian Infrastructure Investment Bank (AIIB), and the European Bank for Reconstruction and Development (EBRD). The Divriği–Kars–Georgia line, connecting to the South Caucasus, is being upgraded with financing from the World Bank (WB), Islamic Development Bank (IsDB), and AIIB. This section is the most capacity-constrained in the Middle Corridor, making its modernization a priority.

With rail capacity improvements at both ends of the Middle Corridor, the Bosphorus crossing in Istanbul is the next major bottleneck. Currently, rail traffic can only pass through the Marmaray tunnel, but freight trains are restricted to a limited nighttime window, severely limiting capacity and maintenance time. These limitations are affecting both operational capacity and long-term sustainability.

The only alternative to the Marmaray tunnel for freight is an inefficient and costly rail-to-truck transfer across the Bosphorus, reducing Istanbul's logistics efficiency and making the Türkiye route of the Middle Corridor less competitive than the Black Sea alternative. For passenger transport, an alternative crossing would improve operational resilience, enhance urban mobility, and expand high-speed rail access to underserved parts of Istanbul, including both airports.

A new high-capacity rail crossing of the Bosphorus has become Türkiye's strategic priority. This project will complete the Middle Corridor's uninterrupted rail connection across Türkiye, reinforcing its role as a global trade hub. It will benefit other major trade routes, including the Iraq Development Road and Türkiye's exports to the EU. The project will also reduce congestion, cut emissions, lower road wear, and improve safety by shifting freight from trucks to rail.

The Turkish government plans to build a 122-km greenfield railway bypass around Istanbul, connecting Çayırova (Asian side) to Çatalca (European side) via the Yavuz Sultan Selim Bridge. This electrified, mixed-use line will serve both passenger (up to 160 km/h) and freight (80–120 km/h) trains, linking to the national high-speed rail network. It will offer direct connections to Sabiha Gökçen and İstanbul airports, enhancing urban mobility and multimodal logistics, with air-to-rail freight transfers. The two airports will be the only stations on the bypass.

The transformative rail link is planned to be constructed within the next 6–7 years, and operations expected to begin by mid-2032.

1.2 Project Description

The Istanbul North Rail Crossing (INRAIL) Project ("Project") is a strategic infrastructure initiative aimed at establishing a high-capacity, heavy-duty overland railway connection between the European and Asian sides of Istanbul. By addressing a critical gap in the national railway network, the project is expected to significantly enhance Türkiye's intercontinental rail connectivity and overall logistics efficiency.

The Project involves the construction of a 122-kilometer greenfield dual-track railway line, along with full electrification and advanced signaling systems. The alignment runs from Çayırova Station on the Asian side to Çatalca Station on the European side, crossing the Bosphorus via the Yavuz Sultan Selim Bridge, where space has been pre-designated for rail use.

In addition, the project includes high-standard rail connections to Istanbul Airport (on the European side) and Sabiha Gökçen Airport (on the Asian side). It is being implemented by the Directorate-General of Infrastructure Investments (AYGM) under the Ministry of Transport and Infrastructure (MoTI) of the Republic of Türkiye.

1.2.1 Purpose of the Project

The INRAIL Project aims to strengthen Türkiye's role as a regional logistics hub by investing in strategic railway infrastructure along the Trans-Caspian Middle Corridor. One of the Project's key priorities is to address growing freight and passenger bottlenecks by establishing a high-capacity rail connection across the Bosphorus via the Yavuz Sultan Selim Bridge, linking Istanbul Airport and Sabiha Gökçen Airport — Türkiye's busiest air transport hubs. The Project also aims to enhance urban mobility, reduce emissions from road transport, reinforce intercontinental connectivity, and support Türkiye's long-term economic and climate goals.

1.2.2 Project Location

INRAIL will be located on both the Asian and European sides of Istanbul. The railway line will begin near Çayırova Station in Kocaeli Province (Asian side) and extend westward to Çatalca Station in Istanbul Province (European side). The location map of the Project is given in Figure 1-1 and a 1/125,000 scale topographic map showing the Project Area and its surroundings are given in Figure 1-2 (Please also see Appendix-1).

Figure 1-1 Location Map of the Project

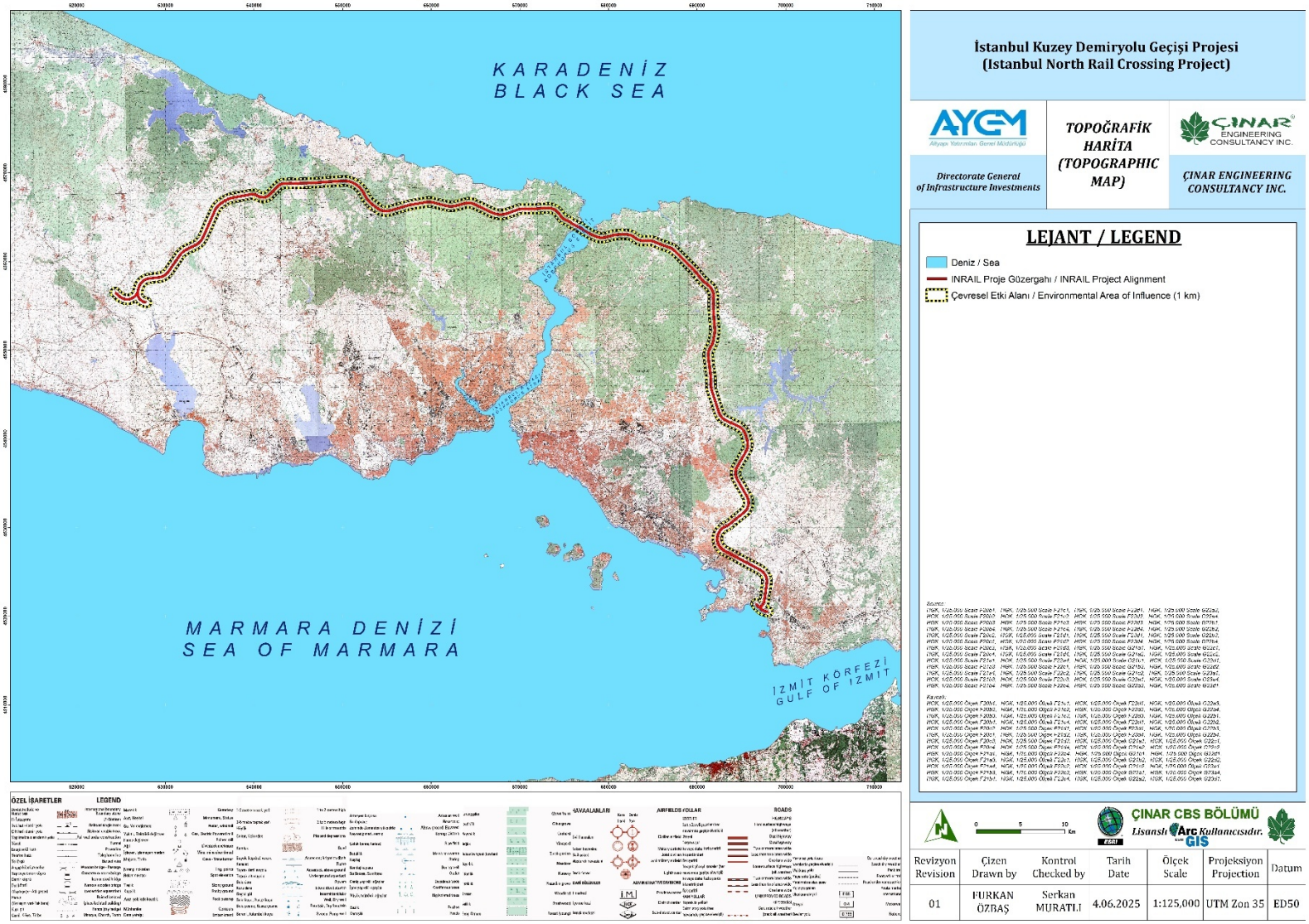

Figure 1-2 Topographic Map of the Project Area

1.2.3 Technical Specifications of the Project

The railway line, with a total length of 122 kilometers, branches off the Marmaray Line at the Çayırova location, passes by Sabiha Gökçen Airport, turns north after the airport, crosses the Bosphorus via the Yavuz Sultan Selim Bridge, reaches Istanbul Airport, and finally connects to the Halkalı-Kapıkule Line at Çatalca on the European side.

The construction of the line is divided into three main sections:

- Section 1 starts from Gebze (Çayırova), passes through Sabiha Gökçen Airport Station, and continues up to Km: 38+330. Including the Çayırova connection, the total length of this section is 40.158 kilometers.
- Section 2 begins at Km: 38+330, passes over the YSS Bridge, and ends approximately 12 kilometers before reaching Istanbul Airport. This section is 40.802 kilometers long.
- Section 3 begins at Km: 19+540, enters Istanbul Airport Station at Km:31+420, and continues to Km: 28+242.92 at Çatalca Connection-1. Including Çatalca Connection-2, the total length of this section is 41.093 kilometers.

To minimize environmental and social (E&S) impacts along the alignment, various engineering structures are planned. List of engineering structures and their properties are summarized in Table 1-1.

Table 1-1 Engineering Structures List

Name of Structure	Number	Length (km)
Total Tunnel	29	49.43
Tunnel Boring Machine (TBM) Tunnel	3	17.84
New Austrian Tunneling Method (NATM) Tunnel	26	31.59
Bridge	43	22.44
Cut-and-Cover Tunnel	19	4.92
Underpass / Overpass	26	-
Culvert	49	-

For electrification, three transformer centers with a capacity of 154/25 kV each will be constructed. In terms of signaling systems, ERTMS/ETCS/ATP Level 1-2 automatic train protection and control systems will be installed.

1.2.4 Auxiliary Facilities

"Auxiliary Facilities" refer to the supporting infrastructure necessary for the effective implementation and operation of the Project. These facilities ensure that construction, maintenance, and energy transmission processes function efficiently. The auxiliary facilities of the Project include:

- Construction Sites, and
- Energy Transmission Lines (ETLs)

Multiple construction sites can be established for the Project to host temporary facilities such as storage areas, concrete plants, and staff accommodations. These sites will also support vehicle and equipment maintenance. Their exact number and locations are not yet determined and will be selected by the future contractor, ensuring they are not placed in environmentally protected areas like agricultural lands, wetlands, or water reservoirs.

ETLs will be used to transmit electricity generated by the facility to the national grid. The projects and routes of the ETL lines have not yet been finalized as of the date of this report.

1.2.5 Project Lifespan and Labor Demands

The INRAIL Project is planned to be implemented over an estimated period of 6 to 7 years, with construction activities expected to commence in the near term and operations targeted to begin by mid-2032. The Project's implementation will require a significant labor force across multiple

phases, including planning, construction, and operations.

During both the construction and operation phases, the Project will employ a large number of workers including:

- Direct workers, employed by the implementing agency and contractors;
- Contracted workers, engaged through third-party construction and service providers;
- Primary supply workers, involved in the provision of key materials and equipment for the Project.

In line with national legislation and international standards, the Project will adhere to Türkiye's labor laws and relevant International Labour Organization (ILO) conventions, to which Türkiye is a party. These include key provisions on:

- Non-discrimination and equal opportunity in employment,
- Freedom of association and the right to collective bargaining,
- Prohibition of child labor and forced labor,
- Minimum working age and wage regulations,
- Occupational health and safety (OHS) standards and measures,
- Grievance and dispute resolution mechanisms.

Risks related to child or forced labor are not expected in this Project. However, the Draft Environmental and Social Impact Assessment (ESIA) will further evaluate labor-related risks such as potential violations of equal opportunity, discriminations, gender-based violence (GBV), or harassment in the workplace. Mitigation measures and monitoring systems will be proposed accordingly.

A Labor Management Procedure (LMP) will be developed in accordance with both Turkish labor law and internationally recognized standards, including the World Bank's Environmental and Social Framework (ESF). This will provide a comprehensive framework to manage labor-related risks and obligations during the Project lifecycle.

OHS considerations will be integrated into the Draft ESIA and Draft Environmental and Social Management Plan (ESMP). These concerns will be further addressed by the Design + Build (D+B) Contractor(s) through Final ESIA and Final ESMP and sub-management plans, ensuring alignment with both national regulations and World Bank guidelines. The OHS risk assessment will cover both construction and operational phases of the Project.

Subsequently, the D+B Contractor(s) will be responsible for preparing a site-specific Contractor ESMP (C-ESMP). This plan will address the particular OHS risks, as well as the broader E&S impacts, associated with both the pre-construction and construction phases of the Project. Commencement of any physical site activities will be contingent upon the finalization and formal approval of this document. No on-site work shall begin prior to the completion of this process.

The operation phase will also require a smaller but stable workforce for rail operations, maintenance, and monitoring activities. Employment opportunities during this phase will contribute to local economic development, particularly in Istanbul and surrounding regions.

1.2.6 Project Alternatives

The alternatives evaluated under the Project are listed in this section.

1.2.6.1 No-Project Alternative

The "no-project" scenario was considered as a baseline. Under this alternative, freight and passenger trains would continue to rely on the Marmaray tunnel as the only Bosphorus rail crossing. This would maintain current operational limitations, including:

- Severe restrictions on freight movement due to limited night-time access,
- Reduced tunnel availability for maintenance, risking long-term infrastructure sustainability,

- Continued reliance on inefficient and polluting rail-to-truck transshipment for freight,
- Persisting urban congestion and high road maintenance costs in Istanbul,
- Missed opportunities for multimodal logistics and improved air-to-rail connectivity.

Given these constraints, the no-project alternative would undermine Türkiye's ambitions to enhance rail-based freight and passenger transport and its role as a logistics hub within the Middle Corridor.

1.2.6.2 Route Alignment Alternatives

As part of the alignment planning process, several key route options were explored to optimize the operational, economic, and environmental efficiency of the proposed railway bypass. In particular, the placement of station nodes near Istanbul's two major airports-Sabiha Gökçen and Istanbul Airport—was analyzed in depth. Both airports will be operational for both passenger and freight services.

a. **Sabiha Gökçen Airport Station Alternatives:** Three alternatives were considered for the Sabiha Gökçen Airport connection:

   Alternative 1: Construction of a station near Viaport Shopping Mall, with passenger transfers to the airport via dedicated road-based shuttle services, and provisions for freight transport as well.

   Alternative 2: Construction of a station near Viaport Mall, with an additional metro line providing a direct rail link between the station and Sabiha Gökçen Airport, along with provisions for freight transport connectivity.

   Alternative 3: Direct integration of the INRAIL alignment with Sabiha Gökçen Airport, by routing the railway beneath the terminal and establishing a station within the airport complex, with additional provisions to accommodate freight transport operations.

Following a comprehensive technical and strategic assessment, Alternative 3 has been selected as the definitive solution. The other two alternatives —Viaport Mall-based road transfer and the metro connection— have been excluded from further consideration. The direct rail link to Sabiha Gökçen Airport has been deemed most suitable to meet the project's intermodal, operational, and long-term sustainability goals.

b. Istanbul Airport Station Alternatives (Freight and Passenger Services): Similarly, two alternatives were evaluated for the Istanbul Airport segment:

   Alternative 1 – Combined Airport Station for Freight and Passenger Services: This alternative involves the construction of a single rail alignment and a shared station within the Istanbul Airport area, designed to serve both freight and passenger trains. Unlike the separate station approach, this option consolidates operations into one corridor to reduce land use and lower construction costs. However, combining freight and passenger services-particularly when hazardous materials are transported by freight trains-can significantly increase safety risks. The lack of physical separation raises the potential for accidents or incidents that could impact both transport modes. Therefore, careful planning and the implementation of robust safety measures will be essential.

   Alternative 2 – Separate Airport Stations for Freight and Passenger Services: This alternative involves the construction of two separate rail alignments and two corresponding stations within the Istanbul Airport area—one dedicated to freight trains and the other to passenger trains. One of the primary reasons for separating freight and passenger train operations in this alternative is the need to address safety concerns related to the transportation of hazardous materials. Freight trains often carry substances that pose significant risks in the event of an accident or spill. By establishing separate rail alignments and stations for freight and passenger services, the design effectively minimizes the

potential for interaction between these two modes, thereby reducing the likelihood of safety incidents. This separation not only enhances operational safety but also ensures compliance with international standards for hazardous materials transport within mixed-use infrastructure systems. By separating freight and passenger operations, this option enables more efficient and safer traffic management. It also ensures both transport modes are effectively integrated with the airport, enhancing overall network efficiency. The specific mitigation measures to be taken in this regard will be detailed in the Draft ESIA Report.

c. **Istanbul Airport Station Alternatives (Rail Connection to the Cargo Terminal):** Similarly, two alternatives were evaluated for the Istanbul Airport segment:

Alternative 1 – Adding Rail Connection to the Cargo Terminal: This alternative includes the construction of open-ended short branch lines/spurs from the INRAIL alignment directly to the cargo terminal of Istanbul Airport. Supporting multimodal freight operations, this option aligns with Türkiye's objective to become a regional logistics hub. Although it requires additional investment and close coordination with airport operations, it enables seamless air-to-rail logistics transfers and offers long-term advantages in terms of efficiency and competitiveness in freight transport.

Alternative 2 – Excluding Rail Connection to the Cargo Terminal: This alternative considers the option of not extending a rail spur from the INRAIL alignment to the cargo terminal of Istanbul Airport. Under this scenario, rail access would be limited to passenger services and freight transport to and from the airport would continue to rely on existing road-based logistics infrastructure. While this option avoids the need for additional investment and mitigates the complexity of coordinating with airport authorities during construction and operation, it also forgoes the opportunity to integrate air and rail freight systems. As a result, it may limit the project's contribution to Türkiye's broader strategic objective of enhancing its multimodal transport capabilities and positioning itself as a regional logistics hub. In the long term, the absence of a direct rail link to the cargo terminal could result in operational inefficiencies and reduce the competitiveness of rail freight services associated with the airport.

Comparison and Considerations: The evaluation of these alignment alternatives considered multiple criteria, including technical feasibility, cost, travel time, multimodal integration, land use impacts, and future scalability. Direct airport access alternatives for both Sabiha Gökçen and Istanbul Airport were ultimately favored in preliminary assessments due to their strategic alignment with national logistics goals, potential to enhance user experience, and support for low-emission transport systems.

The assessment is guided by a set of comparative criteria, including:

- Technical feasibility and constructability,
- Safety considerations, particularly regarding the transport of hazardous materials,
- Cost-effectiveness and land use efficiency,
- Operational flexibility and traffic management,
- Level of integration with existing airport infrastructure,
- Impact on multimodal transport potential,
- Compliance with international standards, and
- Alignment with Türkiye's national logistics and low-carbon transport goals.

Following a comprehensive assessment of the alternatives presented for Istanbul Airport in sections (b) and (c), the following solutions have been selected to ensure the highest standards of safety, operational efficiency, and long-term strategic alignment with Türkiye's logistics goals:

For section (b), Alternative 2—which proposes the construction of separate rail alignments and dedicated stations for freight and passenger services within the Istanbul Airport area—has been

selected. This option offers significant advantages in terms of operational safety, especially considering the potential risks associated with the transport of hazardous materials by freight trains. By physically separating freight and passenger services, the risk of accidents or incidents that could impact both modes are substantially reduced. It also ensures compliance with international standards related to the safe transport of hazardous goods, aligning with best practices in integrated transport infrastructure design.

For section (c), Alternative 1—which involves adding a direct rail connection from the INRAIL alignment to the cargo terminal of Istanbul Airport—has been selected. This option is in line with Türkiye's broader strategic vision to enhance multimodal transport infrastructure and position itself as a regional logistics hub. Establishing a direct rail link to the cargo terminal will enable seamless transfers between air and rail freight systems, thereby increasing efficiency, reducing reliance on road transport, and lowering associated emissions.

Together, the selected alternatives under sections (b) and (c) represent a balanced approach that prioritizes safety, efficiency, and strategic development objectives at Istanbul Airport. Further technical design details and mitigation measures will be elaborated in the Draft ESIA Report.

1.3 The Need for Environmental and Social Impact Assessment

A Draft ESIA is essential for the INRAIL Project, considering its multi-year implementation period, extensive construction activities, and the complex socio-environmental landscape across the project corridor. Given the scale of infrastructure investment and the potential impacts on both urban and peri-urban communities, the Draft ESIA will serve as a critical tool in identifying and managing project-related risks.

The primary objective of this Draft ESIA is to ensure that all E&S risks—particularly those associated with labor influx, land use, biodiversity, water pollution, community health and safety, and occupational health and safety—are systematically assessed and that effective, context-specific mitigation measures are developed.

ÇINAR Mühendislik will be responsible for carrying out Phase I of the Istanbul North Rail Crossing Project (INRAIL), focusing on the preparation of baseline E&S assessments and instruments in alignment with the World Bank's ESF and the draft ESMP. This phase aims to establish a strong foundation for the project's E&S management, ensuring compliance with both international standards and national regulations.

During Phase I, ÇINAR Mühendislik will undertake the following tasks:

- Preparation of Inception Report
- Preparation of Draft ESIA and Draft ESMP: ÇINAR will develop a Draft ESIA and a Draft ESMP in accordance with the World Bank's ESF and its Environmental and Social Standards (ESSs). Additionally, the following E&S instruments will be prepared and delivered:
    - Draft Stakeholder Engagement Plan (SEP)
    - Labor Management Procedures (LMP)
    - Resettlement Framework (RF)
    - Key inputs for AYGM's Environmental and Social Commitment Plan (ESCP)
- The Draft ESIA and Draft ESMP will serve as a strategic framework to guide the development of detailed mitigation, management, and action plans by the D+B Contractor(s), who will be selected during the project implementation phase.
- Stakeholder engagement will be an integral part of the preparation process, ensuring that key perspectives are incorporated across the Draft ESIA, Draft ESMP, and other E&S instruments.

The preparation of the Draft ESIA Report will play a key role in informing the risk categorization

of the INRAIL Project. As a forward-looking assessment tool, the Draft ESIA will provide a structured evaluation of potential E&S impacts across all project phases, helping to determine whether the Project falls under a Substantial or High-Risk classification as per the World Bank ESF.

This Draft ESIA Report will serve as a guidance document for creditors, offering evidence-based insights into key risk areas such as labor management, land acquisition, biodiversity, stakeholder engagement, and occupational and community health and safety. The findings and preliminary mitigation measures outlined in the report will support financing institutions in making informed decisions about the project's compliance, due diligence needs, and monitoring requirements.

By aligning with both national regulatory requirements and international standards, the Draft ESIA will not only support sound risk classification, but also demonstrate the Project's commitment to sustainable and responsible infrastructure development.

1.4 Structure of the Draft ESIA Report

The Draft ESIA Report to be prepared contains the following sections that will be included and/or used in other relevant E&S documents to be prepared:

Executive Summary: This section provides a concise overview of the Scoping Report, summarizing the main objectives, key findings, and recommendations for the ESIA studies. It highlights the Project's goals, potential environmental, social, health and safety impacts, the methodology to be applied, and the next steps for the ESIA process.

Section 1 - Introduction: The introduction outlines the Project background, Purpose of the Project, explaining its methodology in determining the E&S scope of the Project. It provides a brief introduction to the Project, highlights its significance and the necessity of an ESIA, and outlines the structure of the Draft ESIA Report.

Section 2 - Legal and Institutional Framework: This section sets out the legal obligations to which the Project will be subject including relevant national legislation as well as international conventions to which Türkiye is a party. It also identifies the gaps between the WB ESSs and national legislative requirements and the measures to be taken to fill these gaps.

Section 3 - Project Description: This section will describe all units of development to be undertaken under the Project. Briefly describe the proposed project and its geographical, environmental, social and temporal context, including any off-site investments that may be required (e.g. private pipelines, access roads, power supply, water supply, housing and raw material and product storage facilities) and the primary suppliers of the project. The section will also cover all associated facilities that are essential for the project's construction and operation, including but not limited to borrow areas for sand and gravel, stone quarries, concrete batch plants, asphalt bases (if applicable), and soil disposal areas resulting from tunneling activities. Considering the details of the project, the need for any plan to meet the requirements of national laws, international obligations, and IFI's E&S requirements will be indicated. Include a map in sufficient detail showing the Project area and the area that may be affected by direct, indirect and cumulative impacts of the Project. The description will also include auxiliary facilities required for the project, and whether the project involves any associated facilities. In such case, it will also outline how the application of the ESF requirements to these associated facilities will be managed.

Section 4 - Baseline Data: The Baseline Data section outlines the current E&S conditions of the Project area. It includes an analysis of the natural environment (e.g., land use, water quality, biodiversity) and the social context (e.g., local demographics, types of settlements, economic activities, land ownership, cultural heritage, etc.). This section serves as the reference point for comparing the potential impacts of the Project and determining the significance of those impacts.

Section 5 - Environmental and Social Risks and Impacts: In this section, an ESIA will be conducted for each discipline by identifying the anticipated E&S impacts during the pre-construction, construction, and operation phases of the project, as well as their contribution to the existing pollution load determined in the previous section.

Section 6 - Analysis of Alternatives: The assessment systematically compares feasible alternatives to the proposed project site, technology, design, and operational arrangements—including the "without project" scenario—based on their potential E&S impacts. It evaluates the feasibility of mitigating these impacts for each alternative, taking into account the capital and recurrent costs of mitigation measures, their appropriateness and effectiveness under local conditions, and the institutional, training, and monitoring requirements they may entail. Where possible, the E&S impacts of each alternative are quantified, and economic values are assigned to these impacts when feasible.

Section 7 - Mitigation Measures: The assessment identifies appropriate mitigation measures and highlights any significant residual negative impacts that cannot be fully mitigated, while also evaluating the acceptability of those residual impacts to the extent possible. It outlines differentiated measures to ensure that adverse effects do not disproportionately affect disadvantaged or vulnerable groups and provides the indication of the party/parties responsible for implementation of the measures and/or their monitoring. Additionally, the assessment specifies which issues require no further analysis, providing a clear rationale for this determination. It also offers guidance for the preparation of specific sub-management plans aimed at addressing impacts on various valued E&S components.

Section 8 - Design Measures: The assessment outlines the rationale for selecting the proposed project design, detailing the considerations that led to its adoption over other options. It specifies the applicable Environmental, Health, and Safety Guidelines (EHSGs), or, where the EHSGs are deemed inapplicable, provides a justification for the recommended emission levels and pollution prevention and abatement measures. These recommendations are aligned with Good International Industry Practice (GIIP) to ensure E&S sustainability.

Appendices: The appendices include a list of individuals and organizations that contributed to the preparation of the E&S assessment. It also provides a comprehensive list of references, data sources, and others, including both published and unpublished materials utilized throughout the assessment process. Additionally, the annex contains a detailed record of meetings, consultations, and surveys conducted with stakeholders—particularly affected communities and other interested parties—along with the methods used to facilitate their engagement and gather their input. Relevant data referenced or summarized in the main text is presented in accompanying tables. Finally, the annex includes a list of associated reports and plans developed as part of the assessment as well as a summary of the Terms of Reference (ToR) guiding the preparation of the ESIA and related instruments.

2 GENERAL SCOPE OF WORK AND REQUIREMENTS

This section outlines the general scope of work and key requirements to be fulfilled during the preparation phase, in accordance with Section 2.2 of the Terms of Reference (ToR) prepared by AYGM and the World Bank.

2.1 Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP)

The Draft ESIA will identify baseline environmental and social conditions within the project's area of influence, assess potential alternatives, and analyze direct, indirect, and cumulative impacts. Appropriate mitigation and monitoring measures will be proposed accordingly.

Çınar will:

- Review existing data and relevant reports,
- Conduct field studies to collect physical, biological, and socio-economic baseline data,
- Define the project's area of influence and associated facilities,
- Manage the national Environmental Impact Assessment (EIA) process and support required approvals,
- Engage stakeholders to ensure their feedback informs project design.

The draft ESMP will present a comprehensive framework of mitigation and monitoring measures, aligned with the mitigation hierarchy (avoid, minimize, mitigate, compensate/offset), to address the identified impacts. The Draft ESMP will also outline initial responsibilities, timelines, and performance indicators, which will later be expanded by the Design and Build (D+B) Contractor(s) into detailed sub-management plans during the project implementation phase.

2.2 Assessment and Management of E&S Risks and Impacts

The Project's environmental and social risks and impacts—including direct, indirect, and cumulative effects—will be assessed across construction, operation, and decommissioning phases. Key areas of focus will include air and water quality, waste management, noise and vibration, biodiversity, land use, traffic safety, vulnerable groups, occupational health and community health and safety.

Risks will be classified in line with the World Bank Environmental and Social Framework, and managed according to the mitigation hierarchy: avoid, minimize, mitigate, compensate, or offset. This assessment will also inform the overall E&S risk categorization of the project .

2.3 Labor and Working Conditions

Labor and working conditions related to direct workers, contracted workers, and primary supply workers will be assessed in accordance with Turkish labor laws and International Labour Organization (ILO) conventions.

Labor Management Procedure (LMP) will be developed to cover recruitment, non-discrimination, minimum working age, occupational health and safety, wage policies, grievance mechanisms, and worker codes of conduct. Specific measures will be implemented to prevent and respond to sexual exploitation, abuse, and harassment (SEA/SH), including awareness-raising and training activities.

In addition, key issues such as the employment and protection of migrant workers, the provision and management of workers' accommodation in line with international good practices, and the establishment of robust contractor management procedures will also be addressed as part of the LMP and the overall E&S framework of the Project.

2.4 Resource Efficiency and Pollution Prevention and Management:

The project will promote the efficient use of natural resources—including water, energy, and raw materials—while addressing pollution prevention during both construction and operation phases.

Key issues to be analyzed include dust emissions, exhaust gases, waste generation, noise, and vibration, particularly from tunneling and heavy machinery. A Waste Management Plan will outline appropriate methods for the disposal of hazardous and non-hazardous waste.

In addition, the assessment under this section will also consider associated facilities such as borrow areas, quarries, concrete batching plants, and spoil disposal sites, evaluating their potential impacts on resource use and pollution generation. Relevant mitigation and monitoring measures will be integrated accordingly.

All measures will align with the World Bank Group Environmental, Health, and Safety (EHS) Guidelines, including both the General and Rail-specific guidelines.

2.5 Community Health and Safety

The project's potential impacts on community health and safety, especially during construction, will be assessed, including risks related to increased traffic, excavation work, noise, dust, and the use of temporary structures. Additional risks such as communicable disease transmission and the potential for SEA/SH due to labor influx will also be evaluated. Draft frameworks will be developed for the Community Health and Safety Plan, Emergency Response Plan, Traffic Management Plan, and SEA/SH Action Plan (if required), to be further detailed during implementation.

Security personnel will be deployed throughout all phases of the Project. The management and conduct of security forces will be fully in line with the World Bank's ESS4, including requirements related to screening, training, proportional use of force, rules of engagement, and accessible grievance mechanisms to ensure the protection of community rights and well-being.

2.6 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

If required, land acquisition and resettlement activities will be conducted in accordance with World Bank ESS5 and relevant Turkish regulations. These processes will be guided by a Resettlement Framework (RF) to be developed during the ESIA phase. In the Final ESIA, the anticipated scale of land acquisition will be assessed in terms of total area, number of land plots, and Project-Affected Persons (PAPs).

Involuntary resettlement will be minimized, and affected persons' livelihoods will be protected. Particular attention will be paid to vulnerable groups. During detailed design, Resettlement Plan (RP) and, if necessary, Livelihood Restoration Plan (LRP) will be prepared by the D+B Contractor.

2.7 Biodiversity Conservation and Sustainable Management of Living Natural Resources

The Project's AoI will be assessed for biodiversity-related risks and impacts in accordance with the World Bank Environmental and Social Standard 6 (ESS6) and the International Finance Corporation (IFC) Performance Standard 6. The assessment will identify the presence of protected areas, critical habitats, threatened or endangered species, and ecologically sensitive areas.

A Critical Habitat Screening will be conducted to inform the design of appropriate avoidance, minimization, and mitigation measures. If necessary, a Biodiversity Management Plan will be prepared during the implementation phase to address identified impacts.

The assessment will incorporate seasonal ecological data, species migration patterns, and potential interactions with nearby protected areas to ensure a comprehensive understanding of biodiversity within the project's area of influence.

2.8 Cultural Heritage

Cultural heritage—both tangible and intangible—that may be located within or near the project area will be assessed in accordance with World Bank ESS8. In line with best practice, coordination with the General Directorate of Cultural Heritage and Museums and its relevant provincial directorates was initiated early in the process, and initial consultations were conducted in May 2025. These consultations informed the scope and methodology of the field surveys, which have since been completed by the Project team.

However, the final assessment of cultural heritage by the General Directorate is pending completion of their own field investigations. The results of both Çınar's field surveys and the authority's official evaluations will be presented in the ESIA Report.

A Chance Finds Procedure will be developed and included in the ESMP to manage any unexpected discoveries during construction. If needed, a Cultural Heritage Management Plan will be prepared based on the final design.

2.9 Stakeholder Engagement and Information Disclosure

Stakeholder engagement will be conducted throughout the project with affected communities, government authorities, Non-Governmental Organizations (NGOs), and other relevant actors. A Stakeholder Engagement Plan (SEP) will be prepared, outlining stakeholder identification, communication methods, consultation processes, and grievance mechanisms. Engagements will be carried out in culturally appropriate ways and in relevant local languages. Special attention will be paid to ensuring the participation of vulnerable groups. Stakeholder feedback will be documented and reflected in the project design and reporting.

a) Stakeholder mapping and initial consultations: Key stakeholders have been identified and classified as project-affected parties (PAPs) and other interested parties (OIPs). Initial consultations with relevant stakeholders—including government agencies and local institutions—have already been conducted.

b) Preparation of a preliminary SEP: Based on stakeholder feedback received during the initial consultations, a draft Stakeholder Engagement Plan (SEP) has been prepared. The SEP outlines the engagement strategy, consultation activities, roles and responsibilities, schedule, and indicative budget.

c) Consultations on the preliminary SEP: The draft SEP will be publicly disclosed and discussed with key stakeholders, and their feedback will be documented.

d) Preparation of the appraisal-stage SEP: The draft SEP will be updated and finalized based on the feedback received during consultations and will be disclosed prior to project appraisal.

All engagement activities will be carried out in a culturally appropriate manner and in relevant local languages. Special attention will be paid to ensuring the participation of vulnerable or disadvantaged groups. Stakeholder feedback will be continuously documented and reflected in the project's environmental and social decision-making and reporting processes.

3 METHODOLOGY FOR THE PREPARATION OF ESIA AND E&S INSTRUMENTS

The methodology outlined in this section defines the approach, tools, and procedures to be followed for the preparation of the Draft ESIA and associated E&S instruments in accordance with national regulations and the World Bank's Environmental and Social Framework (ESF).

3.1 Definition of the Study Area

According to the *"Regulation on Control of Air Pollution from Industrial Sources"*, which was published in the Official Gazette dated 03.07.2009 and numbered 27277, the impact area is defined as the area with a radius of 50 (fifty) times the height of the stack from the center of the emissions.

For facilities with an effective height of emissions less than 30 m from the ground, the facility impact area is a square area with a side length of 2 km.1f the surface distribution of off-stack emission sources (area source) is greater than 0.04 km^2, the facility impact area is a square area with a side length of 2 km, with the area source in the center of the square. The facility impact area is taken as basis in determining the surface distribution of emission sources.

The Investigation Area is a square area with a side length of 1 km within the facility impact area. In special cases where a decision on pollution cannot be made, the side lengths of the investigation area are taken as 500 meters.

Considering all these issues, the Area of Influence (AoI) for the Project has been defined as an area of 500 m in each direction considering the line and is given in Figure 3-1 (Detailed maps, including district-wise Influence area, will be provided in the Draft ESIA Report).

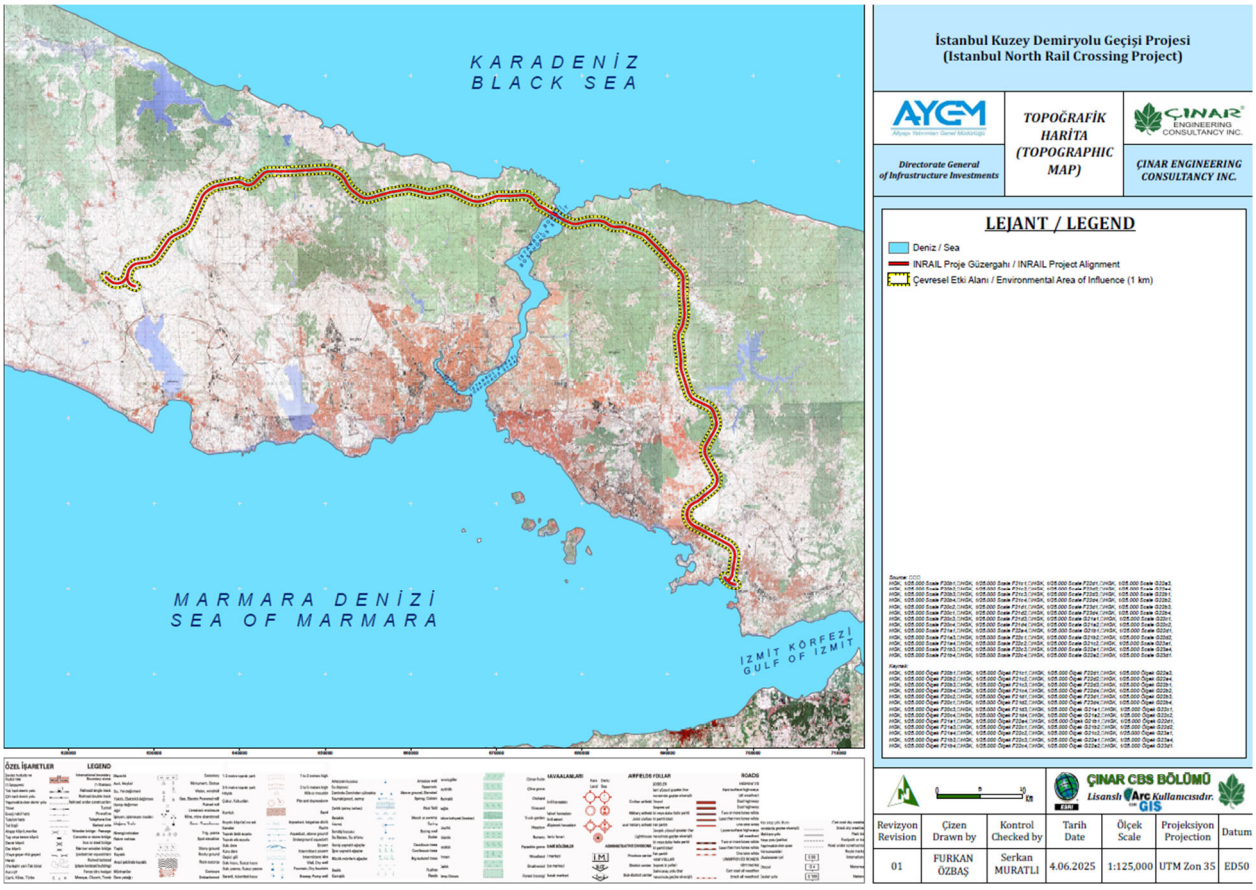

Figure 3-1 Area of Influence

3.2 Review of Proposed Interventions/Sub-Components

In line with the requirements set out in Section 3.1.1.2 of the ToR, existing environmental, technical, and planning documents related to the Project have been reviewed as part of the baseline preparation for the ESIA. This includes the national EIA procedures, the ESIA report of the North Marmara Motorway—which shares a significant portion of the corridor with the INRAIL Project—and other relevant permits and studies that inform the environmental and social context.

The ESIA documentation of the North Marmara Motorway serves as a valuable secondary source for understanding environmental and social sensitivities within the project area. The Northern Marmara Motorway starts at the Kınalı toll plaza near the Alipaşa neighbourhood in the Silivri district of Istanbul province, passes through the city of Kocaeli and ends at the Akyazı Trans-European Motorway toll plaza in the Akyazı district of Sakarya province, while the sea crossing is provided by the existing Yavuz Sultan Selim Bridge (Istanbul's Third Bosphorus Bridge) and connected motorways [(1)]. The assessment process after the scoping phase during the preparation of the ESIA report comprised examining alternatives, identifying stakeholders (by focusing on directly impacted individuals) and participation, collecting fundamental environmental and social data through desk and field studies, identifying impacts, and establishing measures and actions to estimate, analyze, and mitigate or manage such impacts. The process was carried out in compliance with the requirements of the related Turkish laws and regulations, the Equator Principles, and the IFC Sustainability Framework. The findings obtained in all phases were compiled in the Environmental and Social Impact Assessment (ESIA) Report prepared for the European Side of the Northern Marmara Motorway Project.

In addition, the ESIA study conducted for the Nakkaş-Başakşehir Motorway Project is another important source of data for the Project [(2)]. This report was prepared in alignment with the environmental and social standards of international financial institutions including the EBRD, IFC, World Bank, and AIIB. It provides relevant insights, particularly in terms of environmental sensitivities and stakeholder considerations along a corridor largely parallel to the proposed INRAIL alignment.

To support the planning and execution of environmental and social assessments, the data reviewed have been grouped under five categories:

i) Data obtained from field investigations
ii) Data derived from measurements and technical analyses,
iii) Data gathered from institutional databases related to environmental and social aspects,
iv) Data generated through stakeholder engagement activities, and
v) Data shared directly by AYGM.

Under category (v), the following documents were provided to the Consultant by AYGM and have been reviewed prior to developing the ESIA methodology and scoping:

- Feasibility Report,
- Digital GIS Data,
- ,
- Engineering structure lists and technical specifications,
- General project presentations.

These documents have been instrumental in understanding the preliminary scope of the Project, identifying data gaps, and ensuring alignment with both national procedures and World Bank requirements.

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[1] *Final ESIA Report of the North Marmara Motorway Project, ENCON Environmental Consultancy Co., March 2018,* https://www.kuzeymarmaraotoyolu.com/en/environmental-management
[2] *Final ESIA Report of the Nakkaş-Başakşehir Highway Project, ERM, August 2023* http://nakkasotoyolu.com/tr/47126

3.2.1 Scoping and Risk Screening

In line with Section 3.1.1.3 of the ToR, an initial scoping and risk screening exercise has been conducted to identify key environmental and social issues relevant to the Project, and to guide the prioritization of detailed assessments during the ESIA process.

Scoping activities were based on the review of available documents, the project's geographical footprint, and its interaction with environmentally and socially sensitive areas. The following factors were considered:

- Proximity to protected areas, water bodies, forested lands, agricultural zones, and residential areas and urban settlements,
- Potential impacts on vulnerable or disadvantaged groups,
- Areas of cultural or historical significance,
- Presence of existing infrastructure (e.g., highways, utilities, pipelines).

Based on this preliminary analysis, a list of environmental and social topics requiring focused assessment during the ESIA has been developed, including:

- Biodiversity and habitat disruption,
- Land acquisition and physical and economic displacement,
- Occupational and community health and safety,
- Noise, vibration, and air quality (especially during tunnel excavation),
- Construction waste and hazardous material management,
- Labor influx and SEA/SH risks,
- Traffic safety and disruption to local transportation.
- Presence of borrow areas (for sand, stone, etc.), concrete batch plants, and excavated material disposal areas, and their impacts.

This risk screening has also informed the preliminary risk classification of the Project and will guide the scope, intensity, and methodology of field surveys and stakeholder consultations in the next phases.

3.3 Environmental and Social Baseline

As outlined in Section 3.1.1.4 of the ToR, the environmental and social baseline assessment will be developed through a combination of primary and secondary data sources to provide a comprehensive understanding of existing conditions within the Project's AoI. The baseline will cover physical, biological, and socio-economic environments, and will form the basis for assessing potential impacts and risks associated with the Project.

3.3.1 Physical Environment

The physical baseline will include data on:

- Topography and Geology
- Climate and Meteorology
- Air Quality
- Noise and Vibration Levels
- Hydrology and Surface Water Quality
- Groundwater Conditions
- Soil Quality, especially in agricultural areas
- Protected areas (both nationally and internationally recognized)

3.3.2 Methodology for Environmental Measurements and Analyses

Environmental measurements in the project area and/or its surroundings will be conducted by ÇINAR Laboratories Group, which holds a Competency Certificate issued by the Ministry of

Environment, Urbanization, and Climate Change and is accredited by the Turkish Accreditation Agency (TÜRKAK). These measurements will be carried out as specified in Table 3-1 and each environmental assessment will be interpreted considering national regulations and international standards.

ÇINAR will use the defined Project Standards in the existing ESIA reports to evaluate and compare the results of baseline data gathered, such as WBG EHS Guidelines, Turkish Regulations, etc.

Table 3-1 Number of Environmental Measurements and Analyses

Parameter	Number of Sampling Points	Relevant Regulation for Assessment
PM_{10} (24-hour)	15	Regulation on the Control of Industrial Source Air Pollution (Official Gazette Date: 03.07.2009, Official Gazette Number: 27277) WBG General and Sectoral EHS Guidelines (WHO Air Quality Guideline Values) (2007)
$PM_{2.5}$ (24-hour)	15	Regulation on the Control of Industrial Source Air Pollution (Official Gazette Date: 03.07.2009, Official Gazette Number: 27277) WBG General and Sectoral EHS Guidelines (WHO Air Quality Guideline Values) (2007)
Noise (48 hours)	30	Environmental Noise Control Regulation (Official Gazette Date: 30.11.2022, Official Gazette Number: 32029) WBG General and Sectoral EHS Guidelines (2007)
Surface Water Quality	5	Surface Water Quality Regulation (Official Gazette Date: 30.11.2012, Official Gazette Number: 28483)
Groundwater Quality	5	Regulation on the Protection of Groundwater Against Pollution and Deterioration (Official Gazette Date: 07.04.2012, Official Gazette Number: 28257) or; Regulation on Water for Human Consumption (Official Gazette Date: 17.02.2005, Official Gazette Number: 25730)
Soil Quality	12	Regulation on the Control of Soil Pollution and Contaminated Sites with Point Sources (Official Gazette Date: 08.06.2010, Official Gazette Number: 27605)

The measurement and analysis locations determined based on the initial studies conducted by ÇINAR and the ESIA Report prepared for the Northern Marmara Motorway Project are given in Figure 3-2.

Figure 3-2 Measurement and analysis locations foreseen by ÇINAR

At locations where PM_{10}, $PM_{2.5}$, and noise measurements were conducted, priority was given to areas within the impact zone that are frequently used by the local population, such as hospitals, schools, and mosques. In order to determine the measurement points, a preliminary modeling study was carried out using the U.S. Environmental Protection Agency (EPA)-approved AERMOD Air Dispersion Modeling system. Based on the preliminary model results, locations with the highest expected emissions were identified for measurement and analysis.

For surface water analysis, samples were primarily collected from surface water bodies within the project impact area, including the Ömerli Dam and Ayazma Stream. In addition, samples were taken for groundwater analysis from licensed wells located within the impact zone.

Areas rich in vegetative soil, such as agricultural lands within the project corridor, were also identified.

The measurement points and their final locations were determined through site visits and consultations with the AYGM Project Implementation Unit (PIU) team [3].

3.3.3 Site Inspections Planned by ÇINAR's Experts

In order to establish a baseline understanding of the E&S context of the Project site and its area of influence, ÇINAR's specialists will conduct a series of field investigations and on-site assessments.

Following the signing of the contract under the Project, the first field study was carried out by ÇINAR's experts on 16.04.2025 to observe the environmentally and socially sensitive areas. The findings obtained during the studies are given in this section (further field studies identified within the scope of the Project will be carried out by ÇINAR's experts within the ESIA process in order to determine the E&S current situation). Details of the fieldwork are provided in Appendix-5.

All field studies envisaged to be carried out in and around the Project area during the ESIA process are given in Section 5 together with their anticipated dates.

3.3.4 Geological and Hydrogeological Characteristics

Within the scope of the Project, the geological, geomorphological, seismic and hydrogeological characteristics of the Project route and its surroundings will be thoroughly evaluated using both national datasets and field investigations.

To assess the general geological structure of the region, the 1/500,000 scale Geological Map of Türkiye – Istanbul sheet, and the 1/100,000 scale F20, F21, F22 and G22 sheets prepared by the General Directorate of Mineral Research and Exploration (MTA) will be reviewed. Based on these maps, a geological map specific to the route and study area will be digitized and prepared at an appropriate scale. The lithological characteristics and stratigraphic positions of the geological formations intersected by the Project will be defined accordingly. The finalized geological map of the Project route will be included as an Appendix-3.

The tectonic structure of the region and its active fault lines will be examined using the 1/250,000 scale Bandırma (NK35-11b) and Bursa (NK35-12) sheets as well as the 1/200,000 scale MTA active fault maps. Digital tectonic data obtained through the MTA Geoscience Portal will be used to prepare an active fault map showing the proximity of the route to known fault zones. The distances from the route to the nearest fault lines will be indicated and evaluated. Additionally, the presence of protected geosite areas along or near the Project corridor will be examined using data provided by the Association for the Protection of Geological Heritage (Jemirko).

To determine slope instability and mass movement risks in the study area, the 1/500,000 scale Türkiye Landslide Inventory Map and relevant numerical datasets from the MTA Geoscience Portal will be utilized. An appropriately scaled landslide map for the Project route will be prepared,

[3] *It is planned to carry out sampling and measurement activities between 11.06.2025-22.06.2025 by Çınar Laboratory.*

and features such as active landslides, historic landslides, and creep zones in the vicinity will be analyzed and interpreted.

The seismic characteristics and seismicity of the Project area will be assessed using the *"Earthquake Hazard Map of Türkiye, 2018"* obtain from the Disaster and Emergency Management Presidency (AFAD) and the interactive Earthquake Hazard Map developed by AFAD. Earthquake data within a 100 km radius of the Project route will be reviewed based on AFAD's earthquake catalogues. Peak Ground Acceleration (PGA475) values expected along the route will also be examined using Earthquake Ground Motion Level-2 data to provide insight into the seismic hazard level of the region.

Hydrological conditions will be assessed using 1/25,000 scale topographic maps, surface water data from the Turkish National Geographic Information System, and datasets from the National Water Information System of the Ministry of Agriculture and Forestry. An appropriate-scale hydrology map will be developed to show surface water features (rivers, streams, lakes, reservoirs, etc.) within and around the Project corridor. The engineering structures planned for surface water crossings (e.g., bridges, culverts) will be identified and described. Furthermore, if any drinking water protection zones are located in the vicinity of the route, these will be marked and the potential impacts of the Project on these resources will be evaluated in consultation with the relevant authorities.

Hydrogeological characteristics of the route and its surrounding environment will be assessed based on hydrogeological maps and surveys conducted by the State Hydraulic Works (DSİ), the International Hydrogeological Map of Europe (IHME 1500), and relevant Master Plan hydrogeology reports available in ÇINAR's archives. An appropriate scale hydrogeology map will be prepared to describe the permeability, aquifer characteristics, and potential vulnerability of hydrogeological units affected by the Project. Groundwater data, including licensed wells within the area of influence, will also be analyzed.

In addition to desktop research and national datasets, Geological-Geotechnical and Hydrogeological observation, investigation, and survey reports previously prepared during route selection and project design phases—if provided by the Administration—will also be reviewed and incorporated into the Draft ESIA Report.

Furthermore, the findings will be integrated into the ESCP, ensuring that the D+B Contractor(s) incorporate robust biodiversity conservation strategies into their Final ESIA Report.

3.3.5 Social Baseline

3.3.5.1 Scope of the Social Baseline Research

In order to assess the socio-economic impacts of the Project, baseline information will be collected. This information will include demographic characteristics at the household level (in other words, Project-Affected Parties (PAPs)), identification of vulnerable groups, concerns about the Project, and preferred communication methods. Similar data will also be obtained through interviews with mukhtars and community meetings at the settlement level. Interviews will be held with both local and national NGOs, local administrations, project-related institutions, development agencies, and local media representatives.

During consultations with stakeholders classified under the other, particularly non-governmental organizations (NGOs), data will be collected to identify vulnerable groups and assess the extent to which they may be affected by the Project.

Baseline assessment activities will be carried out in 53 settlements located within 12 districts of Istanbul and Kocaeli provinces that intersect with the Project Area of Influence. These settlements have been identified as areas with potential exposure to the social risks and impacts of the Project, although the specific land acquisition requirements have not yet been finalized.

To ensure equitable and meaningful participation, the social research has been designed with a strong emphasis on inclusivity. In addition to proportional sampling based on household size, special adjustments were made to include settlements with low populations but high relevance to the Project, particularly those located near the alignment.

3.3.5.2 Research Methodology

The socio-economic analysis covers the Istanbul region (TR1) (is also the name of the sub region (TR10), and province (TR100)), as well as Kocaeli province (TR421). Kocaeli province (TR421) is part of Kocaeli sub region (TR42) with Sakarya (TR422), Düzce (TR423), Bolu (TR424), and Yalova (TR425), which are located within Eastern Marmara region (TR4) [(4)].

In this structure, Istanbul and Kocaeli are provinces, and metropolitan municipalities; while Gebze, Çayırova, Tuzla, Pendik, Sultanbeyli, Sancaktepe, Çekmeköy, Beykoz, Sarıyer, Eyüp, Arnavutköy, and Çatalca are districts and metropolitan district municipalities.

Stakeholders are identified progressively based on the defined social impact area. The definition and categorization of stakeholders align with internationally recognized standards.

Project-Affected Parties (PAP): Local communities that are subject to risks or adverse impacts on their environment, health, livelihoods, or socio-economic conditions as a result of project activities.

Other Interested Parties (OIP): These can include local authorities, non-governmental organizations (NGOs), civil society organizations, and other groups that may have an interest in the project or could be impacted indirectly.

Disadvantaged/Vulnerable Individuals or Groups (DVIG): Project-affected individuals or groups that may face particular challenges in accessing project information, participating in consultations, or benefiting from project opportunities. This may include women, children, elderly individuals, ethnic minorities, or those with disabilities.

While defining the Project's social impact area, the Area of Influence (AoI) corridor has been taken as a reference. The local population residing in the settlements within this corridor is considered as directly affected PAPs. A total of 53 settlements (see Table 3-6) that are in direct contact with the corridor have been identified. These PAPs may include landowners, formal and informal users of privately owned land, as well as formal and informal users of public land, who may be subject to physical and economic displacement due to land acquisition by the Project. However, in order to definitively identify these PAPs, the Project's land requirements within the corridor must be clearly defined. Since the land requirements cannot be definitively defined at this stage, it is not possible to carry out a study directly targeting these PAPs. A social research methodology has been defined for the area designated as the social impact area.

This methodology and the distribution of stakeholders to be engaged are as follows.

- A household survey will be conducted in the settlements located within the corridor. The population of this survey consists of the total number of households in the 53 settlements intersecting with the corridor. According to the sampling method explained under section Sampling, a total of 383 household interviews are planned. Their distribution is provided in Table 3-6 and Table 3-7.
- The areas highlighted in color (dark yellow) indicate settlements that intersect with key components such as structural works (see Table 3-6 and Table 3-7)
- Since this distribution is created statistically based on household size, it has some limitations. The most important issue here is the presence of settlements that, despite having a very close relationship with the Project, have proportionally low representation

[4] *Republic of Türkiye, Ministry of Industry and Technology, Development Agencies. https://ka.gov.tr/en/development-agencies. Access date: April 2025.*

due to their household size. To address this gap, in-depth interviews will also be conducted in these settlements. These settlements are shown in the Table 3-6.

- Additionally, some adjustments have been made within the sample to ensure representation of settlements with low population.
- For each of these settlements, an interview will be conducted with a local representative (mukhtar or council member) to carry out a settlement-level survey.
- Interviews will be conducted with NGOs categorized under OIP. The table provided with Table 3-2 lists the NGOs located within the corridor. The primary criterion applied in selecting NGOs is their representation of parties that may have an interest in the Project. Among these, priority has been given to representing disadvantaged groups, local and culturally sensitive communities, local solidarity associations, and stakeholder groups related to environmental awareness and transportation/travel.
- In addition to the OIP interviews conducted in May, stakeholders related to project components (such as airports and Northern Marmara Highway), local governments, non-governmental organizations working for public benefit, local media outlets, and development agencies will also participate in stakeholder consultations.
- The household survey and local leader (mukhtar) survey will provide quantitative data for the study. In-depth interviews and other face-to-face meetings will serve as sources of qualitative data.
- Public consultation meeting: Socially inclusive participation will be sought through engagement with local authorities and community-based organizations during the planning and organization of consultation meetings. Venue selection will prioritize places that can accommodate larger groups, such as coffeehouses, community centers, and wedding halls. Each meeting will preferably have at least 10 participants. Additional measures will be implemented to ensure the participation of women.
- Focus group discussion: More intensive consultation sessions will be targeted with key subgroups among the PAPs. These will include women, youth, farmers, traders, and others, depending on the specific characteristics of each settlement. Care will be taken to select venues where the target group (men and women alike) can easily access and feel comfortable. Each meeting will have a minimum of 8 and a maximum of 14 participants.
- In depth interviews: Meetings with NGO representatives and/or members will be conducted using a semi-structured interview form.
- A map will also be provided to show the types of settlements along the project corridor, along with the locations where primary social data will be collected

The full list of local civil society organizations is provided below (see Table 3-2). From among these, selections will be made to represent each disadvantaged or interest group, and in-depth interviews or focus group discussions (FGDs) will be organized accordingly.

Table 3-2 Local NGOs located within the AoI-Intersecting Settlements

Name of the NGO	Turkish	Location
Gebze Hearing-Impaired Education, Culture, Youth and Sports Club Association /	Gebze İşitme Engelliler Eğitim Kültür Gençlik ve Spor Kulübü Derneği	Gebze / Kocaeli
Gebze Hacı Bektaş Veli Culture and Solidarity Association	Gebze Hacı Bektaşi Veli Kültür ve Dayanışma Derneği	Cumhuriyet / Gebze / Kocaeli
Association for Services to Çayırova District	Çayırova İlçesine Hizmet Derneği	Cumhuriyet / Gebze / Kocaeli
Gebze Cumhuriyet and Adem Yavuz Neighborhoods Beautification and Sustainability Association	Gebze Cumhuriyet ve Adem Yavuz Mahalleleri Güzelleştirme ve Yaşatma Derneği	Cumhuriyet / Gebze / Kocaeli
Çayırova Mukhtars Association	Çayırova Muhtarlar Derneği	Şekerpınar / Çayırova / Kocaeli

Name of the NGO	Turkish	Location
Çayırova Şekerpınar Development and Guidance Association	Çayırova Şekerpınar Gelişim ve Rehberlik Derneği	Şekerpınar / Çayırova / Kocaeli
Tuzla Social Solidarity and Education Association	Tuzla Sosyal Dayanışma ve Eğitim Derneği	Aydınlı / Tuzla / İstanbul
Association for the Educational Activities of the Hearing Impaired	İşitme Engelliler Eğitim Faaliyetleri Derneği	Aydınlı / Tuzla / İstanbul
"Evora" Arts and Sports Club Association	Evora Sanat ve Spor Kulübü Derneği	Aydıntepe / Tuzla / İstanbul
Pendik Kavakpınar Neighborhood Settlers Protection and Social Solidarity Association	Pendik Kavakpınar Mahallesini Yerleşimcilerini Koruma ve Sosyal Yardımlaşma Derneği	Kavakpınar / Pendik / İstanbul
Güllübağlar Sports Club Association	Güllübağlar Spor Kulübü Derneği	Güllübağlar / Pendik / İstanbul
Pendik District Şeyhli Neighborhood Solidarity and Assistance Association	Pendik İlçesi Şeyhli Mahallesi Yardımlaşma ve Dayanışma Derneği	Şeyhli / Pendik / İstanbul
"Becerikli Eller" Association	Becerikli Eller Derneği	Şeyhli / Pendik / İstanbul
Pendik Culture, Arts and Education Association	Pendik Kültür Sanat ve Eğitim Derneği	Kurtköy / Pendik / İstanbul
"Yerini Bil Kız" Girls' Empowerment Association	Yerini Bil Kız Çocuklarını Güçlendirme Derneği	Kurtköy / Pendik / İstanbul
Kurna Village Social Solidarity and Cultural Assistance Association	Kurna Köyü Sosyal Dayanışma ve Yardımlaşma Kültür Derneği	Kurna / Pendik / İstanbul
Pendik Mukhtars Association	Pendik Muhtarlar Derneği	Kurna / Pendik / İstanbul
Istanbul Public Transportation Workers Solidarity and Assistance Association	İstanbul Toplu Taşıma Çalışanları Yardımlaşma ve Dayanışma Derneği	Akşemsettin / Sultanbeyli / İstanbul
Istanbul Urban Development Support Association	İstanbul Kentsel Gelişimi Destekleme Derneği	Paşaköy / Sancaktepe / İstanbul
Association for Supporting the Environment and Ecological Life	Çevre ve Ekolojik Yaşamı Destekleme Derneği	Paşaköy / Sancaktepe / İstanbul
"Özgün" Special Needs Individuals Solidarity Association	Özgün Özel Gereksinimli Bireyler Yardımlaşma Derneği	Paşaköy / Sancaktepe / İstanbul
Çekmeköy Nişantepe Roman Solidarity and Assistance Association	Çekmeköy Nişantepe Romanları Yardımlaşma ve Dayanışma Derneği	Nişantepe / Çekmeköy / İstanbul
Çekmeköy Mukhtars Association	Çekmeköy Muhtarlar Derneği	Nişantepe / Çekmeköy / İstanbul
Ömerli Cultural Heritage Protection and Development Association	Ömerli Kültür Değerleri Koruma ve Geliştirme Derneği	Ömerli / Çekmeköy / İstanbul
Çekmeköy Nature Conservation and Sustainability Association	Çekmeköy Doğayı Koruma ve Yaşatma Derneği	Reşadiye / Çekmeköy / İstanbul
Bozhane village Sports Club Association	Bozhane Köyü Spor Kulübü Derneği	Bozhane / Beykoz / İstanbul
Beykoz Öğümce Village Culture, Solidarity and Assistance Association	Beykoz Öğümce Köyü Kültür Dayanışma ve Yardımlaşma Derneği	Öğümce / Beykoz / İstanbul
Intercultural Communication and Solidarity Association	Kültürlerarası İletişim ve Dayanışma Derneği	Demirciköy / Sarıyer / İstanbul
Uskumruköy Environment, Development, Solidarity, Culture and Education Association	Uskumruköy Çevre Kalkınma Dayanışma Kültür ve Eğitim Derneği	Uskumruköy / Sarıyer / İstanbul
Gümüşdere Village Beautification and Solidarity Association	Gümüşdere Köyü Güzelleştirme ve Dayanışma Derneği	Gümüşdere / Sarıyer / İstanbul
Uskumruköy Nature Protectors and Animal Lovers Association	Uskumruköy Doğayı Koruyanlar ve Patileri Sevenler Derneği	Uskumruköy / Sarıyer / İstanbul
Arnavutköy Association for Persons with Disabilities	Arnavutköy Engelliler Derneği	Arnavutköy / İstanbul
Bolluca Solidarity and Assistance Association	Bolluca Yardımlaşma ve Dayanışma Derneği	Bolluca / Arnavutköy / İstanbul

Name of the NGO	Turkish	Location
İmrahor Neighborhood Tradesmen Solidarity Association	İmrahor Mahallesi Esnaf Dayanışma Derneği	İmrahor / Arnavutköy / İstanbul
Arnavutköy İmrahor Neighborhood Solidarity Association	Arnavutköy İmrahor Mahallesi Dayanışma Derneği	İmrahor / Arnavutköy / İstanbul
Istanbul Airport Reporters Association	İstanbul Havalimanları Muhabirleri Derneği	Tayakadın / Arnavutköy / İstanbul
Tourism, Transport and Travel Agencies Association	Turizm Ulaştırma ve Seyahat Acenteleri Derneği	Tayakadın / Arnavutköy / İstanbul
Durusu Park Nature Conservation and Beautification Association	Durusu Park Doğal Yaşamı Koruma ve Güzelleştirme Derneği	Boyalık / Arnavutköy / İstanbul
Tourism, Transport and Travel Agencies Association	Turizm Ulaştırma ve Seyahat Acenteleri Derneği	Tayakadın / Arnavutköy / İstanbul
Çatalca İzzettin Village Education and Culture Association	Çatalca İzzettin Köyü Eğitim ve Kültür Derneği	İzzettin / Çatalca / İstanbul
Çatalca Environmental Protection and Nature Lovers Association	Çatalca Çevre Koruma ve Doğa Sevenler Derneği	Ferhatpaşa / Çatalca / İstanbul
Çatalca Thrace-Rumelia Culture and Solidarity Association	Çatalca Trakya Rumeli Kültür ve Dayanışma Derneği	Ferhatpaşa / Çatalca / İstanbul
World Environmental Awareness and Education Association	Dünya Çevre Bilinci ve Eğitim Derneği	Ferhatpaşa / Çatalca / İstanbul
Association for Combating Disability	Engelle Mücadele Derneği	Ferhatpaşa / Çatalca / İstanbul
Çatalca Mukhtars Association	Çatalca Muhtarlar Derneği	Kaleiçi / Çatalca / İstanbul
Çatalca Balkan and Roman Culture, Arts and Solidarity Association	Çatalca Balkan ve Roman Kültür Sanat Dayanışma Derneği	Kaleiçi / Çatalca / İstanbul
“Bir Nefes” Nature and Green Conservation Association	Bir Nefes Doğayı ve Yeşili Koruma Derneği	Kaleiçi / Çatalca / İstanbul

In addition to these local NGOs, the following organizations that operate nationwide but have their headquarters in Istanbul have also been included in the stakeholder list. This stakeholder group will also be important due to their capacity to represent disadvantaged groups and parties that may have an interest in the Project.

- Association for Solidarity for Equality / Eşitlik İçin Dayanışma Derneği
- Turkish Women's Council Association, Bakırköy Branch / Türk Kadınlar Konseyi Derneği Bakırköy Şubesi
- Atlas Women Producers Association / Atlas Kadın Üreticiler Derneği
- Istanbul Association for Solidarity with Families of Persons with Disabilities / İstanbul Engelli Aileleri ile Dayanışma Derneği
- No Barriers for Us Association / Bize Engel Yok Derneği
- Marmara Association for Persons with Disabilities / Marmara Engelliler Derneği
- Mor Çatı Women's Shelter Foundation / Mor Çatı Kadın Sığınağı Vakfı
- Environment Foundation of / Türkiye Çevre Vakfı
- Turkish Marine Environment Protection Association / Deniz Temiz Derneği (TURMEPA)
- Istanbul Violence Prevention and Monitoring Center / İstanbul Şiddet Önleme ve İzleme Merkezi (Istanbul ŞÖNİM)
- Foundation for the Protection and Promotion of the Environment and Cultural Heritage / Çevre ve Kültür Değerlerini Koruma ve Tanıtma Vakfı (ÇEKÜL)
- World Wide Fund for Nature / İstanbul Branch Office

In addition to the interviews conducted within the scope of the draft studies, the following institutions listed as stakeholders but not reached for interviews due to various reasons will also be included in the study (see Table 3-3).

Table 3-3 Additional Meetings with OIP

Location	Category	Stakeholder
İstanbul / Tuzla	OIP / Local administrative unit	Tuzla Municipality
İstanbul / Pendik	OIP / Local administrative unit	Pendik District Governorate
İstanbul / Beyoğlu	OIP / Local administrative unit	Istanbul Metropolitan Municipality
Istanbul / Fatih	OIP / Local administrative unit	Istanbul Governorship
İstanbul / Beykoz	OIP / Local administrative unit	Beykoz District Governorship
İstanbul / Beykoz	OIP / Local administrative unit	Beykoz Municipality
İstanbul / Çekmeköy	OIP / Institutions Related to Project Components	Yavuz Sultan Selim Bridge and Northern Peripheral Highway Operation
İstanbul / Arnavutköy	OIP / Institutions Related to Project Components	Istanbul Airport Operator İGA
İstanbul / Kurtköy	OIP / Institutions Related to Project Components	Sabiha Gökçen Airport Operator HEAŞ
İstanbul / Beyoğlu	OIP / Development agencies	Istanbul Development Agency
Ankara	OIP / State organization	Republic of Turkey Ministry of Interior Disaster and Emergency Management Authority (AFAD)

Local media outlets are among the parties that may have an interest in the Project. The full list of local newspapers in the region is provided below. From this list, selections will be made to ensure representation from Kocaeli, the European side of Istanbul, and the Anatolian side of Istanbul (see Table 3-4).

Table 3-4 Local media outlets

Province	District	Location	Turkish
İstanbul	Bakırköy	European side	Bizim Anadolu
İstanbul	Beylikdüzü	European side	Damga
İstanbul	Silivri	European side	Hürhaber
İstanbul	Beyoğlu	European side	Hürses
İstanbul	Halkalı / Küçükçekmece	European side	İstanbul
İstanbul	Zeytinburnu	European side	İstiklal
İstanbul	Şişli / Üsküdar	European side	Şok
İstanbul	Tünaydın	Anatolian side	Tünaydın
İstanbul	Bahçelievler	European side	Türkiye'de Yeniçağ
İstanbul	Bahçelievle	European side	Yeni Çağrı
İstanbul	Esenler	European side	Yeni Devir
Kocaeli	İzmit	-	Bizim Yaka Kocaeli
Kocaeli	İzmit	-	Çağdaş Kocaeli
Kocaeli	Derince	-	Derince Ekspres
Kocaeli	Gebze	-	Gazete Gebze
Kocaeli	Darıca	-	Gebze Hürses
Kocaeli	Gebze	-	Gebze Yenigün
Kocaeli	Gölcük	-	Gölcük Haber
Kocaeli	Gölcük	-	Gölcük Postası
Kocaeli	İzmit	-	Kocaeli
Kocaeli	İzmit	-	Kocaeli Demokrat

Province	District	Location	Turkish
Kocaeli	İzmit	-	Mavi Kocaeli
Kocaeli	İzmit	-	Mavi Marmara
Kocaeli	İzmit	-	Özgür Kocaeli
Kocaeli	İzmit	-	Yeni Haber

The methodology, techniques, tools to be applied during the social research, their relation to stakeholder groups, and the designed objectives have been summarized in Table 3-5.

Table 3-5 Summary of Social Research Methodology

Stakeholder Group	Stakeholder Name	Research Methodology	Research Type	Research Tool	Location	Planned Number of Participants	Will disadvantaged / sensitive groups be included / prioritized? Which ones?
PAP	Local residents / Household heads	Quantitative	Household survey	Household questionnaire	53 settlements within the AoI	837	Yes. Priority will be given to women who are household heads living alone.
PAP	Local representative	Quantitative	Settlement survey	Mukhtar questionnaire	53 settlements within the AoI	53	No
PAP	Local residents	Qualitative	Community survey	Semi structured interview form	A total of 9 meetings, with at least one in each settlement İstanbul/Beykoz/Cumhuriyet İstanbul/Beykoz/Paşamandıra İstanbul/Beykoz/Ali Bahadır İstanbul/Sarıyer/Uskumruköy İstanbul/Sarıyer/Gümüşdere İstanbul/Eyüpsultan/Odayeri İstanbul/Eyüpsultan/Işıklar İstanbul/Arnavutköy/Tayakadın İstanbul/Çatalca/Nakkaş	With at least 10 participants per meeting, the total participation will be approximately 100.	Yes. Priority will be given to individuals affected by previous projects.
OIP	Local NGO	Qualitative	Focus group discussion	Unstructured questionnaire	7 or 8 number of meetings will be held, each including at least one NGO representing each interest group and/or disadvantaged group (Culture & Arts, Occupational Groups, Urban & Development, Environment, Disabled, Ethnic Groups, Women, Local Communities).	With at least 10 participants, total attendance will be between 70 and 80 people.	Yes. - Disabled individuals - Ethnic identities - Women
OIP	Nationwide NGO	Qualitative	In-depth interview	Semi structured interview form	Various places in İstanbul	For each in-depth interview, there will be at least one representative from an institution, with a total participation of between 12 and 15 individuals.	Yes. - Disabled individuals - Ethnic identities - Women
OIP	Local administrative unit	Qualitative	In-depth interview	Semi structured interview form	Tuzla, Pendik, Fatih, Beykoz	For each in-depth interview, there will be at least one representative from an institution, with a total participation of between 6 and 8 individuals.	No
OIP	Institutions Related to Project Components	Qualitative	In-depth interview	Semi structured interview form	Kurtköy, Çekmeköy, Arnavutköy	For each in-depth interview, there will be at least one representative from an institution, with a total participation of between 3 and 5 individuals.	No
OIP	Development agencies State organization	Qualitative	In-depth interview	Semi structured interview form	Beyoğlu / Ankara	For each in-depth interview, there will be at least one representative from an institution, with a total participation of between 4 and 6 individuals.	No
OIP	Local media	Qualitative	In-depth interview	Semi structured interview form	European side of Istanbul / Anatolian side of Istanbul / Kocaeli	For each in-depth interview, there will be at least one representative from an institution, with a total participation of between 6 and 8 individuals.	No

3.3.5.3 Sampling

As the primary research tool in the social impact assessment was designed as a household survey, the total number of households was used as the population (N) for sampling purposes instead of the total population. For these purposes; Cochran's sample size formula was preferred for large populations, as it provides a statistically reliable estimate of the required sample size based on desired confidence level and margin of error, regardless of the total population size. It is particularly effective when the population exceeds 10,000.

Cochran's formula for sample size calculation for a finite population

$$n = \frac{N.Z^2.p.(1-p)}{(N-1).e^2 + Z^2.p.(1-p)}$$

- **n:** Required sample size
- **N:** Population size (169,862 households)
- **Z:** Z-score 1.96 for 95% confidence level
- **p:** Estimated proportion (0.5 is often used if the proportion is unknown)
- **e:** Margin of error (0.05 for 5%)

So;

$$n = \frac{169{,}862.(1.96)^2.0.5.(1-0.5)}{(169{,}862-1).(0.05)^2 + (1.96)^2.0.5.(1-0.5)} = \mathbf{383}$$

This number can be used as 169,862 households for a 95% confidence level and a 5% margin of error.

Given that the sample is distributed across settlements, a design effect has been incorporated to account for the potential increase in variance resulting from a sampling design that deviates from simple random sampling. Assuming a design effect of 2, the minimum required sample size is calculated as 766. The sample size was increased to 837 to avoid fractional allocation during distribution and to ensure a minimum of 4 samples per settlement.

In the distribution of the sample (n) to be implemented during the fieldwork across the settlements, a distribution based on household size was used (see Table 3-6).

Table 3-6 Population figures of AoI-Intersecting Settlements

	Province	District	Settlement	Population	District Average Household Size	Number of Households in the Settlement
1	Kocaeli	Gebze	Cumhuriyet	10,038	3.33	3,014
2	Kocaeli	Çayırova	Yeni Mahalle	21,192	3.4	6,233
3	Kocaeli	Çayırova	Şekerpınar	2,847	3.4	837
4	İstanbul	Tuzla	Aydıntepe	27,173	3.12	8,709
5	İstanbul	Tuzla	İstasyon	26,338	3.12	8,442
6	İstanbul	Tuzla	Aydınlı	72,942	3.12	23,379
7	İstanbul	Pendik	Sanayi	2,999	3.17	946
8	İstanbul	Pendik	Kavakpınar	65,879	3.17	20,782
9	İstanbul	Pendik	Güllübağ	19,001	3.17	5,994
10	İstanbul	Pendik	Şeyhli	19,684	3.17	6,209

	Province	District	Settlement	Population	District Average Household Size	Number of Households in the Settlement
11	İstanbul	Pendik	Harmandere	9,947	3.17	3,138
12	İstanbul	Pendik	Ramazanoğlu	2,427	3.17	766
13	İstanbul	Pendik	Kurtköy	38,756	3.17	12,226
14	İstanbul	Pendik	Yenişehir	65,637	3.17	20,706
15	İstanbul	Pendik	Emirli	252	3.17	79
16	İstanbul	Pendik	Kurna	1,154	3.17	364
17	İstanbul	Pendik	Kurtdoğmuş	614	3.17	194
18	İstanbul	Sultanbeyli	Mecidiye	21,859	3.85	5,678
19	İstanbul	Sultanbeyli	Akşemsettin	13,886	3.85	3,607
20	İstanbul	Sancaktepe	Paşaköy	1,758	3.49	504
21	İstanbul	Çekmeköy	Nişantepe	12,546	3.18	3,945
22	İstanbul	Çekmeköy	Ömerli	5,702	3.18	1,793
23	İstanbul	Çekmeköy	Reşadiye	2,887	3.18	908
24	İstanbul	Çekmeköy	Hüseyinli	849	3.18	267
25	İstanbul	Beykoz	Cumhuriyet	1,966	3.09	636
26	İstanbul	Beykoz	Bozhane	464	3.09	150
27	İstanbul	Beykoz	Öğümce	493	3.09	160
28	İstanbul	Beykoz	Paşamandıra	1,374	3.09	445
29	İstanbul	Beykoz	Ali Bahadır	781	3.09	253
30	İstanbul	Beykoz	Anadolu Feneri	687	3.09	222
31	İstanbul	Beykoz	Poyrazköy	881	3.09	285
32	İstanbul	Sarıyer	Garipçe	370	2.87	129
33	İstanbul	Sarıyer	RumeliFeneri	4,074	2.87	1,420
34	İstanbul	Sarıyer	Demirciköy	1,698	2.87	592
35	İstanbul	Sarıyer	Uskumruköy	10,197	2.87	3,553
36	İstanbul	Sarıyer	Gümüşdere	2,519	2.87	878
37	İstanbul	Sarıyer	Kısırkaya	378	2.87	132
38	İstanbul	Eyüpsultan	Çiftalan	187	3.05	61
39	İstanbul	Eyüpsultan	Ağaçlı	731	3.05	240
40	İstanbul	Eyüpsultan	Odayeri	229	3.05	75
41	İstanbul	Eyüpsultan	Işıklar	549	3.05	180
42	İstanbul	Eyüpsultan	İhsaniye	185	3.05	61
43	İstanbul	Arnavutköy	Bolluca	8,446	3.76	2,246
44	İstanbul	Arnavutköy	İmrahor	12,088	3.76	3,215
45	İstanbul	Arnavutköy	Tayakadın	3,716	3.76	988
46	İstanbul	Arnavutköy	Baklalı	866	3.76	230
47	İstanbul	Arnavutköy	Dursunköy	433	3.76	115
48	İstanbul	Arnavutköy	Boyalık	758	3.76	202
49	İstanbul	Arnavutköy	Yassıören	675	3.76	180
50	İstanbul	Çatalca	Nakkaş	803	2.63	305
51	İstanbul	Çatalca	İzzettin	1,304	2.63	496
52	İstanbul	Çatalca	Ferhatpaşa	28,400	2.63	10,798

	Province	District	Settlement	Population	District Average Household Size	Number of Households in the Settlement
53	İstanbul	Çatalca	Kaleiçi	7,617	2.63	2,896
				539,236		**169,862**

Based on the data provided in Table 3-6, the distribution of the total sample size by settlement is presented in Table 3-7. Due to population size, settlements represented by 0 and 1 were subject to adjustments in the sample distribution while preserving the overall proportionality. These modifications are also presented in Table 3-7.

Table 3-7 Sampling values of AoI-Intersecting Settlements

	Province	District	Settlement	Proportion in the Sample	Value to Be Taken in the Sample	Adjusted Value
1	Kocaeli	Gebze	Cumhuriyet	1.86	14	14
2	Kocaeli	Çayırova	Yeni Mahalle	3.93	30	30
3	Kocaeli	Çayırova	Şekerpınar	0.53	4	4
4	İstanbul	Tuzla	Aydıntepe	5.04	39	39
5	İstanbul	Tuzla	İstasyon	4.88	37	37
6	İstanbul	Tuzla	Aydınlı	13.53	104	104
7	İstanbul	Pendik	Sanayi	0.56	4	4
8	İstanbul	Pendik	Kavakpınar	12.22	94	94
9	İstanbul	Pendik	Güllübağ	3.52	27	27
10	İstanbul	Pendik	Şeyhli	3.65	28	28
11	İstanbul	Pendik	Harmandere	1.84	14	14
12	İstanbul	Pendik	Ramazanoğlu	0.45	3	4
13	İstanbul	Pendik	Kurtköy	7.19	55	55
14	İstanbul	Pendik	Yenişehir	12.17	93	93
15	İstanbul	Pendik	Emirli	0.05	0	4
16	İstanbul	Pendik	Kurna	0.21	2	4
17	İstanbul	Pendik	Kurtdoğmuş	0.11	1	4
18	İstanbul	Sultanbeyli	Mecidiye	4.05	31	31
19	İstanbul	Sultanbeyli	Akşemsettin	2.58	20	20
20	İstanbul	Sancaktepe	Paşaköy	0.33	2	4
21	İstanbul	Çekmeköy	Nişantepe	2.33	18	18
22	İstanbul	Çekmeköy	Ömerli	1.06	8	4
23	İstanbul	Çekmeköy	Reşadiye	0.54	4	4
24	İstanbul	Çekmeköy	Hüseyinli	0.16	1	4
25	İstanbul	Beykoz	Cumhuriyet	0.36	3	4
26	İstanbul	Beykoz	Bozhane	0.09	1	4
27	İstanbul	Beykoz	Öğümce	0.09	1	4
28	İstanbul	Beykoz	Paşamandıra	0.25	2	4
29	İstanbul	Beykoz	Ali Bahadır	0.14	1	4
30	İstanbul	Beykoz	Anadolu Feneri	0.13	1	4

	Province	District	Settlement	Proportion in the Sample	Value to Be Taken in the Sample	Adjusted Value
31	İstanbul	Beykoz	Poyrazköy	0.16	1	4
32	İstanbul	Sarıyer	Garipçe	0.07	1	4
33	İstanbul	Sarıyer	RumeliFeneri	0.76	6	6
34	İstanbul	Sarıyer	Demirciköy	0.31	2	4
35	İstanbul	Sarıyer	Uskumruköy	1.89	14	14
36	İstanbul	Sarıyer	Gümüşdere	0.47	4	4
37	İstanbul	Sarıyer	Kısırkaya	0.07	1	4
38	İstanbul	Eyüpsultan	Çiftalan	0.03	0	4
39	İstanbul	Eyüpsultan	Ağaçlı	0.14	1	4
40	İstanbul	Eyüpsultan	Odayeri	0.04	0	4
41	İstanbul	Eyüpsultan	Işıklar	0.10	1	4
42	İstanbul	Eyüpsultan	İhsaniye	0.03	0	4
43	İstanbul	Arnavutköy	Bolluca	1.57	12	12
44	İstanbul	Arnavutköy	İmrahor	2.24	17	17
45	İstanbul	Arnavutköy	Tayakadın	0.69	5	5
46	İstanbul	Arnavutköy	Baklalı	0.16	1	4
47	İstanbul	Arnavutköy	Dursunköy	0.08	1	4
48	İstanbul	Arnavutköy	Boyalık	0.14	1	4
49	İstanbul	Arnavutköy	Yassıören	0.13	1	4
50	İstanbul	Çatalca	Nakkaş	0.15	1	4
51	İstanbul	Çatalca	İzzettin	0.24	2	4
52	İstanbul	Çatalca	Ferhatpaşa	5.27	40	40
53	İstanbul	Çatalca	Kaleiçi	1.41	11	11
					766	**837**

3.3.6 Baseline Studies for Cultural Heritage

In line with the requirements of the World Bank's Environmental and Social Standard 8 (ESS8), baseline studies will be conducted to identify and assess the potential presence of cultural heritage—both tangible and intangible—within the Project's Area of Influence (AoI). These studies aim to establish a comprehensive understanding of known and potential heritage sites that may be directly or indirectly affected by project activities.

The cultural heritage baseline will be developed through a multi-step approach:

Desktop Study and Literature Review

- Review of existing national databases, previous archaeological studies, local development plans, and heritage-related records.
- Identification of registered sites, archaeological protection zones, religious or ceremonial sites, historical structures, and cultural landscapes.

Consultation with Competent Authorities and Local Stakeholders

- Engagement with the General Directorate of Cultural Heritage and Museums, relevant regional conservation boards, and local municipalities.
- Collection of expert opinion and historical context from archaeologists, historians, and community elders.

Field Reconnaissance / Visual Survey

- Walkover surveys in high-potential areas identified through desktop analysis, with participation of cultural heritage specialists.
- GPS-based mapping and photographic documentation of visible features.
- Identification of high-probability zones for undocumented archaeological remains.

Intangible Cultural Heritage Screening

- Identification of practices, oral traditions, rituals, or other intangible cultural elements specific to local communities.
- Community interviews and group discussions, if relevant.

Gap Analysis and Sensitivity Mapping

- Identification of information gaps to be addressed in the ESIA phase.
- Preparation of sensitivity maps indicating proximity to protected or culturally significant areas.

Expected Outputs

- A cultural heritage baseline report summarizing findings from desktop and field activities.
- A preliminary list of heritage assets and zones of sensitivity.
- Recommendations for avoidance, protection, or further investigation.
- A framework for developing a Chance Finds Procedure as part of the Draft ESMP.
- This baseline assessment will inform the cultural heritage risk evaluation in the ESIA and guide the development of mitigation measures during the design and construction phases.

3.4 Documenting the Legal, Policy and Administrative Requirements

In accordance with Section 3.1.1.4 of the ToR, the ESIA will include a clear and structured description of the legal, policy, and administrative framework applicable to the Project. This will provide the basis for ensuring that the assessment complies with both national legislation and international standards, particularly those of the World Bank.

The documentation of applicable requirements will include:

- National regulatory framework: environmental laws, social protection legislation, labor regulations, land acquisition and expropriation laws, biodiversity conservation, cultural heritage protection, and applicable permitting procedures under the Turkish EIA Regulation.
- Institutional framework: roles and responsibilities of central and local government institutions involved in environmental and social management, including the Ministry of Environment, Urbanization and Climate Change (MoEUCC), AYGM, and other relevant authorities.
- International conventions and treaties: to which Türkiye is a party, such as the Aarhus Convention, Bern Convention, Ramsar Convention, and other relevant multilateral environmental agreements. This also includes International Labour Organization (ILO) conventions and other relevant international conventions on labor rights, working conditions, and social protection, which are especially relevant in addressing ESS2 and ESS4 requirements under the World Bank's Environmental and Social Framework.
- World Bank Environmental and Social Framework (ESF): applicable Environmental and Social Standards (ESS1–ESS10), Environmental, Health and Safety (EHS) Guidelines, and any other specific requirements applicable to the INRAIL Project as a World Bank-financed investment.

3.4.1 Information about Turkish EIA Regulation

In Türkiye, Article 10 of the Environmental Law stipulates that the institutions, organizations and facilities, whose planned activities may lead to environmental issues, are obliged to submit an EIA Report or a Project Introduction File to Ministry of Environment, Urbanization, and Climate Change (MoEUCC). Within this context, the EIA Regulation was first put into force in 1993 and has been subjected to various revisions and renewals over time. The most updated EIA Regulation was published in the Official Gazette No.31907 on July 29, 2022. Annex-1 and Annex-2 of the EIA Regulation, based on activity type and/or facility capacity, categorize investments and facilities as projects subject to full-scale EIA process (see Annex-1) or projects subject to screening-elimination process (see Annex-2). EIA Process in Türkiye is summarized in Figure 3-3.

3.4.2 Evaluation of the Project within the Scope of National EIA Regulation

The Project was evaluated under Article 9/a (Construction of railway lines excluding connection and transmission lines) of the Annex-1 List of the National EIA Regulation, published in the Official Gazette dated July 29, 2022, and numbered 31907. As of the submission date of this Report, the EIA Application File has been prepared but has not yet been submitted to the Ministry of Environment, Urbanization and Climate Change.

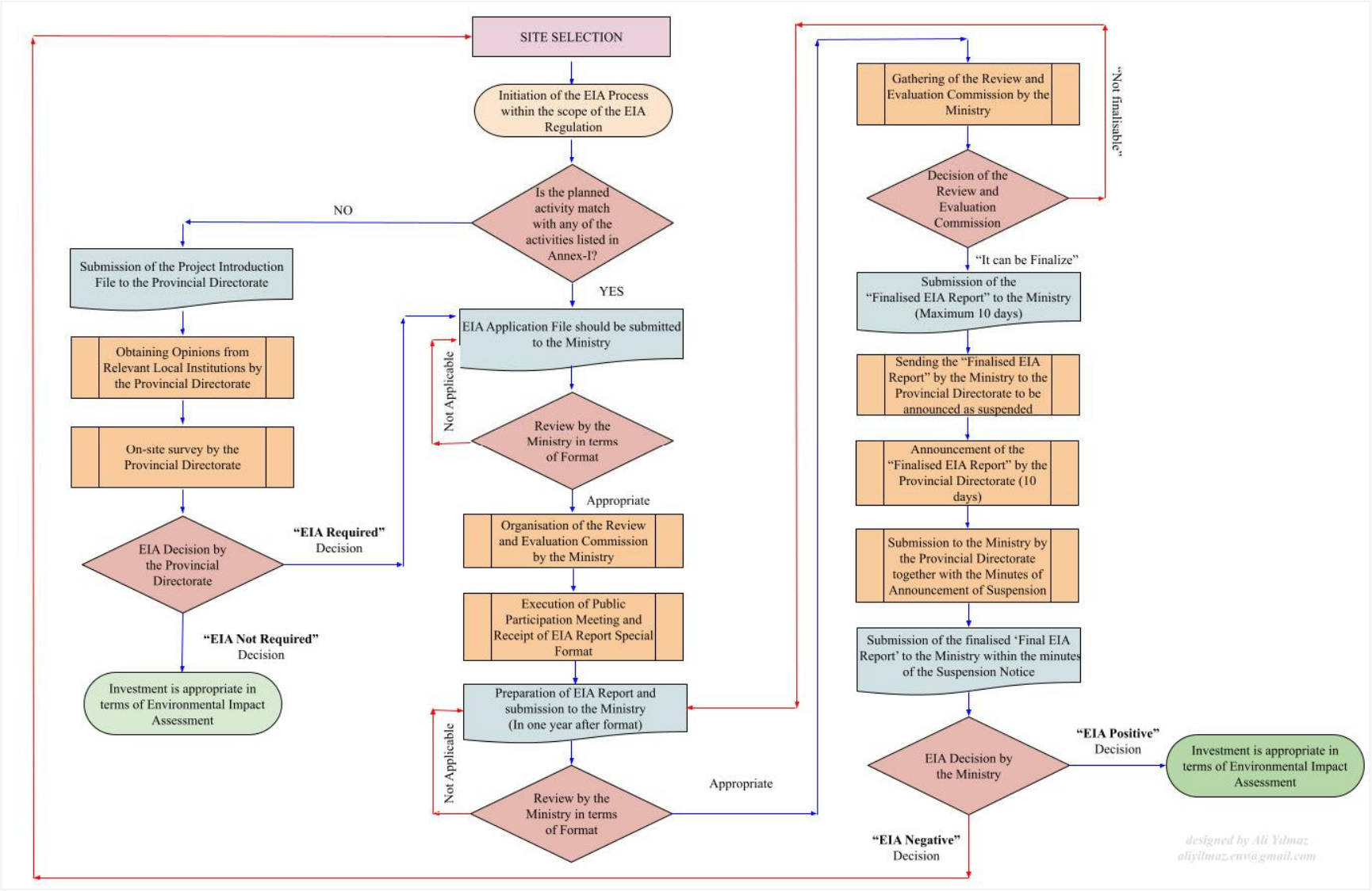

Figure 3-3 EIA Process in Türkiye

The ESIA will also identify any gaps or inconsistencies between national laws and World Bank requirements and propose ways to bridge those gaps during project implementation (e.g., via the ESMP or through binding obligations in the ESCP).

3.5 Critical Habitat Assessment

The critical habitat assessment for the project will be carried out to identify potential biodiversity impacts and to determine appropriate conservation measures. Within this scope, the assessment will document:

- Terrestrial and Aquatic Ecosystems
- Flora and Fauna Species, including any species of conservation concern
- Habitats, Natural and Critical
- Protected Areas, Forests, Wetlands, and other sensitive zones

Secondary data from national and regional databases will be supplemented with targeted field surveys.

Biodiversity-related data collection will be carried out using a multi-tiered approach to ensure a comprehensive understanding of the ecological characteristics of the Project area and its surroundings. This process will include:

- Literature Review: Existing scientific publications, academic theses, previous EIA/ESIA Reports, reports prepared for the Nakkaş-Başakşehir Motorway Project, the Northern Marmara Motorway Project, and Istanbul Airport, as well as biodiversity inventories and conservation status databases (e.g., IUCN Red List, national Red Data Books, Natura 2000 if applicable), will be reviewed to identify known species, ecosystems, and ecologically sensitive areas.
- Consultations with Relevant Authorities: Official consultations will be held with key institutions such as the General Directorate of Nature Conservation and National Parks (DKMP), universities, and local environmental non-governmental organizations. These interactions aim to obtain region-specific biodiversity data, records of protected species, and ongoing conservation efforts.
- Field Surveys: Targeted ecological surveys will be conducted by qualified and experienced ecologists in accordance with relevant national and international standards. These surveys will cover key taxa including vascular plants, mammals, birds, reptiles, amphibians, and insects. Seasonal surveys may be planned to ensure detection of migratory or phenologically sensitive species [5].

3.5.1 Protected Areas

This section of the EIA report will combine the results of the fieldwork mentioned above, additional fieldwork carried out by experts, and relevant literature studies. Together, these sources will provide a comprehensive overview of the current biodiversity in the Project area.

The project route passes through the Sarıyer–Feneryolu Wildlife Development Area (WDA), which is located within the administrative boundaries of Sarıyer district. This protected area was officially registered in 2005 and covers an area of 1,565.22 hectares.

Notable landmarks within the boundaries of the WDA include Marmaracık Nature Park and a bird observation tower, which contribute to the area's ecological and recreational significance. The North Marmara Highway lies along the east–west axis of the area, intersecting or bordering the

[5] *It is planned to carry out field work by the biodiversity team between 11.06.2025-22.06.2025.*

protected zone [6]. Additionally, Koç University's main campus is also located within the WDA.

The protected areas around the project area are given in Table 3-8 and the protected areas marked on the satellite image are given in Figure 3-4, Figure 3-5 and Figure 3-6.

Table 3-8 National and International Protected Areas and Their Distances to the Project Area

Protected Areas	Continent	Location by Project Area	Air Distance (m)
Sarıyer-Feneryolu Wildlife Development Area	European	-	0.00
Ömerli Dam	Anatolian	East	350.00
Kömürcübent Nature Park	Anatolian	South	2,735.00
Hacetderesi Nature Park	Anatolian	West	3,100.00
Ayvatbendi Nature Park	European	South	3,240.00
Göktürkgöleti Nature Park	European	South	3,350.00
Bentler Nature Park	European	South	3,450.00
Beykoz Göknarlık Natural Protection Area	Anatolian	South	3,805.00
Polonezköy Nature Park	Anatolian	West	3,910.00
Falih Rıfkı Atay Nature Park	European	South	4,010.00
Elmasburnu Nature Park	Anatolian	North	4,420.00
Neşetsuyu Nature Park	European	South	4,480.00
Mehmet Akif Ersoy Nature Park	European	South	5,350.00
Gazilerdağı Nature Park	Anatolian	East	5,600.00
Irmak Nature Park	European	South	5,995.00
Avcıkoru Nature Park	Anatolian	East	6,020.00
Fatih Çeşmesi Nature Park	European	South	6,265.00
Kirazlıbent Nature Park	European	South	6,432.00
Fatih Sultan Mehmet Nature Park	European	South	8,210.00
Parkorman Nature Park	European	South	9,776.00
Göztepe Nature Park	Anatolian	South	10,800.00
Ballıkayalar Nature Park	Anatolian	East	10,900.00
Şamlar Nature Park	European	South	11,300.00

[6] *1st Regional Directorate of the Ministry of Agriculture and Forestry website, https://bolge1.tarimorman.gov.tr/Documents/menu-dosyalar/Korunan%20Alanlar/Yaban%20Hayat%C4%B1%20Geli%C5%9Ftirme%20Sahas%C4%B1/%C4%B0stanbul/feneryolu-yhgs.pdf*

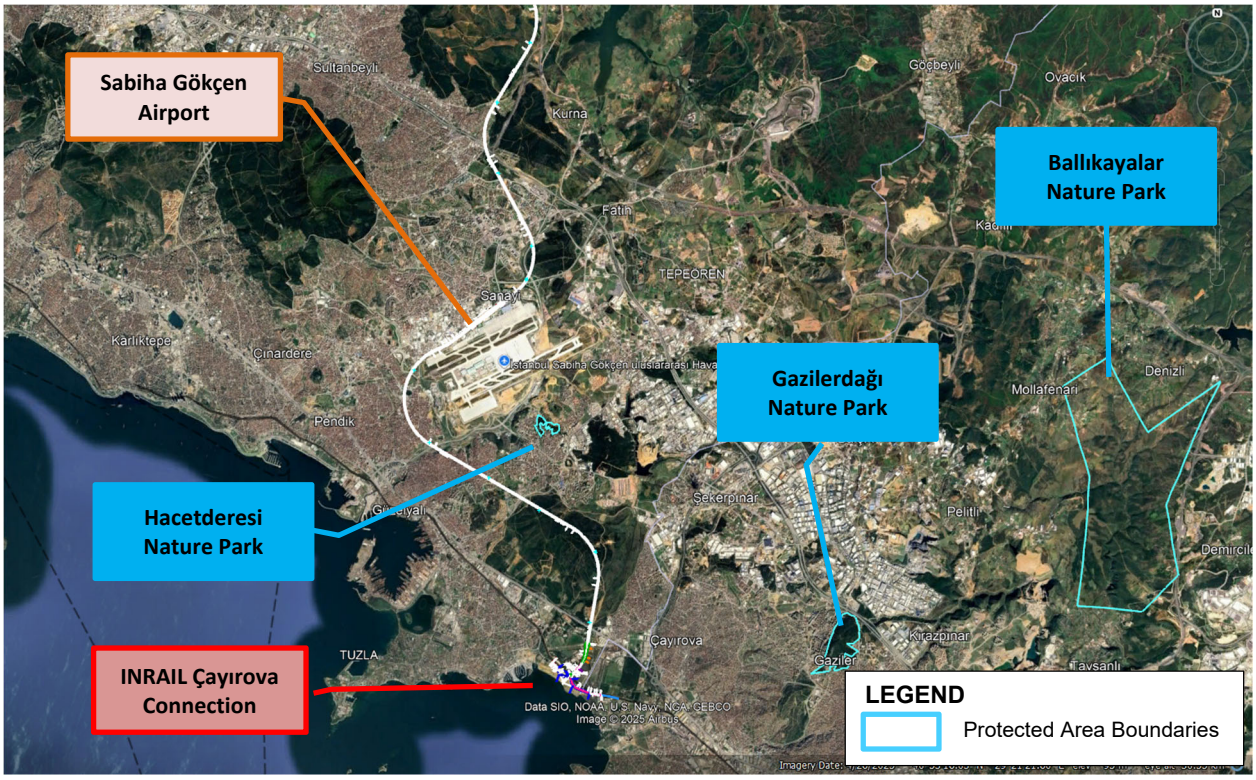

Figure 3-4 National and International Protected Areas around the 1st Section of the Project Area

Source: *Official website of the General Directorate of Nature Conservation and National Parks*

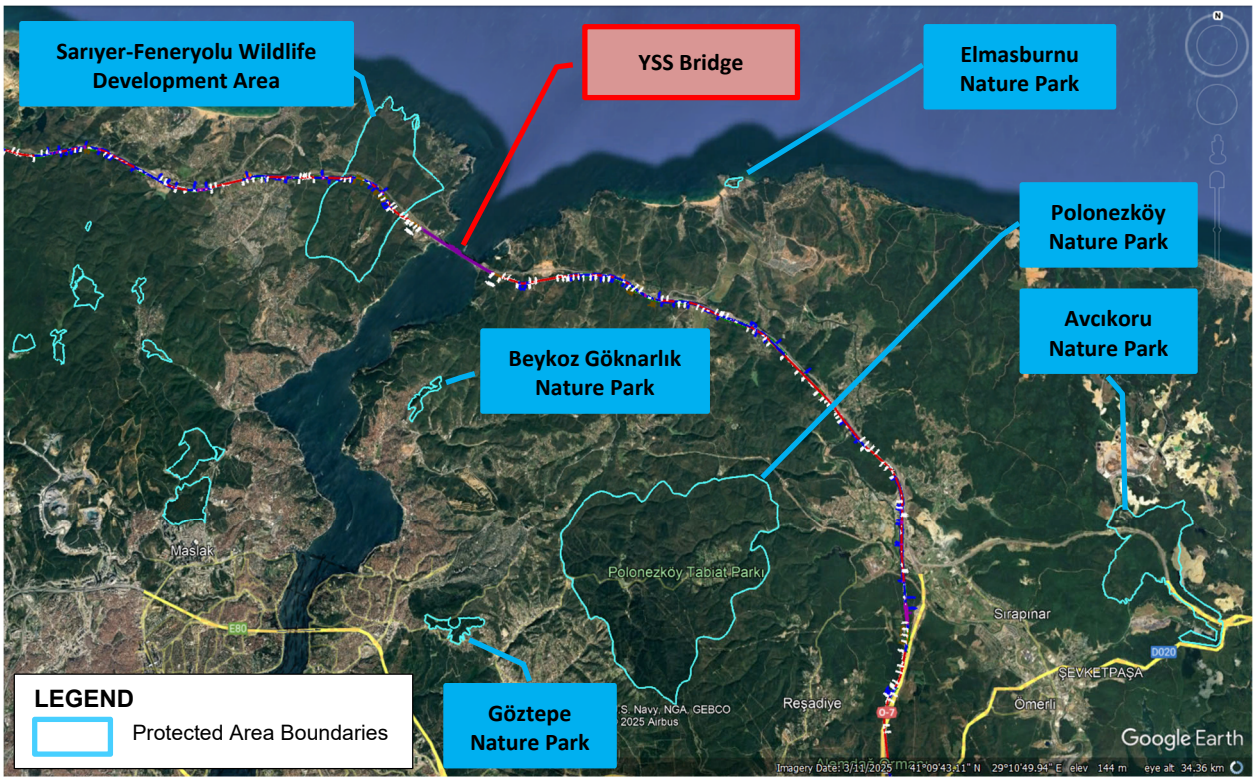

Figure 3-5 National and International Protected Areas around the Project Area on the Anatolian Side

Source: *Official website of the General Directorate of Nature Conservation and National Parks*

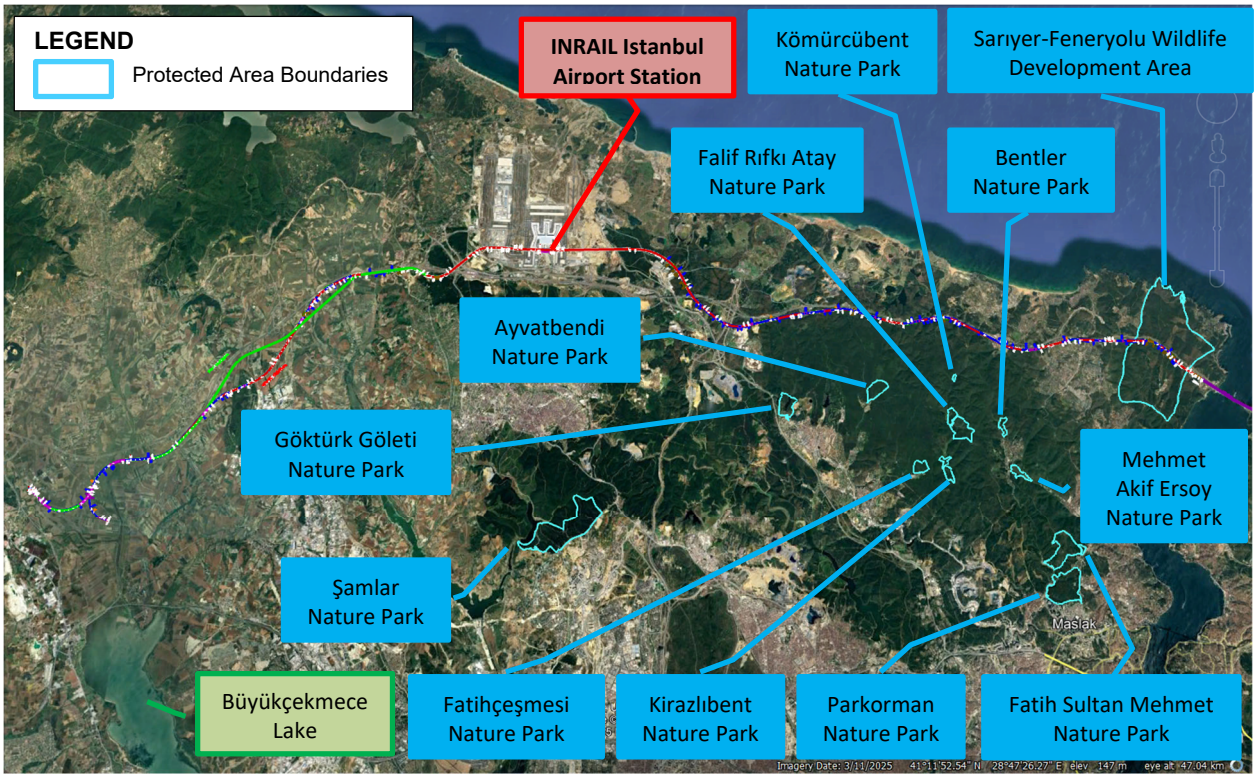

Figure 3-6 National and International Protected Areas around the Project Area on the European Side

Source: *Official website of the General Directorate of Nature Conservation and National Parks*

The results of these efforts will establish the ecological baseline for the Draft ESIA Report and serve as the foundation for assessing the Project's potential impacts on biodiversity. Informed by this assessment, appropriate measures will be developed in accordance with the mitigation hierarchy—prioritizing avoidance, followed by minimization and mitigation. Where residual impacts persist, potential biodiversity offset strategies will also be explored.

Furthermore, the findings will be integrated into the ESCP, ensuring that the D+B Contractor(s) incorporate robust biodiversity conservation strategies into their Final Biodiversity Management Plan (BMP).

3.6 Analysis of Alternatives

In accordance with Section 3.1.1.6 of the ToR, the ESIA will include an objective analysis of feasible project alternatives. This includes the assessment of different route alignments, construction techniques, and the "no-project" scenario. The purpose of this analysis is to inform decision-making by identifying options that can reduce environmental and social risks and enhance overall sustainability and resilience.

The alternatives analysis will cover:

- Route alignment alternatives: Evaluation of different track corridors considering technical feasibility, land use impacts, proximity to sensitive areas (e.g., water bodies, residential zones, forests), and social implications (e.g., displacement, land acquisition). Both quantitative and qualitative data collection techniques will be utilized as part of the social research. Quantitative data at the community level will primarily be obtained through structured survey forms, while qualitative data on sensitive issues will be gathered through in-depth interviews.
- Design and technology options: Assessment of construction methods (e.g., tunneling vs. open cut), choice of materials, and energy efficiency measures.

- Environmental and social performance: Comparison of alternatives in terms of expected emissions, biodiversity impacts, land fragmentation, safety, and community concerns.
- The “no-project” scenario: Evaluation of the environmental and social consequences if the Project were not implemented, to establish a baseline for comparing action vs. inaction.

The alternatives are provided in the section numbered “1.2.6. Project Alternatives” above and, will be analyzed using multi-criteria assessment methods, and the results will guide project design refinement. The rationale for selecting the preferred option will be clearly documented, based on both technical and E&S considerations.

3.7 Impacts and Risk Assessment of the Proposed Development

In accordance with Section 3.1.1.7 of the ToR, this section will present a comprehensive assessment of the environmental and social risks and impacts associated with the proposed development. The assessment will consider all project phases—pre-construction, construction, operation, and decommissioning—and will include both direct and indirect, as well as short-term and long-term impacts.

The assessment will cover, but will not be limited to, the following key impact areas:

- Physical Environment: impacts on air quality, noise, vibration, soil, geology, and surface and groundwater resources.
- Biological Environment: impacts on terrestrial and aquatic ecosystems, flora and fauna, including species of conservation concern and critical habitats.
- Social Environment: impacts on land use, livelihoods, community structures, vulnerable groups, and population dynamics. The social baseline data to be collected should contain such data collected in a professional and systematic manner, with sufficient level of detail, to enable a proper assessment of these impacts. The ToR states that environmentally and socially sensitive locations will be surveyed on and along the proposed project's AoI. The Impacts and Risk Assessment shall include (but is not limited to): Socio-economics aspects including:
    a) Land acquisition and involuntary resettlement
    b) Economic displacement
    c) Aspects related to project-induced migration (cost of living, pressure in social services, crime, etc.)
    d) Socio-economic development opportunities (jobs, capacity development, etc.)
    e) Social tensions or conflict

  The above information shall be collected from secondary sources as well as through primary data collection, at representative and sensitive locations.
- Community Health and Safety: risks related to traffic, communicable diseases, hazardous materials, and labor influx.
- Cultural Heritage: potential effects on known and unknown tangible and intangible heritage assets.
- Occupational Health and Safety (OHS): risks to workers during construction and operation phases.

3.7.1 E&S Assessment Approach

Within the scope of the Draft ESIA Report, the following topics will be addressed and included in the Draft ESMP:

- Key performance indicators and monitoring methodology to be evaluated within the scope of monitoring,
- Actions to enhance and strengthen E&S management capacity, along with training for personnel,

- Implementation schedule and cost estimates for impact mitigation, monitoring, and capacity development efforts.

In the preparation of the Draft ESMP and sub-management plans, an E&S assessment approach will be employed. The E&S Approach aims to identify potential impacts or risks at an early stage and eliminate or minimize them with actions to be taken. It is intended to be applied throughout all elements of the project. Prediction is the first step in determining and evaluating impacts, followed by a formal impact assessment procedure. The main steps of impact assessment are provided in Figure 3-7.

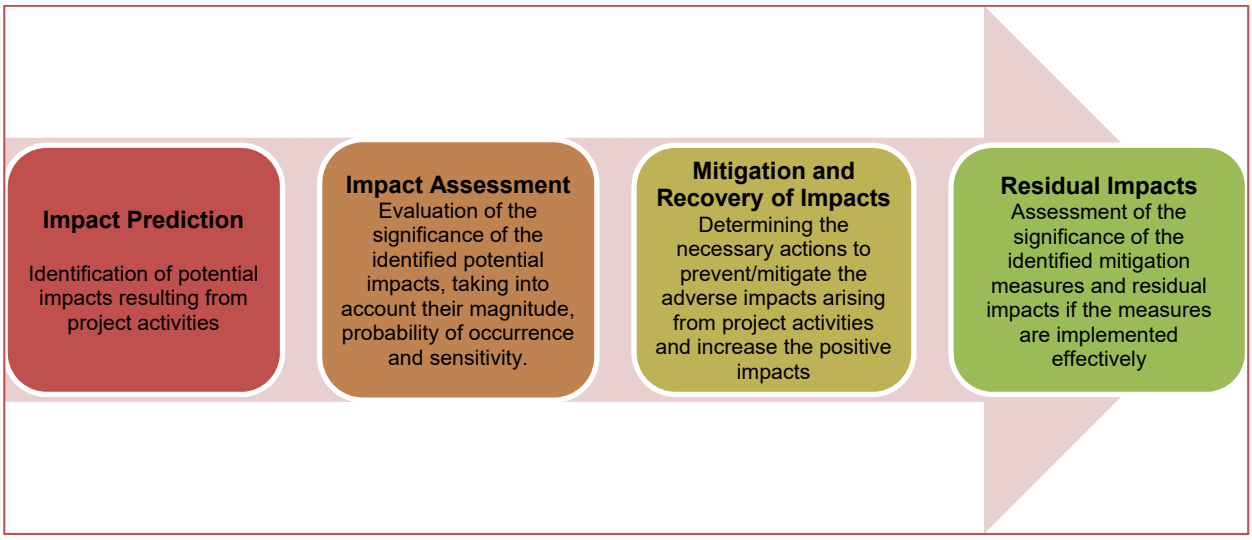

Figure 3-7 Impact Assessment Steps

After the impacts are assessed through several steps as mentioned above, necessary mitigation measures to minimize the adverse impacts and risks, monitoring activities for the full compliance of the requirements, relevant responsible personnel who will continuously take actions and monitor the performance are defined within the Draft ESIA report.

3.7.2 E&S Impact Rating

The methodology to be used for the characterization of E&S impacts arising from the implementation of the Project has been developed based on the methodologies described in the United Kingdom's (UK) applicable government publications on EIA (Institute of Environmental Management and Assessment-IEMA, 2011: The State of Environmental Impact Assessment Practice in the UK, Scottish Natural Heritage's (SNH) Handbook on Environmental Impact Assessment (2013) and other available guidance documents on impact assessment (Canter, 1993, Standards Association of Australia, 1999, etc.).

In accordance with good ESIA practice, the significance of impacts will be determined based on the sensitivity of the receptor and the overall magnitude of the Project's impact on that specific receptor. The magnitude of the impact is determined using quantitative or, where this is not possible, qualitative methods based mainly on professional judgement. An environmental and/or social impact may be beneficial or adverse. The sensitivity of the receptor will be determined based on the baseline information, which takes into consideration the public interest, designations, legal requirements, acceptability, sustainability, etc., and also where relevant, in consultation with the affected communities.

The overall magnitude of the impacts will be determined as a factor of the following magnitude components.

The overall magnitude of an impact or risk is determined by a comprehensive analysis of the criteria which may encompass the following:

- Geographical extent (wide, local or restricted)
- Reversibility (long term reversible/irreversible, medium-term reversible or short-term reversible)
- Duration (long term, medium term or short term)
- Frequency (continuous, recurrent, intermittent or one-off)

Criteria for magnitude factors are provided in Table 3-9.

Table 3-9 Magnitude Factors and Scales

Magnitude Factors	Scales		
	High	Medium	Low
Geographical extent	Wide	Local	Restricted
	Beyond the AoI	Within the AoI	Within the construction site
Reversibility	Irreversible/Long-term reversible	Medium-term reversible	Short-term reversible
	Reversible after the operation period or irreversible	Reversible within the operation period	Reversible during construction phase or after one year of construction period
Duration	Long-term	Medium-term	Short-term
	After the operation period	Within the operation period	Within construction period
Frequency	Continuous/Recurrent	Intermittent	One-off/rare
Severity	Significant	Moderate	Minimal
	Significant potential change/damage, limited or no mitigation measures	Moderate potential change/damage and/or costly or ineffective mitigation measures	Minimal potential change/damage effective and feasible mitigation measures

** Calculation of overall magnitude: In the table, "High" will be assigned 3 points, "Medium" 2 points, and "Low" 1 point. In total; (5-6 Points: Negligible, 7-9 Points: Minor, 10-12 Points: Moderate, 13-15 Points: Major)*

General criteria to be taken into consideration when determining sensitivity of the receptor and the overall magnitude are provided in Table 3-10, whereas specific assessments and methodological variations (if any) for each environmental and/or social component will be presented in the Draft ESIA Report.

Table 3-10 General Criteria for Identification of Receptor Sensitivity and Impact Magnitude Levels

Level	Receptor Sensitivity	Impact magnitude	
		Adverse	Beneficial
High	Highly important (national and international scale of importance), high rarity, potential for substitution very limited	Loss of resource and/or quality and integrity of resources; 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.
Medium	Moderately important (regional scale of importance) and moderate rarity, potential for substitution limited	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features and elements	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Minor importance (local scale of importance), not rare	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.
Negligible	No or very low importance and rarity	No or very minor loss or detrimental alteration to one or	No or very minor benefit to or positive addition of one or more

Level	Receptor Sensitivity	Impact magnitude	
		Adverse	Beneficial
		more characteristics, features or elements	characteristics, features or elements

Following the identification of receptor sensitivity and overall magnitude of an impact on that specific receptor, the significance of the impact will be determined by using a standard matrix style approach, which consists of a 4x4 matrix. The matrix and general descriptions of each significance level identified in the matrix are provided in Table 3-11.

Table 3-11 Significance Assessment Matrix

		Receptor Sensitivity			
Overall Magnitude		High	Medium	Low	Negligible
	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Minor
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Minor	Negligible	Negligible

Source: *Adapted from IEMA, 2011; UK HA 205/08 Volume 11, Section 2; Canter, L., 1993; and other impact assessment methodology guidance/handbooks.*

Major	Impacts are considered to be very important and are likely to be material in decision-making, which would be associated with sites or features of international, national or regional importance as well as local importance if the site or feature is subject to a major change. Mitigation measures are imperative to reduce the significance to lower levels before proceeding with the Project.
Moderate	Impacts are not likely to be key decision-making factors. The cumulative impacts of such factors may influence the decision-making if they lead to an increase in the overall adverse impact on a particular receptor. If possible, impact significance is to be reduced to lower levels by taking mitigation measures; otherwise, acceptance of associated risks is required for proceeding with the Project.
Minor	Impacts may be raised as local factors, which are unlikely to be critical in the decision-making process, but important in enhancing the subsequent design of the Project. Assurance of compliance with standards and safety criteria is sufficient to proceed.
Negligible	No impact or impacts are beneath the level of perception so that they are acceptable with normal operating procedures.

3.8 Gender Dimensions and SEA/SH Risk Assessment

In line with Section 3.1.1.8 of the ToR, this section will address gender-related aspects and the potential risks of sexual exploitation, abuse, and harassment associated with the Project, particularly during the construction phase where large numbers of workers and contractors may be involved.

3.8.1 Gender Dimensions

The ESIA will assess how the Project may differently affect men, women, and vulnerable subgroups (e.g., female-headed households, elderly women, girls) in terms of:

- Access to employment and livelihood opportunities,
- Use of infrastructure and transportation services,
- Exposure to risks such as land acquisition or loss of access to resources,
- Representation and participation in stakeholder engagement processes.

Special attention will be given to ensuring that women's voices are meaningfully included in consultations, and that data are disaggregated by gender where appropriate.

3.8.2 SEA/SH Risk Screening

The Project will undergo a preliminary SEA/SH risk assessment, in accordance with World Bank guidance, to evaluate:

- The size and composition of the incoming workforce,
- Proximity to communities and potential for increased social interaction,

- Capacity of local services (health, law enforcement) to respond to SEA/SH incidents,
- Location and number of labor camps including their spatial distribution, management arrangements, and distance from vulnerable groups,
- Prevalence of SEA/SH risks in the region, based on existing social data.

Based on this screening, the ESIA will outline preventive measures to be detailed in the ESMP, including:

- Development of a Code of Conduct for all workers,
- Establishment of confidential grievance mechanisms for reporting SEA/SH cases,
- Training and awareness programs for workers and communities,
- Engagement with local service providers and civil society organizations.

The results of this assessment will be used to ensure that gender equality and SEA/SH risk prevention are integrated into the design and implementation of the Project.

3.9 Guidance for Preparation of the Contractors' Environmental and Social Management Plan (ESMP)

In accordance with Section 3.1.1.9 of the ToR, the Consultant will prepare a Draft ESMP that provides guidance for the Design and Build (D+B) Contractor(s) to develop a full and detailed Final ESMP prior to construction.

Additionally, under the contract to be signed with the D+B Contractor(s) and AYGM, the D+B Contractor(s) will also be required to prepare a Contractor's ESMP. The D+B Contractor(s) will not be permitted to commence any on-site activities prior to the preparation and approval of the C-ESMP.

This guidance will ensure that the Contractor's ESMP is:

- Aligned with the findings and mitigation measures identified in the Final ESIA;
- Aligned with the findings and mitigation measures identified in the Final ESMP;
- Compliant with national environmental and social regulations as well as the World Bank Environmental and Social Framework (ESF).
- Based on the mitigation hierarchy (avoid, minimize, mitigate, compensate/offset).

A Draft ESMP will be prepared by ÇINAR. The Draft ESMP serves as a comprehensive framework to ensure that all potential adverse impacts identified during the ESIA process are effectively mitigated and monitored throughout the Project lifecycle. For each project phase—pre-construction, construction, and operation—specific mitigation measures will be developed to minimize E&S risks, with clearly assigned responsibilities and implementation timelines. In parallel, a detailed monitoring plan will be established to assess the effectiveness of these measures, track compliance, and facilitate adaptive management. Draft ESMP will also define reporting procedures and communication strategies with relevant stakeholders and authorities to ensure transparency and accountability during project implementation. The Draft ESMP will include templates, key principles, guidelines and minimum requirements for the following sub-management plans to be developed by the Contractor:

- Waste Management Plan
- Traffic/Transportation Management Plan
- Community Health and Safety Management Plan
- Occupational Health and Safety (OHS) Plan and Procedures
- Labor Influx Management Plan
- SEA/SH Action Plan
- Emergency Preparedness and Response Plan
- Stakeholder Engagement Implementation Plan

- Biodiversity Management Plan
- Cultural Heritage Management Plan and Chance Finds Procedure
- Security Management Plan
- Labor Camp Management Plan
- Chemical and Hazardous Material Management Plan
- Air Quality Management Plan
- Noise Management Plan
- Water and Wastewater Management Plan
- Pollution Prevention and Control Plan
- Environmental, Social, Health and Safety Training Management Plan

Each sub-plan will include:

- Objectives and scope
- Roles and responsibilities
- Specific mitigation and monitoring measures
- Implementation schedule
- Reporting procedures and documentation requirements

The Contractor will be responsible for updating and finalizing the Draft ESMP prior to the start of construction, subject to review and approval by AYGM and the World Bank. The Consultant will support this process by providing technical input and verifying alignment with the ESIA findings and good international practice.

3.9.1 Mitigation Measures

All E&S impact assessments to be conducted under the scope of the Project will be evaluated in detail for each project phase (pre-construction, construction, and operation), and the potential impacts will be identified accordingly. For each activity, the type, magnitude, extent, duration, and reversibility of potential impacts will be analyzed. Based on these evaluations, appropriate mitigation measures will be proposed to avoid, reduce, or where possible, eliminate the anticipated adverse impacts.

These mitigation measures will include technical, administrative, and operational actions, and for each measure, the responsible party or stakeholder, as well as the proposed timeline for implementation, will be clearly defined. Additionally, monitoring mechanisms will be proposed to track the effectiveness of the measures and to revise them if necessary. In this way, the Project will be implemented in a sustainable manner with regard to its E&S impacts. The draft mitigation table is given in Table 3-12.

Table 3-12 Mitigation Measures (draft)

Phase	E&S Risks	Overall Magnitude	Receptor Sensitivity	Description of Risk/Expected Impact	Mitigation Measures	Final Impact Significance	Responsibility

3.9.2 Monitoring

To ensure that the proposed mitigation measures are effectively implemented and that the E&S impacts remain within acceptable limits throughout all phases of the Project (pre-construction, construction, and operation), a robust monitoring system will be developed. The Draft ESMP will outline key parameters to be monitored, the frequency of monitoring activities, responsible parties, and reporting mechanisms.

Monitoring activities will cover both environmental aspects—such as air quality, noise levels, water resources, soil conditions, and biodiversity—and social aspects, including land use, and

stakeholder engagement as well as occupational health and safety and community-based health and safety aspects. These activities will allow for the early identification of unforeseen impacts and enable timely corrective actions.

Regular monitoring reports will be prepared and submitted to relevant authorities and stakeholders as required. These reports will document the implementation status of mitigation measures and provide data-driven assessments of E&S performance. The monitoring program will be adaptive in nature, allowing for revisions based on monitoring results and feedback from stakeholders. The draft monitoring table is given in Table 3-13.

Table 3-13 Monitoring Table (draft)

Phase	Parameter to be monitored	Indicators to be monitored	Parameter to be monitored/ type of monitoring equipment	Frequency of measurement or continuous	Cost of equipment or contractor charges to perform monitoring	Responsibility

3.9.3 Reporting

The Contractor will prepare a site-specific C-ESMP, which will be consistent with the Final ESMP. The C-ESMP will detail site-specific measures and clearly define the Contractor's E&S reporting obligations.

The Contractor will be required to prepare regular E&S performance reports throughout the construction phase. These reports will include updates on the implementation status of the C-ESMP, monitoring results, incidents and non-compliances, stakeholder engagement activities, and grievance records.

Reporting frequency and format will be specified in the C-ESMP and must align with the requirements of AYGM and the World Bank. All reports will be reviewed by the PIU and may be subject to third-party verification as needed.

4 DEVELOPMENT OF COMPLEMENTARY INSTRUMENTS

In accordance with Section 3.1.2 of the ToR, ÇINAR will prepare the complementary E&S instruments required under the WB-ESF. These instruments will be developed in parallel with the Draft ESIA and ESMP and will serve as standalone documents to guide implementation during the construction and operation phases.

4.1 Stakeholder Engagement Plan (SEP)

The Draft Stakeholder Engagement Plan (SEP) will identify all relevant stakeholders, including Project-Affected People (PAPs), vulnerable groups, public institutions, NGOs, and local communities. The Draft SEP will outline engagement principles, consultation methods, timelines, and responsibilities for ongoing communication throughout the project lifecycle.

The Draft SEP will also include a grievance redress mechanism (GRM) to address concerns and complaints in a timely, transparent, and culturally appropriate manner. Special efforts will be made to ensure inclusive and gender-sensitive engagement, especially in areas with limited access to information or services.

4.2 Labor Management Procedures (LMP)

The Labor Management Procedures (LMP) will define how labor-related matters will be managed during the project in accordance with World Bank ESS2 and Turkish labor laws. It will apply to direct workers, contracted workers, and primary supply workers.

The LMP will address:

- Terms and conditions of employment
- Occupational health and safety
- Non-discrimination and equal opportunity
- Minimum age of employment
- Workers' grievance mechanism
- Code of conduct provisions, including for SEA/SH risk mitigation

The LMP will be used as a framework for the Contractor's human resources and workforce management practices during construction.

4.3 Resettlement Framework (RF)

The Resettlement Framework will be prepared in accordance with World Bank ESS5 and relevant national legislation. It will outline the principles, procedures, and institutional responsibilities for addressing land acquisition, restrictions on land use, and involuntary resettlement.

The RF will:

- Establish eligibility criteria and compensation entitlements
- Define procedures for consultation with affected persons
- Describe mechanisms for livelihood restoration and support for vulnerable groups
- Include a grievance mechanism related to resettlement issues

This framework will guide the preparation of site-specific Resettlement Plan(s) (RP) during the implementation phase, if and where necessary.

4.4 Inputs to the Environmental and Social Commitment Plan (ESCP)

ÇINAR will provide inputs to the Environmental and Social Commitment Plan, which defines the actions, timelines, and responsibilities that AYGM and other implementing entities will commit to during project implementation to meet ESF requirements.

These inputs will include:

- A list of E&S instruments to be prepared, finalized, or updated
- Capacity building and institutional strengthening measures
- Reporting and monitoring obligations
- Compliance milestones and deadlines

The ESCP will be finalized in consultation with the World Bank and included as part of the legal agreement for the Project.

5 WORK PLAN AND SCHEDULE

All reports (Draft ESIA and Draft ESMP as well as SEP, RF and LMP documents) will be prepared by ÇINAR in English in the first phase. All deliverables will be subject to comments and feedback by the AYGM PIU and the World Bank, as required. ÇINAR will submit all final documents in Turkish and English for web disclosure and hard copy distribution to the public. ÇINAR will ensure compliance with all relevant national and international data protection laws and regulations at all times.

The field work carried out under the Project until the date of submission of this report is given in Table 5-1.

Table 5-1 Completed Site Studies by ÇINAR

Site Study	Date
Environmental Site Survey	16.04.2025
Initial stakeholder consultations within the scope of Draft SEP preparation	12.05.2025-15.05.2025
Cultural Heritage Impact Assessment	20.05.2025-24.05.2025
Field studies on biodiversity	27.06.2025-28.06.2025

The fieldwork activities to be undertaken as part of the Project are presented in Table 5-2.

Table 5-2 Site Studies to be undertaken by ÇINAR

Site Study	Date
Baseline Laboratory Measurements and Analysis	05-19.07.2025
Secondary Stakeholder Engagement Activities	21-25.07.2025
Socio-economic survey	21-25.07.2025

All outputs will be prepared and submitted to AYGM in accordance with the reporting milestones and the current status of these outputs and planned field studies are given in Table 5-3.

Table 5-3 Reporting Milestones

Document		Planned Date
1	Inception Report	under review
2	Draft Stakeholder Engagement Plan (SEP)	2.06.2025
3	Draft Resettlement Framework (RF)	30.06.2025
4	Draft Labor Management Procedures (LMP)	30.06.2025
5	Draft Environmental and Social Impact Assessment (ESIA)	28.07.2025
6	Draft Environmental and Social Management Plan (ESMP)	28.07.2025
7	Draft Inputs to the Environmental and Social Commitment Plan (ESCP)	25.08.2025
8	Final SEP	22.09.2025
	Final RF	
	Final LMP	
	Final Draft ESIA	
	Final Draft ESMP	
	Final Inputs to the ESCP	

6 EXPERT TEAM AND ASSIGNMENTS

In line with Section 6 of the ToR, ÇINAR has mobilized a multidisciplinary team comprising all the key experts defined as essential for the successful completion of the assignment. The team includes environmental, social, technical, and thematic specialists with proven experience in preparing Draft ESIA Report in compliance with both Turkish legislation and international standards such as the World Bank Environmental and Social Framework, IFC Performance Standards, and EBRD Performance Requirements.

The expert team structure is presented in Table 6-1, along with the general responsibilities and qualification profiles in line with ToR requirements:

Table 6-1 Key Experts and Their Responsibilities

Position	Responsibilities
Project Coordinator	Overall project coordination, quality assurance, ESIA oversight
Senior Environmental Specialist	Lead environmental baseline, impact and risk assessments
Senior Social Specialist	Socio-economic baseline, cultural heritage, resettlement, SIA
Land Acquisition & Resettlement Specialist	Prepare Resettlement Framework, assess land-based impacts
Archaeologist / Cultural Heritage Expert	Assess risks to tangible and intangible heritage, advise on mitigation
Occupational Health and Safety Specialist	OHS risk assessment, compliance with EHS and ESS2 standards
Biologist (Botanist)	Flora and vegetation baseline, critical habitat analysis
Zoologist (Terrestrial Ecologist)	Fauna assessment, biodiversity and habitat evaluation
Entomologist	Insect and pollinator species identification, critical habitat inputs
Ornithologist	Avifauna surveys, migratory routes, protected bird species
Stakeholder Engagement Expert	Prepare SEP, stakeholder mapping, grievance mechanism
Hydrogeologist	Groundwater baseline, well monitoring, vulnerability assessment
GIS Expert	Spatial analysis, thematic mapping, overlap/sensitivity maps
Gender Expert	Gender analysis, SEA/SH risk assessment, inputs to LMP & ESMP
Soil Expert	Soil classification, erosion risk, land use analysis

The deployment and field schedule of each expert will be aligned with the ESIA work plan and coordinated with the AYGM PIU.

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APPENDICES

Appendix-1: 1/125,000 scale Topographic Map Showing the Project Area

Appendix-2: 1/125,000 scale Land Asset Map Showing the Project Area

Appendix-3: 1/125,000 scale General Geology Map Showing the Project Area

Appendix-4: Draft Stakeholder List

Appendix-5: Site Inspections Planned by ÇINAR's Experts