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ÇINAR ENGINEERING CONSULTANCY INC.

GREAT RICH TECHNOLOGIES SPECIAL FUNCTIONAL FILMS PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

CNR-REP-GR-ESIA-001

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(Final)

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ABBREVIATIONS AND ACRONYMS

ABPRS	Address Based Population Registration System
AFAD	Disaster and Emergency Management Authority
AoI	Area of Influence
BMP	Biodiversity Management Plan
The Company	The Great Rich Limited
CHS	Community Health and Safety
CIA	Cumulative Impact Assessment
ÇINAR	Çınar Engineering Consultancy
DSİ	State Hydraulic Works
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
ENCR	Environmental Noise Control Regulation
EPRP	Emergency Preparedness and Response Plan
EQS	Environmental Quality Standards
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EU	European Union
GBVH	Gender Based Violence and Harassment
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GIS	Geographical Information System
GM	Grievance Mechanism
HR	Human Resources
IBA	Important Bird Area
IFC	International Finance Corporation
INA	Important Nature Area
IPA	Important Plant Area
İŞKUR	Turkish Employment Agency
ISO	International Organization for Standardization
KBA	Key Biodiversity Area
KGM	General Directorate of Highways
LAUs	Local Administrative Units

MoAF	Ministry of Agriculture and Forestry
MoEUCC	Ministry of Environment, Urbanization, and Climate Change
MTA	General Directorate Mineral Research and Exploration
NA	Not available
NAFZ	North Anatolian Fault Zone
NGO	Non-Governmental Organization
OHS	Occupational Health and Safety
OIP	Other Interested Parts
PAP	Project Affected Parts
PIF	Project Introduction File
PM	Particulate Matter
PPE	Personal Protective Equipment
Project	Annual Production Of 280 million Square Meters Of Designable Great Rich Technologies Project
PS	Performance Standard
RCIAP	Regulation on the Control of Industrial Air Pollution
RWIHC	Regulation on Water Intended for Human Consumption
SEA/SH	Sexual Exploitation and Abuse / Sexual Harassment
SEP	Stakeholder Engagement Plan
SWCR	Surface Water Quality Regulation
VESC	Valued Environmental and Social Component
VOC	Volatile Organic Compound
WBG	World Bank Group
WGM	Worker Grievance Mechanism
WHO	World Health Organization
WPCR	Water Pollution Control Regulation

LIST OF APPENDICES

EXECUTIVE SUMMARY

The Great Rich Technologies Project aims to establish a state-of-the-art manufacturing facility for advanced nanoporous materials used in energy storage, filtration, and catalysis. The project will generate economic and technological benefits, including job creation, innovation, and regional growth.

The facility will be located in Evrensekiz/Gündoğu Neighborhood (Lüleburgaz, Kırklareli Province), benefiting from industrial infrastructure and transportation access. The project will be executed in phases, starting with feasibility studies, followed by construction, commissioning, and full-scale production.

The project will comply with local, national, and international regulations, including Good International Industry Practice (GIIP), to ensure environmental protection, safety, and sustainability. The Environmental and Social Impact Assessment (ESIA) evaluates air and water quality, biodiversity, occupational and community health, cultural heritage, and socio-economic impacts. Mitigation measures will be implemented to minimize risks.

The ESIA Report integrates environmental and social considerations into project planning and decision-making. Key objectives include:

- Providing information for regulatory authorities, investors, and stakeholders.
- Anticipating and mitigating adverse impacts to reduce project risks.
- Ensuring compliance with national and international environmental and social standards.
- Promoting transparency and fostering stakeholder engagement.

As a greenfield investment, the ESIA focuses on IFC Performance Standards which are;

PS1: Assessment and Management of Environmental and Social Risks and Impacts

PS2: Labor and Working Conditions

PS3: Resource Efficiency and Pollution Prevention

PS4: Community Health, Safety, and Security

For this Project, PS5 (Land Acquisition and Involuntary Resettlement), PS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources), and PS8 (Cultural Heritage) screening were conducted. Screening showed that these PSs are not triggered.

The company will adhere to IFC's Policy on Environmental and Social Sustainability by preparing the following reports:

- Environmental and Social Impact Assessment (ESIA) Report
- Environmental and Social Management Plan (ESMP)
- Non-Technical Summary (NTS) (In Turkish)
- Stakeholder Engagement Plan (SEP)
- Pollution Prevention and Waste Management Plan (PPWMP)
- Occupational Health & Safety (OHS) Management Plan
- Emergency Preparedness & Response Plan (EPRP)
- Labor Management Plan (LMP)

- Community Health & Safety Plan (CHSP)
- Chance Find Procedure (CFP)

The ESIA methodology follows international best practices (IEMA, UK EIA guidelines, and IFC standards). Impacts are assessed based on:

- Magnitude (geographical extent, reversibility, duration, frequency)
- Receptor Sensitivity (importance, rarity, potential substitution)
- Impact Significance (quantitative and qualitative assessments)

Impact assessment criteria categorize effects as high, medium, low, or negligible, with corresponding mitigation measures.

This comprehensive assessment ensures that the Great Rich Technologies Project aligns with sustainability goals, environmental standards, and stakeholder expectations. E&S risks and impacts of the Project are as follows:

- Land Review, Land use, Soil, and Geology,
- Noise and Vibration,
- Air Quality and Greenhouse Gas Emissions,
- Climate Change Risk Assessment,
- Water Resources, Water Quality, and Wastewater,
- Resources and Waste Management,
- Biological Environment,
- Socio-Economic Environment,
- Labor and Working Conditions,
- Occupational Health and Safety

The potential impacts and risks have been categorized as Major, Moderate, Minor, and Negligible, with efforts focused on avoiding and minimizing them in line with the impact mitigation hierarchy. The Environmental and Social Management Plan will be prepared specifically for the Project. It outlines measures for mitigating and monitoring environmental and social risks and impacts associated with the project activities. The plan includes institutional measures and specifies the actions needed for their implementation. It also identifies potential adverse effects and recommends interventions to address them. It sets out the requirements for the effective and timely execution of these interventions, along with detailed explanations on how these requirements will be met. Specifically, the monitoring section includes a detailed description and technical specifications of the monitoring measures, such as monitoring parameters, locations, methods, frequency, legal requirements, key performance indicators, responsible parties, and monitoring and reporting procedures.

For the effective implementation of the Environmental and Social Management Plan, roles and responsibilities will be clearly defined, and a comprehensive training program will be established to support capacity building.

The Company and the Contractor are responsible for conducting the necessary monitoring and audit activities required by the Project and completing the relevant reporting. Regular internal audits and E&S monitoring will be carried out by The Company during the construction and operation phase.

1 INTRODUCTION

The Great Rich Technologies Project (Great Rich Technologies Project) is a significant industrial development aimed at establishing a state-of-the-art manufacturing facility for the production of innovative nanoporous materials. These materials are designed to cater to a range of applications, such as energy storage, filtration, and catalysis, offering advanced technological solutions to industries worldwide.

The project is expected to bring substantial economic and technological benefits to the region, generating job opportunities, fostering innovation, and contributing to regional economic growth. By introducing advanced manufacturing techniques and processes, the project aims to position itself as a leader in the production of high-tech materials with sustainable and eco-friendly attributes. Great Rich Technologies Limited operates a similar production facility named in Jiangyin, China, with several photos provided below.

Figure 1-1. Huizhi Factory View-1

Figure 1-2: Views from Workshops

Figure 1-3. Views from Production Areas

Figure 1-4. Views from Packaging Machine

The proposed facility will be strategically located in Evrensekiz OIZ at Evrensekiz/Gündoğu Neighborhood, within the district of Lüleburgaz, Kırklareli Province, an area known for its favorable industrial infrastructure and easy access to transportation networks, enabling efficient logistics for both raw material sourcing and product distribution. The project will be executed in phases, starting with feasibility studies and design, followed by construction and commissioning of the facility, and concluding with full-scale operational production.

In line with regulatory requirements and Good International Industry Practice (GIIP), the project will adhere to local, national, and international standards related to environmental protection, safety, and sustainability. The Environmental and Social Impact Assessment (ESIA) plays a crucial role in evaluating the potential environmental and social impacts and risks associated with the project. This ESIA assessed various factors in environmental status such as air and water quality, ecological impacts, occupational &community health and safety risks, cultural heritage and socio-economic consequences for local communities, providing a comprehensive evaluation of the project's potential effects and risks. It will also identify appropriate mitigation measures to minimize adverse impacts and ensure the project's long-term sustainability.

Through this comprehensive assessment, the project aims to integrate sustainable development practices, ensuring that it aligns with both environmental standards and social expectations. The ESIA will also include extensive stakeholder engagement to ensure the concerns of affected people (PAP), including disadvantaged /and or vulnerable groups, and other interest groups, if any, are addressed and incorporated into the project planning and implementation.

1.1 Scope and Purpose of the ESIA

This ESIA Report serves as a comprehensive document detailing the findings and analysis of the ESIA process and it is crucial for promoting sustainable development by integrating environmental and social considerations into project planning and decision-making processes. This report outlines the extent of the E&S assessments. It provides a detailed examination of potential E&S risks and impacts associated with the project, considering factors such as land use and soil, air quality, noise and vibration, water resources, biodiversity, community health and safety, occupational health and safety, labour and working conditions, affected stakeholders and livelihoods. The report identifies measures to avoid, minimize, or mitigate adverse impacts, along with plans for monitoring and managing environmental and social risks during project implementation/lifecycle of the project.
The general purposes of the ESIA are summarized as follows:

- The ESIA report provides decision-makers, such as regulatory authorities, project proponents, and investors, with the information needed to make informed decisions regarding project approval, modification, or rejection,
- The report helps to anticipate and mitigate adverse impacts, reducing the likelihood of negative consequences during project implementation by identifying potential environmental and social risks,
- It ensures compliance with environmental and social regulations and standards, both at the national and international levels (IFC PSs).
- It promotes transparency by disclosing the environmental and social implications of the proposed project to stakeholders and the public, fostering accountability in project decision-making processes.

The report supports efforts to address conflicts and build consensus among diverse stakeholders by documenting stakeholder concerns and incorporating feedback into the assessment process. Being a greenfield investment, the ESIA primarily focuses on IFC PS1, PS2, PS3, PS4, PS6 and PS8 by considering the project's nature.

1.2 Structure of the ESIA Report

The general outlines of the ESIA report covering the important environmental and social issues related to the Project are given in Table 1-1.

Table 1-1. Structure of the ESIA Report

Chapter	Name	Description
1	Introduction	Overview of the Project and ESIA studies.
2	Regulatory Frameworks	Description of the legal and institutional context of the project, international requirements including IFC requirements, a gap analysis between national legislation and IFC Sustainability Framework, along with specifications.
3	Project Description	Details of the project components, project phases and project alternatives.
4	Environmental and Social Baseline, Impact Assessment and Mitigation Measures	Subdivided into various sections addressing different environmental and social aspects such as the physical environment, biological environment, socio-economic environment.
5	Environmental and Social Management System	Identification of existing ESMS of The Company and organizational structure of the Project.
6	Environmental and Social Management Plan	Identification of the mitigation and management measures and monitoring requirements to ensure effective implementation of the E&S impacts and risk (wil be submitted as a separate plan).
7	Stakeholder Engagement	Description of the methods and outcomes of engaging with internal and external stakeholders.
8	Grievance Mechanism	Explanation of the methods to provide affected parties with a means to voice their grievances, seek solutions, and ensure accountability.

1.3 Project Deliverables

The Company is responsible for the deliverables in line with the IFC's Policy on Environmental and Social Sustainability.

The deliverables within the scope of the new investment are outlined as follows:

- Environmental and Social Impact Assessment Report (ESIA)
- Environmental and Social Management Plan (ESMP)
- Non-Technical Summary (NTS)
- Stakeholder Engagement Plan (SEP)
- Pollution Prevention and Waste Management Plan (PPWMP)
- Occupational Health and Safety (OHS) Management Plan
- Emergency Preparedness and Response Plan (EPRP)
- Labor Management Plan (LMP)
- Community Health and Safety Plan (CHSP)

1.4 ESIA Methodology

The methodology for characterizing the environmental and social risks and impacts resulting from the Project's implementation has been formulated based on the frameworks outlined in relevant UK government publications on Environmental Impact Assessment (Institute of Environmental Management and Assessment-IEMA, 2011: The State of Environmental Impact Assessment Practice in the UK; Highways Agency 205/08: Volume 11, Chapter 2 Environmental Impact Assessment and Handbook for Scoping Projects: Environmental Impact Assessment), 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.).

According to the best GIIP practices, the significance of impacts will be assessed by considering the overall magnitude of the Project's impact on that particular receptor and the sensitivity of the receptor. The magnitude of the impact will be evaluated utilizing quantitative methods whenever feasible, or alternatively, qualitative approaches primarily relying on professional judgment when quantitative assessment is not feasible. It is important to note that environmental and/or social impacts may vary in their nature, being either beneficial or adverse.

The overall magnitude of impacts will be assessed based on several key components. The magnitude of an impact or effect will be assessed through a comprehensive analysis of criteria, which may include but are not limited to 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/rare)

Criteria for magnitude factors are provided in Table 1-2.

Table 1-2. Magnitude Factors and Scales

Factor	Scales		
Magnitude	**High**	**Medium**	**Low**
Geographical extent	Wide	Local	Restricted
	Beyond the area of influence*	Within the area of influence*	Within the project site
Reversibility	Long-term reversible / Irreversible	Medium-term reversible	Short-term reversible
	Reversible after the operation period or irreversible	Reversible within the operation period	Reversible within construction period 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

**See Chapter 1.5*

On the other hand, **the sensitivity of the receptor** will be determined based on comprehensive baseline information, taking into account factors such as public interest, designations, legal requirements, acceptability, sustainability, and any other relevant considerations. Additionally, where applicable, consultation with affected communities will be undertaken to ensure a thorough understanding of the sensitivity of the receptors involved.

The general criteria for assessing the sensitivity of the receptor and determining the overall magnitude are outlined in Table 1-3. Specific assessments and any methodological variations for individual environmental and/or social components are detailed in the relevant chapters of the ESIA Report.

Table 1-3. 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 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 more characteristics, features or elements	No or very minor benefit to or positive addition of one or more characteristics, features or elements

Following the identification overall magnitude of an impact on that specific receptor and receptor sensitivity, 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 1-4.

Table 1-4. Significance Assessment Matrix

		Receptor Sensitivity			
		High	Medium	Low	Negligible
Overall Magnitude	High				
	Medium				
	Low				
	Negligible				

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 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.

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

1.5 Area of Influence (AoI) and ESIA Study Area

According to IFC Performance Standards on Environmental and Social Sustainability, where the project involves specifically identified physical elements, aspects, and facilities that are likely to generate impacts, environmental and social risks and impacts will be identified in the context of the project's area of influence. This area of influence encompasses, as appropriate:

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

In consideration of the above definition of the AoI, it is required to conduct ESIA studies in areas that at least cover the AoI. Thus, the overall ESIA study area has been defined to be wide enough to encompass the AoI for each environmental and social impact component.

A 1,000-meter radius around the boundaries of the project site has been designated as AoI from an environmental perspective (see Figure 1-5). On the other hand, from the social perspective, the study area for the assessment of social impacts may be extended up to 2 km, as necessary, to cover affected communities by taking into account the direct and indirect effects of the Project. Besides, for cumulative impact assessments, the area within a 3 km

radius and sub basin boundaries of the downstream of Ergene River Branch has been identified as the Cumulative AoI (Figure 6-3).

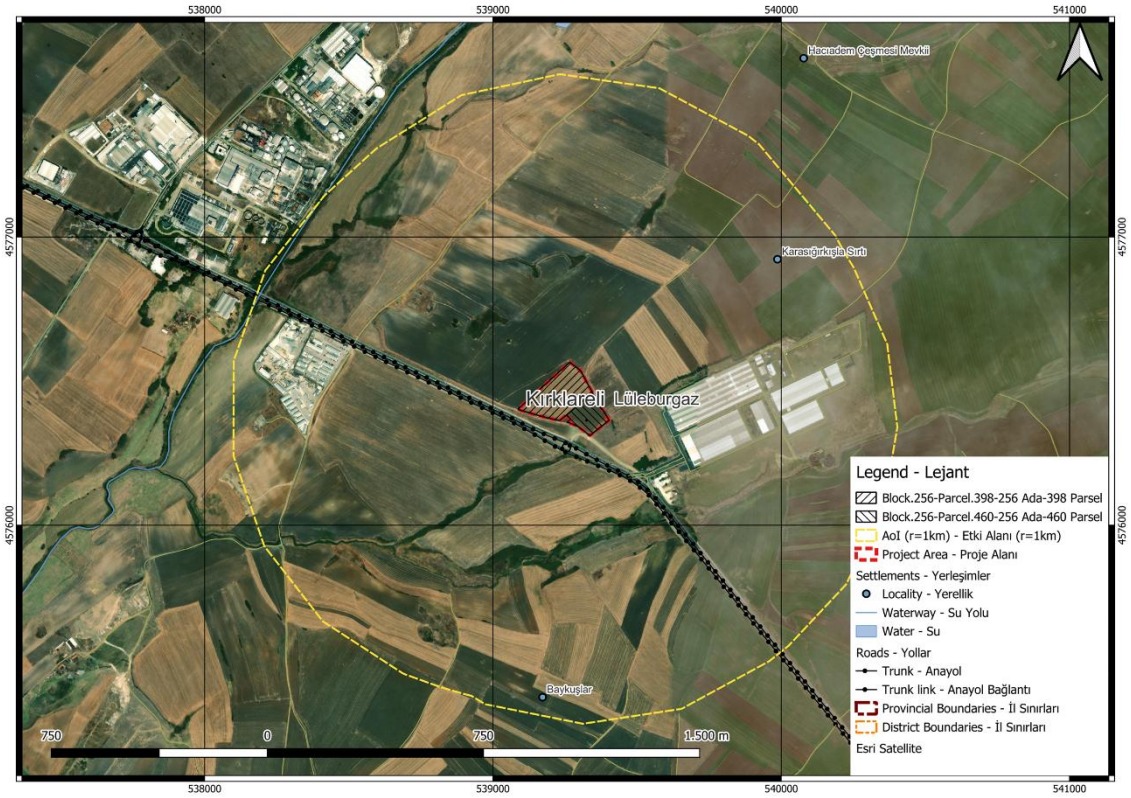

Figure 1-5. Project Area and its AoI

1.6 Limitations and Uncertainties

The Environmental and Social Impact Assessment (ESIA) process is an essential tool for identifying and addressing potential environmental and social impacts of the project. However, as with any complex assessment, there are inherent limitations and uncertainties that need to be acknowledged and addressed. These limitations and uncertainties include:

Data Gaps and Availability

One of the key challenges encountered during the ESIA was the availability and completeness of baseline environmental and social data. In some cases, data on local biodiversity, soil conditions, and air and water quality were limited or unavailable, which may have impacted the precision of the impact assessments.

Measures: To address these gaps, additional field surveys and data collection efforts were conducted where feasible. For example, targeted surveys on local wildlife and vegetation were undertaken to enhance the understanding of biodiversity in the project area. Additionally, collaboration with local authorities and environmental agencies helped to fill in data gaps related to air and water quality.

Site-Specific Variability

The project area is subject to variability in environmental and social conditions that may not have been fully captured during the initial assessment. For example, changes in seasonal weather patterns, agricultural practices, or unanticipated social dynamics could affect the magnitude and scope of impacts.

Measures: To address this uncertainty, a flexible and adaptive approach was adopted for monitoring and mitigation. Ongoing monitoring programs were designed to allow for adjustments to mitigation measures as site conditions evolve. This includes real-time monitoring of air quality, noise, and water resources, with adjustments made if impacts exceed established thresholds.

Unpredictable Social Dynamics

The social dynamics of the local communities may evolve over time, and there may be unforeseen changes in community perceptions, behaviours, or expectations. Additionally, the long-term social impacts of the project, such as employment opportunities and local infrastructure improvements, are difficult to fully predict.

Measures: Regular stakeholder consultations and community engagement sessions were scheduled throughout the project's lifecycle to ensure that emerging social issues are identified and addressed promptly. A grievance mechanism was established to provide a structured approach for addressing any social concerns that arise during construction and operation.

Regulatory and Policy Changes

Environmental regulations and social policies may change during the course of the project, potentially altering the compliance landscape. Uncertainty regarding future amendments to local, regional, or national regulations could impact project implementation, particularly with regard to waste management, water use, and labour standards.

Measures: The ESIA process included a review of existing regulations and a commitment to complying with both national and international environmental and social standards. In addition, a system for monitoring regulatory changes was put in place to ensure the project remains in compliance with any new or updated policies. Any significant regulatory changes will be addressed through the adaptive management framework.

Climate Change and Extreme Weather Events

Climate change introduces uncertainty regarding the future frequency and intensity of extreme weather events, such as floods, droughts, and storms. These events could exacerbate environmental impacts or disrupt construction activities.

Measures: Climate change considerations were incorporated into the project's planning phase, including the identification of vulnerable infrastructure and the development of climate-resilient designs. The project team will also be prepared to adapt to changing conditions by implementing contingency plans for extreme weather events, including flood prevention measures and the adaptation of construction schedules to mitigate delays caused by inclement weather.

2 REGULATORY FRAMEWORKS

2.1 National Legislation

Turkish Environmental Law No. 2872, which was issued in the Official Gazette No. 18132 on August 11, 1983, describes the fundamental principles required to protect the environment in accordance with sustainable development and sustainable environmental goals. Environmental Law provides a legal framework for the development of environmental regulations in accordance with national and international standards.

In addition to Environmental Law and associated regulations, several laws in relation with environmental protection, pollution prevention and control, human rights and safety are listed in Table 2-1.

Table 2-1. Highlighted Laws Covered by National Legislation

Law	Law Number
Electricity Market Law	6446
Energy Efficiency Law	5627
Groundwater Law	167
Highway Traffic Law	2918
Labor Law	4857
Law on Measures to be taken and Aids to be provided for Disasters Effective in Public Life	7269
Law on Right to Information	4982
Law on Soil Conservation and Land Use	5403
Municipality Law	5393
Occupational Health and Safety Law	6331
Public Health Law	1593
Agricultural Law	5488
Forestry Law	6831
Law on Conservation of Cultural and Natural Assets	2863
Law on Soil Conservation and Land Use	5403
National Parks Law	2873
Hunting Law	4915
Pasture Law	4342

Environmental, social and OHS-related regulations that are valid for the project within the above-mentioned laws are listed in Table 2-2.

Table 2-2. Prominent Regulations Covered by National Legislation

Regulation Name	Relevance of the Legislation with the Project	Official Gazette Date	Issue
Environmental Permits and Licenses (General)			
Regulation on Environmental Impact Assessment	Evaluating the activities carried out within the scope of the project, including related and auxiliary facilities, according to the Annex-1 and Annex-2 lists of the Regulation, and obtaining decisions on “EIA Out of Scope” “EIA Not Required” or “EIA Positive”.	29.07.2022	31907
Regulation on Environmental Permits and Licenses	Evaluating the activities carried out within the scope of the project, including related and auxiliary facilities, according to the Annex-1 and Annex-2 lists of the Regulation, and obtaining necessary environmental permit(s) on air emissions, wastewater discharge and environmental noise.	10.09.2014	29115
Regulation on Environmental Audit	It covers the procedures and principles regarding environmental inspections and the application of administrative sanctions in accordance with Environmental Law No. 2872, as well as the related works and transactions to be carried out throughout the implementation period of the project.	12.06.2021	31509
Regulation Concerning Environmental Management Services	It explains the procedures and principles regarding the conditions, certification, and obligations of those who will provide environmental management services within the scope of the project.	01.11.2022	32000
Regulation on Pollutant Release and Transportation Record	It explains the procedures and principles for establishing the release and transportation records of pollutants to protect the environment and reduce environmental pollution from diffuse sources and industrial sources.	04.12.2021	31679
Climate Change			
Regulation on Minimization of Ozone Depleting Substances	It determines the procedures and principles regarding the use and termination of substances controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer, to be used within the scope of the project	07.04.2017	30031
Regulation on Monitoring of Greenhouse Gas Emissions	It covers monitoring, reporting, and verification of greenhouse gas emissions arising from activities included in the annexes of the regulation.	17.05.2014	29003
Land Use and Soils			
Regulation on Control of Soil Pollution and Point Source Contaminated Sites	It determines the principles for preventing soil contamination as a receiving environment due to project activities, identifying contaminated or potentially contaminated sites and sectors, and the cleanup and monitoring of contaminated soils and sites in alignment with sustainable development goals.	08.06.2010	27605
Regulation on Protection, Use and Planning of Agricultural Lands	It defines the procedures and principles for ensuring that project activities do not affect agricultural land, preventing misuse, and taking necessary measures in accordance with the principles of sustainable development.	09.12.2017	30265
Water			

Regulation Name	Relevance of the Legislation with the Project	Official Gazette Date	Issue
Regulation on Surface Water Quality	It determines the procedures and principles for monitoring, determining, and classifying the quality and quantity of surface water resources and for the measures to be taken to achieve good water status. Baseline measurements and/or analyses to evaluate the impact of project activities on water resources are carried out within this framework.	30.11.2012	28483
Regulation on Water Pollution Control	In the case of wastewater discharge resulting from project activities (such as effluent from a wastewater treatment plant), it specifies the standards that the discharged water must meet.	31.12.2004	25687
Regulation Concerned Water Intended for Human Consumption	It sets the appropriate quality standards for hygiene and health for mains water or groundwater used as drinking water by employees within the scope of the project.	17.02.2005	25730
Regulation Concerning Protection of Groundwater against Pollution and Deterioration	It establishes the principles for protecting the current state of groundwater from project activities, preventing pollution and degradation, and improving the water quality.	07.04.2012	28257
Regulation on Monitoring of Surface Water and Groundwater	It covers issues related to the monitoring of surface water and groundwater resources affected directly or indirectly by the project activities.	11.02.2014	28910
Regulation on Control of Pollution Caused by Hazardous Substances in and around the Water Bodies	It includes measures to detect, prevent and gradually reduce pollution caused by hazardous substances in water and its surroundings resulting from project activities and associated/auxiliary facilities.	26.11.2005	26005
Regulation on Planned Areas Zoning	It includes procedures and principles regarding building and construction in accordance with the plan, science, health and sustainable environmental conditions, project design and supervision. Article 7 of the Regulation states that “The mechanical installation projects of the buildings to be built on parcels larger than 2,000 m² must include a rainwater collection system to collect the rainwater to be collected from the roof surface, if necessary, filtered and collected in a tank and used in building toilet flushes.”	03.07.2017	30113
Communique on Sampling of Surface Water, Groundwater and Sediment and Biological Sampling	It explains the requirements for taking samples, transporting, protecting, and storing samples in order to determine the impact of project activities on the aquatic environment (for baseline measurements, periodic monitoring, and measurements to be made in case of any grievances).	21.02.2015	29274
Communique on Administrative Procedures for the Regulation on Water Pollution Control	The purpose of this Communiqué is to regulate the administrative procedures and practices concerning the responsibilities and permit acquisition principles outlined in the Water Pollution Control Regulation, published in the Official Gazette on 31 December 2004, with the number 25687. This Communiqué addresses the principles for obtaining permission for the direct discharge of all	10.10.2009	27372

Regulation Name	Relevance of the Legislation with the Project	Official Gazette Date	Issue
	types of urban, domestic, and/or industrial wastewater into the receiving environment.		
Waste Management			
Regulation on Control of Packaging Wastes	It includes requirements for effective waste management and disposal in line with the waste management hierarchy, applicable to all phases of the project, based on the type of waste generated.	26.06.2021	31523
Regulation on Waste Management		02.04.2015	29314
Regulation on the Control of Excavation Soil, Construction and Demolition Wastes		18.03.2004	25406
Regulation on the Control of Medical Wastes		25.01.2017	29959
Regulation on the Management of Waste Oils		21.12.2019	30985
Regulation on the Control of Vegetable Waste Oils		06.06.2015	29378
Regulation on the Control of Waste Batteries and Accumulators		31.08.2004	25569
Regulation on the Control of End-of-Life Tires		25.11.2006	26357
Regulation on the Control of Waste Electrical and Electronic Equipment		26.12.2022	32055
Regulation on the Control of End-of-Life Vehicles		30.12.2009	27448
Regulation on Zero Waste	It contains the principles that must be adopted for the protection of the environment, human health, and all resources in waste management processes in line with the principles of sustainable development throughout the life of the project.	12.07.2019	30829
Regulation on the Landfill of Wastes	It explains the characteristics and requirements of the sanitary landfills to which the waste generated within the scope of the project and that cannot be recycled will be sent	26.03.2010	27533
Air Quality and Greenhouse Gas Emissions			
Regulation on the Control of Industrial Air Pollution	It covers the examination and determination of the prevention of air pollution resulting from project activities, the limit values that must be maintained in the receiving environments (sensitive receptors), and the flue gas emission limit values originating from the facility (as fixed emission sources).	03.07.2009	27277

Regulation Name	Relevance of the Legislation with the Project	Official Gazette Date	Issue
Regulation on Assessment and Management of Air Quality	It covers the necessary measures to define air quality targets and ensure good air quality in order to prevent or reduce the harmful effects of air pollution resulting from the activities carried out within the scope of the project on the environment and human health.	06.06.2008	26898
Regulation on the Control of Exhaust Gas Emissions	It contains the procedures and principles regarding the protection of living beings and the environment from the effects of air pollution caused by exhaust gases from motor vehicles used in project activities and driving in traffic. It ensures the reduction of exhaust gas pollutants, their control through measurements, and implementation.	11.03.2017	30004
Regulation on Monitoring of Greenhouse Gas Emissions	It covers the procedures and principles for monitoring, reporting, and verifying both direct and indirect (due to the supply chain) greenhouse gas emissions arising from project activities, mainly from traffic/transportation and auxiliary/associated facilities.	17.05.2014	29003
Regulation on Increasing Efficiency in the Use of Energy Resources and Energy	It covers the procedures and principles for the effective use of energy during the construction and operation periods of the project, aiming to prevent energy waste, reduce energy costs, and increase efficiency in the use of energy resources to protect the environment.	27.10.2011	28097
Management of Chemicals			
Regulation on Classification, Labelling and Package of Materials and Mixtures	It regulates the administrative and technical procedures and principles for the classification, labeling, and packaging of chemicals and hazardous substances used in the project to ensure a high level of protection for human health and the environment and to facilitate their safe circulation.	11.12.2013	28848
Regulation on Safety Information Forms on Hazardous Substances and Mixtures	It regulates the administrative and technical procedures and principles for the preparation and distribution of safety data sheets to ensure effective control and supervision of the adverse effects that chemicals and hazardous substances used in the project may have on human health and the environment.	13.12.2014	29204
Regulation Regarding Prevention of Major Industrial Accidents and Mitigation of Their Effects (“BEKRA”)	It determines the procedures and principles for measures to ensure a high level of effective and continuous protection against major industrial accidents in related and auxiliary facilities containing hazardous substances, and to minimize the potential damage to people and the environment.	02.03.2019	30702
Regulation Regarding Transport of Hazardous Materials on Highways	It defines the necessary procedures and principles for carrying out hazardous material transportation on public roads within the scope of the project in a safe, secure, and orderly manner, without harming human health, other living beings, or the environment.	18.06.2022	31870
Community and Occupational Health and Safety and Labor and Working Conditions			

Regulation Name	Relevance of the Legislation with the Project	Official Gazette Date	Issue
Regulation on Occupational Health and Safety Risk Assessment	It regulates the procedures and principles for conducting risk assessments related to occupational health and safety in the project's activity areas, including related and auxiliary facilities.	29.12.2012	28512
Regulation on Occupational Health and Safety Services	It regulates the authorization of joint health and safety units for providing occupational health and safety services within the scope of the project, including the issuance and cancellation of authorization certificates, as well as their duties, powers, responsibilities, and working procedures.	29.12.2012	28512
Regulation on Duties, Authority, Responsibilities and Trainings of Occupational Health and Safety Specialists	It regulates the qualifications, training, and certification of occupational safety experts, as well as their duties, powers, responsibilities, and working procedures for the occupational health and safety services to be received within the project.	29.12.2012	28512
Regulation on Procedures and Principles of Occupational Health and Safety Training of Employees	It regulates the procedures and principles for providing occupational health and safety training to employees within the scope of the project.	15.05.2013	28648
Regulation on the Occupational Health and Safety Committees	It determines the working procedures and principles for occupational health and safety committees in workplaces with fifty or more employees where continuous work lasts more than six months.	18.01.2013	28532
Regulation on the Health and Safety Measures to be taken in Workplace Buildings and Additions	It specifies the minimum health and safety conditions for workplace buildings and extensions used in the project.	17.07.2013	28710
Regulation on Protection of Buildings from Fire	It defines the procedures and principles for measures, organization, training, and inspection before and during a fire in areas where project activities are conducted.	19.12.2007	26735
Regulation on Emergency Cases in Workplaces	It regulates the procedures and principles for preparing emergency plans in workplaces used for the project, covering prevention, protection, evacuation, firefighting, first aid, and similar issues, as well as the safe management of these situations and the assignment of responsible employees.	18.06.2013	28681
First Aid Regulation	It regulates the procedures and principles for reducing the risk of death and injury due to accidents by ensuring the presence of first aiders based on the number of personnel in the project facilities; it also covers the establishment, operation, and inspection of centers for first aid instructor training, first aid training, and the certification of first aiders.	29.07.2015	29429
Communique on Hazard Classes List related to Occupational Health and Safety	It determines the hazard classes of workplaces used in the project for occupational health and safety purposes.	26.12.2012	28509
Regulation Concerning the Protection of Workers from Risks Associated with Noise	It defines the minimum requirements to protect employees from health and safety risks resulting from exposure to noise in the project's activity areas, particularly hearing-related risks.	28.07.2013	28721
Regulation Concerning the Protection of Workers from Risks Associated with Vibration	It establishes the minimum requirements for protecting employees from health and safety risks resulting from exposure to mechanical vibration within the scope of the project.	22.08.2013	28743

Regulation Name	Relevance of the Legislation with the Project	Official Gazette Date	Issue
Regulation on Health and Safety Conditions in the Use of Work Equipment	It defines the minimum health and safety requirements for the use of work equipment in workplaces used for the project.	25.04.2013	28628
Regulation on Occupational Health and Safety in Construction Works	It defines the minimum occupational health and safety requirements for construction works within the scope of the project	05.10.2013	28786
Regulation on Health and Safety Regarding Temporary and Time Limited Works	It ensures that employees on temporary or fixed-term contracts within the scope of the project are provided with the same level of health and safety protection as other employees in the workplaces.	23.08.2013	28744
Regulation on Health and Safety Precautions Regarding Working with Chemicals	It defines the minimum requirements for protecting employees' health and ensuring a safe working environment from existing or potential risks arising from chemicals present, used, or processed in workplaces within the scope of the project.	12.08.2013	28733
Regulation on Health and Safety Signs	It defines the minimum requirements for the implementation of health and safety signs to be used in workplaces.	11.09.2013	28762
Regulation on Dust Management	It defines the procedures and principles for dust control in workplaces used within the scope of the project to prevent risks arising from dust and ensure the protection of workers from its effects.	05.11.2013	28812
Regulation on Personal Protection Equipment	It defines the procedures and principles regarding the requirements for the Personal Protective Equipment (PPE) purchased and used within the scope of the project.	01.05.2019	30761
Regulation on Usage of Personal Protective Equipment in Workplaces	It determines the procedures and principles regarding the features, supply, use, and other matters related to personal protective equipment to be used to prevent or adequately reduce risks in the workplaces within the scope of the project.	02.07.2013	28695
Regulation on Vocational Training of the Employees Working in Dangerous and Highly Dangerous Workplaces	It regulates the procedures and principles for the vocational training of employees in hazardous and very hazardous works within the scope of the project.	13.07.2013	28706
Noise			
Regulation on Environmental Noise Control	It covers the procedures and principles for controlling environmental noise and vibration originated from project activities to prevent their adverse effects on the environment and human health and includes the limit values that must be met in receiving environments.	30.11.2022	32029
Regulation on Environmental Noise Emission Caused by Equipment Used Outdoors	It establishes the procedures and principles for the application of noise emission standards for equipment used in open areas within the scope of the project, including the collection of technical documents and information, compliance assessment procedures, and labeling.	30.12.2006	26392
Social			
Regulation on the Implementation of Law Concerning Private Security Services	It establishes the procedures and principles for the requirements of private security services to be procured within the scope of the project.	07.10.2004	25606

Regulation Name	Relevance of the Legislation with the Project	Official Gazette Date	Issue
Others			
Regulation on Traffic in Highway	It covers measures to ensure traffic order on highways within the scope of the project's activities and addresses all issues related to traffic safety for people and property.	18.07.1997	23053
Regulation on Opening a Business and Working Licenses	It regulates the principles and procedures for issuing business opening and working licenses for the workplaces used in the project activities.	10.08.2005	25902

2.1.1 Environmental Impact Assessment under National Legislation

An EIA is a systematic approach to figure out the favourable and adverse impacts/risks of a defined project on the environment. This process is not a decision-making process in itself; it is a process that progresses in parallel with the decision-making process and acts as a supporting mechanism. It is the analysis and assessment of environmental impacts resulting from new projects and developments, including the social consequences and alternative solutions of all direct or indirect, permanent, or transient potential impacts.

EIA studies have been granted legal status through Article 10 of Environmental Law No. 2872, which was published in the Official Gazette dated 11/8/1983 and numbered 18132 in Turkiye. On 7 February 1993, the EIA Regulation was put into force and has undergone amendments many times to date, and it has been completely amended 8 times in total, all aimed at aligning with the European Union (EU) Legislation and the EU EIA Directive for harmonization purposes. Currently, the Environmental Impact Assessment Regulation, published in the Official Gazette dated 29/07/2022 and numbered 31907, is in force.

With the introduction of the online EIA Process Management System, known as “e-ÇED”, institutions and organizations authorized by the Ministry of Environment, Urbanization and Climate Change (MoEUCC) can now submit EIA applications through this digital platform.

The EIA process consists of three phases:

i. Environmental baseline studies
ii. EIA Studies
iii. Establishment of environmental and social management plans and monitoring activities

EIA studies will commence following environmental baseline studies. These baseline studies involve the following steps.

- Identifying facilities and settlements within the project area,
- Assessing existing environmental conditions,
- Determination of the methods and means for the determination of environmental impacts, determination of possible environmental (direct and indirect) impacts,
- Setting standards related to environmental impacts and determination of future distribution (investment and operation periods),
- Determination of analysis criteria in terms of quantity and quality,
- Determining and examining the existing transportation system,
- Taking the necessary images both in the project area and the environment in the field with the digital camera,
- Identifying and investigation of the nearest protected areas and sensitive ecosystems to the project area. In case of the presence of National Parks, Nature Parks, Wetlands Wildlife Protection Areas. Natural Heritage, Nature Conservation Areas, Reserve Areas. Biogenetic Reserves, Natural Sites and Monuments, Biosphere Archaeological, Historical, Cultural Mass, Special Environmental Protection Areas Special Protected Areas, Tourism Documents etc. in the activity area, further study should be done in this regard.

In Türkiye, the procedures for EIA studies differ based on whether the projects are listed in Annex I or Annex II of the EIA Regulation. For activities in the Annex-I list, an EIA Report is prepared. For activities in the Annex-II list, a Project Introduction File (PIF) is compiled.

A summarized representation of the EIA process in Türkiye is provided in Figure 2-1.

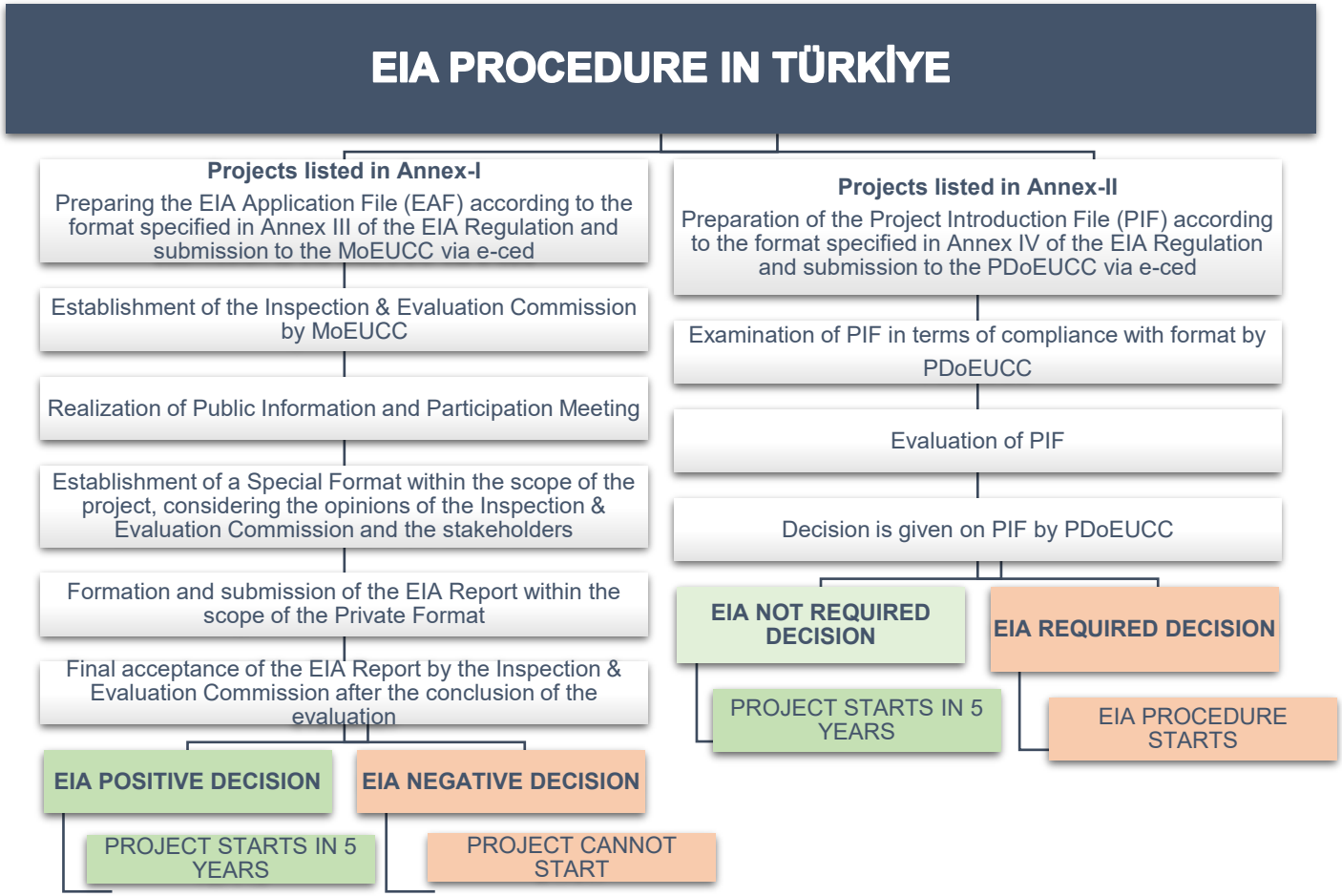

Figure 2-1. EIA Process in Türkiye

2.1.1.1 Evaluation within the scope of Regulation on Environmental Impact Assessment

The project is considered outside the scope under the Turkish EIA Regulation, and discussions with the local authority are ongoing to obtain the relevant opinion accordingly.

As of June 2025, once the land transfer procedures are completed, the necessary applications will be submitted in accordance with national legislation to obtain the official letter confirming exemption from the Environmental Impact Assessment (EIA) process, and the relevant exemption letter will be obtained from Kırklareli Provincial Directorate of Environment, Urbanization and Climate Change. GRT plans to complete the land transfer within two weeks and then EIA can be updated.

2.1.2 Project-Related Licenses, Permits and Approvals

The essential environmental permits and/or licenses required for the Project are as follows:

- Land use permit (title deed),
- EIA permission/opinion,
- Construction permit/building license,
- Business Opening and Working License,
- Environmental permit in terms of environmental noise, wastewater discharge and/or air emissions for the planned Project,
- Approval of Industrial Waste Management Plan,
- Agreements made with licensed waste management and disposal companies,
- Permit for private security.

2.2 International Standards

2.2.1 IFC Sustainability Framework

The IFC Sustainability Framework (2012) serves as a comprehensive structure designed to help private sector companies manage environmental, social, and governance (ESG) risks in alignment with sustainable development goals. It reflects the International Finance Corporation's (IFC) commitment to ensuring that business activities not only contribute to economic growth but also uphold high standards of social and environmental responsibility.

The framework's main objective is to promote sustainability by guiding clients to manage risks responsibly and achieve positive environmental and social outcomes. Key benefits include:

- Risk Mitigation: Helps businesses identify and address potential environmental and social risks early.
- Enhanced Performance: Promotes sustainable practices that can improve overall project efficiency and effectiveness.
- Stakeholder Engagement: Facilitates better relationships with local communities and stakeholders.
- Compliance with Global Standards: Ensures alignment with international sustainability practices, enhancing reputation and trust.

The **IFC Performance Standards (PS)** are a set of principles that guide the management of environmental and social risks and impacts in projects. They provide a framework for understanding project impacts, establishing mitigation measures, and ensuring sustainable development. These standards will be considered and adhered to during the ESIA study to ensure that the **Great Rich Technologies Project** is managed responsibly and complies with international best practices.

The following **IFC Performance Standards, WBG General and Sectoral EHS Guidelines** *(specifically Printing – 2007)* are considered relevant to the project and were incorporated into the ESIA study:

Table 2-3. IFC PSs Description

Performance Standard	Requirements	Relevance to the Project
PS 1: Assessment and Management of Environmental and Social Risks and Impacts	• Environmental and Social Assessment and Management System • Policy should include environmental and social objectives and principle to achieve sound environmental and social performance. • Identification of Risks & Impacts • Management Programs • Organizational Capacity & Competency • Emergency Preparedness & Response • Monitoring & Review • Stakeholder Engagement • External Communication & Grievance Mechanism • Ongoing Reporting to Affected Communities	This standard requires the identification and management of environmental and social risks associated with the project and the company. It will guide the consultant in developing an effective Environmental and Social Management System (ESMS) and related management plans. While the area is not expected to have cultural heritage, a **Chance Find Procedure** will be developed in line with this standard to ensure that any potential discoveries of cultural heritage during the construction phase are managed in compliance with relevant regulations.
PS 2: Labor and Working Conditions	• Human Resources Policies and Procedures • Working Conditions & Terms of Employment • Workers' Organizations • Non-Discrimination and Equal Opportunity • Grievance Mechanism • Child Labor not allowed. • Occupational Health & Safety Workers Engaged by Third Parties	This standard is critical for ensuring fair labor practices, including the protection of workers' rights, occupational health and safety, and labor management practices. It will address the project's obligations related to workforce health, safety, and working conditions, GBVH issues This is applicable to all direct workers of the company, EPC contractor, all subcontractors and supply chain.
PS 3: Resource Efficiency and Pollution Prevention	• Water Consumption • Pollution Prevention • Wastes Hazardous Material Management	The project will need to ensure efficient use of resources and minimize environmental pollution. This standard will guide measures for energy and water efficiency, waste management, air quality control, noise and vibration, and the prevention of land and water pollution.
PS 4: Community Health, Safety, and Security	• Infrastructure and Equipment Design and Safety • Hazardous Materials Management and Safety • Community Exposure to Disease Emergency Preparedness and Response	This standard focuses on minimizing health, safety, and security risks to local communities. It will ensure that the project does not cause adverse impacts on community health and that adequate measures are in place to mitigate risks such as noise, dust, traffic accidents, GBVH issues, security issues,.

Performance Standard	Requirements	Relevance to the Project
PS 5: Land Acquisition and Involuntary Resettlement	• Compensation and Benefits for Displaced Persons • Community Engagement • Grievance Redressal Mechanism Resettlement and Livelihood Restoration Planning and Implementation	Great Rich Technologies Limited has signed a sales promise agreement with the owner of the land, Koray Chemical Industry and Trade Limited Company (Koray Chemical), for the sale of the project area. The land was acquired by Koray Chemical in 1997 directly from farmers. The agreement process with Great Rich Technologies Limited started through a real estate agent and continued with the request for land from the region. Company officials visited the region, held meetings and request to buy the land. The official of Koray Chemical is also the Chairman of the Board of Directors of Evrensekiz OIZ. Therefore PS5 is not triggered.
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	• Identification and Assessment of Biodiversity Impacts • Compliance with the requirements to operate within Legally Protected and Internationally Recognized Areas • Avoidance and mitigation/management of Natural Habitat to achieve no-net-loss. • Application of management/mitigation in Modified Habitat • Avoidance and mitigation/management of Critical Habitat to achieve net gain (if applicable) • Management of invasive species • Management of ecosystem services Management and use of living natural resources	Although the direct impact on biodiversity is expected to be minimal, the project area is located near the Evrensekiz Stream. Therefore, the assessment will consider indirect and cumulative impacts on local biodiversity, including aquatic ecosystems, and mitigation measures through implementation of construction management addressed under PS1will prevent adverse effects. Note that based on IFC Biodiversity Screening for the Project, PS6 is not triggered. Hence, biodiversity assessment can be focused on the regulatory requirement.
PS 7: Indigenous Peoples	• Avoidance of adverse impacts • Participation and Consent Mitigation and Development Benefits	There are no indigenous communities or groups in Türkiye, hence, PS7 is not triggered.
PS 8: Cultural Heritage	• Protection of Cultural Heritage in Project Design and Execution • Consultation Community Access	While the area is not expected to have cultural heritage, a **Chance Find Procedure** will be developed in line with this standard to ensure that any potential discoveries of cultural heritage during the construction phase are managed in compliance with relevant regulations.

By implementing these standards, GRT managing their environmental and social impacts can contributes to broader development goals focused on economic growth, social inclusion, and environmental sustainability.

Performance Standards that are expected to be relevant to the Project and considered within the scope of the ESIA are PS1, PS2, PS3, PS4.

2.2.2 Other E&S Guidelines

The following E&S Guidelines are also applicable to the project as reference technical documents for determining performance levels and measures to manage the hazards and risks related to environmental, social and OHS issues established for the project:

- World Bank Group (WBG) General Environmental, Health and Safety (EHS) Guidelines (2007),
- WBG EHS Guidelines for Printing (2007),
- Good International Industry Practices (GIIP),
- World Health Organization (WHO) Documents regarding Drinking-Water Quality Guidelines and Air Quality Guidelines.

2.2.3 International Environmental and Social Conventions

Türkiye has joined several conventions and protocols aimed at managing global and regional environmental resources, biodiversity, and cultural heritage. These agreements, which encompass environmental, biodiversity, archaeology, cultural heritage, and labor-related matters, are outlined in Table 2-4. Türkiye's involvement in these global treaties will be considered when formulating suitable management strategies for safeguarding the aforementioned issues.

Table 2-4. International Agreements, Conventions and Protocol

International Agreements, Conventions and Protocols	Entry Into Force Date	Date of Approval/ Entry into Force by Türkiye
Environmental Protection		
The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND)	18.12.1971	18.12.1971
International Convention on Civil Liability for Oil Pollution Damage	29.11.1969	29.11.1976
Stockholm Convention on Persistent Organic Pollutant (POPs)	22.05.2001	23.05.2001
Air Quality and Climate Change		
Vienna Convention for the Protection of the Ozone Layer	22.03.1985	08.09.1990
Montreal Protocol on Substances Depleting the Ozone Layer (1990)	16.09.1987	19.01.1991
United Nations Framework Convention on Climate Change (UNFCCC)	09.05.1992	24.05.2004
Kyoto Protocol	11.12.1997	26.08.2009
Biodiversity		
Convention for the Conservation of European Wildlife and Natural Habitats (BERN)	19.09.1979	01.09.1984
UN Convention on Biological Diversity and the Cartagena Protocol on Biosafety	24.05.2000	17.06.2003
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	01.07.1975	27.12.2001

International Agreements, Conventions and Protocols	Entry Into Force Date	Date of Approval/ Entry into Force by Türkiye
Convention (International Treaty) on Plant Genetic Resources for Food and Agriculture	03.11.2001	17.07.2006
Cultural Heritage		
Convention on the Protection of the World Cultural and Natural Heritage	16.11.1972	14.02.1983
European Charter of the Architectural Heritage	26.09.1975	12.03.1985
European Convention on the Protection of the Archaeological Heritage	06.05.1969	29.11.1999
European Cultural Convention	19.12.1954	10.10.1957
Convention for the Protection of the Architectural Heritage of Europe	03.10.1985	16.05.1994
Convention for the Protection of Human Rights and Fundamental Freedoms (ETS No. 5) (the European Convention on Human Rights) and its protocols	04.11.1950	04.11.1950
UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property	14.11.1970	25.12.1979
UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions	20.10.2005	20.10.2005
UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage	16.11.1972	16.01.1983
Labor, Safety and Health		
ILO Safety and Health in Construction Convention	20.06.1988*	11.01.1991
ILO Occupational Safety and Health Convention	22.06.1981*	22.04.2005
ILO Worst Forms of Child Labor Convention	17.06.1999*	17.01.2001
ILO Forced Labor Convention	28.06.1930*	23.06.1998
ILO Minimum Age Convention	26.06.1973*	26.06.1997
ILO Freedom of Association and Protection of the Right to Organize Convention	09.07.1948*	03.07.1951
ILO Worker's Representatives Convention	23.06.1971*	12.07.1993
ILO Human Resources Development Convention	24.06.1975*	29.09.1977
ILO Employment Policy Convention	09.06.1964*	27.11.1967
ILO Social Security Convention	28.06.1952*	29.01.1975
ILO Equal Remuneration Convention	29.06.1951*	19.07.1967
ILO Discrimination (Employment and Occupation) Convention	25.06.1958*	19.07.1967
ILO Abolition of Forced Labor Convention	25.06.1957*	29.03.1961
ILO Right to Organize and Collective Bargaining Convention	01.06.1949*	23.01.1952

**The dates of entry into force are provided.*

2.3 Gap Analysis

Within the scope of this ESIA Report, a Gap Analysis Study has been conducted to identify the requirements of the IFC PS and WBG EHS Guidelines that are relevant to the project. The study also examines the extent to which national legislation covers these requirements and identifies the gaps, along with the measures proposed to bridge these gaps in the present project (see Table 2-5).

Table 2-5. Gap Analysis

PS	Requirements	Coverage by National Legislation	Identified Gaps	Actions to Bridge the Gaps
PS1: Assessment and Management of Environmental and Social Risks and Impacts	The ultimate aim of PS1 is to promote strong environmental and social risk management practices that contribute to sustainable development, while ensuring proactive engagement with stakeholders and continuous improvement throughout the project. ▪ Developing and maintaining Environmental and Social Management System (ESMS) ▪ Identification of risk and impacts ▪ Implementing management programs ▪ Establishing organizational capacity and competency ▪ Developing Emergency Preparedness and Response Plan ▪ Conducting stakeholder engagement and implementing grievance mechanism ▪ Monitoring and review of the ESMS to monitor its effectiveness ▪ External reporting on E&S performance	Turkish Environmental Law No. 2872 mandates environmental impact assessments for projects.	The EIA process lacks comprehensive assessment of social risks and impacts, particularly those concerning local communities. There is no established Chance Find Procedure for unexpected discovery of cultural heritage during construction.	Ensure a thorough ESIA process that incorporates both environmental and social risk assessments, including community consultation and impact management plans. This will include assessments of social risks related to labor, local communities, and vulnerable groups. All of the company's factories in China hold the necessary certifications, and full-time environmental managers are responsible for overseeing environmental affairs at these facilities. Once the Turkish factory is completed, it will need to apply for the required certifications and hire local full-time environmental managers. In the interim, the environmental manager from the Chinese factories will provide guidance to the Turkish factory to ensure all necessary environmental tasks are completed before construction is finished. Develop and implement a Chance Find Procedure to address potential discoveries of cultural heritage during construction, ensuring full compliance with Turkish cultural heritage laws. Workers will be trained on how to recognize cultural artifacts, and a protocol will be in place for handling any findings.

PS	Requirements	Coverage by National Legislation	Identified Gaps	Actions to Bridge the Gaps
PS2: Labor and Working Conditions	Ensure fair labor practices and safe working conditions for all workers involved in the project. Comply with national labor laws and regulations. Provide training and capacity building for workers.	Turkish Labor Law provides regulations on labor rights and working conditions. Occupational Health and Safety Law has provisions on OHS.	Gaps in detailed policies for workforce conditions, especially regarding worker welfare and grievance mechanisms.	Develop and implement clear labor management policies, including worker welfare programs, grievance mechanisms, and labor rights protection. Training and awareness programs will be established to ensure compliance with both national and international labor standards. The environmental manager will be hired and the E&S team will be built prior to construction
PS3: Resource Efficiency and Pollution Prevention	Minimize resource use, waste generation, and pollution during project implementation. Implement measures to reduce energy consumption, water usage, and emissions.	Turkish environmental legislation includes regulations on pollution prevention and resource management.	There is insufficient planning for resource efficiency (e.g., water, energy) and detailed measures for pollution prevention.	Develop a comprehensive pollution prevention and resource efficiency plan, including detailed waste management, air quality, and water treatment measures. Introduce strategies to optimize resource consumption, including renewable energy use, and explore advanced waste management practices like recycling and reusing materials. The project will refer to all pollution prevention procedures of the Chinese factory and comply with local requirement in Türkiye and WBG EHS guideline.
PS4: Community Health, Safety, and Security	Protect the health and safety of communities living near project sites. Identify potential health and safety risks associated with project activities. Develop measures to minimize risks and respond to emergencies.	In Turkish legislation, community health and safety are covered to a certain extent by various legal regulations including Occupational Health and Safety Law, Environmental Law and Regulation on Disaster and Emergency Response Services	The project lacks specific community health impact mitigation measures, including monitoring and community engagement during construction and operation.	Develop a community health and safety management plan, including noise control, dust mitigation, emergency response plans, and regular community engagement. Regular monitoring of environmental and health risks in the surrounding communities will be integrated into the project's safety and environmental plans. Implement construction management addressed under PS1.

* PS7: Indigenous Peoples is not applicable for the Projects in Türkiye, since there is no communities or groups of people which can be identified/defined as indigenous peoples in the country.

3 PROJECT DESCRIPTION

The **Nanoporous Project** is a large-scale industrial venture aimed at establishing a state-of-the-art manufacturing facility for the production of advanced nanoporous materials. These materials are designed for various applications, including energy storage, filtration, and catalysis. This section provides a detailed description of the project components, location, timeframe, workforce, resource management, technology, and construction methodology. Project Area will approximately have an area of 37,800 m^2.

3.1 Project Components

The project comprises several key components, each designed to support the overall objective of producing high-performance nanoporous materials:

3.1.1 Raw Material Selection, Production Process, and VOC Treatment

3.1.1.1 Raw and Auxiliary Materials

The raw materials used in production are sourced from both domestic and international suppliers. The selection of these materials is based on their quality, performance, and sustainability aspects. The table below outlines the main raw materials used for each product, along with their place of origin.

Table 3-1. Raw Materials Table

Product Name	Main Raw Material	Place of Origin
Car Coat Film	TPU Film	Türkiye
	PET Membrane	Türkiye
	Repair Liquid	China (early stage), Türkiye (after verification)
	Glue for Installation Layer	China (early stage), Türkiye (after verification)
Energy Saving Window Film	PET Membrane	Türkiye
	Hardening Coating Solution	China (early stage), Türkiye (after verification)
	Glue for Installation Layer	China (early stage), Türkiye (after verification)
	UV Absorbent	China (early stage), Türkiye (after verification)
	Insulating Paste	China (early stage), Türkiye (after verification)
CO2 Catching Material	Metal Compounds	Türkiye
	Organics	Türkiye

Product Name	Main Raw Material	Place of Origin
	Solvent	Türkiye
VOCs Waste Gas Adsorption Material	Metal Compounds	Türkiye
	Organics	Türkiye
	Solvent	Türkiye

3.1.1.2 Production Process

The manufacturing process involves various stages, including material preparation, coating, curing, and packaging. Each step is optimized to ensure high-quality production while minimizing environmental impact.

Car Coat Film Manufacturing Process

i. **Material Preparation**: TPU film and PET membrane are cut and layered according to specifications.

ii. **Coating Application**: The repair liquid and adhesive layer are applied.

iii. **Curing and Bonding**: The layers are bonded under controlled temperature and pressure.

iv. **Quality Inspection**: Each film undergoes stringent quality checks for adhesion, durability, and transparency.

v. **Packaging**: The final product is rolled and packaged for shipment.

Energy Saving Window Film Manufacturing Process

i. **Base Layer Preparation**: PET membrane is prepared as the primary substrate.

ii. **Hardening Coating Application**: The hardening coating solution is applied to enhance durability.

iii. **UV Absorption Layer Application**: UV absorbent is integrated to provide protection from harmful UV rays.

iv. **Insulating Paste Application**: This layer enhances energy-saving properties.

v. **Adhesive Layer Application**: The installation layer adhesive is applied.

vi. **Curing and Quality Control**: The film undergoes a curing process and is checked for optical clarity, thickness, and performance.

CO2 Catching Material Production Process

- **Raw Material Mixing**: Metal compounds (Ferric acetate)and organic material (4-aminobenzoic acid) are blended.
- **Solvent Treatment**: A solvent is added to ensure uniform distribution of active ingredients.
- **Drying and Activation**: The material undergoes thermal treatment to enhance CO2 capture efficiency.
- **Granulation and Packaging**: The material is processed into granules and packaged for industrial use.

VOCs Waste Gas Adsorption Material Production Process

- **Raw Material Processing**: Metal compounds (4,4'-Xanthoyldibenzoic acid, Aluminum sulfate 18hydrate) and organics are mixed (zinc, aluminium).
- **Solvent Incorporation**: A solvent is introduced to enhance the adsorption capability.
- **Heat Treatment**: The material undergoes a high-temperature process to activate adsorption sites.
- **Quality Testing and Packaging**: Adsorption efficiency is tested before final packaging.

3.1.2 Production Facility

The core component of the project is the manufacturing facility, which will house the production lines for the nanoporous materials. This facility will include various sections for raw material processing, synthesis, shaping, and finishing.

The flow chart below (see Figure 3-1) outlines a detailed process Automative Paint Protection Film Materials. It consists of creating a product through multiple stages of mixing, coating, drying, and applying films. It begins with gathering and mixing the necessary ingredients, followed by an initial coating and oven drying. After this, a high permeability brightening film is applied and dried again. The process then involves another coating and the application of a double layer of white bottom film. This ensures the product has the desired properties and appearance. Subsequently, the mixture is rolled up and subjected to high temperature curing to solidify its structure. The cured product is then cut into the desired shape or size using a slitter. Finally, the finished product is prepared for shipment. Automotive paint protection film (PPF), also known as invisible car film, is primarily used to protect the paint of passenger vehicles. PPF is categorized into two types: invisible car film, which focuses solely on protection, and automotive color-changing film, which also considers aesthetics. In recent years, as consumer awareness of vehicle appearance has increased, automotive protective films have transitioned from being a luxury product to a mainstream, widely used solution, driving rapid market growth.

PPF consists of a five-layer structure: PET film (removed during application to protect the surface coating), surface coating (providing anti-fouling and self-healing properties), base film (the core protective layer), pressure-sensitive adhesive, and release film (removed during application to protect the adhesive layer). The base film is the key protective component, with PVC and TPU being the most commonly used materials. TPU offers superior performance over PVC, including impact resistance, puncture resistance, scratch resistance, corrosion resistance, excellent weather durability, self-healing properties, no adhesive residue upon removal, and a high-quality texture.

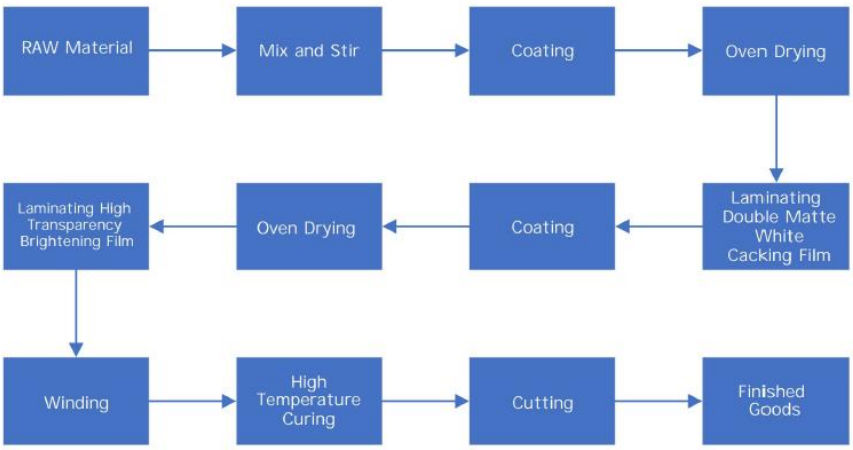

Figure 3-1. Process Flowchart of Automative Paint Protection Film Materials

The flow chart below (see Figure 3-2) outlines of Energy-Saving Window Film Production. They are applied to front and rear windshields, side windows, and sunroofs, providing heat insulation, sun protection, UV prevention, and shatter resistance. These films consist of multiple layers, including an abrasion-resistant layer, a PET safety base layer, a metal heat insulation layer, a composite adhesive, a UV absorption layer, and a high-transparency PET release film. Automotive window films are applied to front and rear windshields, side windows, and sunroofs, providing heat insulation, sun protection, UV prevention, and shatter resistance. These films consist of multiple layers, including an abrasion-resistant layer, a PET safety base layer, a metal heat insulation layer, a composite adhesive, a UV absorption layer, and a high-transparency PET release film.

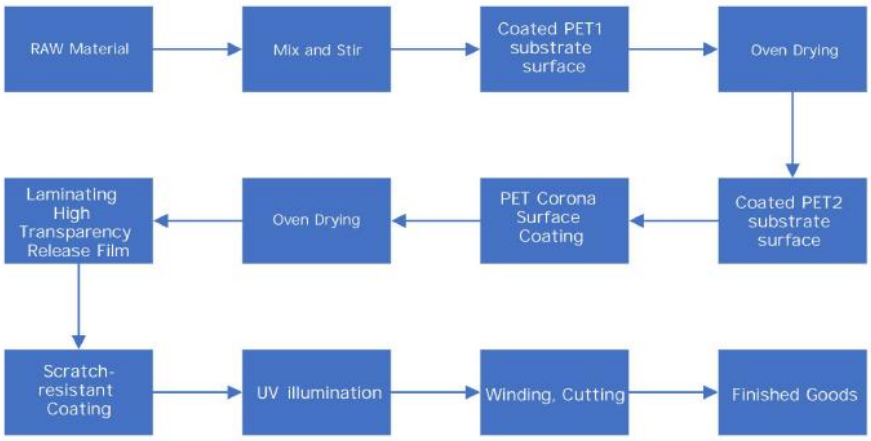

Figure 3-2. Process Flowchart of Energy-Saving Window Film Production

The flow chart below (see Figure 3-3) outlines Proton Exchange Membrane Production. As a key component of PEM fuel cells, the proton exchange membrane plays a crucial role in battery operation. It functions as a separator, preventing contact between the anode and cathode to avoid direct reactions between the two polar fuels, ensuring maximum energy efficiency. Additionally, it facilitates the transport of hydrogen ions, with high proton conductivity being essential for battery performance. A distinctive feature of the proton exchange membrane is its selective permeability, allowing only hydrated protons (H_3O^+) to pass through. These protons bind to sulfonic groups within the membrane and transfer from one group to another.

Meanwhile, electrons and other anions are blocked, forcing electrons to travel through the external circuit, thereby generating an electric current.

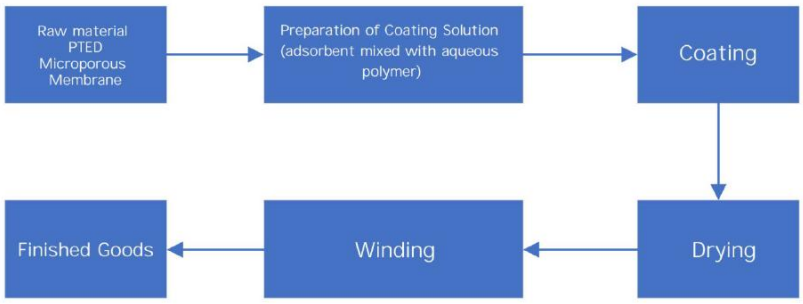

Figure 3-3. Process Flowchart of Proton Exchange Membrane Production

The flow chart below (see Figure 3-4) outlines the production process of Low-Humidity Adsorbent (Water Vapor Capture Material). The process involves mixing specialized low-humidity adsorbents with polymers and using electrospinning technology to collect fibers on a substrate. This method enhances the material's surface area and adsorption efficiency, making it ideal for applications such as humidity control, air dehumidification, and moisture-sensitive environments. Compared to traditional desiccants, this advanced material offers higher efficiency, lower energy consumption, and improved durability, providing a sustainable solution for industrial and commercial use.

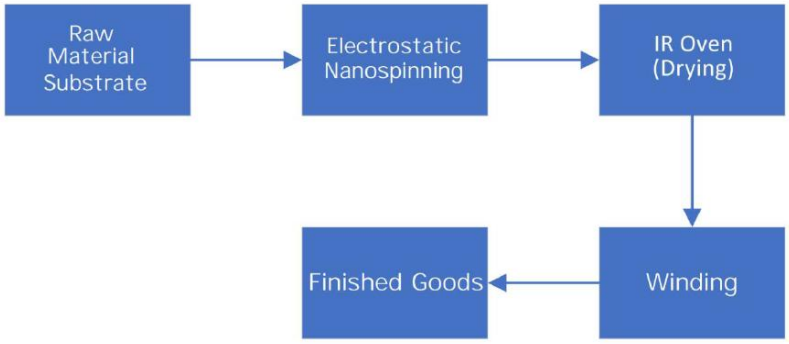

Figure 3-4. Process Flowchart of Low-Humidity Adsorbent (Water Vapor Capture Material) Production

The flow chart below (see Figure 3-5) outlines CO_2 Capture Material Production Process. Globally, 4 billion tons of CO_2 are emitted into the atmosphere each year. This has led to severe environmental pollution and harm to both the planet and human living conditions.

Carbon capture, utilization, and storage (CCUS) technology offers a large-scale solution for achieving net-zero emissions. It captures CO_2 from emission sources such as power plants and industrial facilities, as well as directly from the atmosphere. The captured CO_2 can then be repurposed as a raw material or securely stored deep underground, effectively reducing carbon emissions.

As a potentially transformative technology, CCUS plays a vital role in addressing climate change and has broad application potential. The company employs advanced nanoporous materials with high flux capabilities for CO_2 capture. When combined with polymer films, this technology achieves high capture efficiency with low regeneration energy consumption.

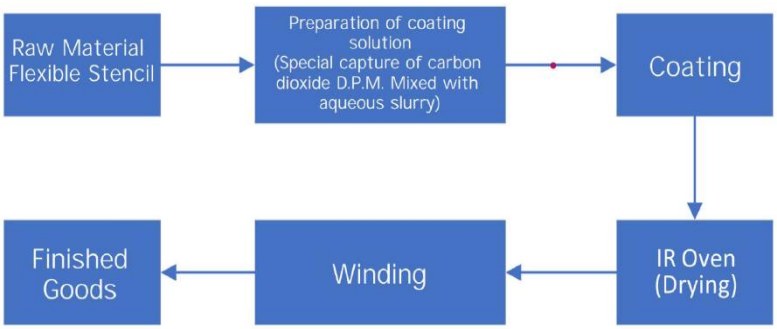

Figure 3-5. Process Flowchart of CO_2 Capture Material Production Process

The flow chart below (see Figure 3-6) outlines Volatile Organic Compounds (VOCs) Waste Gas Adsorption Materials. In industries such as petrochemicals, printing, synthetic leather, electronic components, baking paint, and pharmaceuticals, volatile organic compounds (VOCs) contribute significantly to air pollution. Additionally, inhalation of these pollutants poses serious health risks. Therefore, controlling VOC emissions is crucial.

The printing industries generate high concentrations of VOC emissions, which are traditionally treated using combustion methods. While thermal oxidation converts harmful components in waste gases into harmless substances, it also results in high carbon dioxide emissions and energy consumption. The latest approach focuses on the recovery and reuse of VOCs.

Common adsorbents for VOC treatment include waste stones, resin types, coconut shell activated carbon, and ball-shaped activated carbon (BAC). The company utilizes advanced nanoporous materials with tailored structural designs for different gases. By coordinating with metal ions, these materials form unique pore structures that create varying attractive forces with VOCs, achieving adsorption capacities several times greater than that of conventional activated carbon.

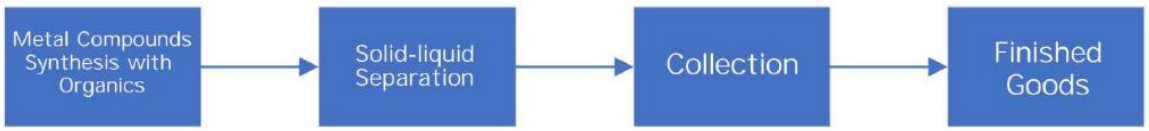

Figure 3-6. Process Flowchart of VOCs Waste Gas Adsorption Materials

3.1.3 Raw Material Storage and Handling

Dedicated storage areas will be provided for the safe storage and handling of raw materials required for the production process. This includes chemical substances, catalysts, and other materials critical to the manufacturing process.

3.1.4 Technology Development and Research and Development (R&D) Center

The project will include a R&D center to support ongoing innovation and improvements in the production process. This facility will focus on optimizing material properties, increasing production efficiency, and exploring new applications for the nanoporous materials.

3.1.5 Packaging and Distribution Area

A section of the facility will be dedicated to the final packaging of the produced materials, preparing them for distribution to customers. This area will include automated packaging lines to ensure efficiency and consistency.

3.1.6 Support Infrastructure

The project will include the construction of support infrastructure such as utility systems (water, electricity, and waste management), administrative offices, employee welfare facilities, and security systems.

3.2 Project Location

The project is located at Parcel 398 and 460 of block 256 at Evrensekiz/Gündoğu Neighborhood, within the city of Lüleburgaz, Kırklareli Province, in the Republic of Türkiye. The selected location benefits from its strategic positioning in one of Türkiye's key industrial hubs, making it an ideal site for the establishment of the Nanoporous Materials facility. The Project Topographical Map is given Figure 3-7.

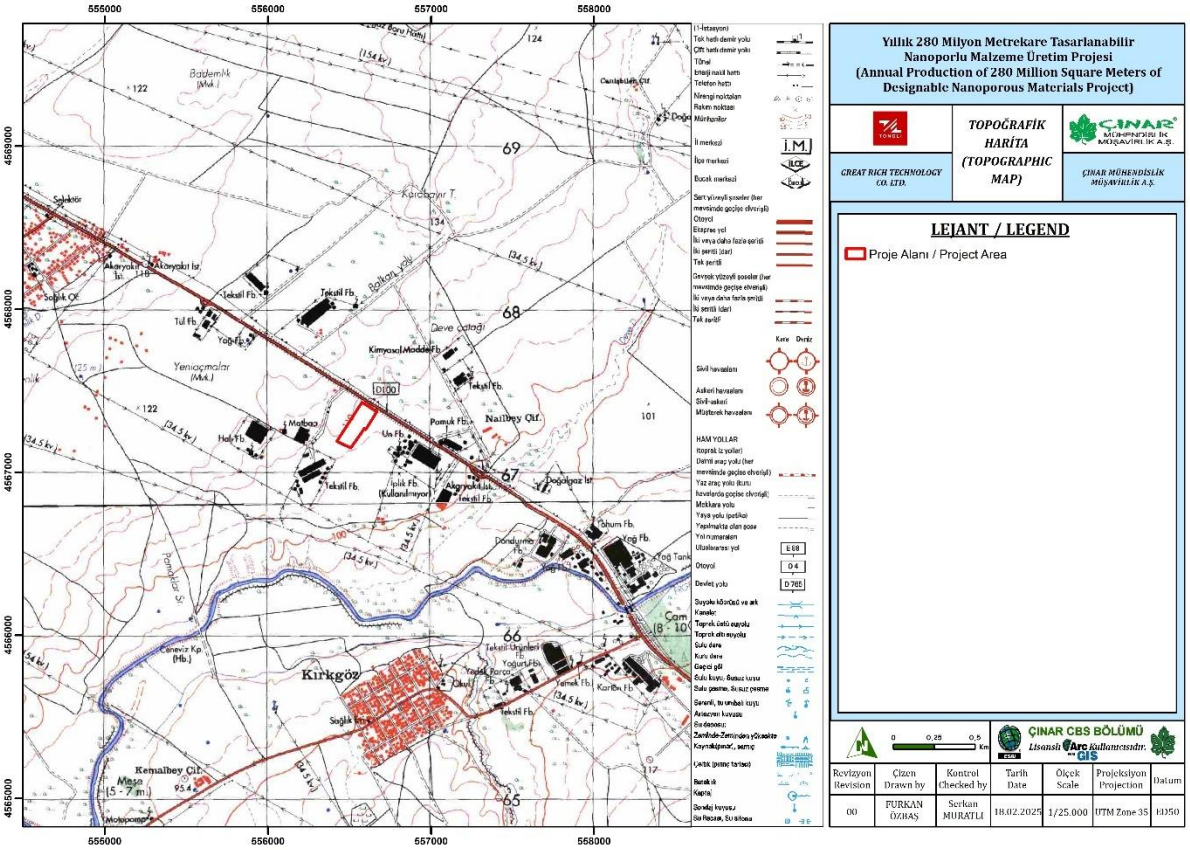

Figure 3-7. Topographical Map

The location in Lüleburgaz, Kırklareli Province, offers several strategic advantages for the project, particularly in terms of logistics and accessibility. Lüleburgaz is well-connected to major transportation networks, including highways and railways, which facilitate the efficient movement of raw materials and finished products. Additionally, the proximity to industrial zones

and suppliers within Türkiye ensures a reliable supply chain, reducing dependence on international shipments. This accessibility significantly lowers transportation costs and enhances operational efficiency.

The selected site also provides favorable infrastructure conditions necessary for industrial operations. The area is equipped with essential utilities such as electricity, water supply, and wastewater treatment facilities, supporting seamless production processes. The Evrensekiz Stream is located approximately 900 meters west of the Project Area.

The project site is strategically located near the Istanbul-Edirne Road, a major transportation corridor that facilitates the efficient movement of raw materials and finished products. This proximity enhances logistical efficiency, reducing transportation costs and ensuring timely delivery.

Furthermore, the project is situated within an Organized Industrial Zone (OIZ), which offers significant advantages in terms of infrastructure, regulatory support, and access to industrial utilities. Being in an OIZ means that the necessary infrastructure—such as electricity, water, and waste management systems—is already in place, allowing for a smoother and more efficient operation. Additionally, the OIZ designation ensures that the project complies with local zoning regulations and benefits from government incentives designed to promote industrial development. The views from the Project Site are provided Figure 3-9.

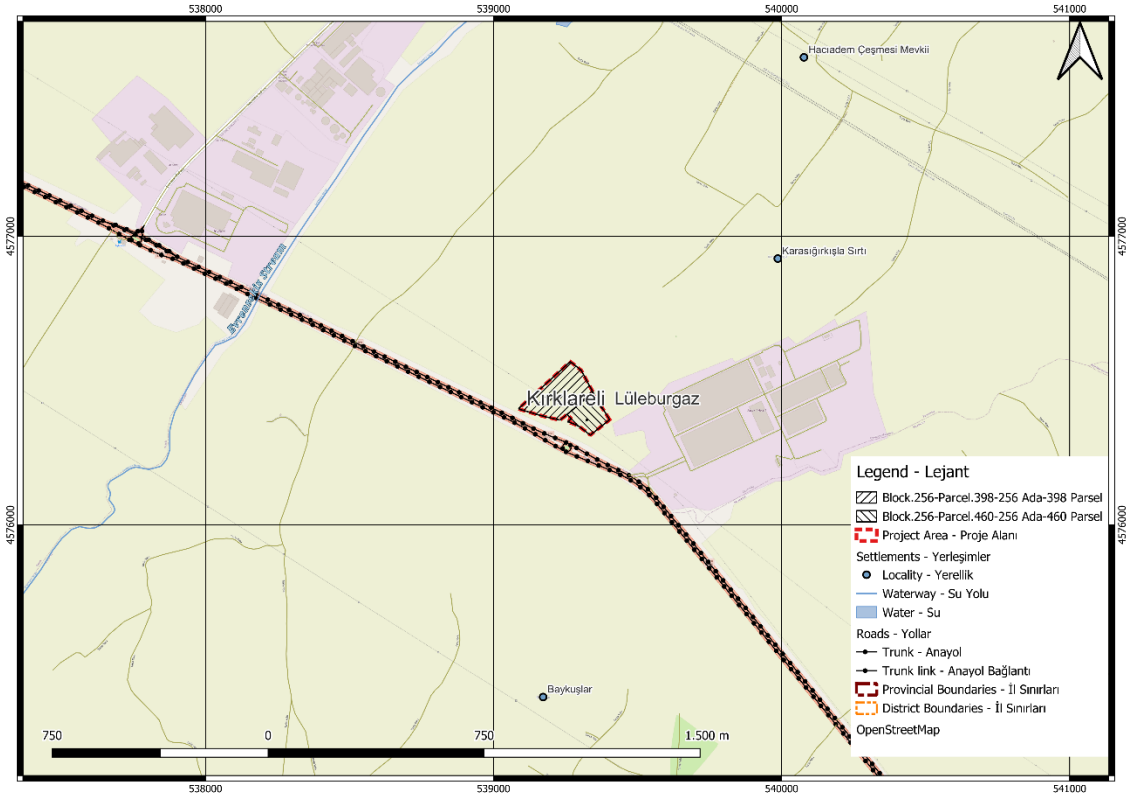

Figure 3-8. Project Location

Figure 3-9. Views from Site

3.3 Project Timeframe

The **Great Rich Technologies Project** is expected to be completed within a 2-year timeframe, with the following major phases:

Phase	Timeline	Key Activities
1. Preparatory Works	**June 2025 – October 2025**	• Land acquisition and transfer procedures
• Reconstruction of high-voltage power lines		
• Installation of rainwater and sewage pipelines on site		
• Design finalization and technical review of plant building plans		
2. Permitting & Mobilization	**October 2025 – January 2026**	• Obtain construction permits
• Site mobilization and preparatory works		
• Procurement planning and tendering for civil works and equipment		
3. Construction Phase	**January 2026 – June 2027**	• Civil construction of factory buildings
• Ongoing coordination with equipment suppliers		
• Utility connections and infrastructure development		
4. Installation & Commissioning	**July 2027 – February 2028**	• Installation of production equipment
• Commissioning and systems integration		
• Cleanroom and interior works		
• Trial production and testing		

The project's construction factory will engage a local professional EPC company in Turkiye to oversee the implementation. In the first 3 to 6 months, raw materials necessary for the project production will be shipped from Shanghai Port to Istanbul Port. Subsequently, raw materials will either be sourced locally within Türkiye or transported by road from neighbouring countries.

From March 2025 to December 2025, the project will focus on completing the establishment of the park, designing and reviewing the factory drawings, carrying out bidding processes, and finalizing various pre-construction procedures. During this period, some equipment for the project will also be ordered.

Between January 2026 and June 2027, the construction of civil works and two workshops within the factory will be completed. Some equipment will begin to enter the site, and the remaining equipment will continue to be ordered to ensure that the project progresses as planned.

From January 2027 to December 2027, the equipment for the two workshops will arrive on-site. The construction will be completed, and the equipment will be commissioned in preparation for production. By this time, the construction of other buildings for the project will be nearly finished.

Lastly, from January 2028 to September 2028, all the equipment required for the factory will arrive on-site. The project construction will be finalized, and the equipment will undergo final debugging before the full-scale production begins.

3.4 Project Workforce

The workforce will be distributed as follows:

a) Construction

An EPC Company under the supervision of GRT will be hired for the construction of the factory. During the construction phase of the **Great Rich Technologies Project**, an estimated workforce of approximately 200 people will be involved. This workforce will consist of a variety of professionals, including construction workers, technical personnel, skilled tradespeople, supervisory staff, and logistics and support personnel.

b) Operation

A total of 191 employees will work for the Project. 90% of the workforce will be locally recruited, including: (i) production line workers – 106 employee, 100% local, (ii) middle management and technical positions – 54 employee, over 80% local (such as production supervisors, quality control, and procurement), and (iii) senior management and core R&D – 31 employee, initially retaining a portion of expatriates (5%–15%) to ensure technology transfer and system establishment.

The E&S&OHS team of the Project consists of 21 personnel and will work under the Human Resources and Administration Department (9 personnel), and the General Manager's Office Safety and Environmental Protection Department (10 personnel) and Information Department (4 personnel). Please refer to Section 5.1 for more information.

3.5 Project Resource Management

Resource management will be critical to ensure the efficiency and sustainability of the project. The primary resources involved in the project include raw materials, water, energy, and labour. Each resource will be carefully managed to minimize waste, optimize usage, and ensure cost-effectiveness:

3.5.1 Water and Energy

Water and energy management will be optimized through the use of efficient systems and technologies. Energy-efficient equipment and renewable energy sources will be explored to reduce the facility's carbon footprint and lower operational costs. The water will be supplied via the network of Evrensekiz OIZ.

3.5.2 Labour

The project will implement a structured Human Resources (HR) management system to ensure effective workforce administration and full compliance with applicable labor laws and international standards. Led by an HR Manager under the Project Director, the HR structure will oversee recruitment, contract management, training, and worker welfare across all employment categories, including direct, contracted, and supplier workers. Key measures include ensuring written contracts, fair working conditions, timely wages, and access to a confidential grievance mechanism. Regular training on occupational health and safety, non-discrimination, and worker rights will be conducted, and compliance will be monitored through audits and site inspections to ensure that all labor practices meet national regulations and align with standards such as the ILO Conventions and IFC Performance Standard 2.

3.5.3 Waste Management

Waste materials generated during the lifecycle of the project will be carefully managed in line with waste management hierarchy to minimize environmental impact. This includes recycling, waste separation, and using sustainable methods to treat waste products.

3.5.4 Technology

The project will utilize cutting-edge technology to produce nanoporous materials that can be designed for specific industrial applications. The key technological components include:

3.5.4.1 Synthesis Technology

The production process will involve advanced synthesis methods such as sol-gel techniques, chemical vapor deposition (CVD), and other state-of-the-art processes to create nanoporous materials with precise specifications.

3.5.4.2 Material Shaping and Molding

Once synthesized, the nanoporous materials will be shaped into sheets or other forms using high-precision molding and cutting technologies. These materials will then be treated for durability, strength, and specific application properties.

3.5.4.3 Automation and Control System

The facility will feature automated production lines that optimize material flow, reduce manual labour, and improve production efficiency. Advanced control systems will monitor and regulate every stage of the production process to maintain quality standards.

3.5.4.4 Quality Assurance and Testing

State-of-the-art testing equipment will be used to ensure that all produced materials meet strict quality standards. This includes testing for material strength, durability, porosity, and application-specific properties.

3.5.5 Construction Methodology

The construction of the **Great Rich Technologies Project** will follow a structured and methodical approach to ensure timely and efficient completion. The key steps in the construction methodology include:

3.5.5.1 Site Preparation

The site will be cleared and prepared for construction, including topsoil stripping, excavation, levelling, and grading to create a stable foundation for the facility.

c) Foundations and Structural Work

Strong and durable foundations will be built using reinforced concrete to support the heavy equipment and infrastructure of the production facility.

d) Building Construction

The facility will be constructed using prefabricated and steel frame systems to ensure rapid assembly while maintaining structural integrity.

e) Electrical and Mechanical Installations

Electrical systems will be installed to provide power for machinery, lighting, and HVAC systems. Mechanical installations will include ventilation, water treatment, and waste management systems.

f) Equipment Installation

Production equipment, including reactors, mixers, and moulders, will be installed and calibrated to ensure smooth operation during production.

g) Testing and Commissioning

After construction is completed, the facility will undergo testing and commissioning to verify that all systems are functional, and the facility is ready for full-scale operation.

The construction process will be managed by a dedicated project management team to ensure that all milestones are met, and the project remains on schedule. Regular inspections and quality control checks will be carried out to ensure that the facility is built to the highest standards.

This detailed description outlines the various aspects of **Great Rich Technologies Project**, from its components and location to its workforce, resource management, technology, and construction methodology. Each element is designed to contribute to the overall success of the project, ensuring the delivery of a high-quality product and sustainable operations.

4 ENVIRONMENTAL & SOCIAL BASELINE, IMPACT ASSESSMENT AND MITIGATION MEASURES

Environmental and social baseline, impact assessment and mitigation measures are discussed in this chapter on following topics:

- Land Review, Land Use, Soils and Geology
- Noise and Vibration
- Air Quality and Greenhouse Gas Emissions
- Water Resources, Water Quality and Wastewater Management
- Resource and Waste Management
- Biological Environment
- Socio-Economic Environment
- Labor and Working Conditions
- Occupational Health and Safety

4.1 Land Review, Land Use, Soils and Geology

4.1.1 Methodology and Project Standards

The national legislation and international standards that will be considered for the impacts/risks related to the land use, soil, geology and natural hazards during the project activities and will be complied are as follows:

- Law on Soil Protection and Land Use (Law No. 5403)
- Implementing Regulation on Soil Protection and Land Use
- Pasture Law (Law No. 4342)
- Regulation on the Control of Soil Pollution and Soil Contaminated by Point Sources
- Regulation on Structures to be Built in Disaster Zones
- Building Earthquake Regulation of Türkiye
- IFC – PS1: Assessment and Management of Environmental and Social Risks and Impacts
- WBG/IFC General Environmental, Health, and Safety (EHS) Guidelines - 4. Construction and Decommissioning - 4.1: Environment

The limit values considered for the evaluation of the baseline conditions are the Dutch Target and Intervention Values provided in Table 4-1 and the Generic Contaminant Limit Values specified in the Turkish Regulation on Soil Pollution Control and Contaminated Sites by Point Source provided in Table 4-2.

Table 4-1. Dutch Target and Intervention Values for Soil Remediation

PARAMETER	DUTCH LIMITS (mg/kg)
	Intervention Value[1]
Total Petroleum Hydrocarbons (TPH)	5,000
Arsenic	55
Barium	625
Cadmium	12

[1] Intervention Value indicates the action limit for particular parameter.

PARAMETER	DUTCH LIMITS (mg/kg)
	Intervention Value[1]
Chromium	380
Copper	190
Mercury	10
Molybdenum	200
Lead	530
Antimony	15
Selenium	100
Zinc	720

Table 4-2. Sector Specific Parameters and Limit Values Specified in Turkish Regulation on Soil Pollution Control and Contaminated Sites by Point Source for Electricity Generation Facilities

Parameter	Engulfment of the soil and absorption by means of dermal contact (mg/kg)	Inhalation of volatile matter in external environment (mg/kg)	Inhalation of fugitive dust in the external environment (mg/kg)	Moving of the contaminants to the surface water and drinking of the surface water (mg/kg)*	
				Dilution Factor = 10	Dilution Factor = 1
Total Organic Halogens (TOX)**	-	-	-	-	-
Total Petroleum Hydrocarbons (TPH)	188,496	-	-	175	17.4
Arsenic	0.4	-	471	3	0.3
Boron**	-	-	-	-	--
Barium	15,643	-	433,702	288	29
Cadmium	70		1,124	27	3
Chromium	235		24	900	1
Copper	3,129		-	514	51
Mercury	23		-	3	0.6
Molybdenum	391	-	-	14	1
Lead	400	-	-	135	14
Antimony	31	-	-	2	0.2
Selenium	391	-	-	0.5	0.05
Zinc	23,464	-	-	6,811	681

** In occurrence of one the events such as the distance to the aquifer is less than 3 m; existence of fractured or karstic aquifer; and the area of the contaminant source is equal to or greater than 10 ha; the Dilution Factor shall be taken as "1", in other cases, the Dilution Factor shall be taken as 10.*

*** No limit value is provided for TOX and Boron; however, these two parameters are presented in sector specific indicator parameters list provided.*

4.1.2 Baseline Conditions

4.1.2.1 Land Use and Soil

The nearest residential area, Evrensekiz Neighborhood, is located approximately 4 kilometers from the project site. Although this area is not immediately adjacent to the project, the proximity of residential settlements requires careful consideration of potential impacts, such as noise, air emissions, and dust, during the construction and operational phases.

According to the Environmental Plan (Figure 4-1), the project area is classified as Industrial Land, aligning with the land-use designation for the Evrensekiz OIZ. This area is intended to accommodate industrial activities, with appropriate infrastructure and utilities for manufacturing operations. The surrounding land use is predominantly industrial, with commercial and residential areas further distanced from the project site. The industrial zoning of the area makes it a suitable location for large-scale manufacturing, providing access to key infrastructure such as transportation networks, utilities, and proximity to ports.

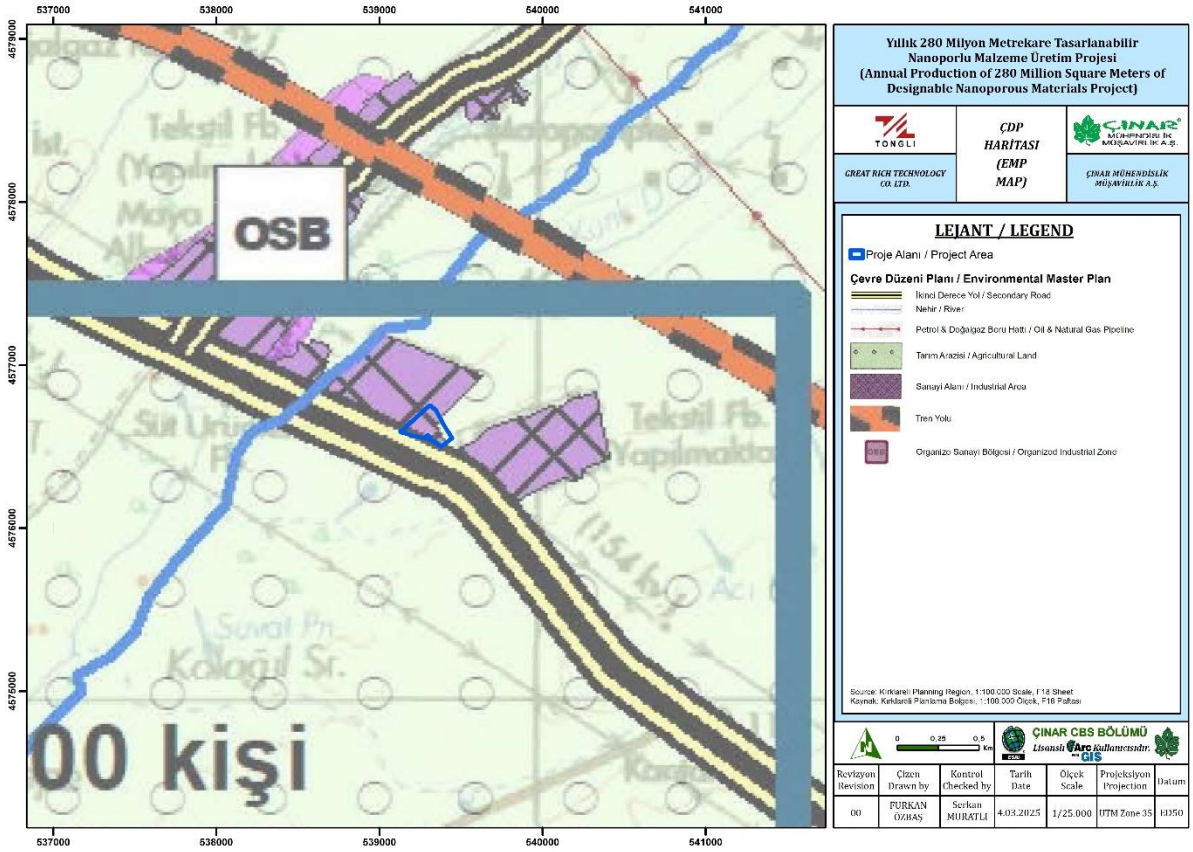

Figure 4-1. Environmental Plan of Project Area

In terms of broader land-use classifications, the project site is classified as **non-irrigated arable land** according to the Corine 2018 land cover data (Figure 4-2). This indicates that the land was historically used for agricultural purposes, although not suitable for irrigation-based farming. The use of the site for industrial purposes aligns with regional development plans that promote industrialization and job creation within the Kırklareli province.

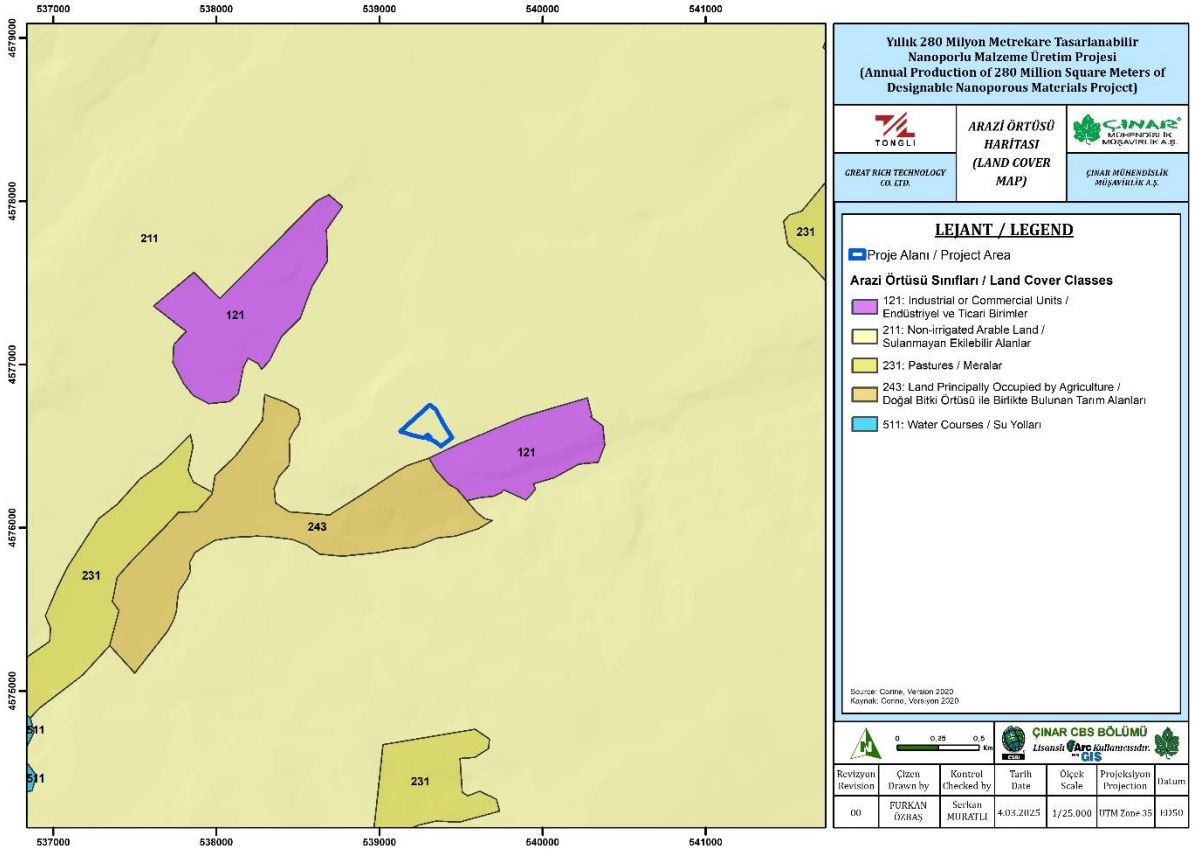

Figure 4-2. Corine 2018 LULC of Project Area

Furthermore, according to the Ministry of Agriculture and Forestry's (MoAF) Land Class Inventory, the land is classified as **dry agricultural area**. This classification indicates that the land was previously utilized for dryland farming, where crops were grown without irrigation. However, due to the ongoing conversion of the land for industrial purposes, this classification will no longer be applicable once the project is operational (Figure 4-3).

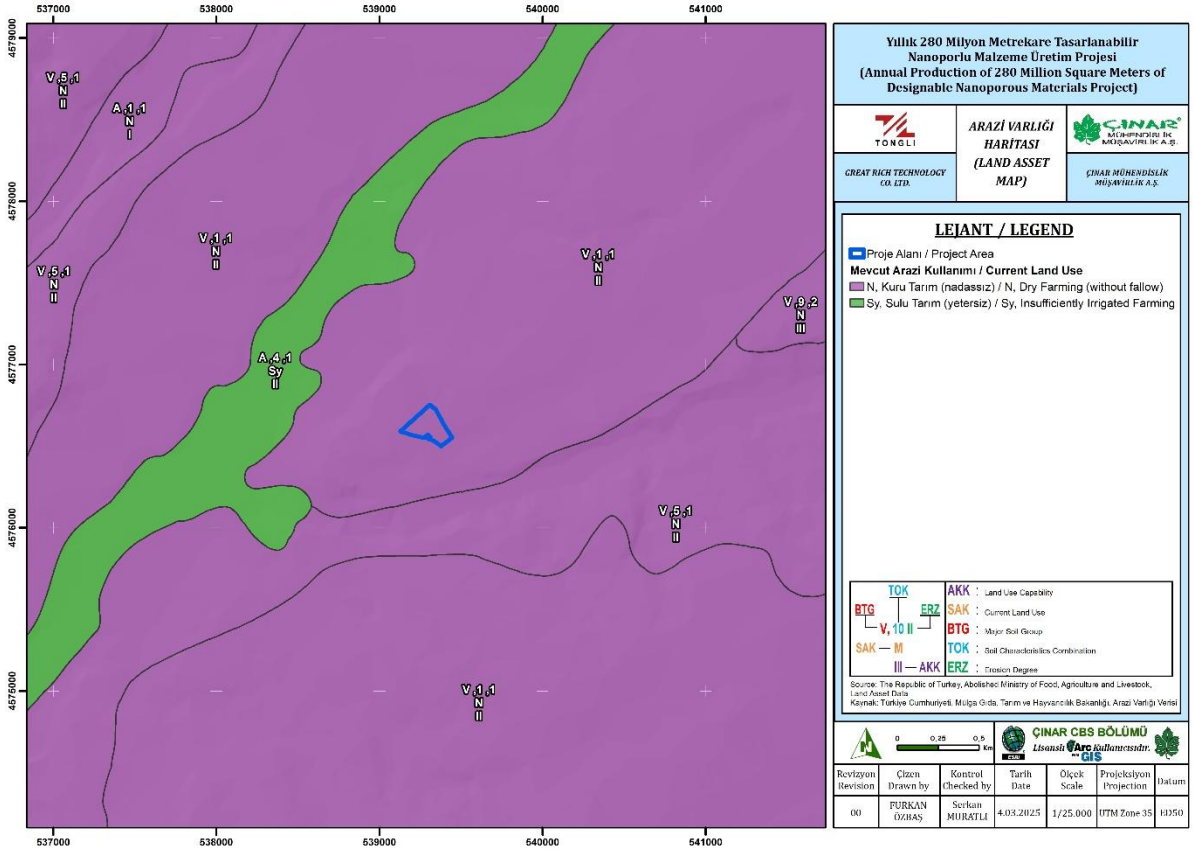

Figure 4-3. LUC of Project Area

During the construction phase, significant soil disturbance will occur due to excavation, grading, and preparation of the land for foundations and infrastructure. Measures will be taken to reduce soil erosion, prevent soil compaction, and manage the stockpiling of excavated soil, particularly to prevent runoff into nearby water bodies, including the Evrensekiz Stream, located approximately 900 meters south of the project area.

The project area falls under the "Class II Land Capability" category, which indicates that the land is suitable for a wide range of agricultural activities, with moderate limitations. Class II lands typically have soils that are fertile and capable of supporting various crops, though they may have some restrictions such as slight erosion risks or drainage challenges. While these lands are considered productive for agricultural use, the limitations mean that careful land management practices are required to maintain soil health and prevent degradation. In the context of the proposed project, the classification highlights the importance of evaluating soil stability and ensuring that construction activities do not lead to long-term soil erosion or degradation. Sustainable construction practices and proper soil management will be crucial to minimize any adverse impacts on the surrounding land quality and preserve its agricultural potential.

Land use capability refers to the inherent potential of a piece of land to support specific human activities and land uses based on its physical, environmental, and ecological characteristics. It involves an assessment of the land's suitability for various purposes, such as agriculture, infrastructure development, conservation, or recreational use. Evaluating land use capability is essential for this project because it provides a comprehensive understanding of how the proposed project infrastructure can be integrated into the existing landscape while respecting the natural attributes and limitations of the land. This assessment is integral to responsible

land use planning and management, ensuring that the project's objectives align with the preservation of ecological integrity and the well-being of local communities. Land use capability classes that are defined by the Ministry of Agriculture and Forestry are presented below.

Table 4-3. Land Use Capability Classes Descriptions

Arability Status	Capability Class	Definition	Factors Restricting Agriculture
Agricultural lands suitable for soil cultivation	I	It is arable for many crop types.	There is no or little limitation.
	II	**It is suitable for long term cultivation of several types of crops.**	**Special mitigation measures are required for soil and water loss.**
	III	It is suitable for the cultivation of specific crops that provide special mitigation measures. Generally, it needs special care during agricultural use.	It is prone to erosion and artificial drainage is required during cultivation.
	IV	With suitable ploughing, some special agricultural crops can be cultivated. Generally, it needs special care during agricultural use.	There are serious limitations related with soil depth, stone content, humidity and inclination.
Agricultural lands not suitable for soil cultivation	V	This class includes soils that are even or slightly inclined, stony or very moist. These are not suitable for ploughing and cultivation. Generally, they are used for meadow or forestry area.	They have weak drainage and a structure not suitable for ploughing.
	VI	This is not suitable for ploughing and cultivation. They are mostly used as pasture and forestry area.	Very serious limitations are present owing to inclination and shallow soil.
	VII	It is not economic for agricultural activities; however, it is suitable for weak pasture or Afforestation areas.	There are limitations owing to shallow soil, stone content, inclination, and erosion.
Non-arable lands	VIII	It is not suitable for vegetation. It can be used for recreational purposes or as wildlife protection area.	There is no soil.

Suitability conditions in terms of cultivation, pasture and forestry activities by land classes were defined by former Ministry of Agriculture and Rural Affairs in 2008 within the scope of “Technical Procedure on Soil and Land Classification Standards” and presented in Table 4-4.

Table 4-4. Suitable Land Uses According to the Land Use Capability Classes

Land Use Capability	——— Increase in Land Use Intensity ———►								
	Wildlife	Forestry	Grazing			Agriculture			
			Limited	Moderate	Intensive	Limited	Moderate	Intensive	Very Intensive
Class I									
Class II									
Class III									
Class IV									
Class V									
Class VI									

Land Use Capability	——— Increase in Land Use Intensity ——►								
	Wildlife	Forestry	Grazing			Agriculture			
			Limited	Moderate	Intensive	Limited	Moderate	Intensive	Very Intensive
Class VII									
Class VIII									

Considering the fact that the Project Area is majorly agricultural land with a Class II LUC has a suitable for long term cultivation of several types of crops.

As per **Law No. 5403 on Soil Protection and Land Use**, the conversion of agricultural land to non-agricultural uses will follow the legal procedures, including obtaining permits from the **Provincial Directorate of Agriculture and Forestry**.

4.1.2.2 Soil Quality

The soil at the project site primarily consists of **Vertisols**, a major soil group characterized by their high clay content and expansive nature. Vertisols are known for their distinctive properties, including significant swelling and shrinking behavior depending on moisture content. When wet, these soils expand, becoming highly cohesive and sticky, while they contract and crack when dry, which can lead to surface instability. These soils are typically fertile, supporting a variety of crops when used for agricultural purposes. However, due to their shrink-swell capacity, Vertisols can present challenges for construction, particularly in terms of foundation stability and soil compaction. To mitigate these challenges during the project's construction phase, proper soil stabilization techniques, such as compaction or soil treatment, will be necessary to ensure the structural integrity of the foundations and prevent potential settlement issues. The expansive nature of Vertisols also requires careful management of water drainage and moisture levels to avoid excessive swelling or cracking during both the construction and operational phases (Figure 4-4).

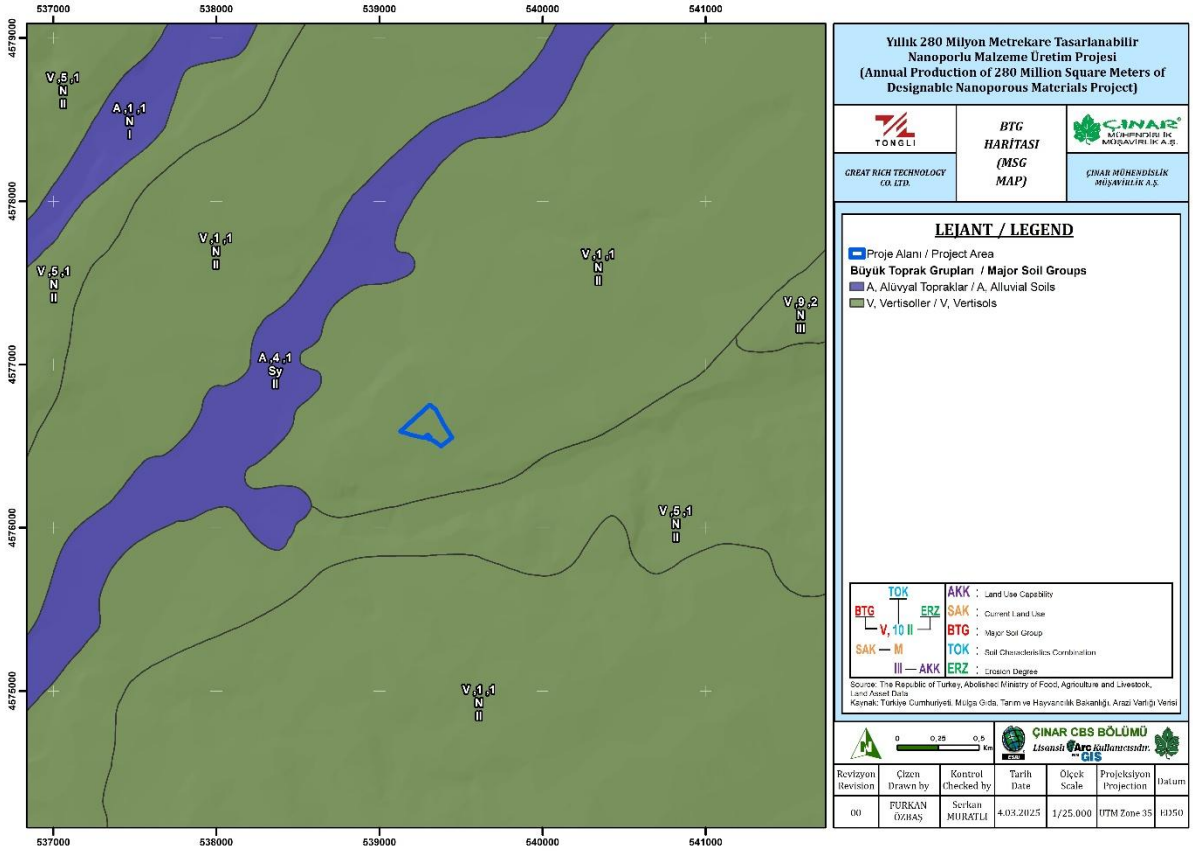

Figure 4-4. Major Soil Groups

The soil conditions at the project site have been evaluated to understand their suitability for construction activities and to identify potential impacts that may arise from the project's construction and operation. Preliminary geotechnical investigations suggest that the site has moderate to well-draining soils, consisting primarily of clay and sandy soil mixtures. These soil types are generally suitable for construction, although proper foundation design will be required to ensure stability and load-bearing capacity, particularly due to the scale of the proposed production facility and associated infrastructure.

Table 4-5. Soil Sample Analysis Results

Parameter	Unit	S-1 Test Result	S-2 Test Result	Dutch Intervention Value
Total Cyanide (CN^-)	mg/kg	< 0.4	< 0.4	–
Chromium (unspecified)	mg/kg	< 20	< 20	380
Antimony (Sb)	mg/kg	< 0.05	< 0.05	15
Arsenic (As)	mg/kg	< 0.05	< 0.05	55
Copper (Cu)	mg/kg	**1269**	**254**	**190**

Mercury (Hg)	mg/kg	< 0.1	< 0.1	10
Zinc (Zn)	mg/kg	**3846**	**4218**	**720**
Cadmium (Cd)	mg/kg	< 0.05	< 0.05	12
Cobalt (Co)	mg/kg	< 0.05	< 0.05	–
Total Chromium (Cr)	mg/kg	127	69.2	380
Lead (Pb)	mg/kg	41	106	530
Molybdenum (Mo)	mg/kg	< 0.05	< 0.05	200
Nickel (Ni)	mg/kg	847	702	–
Benzene	mg/kg	< 0.1	< 0.1	–
Toluene	mg/kg	< 0.1	< 0.1	–
Ethylbenzene	mg/kg	< 0.1	< 0.1	–
Styrene	mg/kg	< 0.1	< 0.1	–
Xylene	mg/kg	< 0.1	< 0.1	–
Chromium +3	mg/kg	< 20	< 20	–
Free Cyanide	mg/kg	< 0.4	< 0.4	–
Thiocyanate $[SCN]^-$	mg/L	1.262	1.339	–
Phenol and compounds	mg/kg	< 0.1	< 0.1	–
4-Methylphenol	mg/kg	< 0.1	< 0.1	–
3-Methylphenol	mg/kg	< 0.1	< 0.1	–
2-Methylphenol	mg/kg	< 0.1	< 0.1	–

The analysis of the soil test results against the Dutch Soil Intervention Values indicates that two parameters—Copper (Cu) and Zinc (Zn)—exceeded the acceptable limits in both sampling locations (S-1 and S-2). Specifically, copper concentrations were measured at 1269 mg/kg and

254 mg/kg, exceeding the intervention value of 190 mg/kg, while zinc concentrations were 3846 mg/kg and 4218 mg/kg, well above the threshold of 720 mg/kg. These elevated levels may be attributed to anthropogenic activities such as industrial processes, the application of agrochemicals (fertilizers and pesticides), use of treated wastewater for irrigation, or proximity to waste disposal or scrap metal sites. Copper and zinc are common in industrial waste and corrosion byproducts, and both can accumulate in soil over time due to their non-degradable nature, especially in areas lacking proper waste management practices or near construction, mining, or metal-handling facilities.

4.1.2.1 Regional Geology

The region between Çorlu and Lüleburgaz, located in the eastern part of the Thrace Basin, is geologically composed of Tertiary and Quaternary-aged sediments deposited on a Paleozoic and Mesozoic basement (Okay et al., 1996). The Thrace Basin has a sedimentary sequence influenced by terrestrial and marine environments from the Neogene period, with widespread lithological units such as sandstone, mudstone, marl, and limestone (Tüysüz et al., 2004). These units are occasionally interbedded with volcanic ash layers and lignite seams. Lignite deposits are particularly prevalent within Miocene-aged formations, although they are not exploited on a large economic scale (Yılmaz & Duru, 2002).

One of the most striking geological features of the region is the extensive Quaternary-aged alluvial deposits found throughout the Ergene Basin. These alluviums are highly fertile and play a significant role in agricultural activities. However, from a geotechnical perspective, they are characterized by low bearing capacity and high liquefaction susceptibility (Akgün et al., 2011). Furthermore, the Oligocene and Miocene sediments in the area act as aquitards, influencing the regional groundwater dynamics (Öztürk et al., 2010).

4.1.2.2 Geology of Project Area

The project area is located in Lüleburgaz district, Kırklareli province, within the Lüleburgaz-Evrensekiz Organized Industrial Zone (OSB), for which a location selection has been made before. The project area is located within the boundaries of the Upper Miocene-Pliocene-aged Thrace Formation, which consists of sand, gravel, and clay.

There are no protected geological sites or unique geological or geomorphological structures within the project area and its immediate surroundings. The geological units and lithological characteristics of the project area and its surroundings are presented below from oldest to youngest, and the geological map is shown in Figure 4-5.

Stratigraphy

Phanerozoic

Cenozoic

Neogene

Upper Miocene

Ergene Formation (Mie)

The Ergene Formation consists of white and yellowish cross-bedded sands with clay and gravel lenses, loosely cemented. It unconformably overlies the Danişmen Formation. Large and small-scale planar and trough cross-bedded gravels and sands contain limited clay lenses.

The current direction in cross-beds is generally southward and unidirectional. As observed in boreholes, this unit exhibits varying thickness and consists of fining-upward sequences from bottom to top. The cross-bedded gravels and sands are interpreted as channel deposits, while the fine sand, silt, and clay layers represent floodplain deposits. The age of the unit has been determined as Upper Miocene

Upper Miocene – Pliocene

Trakya Formation (MiPlt)

The Thrace Formation consists of gravel, sand, clay, and mudstones in red, brown, yellow, and white colors, and contains abundant silicified wood fragments. The gravels mainly comprise quartz, quartzite, and gneiss, with occasional volcanic rock fragments. This formation appears as an alluvial fan system fed by the Istranca Massif and predominantly developed over older units. The gravel size decreases as the distance from the massif increases. Due to its transitional nature with the Ergene Formation, the Thrace Formation is assumed to have formed during the Upper Miocene-Pliocene age range.

Quaternary

Alluvium (Qal)

Gravel, sand, clay, and silt deposits formed in river valleys and plains.

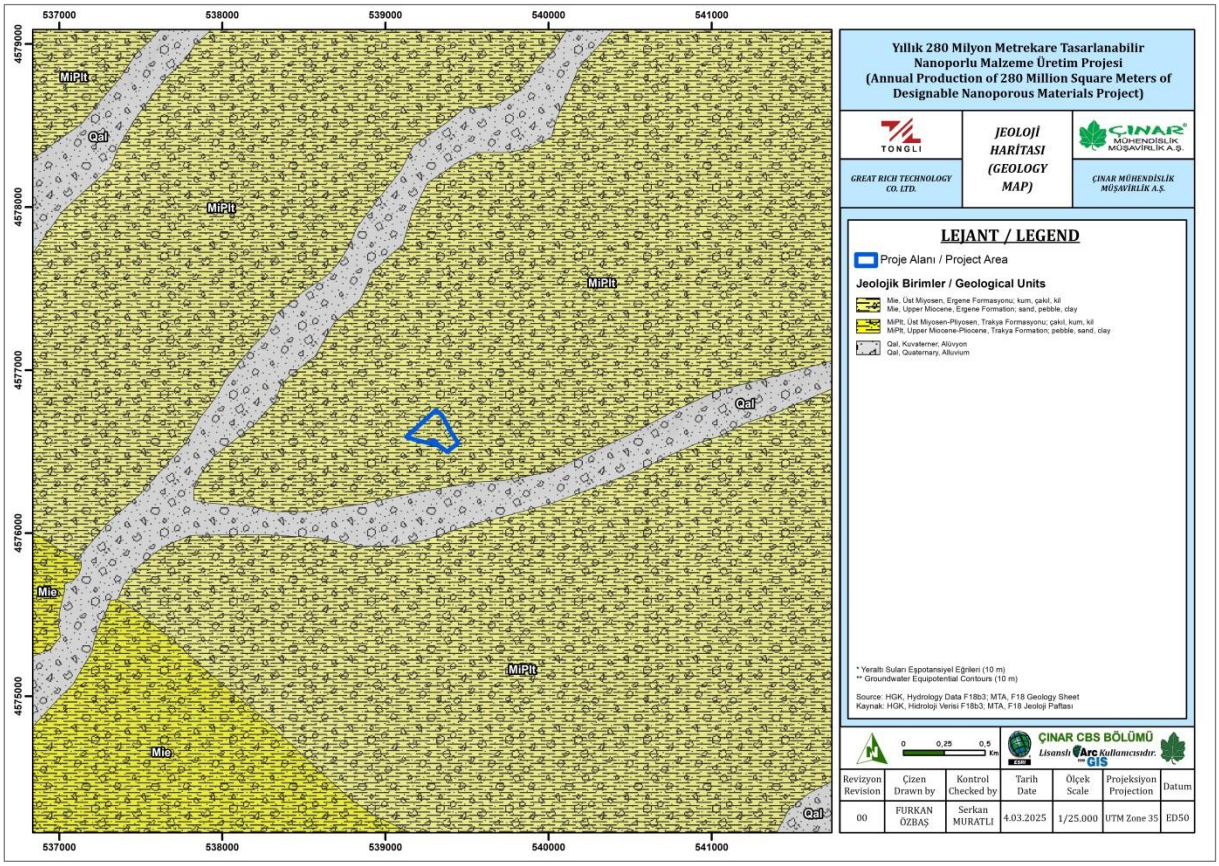

Figure 4-5: General Geology Map

4.1.2.1 Tectonic

The Thrace Basin was formed in association with the extensional tectonics of Western Anatolia and is characterized as a region with low deformation (Şengör & Yılmaz, 1981). The structural framework of the basin is primarily controlled by the presence of the Istranca Massif in the north and Paleozoic-Mesozoic-aged formations in the south. The tectonic evolution of the basin is marked by subsidence and extensional faulting, particularly during the Oligocene and Miocene periods (Elmas, 2003).

Although the region is not directly located on an active fault, it is relatively close to the northern branch of the North Anatolian Fault Zone (NAFZ), which extends through the Marmara Sea (Barka, 1992). The North Anatolian Fault Zone is located 60 km south of the project area. As a result, the area is indirectly affected by seismotectonic movements. In the southern parts of the Ergene Basin, small-scale normal and reverse faulting has been observed over geological time. While most of these faults are not classified as active, local ground movements and deformations warrant further geotechnical investigation (Bozkurt, 2001).

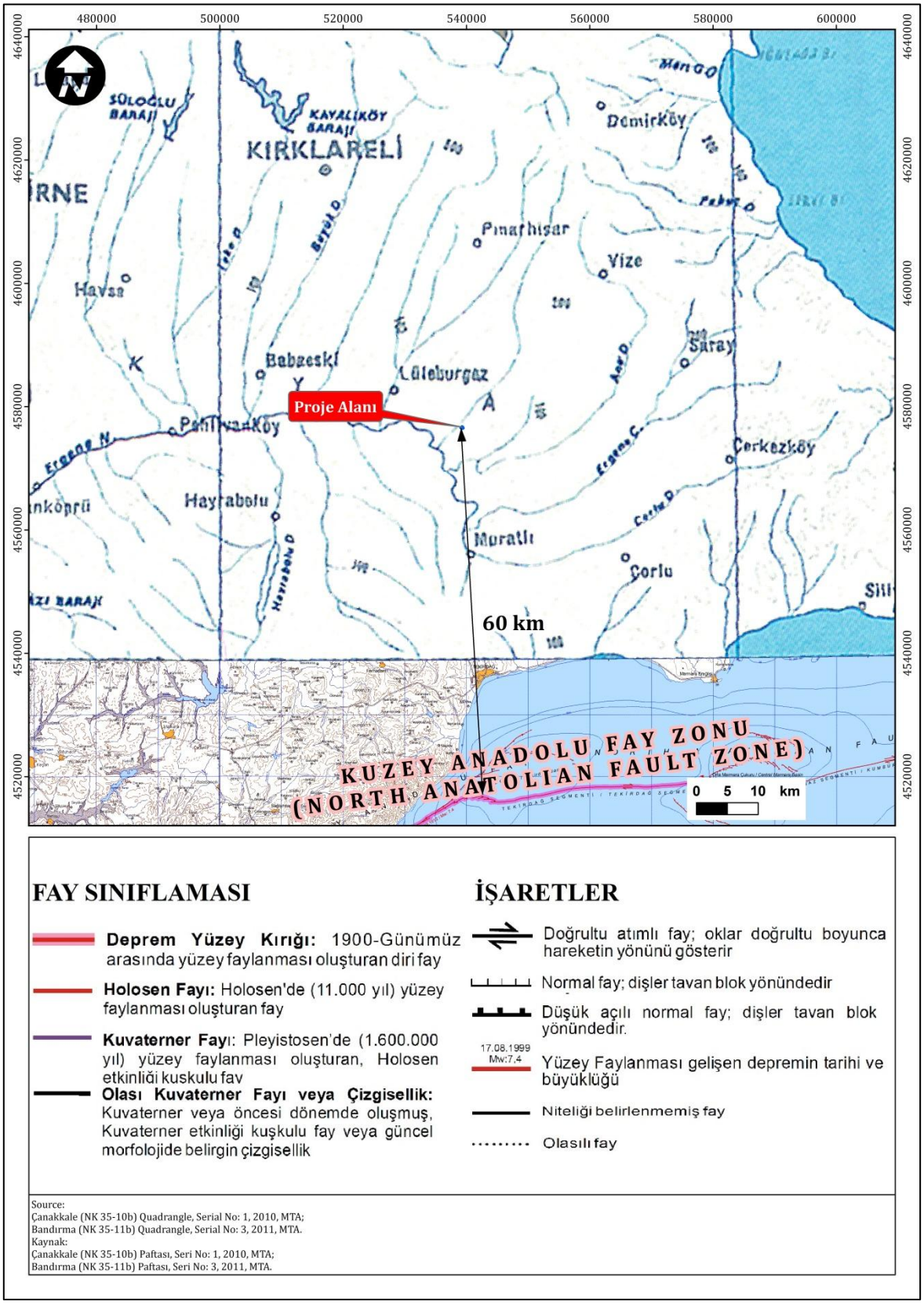

Figure 4-6. Active Faults Map at and Around the Project Area[2]

4.1.2.2 Seismicity

The region is generally considered to have a low-to-moderate seismic hazard, with a low probability of experiencing major destructive earthquakes. However, high-magnitude earthquakes along the northern branch of the NAFZ within the Marmara Sea could generate secondary seismic effects in this area, including wave amplification and ground motion variations (Parsons et al., 2000).

Local site conditions play a critical role in seismic hazard assessments. In particular, the alluvial sediments of the Ergene Basin have the potential to amplify seismic waves and increase liquefaction susceptibility during earthquakes (Koral & Özalaybey, 2013). Therefore, in areas with thick alluvial deposits, soil improvement measures should be implemented, and seismic design codes must be strictly adhered to in structural engineering. Additionally, detailed investigations into the potential reactivation of pre-existing fault systems are essential for comprehensive regional seismic risk analysis (Pınar et al., 2016).

The renewed "Türkiye Earthquake Hazard Map", published in the Official Gazette dated 18.03.2018 and numbered 30364 (duplicate) and entered into force as of 01.01.2019, is given in Figure 4-7 and project area is marked on. The project area was examined on the interactive earthquake hazard map published by AFAD, and the largest ground acceleration value (PGA 475) for the 475 Year Recurrence Period was determined as 0.258 g (see Figure 4-8).

[2] Bursa (NK 35-12) Quadrangle, Serial No:9, 2011,MTA

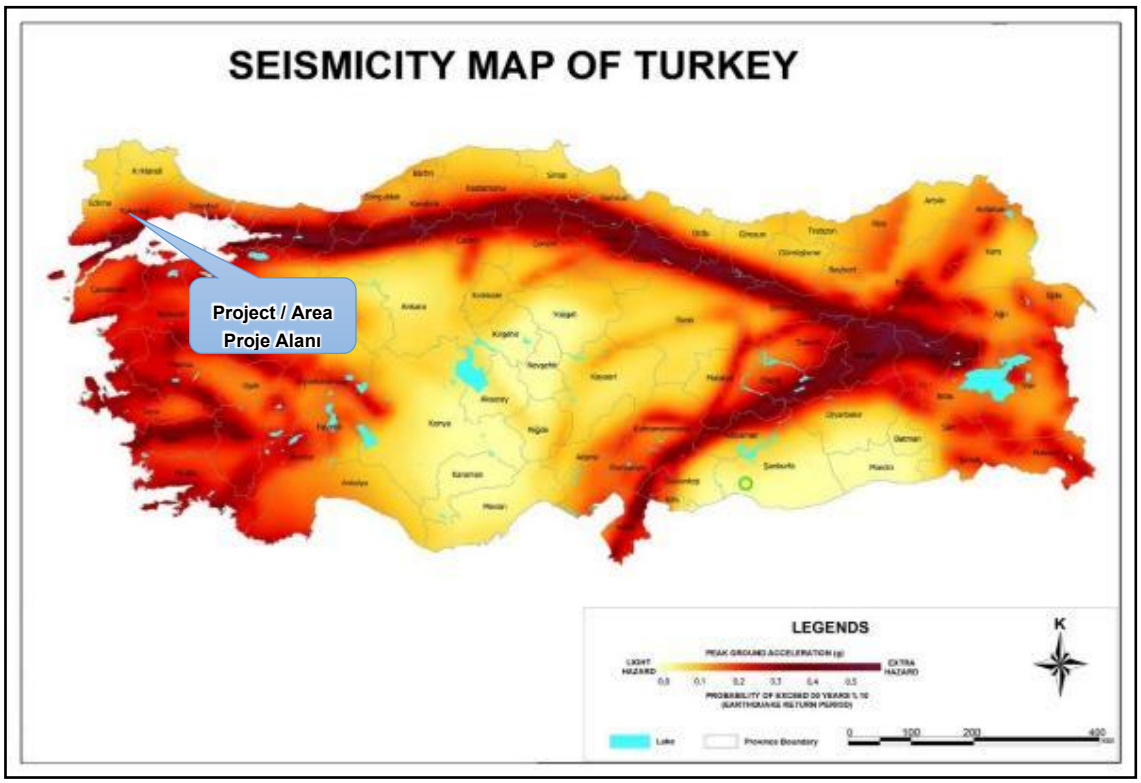

Figure 4-7. Earthquake Hazard Map of Türkiye with Project Area Marked[3]

[3] AFAD, 2018, Interactive Earthquake Hazard Map

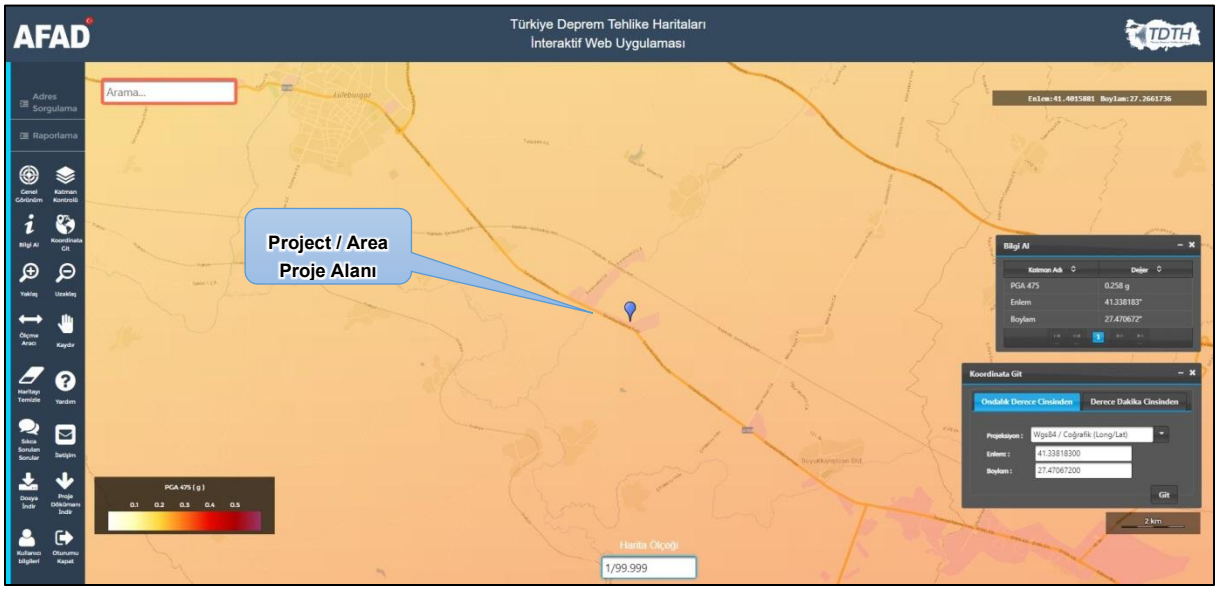

Figure 4-8. Project Area Peak Ground Acceleration (PGA 475)[4]

Earthquakes with magnitudes M≥ 4.5 from 1900 to the present (2025) within a 100 km diameter, with the project area being the center, are shown in Figure 4-9. The details of these earthquakes are provided in Table 4-6.

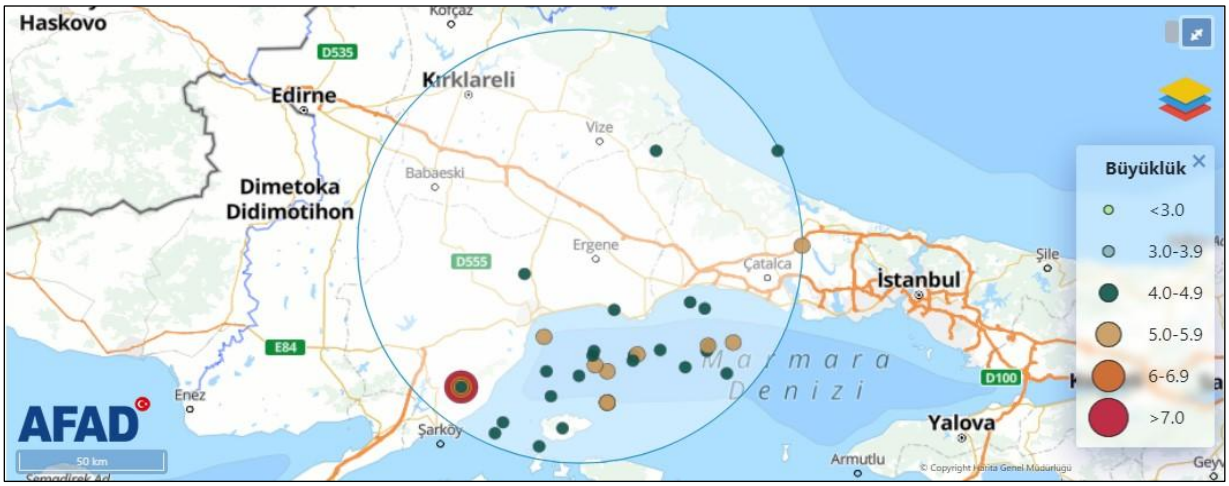

Figure 4-9. Earthquakes with a magnitude of M≥4.5 occurred within a 100 km diameter with project area being the center[5]

Throughout history, the Lüleburgaz and Lüleburgaz regions have been affected by several significant earthquakes. One of the most destructive was the 7.3 magnitude Mürefte Earthquake on August 9, 1912, which caused severe damage in Lüleburgaz, including the burning of 167 buildings, the loss of 60-70 lives, and injuries to around 150 people. Lüleburgaz was also impacted, though specific damage reports are limited.

Another notable event was the major Istanbul earthquake on April 23, 1766, which caused extensive destruction in Lüleburgaz and Büyükçekmece. Additionally, the earthquake near

[4] AFAD, 2018, Interactive Earthquake Hazard Map

[5] https://deprem.afad.gov.tr/depremkatalogu

Havsa, Edirne, on July 29, 1752, estimated to be of magnitude greater than 7.0, provides further insight into the seismicity of the Thrace region.

More recently, the 5.8 magnitude earthquake that struck the Silivri offshore area in the Marmara Sea on September 26, 2019, was felt in Lüleburgaz, causing panic among residents.

These historical earthquakes highlight the seismic risk in the Lüleburgaz and Lüleburgaz regions, emphasizing the importance of earthquake-resistant construction and urban planning to mitigate potential future hazards.

Table 4-6. Earthquakes Occurring in the Project Area Between 1900 and 2025

Date	Latitude	Longitude	Depth (km)	Type	Magnitude
27/11/2013 04:13:37	40,833800	27,905100	18,8	Mw	4,5
07/06/2012 20:54:25	40,854000	27,923500	14,9	Mw	5,0
25/07/2011 17:57:20	40,819500	27,749800	7,0	Mw	5,1
18/04/1995 05:36:04	40,864800	27,745300	22,3	mb	4,7
13/04/1995 04:08:03	40,850000	27,740000	22,6	mb	4,8
08/03/1991 09:23:13	40,850400	27,909300	11,0	mb	4,5
15/05/1986 18:13:56	40,720300	27,568400	10,0	mb	4,6
12/07/1982 14:46:14	40,995800	27,828400	25,1	mb	4,6
15/06/1978 00:26:45	40,785600	27,683500	27,9	mb	4,6
01/05/1971 13:45:27	40,868000	28,017000	6,9	mb	4,6
26/07/1959 17:07:06	40,910000	27,540000	10,0	MS	5,4
13/03/1952 06:30:01	41,020000	28,140000	11,0	MS	4,9
16/06/1942 05:42:34	40,800000	27,800000	20,0	MS	5,6
10/10/1929 23:00:54	41,110000	27,460000	10,0	MS	4,5
13/10/1919 07:54:10	41,500000	28,000000	10,0	MS	4,5
24/04/1913 17:00:00	40,800000	27,550000	10,0	MS	4,8
16/09/1912 21:05:00	40,700000	27,000000	10,0	MS	5,2

Date	Latitude	Longitude	Depth (km)	Type	Magnitude
13/09/1912 23:32:00	40,700000	27,000000	10,0	MS	6,2
11/08/1912 07:19:00	40,750000	27,200000	10,0	MS	4,8
10/08/1912 18:30:00	40,750000	27,200000	10,0	MS	5,3
10/08/1912 09:22:00	40,750000	27,200000	10,0	MS	6,2
09/08/1912 01:29:00	40,750000	27,200000	10,0	MS	7,4
14/08/1909 03:00:00	41,000000	28,200000	10,0	MS	4,7
16/11/1908 20:31:36	41,500000	26,500000	20,0	MS	4,5

The buildings to be built within the scope of the project must be in accordance with the principles of the "Regulation on the Buildings to be Constructed in Disaster Areas" published in the Official Gazette dated 14/07/2007 and numbered 26582 of the Ministry of Public Works and Settlement, and the Disaster and Emergency Services published in the Official Gazette dated 18.03.2018 and numbered 30364 and entered into force on 01.01.2019. Also, the provisions of the "Turkish Building Earthquake Regulation" of the Situation Management Presidency must be strictly followed.

4.1.3 Impact Assessment and Mitigation Measures

4.1.3.1 Construction Phase

During the construction phase, several potential impacts on land use and soil quality are anticipated. These include soil erosion, compaction, and contamination due to construction activities such as excavation, heavy machinery movement, and the storage of materials. The disturbance of soil during excavation or site preparation could lead to the loss of fertile topsoil, affecting its future productivity. Additionally, soil compaction from heavy equipment could reduce soil permeability, affecting water infiltration and plant growth.

To mitigate these impacts, the following measures will be implemented:

- **Erosion Control**: During the construction phase, erosion control is a critical component of mitigating soil degradation caused by water runoff and wind. Construction activities such as excavation, grading, and vegetation clearing can expose bare soil, making it vulnerable to erosion. Without proper measures, soil can be washed away by rain or blown by wind, leading to sedimentation in surrounding water bodies and degradation of nearby land areas. To address this, the site will implement a variety of erosion control techniques. Temporary silt fences and sediment barriers will be placed along vulnerable areas to trap sediment and reduce the flow of water across disturbed surfaces. Additionally, erosion control blankets or geotextiles will be installed on steeper slopes or areas where vegetation is sparse to protect the soil from direct exposure to rainfall. Vegetative cover will also be established as quickly as possible in disturbed areas to help stabilize the soil and minimize erosion.

Furthermore, during construction, a site-specific stormwater management practices will be developed, which will include the installation of sedimentation ponds or silt traps to collect and filter runoff before it can discharge into local waterways. Temporary diversion channels or swales will be constructed to redirect surface water flow away from active construction zones. The key to successful erosion control lies in early implementation and ongoing maintenance. This will include monitoring the effectiveness of installed control measures after rainfall events and making adjustments where necessary. Routine inspections will be carried out to ensure the structures remain intact and effective, and prompt repairs or replacements will be made if any barriers or blankets are found to be damaged or ineffective.

- **Topsoil Management**: Topsoil is a valuable and irreplaceable resource that contains essential nutrients and organic matter needed for vegetation growth. During the construction phase, the excavation and earth-moving activities may disturb the natural soil layers, and improper management of topsoil can lead to loss of soil fertility and increased erosion risks. To prevent this, topsoil will be carefully handled and stored separately from subsoil during excavation and grading activities (with a height of 2 meters and slope not steeper than 45 degrees).

  The topsoil will be stripped in advance of any major construction works and stockpiled in designated areas that are protected from wind, water erosion, and contamination. These stockpiles will be clearly marked and protected by temporary erosion control measures such as silt fences or tarps to prevent topsoil from washing away during rainfall.

  Once construction activities are completed, the stored topsoil will be returned to the disturbed areas to restore the natural soil structure. The stored topsoil will be spread evenly to ensure proper coverage and facilitate the growth of vegetation. To ensure the best outcomes, the re-spreading of topsoil will be done in a manner that minimizes compaction, using light equipment and avoiding driving on the reinstated areas. The implementation of this topsoil management strategy will help to maintain or improve soil fertility and promote vegetation re-establishment, contributing to long-term land restoration and sustainability. Additionally, the project will aim to reuse as much of the original topsoil as possible, reducing the need for artificial soil amendments.

- **Compaction Prevention**: Soil compaction is a significant concern during the construction phase, especially in areas where heavy machinery is used. Compacted soil has reduced porosity, which affects water infiltration, root growth, and overall soil health. Construction vehicles and equipment can cause excessive compaction, particularly in sensitive areas such as greenfields or areas with fragile soils. To prevent this, the project will establish clear guidelines for equipment use and movement across the site. Heavy machinery will be restricted to designated, compacted access routes and haul roads to minimize disturbance to surrounding soils. In particularly sensitive or soft areas, lighter vehicles or equipment will be used to avoid excessive compaction. Furthermore, the soil moisture content will be monitored to ensure that the soil is not excessively wet, as this can increase the likelihood of compaction during machinery movement.

  In addition to restricting machinery use, soil compaction will be mitigated by using temporary soil stabilization techniques where necessary. For example, where the soil is particularly vulnerable, soil aeration methods, such as deep ripping or tilling, will be used to break up compacted layers and restore soil structure. This practice will help improve water infiltration, root penetration, and overall soil health. The compaction prevention measures will be monitored regularly to assess the effectiveness of the

techniques used and to ensure that soil conditions remain favourable for the restoration of vegetation and other ecological functions. Where compaction is identified, corrective actions, such as the use of lighter machinery or aeration, will be taken promptly.

- **Chemical Management**: The construction phase may involve the use of various chemicals such as fuels, oils, lubricants, paints, and solvents. Improper handling or storage of these materials can lead to soil contamination, which may have long-term impacts on soil health and surrounding ecosystems. To prevent this, a detailed chemical management plan will be developed, outlining procedures for the safe storage, use, and disposal of chemicals on-site. All chemicals will be stored in secure, labelled containers, in designated, impermeable areas away from sensitive ecological zones. Chemical storage facilities will be designed with secondary containment systems, such as bunded areas, to prevent spills from reaching the soil. In addition, workers will be trained in the safe handling of chemicals and spill response protocols.

  To further reduce the risk of soil contamination, the project will implement stringent procedures for spill containment and clean-up. Spill kits will be readily available on-site, and all personnel will be trained in their proper use. In the event of a spill, immediate containment measures will be taken to prevent the chemical from spreading, and a proper clean-up process will be followed to ensure that the soil is not affected. Regular inspections will be conducted to ensure compliance with chemical management protocols, and any identified hazards will be addressed promptly. The project will also work closely with waste disposal contractors to ensure that chemical waste is disposed of properly, in accordance with local and international environmental regulations.

4.1.3.2 Operation Phase

During the operation phase, potential sources of soil contamination primarily stem from chemical spills, improper waste handling, and leakage from storage tanks or pipelines. The main contaminants include organic solvents (e.g., acetone, toluene, and ethanol), adhesives, hardening coating solutions, repair liquids, and VOC-laden residues. If these substances are not properly handled, they can seep into the soil, altering its composition and potentially affecting groundwater quality. No dust involved in the RTO system, no waste filters or cartridges generated, as RTO does not require pre-treatment;

Another key risk factor is leakage from raw material and waste storage areas, particularly for materials like insulating paste, UV absorbents, and chemical adhesives, which contain hazardous components. Storage containers, pipelines, and waste collection units can degrade over time, leading to slow leaks that may go undetected without proper monitoring. Stormwater runoff can also transport fine particulate matter, spilled chemicals, and heavy metal residues from production areas to surrounding soil, further increasing the risk of contamination. If left unmitigated, these pollutants can accumulate over time, leading to reduced soil fertility, toxicity concerns, and potential environmental liabilities.

To prevent soil contamination, the facility will implement strict chemical handling procedures, impermeable storage areas with secondary containment, and a hazardous waste management system. All liquid chemicals, including solvents, adhesives, and hardening solutions, will be stored in leak-proof containers within bunded areas to contain potential spills.

To mitigate these risks during the operation phase, the following measures will be enforced:

- **Waste Management**: A strict waste management plan will be implemented, including waste segregation, recycling, and disposal protocols to prevent soil contamination. Hazardous waste will be stored in designated, secure areas.
- **Spill Response and Containment**: Secondary containment systems and spill response protocols will be in place for chemical storage areas to quickly contain and clean up any accidental spills or leaks, preventing soil contamination.
- **Regular Inspections**: Routine inspections of production areas, storage facilities, and waste management systems will be conducted to identify any potential risks to soil quality.
- **Sustainable Land Use Practices**: Sustainable practices such as regular soil health assessments and minimal disturbance of surrounding land will be employed to ensure that the soil quality remains intact over the long term. Where necessary, soil amendment and restoration measures will be applied to maintain or improve soil health.

These mitigation measures aim to minimize the potential adverse impacts on soil quality during both the construction and operation phases, ensuring that the project operates in an environmentally responsible manner while protecting the land resources.

Table 4-6. Land Use, Soil and Geology-Related Impact Significances and Proposed Mitigation Measures

Potential Impact / Risk	Project Phases	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation)	Proposed Mitigation Measures	Residual Impact Significance
		Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Loss of Vegetative Topsoil	Land Preparation and Construction	Local	Irreversible	Long-term	One-off	Medium	Medium	Moderate	• Land preparation and construction works will be conducted at designated site that will be visibly and appropriately marked. • Waste and Wastewater Management Plan will be prepared and in place and training will be provided to the construction personnel on the Plan. • Topsoil will be stripped only from the project areas. • Stripping activities will not be performed when soil is wet to avoid soil compaction. • Topsoil will be stored separately from subsoil for the shortest time possible and it will be used for landscaping purposes. If long-duration storage is planned, the average height of topsoil stacks will be 2 meters, and the side slope of these stacks will not exceed 3:1. Dykes will be established around the designated storage area of the excavated material to hinder loss of soil. • The provisions of the Regulation on Control of Excavation Soil, Construction and Demolition Wastes shall be complied during land preparation and construction phase of the Project and excess excavation material will be re-used as appropriate or disposed of in existing licensed excavation waste storage sites. • Grading will be conducted by regarding natural slope and drainage conditions. • To avoid any flooding events, a drainage system will be constructed in line with natural drainage system. • Erosion control measures should be implemented after the completion of the earthworks. • Reinstatement/revegetation should be carried out at all disrupted area after the termination of the construction works to protect soil against winds by preferring appropriate herbs/grasses to be sowed. • Maintenance of the vehicles, machinery and equipment will be performed on a regular basis. • Discharge of hazardous materials and wastes into soil will be forbidden. • Hazardous materials and hazardous wastes should be temporarily stored in a designated area with impermeable floor in an enclosed manner. • Secondary containment structures and spill kits should be utilized along with the implementation of the Emergency Preparedness and Response Plan. • Accidental spills and leakages will be managed through implementation of the Emergency Preparedness and Response Plan. • Integrity of the septic tank will be control periodically. • Provisions of the Regulation on the Control of Soil Pollution and Soil Contaminated by Point Sources will be complied. • Wastes to be generated during the land preparation and construction phases of the Project will be stored and disposed of in a controlled manner in accordance with the relevant regulations defined in Section 2.1 and in line with the management practices described in this report. • OIZ will provide WW collection points and will be directly engaging with the wastewater 3rd party company • Waste and Wastewater Management Plan will be prepared and in place. • A grievance mechanism will be established to ensure any complaints/comments regarding the Project will be received and responded in a timely manner, providing solutions and taking corrective measures as appropriate. • Necessary information will be shared with the users of the nearby agricultural areas during land preparation before construction (when the construction will start, the approximate dates for heavy constructions and activities likely to generate noise). • Training of all project personnel will be provided to create awareness in terms of environmental, social and OHS aspects.	Minor
Mixing of Distinct Soil Layers		Local	Irreversible	Long-term	One-off	Medium	Medium	Moderate		Minor
Improper Handling of Excavation Waste		Local	Irreversible	Long-term	One-off	Medium	Medium	Moderate		Minor
Erosion Potential		Local	Short-term reversible	Medium-term	One-off	Low	Medium	Minor		Negligible
Soil Contamination		Local	Short-term reversible	Short-term	Intermittent	Low	High	Minor		Negligible
Damage owing to Natural Hazards		Wide	Irreversible/ Long-term reversible	Long-term	One-off/rare	High	High	Moderate		Minor

Potential Impact / Risk	Project Phases	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation)	Proposed Mitigation Measures	Residual Impact Significance
		Extent	Reversibility	Duration	Frequency	Overall Magnitude				
									• The provisions of the "Regulation on Structures to be Built in Disaster Zones" of the Abrogated Ministry of Public Works and Settlement and the provisions of the "Building Earthquake Regulation of Türkiye" of the Disaster and Emergency Management Presidency will be strictly complied with. • All engineering structure and superstructures (fill, cut) in the project will be designed and constructed taking into account the earthquake resistant design parameters and criteria.	
Soil Contamination	Operation	Local	Short-term reversible	Medium-term	Intermittent	Low	Medium	Minor	• Waste and Wastewater Management Plan will be prepared and in place and training will be provided to the construction personnel on the Plan. • Integrity of the septic tank will be control periodically. • Discharge of hazardous materials and wastes into soil will be forbidden. • Secondary containment structures and spill kits should be utilized along with the implementation of the Emergency Preparedness and Response Plan.	Negligible

4.2 Noise and Vibration

4.2.1 Methodology and Project Standards

Methodology

This chapter outlines the methodology for measuring noise levels in accordance with **ISO 1996-2:2017 - Acoustics**, a standard recognized by the International Finance Corporation (IFC). The primary objective of this noise measurement is to assess the environmental noise levels at specific receptor locations and evaluate the potential impacts on sensitive receptors, such as residential areas, schools, and hospitals.

Measurement Equipment

Noise measurements are conducted using **Class 1 or Class 2 sound level meters** that comply with the international standards outlined in **IEC 61672** for electroacoustics. To ensure the accuracy of the results, the sound level meter is calibrated both before and after the measurement session. Additionally, the microphone is equipped with a **windshield** to mitigate interference from wind noise, ensuring that the measurements reflect only the target environmental noise.

Measurement Locations

The location of the noise measurements is carefully selected (Yenibedir and Evrensekiz) to represent areas of concern, particularly where noise exposure is most significant. These locations include:

Measurements should avoid areas with significant reflection or blockage from sound sources, such as tall buildings, to obtain accurate data.

The standard measurements include the following parameters:

- **A-weighted sound pressure level (dB(A))**: This is the standard measurement for environmental noise, adjusted for the sensitivity of the human ear.
- **Leq (Equivalent Continuous Sound Level)**: This represents the continuous equivalent sound level over the measurement period and is particularly useful for assessing general noise exposure.
- **Percentile levels (L10, L50, L90)**: These values represent the noise level exceeded for 10%, 50%, and 90% of the time, offering insight into the variability of the noise levels throughout the measurement period.
- **Lmax and Lmin (Maximum and Minimum Sound Levels)**: These parameters indicate the highest and lowest levels of noise recorded during the measurement period.
- **Frequency analysis**: In certain cases, the noise may be further analyzed using **1/3-octave bands** to assess the frequency distribution of sound energy, especially when specific sources of noise (e.g., machinery or traffic) are a concern.

Measurement Duration

The duration of the noise measurements is critical for capturing the variability of noise levels. For **short-term measurements**, a minimum of 10 to 15 minutes is recommended, while **long-term measurements** may span several days or weeks to assess variations throughout different times of day and week. Measurements are conducted during both **daytime** and **nighttime** to capture the full spectrum of noise exposure. This helps in understanding the noise levels during high-activity periods (e.g., daytime) and low-activity periods (e.g., nighttime).

Measurement Time and Meteorological Conditions

The measurements are performed at representative times, considering both the typical operational hours of the noise source and the periods when sensitive receptors are most affected. These include:

- **High activity periods** (e.g., rush hour traffic).
- **Low activity periods** (e.g., nighttime, weekends).

Meteorological conditions, such as **wind speed, temperature, and humidity**, are monitored during the measurement session, as they can significantly influence the propagation of sound. Measurements should ideally be conducted in **dry conditions**, with wind speeds kept below 5 m/s. Rain or snow should be avoided, as these conditions can distort the data.

Conclusion

The methodology for noise level measurement based on ISO 1996-2:2017 ensures that the noise assessment is consistent, reliable, and in line with IFC and international standards. By following these procedures, the assessment of noise impacts on surrounding communities is accurate, providing valuable data for evaluating compliance with noise regulations and determining any necessary mitigation measures.

Assumptions and Limitations

The following assumptions were made during modelling:

- During the construction phase, it was assumed that all the machinery and equipment planned to be used will operate simultaneously.
- When calculating the noise levels in the residential area affected by the project, the closest household in the residential area was taken into consideration.
- It was assumed that in the construction phase, all machinery and equipment will operate only in daytime.
- It was assumed that in the operation phase, no significant impact will be in question.

Project Standards

Within the scope of the project, 48-hour noise measurements will be carried out at one point on weekdays and weekends.

The local legislation Environmental Noise Control Regulation limit values and IFC international financial institution limit values used within the scope of noise quality are given in the tables below.

Table 4-7. National Environmental Noise Limit Values

Noise Source	Measured Parameter	Environmental Noise Level		
		Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)
Industrial facilities, transportation resources	$LAeq_{,5min.}$	65 dB(A)	60 dB(A)	55 dB(A)
All sources	L_{Cmax}	100 dB(C)		

Table 4-8. IFC International Finance Corporation Environmental Noise Limit Values

Recipient Type	Measured Parameter	Environmental Noise Level	
		Day (07:00-22:00)	Night (22:00-07:00)
Residential, institutional, schools	$LA_{eq,.}$	55 dB(A)	45 dB(A)

Analyses will be carried out with state-of-the-art devices within the scope of TÜRKAK accreditation and analysis results will be reported by people specialized in their fields. All analysis services provided by Çınar Çevre Laboratuvarı A.Ş. will be carried out within the scope of the Quality Management System established in accordance with the standard *"TS EN ISO/IEC 17025 "General requirements for the Competence of Testing and Calibration Laboratories".*

4.2.2 Baseline Conditions

In order to determine the baseline noise levels in the project area, background noise measurements will be performed for 48 hours.

Background noise measurements will be carried out at one point near Evrensekiz Neighborhood and one point near Yenibedir Village that have the potential to be adversely affected by construction and operation activities.

The background noise measurement points are listed in Table 4-9.

Table 4-9. Sampling Locations

Name	X (WGS 84 UTM Zone 35N)	Y (WGS 84 UTM Zone 35N)
AQN-1	535505	4578576
AQN-2	541127	4579515

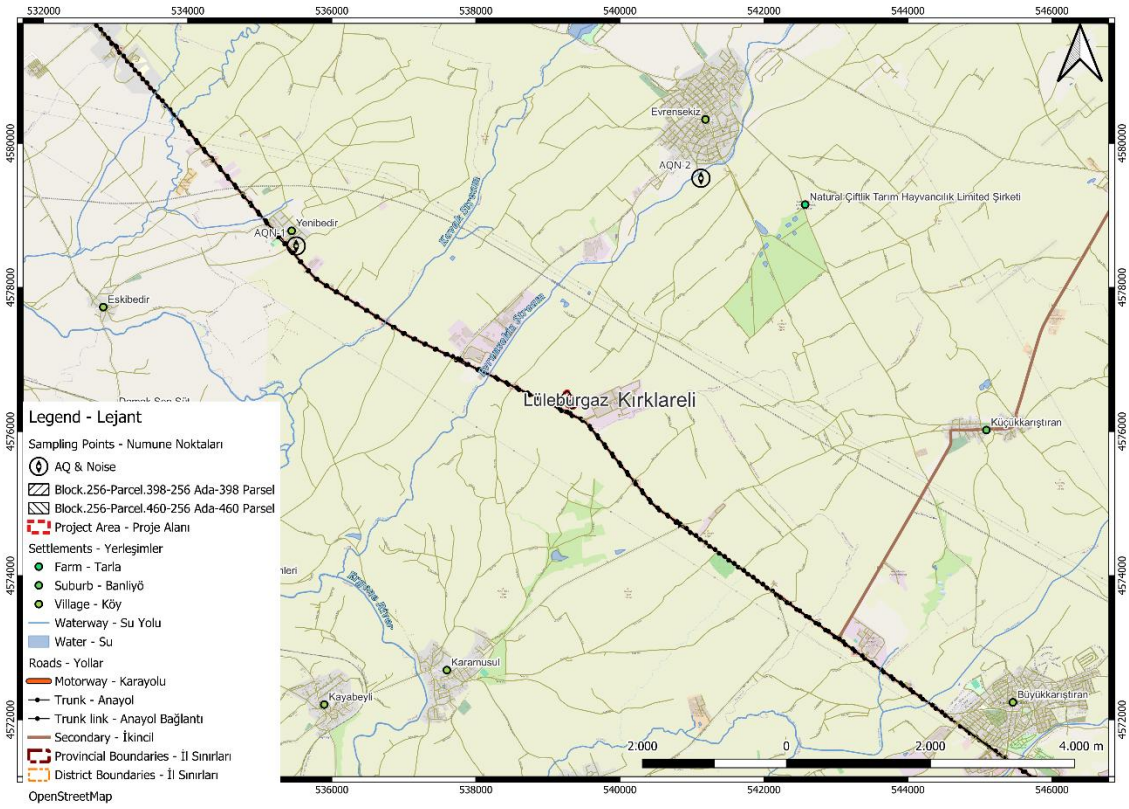

Figure 4-10. Background Noise Measurement Locations

The results of background noise measurements will be evaluated within the scope of Regulation on Assessment and Management of Environmental Noise (RAMEN) as Day (07:00-19:00), Evening (19:00-23:00), Night (23:00-07:00) averages and IFC Environmental, Health and Safety (EHS) Guidelines for Environmental Noise Management as Daytime (07:00-22:00) and Nighttime (22:00-07:00) averages.

Table 4-10. Background Noise Measurement Results

Location	Date	Period	ENPR (dBA)	IFC (dBA)	National Limit (dBA)	IFC Limit (dBA)
AQ-1	13.03.2025	Daytime	53.1	52.1	65	55
AQ-1	13.03.2025	Evening	47.4	-	60	-
AQ-1	13.03.2025	Night	43.5	44.8	55	45
AQ-1	14.03.2025	Daytime	51.4	51	65	55
AQ-1	14.03.2025	Evening	49.3	-	60	-
AQ-1	14.03.2025	Night	44	44	55	45
AQ-2	13.03.2025	Daytime	49.8	50	65	55
AQ-2	13.03.2025	Evening	50	-	60	-
AQ-2	13.03.2025	Night	44.5	45.1	55	45
AQ-2	14.03.2025	Daytime	49.1	48.7	65	55
AQ-2	14.03.2025	Evening	47.2	-	60	-
AQ-2	14.03.2025	Night	43.7	44.4	55	45
AQ-3	13.03.2025	Daytime	46.7	45.8	65	55
AQ-3	13.03.2025	Evening	43.7	-	60	-
AQ-3	13.03.2025	Night	40.8	42.2	55	45
AQ-3	14.03.2025	Daytime	47.7	48.1	65	55
AQ-3	14.03.2025	Evening	48.7	-	60	-
AQ-3	14.03.2025	Night	44.7	44.8	55	45

According to the above table, current noise levels show compliance with both national and international limits.

4.2.3 Impact Assessment and Mitigation Measures

4.2.3.1 Construction Phase

The land preparation and construction work of the project are planned to be completed within 9 months considering the construction start date. The works will be carried out during daytime hours.

The machinery, vehicles and equipment and their quantities that will operate during the machinery-equipment installation phase of the Project are given in Table 2.1.

Table 4-11. Machinery and Equipment to be Used in Land Preparation and Machinery-Equipment Installation Works

Machinery And Equipment Name	Number Of Vehicles For Each Phase
Truck	2
Excavator	2
Forklift	4

Machinery And Equipment Name	Number Of Vehicles For Each Phase
Loder	1

The machinery and equipment listed in Table 4-11 will operate in a specific sequence and are unlikely to be in the same place at the same time. However, since the noise calculations made within this ESIA report are based on the most unfavourable scenario, it is assumed that they are all working in the same place at the same time.

SoundPLAN 8.1 program was used to determine the total noise level that will occur during the construction-assembly works of the planned project. Information about the noise levels of the vehicles and equipment selected as noise sources in the calculations was obtained from the database in the library of the program.

There will be noise generation from construction equipment such as trucks and forklifts during the land preparation and phase of the Project.

Truck (Truck: neutral):

The total noise level generated by the truck (Truck: neutral) selected in SoundPLAN 8.1 program is 94 dBA and its distribution according to frequencies is given in Figure 4-11.

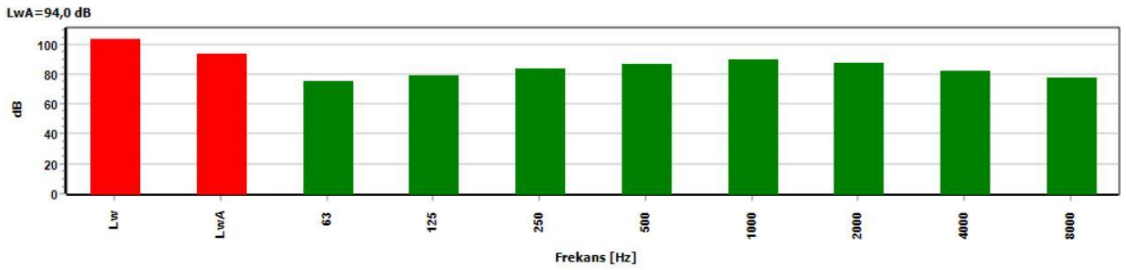

Figure 4-11. Frequency Analysis of Noise Level of Truck

Excavator

The total noise level to be generated by the excavator vehicle selected in SoundPLAN 8.1 program is 105 dBA and its distribution according to frequencies is given in Figure 4-12.

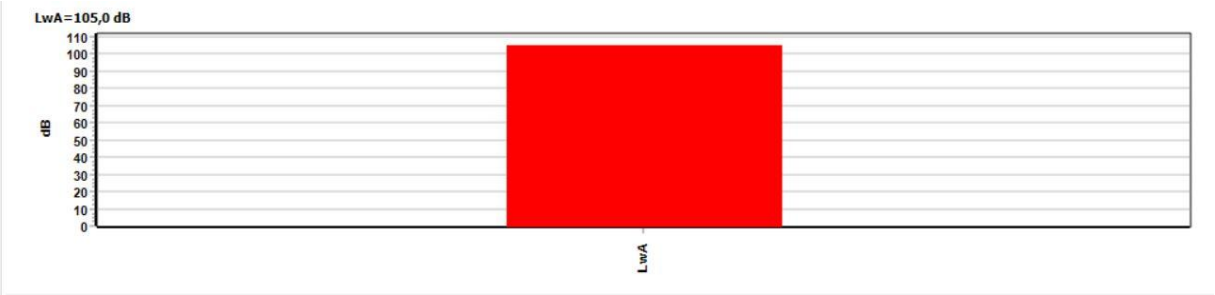

Figure 4-12. Frequency Analysis of Noise Level of Excavator

Forklift

The total noise level to be generated by the forklift truck selected in SoundPLAN 8.1 program is 100 dBA and its distribution according to frequencies is given in Figure 4-13.

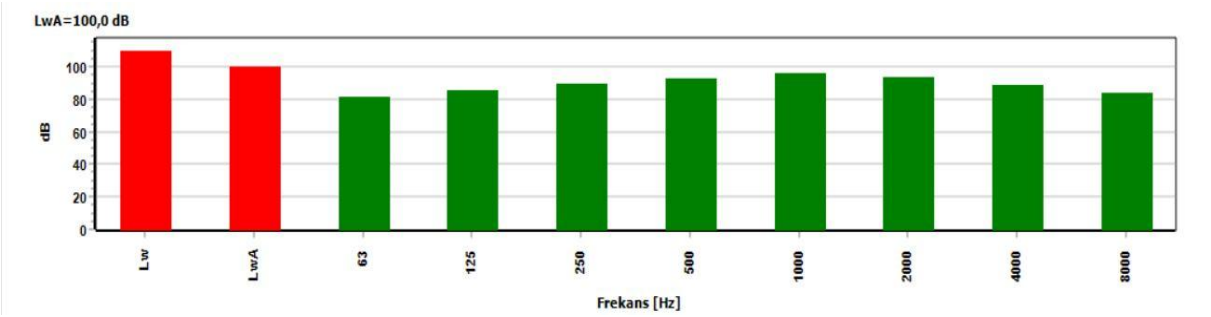

Figure 4-13. Frequency Analysis of the Noise Level of the Forklift

Loader

The total noise level to be generated by the Loder vehicle selected in SoundPLAN 8.1 program is 116 dBA and its distribution according to frequencies is given in Figure 4-14.

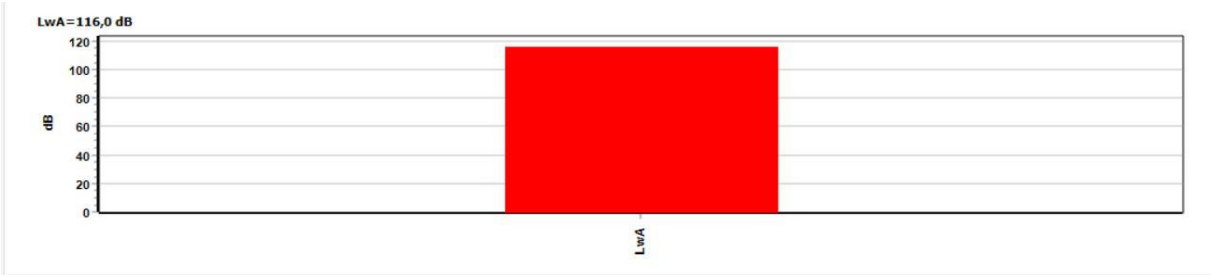

Figure 4-14. Frequency Analysis of Noise Level of the Loader

The goal of this section is to calculate the maximum noise level (Lmax) from the machinery and equipment used during construction at the closest settlement locations of Yenibedir (4.2 km) and Evrensekiz (3.5 km). The calculations will help assess the noise impact on these settlements and determine if mitigation measures are needed.

Machinery and Equipment Used

The following machinery and equipment will be used during the construction phase:

- Trucks: 2 vehicles
- Excavators: 2 vehicles
- Forklifts: 4 vehicles
- Loaders: 1 vehicle

Each machine generates a different level of noise, measured in LwA (A-weighted sound power level), expressed in decibels (dB). The LwA of each machine is as follows:

- Truck: 94 dB
- Excavator: 105 dB
- Forklift: 100 dB
- Loader: 116 dB

The closest settlements are:

- Yenibedir: 4.2 km from the construction site.

- Evrensekiz: 3.5 km from the construction site.

Noise Attenuation with Distance

Noise levels from point sources decrease with distance, and this attenuation follows an inverse square law. The formula used to calculate the noise level at a specific distance is:

L_d = L_wA - 20 * log10(r)

Where:

- L_d is the sound pressure level (dB) at distance r,

- L_wA is the sound power level (dB) at the source,

- r is the distance from the source in meters.

For this analysis, we will use the following distances:

- Yenibedir: 4.2 km = 4200 meters

- Evrensekiz: 3.5 km = 3500 meters

Calculations of Noise Levels at Yenibedir and Evrensekiz

At Yenibedir (4.2 km from the construction site)

The noise levels for each piece of machinery at Yenibedir are as follows:

- For Trucks: Ld_Truck = 21.54 dB

- For Excavators: Ld_Excavator = 32.54 dB

- For Forklifts: Ld_Forklift = 27.54 dB

- For Loaders: Ld_Loader = 43.54 dB

At Evrensekiz (3.5 km from the construction site)

The noise levels for each piece of machinery at Evrensekiz are as follows:

- For Trucks: Ld_Truck = 23.12 dB

- For Excavators: Ld_Excavator = 34.12 dB

- For Forklifts: Ld_Forklift = 29.12 dB

- For Loaders: Ld_Loader = 45.12 dB

Total Noise Level

At Yenibedir (4.2 km)

The total noise level is calculated using the following formula:

L_total = 10 * log10(Σ(10^(Ld_i/10)))

For Yenibedir, the individual noise levels are:

- Trucks: 21.54 dB

- Excavators: 32.54 dB

- Forklifts: 27.54 dB

- Loaders: 43.54 dB

The total noise level at Yenibedir is 44.06 dB.

At Evrensekiz (3.5 km)

For Evrensekiz, the individual noise levels are:

- Trucks: 23.12 dB
- Excavators: 34.12 dB
- Forklifts: 29.12 dB
- Loaders: 45.12 dB

The total noise level at Evrensekiz is 45.49 dB.

Comparison with Noise Standards

The calculated total noise levels at both locations are:

- Yenibedir: 44.06 dB
- Evrensekiz: 45.49 dB

These levels should be compared against the local regulations and the World Health Organization (WHO) guidelines for environmental noise. Based on these results, the levels of noise are within acceptable limits, considering that typical day-time noise levels should generally be below 55 dB(A) in residential areas.

The calculated noise levels at both Yenibedir and Evrensekiz are within acceptable environmental noise limits for residential areas. However, to mitigate any potential disturbances during construction, additional measures such as the use of quieter machinery, scheduling construction activities during non-sensitive hours, and the implementation of noise barriers or buffer zones could be considered to minimize the impact on the surrounding communities.

4.2.3.2 Operation Phase

During the operation phase, the noise generated by the project is expected to be minimal and within acceptable limits. The machinery and equipment used in the operational phase are designed to operate quietly, and operational activities will primarily involve routine maintenance and management tasks that do not contribute significantly to noise pollution.

In the Huizhi facility located in Jiangyin, the primary noise sources stem from the operation of industrial equipment such as fans, high-power motors, vacuum systems, and air compressors, as well as mechanical activities related to construction and expansion projects. To manage these emissions, the company adheres to the "Environmental Noise Emission Standards for Industrial Enterprises" (GB12348-2008), which set daytime and night-time noise limits for industrial zones at 65 dB and 55 dB respectively. Additionally, noise levels at workstations must not exceed 85 dB.

Noise management involves integrating noise control measures into the design, construction, and operation phases of all projects. Sound insulation and silencing technologies are the primary control methods, supported by routine equipment maintenance to prevent noise from mechanical failures. The ES Team is responsible for investigating noise complaints and revising environmental management plans when necessary. During equipment handling and repairs, strict protocols are in place to minimize noise, such as avoiding dropping materials, using soundproofing facilities, and assigning personnel for careful material handling.

For construction activities, the company mandates pre-inspections of machinery and enforces working hour limits (6:00–22:00) to reduce community disturbance, aligning with GB12523-2011 standards. Specific noise limits are applied to different construction stages, and night-time piling is prohibited. The company also regulates motor vehicle speeds to control traffic noise and bans outdated, noisy equipment. All construction units must comply with operational time restrictions and are subject to ongoing supervision and inspection by the company.

The environmental noise pollution prevention and control measures for the project will be designed, constructed, and implemented concurrently with the main project. These measures are currently applied at the factory in China and can be effectively implemented in Türkiye as well, in accordance with local regulations. In Türkiye, noise pollution control is integrated into the planning and execution phases of any construction or industrial project, as required by the *Environmental Noise Management Regulation*, which mandates that noise mitigation measures be part of the project's initial design and operation.

To control the noise generated during production and daily operations, sound insulation and silencing technical measures will primarily be adopted. The factory will develop noise reduction plans and organize efforts to implement them based on specific operational conditions. Regular maintenance of equipment will be carried out to prevent excessive noise caused by mechanical failure. These noise control strategies, used effectively in China, can also be applied in Türkiye to meet Turkish noise management standards. Regular maintenance is also emphasized under Türkiye's *Occupational Health and Safety Law* to prevent noise-induced health risks.

In the event of complaints regarding noise emissions from surrounding areas, the Safety and Environmental Protection Department will organize relevant departments to reassess noise control targets and adjust the environmental management plans accordingly. This practice, already in place in the Chinese factory, will also be implemented in Türkiye, where local environmental agencies require that companies address complaints and take corrective actions to ensure compliance with noise emission standards.

During equipment maintenance, especially when handling metals or other materials, it will be strictly prohibited to throw or drop materials from heights. These practices, currently used in the Chinese factory, can be easily replicated in Türkiye, where noise reduction during material handling and metal cutting is regulated by national standards to minimize environmental noise impact.

The ES Team will regularly inspect noise emission sources within the factory and ensure that corrective actions are taken for any non-compliance. This process, already established in the Chinese factory, will be applied in Türkiye as well, where the Ministry of Environment, Urbanization, and Climate Change mandates regular inspections to ensure that noise levels remain within permissible limits in industrial zones.

Before the start of any new, modified, or expanded projects, as well as during construction, the project team will require and oversee the inspection of construction equipment to be used on-site. Construction activities will be scheduled between 6:00 AM and 10:00 PM to avoid disturbing the closest settlements which are neighborhoods of Yenibedir (4.2 km) and Evrensekiz (3.5 km). If continuous construction is required, it will be done in a way that does not affect the public. The noise limits for construction sites will adhere to the *Environmental Noise Emission Standard for Construction Site Boundaries* (GB12523-2011), which mirrors the noise emission standards in Türkiye. These noise limits will be observed throughout the

construction phases to ensure that operations do not negatively impact the local community, particularly during the nighttime.

The construction unit will strictly control the operating hours of noise-generating equipment to prevent public disturbance, and the unit will be subject to regular supervision and inspection. This practice, in place in China, will be adopted in Türkiye as well, where local regulations require construction schedules to minimize noise emissions during non-daytime hours. Contractors in Türkiye commonly plan construction schedules that limit noisy activities to acceptable hours, in line with municipal noise regulations.

Motor vehicles within the company will adhere to speed limits to prevent noise pollution. In Türkiye, similar regulations apply to vehicles operating in industrial zones, requiring them to follow speed limits to reduce noise and ensure safety. The application of these vehicle speed limits to prevent noise pollution will be a standard procedure, just as it is in the Chinese factory.

Finally, the use of outdated or backward equipment that generates excessive environmental noise pollution will be prohibited. In Türkiye, the Ministry of Environment, Urbanization, and Climate Change enforces strict environmental noise standards that limit the use of older machinery in urban and industrial zones. The Chinese factory has already phased out noisy, outdated equipment, and this approach can be applied to the Turkish project to ensure compliance with national noise regulations.

Table 4-12. Impact Significances, Mitigation Measures and Value of Residual Impacts – Noise and Vibration

Potential Impact / Risk	Project Phases	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation)	Proposed Mitigation Measures	Residual Impact Significance
		Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Increase in Noise Levels	Land Preparation and Construction	Local	Short-term reversible	Short-term	Continuous	Low	Medium	Minor	• As minimum number of machinery and equipment as possible will be operated simultaneously. • Maintenance of the vehicles will be performed on a regular basis in order to ensure their good working conditions. • Idling of vehicles will be avoided. • Driving of construction vehicles through the settlements will be avoided where possible. • Night works should be kept to a minimum. • When necessary, portable noise barriers are recommended to minimize noise emission to the nearest settlement. • All construction activities will be carried out in compliance with the noise levels specified in the Regulation on Environmental Noise Control and noise limits of WBG General EHS Guidelines. • Induction training with necessary environmental training that aims at reducing noise caused by project activities will be provided to all project personnel to create awareness. • Notification of communities/settlements about the noise levels that may be created during construction phase due to heavy machinery use will be provided. • Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken and necessary noise level measurements will be performed. • Employees will be provided with protective equipment as specified in the Occupational Health and Safety Law.	Negligible
Increase in Noise Levels	Operation	Local	Short-term reversible	Short-term	Continuous	Negligible	Medium	Negligible	• During the procurement of the machinery and equipment, the sound levels in the technical specifications will be considered. • Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken, and necessary measurement will be performed. • Maintenance of the plant components including transformers, inverters etc. and vehicles utilized for transportation will be performed on a regular basis in order to ensure their good working conditions. • Architectural design will emphasise the selection of structures and building materials, as well as soundproofing, to keep the noise level at the lowest possible level during the operation of the plant to reduce noise and minimise its impact.	Negligible

4.3 Air Quality and Greenhouse Gas Emissions

4.3.1 Methodology and Project Standards

The national legislation and international standards that will be considered for the impacts/risks related with the water resources and water quality during the project activities and will be complied are as follows:

Ambient Air Quality

- Industrial Air Pollution Control Regulation (IAPCR)
- Air Quality Assessment and Management Regulation (AQAMR)
- Exhaust Gas Emission Control Regulation
- WBG General EHS Guidelines
- IFC PS1: Assessment and Management of Environmental and Social Risks and Impacts
- IFC PS3: Resource Efficiency and Pollution Prevention
- WBG General EHS Guidelines - 1. Environment - 1.4: Water Conservation
- World Health Organization (WHO) Ambient Air Quality Guidelines

The limit values considered for the evaluation of the baseline air quality are the limit values specified in Table 2.2 in Industrial Air Pollution Control Regulation and in IFC/WHO Environmental Air Quality Guides (see Table 4-13 and Table 4-14).

Table 4-13. National Environmental Air Quality Limit Values

Parameter	Period	Unit	Threshold Limit
SO_2	Hourly (It is not exceeded more than 24 times in a year.)	µg/m³	350
	24-hour		125
	Long Term Value (LTV)		60
	Annual and winter period (1 October-31 March)		20
NO_2	Hourly (It is not exceeded more than 18 times in a year.)	µg/m³	200*
	Year		40
PM_{10}	24-hour (It is not exceeded more than 35 times in a year.)	µg/m³	50
	Year		40
Pb	Year	µg/m³	0,5
CO	Maximum daily 8-hour average	mg/m³	10

Parameter	Period	Unit	Threshold Limit
Cd	LTV	µg/m^3	0,02
HCl	Short Term Value (STV)	µg/m^3	150
	LTV		60
HF	Hour	µg/m^3	30
	STV		5
H_2S	Hour	µg/m^3	100
	STV		20
Total Organic Compounds (In terms of carbon)	Hour	µg/m^3	280
	STV		70
Dust Deposition	STV	mg/m^{2}gün	390
	LTV		210

Table 4-14. WHO Environmental Air Quality Guides Limit Values

Parameter	Averaging Period	Guideline Value (µg/m^3)
SO_2	10 minutes	500
	24-hour	40
NO_2	1 hour	200
	1 year	10
PM_{10}	24-hour	45
	1 year	15
$PM_{2.5}$	24-hour	15
	1 year	5

Parameter	Averaging Period	Guideline Value (µg/m³)
O_3	8-hour daily maximum[6]	100
	Peak Season[7]	60

"Emission Factors to be used in Dust Emission Mass Flow Calculations" given in the Regulation on Control of Industrial Air Pollution will be used for the calculation of the expected dust emissions.

Table 4-15. Emission Factors to be used Dust Emission Mass Flow Calculations

Sources	Emission Factors	
	Uncontrolled	Controlled
Removal (kg/ton)	0.025	0.0125
Loading (kg/ton)	0.010	0.005
Transport (total distance round trip) (kg/ton)	0.7	0.35
Dumping (kg/ton)	0.010	0.005
Storage (kg/ha.day)	5.8	2.9

4.3.2 Baseline Conditions

The study area for air quality monitoring includes various locations within and around the project zone, including sensitive receptors such as residential areas, schools, hospitals, and ecologically sensitive regions. air quality sampling was conducted following internationally recognized methods, ensuring that both urban and rural areas were covered.

The measurements that will be taken during Project Area near the Evrensekiz Neighborhood. The measurements will be recorded at various points in the study area.

[6] 99th percentile (3-4 exceedance days per year). New 2021 guideline

[7] New WHO 2021 guideline

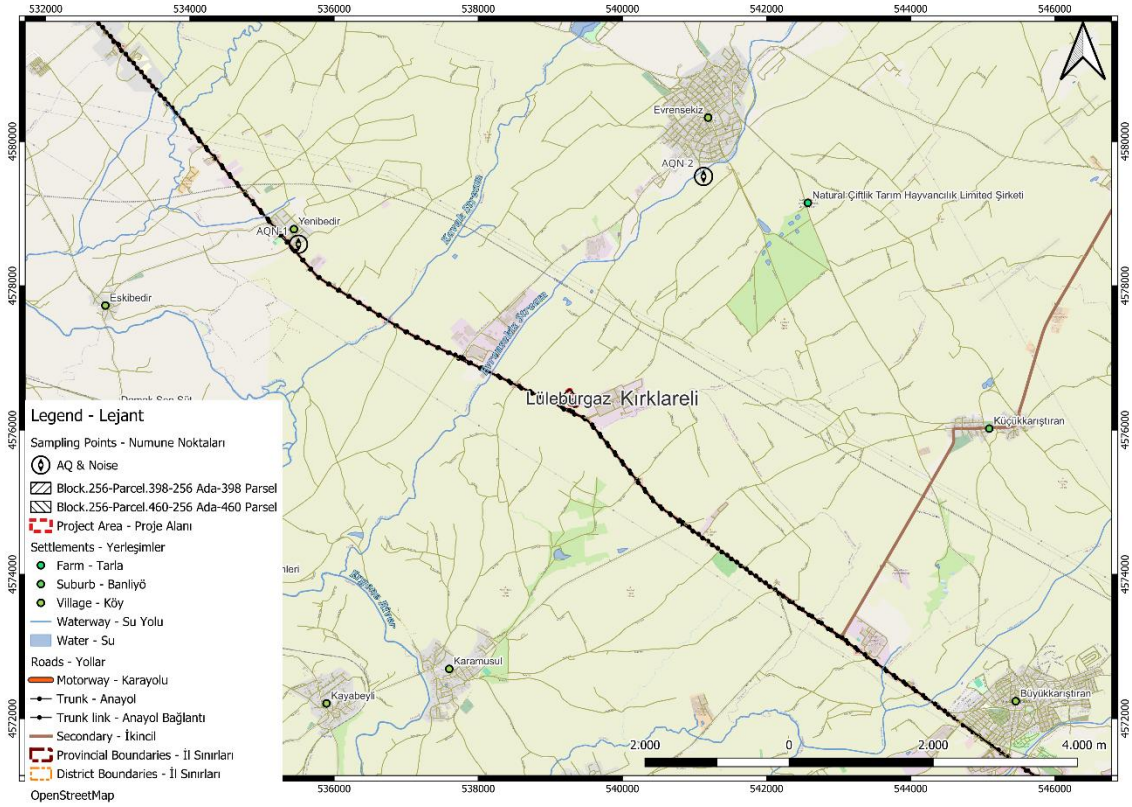

Figure 4-15. Air Quality Sampling Locations

Table 4-16: PM2.5 Results

Sampling Point	Location	Date	PM2.5 (µg/Nm³)	Average PM2.5 (µg/Nm³)	WHO Limit (µg/m³)
AQ-1	PM2.5 – 1st Station	11.03.2025	18.8	**18.7**	**15**
		12.03.2025	18.6		
AQ-2	PM2.5 – 2nd Station	11.03.2025	22.5	**24.1**	**15**
		12.03.2025	25.7		
AQ-3	PM2.5 – 3rd Station	11.03.2025	22.8	**23.6**	**15**
		12.03.2025	24.3		

Table 4-17: PM10 Results

Sampling Point	Location	Date	PM10 (µg/Nm³)	Average PM10 (µg/Nm³)	National Limit (µg/m³)
AQ-1	PM10 – 1st Station	11.03.2025	25.1	26.6	45
		12.03.2025	28.1		

AQ-2	PM10 – 2nd Station	11.03.2025	37.5	36.2	45
		12.03.2025	34.8		
AQ-3	PM10 – 3rd Station	11.03.2025	30.4	37.3	45
		12.03.2025	44.3		

PM2.5 and PM10 concentrations were measured at three separate monitoring stations on 11 and 12 March 2025. The **PM2.5 levels** ranged from **18.6 to 25.7 µg/Nm³**, with average values at all locations **exceeding the WHO 24-hour guideline limit** of 15 µg/m³. This exceedance suggests the presence of moderate air quality concerns, likely influenced by local construction activities, unpaved surfaces, or transportation-related dust. On the other hand, **PM10 concentrations** varied between **25.1 and 44.3 µg/Nm³**, remaining **within the national 24-hour average limit** of 45 µg/m³ set by Turkish air quality regulations. Overall, while **PM10 levels are compliant**, **elevated PM2.5 readings indicate the need for enhanced dust suppression measures** and more frequent monitoring, particularly near sensitive receptors and active construction zones

Table 4-18: SO2, NO2 and VOC Results

Measurement Type	Measurement Point	Measurement Period	Measurement Results (µg/m³)	Limit Value (µg/m³)
SO_2	AQ - 1	11.03.2025 – 11.04.2025	20.3	60
	AQ - 2	11.03.2025 – 11.04.2025	20.1	
	AQ - 3	11.03.2025 – 11.04.2025	19.3	
NO_2	AQ - 1	11.03.2025 – 11.04.2025	5.95	40
	AQ - 2	11.03.2025 – 11.04.2025	7.4	
	AQ - 3	11.03.2025 – 11.04.2025	2.15	
VOC	AQ - 1	11.03.2025 – 11.04.2025	19.8	70
	AQ - 2	11.03.2025 – 11.04.2025	15.5	
	AQ - 3	11.03.2025 – 11.04.2025	25.2	

Measurements of **SO_2, NO_2, and VOC** were conducted at three air quality monitoring stations between **11 March and 11 April 2025**. All recorded values were **well below the applicable limit values**, indicating satisfactory ambient air quality for these parameters during the monitoring period.

- **SO_2 concentrations** ranged from **19.3 to 20.3 µg/m³**, significantly below the **national limit of 60 µg/m³**.
- **NO_2 levels** varied between **2.15 and 7.4 µg/m³**, remaining far under the **40 µg/m³ threshold**.
- **VOC measurements** ranged from **15.5 to 25.2 µg/m³**, also below the **limit of 70 µg/m³**

4.3.3 Impact Assessment and Mitigation Measures

4.3.3.1 Construction Phase

The project will cover an area of approximately 37,800 m² and will involve an estimated soil excavation depth of 30 cm. This will generate approximately 113,400 m³ of excavated material, equating to around 1,820 tons of excavation waste. Considering the construction will last one year, 20 days a month and 8 hours per day, emission rate is 0.46. The following table shows the estimated dust emissions during project activities.

Table 4-19. Estimated Emissions for Phase I

Activity	Emission Factor (kg/ton)	Emission (kg/hr) (Controlled)
Vegetation Stripping	0.025	0,024
Excavation	0.025	0,024
Loading	0.010	0,01
Transport	0.7	0,65
Unloading	0.010	0,01
Total		**0,714**

Given that the emissions are below the 1 kg/hour threshold specified in the RCIAR, detailed air quality modeling is not required. However, the implementation of best practices for dust suppression and control will be necessary to minimize impacts on air quality.

The following mitigation measures will be implemented to control and reduce dust emissions:

- **Watering**: Regular watering of the construction site, particularly during excavation and soil handling activities, to prevent dust generation.
- **Dust Control Equipment**: Use of dust suppression systems on machinery and vehicles.
- **Material Handling**: Minimization of soil handling and transport during dry conditions, ensuring that materials are covered during transport to reduce dust emissions.
- **Traffic Management**: Speed limits for vehicles operating on unpaved roads, reducing the likelihood of dust generation.
- **Storage Area Management**: Ensuring that stored materials, especially topsoil, are covered and that temporary storage areas are properly maintained to reduce dust emissions.

Impact significances, mitigation measures and value of residual impacts on air quality are provided in Table 4-20.

4.3.3.1 Operation Phase

The primary pollutant mentioned is **volatile organic compounds (VOCs)**, which are emitted from various processes and locations within the project. These include drying and curing

processes, research and development (R&D) activities, workshops (Additionally, dust particles are noted as another type of atmospheric pollutant.

During the production process, waste gas emissions primarily include non-methane total hydrocarbons, low-concentration particulate matter, nitrogen oxides, toluene, and ethyl acetate. These emissions are not specially stored or measured individually, as they are directly routed through a Regenerative Thermal Oxidizer (RTO) system for treatment. The RTO ensures that gas concentrations are reduced to within regulatory limits before being discharged into the atmosphere.

Volatile organic compounds (VOCs) are mainly generated from the production of car cover films and energy-saving window films, contributing to emissions of non-methane hydrocarbons, particulates, and nitrogen oxides. However, in the production of CO_2 adsorption materials and VOC adsorption materials, water-based solvents are used, resulting in no significant VOC emissions from these processes.

The exhaust gas treatment system operates using a Regenerative Thermal Oxidizer (RTO), where the exhaust gas is directed into either Regenerator A or B via an induced draft fan. Inside the system, the gas is heated to a high temperature range of 750℃–850℃, which allows for the incineration of pollutants. If the incoming gas temperature is too low to ensure complete combustion, natural gas is ignited in the combustion chamber to raise the temperature to the required level, depending on the type of pollutant present.

Once the exhaust gas reaches the appropriate temperature, it undergoes thermal oxidation, effectively breaking down harmful compounds. The resulting clean gas is then released into the atmosphere through the exhaust emission pipe, ensuring that emissions meet environmental standards. This process provides an efficient and controlled method of reducing industrial air pollution.

The organic solvent waste gas is collected by fans and exhaust ducts and then treated in a Regenerative Thermal Oxidizer (RTO) waste incinerator, where it undergoes high-temperature incineration. This process effectively reduces the emission of volatile organic compounds (VOCs). The RTO in this project is an internationally advanced environmental protection and energy-saving equipment, specifically designed to handle organic waste gas generated during production. It achieves a VOC destruction rate exceeding 99%, ensuring compliance with the "Industrial Air Quality Control Regulation."

After treatment by the VOC device, the main pollutants in the organic waste gas are sulfur dioxide (SO_2) and nitrogen oxides (NOX). The high efficiency of the VOC treatment device ensures that the emissions have no significant impact on the surrounding atmospheric environment. This advanced treatment system not only meets regulatory requirements but also contributes to the project's overall environmental sustainability by minimizing the release of harmful pollutants into the atmosphere.

Waste Gas Identification involves the classification of waste gases into organized and unorganized emissions. Organized emissions include waste gases that are collected and treated through special facilities, such as those from canteens and process waste gases. Unorganized emissions, on the other hand, include emissions like vehicle exhaust and dust that are not collected in the workshop. The identification process will be carried out by the Safety and Environmental Protection Center, in collaboration with other departments. This approach will be similarly implemented in the Turkish project to properly manage waste gas emissions.

Exhaust Gas Control begins with an environmental factor assessment whenever new equipment, processes, or materials are introduced. Clean production processes that are energy-efficient and have low pollutant emissions will be prioritized, while older, less efficient

equipment will be phased out. This approach will also be implemented in Türkiye, ensuring the reduction of environmental pollution. In the event that key ventilation equipment like exhaust fans or systems fails, maintenance personnel will address the issues promptly, with regular maintenance to ensure optimal operation. This practice will be followed in Türkiye as well, to guarantee the effective treatment and discharge of waste gases. Additionally, the canteen's cooking fume exhaust is captured by range hoods and discharged to the roof. In Türkiye, a similar method will be used for managing cooking fumes. For motor vehicles, an annual inspection is required, and those with excessive emissions are eliminated. This policy will also be applied to vehicles in the Turkish project, ensuring compliance with emission standards.

4.3.3.1.1 VOC Treatment System

During the operation phase, the main sources of air emissions will be volatile organic compounds (VOCs), combustion gases, and particulate matter generated from production processes, material handling, and the operation of heating and ventilation systems. VOC emissions will primarily originate from the use of solvents, adhesives, and coating processes in film production.

To effectively control and minimize air emissions, the facility will be equipped with an advanced gas absorption system and a Regenerative Thermal Oxidizer (RTO) incinerator. The gas absorption system will capture VOCs and other gaseous pollutants from production areas, reducing their release into the atmosphere. The RTO incinerator will thermally oxidize VOC emissions at high temperatures (800-1000°C), breaking them down into harmless byproducts like CO_2 and water vapor. Additionally, the system will incorporate heat recovery technology, which will improve energy efficiency by utilizing excess heat for production processes, thereby reducing fuel consumption and associated emissions.

The implementation of these air emission control measures will provide multiple benefits, including compliance with environmental regulations, improved workplace air quality, and reduced environmental impact. By minimizing VOC emissions and other pollutants, the project will help protect human health and the surrounding ecosystem. Moreover, the gas absorption and RTO systems will enhance operational sustainability by ensuring that the facility meets national and international air quality standards.

4.3.3.1.2 Waste Gas Collection and Treatment Process

VOC Emission Capture:

- A ventilation system with exhaust fans collects VOC emissions from different stages of production.
- The collected emissions are directed into an exhaust cylinder.

Thermal Oxidation in RTO:

- The RTO system operates at high temperatures (typically 800-1000°C) to decompose VOCs.
- The organic waste gases are converted into CO2 and water vapor.

Energy Recovery:

- The system features a heat recovery mechanism that reduces energy consumption.
- The recovered heat is reused within the production process to improve efficiency.

Emission Control:

- Post-treatment, the cleaned gases are safely released into the atmosphere.
- Continuous monitoring ensures compliance with international environmental standards.

4.3.3.1.3 Environmental Benefits

- **Reduction in Air Pollution**: The RTO system ensures the decomposition of harmful organic compounds, significantly lowering VOC emissions.
- **Energy Efficiency**: Heat recovery minimizes fuel consumption and operational costs.
- **Compliance with Regulations**: The system adheres to stringent environmental protection guidelines, promoting sustainable industrial practices.

The raw material selection and production processes are designed to ensure high-quality output while prioritizing sustainability. The VOC treatment system, specifically the use of an RTO incinerator, plays a crucial role in minimizing environmental impact. With the planned transition of certain raw materials from international to domestic sources, the company aims to enhance production efficiency, cost-effectiveness, and sustainability. Future improvements may involve the integration of additional green technologies and enhanced monitoring systems for continuous environmental protection.

Table 4-20. Impact Significances, Mitigation Measures and Value of Residual Impacts – Air Quality and GHG Emissions

Potential Impact / Risk	Project Phases	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation)	Proposed Mitigation Measures	Residual Impact Significance
		Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Deterioration in Air Quality	Land Preparation and Construction	Local	Short-term reversible	Short-term	Continuous	Low	Medium	Minor	• The impact of the dust formed during the construction phase will be mitigated by watering the construction site and the access roads. • Truck carrying dust-generating materials will be covered and the upper part of the material will be kept at 10% humidity. • Loading/unloading will be carried out carefully without scattering. • Maintenance of the vehicles will be performed on a regular basis. The requirements of the "Exhaust Gas Emission Control and Gasoline and Diesel Quality Regulation" will be met. • Idling of vehicles will be avoided to prevent unnecessary emissions. • Speed limit will be set and adhered. • Driving of construction vehicles through the settlements should be avoided where possible. • Materials will be loaded and unloaded without scattering and throwing. • As minimum number of machinery and equipment as possible will be operated simultaneously. • The top of the excavated material will be wetted to prevent dust formation and additional dust control measures, such as usage covers, wind barriers, silt fence, will be implemented, if required. • Compliance with the air quality limit values stipulated in national legislation and WBG General EHS Guidelines will be ensured. • In case of any grievance, dust measurements will be conducted and urgent corrective and preventive action(s) will be taken.	Negligible
Increase in Dust Concentrations		Local	Short-term reversible	Short-term	Continuous	Low	Medium	Minor		Negligible
Disturbance in Community and Occupational Health and Safety		Local	Short-term reversible	Short-term	Continuous	Low	High	Minor		Negligible
VOC and Dust Emissions	Operation	Local	Short-term reversible	Short-term	Continuous	Low	High	Minor	**For VOCs:** • **Use Low-VOC Materials:** Opt for materials and products with low or no VOC content (e.g., paints, coatings, adhesives, cleaning agents). • **Improve Ventilation:** Ensure proper ventilation in workspaces using exhaust fans, air purifiers with activated carbon filters, and open windows. • **Implement Closed Systems:** Use closed systems for processes that emit VOCs to contain and treat emissions before release. • **Regular Maintenance:** Regularly maintain equipment and storage containers to prevent leaks and spills. • RTO: Waste gas from production contains non-methane total hydrocarbons, particulate matter, nitrogen oxides, toluene, and ethyl acetate, which are directly treated through a Regenerative Thermal Oxidizer (RTO) and discharged once concentrations meet standards. These emissions primarily originate from the manufacturing of car cover films and energy-saving window films. In contrast, the production of CO_2 and VOC adsorption materials uses water-based solvents, resulting in no VOC emissions. **For Dust Particles:** • **Enclosed Processes:** Enclose processes that generate dust to contain and capture particles before they disperse. • **Regular Cleaning:** Implement regular cleaning schedules using vacuum systems with HEPA filters to remove settled dust from surfaces and equipment.	Negligible

4.4 Climate Change Risk Assessment

4.4.1 Introduction

Climate Change

This chapter reports upon the climate evaluation conducted in line with the EP IV (Principle 2 and Annex A)[8] for assessing physical climate risks. The climate change risk assessment considers climate-related risks upon physical project receptors (as identified within Section 8.2), as well as nearby social and environmental receptors as outlined within other chapters of this ESIA.

Construction phase impacts of climate change on the Project are within the scope of this Assessment considering the fact that impacts of climate change have already been observed. Impacts of climate change on the operational phase of the Project are also within the scope of this Assessment and are considered to be permanent changes that may affect the Project throughout its operational lifetime.

Greenhouse Gas Emissions

This chapter also considers the potential GHG effects from operation of the Project, in accordance with IFC, EP IV.

Consideration of GHG emissions impacts during the construction phase is scoped in for this Assessment to review compliance with IFC PSs[9], which require a GHG emissions assessment to determine whether combined Scope 1 and Scope 2 emissions are expected to be more than 25,000 tonnes of CO_2 equivalent per year. Although there is no anticipated significant GHG emissions arising from the operation of the Project considering its nature, potential carbon sources during the operation phase of the Project are provided in this Assessment for effective management of GHG emissions. Also, avoided GHG emissions associated with the Project during the operational phase are within the scope of this Assessment.

4.4.2 Methodology

4.4.2.1 Applicable Guidelines and Standards

International standards and guidelines applicable to the Project for the assessment of physical climate change risks to the Project and carbon impacts of the Project during construction and operation phases have been presented in this section as follows.

Equator Principles IV (EP IV)[10]

The EP IV are a voluntary set of standards for determining, assessing, and managing social and environmental risks in project financing, including those related to climate change and GHG emissions. They were established to provide a minimum standard for due diligence to support responsible risk decision-making. The principles apply globally and to various sectors, ensuring that the projects financed are developed in a manner

[8] Equator Principles IV (2020), Guidance Note on Climate Change Risk Assessment. Last accessed in November 2023 here: Guidance CLİMATE EVALUATİON_May 2023 (equator-principles.com)

[9] International Finance Corporation. Performance Standards on Environmental and Social Sustainability. Last accessed in March 2024 here: https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-3-en.pdf.

[10] Equator Principles. EP4. Last accessed in March 2024 here:The Equator Principles_EP4_July2020 (equator-principles.com).

that is socially responsible and reflects sound environmental management practices. As such, the EP IV provides guidance on climate evaluation and GHG emissions.

IFC: PSs on Environmental and Social Sustainability[11]

The IFC PSs are part of the IFC's Sustainability Framework aimed for the IFC's clients. The PSs provide guidance on how to identify, manage, and mitigate the risks and impacts of projects, including those related to changing climate and carbon emissions. As part of PSs, Guidance Notes are provided with specific requirements for enhancing project sustainability.

As part of the guidance, a number of requirements are given to clients when certain thresholds are passed. Regarding GHG emissions, IFC PS3: Resource Efficiency and Pollution Prevention outlines client responsibilities for managing and reducing GHG emissions.

BSI: Publicly Available Specification 2080: 2023 (PAS 2080)[12]

PAS 2080 is a globally recognised framework for managing whole life carbon emissions in infrastructure and buildings. PAS 2080 contains requirements across the value chain to establish effective systems for reducing whole life carbon elicited through a rigorous carbon management process.

Initially published in 2016, the updated 2023 specification introduced changes to help guide and integrate low-carbon decision-making into all aspects of an assets' life cycle. Changes include:

- The scope of the standard now includes buildings in addition to infrastructure.
- A greater emphasis on whole life carbon.
- Alignment with net zero.
- A new clause on procurement.
- Encouraging a holistic view of carbon management through systems thinking, by considering the interconnected relationship between assets, networks, and systems and how all influence or have control of carbon.
- Highlighting the importance of collaboration and promoting early engagement across the value chain to integrate decision-making throughout an assets' lifecycle.
- Links with nature and climate resilience.
- Quantifying emissions in the built environment requires a whole life carbon approach across the lifecycle stages of an infrastructure project. Within PAS 2080: 2016, the lifecycle stages of infrastructure projects are broken down into 3 stages to enable GHG emissions quantification.
- Before use stage: A0-5
- Use stage: B1-9
- End-of-life stage: C1-4

[11] International Finance Corporation. Performance Standards on Environmental and Social Sustainability. Last accessed in March 2024 here: 2012-ifc-performance-standards-en.pdf.

[12] British Standards Institution (BSI). Publicly available specification 2080:2023. Last accessed in March 2024 here: PAS 2080:2023 Carbon Management in Infrastructure | BSI (bsigroup.com).

RICS: Whole life carbon assessment for the built environment (WLCA)[13]

RICS WLCA standard serves as a technical methodology for assessing carbon emissions in the built environment. It provides guidance for tracking carbon emissions across the entire life cycle of buildings and infrastructure projects. This includes emissions from material production, construction processes, usage, and eventual disposal. The WLCA standard provides a holistic view, considering three critical components: embodied carbon, operational carbon, and user carbon.

World Resources Institute: The GHG protocol[14]

The GHG protocol establishes a standardised framework to measure and manage GHG emissions across various contexts. The protocol includes guidance on setting organisational and operational boundaries, managing inventory quality, and reporting GHG emissions. The protocol differentiates emissions by scope:

- Scope 1 Direct emissions from owned or controlled sources (e.g., fuel combustion).
- Scope 2: Indirect emissions from purchased electricity, heat, or steam.
- Scope 3: Indirect emissions from the entire value chain (e.g., supply chain, product use, waste).

4.4.2.2 Climate Change

- The climate evaluation is conducted using the following methodology. Please note that the same methodology is used to assess physical climate change risks to the Project during construction and operation phases.
- The study area for the climate evaluation is defined as the Project area itself and the physical, social, and environmental receptors. For example, the physical receptors are those mechanical and electrical equipment and components contained within the Project. Social receptors include staff and local communities.
- The environmental receptors are those nearby environments that could be affected by the combined impacts of changing climate and other impacts caused by the Project.
- The climate baseline shall be constructed using the World Bank CCKP (containing the climate projection data that underpins the IPCC WG1 AR6 report). A precautionary approach will be used to understand the future climate for the mid-future (2040-2059) and far-future (2060-2079) based on the following climate change scenarios:
- SSP1-2.6 for the mid-future (2040-2059) and far-future (2060-2079)
- SSP2-4.5 for the mid-future (2040-2059) and far-future (2060-2079)
- SSP5-8.5 for the mid-future (2040-2059) and far-future (2060-2079)

Each climate hazard (e.g., increased average mean and maximum temperatures) shall be analysed using expert knowledge and desk-based review to identify risks to the Project receptors (e.g., increased speed of thermal fatigue and deterioration of metallic or plastic components and joints of moving parts due to extremely high temperatures).

[13] Royal Institute of Chartered Surveyors. Whole life carbon assessment for the built environment. Last accessed in March 2024 here: Whole life carbon assessment (WLCA) for the built environment (rics.org).

[14] World Business Council for Sustainable Development and World Resources Institute. The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard. Last accessed in March 2024 here: ghg-protocol-revised.pdf (ghgprotocol.org).

For each risk identified, the effect of climate change for all scenarios both for the mid-future and the far-future will be assessed, based on a lifespan of 49 years, meaning that the Project will still be in operation to 2079.

Embedded mitigation that forms part of the design and provides climate resilience will be identified.

A risk rating for each impact will be determined. The scoring of severity of impact on the Project infrastructure will take into account embedded design aspects, which may provide mitigations for climate risks, based on design information made available. The overall risk rating will then be calculated as the combination of likelihood of occurrence of climate change variable and severity of impact on the Project infrastructure as outlined in Section 8.4. Significant effects are those risks that are calculated as being either high or extreme.

Additional mitigation measures will be identified where they exist.

Residual risks to the Project (after the application of additional mitigation measures) will be calculated using the same method.

Receptors / AoI

The AoI with regard to climate resilience is defined as physical receptors that make up the Project, as well as nearby environmental and social receptors that may be subject to in-combination climate impacts due to the Project. The receptors that have been identified as being in scope for the climate change risk assessment include:

- Nearby residents
- Access Roads and Site Roads,
- Staff.

Please note that receptors related to construction activities have been also identified within the scope of this Assessment (Please see **Table 4-33** for corresponding ones).

Impact Assessment

The following qualitative calculation method is used to determine the level of risk associated with present and future climate change impacts to the Project to understand its risk:

$$Impact = likelihood\ of\ impact\ (occurence) \times severity/consequence\ of\ impact$$

Likelihood

The likelihood of impacts to the infrastructure is rated based on the scale below. This has been determined based on an evaluation of current and projected (future) climate data, using a representation of the likelihood of impacts. The current climate impact is based on an estimated impact return period, using the information collected.

Table 4-21:. Likelihood of occurrence of the changing climate variable

Rating	Likelihood of recurring events
Rare	Unlikely during next 50 years, or has not occurred in the past five years
Unlikely	May arise once in 25 years, or may have occurred in the last five years
Possible	May arise once in 10 years, or has happened during the past five years but not every year
Likely	May arise about once per year, or has happened at least once in the past year and in each of the previous five years

Almost certain	Could occur several times per year, or is certain to occur

Severity

The potential severity of the climate impact is rated based on the scale in **Table 4-22**. This has been determined based on a combination of expert judgement and review of available evidence and literature.

Table 4-22: Potential severity of impact on the Project infrastructure

Rating	Likelihood of recurring events
Insignificant	No infrastructure damage, little change to service.
Minor	Localised infrastructure service disruption. No permanent damage. Some minor restoration work required. Early renewal of infrastructure by 10-20%. Need for new / modified equipment.
Moderate	Limited infrastructure damage and loss of service. Damage recoverable by maintenance and minor repair. Early renewal of infrastructure by 20-50%.
Major	Extensive infrastructure damage requiring major repair. Major loss of infrastructure service. Early renewal of infrastructure by 50-90%. Injury to workforce.
Critical	Significant permanent damage and/or complete loss of the infrastructure and the infrastructure service. Loss of infrastructure support and translocation of service to other sites. Early renewal of infrastructure by >90%. Serious injury to workforce.

Evaluation and Determination of Significance of Impact

The risk to the assets of the Project is scored using the risk matrix in **Table 4-23** below, which categorises the level of risk as low, medium, high, or extreme as defined in **Table 4-24**.

Table 4-23: Risk scoring matrix

		Severity of Impact				
		Insignificant	Minor	Moderate	Major	Critical
Likelihood	Rare	Negligible	Low	Low	Medium	High
	Unlikely	Negligible	Low	Medium	Medium	High
	Possible	Low	Low	Medium	High	High
	Likely	Low	Medium	Medium	High	Extreme
	Almost certain	Low	Medium	High	Extreme	Extreme

Table 4-24: Risk category

Rating	Acceptance level	Consequence on the Project
Low	Acceptable	A low level of vulnerability to specific climate risk(s). Remedial action or adaptation may be required.
Medium	Tolerable	A moderate level of vulnerability to specific climate risk(s). Mitigation action or adaptation could improve resilience, although an appropriate level of resilience is provided.
High	Intolerable / Tolerable	A high level of vulnerability to specific climate risk(s). Mitigation action or adaptation is recommended.
Extreme	Intolerable	An extreme level of vulnerability to specific climate risk(s). Mitigation action or adaptation is highly recommended.

4.4.2.3 Greenhouse Gas (GHG) Emissions

The data used to calculate GHG emissions resulting from Project activities during construction and operation phases has been provided by the Project Company. Where required data has not been provided, assumptions were made to quantify emissions. Those assumptions have been provided within related parts in this Assessment.

4.4.2.4 Assumptions and Limitations

The assessment in this report is based on freely available information from third parties for reporting purposes that is relevant to the Project location. This includes observational data from local weather stations, readily available climate change projections, climate change datasets and literature at the time of writing this assessment. The following limitations and disclaimer should be noted:

- Climate change projections: climate projections are not predictions or forecasts but simulations of potential scenarios of future climate under a range of hypothetical greenhouse gas emissions scenarios and assumptions. The results from the experiments performed by climate models cannot, therefore, be treated as exact or factual, but projection options. They represent representations of how the climate may evolve in response to a range of potential forcing scenarios. For a single emission scenario,

projections can vary significantly as a function of the model used and how it is applied, so that there is a wide uncertainty band in the results.

- Scenarios exclude outlying “surprise” or “disaster” scenarios in the literature and any scenario necessarily includes subjective elements and is open to various interpretations. Generally global projections are more certain than regional, and temperature projections are more certain than those for precipitation and wind. Further, the degree of uncertainty associated with all climate change projections increases for projections further into the future. Climate models and associated projections are updated on a regular basis, implying changes in the forecasted future climate. The data is obtained to provide a general ‘sense check’ on the published literature on existing observational and climate projections for the region.
- Should these information sources be modified by these third parties we assume no responsibility for any of the resulting inaccuracies in any of our reports. Any further research, analysis or decision-making should take account of the nature of the data sources and climate projections and should consider the range of literature, additional observational data, evidence and research available, and any developments in these.
- Potential GHG emission sources during the operational phase of the Project and approach to their assessment are provided in this Assessment. However, calculations have not been made due to lack of data on consumptions at this stage of the Project.

4.4.3 Baseline Conditions

4.4.3.1 Climate Change

As part of this section, the resilience of the Project to climate change is being assessed. The Project is located at the intersection of the provincial borders of Kırklareli provinces. The climate baseline is presented in two stages. The first is the present-day climate, which shows the current climatic conditions in Kırklareli. The second is the future baseline, which describes projected climate change (presented as a departure from baseline).

Based on an expected operational lifetime, the projected climate conditions for a mid-future (2040-2059) and far-future (2060-2079) are presented. Using a precautionary principle and in line with EP IV, SSP1-2.6 (Shared Socioeconomic Pathway 1) scenario, SSP2-4.5 (Shared Socioeconomic Pathway 2) scenario and SSP5-8.5 (Shared Socioeconomic Pathway 5) scenario (i.e., the worst-case scenario available) are used to present projected climate change for the mid-future and the far-future.

The data is drawn from the World Bank CCKP, using data from the IPCC’s AR6 published in 2023[15]. This data is recent, using the latest climate science, and is also available at the subnational level; however, it has not been dynamically downscaled to improve accuracy and to correct bias for local climate systems. The highest emissions scenario available from this dataset is referred to as SSP5-8.5 as mentioned above. A summary of the data source is presented in **Table 4-25**.

Table 4-25: Data source employed to establish the future climate baseline

Data source	Mid-future time horizon	Far-future time horizon	Reference period	Future scenario used
World Bank CCKP	2040-2059	2060-2079	1995-2014	SSP1-2.6
World Bank CCKP	2040-2059	2060-2079	1995-2014	SSP2-4.5

[15] Climate Change 2023: The Physical Science Basis. Working Group I Contribution to the IPCC Sixth Assessment Report. Last accessed in November 2023 here: https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/.

World Bank CCKP	2040-2059	2060-2079	1995-2014	SSP5-8.5

Present-day climate

As described below table the climate data reveals a region with a temperate climate, characterized by moderate seasonal changes. The average annual temperature is 13.8°C, with the coldest month being January, which has an average temperature of 3.3°C and a minimum of 0.3°C. Temperatures rise steadily through spring, reaching their peak in July and August, where the average is 24.6°C and the maximum temperatures exceed 31°C. These patterns indicate a distinct warm summer and cold winter cycle, suggesting a continental influence on the region's climate.

Sunshine duration also follows a clear seasonal trend. The annual average sunshine duration is 5.3 hours per day, with the most sunshine occurring in July and August, averaging 8.6 hours daily. In contrast, the darkest months are December and January, with only 2.1 and 2.3 hours of sunshine per day, respectively. This seasonal distribution of sunlight supports the observed temperature variations, as increased sunshine contributes to higher summer temperatures.

Precipitation is moderate throughout the year, with a total annual rainfall of 585.6 mm. Rainfall is fairly well-distributed, although there is a noticeable decline in the summer months. January, November, and December are the wettest months, each receiving around 61–62 mm of rainfall, while August is the driest with only 19.1 mm. Similarly, the number of rainy days is highest in the winter months, reaching 10.6 days in December, and lowest in July and August, which have fewer than five rainy days each. This pattern indicates drier summers and wetter winters, which is typical for many regions with a temperate continental climate.

Table 4-26: Long term Meteorological Data

Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Yearly
Average Temperature (°C)	3,3	4,5	7,5	12,4	17,6	22,1	24,6	24,6	19,9	14,6	9,5	5	13,8
Average Highest Temperature (°C)	7,2	9,2	12,8	18,4	24	28,7	31,3	31,5	26,6	20,1	14	8,7	19,4
Average Lowest Temperature (°C)	0,3	1	3,4	7,3	12	16,1	18,4	18,6	14,5	10,3	6	2,1	9,2
Average Sunshine Duration (hours)	2,3	2,9	4,2	5,5	7,3	7,8	8,6	8,6	6,3	4,4	3	2,1	5,3
Average Number of Rainy Days	9,7	8,27	9,83	9,9	9,77	8,93	4,93	3,37	5,4	7,73	7,8	10,6	96,2
Average Monthly Total Rainfall (mm)	61,9	48,3	48,8	39,1	53,6	56,2	34,2	19,1	39,9	60,6	62,4	61,5	585,6

Future climate baseline

The mid-future and far-future projected climate for Kırklareli according to the World Bank CCKP SSP1-2.6, SSP2-4.5, and SSP5-8.5 scenarios are presented in **Table 4-27**. These are projected values calculated for SSP1-2.6, SSP2-4.5, and SSP5-8.5 scenarios as a departure from the modelled climate for a reference period (1995-2014) and are specific for the Kırklareli region.

Table 4-27: Future climate baseline, SSP1-2.6, SSP2-4.5 & SSP5-8.5, reference period 1995-2014 (50th percentile)

Climate variable	Future climate scenario	Reference value (1995-2014)	Climate value for the mid-future (2040-2059)	Climate value for the far-future (2060-2079)
Mean average temperature	SSP1-2.6	13.08 °C	14.64 °C	14.41 °C
	SSP2-4.5		15.14 °C	15.77 °C
	SSP5-8.5		16.52 °C	17.45 °C
Mean Max. temperature	SSP1-2.6	19.4 °C	18.7 °C	18.49 °C
	SSP2-4.5		19.83 °C	19.98 °C
	SSP5-8.5		20.55 °C	21.76 °C
Mean Min. temperature	SSP1-2.6	9,2°C	10.59 °C	10.32 °C
	SSP2-4.5		11.43 °C	11.58 °C
	SSP5-8.5		12.28 °C	13.22 °C
Mean precipitation	SSP1-2.6	585,6 mm	699.46 mm	689.71 mm
	SSP2-4.5		663.26 mm	667.1 mm
	SSP5-8.5		630.6 mm	612.36 mm

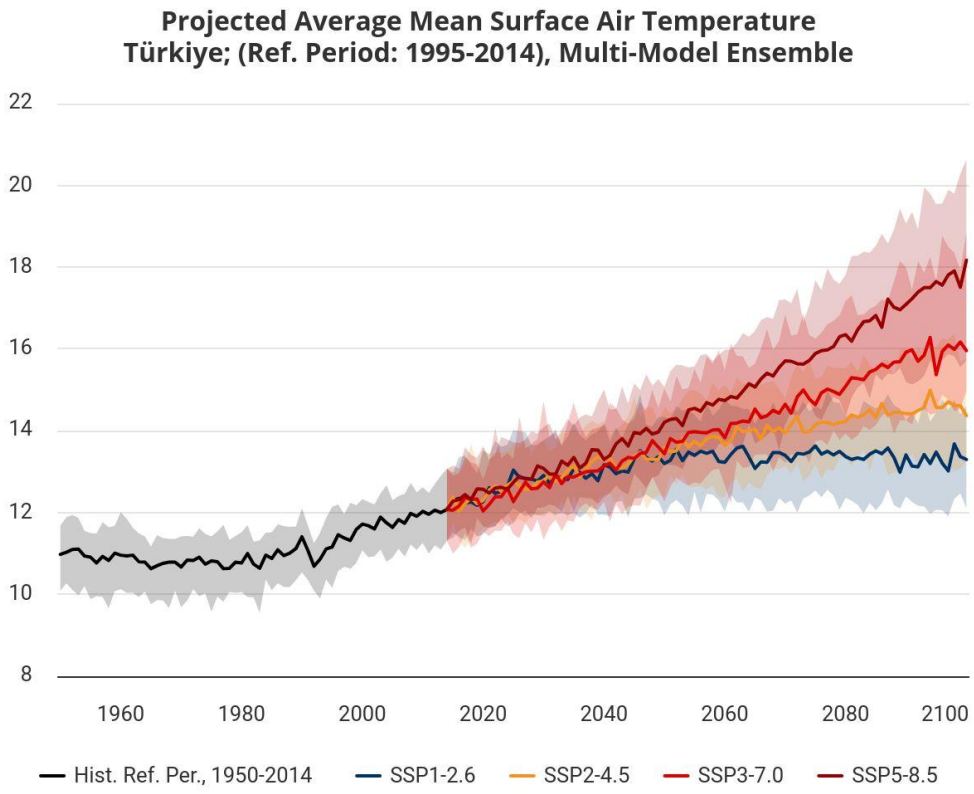

Figure 4-16: Projected Avg. Mean Surface Temp In Türkiye Projections For Each Scenario

In addition to changes in average mean, maximum and minimum temperatures and precipitation regimes, climate change may also result in changes in extreme weather events.

Projected Maximum of Daily Max Temperatures, by season - This represents the projected average single-day maximum value of the daily maximum temperatures over the data aggregation period, shown below by season. It is necessary in understanding heat risks and needs for the hottest part of the day and gives insight into extreme heat conditions. The identified sub-national units with the highest and lowest values reflect the projected time period, 2040-2059.

Table 4-28: Projected Maximum of Daily Max Temperatures

Units: °C	2020-2039				2040-2059				2060-2079				2080-2099			
Scenario	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
SSP1-1.9	17.88 (16.05, 19.72)	31.44 (29.7, 33.11)	37.67 (36.35, 38.98)	34.8 (33.41, 36.08)	18.Ara (16.34, 20)	31.85 (30.2, 33.43)	38.03 (36.67, 39.29)	35.11 (33.73, 36.48)	18.Şub (16.26, 19.82)	31.64 (30.12, 33.08)	37.81 (36.42, 39.03)	34.94 (33.55, 36.16)	17.94 (16.24, 19.71)	31.4 (29.89, 32.94)	37.6 (36.21, 38.79)	34.7 (33.36, 35.94)
SSP1-2.6	17.99 (16.26, 19.83)	31.Ağu (30.03, 33.25)	37.77 (36.44, 38.98)	34.93 (33.55, 35.99)	18.Nis (16.59, 20.55)	32.21 (30.63, 33.74)	38.43 (37.04, 39.8)	35.52 (34.05, 36.81)	18.48 (16.42, 20.32)	32.23 (30.51, 33.63)	38.54 (36.81, 39.91)	35.73 (34.1, 36.97)	18.May (16.51, 20.36)	32.13 (30.2, 33.98)	38.58 (36.94, 39.94)	35.49 (33.8, 36.87)
SSP2-4.5	18.Kas	31.54	37.86	34.87	18.61	32.46	38.64	35.8	19.25	33.32	39.43	36.47	19.77	33.27	40.05	37.04

	(16.41, 19.71)	(29.7, 33.17)	(36.46, 39.1)	(33.45, 36.05)	(16.61, 20.48)	(30.57, 34.26)	(37.33, 39.93)	(34.13, 37.33)	(17.25, 21.31)	(31.21, 34.82)	(37.95, 40.87)	(34.81, 37.96)	(17.53, 21.73)	(31.23, 35.16)	(38.2, 41.41)	(34.85, 38.57)
SSP3-7.0	17.96 (15.56, 20.05)	31.46 (29.45, 33.78)	37.79 (36.38, 39.39)	34.77 (33.24, 36.55)	18.63 (16.57, 20.93)	32.79 (30.52, 34.55)	39.08 (37.45, 40.62)	36.01 (34.39, 37.97)	19.78 (17.4, 22.25)	33.95 (32.14, 35.77)	40.43 (38.69, 42.19)	37.37 (35.2, 39.17)	21.23 (18.28, 24.52)	35.22 (33.03, 37.33)	41.93 (39.62, 44.13)	38.78 (36.56, 41.08)

Projected Change in the Number of Frost Days (Tmin<0℃), by season - This represented the projected anomaly, or change, in the number of days where the daily minimum temperature is less than 0°C A negative value indicates a reduction in the number of Frost Days over the data aggregation period, shown below by season. Changes in minimum temperatures and the number of frost days can have severe number of frost consequences regarding snow and ice packs and glacial conditions, resulting in limited freeze seasons and or melt-off conditions. The identified sub-national units with the highest and lowest values reflect the projected time period, 2040-2059.

Table 4-29: Projected Change in the Number of Frost Days (Tmin<0℃)

Units:days	2020-2039				2040-2059				2060-2079				2080-2099			
Scenario	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
SSP1-1.9	53.79 (42.83, 60.03)	16.45 (10.8, 20.23)	0 (0, 0.01)	9.24 (5.77, 11.67)	52.74 (41.34, 59.01)	15.77 (10.27, 19.52)	0 (0, 0.01)	8.8 (5.53, 11.09)	53.03 (42, 59.21)	16.13 (10.95, 19.83)	0 (0, 0.01)	9.18 (5.94, 11.3)	53.5 (43.1, 59.57)	16.42 (11.74, 20.04)	0 (0, 0.01)	9.46 (6.36, 11.54)
SSP1-2.6	53.47 (42.42, 59.64)	16.33 (9.28, 19.7)	0 (0, 0.01)	9.15 (5.51, 11.46)	51.72 (38.8, 58.56)	15.04 (8.71, 19.34)	0 (0, 0)	8.25 (4.39, 10.71)	50.96 (37.43, 57.7)	14.52 (7.8, 18.66)	0 (0, 0)	8.24 (4.47, 10.64)	51.68 (37.81, 58.19)	14.21 (7.71, 19.12)	0 (0, 0)	8.61 (4.33, 10.81)
SSP2-4.5	53.35 (43.05, 59.33)	15.96 (10.53, 19.94)	0 (0, 0.01)	8.85 (5.59, 11.53)	51.39 (38.57, 57.52)	14.42 (8.52, 18.2)	0 (0, 0)	8.25 (4.79, 10.36)	48.31 (33.41, 55.56)	13.33 (6.49, 17.53)	0 (0, 0)	7.36 (3.29, 9.47)	46.54 (31.25, 53.87)	11.64 (5.54, 16.28)	0 (0, 0)	6.5 (3.18, 8.72)
SSP3-7.0	53.82 (40.22, 60.43)	16.34 (10.94, 20.68)	0 (0, 0.01)	9.32 (5.42, 11.94)	50.09 (36.2, 57.06)	14.17 (7.61, 18.46)	0 (0, 0)	7.51 (3.94, 10.23)	46.78 (28.75, 54.59)	11.46 (4.77, 17.04)	0 (0, 0)	6.39 (2.43, 8.81)	41.43 (20.97, 50.46)	9.17 (3.39, 14.53)	0 (0, 0)	5.06 (1.08, 7.1)

Precipitation

Projected Change in Seasonal Precipitation as Percentage - Projected percent change in total precipitation for the data aggregation period, shown below by season. This is a useful indicator for contextualizing projected precipitation anomalies, or changes. Percent change should be compared with precipitation anomalies to understand absolute values of precipitation (mm) to gain a more complete understanding of projected changes in precipitation dynamics. The identified sub-national units with the highest and lowest values reflect the projected time period, 2040-2059.

Table 4-30: Projected Change in Seasonal Precipitation as Percentage

Units:%	2020-2039				2040-2059				2060-2079				2080-2099			
Scenario	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
SSP1-1.9	99.68 (83.52, 115.72)	100.94 (83.83, 117.13)	80.29 (55.11, 112.55)	94.17 (69.77, 122.92)	98.87 (83.34, 114.39)	99.91 (84.55, 114.64)	78.29 (55.77, 108.73)	94.42 (72.58, 119.14)	98.51 (85.18, 113.16)	99.56 (85.97, 112.94)	79.92 (59.28, 109.22)	94.76 (75.41, 118.24)	98.89 (85.98, 112.83)	99.98 (86.36, 112.82)	81.74 (61.97, 110.69)	95.43 (77.96, 116.56)
SSP1-2.6	101.42 (84.41, 117.73)	101.9 (85.5, 119.15)	78 (55.06, 108.78)	92.56 (69.51, 121.76)	101.35 (82.4, 119.02)	102.06 (84.01, 119.95)	76.01 (51.62, 110.41)	92.69 (66.01, 121.22)	101.29 (84.21, 121.2)	102.41 (83.08, 122.12)	76.13 (52.27, 110.85)	90.98 (65.28, 123.69)	101.93 (84.5, 120.56)	103.01 (82.35, 122.93)	79.38 (54.02, 115.16)	91.68 (68.87, 117.3)
SSP2-4.5	99.25 (82.16, 116.74)	101.34 (82.05, 118.23)	78.36 (53.83, 111.86)	93.11 (68.45, 125.32)	97.99 (82.91, 115.08)	99.76 (81.49, 117.61)	75.02 (49.92, 105.97)	90.72 (66.96, 117.29)	97.86 (79.94, 113.94)	98.08 (80.97, 116.82)	67.54 (42.79, 100.15)	86.8 (62.88, 116.24)	99.08 (80.12, 117.73)	99.28 (80.58, 119.59)	65.31 (41.08, 104.18)	85.34 (63.53, 112.63)
SSP3-7.0	98.98 (80.32, 116.98)	100.05 (80.82, 117.23)	80.36 (48.4, 118.86)	92.21 (65.18, 124.07)	97.7 (75.46, 116.37)	95.77 (77.86, 114.18)	69.58 (42.14, 107.98)	90.76 (63.88, 122.01)	94.18 (76.24, 114.93)	91.66 (75.37, 110.5)	64.61 (39.16, 106.04)	83.63 (58.34, 116.71)	94.67 (74.33, 115.38)	90.1 (67.95, 108.98)	59.35 (33.04, 99.49)	77.65 (52.22, 110.27)

Projected Change in the Average Largest 1-Day Precipitation. Projected anomaly, or change, in the average highest precipitation amount in a 1-day period during each month in the data period, shown below by season. This indicator can be useful in understanding potential change in large precipitation events; this should not be confused with extreme precipitation events. Average Largest 1-Day Precipitation can be compared with mean precipitation anomalies to Identify differences and changes in precipitation dynamics. The identified sub-national units with the highest and lowest values reflect the projected time period, 2040-2059.

Table 4-31: Projected Change in the Average Largest 1-Day Precipitation

Units:mm	2020-2039				2040-2059				2060-2079				2080-2099			
Scenario	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
SSP1-1.9	31.61 (24.46, 41.04)	27.5 (20.68, 36.24)	13.96 (9.1, 22.76)	28.04 (19.98, 41.76)	31.95 (24.72, 41.01)	27.56 (20.83, 36.05)	13.77 (9.03, 22.2)	27.88 (20.05, 41.5)	31.69 (24.73, 40.3)	27.43 (20.96, 35.56)	13.87 (9.21, 22.1)	27.99 (20.32, 41.14)	31.57 (24.64, 39.87)	27.35 (20.97, 35.32)	13.9 (9.29, 22.09)	27.89 (20.38, 41.94)
SSP1-2.6	32.06 (24.98, 41.4)	28.11 (21.06, 36.4)	14.13 (9.19, 21.91)	28.38 (20.16, 40.12)	32.91 (25.48, 42.12)	28.2 (21.13, 36.89)	13.93 (8.98, 21.89)	28.05 (19.81, 44.05)	33.06 (25.55, 42.94)	28.46 (21.57, 36.87)	14.23 (9.24, 22.4)	28.38 (19.95, 39.3)	33.13 (25.3, 42.26)	28.88 (21.62, 37.24)	14.22 (9.08, 22.62)	27.79 (20.01, 47.34)
SSP2-4.5	31.34 (24.57, 40.37)	27.84 (20.95, 36.33)	14.06 (9.06, 22.6)	28.22 (20.19, 42.58)	32.64 (25.03, 41.89)	28.05 (20.9, 36.76)	13.86 (8.87, 22)	28 (20.16, 38.76)	32.9 (25.45, 42.24)	28.49 (21.25, 37.33)	13.19 (8.29, 20.81)	28.36 (20.22, 43.06)	33.57 (25.84, 43.74)	28.76 (21.28, 38.16)	13.13 (8.05, 20.99)	29.02 (20.37, 39.89)
SSP3-7.0	31.77 (23.87, 42.55)	27.26 (20.03, 37.24)	13.83 (8.81, 24.13)	27.88 (19.19, 42.8)	32.23 (23.96, 43.6)	27.83 (20.21, 37.74)	12.98 (7.95, 23.25)	27.85 (19.03, 41.79)	33.33 (25.12, 44.22)	28.17 (20.24, 38.6)	13.01 (7.73, 23.28)	28.29 (19.17, 43.08)	34.44 (25.74, 45.86)	28.62 (20.5, 39.69)	12.33 (7, 22.1)	28.27 (18.76, 41.09)

Storms

Increased surface temperatures may cause changes to the intensity and frequency of storms. Although the degree of change in winds and storms is not certain and there is no data for potential changes in storm track, intensity, and speed of storms, the changes are expected to include a trend towards stronger winds and intense storms. This might affect the Project through heavy rainfall and high winds, which may cause additional stress to structure and structural damage.

Flooding

Flooding due to surface runoff (pluvial flooding) may increase due to both development and changes in land cover, as well as changes in rainfall events. Depending on the projected changes in extreme precipitation events, sudden downpours and flash flooding may increase in frequency. Furthermore, hotter temperatures may increase soil dryness and inability to absorb rainfall and thereby increase surface runoff potential and flash flood risk.

4.4.3.2 Greenhouse Gas (GHG) Emissions

Türkiye's latest national GHG inventory to the UNFCCC disclosed annual emissions of around 524 Mt of CO_2e based on 2020 data[16]. The energy sector is the major source of GHG emissions in Türkiye, constituting 70% of total emissions with 368 Mt of CO_2e. The main contributor is energy industries accounting for 38.9% of total emissions, which is followed by transport sector with 20.5%, other sectors with 21.9%, and manufacturing industries with 16.4%. There is a 163.3% increase in the energy sector related GHG emissions between 1990-2020. In below table , national GHG emissions for 2020 by sector are also presented.

Table 4-32: 2020 GHG emissions by sector

Sector	**Mt CO_2e**
Energy	367.6
IPPU	66.8
Agriculture	73.2
Waste	16.4
Land use, land-use change, and forestry (LULUCF)	-56.9
Total (excluding LULUCF)	**523.9**
Total (with LULUCF)	**466.9**

There is no anticipated significant release of GHG emissions associated with the Project activities during its operation because of the nature of the Project (as no emission is foreseen due to VOC Capture technology).

A greenhouse gas assessment is required to determine whether combined Scope 1 and Scope 2 Emissions are expected to be more than 100,000 tonnes of CO_2 equivalent annually, according

[16] UNFCC (2022) Turkey. 2022 National Inventory Report (NIR), Last accessed in November 2023 here: https://unfccc.int/documents/461926.

to EP IV[17], and 25,000 tonnes of CO_2 equivalent annually as stated in the IFC guidance[18]. If the Project is likely to exceed this threshold, then consideration must be given to relevant Climate Transition Risks (as defined by the TCFD) and an alternatives analysis completed which evaluates lower GHG intensive alternatives. However, it is expected that emissions during operation of the Project (e.g., emissions due to maintenance or renewal activities) will be minimal so it will be under the threshold requiring further assessment. Thus, it is aligned with the EP IV, IFC performance standards, and the EBRD requirements.

4.4.4 Assessment of Impacts

4.4.4.1 Climate Change

Climate projections for both timeframes for all climate change scenarios for Kırklareli include the following:

- Increase in both average and extreme temperatures particularly during summer
- Increase in minimum temperatures in particular during winter
- Decrease in monthly average precipitation particularly during winter[19]
- Increase in the frequency and/or intensity of extreme weather events such as heatwaves, storms, and heavy winds and precipitation.

Based on these climate trends and details provided within the baseline conditions, a range of climate hazards and their potential impacts on the receptors of the Project have been identified both for construction and operation phases and presented in **Table 4-33** and **Table 4-34**.

Construction phase

Since the construction activities will take place over the short term, this Assessment has been performed only for the mid-future. As outlined in Section 8.3.1.2, projected changes in most of climate variables are quite close to each other for SSP1-2.6, SSP2-4.5, and SSP5-8.5 scenarios, in part due to the time horizon used for this assessment, and as the difference between the scenarios widens more in the latter half of the century. For such cases, the likelihood of occurrence of climate hazard and severity of impact are considered to be similar in a qualitative approach.

[17] Equator Principles, Implementation Note, 2020. Last accessed November 2023 here: https://equator-principles.com/app/uploads/Implementation_Note_Sept2020.pdf

[18] IFC, Performance Standard 3, 2012. Last accessed November 2023 here: https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-3-en.pdf

[19] For SSP1-2.6 scenario, a slight increase in precipitation is projected for the far-future. This is not taken into consideration in the assessment, since there is no considerable projected increase.

Table 4-33: Climate Change Impact Assessment for the Construction Phase

Associated climate-hazard	Likelihood of occurrence (of climate-hazard)			Affected receptor(s)	Climate impact	Embedded mitigation action(s)	Severity of impact			Risk Rating			Potential mitigating action(s)	Residual Risk Rating		
	SSP1-2.6	SSP2-4.5	SSP5-8.5				SSP1-2.6	SSP2-4.5	SSP5-8.5	SSP1-2.6	SSP2-4.5	SSP5-8.5		SSP1-2.6	SSP2-4.5	SSP5-8.5
Increase in mean seasonal temperatures and extreme high summer temperatures during heatwaves	Almost certain			Construction equipment and machinery	Engines may overheat causing the machinery to be unusable.	N/A	**Moderate**			**High**			Operators will regularly inspect construction equipment and machinery, for example the coolant levels will be checked on a daily basis. Construction equipment and machinery will be cleaned regularly to prevent dust accumulation, which might block the airflow and cause overheating. Construction equipment and machinery will be shut down when they are not used to protect them from overheating. Construction equipment and machinery will not be stored under the direct influence of sunlight, for example they will be stored in cool and dry storage areas or underneath tarps or trees.	**Negligible**		
				Office / welfare facilities	Overheating of office or welfare facilities, reducing productivity	N/A	**Minor**			**Medium**			Office / welfare facilities will be equipped with proper air conditioning system.	**Negligible**		
				Staff health and safety	Heat stroke could occur in exposed locations. The decrease of workers will lead to delays to the schedule due to productivity being down if workers are ill or on leave therefore no one is available to operate the machinery.	N/A	**Moderate**			**High**			In the construction site, there will be air-conditioned areas for workers to rest. As the day gets warmer, construction workers will be allowed to take frequent breaks in air-conditioned areas and provided with plenty of drinking water. Proper PPE including mesh safety vests helping increase airflow, high-visibility clothing reflecting sunlight, cooling headbands or hardhat sweatbands will be provided to workers. The construction schedule will take into account the coldest	**Low**		

							and hottest hours of the day to limit the exposure, for example, the more physically demanding works will be carried out during the coldest hours of the day. Training will be provided to workers to raise awareness of heat-related stress symptoms.	
Increase in frequency and intensity of drought associated with low precipitation over a long period of time	Possible	Material storage / soil stockpiles / laydown area	Material and soil stockpiles dry out leading to more dust on site.	N/A	**Minor**	**Low**	Stockpile design will include measures to prevent dust generation and runoff (e.g., avoiding steep angles). Dust suppression system will be available on the construction site. Stockpiles will be watered on a regular basis to keep its moisture content at a certain level. Air quality on the site will be monitored and reported on a regular basis.	**Negligible**
Increase in extreme high wind speeds and storm events	Possible	Material storage / soil stockpiles / laydown area	Materials and soil blown away creating dust on site	N/A	**Minor**	**Low**	Dust suppression system will be available on the construction site.	**Negligible**
		Office / welfare facilities	Damage from wind to temporary facilities, potentially making them unusable at times.	N/A	**Minor**	**Low**	The Plant was designed as closed	**Negligible**
		Construction workers' health and safety	Unsafe working conditions on site leading to restrictions on working time or activities being carried out. Potential delays to schedule.	N/A	**Moderate**	**Medium**	Emergency Response Plan will be prepared and implemented.	**Low**
Precipitation changes and increase in rainfall intensity during extreme events	Unlikely	Possible	Material storage / soil stockpiles / laydown area	Materials and soil have potential to runoff into watercourses; this could lead to pollution.	Necessary permission will be obtained from the DSI for the material storage / stockpiles / laydown area.	**Minor** / **Minor**	**Low** / **Low**	Erosion Control Management Plan will be prepared and implemented.	**Negligible** / **Negligible**
			Construction equipment and machinery	Waterlogging of sites restricting ability of machinery to operate on wet ground	N/A	**Minor** / **Minor**	**Low** / **Low**	Emergency Response Plan will be prepared and implemented.	**Negligible** / **Negligible**
			Access roads and site roads,	Restricted site access/ staff being unable to make it to work leading to delays.	N/A	**Minor** / **Minor**	**Low** / **Low**	Emergency Response Plan will be prepared and implemented.	**Negligible** / **Negligible**

Operation phase

Embedded mitigations at this stage of design have been identified and considered in deriving the risk scores, but scores should be updated as design progresses and more detailed design information becomes available.

Table 4-34: Climate change impact assessment for the operation phase

Associated climate-hazard	Likelihood of occurrence (of climate-hazard)						Affected receptor (s)	Climate impact	Embedded mitigation action(s)	Severity of impact						Risk Rating						Potential mitigating action(s)	Residual Risk Rating					
	Mid-future			Far-future						Mid-future			Far-future			Mid-future			Far-future				Mid-future			Far-future		
	SSP1-2.6	SSP 2-4.5	SSP 5-8.5	SSP1-2.6	SSP 2-4.5	SSP 5-8.5				SSP1-2.6	SSP 2-4.5	SSP 5-8.5	SSP1-2.6	SSP 2-4.5	SSP 5-8.5	SSP1-2.6	SSP 2-4.5	SSP 5-8.5	SSP1-2.6	SSP 2-4.5	SSP 5-8.5		SSP1-2.6	SSP 2-4.5	SSP 5-8.5	SSP1-2.6	SSP 2-4.5	SSP 5-8.5
Increased risk of wildfires, particularly associated with droughts and heatwaves	Possible			Likely			Building structure, Access roads and site roads, Associated facility	Significant structural damage	Fire protection and suppression system will be included in the design.	**Major**			**Critical The severity of impact is considered as major since the Project components are surrounded by the forestry area.**			**High**			**High**			Emergency Response Plan will be prepared and implemented.	**High**			**High**		
							Staff access and health and safety	Significant risks to workers health		**Major**			**Major**			**High**			**High**				**Medium**			**Medium**		
Reduced number of days with ice and frost (when temperatures are <0°C) Due to increase in mean seasonal and minimum winter temperatures, it is expected to decrease number of days with ice and frost.	Almost certain						Building structure Machinery and equipment	Ice shedding and ice throw-related damage to structures or equipment	Ice shedding and ice throw assessments will be conducted for the final plant layout.	**Negligible**			**Negligible Risk of ice-shedding and ice throw related damage will decrease with reduced number of days with temperatures below zero. Therefore, severity of impact is considered as insignificant.**			**Low**			**Low**			Regular maintenance activities will not be performed when temperatures are below zero.	**Negligible**			**Negligible**		
Potential increase in frequency of lightning strikes due to increased frequency of storms	Unlikely						Electrical equipment	Damage to electrical equipment, leading to operation interruption.	Lightning and earthing protection systems will be included in the design.	**Minor**			**Minor**			**Low**			**Low**			Given that the design will include lightning protection, the risk to infrastructure due to climate change is low. No further action is	**Negligible**			**Negligible**		

															anticipated.				
Precipitation changes and increase in rainfall intensity during extreme events	Unlikely	Possible	Possible	Likely	Electrical equipment	Damage to electrical equipment, resulting in risk of failures in the system/integrity	General maintenance	**Minor**	**Minor**	**Minor**	**Minor**	**Low**	**Low**	**Low**	**Medium**	Weather data will be monitored, and equipment and infrastructure will be inspected during and after extremes.	**Negligible**	**Low**	**Negligible**	**Low**
					Staff access and health and safety	In the case of widespread flooding across the area, staff access to the site could be restricted.		**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Medium**	**Medium**	**Medium**	**Medium**	Emergency Response Plan will be prepared and implemented.	**Low**	**Low**	**Low**	**Low**

4.4.4.2 GHG Emissions

Construction

- Appropriate waste management will be implemented during construction works, adhering to the Waste Management Hierarchy to avoid and/or minimize on-site waste generation,
- Construction materials will be sourced locally where possible to minimise the amount of construction traffic movements,
- Construction related transport impact will be minimised through enhancement of transportation of construction materials and construction workers, for example by supplying materials from local sources to reduce transportation distance, improving vehicle efficiency by using efficient engines, using low-emissions vehicles, etc.,
- Where possible, materials with low carbon footprint will be considered in the design.

This section provides the calculation of greenhouse gas emissions generated by the machinery used in the construction phase of the project. The machinery includes trucks, excavators, forklifts, and loaders. The calculations are in accordance with the Equator Principles IV (EP IV), which focuses on the environmental and social impacts of large-scale infrastructure projects.

Machinery Details and Emission Calculations

The following machinery will be used during the construction phase:

- Trucks: 2 vehicles
- Excavators: 2 vehicles
- Forklifts: 4 vehicles
- Loaders: 1 vehicle

The operating hours for each piece of machinery are estimated at 1,000 hours per year. Fuel consumption and emissions factors have been sourced from established references and calculations.

Emission Calculation Breakdown

Trucks

- Fuel consumption: 0.33 liters per kilometer (L/km) (estimated average for diesel-powered trucks)
- Average speed: 50 km/h
- Emission factor for diesel: 2.68 kg of CO_2 per liter of diesel
- Fuel consumption per hour = 0.33 L/km * 50 km/h = 16.5 L/h
- CO_2 emissions per hour = 16.5 L/h * 2.68 kg CO_2/L = 44.22 kg CO_2/h
- Total emissions per year for 2 trucks = 44.22 kg CO_2/h * 1,000 hours/year * 2 trucks = 88,440 kg CO_2/year

Excavators

- Fuel consumption: 0.55 liters per minute (L/min) (estimated average for diesel-powered excavators)
- Emission factor for diesel: 2.68 kg of CO_2 per liter of diesel
- Fuel consumption per hour = 0.55 L/min * 60 min/h = 33 L/h
- CO_2 emissions per hour = 33 L/h * 2.68 kg CO_2/L = 88.64 kg CO_2/h
- Total emissions per year for 2 excavators = 88.64 kg CO_2/h * 1,000 hours/year * 2 excavators = 177,280 kg CO_2/year

Forklifts

- Fuel consumption: 0.25 liters per minute (L/min) (estimated average for diesel-powered forklifts)
- Emission factor for diesel: 2.68 kg of CO_2 per liter of diesel

- Fuel consumption per hour = 0.25 L/min * 60 min/h = 15 L/h
- CO_2 emissions per hour = 15 L/h * 2.68 kg CO_2/L = 40.2 kg CO_2/h
- Total emissions per year for 4 forklifts = 40.2 kg CO_2/h * 1,000 hours/year * 4 forklifts = 160,800 kg CO_2/year

Loaders

- Fuel consumption: 0.45 liters per minute (L/min) (estimated average for diesel-powered loaders)
- Emission factor for diesel: 2.68 kg of CO_2 per liter of diesel
- Fuel consumption per hour = 0.45 L/min * 60 min/h = 27 L/h
- CO_2 emissions per hour = 27 L/h * 2.68 kg CO_2/L = 72.36 kg CO_2/h
- Total emissions per year for 1 loader = 72.36 kg CO_2/h * 1,000 hours/year = 72,360 kg CO_2/year

Total Emissions Summary

The total greenhouse gas emissions generated from the machinery used in the construction phase are as follows:

- Trucks: 88,440 kg CO_2/year
- Excavators: 177,280 kg CO_2/year
- Forklifts: 160,800 kg CO_2/year
- Loaders: 72,360 kg CO_2/year
- **Total emissions** = 88,440 + 177,280 + 160,800 + 72,360 = 498,880 kg CO_2/year = 498.88 tonnes of CO_2/year

These emissions are based on an estimated operation of 1,000 hours per machine per year and an average fuel consumption rate for each type of machinery. The calculations are in line with industry standards for estimating emissions from construction equipment.

In conclusion, the greenhouse gas emissions from the machinery during the construction phase of the project are estimated to be approximately 498.88 tonnes of CO_2 per year. These emissions will be monitored and managed in accordance with the Equator Principles IV (EP IV), which emphasizes minimizing environmental impacts and ensuring sustainable practices in large-scale infrastructure projects.

Operation

Operational GHG Emissions

The operational GHG emissions are calculated based on the annual consumption of natural gas and electricity, applying country-specific emission factors (EF) and the global warming potential (GWP) values from IPCC AR6. Natural gas usage contributes to **Scope 1** (direct) emissions, while electricity consumption results in **Scope 2** (indirect) emissions.

The natural gas has a lower heating value (LHV) of 40.34 MJ/m³, and the EF for Turkey's grid electricity is 309 gCO_2/kWh. Methane (CH_4) and nitrous oxide (N_2O) emissions from natural gas combustion are also included using AR6 GWP values. The total annual GHG emissions amount to **11,789 tCO_2e**, with 99.5% from electricity (Scope 2) and 0.5% from natural gas (Scope 1).

Table 4-35: GHG Emissions Calculation Table

Parameter	Value	Unit
Annual natural gas consumption	24,000	m³/year

Annual electricity consumption	38,000,000	kWh/year
EF of electricity (Turkey)	309	gCO_2/kWh
EF of natural gas (CO_2)	56	tCO_2/TJ
EF of natural gas (CH_4)	1	$kgCH_4/TJ$
EF of natural gas (N_2O)	0.1	kgN_2O/TJ
GWP (AR6) – CO_2	1	
GWP (AR6) – CH_4	29.8	
GWP (AR6) – N_2O	273	
Heating value of NG	40.34	MJ/m^3
MJ to TJ conversion	1,000,000	MJ/TJ

Table 4-36: Summary of GHG Emissions

Scope	Emissions (tCO_2e)	Percentage
Scope 1	54	0.5%
Scope 2	11,735	99.5%
Total	**11,789**	**100%**

The Energy-saving Window Film contributes the largest share of emissions due to its relatively high emission factor. This calculation provides an overview of the annual GHG emissions footprint associated with the production of these materials and informs environmental management and mitigation strategies.

4.4.4.3 Conclusion

The future baseline climate is outlined, which is broadly projected to include warmer winters with decreased precipitation, and hotter and drier summers associated with increased drought and high temperature risks. The future baseline has been constructed for the mid-future (2040-2059) and far-future (2060-2079) taking into account the operational lifespan of the Project.

Additional mitigation measures incorporated into the construction phase of the Project includes measures for protecting construction equipment and machinery, health and safety of construction workers, and environment against projected changes in climate. Also, monitoring and management plans required to reduce identified climate change-related risks to construction activities are presented. For the operation phase of the Project, those measures consist of recommendations for the Project design and those that will be incorporated into the operation phase of the Project including monitoring

and management of impacts as they are observed during the lifetime of the Project and responses to this such as upgrades and replacements of equipment to reflect future projected temperatures at the time of their renewal.

Based on the assessment of construction-related GHG emissions and mainly considering the components / activities emitting the most GHG emissions, several measures to minimise the carbon impact of the construction phase are recommended, including implementation of appropriate waste management during construction works, supplying construction materials locally as much as possible, minimising construction related transport impact through enhancement of construction material and worker transportation logistics, preferring materials with low carbon footprint in the design where possible, optimizing design to minimise the quantities of new raw materials needed and establishing sustainable construction management practices to optimise energy efficiency measures during construction site work activities.

Although there is no anticipated significant GHG emissions arising from the operation of the Project considering the nature of the Project, potential Scope 1 and Scope 2 emission sources during the operation phase of the Project are provided in this Assessment for effective management of GHG emissions. However, due to lack of data on consumptions at the time of writing this Assessment, operational GHG emissions have not been calculated. Also, avoided GHG emissions associated with the Project during the operational phase are within the scope of this Assessment.

4.5 Water Resources, Water Quality and Wastewater Management

4.5.1 Methodology and Project Standards

The national legislation and international standards that will be considered for the impacts/risks related with the water resources and water quality during the project activities and will be complied are as follows:

- Turkish Water Pollution Control Regulation
- Regulation on Water Intended for Human Consumption
- Regulation on Pits to be Built in Places where Sewer Pipeline Construction is not Possible
- Regulation on the Protection of Groundwater against Pollution and Deterioration
- Regulation on Surface Water Quality
- Regulation on the Quality and Treatment of Water Intended for Potable Water Supply
- Communiqué on the Determination of the Protection Areas of Aquifers and Springs Supplying Drinking Water
- Chemical Parameters and Indicator Parameters - Turkish Ministry of Health, 2005
- Guidelines for Drinking Water Quality – World Health Organization (WHO)
- IFC PS 1: Assessment and Management of Environmental and Social Risks and Impacts
- IFC PS 3: Resource Efficiency and Pollution Prevention
- WBG General EHS Guidelines - 1. Environment - 1.3 Wastewater and Ambient Water Quality
- WBG General EHS Guidelines - 1. Environment - 1.4 Water Conservation

The limit values considered for the evaluation of the baseline conditions for potable and non-potable water (water for human consumption) are the limit values specified in Regulation on Waters Intended for Human Consumption (RWIHC) and in IFC/WHO Drinking Water Guidelines (see Table 4-37).

Table 4-37. National and International Limit Values for Water Resources

Parameter	Unit	Limit Values in RWIHC	Limit Values of WHO
Antimony	mg/L	0.005	0.020
Arsenic	mg/L	0.01	0.01
Barium	mg/L	-	0.7
Benzene	mg/L	0.001	0.01
Boron	mg/L	1	2.4
Cadmium	mg/L	0.005	0.003
Chromium	mg/L	0.05	0.05
Copper	mg/L	2	2
Cyanide	mg/L	0.05	-
Fluoride	mg/L	1.5	1.5
Lead	mg/L	0.01	0.01
Mercury	mg/L	0.001	0.006
Nickel	mg/L	0.02	0.07
Nitrate	mg/L	50	50

Parameter	Unit	Limit Values in RWIHC	Limit Values of WHO
Nitrite	mg/L	0.5	3
Selenium	mg/L	0.01	0.04
Aluminium	mg/L	0.2	-
Ammonium	mg/L	0.5	-
Chloride	mg/L	250	-
Conductivity	|jS/cm	2500	-
pH	-	6.5<pH<9.5	-
Iron	mg/L	0.2	-
Manganese	mg/L	0.05	-
Sulphate as SO4	mg/L	250	-
Sodium	mg/L	200	-
Uranium	mg/L	-	0.03

In case the wastewater is discharged to the receiving environment after treatment, the limit values specified in the Turkish Water Pollution Control Regulation (WPCR) and IFC/WBG General EHS Guidelines for Wastewater Quality given in Table 4-38 will be complied.

Table 4-38. National and International Limit Values for Treated Wastewater Discharge to Receiving Body

Parameter	WPCR Limit Values for Domestic Wastewater (2 hours composite sample)	IFC/WBG General EHS Guidelines for Wastewater Quality
BOD (mg/L)	50	30
COD (mg/L)	160	125
Total Suspended Solids (mg/L)	60	50
pH	6-9	6-9
Total Nitrogen (mg/L)	-	10
Total Phosphorus (mg/L)	-	2
Oil and Grease (mg/L)	-	10
Total Coliform Bacteria (Most Probable Number/100mL)	-	400

4.5.2 Baseline Conditions

4.5.2.1 Water Resources and Hydrology

The project area does not have any continuously or seasonally flowing streams passing through it.

There are no dams, ponds, or natural lakes in the vicinity of the project area. Additionally, the project area is not located within the absolute or short-distance protection zones of any surface water source that provides drinking or utility water.

There are no natural springs or fountains in the project area or its immediate vicinity. The nearest spring is located approximately 350 meters southwest of the project area. Additionally, there are no springs or fountains downstream of the project area.

Within the scope of the project, the current condition of the surrounding stream beds will be preserved as they are, no excavation or filling will be done, and their natural flows will not be obstructed.

For the streams located around the project area, the provisions specified in the Prime Ministry Circular No. 2006/27 on "Stream Beds and Floods," which came into force by being published in the Official Gazette No. 26284 dated 09.09.2006, and the provisions specified in the "Flood and Sediment Control Regulation," which came into force by being published in the Official Gazette No. 30763, dated 03.05.2019, will be complied with.

The hydrological map of the project area and its surroundings is given in Figure 4-17.

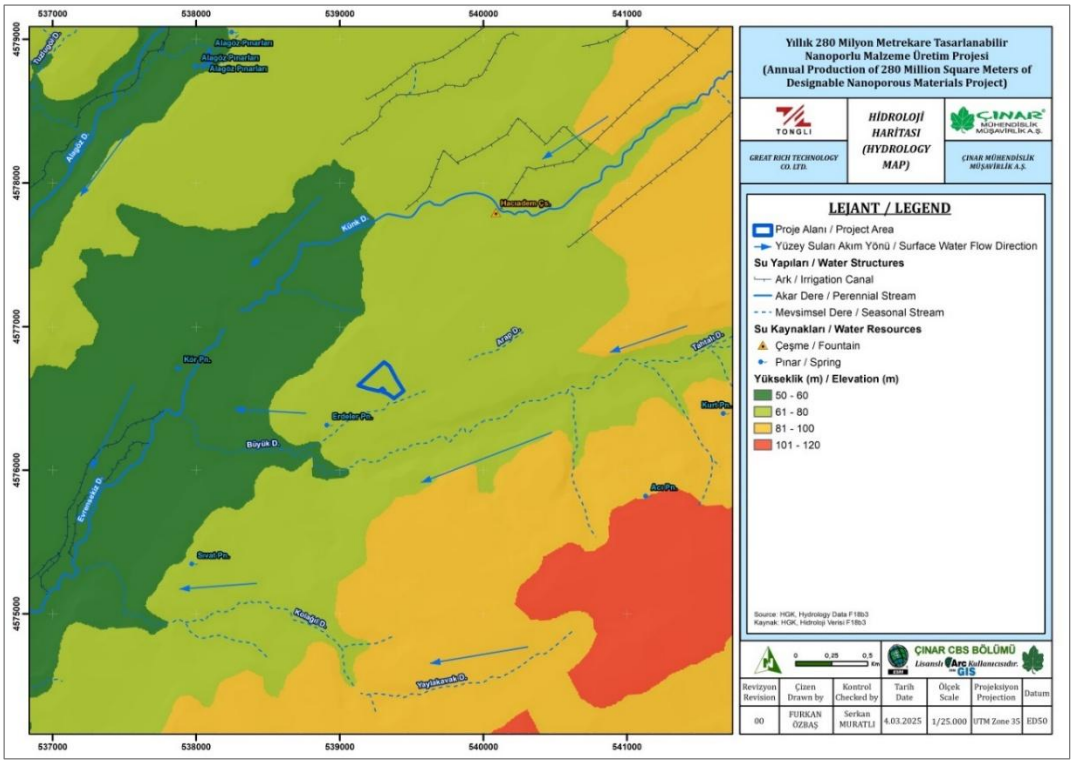

Figure 4-17. Local Hydrological Map of Project Area and Its Surrounding

The project area is located within the boundaries of the low-permeability Upper Miocene-Pliocene-aged Thrace Formation, which consists of gravel, sand, and clay. Due to the clay content of this formation and literature studies, its permeability values are considered low. The most permeable units in the region are the Quaternary-aged alluvial units.

According to well data obtained from the Master Plan Report prepared by DSİ for the Meriç-Ergene Basin, the groundwater level has been calculated, and there is an expected elevation difference of 60-70 meters between the project site and the groundwater level. The groundwater flow direction is southwest. As a result of the evaluations conducted, it has been determined that the project area will not impact groundwater.

Within the scope of the project, the provisions of the “Law No. 167 on Groundwater” and the “Regulation on the Protection of Groundwater against Pollution and Degradation”, published in the Official Gazette dated April 07, 2012, and numbered 28257, as well as the “Regulation on Water Allocations”, published in the Official Gazette dated December 10, 2019, and numbered 30974, will be complied with. The hydrological map of the project area and its surroundings is given at Figure 4-18.

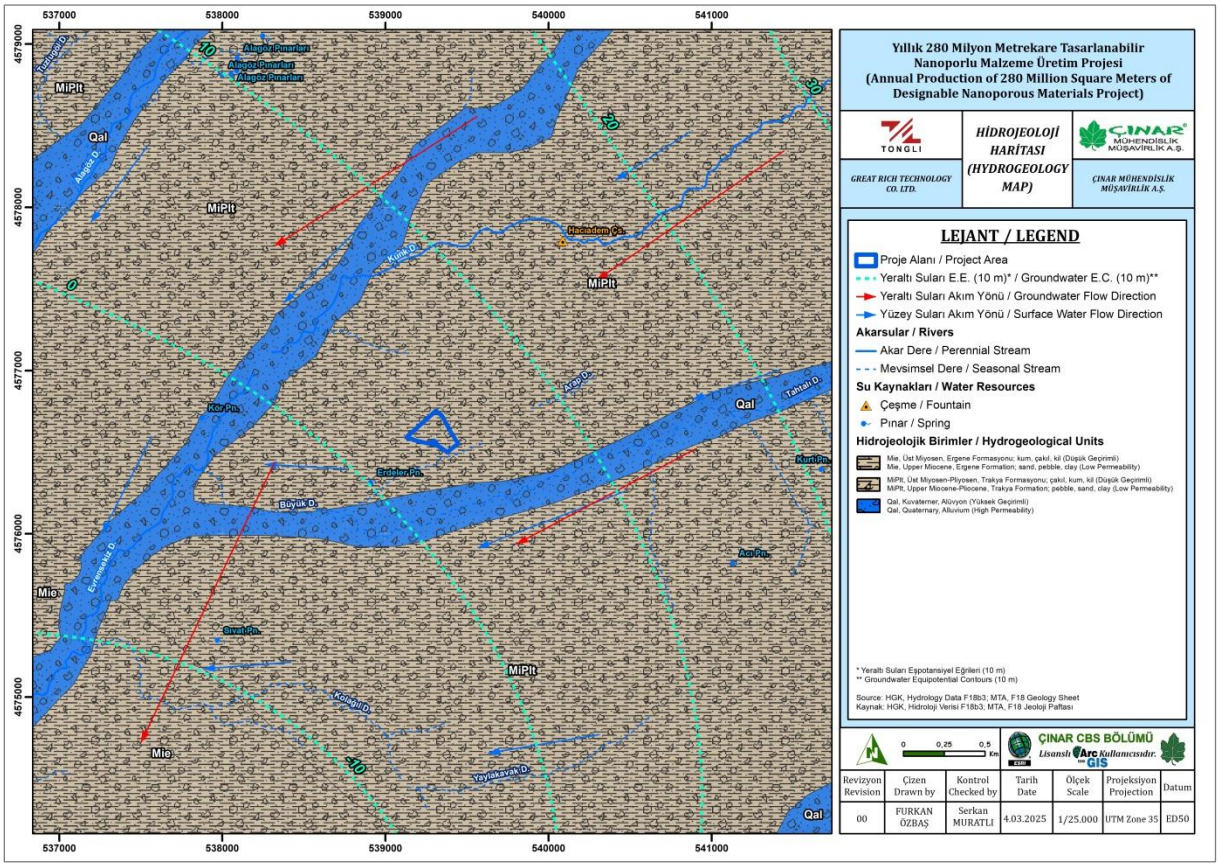

Figure 4-18. Local Hydrogeological Map of Project Area and Its Surroundings

4.5.2.2 Surface Water Quality

In the context of the ESIA Studies surface water samples were collected from two points on Evrensekiz Stream the project impact area as part of the existing condition assessment studies.

The water samples will be analyzed at Çınar Çevre Laboratuvarı according to the Surface Water Quality Management Regulation, Table 5. The sampling locations are shown in the satellite image in Figure 4-19, and the results of the analyses will be presented below.

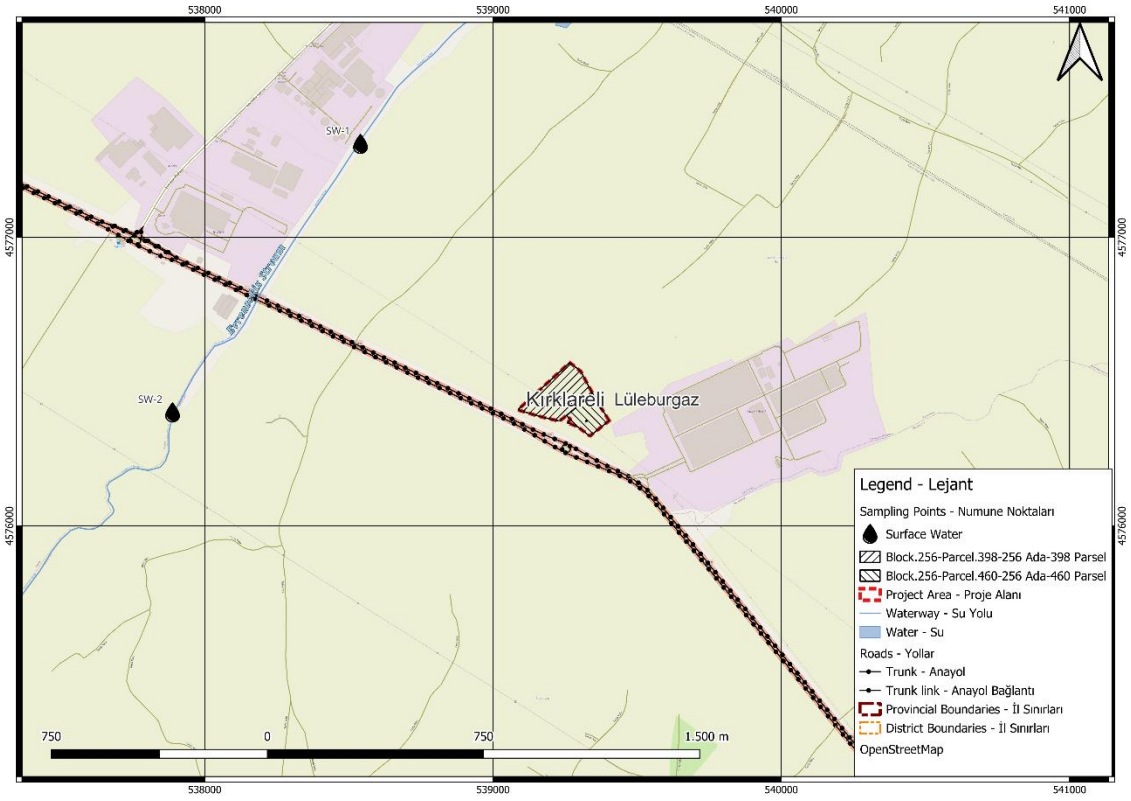

Figure 4-19: Image Showing Surface Water Sample Collection Points

Table 4-39: Surface Water Sampling & Analysis Results

Parameter	Unit	SW-1 Test Result	SW-2 Test Result	Class I (Very Good)	Class II (Good)	Class III (Moderate)	Test Method
pH	-	7.84	7.55	6 – 9	6 – 9	6 – 9	SM 4500 H^+ B
Conductivity	**µS/cm**	**1205.00**	**1143.00**	**<400**	**1000**	**>1000**	**TS 9748 EN 27888**
Dissolved Oxygen	mg/L	2.30	1.58	>8	6	>3	ASTM D 888 Method C
Color (436 nm)	m^{-1}	2.9	2.9	≤1.5	3	>4.3	TS EN ISO 7887 B
Color (525 nm)	m^{-1}	1.8	1.7	≤1.2	2.4	>3.7	TS EN ISO 7887 B
Color (620 nm)	m^{-1}	1.3	1.2	≤0.8	1.7	>2.5	TS EN ISO 7887 B
Biochemical Oxygen Demand (BOD)	**mg/L**	**29.8**	**168**	**<4**	**8**	**>8**	**SM 5210 B**
Chemical Oxygen Demand (COD)	**mg/L**	**76.7**	**433**	**<25**	**50**	**>50**	**SM 5220 B**
Total Cyanide (CN^-)	mg/L	<0.005	<0.005	-	-	-	SM 4500-CN^- C / E

Parameter	Unit	SW-1 Test Result	SW-2 Test Result	Class I (Very Good)	Class II (Good)	Class III (Moderate)	Test Method
Ammonium Nitrogen	**mg/L**	**5.05**	**2.155**	**<0.2**	**1.00**	**>1**	**SM 4500 NH_3 B / NH_3-F**
Total Kjeldahl Nitrogen (TKN)	**mg/L**	**9.68**	**11.6**	**<0.5**	**1.50**	**>1.5**	**SM 4500 Norg B**
Total Nitrogen (N)	**mg/L**	**16.53**	**16.29**	**<3.5**	**11.50**	**>11.5**	**ISO 20236**
Chromium*	mg/L	<0.02	<0.02	-	-	-	SM 3500-Cr B
Sulphide (S^{2-})	mg/L	<0.2	283.00	≤2	5	>5	SM 4500 S^{2-} D
Fluoride (F^-)	µg/L	<100	<100	≤1000	1500	>1500	SM 4110 B
Nitrate Nitrogen	mg/L	1.08	0.615	≤3	10	>10	SM 4110 B
Orthophosphate Phosphorus	mg/L	0.436	<0.01	<0.05	0.16	>0.16	SM 4500 P E
Aluminium (Al)	mg/L	<0.02	<0.02	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Arsenic (As)	mg/L	<0.005	<0.0005	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Copper (Cu)	mg/L	<0.0001	<0.001	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Mercury (Hg)	mg/L	<0.0001	<0.0001	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Zinc (Zn)	mg/L	<0.005	<0.001	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Iron (Fe)	mg/L	<0.005	<0.005	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Total Phosphorus (P)	mg/L	0.05	<0.005	<0.08	0.20	>0.2	TS EN ISO 15587-1,2 / 17294-1,2
Silver (Ag)	mg/L	<0.005	<0.005	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Cadmium (Cd)	mg/L	<0.0005	<0.0005	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Chromium (Cr)	mg/L	<0.001	<0.001	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Lead (Pb)	mg/L	<0.0005	<0.0005	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Manganese (Mn)	µg/L	<0.5	<0.5	≤100	500	>500	TS EN ISO 15587-1,2 / 17294-1,2
Nickel (Ni)	mg/L	<0.005	<0.005	-	-	-	TS EN ISO 15587-1,2 / 17294-1,2
Selenium (Se)	µg/L	<0.5	<0.5	≤10	15	>15	TS EN ISO 17294-1,2
Oil and Grease	mg/L	<10	<10	-	-	-	SM 5520 D

** (a) Purpose of use of water as per quality classes:*

1) Surface waters with a high potential of being utilized as drinking water,

2) Water usable for recreational purposes, including those that require body contact, such as swimming,

Class I - Water with High Quality (implies that the status of water is "Very good");	*3) Water that can be used for trout production,* *4) Usable water for animal production and farm needs,*
Class II. - Slightly Contaminated Water (implies that the status of water is "Good");	*1) Surface waters with a high potential of being utilized as drinking water,* *2) Water usable for recreational purposes,* *3) Water that can be used for fish production other than trout,* *4) Irrigation water provided that it meets the irrigation water quality criteria determined by the legislation,*
Class III. - Contaminated water (implies that the status of water is "Moderate");	*It refers to water and industrial water that can be used for aquaculture after appropriate treatment, excluding facilities that require qualified water such as food and textiles.*
***The analysis of the "Oil and Grease" parameter cannot be determined at a level lower than 10 by the relevant laboratory. Therefore, it could not be classified.*	

*** SWCR Annex 5, Table 4: Specific Pollutants and Environmental Quality Standards for Surface Water Resources, maximum allowable concentration (MAC-EQS)

**** SWCR Annex 5, Table 5: Priority Substances and Environmental Quality Standards for Surface Water Resources, maximum allowable concentration (MAC-EQS)

The above table summarizes the test results for surface water samples SW-1 and SW-2, presenting key water quality parameters such as pH, dissolved oxygen, biochemical oxygen demand (BOD), chemical oxygen demand (COD), color, nutrients, and metals. Both SW-1 and SW-2 are generally within acceptable ranges, with a few parameters classified as Class III (Moderate), indicating a moderate level of contamination.

The parameters falling under Class III for both SW-1 and SW-2 include the biochemical oxygen demand (BOD), chemical oxygen demand (COD), ammonium nitrogen, and total nitrogen. Specifically, SW-2 has significantly higher values for BOD (168 mg/L) and COD (433 mg/L), which are indicative of organic pollution and the presence of high levels of biodegradable material. The elevated ammonium nitrogen and total nitrogen levels in both samples (especially in SW-1) suggest possible pollution from agricultural runoff or wastewater discharges. These high levels of nitrogen compounds could result from fertilizers, sewage, or other sources of nutrient pollution, which can promote algae growth and lead to oxygen depletion, further degrading water quality.

The presence of moderate pollution is commonly linked to human activities such as industrial discharges, agricultural runoff, and improper waste disposal. This contamination could result in an imbalance in the ecosystem, impacting aquatic life by reducing oxygen availability and promoting eutrophication.In addition the ground water sampling result which was taken from Evrensekiz neighbourhood is summarised below.

Table 4-40: Groundwater Sampling Results

Parameter	Test Result (mg/L)	Limit Values in RWIHC	Limit Values of WHO
pH	7.49	6.5 < pH < 9.5	6.5 < pH < 9.5
Fluoride (F^-)	< 0.1	1.5	1.5
Chloride (Cl^-)	20.9	250	250
Nitrite (NO_2^-)	< 0.33	0.5	3
Nitrate (NO_3^-)	0.926	50	50

Parameter	Test Result (mg/L)	Limit Values in RWIHC	Limit Values of WHO
Arsenic (As)	< 0.0005	0.01	0.01
Barium (Ba)	< 0.005	-	0.7
Boron (B)	< 0.02	1	2.4
Mercury (Hg)	< 0.0001	0.001	0.006
Cadmium (Cd)	< 0.0005	0.005	0.003
Lead (Pb)	< 0.0005	0.01	0.01
Manganese (Mn)	< 0.0005	0.05	0.05
Nickel (Ni)	< 0.005	0.02	0.07
Selenium (Se)	< 0.0005	0.01	0.04
Uranium (U)	< 0.0005	-	0.03

Accordingly, all heavy metals and toxic substances (e.g., arsenic, barium, mercury, cadmium, lead, manganese, etc.) are either non-detectable or well below the limit values. Parameters like fluoride, chloride, and nitrate are within the safe drinking water standards. The pH is within the acceptable range. The water quality for this sample meets the recommended standards for drinking water.

4.5.3 Impact Assessment and Mitigation Measures

4.5.3.1 Construction Phase

Water Use

During the construction phase of the project, 200 workers will be employed.

Daily needs[20] of the personnel who will work in the land preparation and construction phase of the project will be provided from the construction site to be established and within this scope calculations are made.

200 people x (230 L/day-capita) = 46.0 m^3/day

Drinking water that will be needed during land preparation and construction period will be purchased from the nearest settlements and utility water will be supplied by tankers.

Wastewater Generation

The construction of the planned project will generate wastewater primarily due to water consumption by the personnel and the operational activities on the site. This chapter evaluates the potential impacts of wastewater generation during the construction phase, including its volume, composition, treatment, and disposal methods. The analysis is intended to ensure that

([20]) (TURKSTAT) 2022 According to Türkiye Municipality Water Statistics for Kırklareli

wastewater management practices comply with environmental regulations, minimize potential adverse impacts, and protect both human health and the surrounding environment.

Sources of Wastewater Generation

The primary sources of wastewater during the construction phase will be:

- *Personnel Water Use*: Water consumed by the construction workforce, including drinking water, hygiene use, and other domestic purposes.
- *Site Operations*: Water used for dust suppression during excavation, soil stripping, and vehicle traffic activities on the construction site.

Wastewater Generation from Personnel Water Use

During the construction phase, it is expected that 200 workers will be employed on-site ın total for both phases. According to the accepted water consumption standards, each worker will use approximately 230 liters of water per day. The total water requirement for the workforce is therefore estimated at:

- Total Personnel Water Requirement: *46.0 m^3/day*

Given that all of the water used by the personnel will be converted into wastewater, the total wastewater generation from personnel is expected to be: *46.0 m^3/day*

The composition of the wastewater generated will be typical of domestic wastewater, consisting of various pollutants such as organic matter, nutrients, and suspended solids. The wastewater will contain contaminants such as:

- Biochemical Oxygen Demand (BOD5): 4.5-5.4 kg/day
- Chemical Oxygen Demand (COD): 7.2-10.26 kg/day
- Total Organic Carbon (TOC): 2.7-5.4 kg/day
- Total Solids (TS): 17-22 kg/day
- Suspended Solids (SS): 7-14.5 kg/day
- Chlorides: 0.4-0.8 kg/day
- Total Nitrogen: 0.6-1.2 kg/day
- Free Ammonia: 0.36-0.72 kg/day
- Phosphorus: 0.06-0.45 kg/day

These pollutants will need to be addressed through proper wastewater treatment systems to ensure compliance with national environmental standards.

Wastewater Treatment and Disposal

The project site is located in an area without direct access to an existing wastewater infrastructure, such as a municipal sewer system. Therefore, the wastewater generated during the construction phase will be treated on-site.

In accordance with the Water Pollution Control Regulation (Official Gazette, 31.12.2004, No. 25687), which governs wastewater disposal for settlements with a population equivalent of less than 2,000, the following treatment and disposal method will be implemented:

- *On-site Wastewater Treatment*: The domestic wastewater generated by the personnel will be collected and stored in a leach-proof septic tank.

- *Capacity of Septic Tank*: The septic tank will be sized to accommodate the wastewater generated from 200 workers, with a storage capacity sufficient to handle 46 m³/day of wastewater.
- *Management of Septic Tank*: Once the septic tank reaches 85-90% capacity, it will be emptied by a licensed vacuum truck and transported to an approved wastewater treatment facility for final treatment and disposal.
- *Compliance*: The system will comply with local regulations and the Environmental Law to prevent any contamination of groundwater or surrounding soil.

Impact of Wastewater Generation on the Environment

The wastewater generated during the construction phase could potentially have adverse environmental impacts if not managed properly. These include:

- *Soil and Groundwater Contamination*: Improper handling or leakage from septic tanks could lead to contamination of soil and groundwater, posing risks to human health and the local ecosystem.
- *Water Quality Degradation*: Direct discharge of untreated wastewater could harm surface water bodies if they are present nearby, affecting aquatic life and downstream water users.

However, by implementing the proposed wastewater treatment and disposal system (i.e., leach-proof septic tanks, regular emptying by vacuum trucks, and disposal in a licensed treatment facility), the risks of such impacts will be minimized. The project is designed to ensure that all generated wastewater will be handled in an environmentally sound and legally compliant manner.

Dust Suppression Water Use and Impact on Wastewater Generation

In addition to the water required for personnel, the construction activities, such as excavation and soil stripping, will also require water for dust suppression. An estimated 10 m³/day of water will be used for this purpose. It is important to note that water used for dust suppression will be primarily evaporated through the process and will not generate wastewater. Therefore, no additional wastewater will result from the dust suppression activities.

Summary of Wastewater Generation and Disposal Plan

The total daily water requirement for the construction phase is estimated at 56.0 m³/day, with 46 m³/day m³/day generated as wastewater from personnel use and 10 m³/day used for dust suppression (which does not generate wastewater). The wastewater will be treated on-site in a leach-proof septic tank and regularly emptied and disposed of through a licensed waste management service.

Proper management of wastewater is crucial to minimize its environmental impact during the construction phase of the project. By implementing the outlined wastewater management practices, including on-site treatment and disposal, the project will adhere to all relevant environmental regulations and avoid potential contamination of the surrounding environment. Regular monitoring and maintenance of the wastewater management system will ensure continued compliance and minimize any negative impacts associated with wastewater generation.

Impacts on Surface Water & Groundwater

During construction, several potential impacts on surface and groundwater can occur if proper environmental management practices are not in place. These impacts can result from the handling of wastewater, chemicals, soil erosion, and other activities. Below are the key potential impacts on surface and groundwater during construction:

Surface Water Contamination

Surface water bodies, such as rivers, lakes, streams, and ponds, can be negatively impacted by the following activities during construction:

- **Sediment Runoff**: Disturbance of the soil during excavation, grading, and other activities can lead to sediment-laden runoff, which can enter nearby surface water. High

sediment concentrations can degrade water quality, increase turbidity, and harm aquatic life by reducing oxygen levels and smothering habitats.

- **Wastewater Discharge**: If construction wastewater, such as from sanitation facilities, equipment washdowns, or runoff from industrial activities, is not properly treated or managed, it can be discharged into surface water bodies. This can introduce contaminants like oils, fuels, detergents, and other chemicals, leading to pollution, aquatic toxicity, and nutrient enrichment (eutrophication).
- **Chemical Spills**: The storage and use of hazardous materials (e.g., fuels, oils, solvents, paints, and adhesives) during construction pose a risk of accidental spills. These chemicals can enter surface water through runoff, leakage, or direct discharge, contaminating the water and harming aquatic ecosystems.
- **Stormwater Runoff**: Increased impervious surfaces (e.g., roads, buildings, parking areas) from construction can lead to more rapid stormwater runoff. This runoff can carry pollutants like oils, debris, heavy metals, and chemicals into nearby surface waters, contributing to water quality degradation.

Groundwater Contamination

Groundwater, which is a critical source of drinking water and irrigation, can also be impacted by construction activities. Potential impacts include:

- **Septic Wastewater Leachate**: If onsite wastewater treatment systems like septic tanks are not properly designed, maintained, or monitored, wastewater may leak or overflow, contaminating the groundwater with pathogens, nutrients (nitrogen and phosphorus), and chemicals.
- **Chemical Leakage**: The storage, handling, and disposal of hazardous materials such as fuels, oils, lubricants, and solvents can result in leakage into the soil. If these chemicals reach the groundwater table, they can contaminate the groundwater, making it unsafe for drinking and agricultural use.
- **Leaching of Contaminants**: Construction activities, such as excavation and soil movement, can disturb contaminated soil or groundwater and cause pollutants to leach into groundwater. This can occur if hazardous substances have been previously stored on-site or if chemicals from construction materials (e.g., asbestos, paints, or solvents) seep into the soil.
- **Over-extraction of Water**: In some cases, construction activities require significant amounts of water for dust suppression, concrete mixing, or other purposes. Over-extraction of groundwater for these activities, particularly in areas where water resources are already scarce, can deplete local aquifers and affect groundwater availability for local communities and ecosystems.

Construction activities can have significant impacts on surface and groundwater resources if proper mitigation measures are not implemented. These impacts include contamination from sediment runoff, wastewater discharges, chemical spills, soil erosion, and over-extraction of groundwater. To minimize these impacts, the project must implement best practices in wastewater treatment, erosion control, proper chemical management, and stormwater management. Monitoring and ongoing management will be key in ensuring that any potential impacts on water resources are mitigated effectively.

4.5.3.2 Operation Phase

Water Use and Wastewater Generation

During the operation phase, water will be required for various **cooling systems, and employee consumption**. One of the primary sources of water demand is the **coating and curing process**, which involves the preparation of raw materials and the application of adhesives, hardening coatings, and other chemical solutions. Some production stages require **water-based cooling systems** to regulate the temperature of machinery and chemical reactions, preventing overheating and ensuring product quality.

The plant's water supply will be connected to the municipal water supply main pipeline located outside the plant area. The water meets sanitary drinking water standards. The project's water usage is categorized into production water, domestic water, and fire-fighting water.

The water supply point for the plant is located at the southwest corner of the site, with a connection to the municipal water network via a DN200 main water supply pipeline. The layout of the water supply network consists of a main pipe with one branch pipe, arranged in a ring network, with branch and sub-branch pipes following a radial network layout. The main ring pipe has a diameter of DN110, while the sub-branch pipe is DN100. The materials used for the main and sub-pipes are centrifugal cast iron or steel, while the branch pipes are constructed from PPR or galvanized steel. The fire-fighting water supply pipe is a DN100 galvanized pipe.

For pipeline installation, the plant area will use direct burial methods, while the workshop area will employ trench and overhead laying methods.

Wastewater from Plant Operation

During the operation phase, various industrial and auxiliary processes will generate wastewater, which may contain different types of contaminants, including **organic solvents, heavy metals, process chemicals, and suspended solids**. The wastewater streams primarily originate from **coating and curing processes, equipment cleaning, air pollution control systems, and sanitary facilities**.

Upon the completion of the Wastewater Treatment Plant (WWTP) and associated infrastructure, all essential utility services—including wastewater, potable water, sewage, and stormwater drainage systems—will be provided by the Organised Industrial Zone (OIZ) administration. This comprehensive infrastructure support ensures that all necessary environmental and utility connections are established and maintained by the OIZ.

Furthermore, the OIZ is responsible for issuing all required construction permits prior to the commencement of building activities, as well as the subsequent operational licenses necessary for businesses to begin operations. These include the construction and the Workplace Opening and Operating Licenses, which are granted in accordance with the relevant laws and regulations governing industrial zones.

This centralized approach facilitates a streamlined process for investors and ensures compliance with all regulatory requirements within the OIZ.

Process Wastewater from Coating and Curing Operations

The production of **car coat films, energy-saving window films, CO_2 capturing materials, and VOC adsorption materials** involves the use of **chemical coatings, adhesives, and solvents**. During the **coating application process**, excess liquid coatings and adhesives may need to be cleaned from equipment, leading to the generation of wastewater containing:

- **Adhesives and glue residues** (e.g., polyurethane-based and acrylic adhesives)
- **Hardening and surface treatment chemicals** (e.g., UV-curable coatings, isocyanates)
- **Organic solvents** (e.g., ethanol, toluene, and acetone from cleaning processes)

These wastewater streams can contain **volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and chemical oxygen demand (COD)-rich substances**, which must be treated before discharge.

The infrastructure for potable (utility) water supply and the wastewater treatment plant, which will be connected to the site, will be provided by the Organized Industrial Zone (OIZ) following the completion of the relevant infrastructure and treatment facility projects.

Until these systems become operational, the investor will be responsible for meeting their water needs through temporary means, such as water transportation (e.g., tankers), arranged independently.

Wastewater from Air Pollution Control Systems (Gas Absorption System)

The facility is equipped with **a gas absorption system for VOC treatment**, which utilizes **a wet scrubber or similar technology** to capture and neutralize air pollutants. This system generates wastewater that contains:

- **Absorbed VOCs and breakdown products** (e.g., hydrocarbons, formaldehyde, and benzene derivatives)
- **Chemical additives used for scrubbing reactions** (e.g., sodium hydroxide or sulfuric acid)
- **Suspended particulates and fine chemical residues**

This wastewater stream may be acidic or alkaline depending on the scrubbing process and will require **pH adjustment, filtration, and chemical treatment** before disposal or reuse.

Wastewater from Equipment and Floor Cleaning

Regular cleaning of production equipment, storage tanks, and working surfaces is necessary to prevent cross-contamination and maintain production quality. These cleaning operations generate wastewater containing:

- **Residual coatings, adhesives, and solvents**
- **Detergents and degreasers** used for equipment cleaning
- **Suspended solids from dried or semi-solid chemical deposits**

These substances may contribute to high levels of **chemical oxygen demand (COD), total dissolved solids (TDS), and oil & grease (O&G)** in the wastewater.

The NanoMaterials project generates wastewater from various processes, resulting in the release of several contaminants. The primary source of wastewater is combined wastewater, which includes pollutants such as Chemical Oxygen Demand (COD), Suspended Solids (SS), Ammonia Nitrogen (NH3-N), Total Phosphorus (TP), Total Nitrogen (TN), and oil and grease. These contaminants pose significant environmental risks if not properly managed.

Pollutants and Environmental Impact

- **Chemical Oxygen Demand (COD)**: High levels of COD indicate a substantial amount of organic matter in the wastewater, which can deplete oxygen levels in receiving water bodies, adversely affecting aquatic life.
- **Suspended Solids (SS)**: These particles can cause turbidity, reducing light penetration and impacting the health of aquatic ecosystems.
- **Ammonia Nitrogen (NH3-N)**: Ammonia is toxic to aquatic organisms and can contribute to nutrient pollution.
- **Total Phosphorus (TP) and Total Nitrogen (TN)**: These nutrients can lead to eutrophication, causing harmful algal blooms that deplete oxygen and harm aquatic life.
- **Oils and Grease**: These oils can form surface films, reducing oxygen transfer and harming aquatic organisms.

To mitigate the environmental impact of these pollutants, the project will implement effective wastewater treatment processes. These may include physical, chemical, and biological treatment methods to remove or reduce the concentration of contaminants before discharge. Regular monitoring and maintenance of treatment systems will ensure compliance with environmental regulations and standards, contributing to improved water quality and reduced environmental footprint.

Wastewater from Personnel Water Use

The wastewater generated from personnel activities will include effluent from sanitary facilities (toilets, washbasins, etc.) and other general water usage.

Total Wastewater Generated:

The total amount of wastewater generated will be approximately the same as the total water consumption for personnel. Thus, daily wastewater generation from personnel activities will be:

Wastewater generated from personnel=191 people X 230 Lt/day = 43.93 m^3/day

Wastewater Characteristics:

The generated wastewater will have typical characteristics of domestic wastewater, which may include:

- **Biochemical Oxygen Demand (BOD5):** Approximately **1.53–1.83 kg/day**
- **Chemical Oxygen Demand (COD):** Approximately **2.45–3.48kg/day**
- **Total Suspended Solids (TSS):** Approximately **1.87–2.37kg/day**
- **pH:** Typically, between **6.5 to 7.5**
- **Ammonia (NH_3):** Will be closely monitored to ensure it does not exceed regulatory limits.

Wastewater Treatment

According to engineering analysis, the wastewater generated during the project operation period primarily includes circulating wastewater, domestic sewage, and initial rainwater. The circulating wastewater, equipment and workshop floor washing wastewater, and initial rainwater are reused in the project's leaching process and are not discharged externally. The only wastewater discharged during the project operation period is domestic sewage. This

domestic sewage, along with floor and equipment cleaning wastewater and initial rainwater, is sent to the factory's sewage treatment station for processing. After treatment to meet the first-level discharge standard, the wastewater is disinfected and discharged into the municipal sewage pipeline.

Despite the Project site being relatively far from urban areas and having a large environmental capacity, environmental protection remains a priority. During the project design process, advanced environmental protection standards are adopted to ensure that the design scheme, equipment configuration, facility improvement, and resource allocations meet environmental protection and ecological improvement requirements. This approach ensures that various industrial waste emissions fully comply with waste discharge standards, thereby minimizing the environmental impact and contributing to sustainable development.

The factory area's drainage system utilizes a rainwater and sewage diversion approach, with separate rainwater and domestic sewage pipelines installed along both sides of the main and secondary roads within the site. Production wastewater is directed through the sewage pipeline network to a sewage treatment station located on-site. After treatment, the water is discharged into the municipal sewage pipeline network, provided it meets the municipal connection standards, and then flows to the local sewage treatment plant for further processing.

Domestic sewage is handled separately, with fecal sewage managed through underground septic tanks. After treatment in the septic tanks, the domestic sewage is then discharged into the municipal sewage pipeline network for proper disposal.

These wastewater management practices are currently applied at the factory in Jiangyin, China, but they can also be implemented in the planned project in Türkiye, ensuring consistent environmental management and compliance with local regulations.

The primary sources of wastewater at the factory include domestic sewage such as canteen oily wastewater, toilet sewage, and dormitory wastewater. These same sources are expected in the planned Turkish project, and **mitigation measures** will ensure that all wastewater is properly identified and separated for treatment.

The factory currently does not generate industrial wastewater, and this is expected to remain the case for the Turkish project. However, if any industrial wastewater is produced during the project's construction or operations, **mitigation measures** will be implemented to treat it according to the local standards in Türkiye.

At the factory, clean and dirty water are separated, with domestic wastewater being discharged directly into the urban sewage system, while rainwater is directed into the municipal rainwater network. The same system will be adopted in Türkiye as a **mitigation measure** to prevent contamination of the sewage and rainwater systems.

The Administration Department at the factory manages the cleaning and maintenance of wastewater systems, including the annual clearing of sewage manholes and septic tanks. This practice will be replicated in Türkiye, with **mitigation measures** ensuring the use of non-toxic, phosphorus-free disinfectants to minimize environmental harm during cleaning procedures.

The Equipment Department and relevant departments at the factory are responsible for inspecting wastewater systems for leaks or malfunctions. In the Turkish project, regular inspections will be carried out as a **mitigation measure** to ensure no leaks allow untreated wastewater to enter the environment. Any issues detected will be promptly addressed to avoid pollution.

The factory's external discharge outlets are monitored by external agencies such as the Environmental Monitoring Center and Jiangyin City Urban Drainage Monitoring Station. The

Turkish project will adopt similar monitoring systems. **Mitigation measures** will include regular sampling and analysis of wastewater to ensure compliance with local environmental standards. If any abnormalities are detected, corrective actions will be taken immediately.

At the factory, wastewater performance is regularly analyzed to ensure standards are met. If performance indicators do not meet standards, corrective actions are taken as per the Corrective and Preventive Measures Control Procedure. In the Turkish project, the same **mitigation measures** will be applied to ensure wastewater management is continually optimized and compliant with local regulations.

Table 4-41. Water-Related Impact Significances and Proposed Mitigation Measures

Potential Impact / Risk	Receptor	Project Phases	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Wastewater Generation from Personnel Activities	Surface water and groundwater	Construction & Operation Phase	Local	Reversible	Long-term	Continuous	Low	Moderate	Moderate	• Proper Septic System Design: Ensure septic systems are designed and constructed to local environmental and health standards, with regular maintenance checks. • Regular Inspections and Maintenance: Establish a maintenance schedule for septic systems to prevent leakage and carry out annual inspections. • Buffer Zones: Maintain buffer zones around septic systems, with specific distance requirements from water sources, to prevent contamination of groundwater. • Wastewater Treatment: Consider alternative, more advanced wastewater treatment methods (e.g., membrane bioreactors) if necessary to prevent leaks.	Low
Surface Water Contamination from Wastewater Disposal	Surface water bodies (rivers, lakes)	Operation Phase	Low	Local	Reversible	Long-term	Occasional	Low	Moderate	• **Wastewater Treatment Systems**: Install and regularly maintain septic systems or appropriate wastewater treatment facilities (e.g., primary or secondary treatment). • **Monitoring**: Conduct regular water quality monitoring at discharge points to ensure compliance with environmental standards. • **Contingency Planning**: Develop and implement a contingency plan for accidental discharge, including spill kits and training for workers. • **Employee Training**: Train employees on wastewater management best practices, including proper disposal and containment methods.	Low
Surface Water Runoff and Flooding from Stormwater	Surface water bodies	Operation Phase	Low	Local	Reversible	Long-term	Occasional	Low	Moderate	• **Spill Containment**: Designate areas for the safe storage of chemicals and hazardous materials, including spill containment systems (e.g., bunding, secondary containment). • **Employee Training**: Train all relevant personnel in handling, storing, and disposing of chemicals, along with emergency spill response procedures. • **Spill Response Plan**: Develop and implement a site-specific spill response plan that includes spill detection, immediate containment, and remediation. • **Emergency Equipment**: Provide spill kits and absorbent materials in all chemical storage areas for quick response to any accidental releases.	Low
Impacts from Chemical Spills during Operation	Soil, surface water, and groundwater	Operation Phase	None	Local	Reversible	Short-term	Rare	Low	Moderate	• **Wastewater Treatment Systems**: Install and regularly maintain septic systems or appropriate wastewater treatment facilities (e.g., primary or secondary treatment). • **Monitoring**: Conduct regular water quality monitoring at discharge points to ensure compliance with environmental standards. • **Contingency Planning**: Develop and implement a contingency plan for accidental discharge, including spill kits and training for workers. • **Employee Training**: Train employees on wastewater management best practices, including proper disposal and containment methods.	Low

Potential Impact / Risk	Receptor	Project Phases	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Surface Water Contamination from Wastewater Disposal	Surface water bodies (rivers, lakes)	Operation Phase	Low	Local	Reversible	Long-term	Occasional	Low	Low	• **Wastewater Management**: Install containment structures (e.g., bunded areas) to capture any runoff from cleaning activities, ensuring it is filtered and treated before release.	Negligible
Surface Water Runoff and Flooding from Stormwater	Surface water bodies	Operation Phase	Low	Local	Reversible	Long-term	Occasional	Low	Moderate	• **Wastewater Treatment Systems**: Install and regularly maintain septic systems or appropriate wastewater treatment facilities (e.g., primary or secondary treatment). • **Monitoring**: Conduct regular water quality monitoring at discharge points to ensure compliance with environmental standards. • **Contingency Planning**: Develop and implement a contingency plan for accidental discharge, including spill kits and training for workers. • **Employee Training**: Train employees on wastewater management best practices, including proper disposal and containment methods.	Low
Impacts from Chemical Spills during Operation	Soil, surface water, and groundwater	Operation Phase	Low	Local	Reversible	Long-term	Occasional	Low	Low	• **Alternative Cleaning Techniques**: Explore non-toxic cleaning methods, such as mechanical cleaning or natural methods, to reduce reliance on chemical cleaners. • **Wastewater Management**: Install containment structures (e.g., bunded areas) to capture any runoff from cleaning activities, ensuring it is filtered and treated before release.	Negligible
Operational Wastewater	Soil, surface water, and groundwater	Operation Phase	Low	Local	Reversible	Long-term	Occasional	Low	Low	• Implement advanced treatment systems at the factory's sewage treatment station to ensure domestic sewage meets first-level discharge standards before being disinfected and discharged. • Conduct regular monitoring of wastewater quality to ensure compliance with environmental regulations and standards. • Use efficient and well-maintained equipment to reduce the generation of wastewater and improve treatment efficiency. • Adopt advanced environmental protection standards in the project design to ensure all processes and equipment configurations meet ecological improvement requirements. • Develop and implement emergency response plans to address potential wastewater spills or leaks promptly. • Educate employees and stakeholders about the importance of wastewater management and the measures in place to mitigate its impact.	Negligible

4.6 Resource and Waste Management

4.6.1 Methodology and Project Standards

In the scope of waste and resource management, the project is evaluated according to following international standards and national regulations.

- Waste Management Regulation
- Regulation on Landfilling of Wastes
- Waste Oil Management Regulation
- Packaging Waste Control Regulation
- Regulation on Control of Medical Wastes
- Regulation on Control of Waste Batteries and Accumulators
- Waste Electrical and Electronic Equipment Control Regulation
- Regulation on the Control of Waste Vegetable Oil
- Zero Waste Regulation
- Regulation on Control of Excavated Soil, Construction and Demolition Wastes
- Regulation on the Control of End-of-life Tires
- IFC PS1: Assessment and Management of Environmental and Social Risks and Impacts
- IFC PS3: Resource Efficiency and Pollution Prevention
- WBG General EHS Guidelines - 1. Environment - 1.6: Waste Management
- IFC EHS Guidelines for Metal, Plastic, and Rubber Products Manufacturing

4.6.2 Baseline Conditions

Kırklareli has implemented comprehensive waste management systems to manage both municipal and construction waste effectively. The city follows various waste disposal, recycling, and recovery procedures while also emphasizing environmental sustainability through initiatives like the "Zero Waste" program.

Municipal Waste Management

Kırklareli's solid waste management system is primarily operated by the Kırklareli Local Government Solid Waste Facilities Construction and Operation Union (KIRK-KAB), which includes multiple municipalities from the region. The union is responsible for the management of regular waste disposal sites, including the Kırklareli Solid Waste Landfill Area located in Karaca İbrahim Mahallesi. This landfill covers an area of 150,000 m², and a project was implemented to develop it in four stages. It is designed to address the growing waste management needs of Kırklareli and neighboring municipalities. Additionally, a waste-to-energy project using methane gas from the landfill has been established to generate electricity.

The waste collected by KIRK-KAB comes from various municipalities, including Kırklareli, Babaeski, Demirköy, and others. The landfill area currently does not have a dedicated leachate treatment facility, but leachate from the landfill is collected and transported to Kırklareli's wastewater treatment plant. Furthermore, some municipalities still use illegal dumping sites, including those in Lüleburgaz, Pınarhisar, and Vize, which are causing environmental concerns. Despite this, the union works toward ensuring that waste is transferred to the appropriate disposal sites, promoting proper waste management practices across the region.

The waste composition in Kırklareli's municipalities includes organic kitchen waste, plastics, paper, glass, and metals. Kitchen waste accounts for the largest share of the collected waste, followed by paper, plastic, and other materials. The waste management facilities aim to sort

and handle these wastes efficiently, with some areas practicing mechanical sorting, biological treatment, and composting to reduce the volume of biodegradable waste. However, further improvements are necessary, particularly in separating hazardous and recyclable materials, which would optimize the waste management system.

Lüleburgaz, one of the prominent municipalities in Kırklareli, faces specific challenges in solid waste management. While efforts are made to collect and dispose of waste efficiently, Lüleburgaz has been reported to still use illegal dumping sites, which poses environmental risks. These unauthorized waste disposal practices are problematic, especially in areas where waste is not properly handled or separated. Despite this, the municipality is part of the broader Kırklareli Solid Waste Facilities Construction and Operation Union (KIRK-KAB), which works to ensure that waste is transferred to appropriate and designated disposal sites.

Additionally, Lüleburgaz has been involved in efforts to improve waste management systems, including waste sorting and recycling initiatives. However, like many other municipalities in the region, the challenge remains in managing the high volume of organic waste and improving the separation of recyclable materials from non-recyclable ones. These efforts are expected to align with the regional goal of reducing the reliance on landfills by enhancing composting and recycling programs, although further infrastructure improvements are still needed to address illegal dumping practices.

In the context of KIRK-KAB, Lüleburgaz benefits from the region's waste-to-energy initiatives and the broader waste management efforts aiming to handle the city's waste more sustainably. However, given the illegal dumping issues, there is a clear need for increased monitoring, stricter enforcement of waste disposal regulations, and improved public awareness regarding proper waste handling practices.

In Kırklareli, there is one authorized excavation soil storage facility. The facility is operated by **Polyfilm Plastik Ambalaj San. ve Tic. Ltd. Şti** located in Lüleburgaz. This site is designated for the storage of excavation soil. Additionally, Lüleburgaz Municipality operates one construction and demolition waste recovery facility. This facility plays a key role in managing construction and demolition waste, including recycling and waste reduction.

According to the 2023 report on the management of excavation soil and construction and demolition waste, the waste management practices in Lüleburgaz and Kırklareli are structured as follows:

- **Lüleburgaz Municipality** handles the management of construction and demolition waste (m³/year) and excavation soil (m³/year). This includes the operation of a waste recovery facility and the management of the waste produced.
- Kırklareli Municipality does not report the generation of specific amounts of construction and demolition waste or excavation soil in the 2023 data, but they have one authorized excavation soil storage facility.

As of 2023, Kırklareli province has several waste processing facilities, each focused on different types of waste management and recycling. The following facilities are available in the region:

- **Solid Waste Disposal Facility (Municipality)**: There is one solid waste disposal facility operated by the municipality.
- **Licensed Packaging Waste Collection, Separation, and Recycling Facilities**: Seven facilities are dedicated to the collection, separation, and recycling of packaging waste.

- **Hazardous Waste Recycling Facilities**: There are four facilities that focus on the recycling of hazardous waste.
- **Waste Oil Recycling Facility**: One facility processes waste oil for recycling.
- **Vegetable Waste Oil Recycling Facility**: No facility for vegetable waste oil recycling has been reported.
- **Medical Waste Sterilization Facility**: One facility is responsible for sterilizing medical waste.
- **Non-Hazardous Waste Recycling Facilities**: Fifteen facilities focus on the recycling of non-hazardous waste.

4.6.3 Impact Assessment and Mitigation Measures

4.6.3.1 Construction Phase

During construction, various waste materials such as sand, gravel, lime, concrete, and waste bricks will be generated. Improper disposal of these materials can negatively impact the surrounding environment. Additionally, a significant number of construction workers will be on-site, and their daily activities will produce household waste. This waste must be managed to avoid environmental and health hazards.

To prevent adverse effects, the construction site should be cleaned regularly, with construction waste promptly collected and transported for recycling or proper disposal. Long-term accumulation of construction waste should be avoided to minimize dust generation and other environmental impacts. Household waste should be separately collected and regularly removed by the sanitation department to the nearest landfill for proper disposal. Random piling of waste should be strictly prohibited to prevent rotting, the breeding of mosquitoes and flies, foul odors, and the spread of diseases. Timely waste disposal is essential for maintaining both the health of the workers and the surrounding environment

permit certificate considering the provisions of the Waste Management Regulation.

The potential impacts to be of concern in case of improper waste management is as follows:

- Contamination of soil and water resources and environmental nuisance.
- Potential nuisance to the community and occupational health and safety; and
- Loss of materials that have potential to be reused/ recovered/ recycled.

The types of wastes and their estimated amount during both the land preparation and the construction phase and the operation phase are provided in the following paragraphs.

Domestic Waste

It is envisaged that 200 people will be employed during the land preparation and construction phases of the project and 191 people will be employed during the operation phase. According to Turkish Statistical Institute data, average daily municipal waste quantity is of 1 kg/day per capita[21] for Kırklareli province in 2022.

Which will result in

[21] https://biruni.tuik.gov.tr/medas/?kn=119&locale=tr

1 kg/day per capita X 200 people = 200 kg/day waste during construction

The project will cover an area of approximately 37,800 m² and will involve an estimated soil excavation depth of 30 cm. This will generate approximately 113,400 m³ of excavated material, equating to around 1,370 tons of excavation waste.

The domestic waste will be handled as per the provisions of national Waste Management Regulation. According to the Provincial Environment Status Report of Kırklareli (2023) percentage and amount of each waste type is presented below:

Table 4-42. General List of Wastes for the Construction and Operation Phases

Waste Type	Waste Code	Percentage	Construction (kg/day)
Kitchen	20 03 01	39	16,35
Paper	15 01 01	3	1,26
Cardboard		6	2,52
Volumed Cardboard			0,00
Plastic	15 01 02	14	5,87
Glass	15 01 07	8	3,35
Metal	15 01 11	1	0,42
Garden	20 02 01	5	2,10
Ash (NA for the Project)		7	
Other		17	7,13

**Hazardous Wastes*

Storage of Vegetative Soil: Vegetative soil will be temporarily stored in designated areas that are separated from other construction waste. The storage areas will be designed to prevent erosion and contamination. Temporary storage piles will be kept covered to minimize dust emissions and prevent the leaching of nutrients into surrounding soils or water sources.

Storage of Excavation Soil: Excavation soil will be stored in segregated stockpiles away from active construction zones. The soil will be stored in such a way that it can be easily assessed for potential reuse, such as for landscaping or backfilling. If the excavation soil is not suitable for reuse, it will be transported to approved waste disposal sites. The stockpiles will be monitored to prevent waterlogging or contamination of surrounding areas, and precautions will be taken to avoid any negative impacts on water or air quality.

If excavation waste is not properly managed and stored, several environmental issues may arise, including:

- **Dust Emissions:** Both vegetative and excavation soils, particularly during dry conditions, have the potential to generate dust. Without proper containment or suppression, dust can affect local air quality, contribute to respiratory issues in nearby populations, and impact the surrounding vegetation and wildlife. The project will implement dust control measures, including water spraying on stockpiles and excavation areas, to mitigate this risk.
- **Soil Erosion:** Improperly stored waste, particularly vegetative soil, may lead to soil erosion if left exposed to wind and rain. Erosion of stockpiled soil can result in the loss

of fertile land and the degradation of surrounding ecosystems. Protective barriers and coverings will be used around waste piles to minimize the risk of erosion.

- **Contamination of Water Resources:** If excavation or vegetative soil is improperly stored near water bodies or if runoff occurs during rain, there is a potential risk of contamination. Leachate from waste materials can introduce pollutants into groundwater or surface water, which may affect local ecosystems and human health. Proper storage and containment methods, including the use of geotextile fabric or impermeable liners, will be implemented to prevent such contamination.
- **Impact on Wildlife:** Excavation waste, particularly when stored without proper management, can disrupt local wildlife habitats. Waste piles can create barriers to animal movement or attract unwanted pests. In addition, the presence of exposed materials may encourage the accumulation of invasive plant species. The project will ensure that waste storage areas are carefully selected to avoid disturbance to critical habitats.

The primary goal of excavation waste management is to maximize the reuse of materials to minimize the amount of waste that needs to be disposed of. Both vegetative and excavation soil will first be evaluated for potential reuse within the project, for purposes such as:

- **Backfilling**: Excavation soil may be used to backfill trenches or other excavated areas to level the ground and prepare it for further development or reclamation.

If the materials are not suitable for reuse within the project, they will be transported to authorized disposal sites. The project will ensure that all disposal actions comply with local regulations and that waste is not left in unauthorized or environmentally sensitive areas.

Medical Wastes (18 01 03)

As per paragraph 2 in Article 11 of the Regulation on Occupational Health and Safety Services, an infirmary is requisite for the workplaces with 50 or more employees and also appropriate vehicles will be in place to ensure that employees are transported to the nearest health unit in case of emergency.

In this context, an infirmary area will be established on site since it is planned to have 80 personel during the construction phase. In addition, if medical intervention is required, the workers will be transferred to the nearest health facility.

The total quantity of medical waste that will be generated is calculated according to the worst-case scenario, considering that 0,69 kg[22] of medical waste is generated per year per capita and that all personnel will receive medical intervention at least once a year. The amount of medical waste for land preparation and construction phase is 13.8 kg/year. The medical waste will be handled as per the provisions of National Regulation on Control of Medical Wastes.

End-of-Life Tyres (16 01 03)

It is envisaged that end-of-life tyres will not be of concern in the project area, since the tyres will be changed at facilities outside the project area. However, in the event that end-of-life tyres are generated as a result of the maintenance works to be carried out on the site, they will be disposed of in accordance with the provisions of the Regulation on the Control of End-of-Life Tyres.

[22] www.tuik.gov.tr Türkiye Annual Medical Waste Quantity Per Capita,2018

Waste Oils (20 01 26)

Maintenance and repair of the vehicles to be used for the project activities will be carried out by authorised services outside the project area. Waste oils that may be generated in case of the need for activities such as vehicle maintenance and oil change within the project area will be collected in leak-proof tanks separately from other wastes and disposed of in accordance with the provisions of the Waste Oil Management Regulation.

Hazardous and Special Wastes (16 02 15, 16 01 21, 20 01 35, 15 01 10, 15 01 11, 15 02 02, 20 01 26)

During the land preparation and construction phase of the Project, the following hazardous and specials wastes are anticipated to be generated as a result of the land preparation and construction activities.

- Waste and materials (PPEs, rugs, clothes, etc.) contaminated with hazardous substances such as lubricants hydraulic fluids or fuels,
- The operation and maintenance of construction equipment and machinery requiring the use, storage and transfer of varying quantities of fuels and oils/lubricants,
- Solvents and paints to be used in construction activities,
- Vegetable oils, batteries, electrical/electronic equipment, cables, fluorescent lamps, medical supplies to be consumed by Project personnel.
- Scrap metals and materials that contact with fuels, hazardous substances/chemicals, etc. at the workshops, laboratories, concrete plants, fuel stations, etc.,
- Waste tires and accumulators of the construction machinery.

Hazardous and special wastes need to be properly managed to avoid significant impacts on both environmental receptors and human health. The waste batteries and accumulators and waste electrical and electronic equipment will be handled as per the Provisions of Regulation on Control of Waste Batteries and Accumulators and Electrical and Electronic Equipment Control Regulation, respectively.

4.6.3.1 Operation Phase

Industrial Waste

The production processes for products like car coat films, energy-saving window films, CO2 catching materials, and VOC waste gas adsorption materials generate various types of waste. These waste streams are categorized into **non-hazardous** and **hazardous** waste, based on the nature of the materials and operations involved.

During the production, significant **non-hazardous waste** is generated, primarily from packaging materials. Cardboard, plastic, and metal packaging used to transport raw materials such as TPU films, PET membranes, and solvents create a substantial amount of waste. These materials are typically non-hazardous and can be recycled or disposed of in accordance with local regulations. Another major source of non-hazardous waste is **scrap films and membranes**, which result from excess material or defects in the production of car coat films and window films. These off-cuts or rejected films are generally non-hazardous and should be recycled if possible. Additionally, spent filters from air and wastewater treatment systems, used to capture pollutants such as VOCs and particulate matter, also fall into the non-hazardous waste category. **Construction and maintenance waste** like scrap metal, concrete, wood, and used machinery parts generated during facility upgrades or routine maintenance further contributes to non-hazardous waste streams. Airborne dust from the handling and processing

of raw materials like TPU films, PET membranes, and metal compounds is another non-hazardous waste that must be controlled through appropriate dust suppression measures.

Hazardous waste is generated primarily from the chemicals used in the production processes. **Used solvents**, such as petroleum-based solvents, alcohols, and esters, are employed in the formulation of adhesives, coatings, and films, and are considered hazardous once they are contaminated with chemical residues. These solvents require careful handling and disposal to prevent environmental contamination. Another significant source of hazardous waste comes from **chemical residues** left over from the production of hardening coatings, UV absorbents, and insulating pastes. These chemicals, if improperly handled or disposed of, can pose environmental and health risks. **Spent catalysts** and **metal compounds** used in the production of CO2 catching materials and VOC adsorption materials contain heavy metals that are toxic and must be managed as hazardous waste. Similarly, **waste acids and alkalis** generated from cleaning or coating processes can have extreme pH levels, making them hazardous if not neutralized and treated properly before disposal. **VOC residues** from solvents or semi-processed materials, along with off-spec products like defective films, also contribute to hazardous waste due to their chemical content. Finally, if any equipment used in the facility relies on batteries, **spent batteries** may accumulate as hazardous waste, as they contain harmful substances like lead or cadmium.

After the completion of this project, the solid waste will primarily consist of waste polymers and waste packaging materials generated during the manufacturing process, amounting to 20 tons per year. Hazardous waste, including waste polymers and waste organic solvents, will be managed in accordance with the "Regulations on the Control of Hazardous Waste," utilizing a five-link management system. General solid waste will be classified as resource waste and sent to specialized units for recycling. Additionally, a designated area will be established for the disposal of household waste, which will be uniformly cleared by sanitation departments.

The solid waste generated by the project will be systematically classified, collected, recycled, and treated using economical, reasonable, safe, and effective methods. The disposal processes ensure that the destination of the solid waste is clear, preventing secondary pollution. The project aims for a 100% solid waste disposal rate during its operation period, thereby minimizing the impact on the surrounding environment.

This project falls under a category of construction projects that typically involve pollution factors but have well-established and reliable pollution control measures. By enhancing management during both the construction and operation phases and strictly adhering to relevant environmental protection standards, the project will not significantly impact the environment. Post-completion, environmental management and monitoring will be intensified, with professional personnel assigned to oversee these activities during the company's daily production processes.

As part of the ongoing development within the Organized Industrial Zone (OIZ), the management of waste—particularly wastewater—has been planned strategically in accordance with the construction timeline and operational readiness of the zone.

The OIZ currently consists of a total of **34 parcels**, with the following distribution:

- **15 parcels** are occupied by fully operational factories,
- **2 parcels** are in the construction phase,
- **3 parcels** are at the project planning stage (including **2 parcels allocated to Great Rich**),
- **13 parcels** remain vacant and are not yet under development.

At present, the OIZ does not provide a centralized wastewater treatment service. However, **within one year**, the OIZ is scheduled to **complete and commission its centralized Wastewater Treatment Plant (WWTP)**, which will serve all active and future facilities within the zone.

In the interim period, the waste disposal practices vary depending on the development stage of each facility. Operational factories are responsible for managing and disposing of their wastewater in compliance with national environmental legislation and regulations, typically through licensed waste management service providers. Facilities under construction or in the project stage are expected to take temporary measures to manage wastewater and construction-related waste until the OIZ WWTP becomes operational.

Once the infrastructure is fully established, the OIZ will offer a comprehensive suite of **environmental and technical services**, including:

- **Water supply** and **electricity distribution**,
- **Wastewater treatment services**,
- **Stormwater drainage systems**,
- **Solid waste collection coordination**,
- A dedicated **fire department** for emergency response,
- An **emergency preparedness and response plan**, integrated into the OIZ's overall safety strategy.

With the completion of the infrastructure, all facilities within the zone will be connected to these centralized systems, ensuring standardized, compliant, and environmentally responsible waste management across the entire industrial zone.

Although the Project is being implemented in Türkiye, the hazardous waste management practices currently applied in the same factory in China have been reviewed and adopted as guiding references. These practices have been developed in compliance with the "Environmental Protection Law of the People's Republic of China," the "Law on the Prevention and Control of Environmental Pollution by Solid Waste," and other relevant Chinese environmental regulations. Many of these strategies are consistent with international best practices and will be applied in Türkiye where they align with local regulatory and institutional frameworks.

One such strategy is the adherence to the principles of "prevention first, combination of prevention and treatment" and the "three simultaneous" principle, which ensures that environmental protection measures are planned, constructed, and operated in parallel with the main project. These principles are both practical and in alignment with Turkish environmental legislation and can be feasibly implemented throughout the project lifecycle.

As in the Chinese facility, overall leadership responsibility for hazardous waste management in Türkiye will rest with the highest-ranking project official. An ES team will be established under the leadership of the general manager, including representatives from various departments such as environmental protection, production, operations, and health and safety. This structure has proven effective in China and is well-suited for application in Türkiye, where interdepartmental coordination is also critical for successful environmental management.

A dedicated OHS Team will take responsibility for the centralized management of hazardous waste prevention and control activities. Each production unit will be held accountable for integrating hazardous waste management into daily operations. These internal responsibilities

have been successfully implemented in China and are both practical and applicable to the operational culture in Türkiye.

All project personnel will be required to comply with Turkish environmental laws, regulations, and internal project policies. In line with the practices in China, active employee participation in environmental protection will be encouraged through continuous training and awareness initiatives. Furthermore, environmental records and data on hazardous waste generation, storage, and disposal will be properly maintained. The data management and record-keeping system in China, which supports full traceability and regulatory compliance, is also suitable for the regulatory requirements in Türkiye.

A performance-based reward and penalty system for environmental protection will be implemented for all departments and employees. This mechanism, which incentivizes compliance and encourages continuous improvement, has shown tangible benefits in China and is expected to be effective in the Turkish context as well.

Each project department will participate in environmental inspections and audits, with oversight and coordination provided by the Safety and Environmental Protection Team. As in China, the waste-generating units in Türkiye will hold primary responsibility for the management of hazardous waste, and roles and responsibilities will be clearly defined across departments, including environmental, production, and finance. This system ensures accountability and effective oversight.

Lastly, consistent with both Chinese and Turkish regulations, all hazardous waste containers and packaging will be appropriately labelled to ensure safe handling, storage, and transport. Labeling practices currently used in the Chinese facility will be mirrored in Türkiye, adapted where necessary to align with the relevant Turkish standards.

The hazardous waste management measures are crucial for ensuring safe storage, proper utilization, and responsible disposal of hazardous wastes. These measures aim to reduce both the quantity and harmfulness of hazardous wastes generated during operations. In Türkiye, these measures will be applicable and adapted to the local regulatory framework, particularly in relation to the Ministry of Environment, Urbanization, and Climate Change's hazardous waste management guidelines. The company will follow similar steps to those practiced in Jiangsu Province, including the monthly reporting of hazardous waste quantities to the Turkish authorities, ensuring that hazardous waste data is accurately documented and reported. The system to record and track hazardous waste will also comply with Türkiye's regulatory requirements, using the local environmental reporting systems.

Source Classification System

In accordance with these measures, hazardous wastes in Türkiye will be classified and stored according to their specific characteristics, ensuring they are kept separate from non-hazardous solid wastes. Similar to Jiangsu’s regulations, Türkiye’s waste management system will require separate storage for different types of hazardous wastes, including ensuring proper containment of wastes that are easily volatile or hydrolyzed. This approach is particularly applicable in Türkiye as it aligns with the Turkish Waste Management Regulation, which mandates that incompatible wastes be stored separately to avoid harmful reactions and prevent environmental contamination.

Transfer Form System

The transfer of hazardous waste will be managed in compliance with Turkish regulations, such as the Waste Management Regulation and the procedures set by the Ministry of Environment. Like the measures outlined for Jiangsu Province, hazardous waste transfers within Türkiye will require proper documentation and reporting, ensuring that the waste is transported safely and

in accordance with local laws. The introduction of an electronic transfer system in Türkiye, which mirrors the practice in Jiangsu, would enhance the efficiency of waste transfer processes, with online reporting systems for both intra- and inter-provincial transfers.

Emergency Plan Filing System

Türkiye has established requirements for emergency preparedness and response plans, as detailed in the Turkish Occupational Health and Safety Law and the Waste Management Regulation. Similar to the practice in Jiangsu, companies in Türkiye must file emergency plans with local environmental authorities and update them as needed, particularly when there are changes to the production process. Emergency drills, which are a requirement in both Jiangsu and Türkiye, will also be held annually to ensure that the company's personnel are prepared for potentially hazardous waste incidents. These drills will be recorded and maintained in compliance with Turkish legal obligations.

Storage Facility Management System

In Türkiye, hazardous waste storage facilities are required to adhere to strict regulations designed to prevent environmental contamination. Similar to Jiangsu's "Hazardous Waste Storage Pollution Control Standards," Türkiye mandates that hazardous waste storage sites be designed to prevent leakage, loss, or dispersion of hazardous materials. Facilities will need to implement safety measures such as proper signage, secure containers, and regular inspections to ensure compliance. In addition, storage areas must be equipped with the necessary infrastructure to manage hazardous waste, including proper record-keeping systems that align with Turkish waste tracking requirements.

Chemical Storage

These processes are based on applications currently in use at the factory in China but can be adapted and implemented for the planned project in Türkiye. The steps outlined below ensure the safe handling, procurement, transportation, storage, and disposal of chemicals, in compliance with relevant national regulations and safety standards.

Chemical Selection and Identification

The chemical selection process follows established principles at the Chinese factory, which can be applied to the Turkish project as well. These principles emphasize the prohibition of chemicals banned by laws and regulations, minimizing the use of hazardous chemicals, and replacing highly hazardous chemicals with non-hazardous or low-hazard alternatives. The using department at the project site will compile and share a "Chemical List" with the General Manager's Office Inspection Group, which will summarize and update the project's overall chemical list.

Chemical Procurement

In both the Chinese factory and the Turkish project, the Procurement Department will select and evaluate suppliers in accordance with the "Stakeholder Demand and Expectation Control Procedure." Suppliers are required to provide the Turkish version of the Material Safety Data Sheet (MSDS) for all chemicals, along with labels for safety, environmental protection, and hazard warnings. Updates to the MSDS must be promptly received from suppliers. The Purchasing Department will ensure compliance with national regulations for hazardous chemicals, obtaining the necessary certifications. Limited quantities of chemicals, especially unstable ones, should be purchased and controlled in the warehouse according to inventory guidelines.

Chemical Transportation, Loading, and Unloading

The same process for transportation, loading, and unloading of chemicals followed at the factory in China will apply to the Turkish project. The Purchasing and Warehousing Departments will manage the transportation and unloading of hazardous chemicals according to national regulations. The chemicals must be handled carefully to prevent any leakage, damage, or contamination during transportation. Inspection procedures at the Turkish project site will mirror those used at the Chinese facility, ensuring chemicals are stored properly upon arrival.

Chemical Storage

Chemicals at both the factory in China and the planned Turkish project will be stored according to their categories, with clear labeling and cargo cards. Incompatible chemicals will not be stored together, and high-risk chemicals will be placed in specially designated, fireproof storage cabinets. Regular inspections will be carried out, both at the Turkish project and the Chinese factory, to ensure proper storage conditions, such as fire prevention, anti-static measures, and leakage prevention. Any discrepancies found during inspections will be reported and corrected in a timely manner.

Chemical Use

For both the Chinese factory and the Turkish project, chemicals will be issued on a first-in-first-out basis, and temporary storage points within each department will be well-labeled with necessary protective equipment and MSDS. Using departments will follow established guidelines to minimize the risk of spills and splashes, with all chemical usage being conducted according to strict operating instructions. Personnel will wear personal protective equipment as required, and any chemical-related accidents or emergencies will be managed according to the Emergency Preparedness and Response Control Procedure.

Chemical Disposal

Waste chemicals and their containers will be managed and disposed of in accordance with the Waste Management Regulations, both in the Chinese factory and for the Turkish project. This ensures that all chemicals are disposed of safely and in compliance with environmental regulations to prevent contamination.

Below table shows the possible waste streams for each production and raw material to be used:

Table 4-43. General List of Wastes for the Operation Phase (Industrial Waste)

Process	Raw Material	Waste Code	Waste Code Description
Car coat film	TPU film	07 02 13	Waste plastic
	PET membrane	07 02 13	Waste plastic
	Repair liquid	11 01 15	Liquids and sludges containing hazardous substances from membranes or ion exchange systems
	Glue for installation layer	08 04 09, 08 04 10	Waste adhesives and sealants containing organic solvents or other hazardous substances (excluding adhesives and sealants classified under 08 04 09)
Energy saving window film	PET membrane	07 02 13	Waste plastic
	Hardening coating solution	08 02 01	Waste coating powders

	Glue for installation layer	08 04 09, 08 04 10	Waste adhesives and sealants containing organic solvents or other hazardous substances (excluding adhesives and sealants classified under 08 04 09)
	Uv absorbent	07 04 09, 07 04 10	Halogenated filter cakes and used adsorbents. Other filter cakes and used adsorbents
	Insulating paste	08 04 09, 08 04 10	Waste adhesives and sealants containing organic solvents or other hazardous substances (excluding adhesives and sealants classified under 08 04 09)
CO2 catching material	Metal Compounds	12 01 01, 12 01 02, 12 01 03, 12 01 04	Iron metal slag and chips, iron metal dust and particles, non-ferrous metal slag and chips, non-ferrous metal dust and particles
	Organics&solvent	07 05 03, 07 05 04	Halogenated organic solvents, wash liquids, and main solvents. Other organic solvents, wash liquids, and main solvents
VOCs waste gas adsorption material	Metal Compounds	12 01 01, 12 01 02, 12 01 03, 12 01 04	Iron metal slag and chips, iron metal dust and particles, non-ferrous metal slag and chips, non-ferrous metal dust and particles
	Organics&solvent	07 05 03, 07 05 04	Halogenated organic solvents, wash liquids, and main solvents. Other organic solvents, wash liquids, and main solvents

Raw Materials

Below table is a structured list of the **main raw and auxiliary materials** of the product, including their **GHS hazard classifications**, **permissible exposure limits (PEL)**, and **personal protection measures** where available.

Tablo 4-1: List of main raw and auxiliary materials of the product

Product Name	Chemical Used	GHS Hazard Classification*	Permissible exposure limit*	Personal protection
Car cover film	HF004Z NP-9022	Flammable Liquids Category 2 Serious Eye Damage/Eye Irritation Category 2 Specific Target Organ Toxicity - (Single Exposure) Category 3	PC-TWA: 200 mg/m3 PC-STEL: 300 mg/m3	Provide eyewash stations and safety showers at any time; wear rubber gloves, suitable dust masks, suitable safety glasses, suitable chemical protective clothing and chemical-resistant shoes when operating.
Energy-saving window film	MT042	Serious eye damage/eye irritation Category 2 Flammable liquids Category 2 Acute toxicity - inhalation Category 5 Skin corrosion/irritation Category 2 Reproductive toxicity Category 2 Specific target organ toxicity - single exposure Category 3 Specific target organ toxicity - repeated exposure Category 2 Aspiration hazard Category 1 Acute aquatic hazard Category 2 Chronic aquatic hazard Category 3	PC-TWA: 200 mg/m3 PC-STEL: 300 mg/m3	
CO2 capture materials	Ferric acetate 4-aminobenzoic acid	No category		
VOCs waste gas adsorption materials	4,4'-Xanthoyldibenzoic acid Aluminum sulfate 18hydrate	No category		
OCA optical adhesive		No category		
Absorbent tape		Flammable Liquids Category 2 Serious Eye Damage/Eye Irritation Category 2 Specific Target Organ Toxicity - (Single Exposure) Category 3	PC-TWA: 200 mg/m3 PC-STEL: 300 mg/m3	
VHB Tape		No category		
Proton Exchange Membrane		No category		

** The hazard classifications listed (e.g., Flammable Liquids Category 2, Serious Eye Damage Category 2, Specific Target Organ Toxicity Category 3) are based on the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).*

** Determined according to OSHA. Permissible Exposure Limits – Annotated Table Z-1. U.S. Department of Labor. Available at: https://www.osha.gov/annotated-pels/table-z-1 by Great Rich Technologies*

Domestic Waste

It is envisaged that 200 people will be employed during the land preparation and construction phases of the project and 191 people will be employed during the operation phase. According

to Turkish Statistical Institute data, average daily municipal waste quantity is of 1 kg/day per capita[23] for Kırklareli province in 2022.

Which will result in

1 kg/day per capita X 191 people = 191 kg/day waste during operation

The domestic waste will be handled as per the provisions of national Waste Management Regulation. According to the Provincial Environment Status Report of Kırklareli (2023) percentage and amount of each waste type is presented below:

Table 4-44. General List of Wastes for the Operation Phase (Domestic Waste)

Waste Type	Waste Code	Percentage	Operation (kg/day)
Kitchen	20 03 01	44.68%	85.34 kg
Paper	15 01 01	4.26%	8.13 kg
Cardboard		4.26%	8.13 kg
Volumed Cardboard		4.26%	8.13 kg
Plastic	15 01 02	14.89%	28.45 kg
Glass	15 01 07	9.57%	18.29 kg
Metal	15 01 11	1.06%	2.03 kg
Other		17.02%	32.51 kg

**Hazardous Wastes*

[23] https://biruni.tuik.gov.tr/medas/?kn=119&locale=tr

Table 4-45. Impact Significances, Proposed Mitigation Measures and Value of Residual Impacts – Resource and Waste

Potential Impact / Risk	Project Phases	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation)	Proposed Mitigation Measures	Residual Impact Significance
		Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Inadequate Management of Waste	Land Preparation and Construction	Local	Medium-term	Medium	Continuous	Medium	Medium	Moderate	• Training covering waste generation according to the waste management hierarchy (the prevention, reduction, reuse, recycling and finally disposal) will be provided for personnel to raise awareness. • Waste management activities will be conducted in compliance with the applicable waste management regulations. • Zero waste certificate will be obtained. • Regular on-site inspections of solid waste management will be performed. • The wastes will be segregated (i.e. hazardous/non-hazardous, recyclable/non-recyclable) and stored temporarily in designated storage areas. • The temporary waste storage areas will be constructed based on the requirements listed in the Waste Management Regulation and GIIP. • Hazardous and non-hazardous wastes will be stored separately, having different entrance doors. • Wastes will be stored separately according to the classification, labels indicating the type of waste will be placed for each type of waste. • There will be enough space for the licensed waste transport vehicles to receive the waste. • Reinforced concrete or similar impermeable materials will be used on the floors of storage areas to ensure soil, surface water and groundwater resources are protected from potential contamination. • The top and four sides of the storage area will be covered to prevent the entrance of precipitation into the area. • Adequate ventilation will be provided in case storage of volatile wastes is required. • Adequate drainage system will be provided to collect any leakages. • Absorbents, firefighting equipment, etc. will be kept ready on site for immediate response, in case of an emergency such as spills and fires. • Physical access restrictions will be applied at waste storage areas through use of gates, fences and locks; only authorized persons will be allowed in storage areas. • Cautionary signage and boards with name and contact number of authorized personnel will be provided at the storage areas. • There will not be any waste burning, disposing or burying activities under any circumstances. • The transportation of wastes will be ensured in appropriate frequencies so that the storage capacities are not exceeded. • Waste recycling/recovery/disposal agreements with the authorized municipality or licensed firm will be executed for the management of hazardous and non-hazardous wastes. • Official waste declarations for all waste generated will be submitted to the online system of MoEUCC. • Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken.	Minor
Additional load on existing waste management facilities		Local	Irreversible	Long-term	Continuous	Medium	Low	Minor	• The waste management hierarchy (the prevention, reduction, reuse, recycling and finally disposal) will be followed during the operational activities. • Waste recycling/recovery/disposal agreements with the authorized municipality or licensed firm will be executed for the management of hazardous and non-hazardous wastes.	Negligible
Inadequate Management of Waste	Operation	Local	Medium-term	Medium	Continuous	Medium	Medium	Moderate	• A project-specific Pollution Prevention and Waste Management Plan will be developed and implemented.	Minor

Potential Impact / Risk	Project Phases	Impact Magnitude					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation)	Proposed Mitigation Measures	Residual Impact Significance
		Extent	Reversibility	Duration	Frequency	Overall Magnitude				
									• Training covering waste generation according to the waste management hierarchy (the prevention, reduction, reuse, recycling and finally disposal) will be provided for personnel to raise awareness. • An Industrial Waste Management Plan will be prepared and submitted to the relevant Provincial Directorate of MoEUCC as per the format defined by the MoEUCC. • Regular on-site inspections of solid waste management will be performed. • Hazardous Materials and Hazardous Waste Compulsory Liability Insurance will be executed for the hazardous waste temporary storage area. • There will not be any waste burning, disposing or burying activities under any circumstances. • The transportation of wastes will be ensured in appropriate frequencies so that the storage capacities are not exceeded. • It will be ensured by trainings that wastes are not dumped at locations other than areas specifically designated for this purpose. • Waste recycling/recovery/disposal agreements with the authorized municipality or licensed firm will be executed for the management of hazardous and non-hazardous wastes. • Official waste declarations for all waste generated will be submitted to the online system of MoEUCC. • Grievance Mechanism of the project will be in place. In case of any grievance, urgent corrective and preventive action(s) will be taken.	
Additional load on existing waste management facilities		Local	Irreversible	Long-term	Continuous	Medium	Low	Minor	• A project-specific Waste Management Plan will be developed and implemented. • Training covering waste generation according to the waste management hierarchy (the prevention, reduction, reuse, recycling and finally disposal) will be provided for personnel to raise awareness. • An Industrial Waste Management Plan will be prepared and submitted to the relevant Provincial Directorate of MoEUCC as per the format defined by the MoEUCC. • Regular on-site inspections of solid waste management will be performed. • Hazardous Materials and Hazardous Waste Compulsory Liability Insurance will be executed for the hazardous waste temporary storage area. • There will not be any waste burning, disposing or burying activities under any circumstances. • The transportation of wastes will be ensured in appropriate frequencies so that the storage capacities are not exceeded. • It will be ensured by trainings that wastes are not dumped at locations other than areas specifically designated for this purpose. • Waste recycling/recovery/disposal agreements with the authorized municipality or licensed firm will be executed for the management of hazardous and non-hazardous wastes. • Official waste declarations for all waste generated will be submitted to the online system of MoEUCC.	Negligible

4.7 Biological Environment

The topics covered under the biological environment are the habitat classification, terrestrial flora and fauna, invasive alien species, nationally protected areas and internationally recognized areas, and critical habitat assessment. The biological environment has to be healthy in order to sustain ecological balance, ecosystem services, and the resilience of natural systems. In this context, key species—both threatened and non-threatened—as well as significant ecosystems that the project may impact are recognized. The evaluation considers both direct and indirect impacts on biodiversity, such as habitat loss, fragmentation, and disruption of wildlife movement patterns. Protection measures and mitigation procedures are presented to minimize adverse effects and ensure that any project complies with environmental conservation requirements and sustainable development goals.

4.7.1 Methodology and Project Standards

The biodiversity methodology and project standards will be aligned with the International Finance Corporation (IFC) Performance Standards to safeguard ecosystems and support sustainable development objectives. The biodiversity impact assessment will focus on biodiversity values that are likely to be directly or indirectly affected by the Project, enabling the definition and implementation of relevant mitigation measures. The Project area is located within an agricultural landscape, and species recorded in the wider surroundings are not necessarily associated with the site itself.Therefore, the addressed mitigations per PS1 will be implemented to ensure the conservation of biodiversity.

In accordance with IFC Performance Standard 6 (PS6), the biodiversity assessment considered the ecological relevance of species recorded in the vicinity of the Project site. The identified species are predominantly observed in the surrounding landscape rather than within the Project footprint itself. As the area is characterized by intensive agricultural land use, it does not provide suitable breeding habitat for these species. Instead, the site may function as a temporary crossing corridor or occasional foraging ground for certain fauna. Given the modified nature of the habitat and its limited ecological functionality, the likelihood of significant adverse impacts on these species is considered low; however, mitigation measures will be applied to avoid and minimize any disturbance during Project implementation.

Data Collection

The baseline data for the biological environment of the project area and project AoI are gathered from previously published scientific work, literature information on habitats and species, previous biodiversity surveys, field surveys conducted in March 2025 and expert judgement. The ecological study was conducted with the following objectives:

- Using various standard techniques, assessing the status of major floral and fauna components of all terrestrial habitats (grassland, agro-ecosystem, and homestead plantation) present in the Project AoI;
- Data collection and compilation on the status of floral and fauna components and habitats;
- Provide quantitative data on various floral and fauna components.
- Identification and listing of floral and faunal species of conservation significant (CR, EN, VU and threatened and endemic species in accordance with the International Union of Conservation for Nature - IUCN RED List) in Project AoI; and

- Identification of conservation-sensitive areas (Protect Areas: National Parks, Nature Parks, Nature Reserves, Wildlife Development Area, Special Environmental Protection Area, Wetlands, Biosphere Reserves) in Project AoI.

Some of the general methodologies for field surveys can be listed as the following:

- For this Project, the selection of sampling and vantage points was based on the modified habitat types present within and around the Area of Influence (AoI), ensuring that all data collection, information, and related assessments are representative of site-specific conditionsSome of the flora and fauna species were recorded through direct observations.

Subsequent to the field surveys for assessing the biodiversity of flora (herbs) and fauna (amphibians, reptiles, birds, and mammals) as well as the surrounding ecosystems.

Area of Influence (AoI) for Biological Environment

A 100 m radial zone around the Project area was considered to establish a representative baseline of the biological environment, as this distance captures the immediate area where potential direct impacts are most likely to occur. The extent was determined based on expert opinion, taking into account the Project's footprint, the surrounding habitat characteristics, and the limited ecological connectivity within the predominantly agricultural landscape (see Figure 4-20).

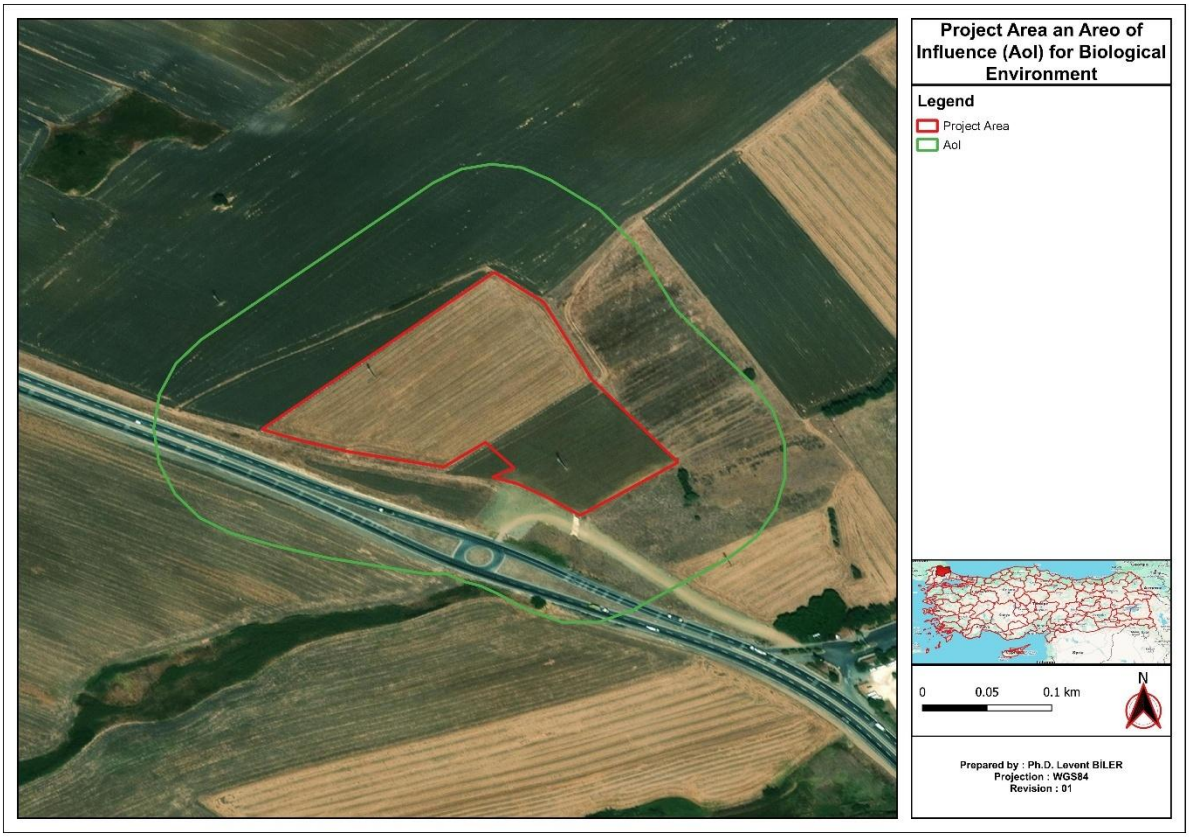

Figure 4-20.Project Area and Area of Influence (AoI) for Biological Environment

Project Standards

National Legislation

Environmental Law No. 2872 aims at the protection of the natural environment in line with the sustainable development principles. Its framework was extended with Law 5491 entering into force on April 26, 2006, amending the Environmental Law, to cover fundamental principles of biodiversity conservation. Article 6 of the Law states the importance of protecting biodiversity, and introduces penal sanctions against damage to the environment, including the destruction of biological diversity, when detected through inspection and audits.

The laws and regulations for conservation of habitats and species in Türkiye as the following:

- Law on National Parks
- Forestry Law
- Law for the Protection of Cultural and Natural Assets
- Terrestrial Hunting Law
- Law on Fisheries
- Law for the Protection of Animals
- Pasture Law
- Regulations on Identification, Registration and Approval of Protected Areas
- Regulation on Conservation of Wetlands
- Regulation for Implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora
- Regulation on Fisheries
- Regulation on Protection of Wildlife and Wildlife Development Areas

Strategies, programs, and action plans to implement statutory biodiversity conservation principles, which have been set forth by the related law and regulations, can be found within the scope of the following official documents prepared at the national scale:

- National Environmental Action Plan (1998)
- National Plan for In-Situ Conservation of Plant Genetic Diversity (1998)
- National Agenda 21 Programme (2001)
- National Wetland Strategy (2003)
- Turkish National Forestry Programme (2004)
- National Science and Technology Policies 2003-2023 Strategy Document (2004)
- Turkish National Action Programme Against Desertification (2005)
- National Environmental Strategy (2006)
- National Rural Development Strategy (2006)
- National Biological Diversity Strategy and Action Plan (2007)

The National Biological Diversity Strategy and Action Plan, whose most recent update was completed in 2007, is a response to the obligation to prepare a national strategy for guiding the implementation of the Convention on Biological Diversity (CBD). The aim of this Strategy is to identify and assess Türkiye's biological diversity in brief, to determine a generally agreed strategy for conservation and to propose the actions required for achieving the goals of Biodiversity Conservation in Türkiye. The Strategy defines the current legal responsibilities concerning biological diversity, underlines the importance of international cooperation intended for policymaking and the importance of the necessary research conditions to develop ecosystem management, and includes a definition and assessment of Türkiye's biological diversity and the strategies and priority action plans towards the goals.

National Guidelines on Protected Areas and Conservation of Biodiversity

There are three important sources in the Turkish biodiversity literature that provide guidance on determining a site's status, especially when it is not a conservation area officially designated

and protected by law but is significant to be considered as a protected area. In “122 Important Plant Areas of Türkiye”, there are defined important plant areas (IPAs) from different regions of Türkiye, based on internationally recognized criteria and locally collected data[24]. Each IPA is explained in terms of its general characteristics, detailed flora species’ composition, threats it faces and related conservation efforts if there are any.

Important Bird Areas (IBA) of Türkiye has also been studied since 1990, through successive projects, which today are conducted by WWF-Türkiye. An inventory that defines 97 IBAs, also in accordance with international selection criteria that had previously been developed by BirdLife International[25], was published in 1997 and is updated on regular basis as conservation studies continue across the country.

Doga Dernegi, partner of BirdLife International in Türkiye, has been working towards sustaining biodiversity since 2002 across the country, through a number of projects covering a wide array of ecosystems, habitats, species, and protected areas. Doga Dernegi initiated a comprehensive study on Key Biodiversity Areas (KBAs) in Türkiye analyzing 472 sites from different regions and published an inventory 2006, which defines each site in terms of its outstanding characteristics and provides a detailed list of species and their global and regional threat statuses[26].

Plant specimens collected during field surveys were identified using the “Flora of Türkiye and East Aegean Islands”[27], while Turkish names of the identified species were compiled using the “Turkish Plant Names” by Prof. Dr. Turhan Baytop[28]. Assessments on threat statuses of flora species were based on the Red Data Book of Turkish Plants[29], which was prepared in accordance with the IUCN Red List criteria of 1994 and updated based on Red List criteria.

Unlike the Red Data Book of Turkish Plants that provides a list for national threat statuses of flora species, on which a consensus has been reached among the scientific community in Türkiye, there are no widely accepted threat lists established for fauna species. Since information on fauna species is limited in guidelines provided in this section, it is important to rely on expert judgment in terms of populations, distribution and general ecology of identified fauna species, and their assessments in line with PS6.

International Standards and Guides

IFC Performance Standard 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources

International Finance Corporation's Performance Standard 6 (IFC PS6) is a key framework designed to guide private sector investments in managing environmental risks and impacts, particularly concerning biodiversity conservation and the sustainable management of living natural resources. The standard aims to promote the protection of biodiversity, the sustainable use of natural resources, and the maintenance of ecosystem services essential to human well-

[24] Ozhatay, N., Byfield, A.& Atay, S. (2005). Important Plant Areas in Türkiye: 122 Key Turkish Botanical Sites. Istanbul : WWF Türkiye.

[25] Magnin, G. & Yarar, M. (1997). Important Bird Areas in Türkiye. İstanbul: Dogal Hayati Koruma Dernegi.

[26] Eken, G., Bozdogan, M., Isfendiyaroglu, S., Kılıç, D.T.& Lise, Y. 2006. Turkiye'nin Onemli Doga Alanlari. Ankara: Doğa Derneği.

[27] Davis, P.H. (ed.). (1965-1988). Flora of Türkiye and the East Aegean Islands, vol. 1-10, Edinburgh: Edinburgh Univ. Press.

[28] Baytop, T. (1994). Türkçe Bitki Adları Sözlüğü. Ankara: Atatürk Kültür, Dil ve Tarih Yüksek Kurumu, Türk Dil Kurumu Yayınları.

[29] Ekim, T., Koyuncu, M., Vural, M., Duman, H., Aytac, Z. & Adiguzel, N. (2000). Red Data Book of Turkish Plants (Pterdophyta and Spermatophyta). Van : Turkiye Tabiatini Koruma Dernegi.

being. It is widely applied in development projects to ensure that business activities do not result in significant adverse impacts on natural habitats, endangered species, or ecosystem services.

PS6 requires project developers to identify and assess risks and impacts on biodiversity and ecosystem services throughout the project lifecycle. This involves categorizing habitats into three types: modified, natural, and critical habitats. Each category demands different levels of assessment and mitigation measures. For example, critical habitats, which are areas of high biodiversity value, require stringent protection measures, including no net loss of biodiversity and, in some cases, a net gain. To achieve these objectives, PS6 emphasizes the implementation of the mitigation hierarchy, which involves avoiding, minimizing, restoring, and offsetting negative impacts.

Additionally, PS6 encourages the sustainable management of living natural resources, such as agriculture, forestry, and fisheries, to ensure that the exploitation of these resources does not threaten biodiversity or ecosystem services. This includes the use of credible certification systems to verify sustainable practices. By adhering to PS6, companies not only mitigate environmental risks but also enhance their social license to operate, contributing to sustainable development and improved environmental governance.

The main objectives set out in PS6 are as following:

- **Biodiversity Conservation**: PS6 aims to protect and conserve biodiversity by preventing significant adverse impacts on natural and critical habitats. It seeks to ensure that development projects avoid harm to endangered species and maintain ecological integrity.
- **Sustainable Management of Living Natural Resources**: The standard promotes the sustainable use of living natural resources, including agriculture, forestry, and fisheries. It encourages practices that ensure long-term sustainability and productivity while minimizing negative environmental impacts.
- **Maintenance of Ecosystem Services**: PS6 emphasizes the importance of maintaining ecosystem services that support human well-being, such as clean water, food security, and climate regulation. It requires the assessment and management of impacts on these services to avoid disrupting communities that depend on them.
- **Mitigation of Environmental Risks and Impacts**: The standard outlines a mitigation hierarchy—avoid, minimize, restore, and offset—to systematically manage environmental risks and impacts. This approach ensures that adverse effects on biodiversity and ecosystem services are effectively addressed.
- **Promotion of Stakeholder Engagement and Sustainable Development**: PS6 encourages meaningful stakeholder engagement, including consultation with affected communities and indigenous peoples. It also supports sustainable development by integrating environmental and social considerations into business operations.

Where identified, risks and impacts on biodiversity or habitats are required to be managed by the Borrower in accordance with the mitigation hierarchy. The Borrower is required to ensure that competent biodiversity expertise is utilized to conduct environmental and social assessment and the verification of the impactiveness and feasibility of mitigation measures and accordingly, the Borrower will develop and implement a project-specific Biodiversity Management Plan (BMP) to address such risks and impacts.

The European Union (EU) Legislation

The European Union (EU) environmental legislation, in the most general sense, is set forth to ensure protection of air and water quality, conservation of resources and protection of

biodiversity, waste management and control of activities which can have an adverse environmental impact, at both Member State level and internationally.

Although not an EU Member State, Türkiye has a set program for alignment with the EU Acquis, which comprises more than 200 major legal acts and a number of regulations have been adapted, also there are studies for Türkiye to achieve in the field of biodiversity and nature protection.

The Birds Directive (2009/147/EC)

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended) aims to protect about 500 wild bird species naturally occurring in the European Union. Under the pressure of habitat loss and fragmentation, intensive agriculture, forestry, fisheries, use of pesticides, and hunting, wild birds can only be protected through regulating human activities by cooperating across borders.

Habitat loss and degradation have been identified as the most serious threats to the conservation of wild birds. The Directive also places special emphasis on the protection of bird habitats for especially endangered and migratory species. Accordingly, Member States are required to designate Special Protection Areas (SPAs) for 194 particularly threatened species and all migratory bird species listed in Annex I of the Birds Directive.

SPAs are scientifically identified areas critical for the survival of the targeted species, such as wetlands. They are part of the Natura 2000 ecological network set up under the Habitats Directive 92/43/EEC. Wild birds across Europe are protected under the five annexes to the Birds Directive as explained in Table 4-46.

Table 4-46. Annexes to the Birds Directive

Annex	Description
I	194 species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species.
II	82 bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks.
III	Overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for 26 species listed here.
IV	The directive provides for the sustainable management of hunting but Member States must outlaw all forms of non-selective and large scale killing of birds, especially the methods listed in this annex.
V	The directive promotes research to underpin the protection, management and use of all species of birds covered by the Directive, which are listed in this annex.

The Habitats Directive (92/43/EEC)

The Habitats Directive 92/43/EEC was adapted in 1992 with the objective to ensure conservation of a wide range of rare, threatened or endemic animal and plant species. Rare and characteristic habitat types are also targeted for conservation. The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all, the directive protects over 1,000 animal and plant species and over 200 so-called "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

Annexes I and III to the Directive contain the types of habitats and species whose conservation requires the designation of special areas of conservation. While annexes II, IV and V list over a thousand animal and plant species that are protected in various ways. Description of annexes to the Habitats Directive is provided in Table 4-47.

Table 4-47. Annexes to the Habitats Directive

Annex	Description
I	Natural habitat types of community interest whose conservation requires the designation of special areas of conservation

Annex	Description
II	(about 900) Core areas of their habitat are designated as sites of Community importance (SCIs) and included in the Natura 2000 network. These sites must be managed in accordance with the ecological needs of the species.
III	Criteria for selecting sites eligible for identification of sites of community importance and designation as special areas of conservation.
IV	(about 400, incl. Annex II species) strict protection regime must be applied across their entire natural range within the EU, both within and outside Natura 2000 sites.
V	(over 90) Member States must ensure that their exploitation and taking in the wild is compatible with maintaining them in a favourable conservation status.

International Conventions and Protocols

Türkiye is party to several conventions on different aspects of biological diversity, which are listed below:

- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1994)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1996)
- Convention for the Conservation of European Wildlife and Natural Habitats (BERN) (1984)

Convention on International Trade in Endangered Species of Wild Flora and Fauna

Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) is an international agreement that has been ratified by governments of 164 states (including Türkiye) and entered into force in 1975. Appendices to the Convention aim to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The principles of CITES are based on sustainability of trade in order to safeguard ecological resources (live animals and plants, vast array of wildlife products derived from them, including food products, exotic leather goods, etc.). Türkiye ratified the Convention in 1996. Categories and species included in CITES are listed in three different appendices based on their protection statuses. These appendices and their explanations are given in Table 4-48.

Table 4-48. Appendices to the CITES

Appendix	Description
I	Species that are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial.
II	Species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled.
III	List of species included at the request of party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation.

IUCN Red List of Threatened Species

The International Union for Conservation of Nature (IUCN) Species Programme, together with the IUCN Species Survival Commission (SSC) has been providing assessments on conservation statuses of a whole range of taxa, including species, subspecies, varieties and even subpopulations of certain species around the globe, in order to draw attention to especially those that are threatened with extinction.

Using the IUCN Red List Categories and Criteria, the IUCN Red List of Threatened Species provides information on species' taxonomy, conservation status and distribution, which have been evaluated globally. The main purpose of the system that the IUCN puts forth is to "catalogue and highlight those plants and animals that are facing a higher risk of global extinction (i.e. those listed as Critically Endangered, Endangered and Vulnerable)". The schematic diagram presenting the structure of the Red List categories is provided in Figure 4-21.

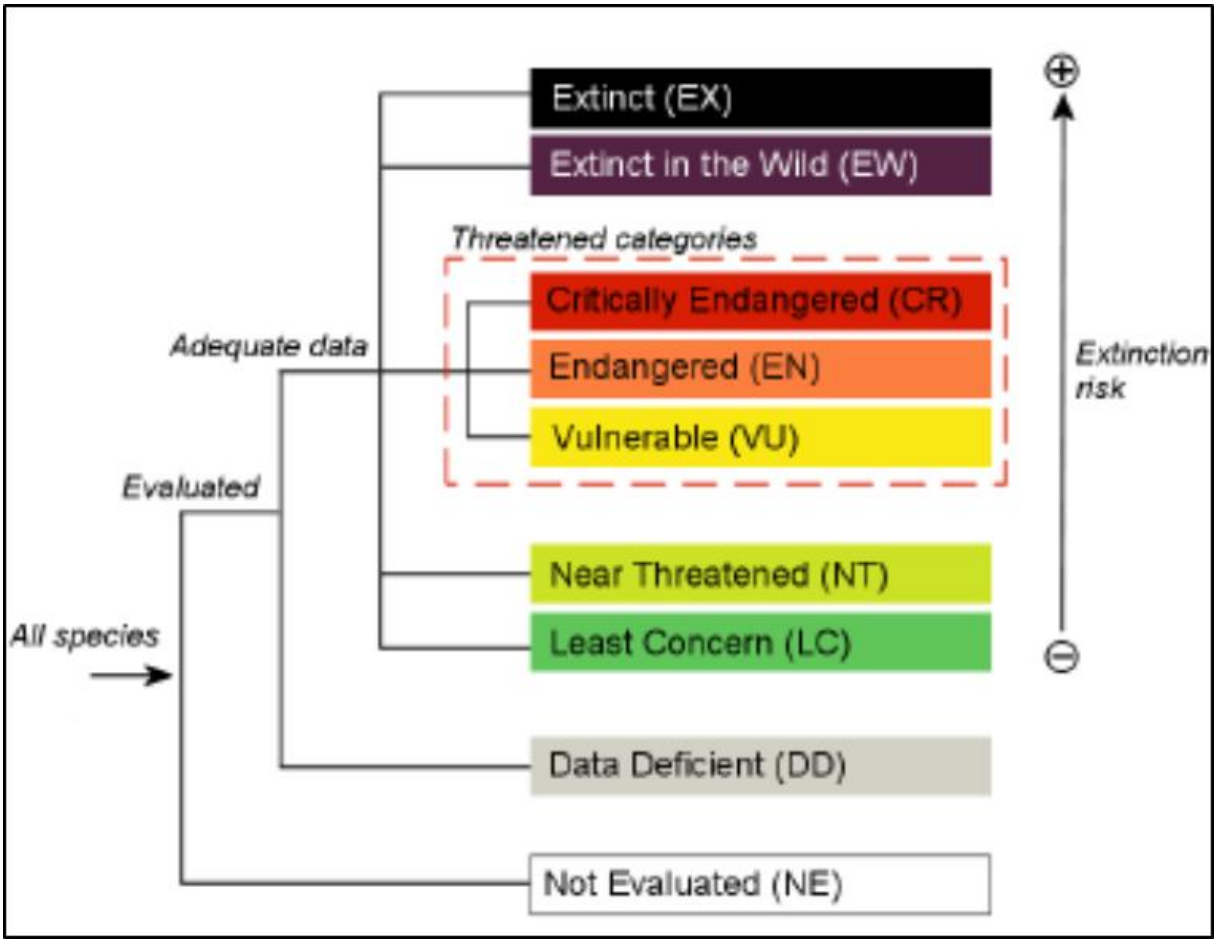

Figure 4-21. Structure of the IUCN Red List Categories

4.7.1.1.1 Legally Protected and Internationally Recognized Areas of High Biodiversity Value

The World Association for Protection of Nature (IUCN), one of the most effective institutions globally on the concept of protected areas, has developed a global definition that has been agreed upon to eliminate confusion.

According to the definition of IUCN for the year 1994: The protected areas are terrestrial and/or marine areas, which serve to ensure the continuity and protection of biological diversity, natural and related cultural resources, and are managed by legal or other effective means.

According to the updated definition of IUCN for the year 2008: Protected areas are the areas that are clearly defined, devoted, and managed by legal or other effective methods, with clearly

defined geographical boundaries for the long-term protection of nature and associated ecosystem services and cultural values.

Türkiye has a rich biological diversity as well as historical, and social aspects since it is a bridge and junction point of the Earth with three of 37 different plant geographical regions (Europe-Siberian, Mediterranean and Iran-Turan). Besides, three of the 34 rich biodiversity hotspots in urgent need to be taken under protection in the world (the Caucasus, the Mediterranean, Irano-Anatolian) are in Türkiye. With this feature, Türkiye, along with China and South Africa, is one of the three hotspots within the three countries' borders and is one of the most important countries in terms of biodiversity and endemic species in their generation.

The biodiversity values hosted by Türkiye are under protection with different conservation area statuses and different laws. Some of these protection statuses were created according to national legislation and some based on international conventions.

The number of protected areas in Türkiye is 1.724 and the size of the protected area is 3.739.459 ha according to the Ministry of Agriculture and Forestry, General Directorate of Nature Conservation National Parks, 2023 bulletin.

There are two different types of protected areas identified: Legally Protected Areas and Internationally Recognized Areas. Legally Protected Areas as defined by PS6 are those that meet the IUCN definition for a protected area, while Internationally Recognized Areas are those that are exclusively defined as UNESCO World Heritage Sites, UNESCO Man and Biosphere Reserves, Key Biodiversity Areas, AZE Areas, and wetlands designated under the Ramsar Convention. When a project is located within a legally protected or internationally recognized area, IFC PS6 sets requirements in addition to those that are related to critical habitat. Accordingly, it is required to;

- demonstrate that the proposed development in such areas is legally permitted
- act in a manner consistent with any government recognized management plans for areas

- consult protected area sponsors and managers, affected communities, indigenous peoples and other stakeholders on the proposed project, as appropriate; and
- implement additional programs to promote and enhance conservation aims and impactive management of the area.

In line with this approach, areas that have been designated a status under the Turkish protected area system, as well as areas designated as Key Biodiversity Areas (KBAs), Important Bird (IBAs) and Important Plan Areas (IPAs) were screened for the purpose of this ESIA.

4.7.1.1.2 Legally Protected Areas

The International Union for Conservation of Nature (IUCN) proposes the following definition for a protected area[30], which today is widely used around the globe, and recognized as the definition of legally protected areas by PS6:

> *"A protected area is a clearly defined geographical space, recognized, dedicated and managed, through legal or other impactive means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."*

[30] IUCN. 2017. Protected Areas: IUCN Global Protected Areas Programme and IUCN World Commission on Protected Areas Delivering the Promise of Sydney. Access link: https://www.iucn.org/theme/protected-areas

Legally protected areas are an essential component of biodiversity conservation efforts, as are the ecosystem services provided by the ecological functions they provide. In Türkiye, the Ministry of Agriculture and Forestry is the primary official body in charge of developing and implementing national biodiversity conservation policies, action plans, conservation area designation, and a variety of other related tasks carried out by central and local directorates within the Ministry's organizational structure. IUCN Protected Area Management Categories[31] were adopted to restructure the Turkish Protected Area System in 2006 through the Biodiversity and Natural Resource Management Project undertaken by the Ministry's General Directorate of Nature Conservation and National Parks [32]. The IUCN Protected Area Management Categories provide a global framework and are recognized by the Convention on Biological Diversity, with the initial goal of fostering a shared understanding of protected areas within and between countries. Categorization is done in accordance with the primary management objectives for a protected area, which are based on the following principles:

- assignment to a category is a not a commentary on management impactiveness,
- the categories systems is international; national names for protected areas may differ, and
- all categories are important; and gradation of human intervention is implied.

As a result, legally protected areas in Türkiye have been re-classified under the six protected area management categories defined by the IUCN Guidelines, which identify the following as the primary reasons for management:

I. Strict protection [Ia) Strict nature reserve and Ib) Wilderness area]
II. Ecosystem conservation and protection (i.e., National Park)
III. Conservation of natural features (i.e., Natural monument)
IV. Conservation through active management (i.e., Habitat/species management area)
V. Landscape/seascape conservation and recreation (i.e., protected landscape (seascape)
VI. Sustainable use of natural resources (i.e., Managed resource-protected area)

Legally protected areas around the Project area and their IUCN protected area categories are given in Table 4-49 and a map showing the locations of the protected areas with respect to the Project area is presented in Figure 4-22.

Table 4-49. Legally Protected Areas

Protected Area	IUCN Protected Area Category	Distance to the Project Area (km)
İğneada Floodplain Forest National Park	II, IV, V	65.86
Kavaklımeşe Nature Park	II	40.27
Kasatura Bay Nature Reserve	Ib ,II	61.57

[31] Dudley, N., Shadie, P. & Stolton, S. 2013. Guidelines for Applying Protected Area Management Categories including IUCN WCPA Best Practice Guidance on Recognising Protected Areas and Assigning Management Categories and Governance Types. Switzerland: IUCN

[32] Thomas, L. 2006. Türkiye Korunan Alan Yönetiminde IUCN Kategori Sistemi. Ankara: Çevre ve Orman Bakanlığı Doğa Koruma ve Milli Parklar Genel Müdürlüğü.

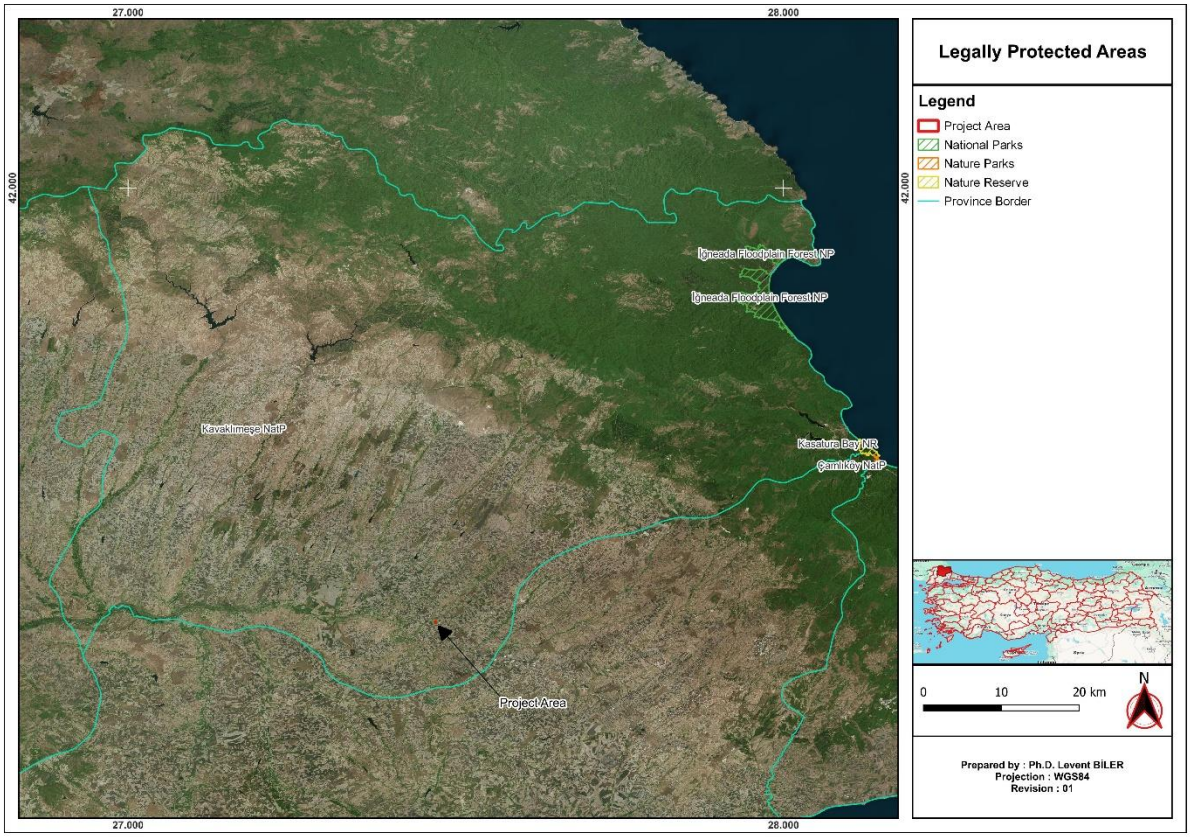

Figure 4-22. Legally Protected Areas

In conclusion, while the project is not near a protected area, also location within an industrial zone, coupled with robust environmental planning and safeguards, ensures that the protected area's ecological and conservation values are not compromised. Considering the distance between the Project area and the legally protected areas in the region, there will be no Project-related impacts on these areas.

4.7.1.1.3 Internationally Recognized Areas

Key Biodiversity Areas (KBAs) in Türkiye represent critical sites for the global persistence of biodiversity, identified based on internationally recognized criteria. According to IFC Performance Standard 6, KBAs often overlap with critical habitats, which are areas of high biodiversity value requiring special protection. These sites include habitats for endangered or endemic species, migratory species, unique ecosystems, or areas associated with significant evolutionary processes.

Türkiye's KBAs are integral to its rich biodiversity, encompassing diverse ecosystems such as wetlands, forests, steppe habitats, and marine environments. As per IFC standards, any development project near or within KBAs must ensure minimal adverse impacts by implementing measures such as avoidance, mitigation, or offsetting of biodiversity losses, ensuring the project's environmental sustainability while maintaining the integrity of these vital areas.

Key Biodiversity Areas (KBAs) are identified globally based on specific criteria, and in Türkiye, many regions have been designated as KBAs due to their ecological importance. These areas

often overlap with Important Bird Areas (IBAs), Important Plant Areas (IPAs), Important Nature Areas (INAs), Zero Extinction Areas (AZE), Cultural Heritage, and Ramsar Areas. The Internationally Recognized Areas within the project area are given in Figure 4-23. The distances to protected areas are shown in Table 4-50.

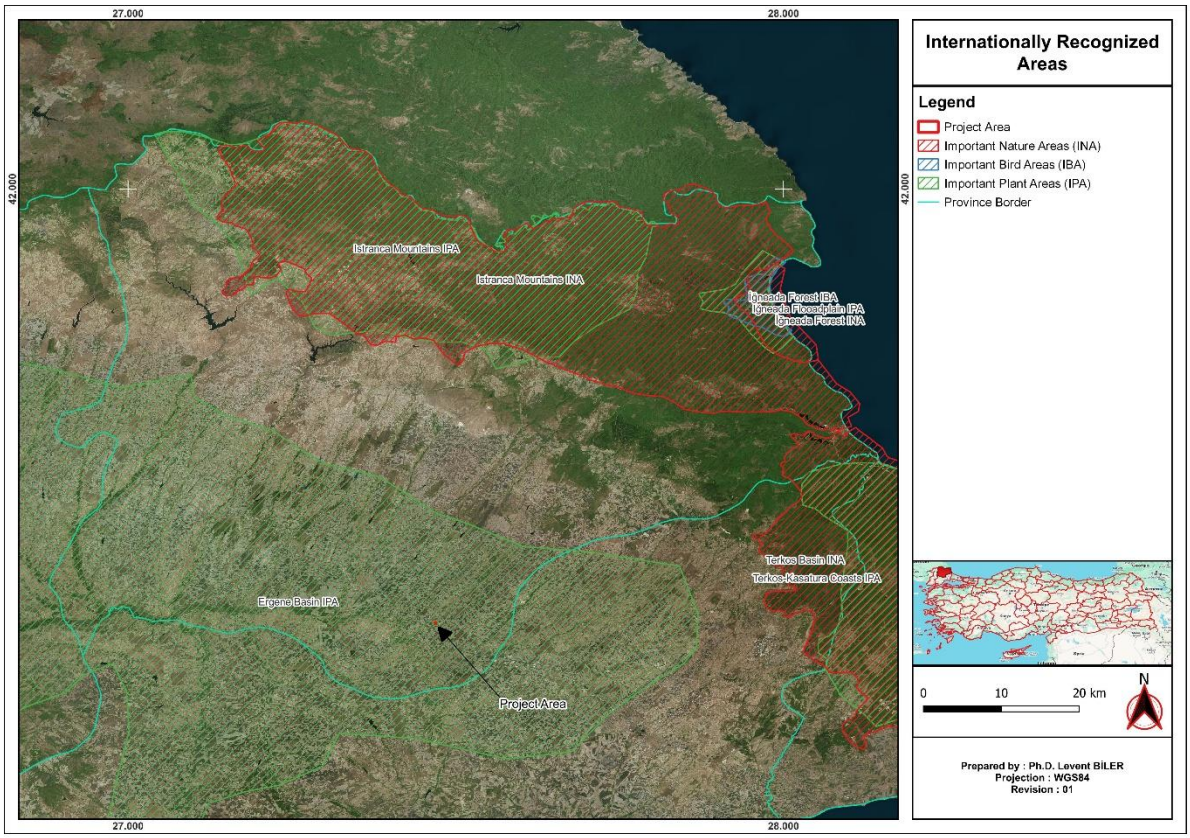

Figure 4-23. Internationally Recognized Areas and the Project Area

Table 4-50. Distance of the Project Area to Internationally Recognized Areas

Internationally Recognized Areas	Distance (km)
Istranca Mountains Important Nature Area	43.91
İğneada Forest Important Nature Area	63.73
Terkos Basin Important Nature Area	43.19
İğneada Forest Important Bird Area	64.29
Istranca Mountains Important Plant Area	43.86
İğneada Floodplain Important Plant Area	63.20
Ergene Basin Important Plant Area	Within the area

According to international conservation guidelines, the project area is located inside a Key Biodiversity Areas (KBAs), Eregen Basin Important Plant Area. KBAs are acknowledged for their worldwide significance in preserving distinctive ecosystems and endemic, congregatory, or endangered species. There is little chance of any negative effects on biodiversity because

the project site is located in an industrial area and does not have any notable natural features or habitats of high conservation importance.

Additionally, the absence of habitats meeting the criteria for KBA designation—such as critical habitats for threatened species or ecosystems of global significance—ensures that the project's activities will not negatively affect these protected areas. The presence of buffer zones around KBAs further reduces any potential risk of disturbance or pollution transfer. The project's location within a heavily altered, human-dominated environment reinforces its negligible impact on nearby ecological values.

4.7.1.2 Baseline Conditions

The Biodiversity Baseline section of the ESIA report provides a comprehensive assessment of the existing biological environment within and around the project area. It includes an evaluation of flora and fauna, key habitats, and ecological processes, ensuring alignment with national regulations and international standards, such as those outlined by the IFC Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources.

The Biodiversity Baseline serves as the foundation for assessing potential project impacts, developing mitigation measures, and ensuring the integration of biodiversity conservation into project planning and decision-making.

The Project area and AoI are located within farmland, which is located between organized industrial zones (see Figure 4-24) and does not trigger IFC PS6.

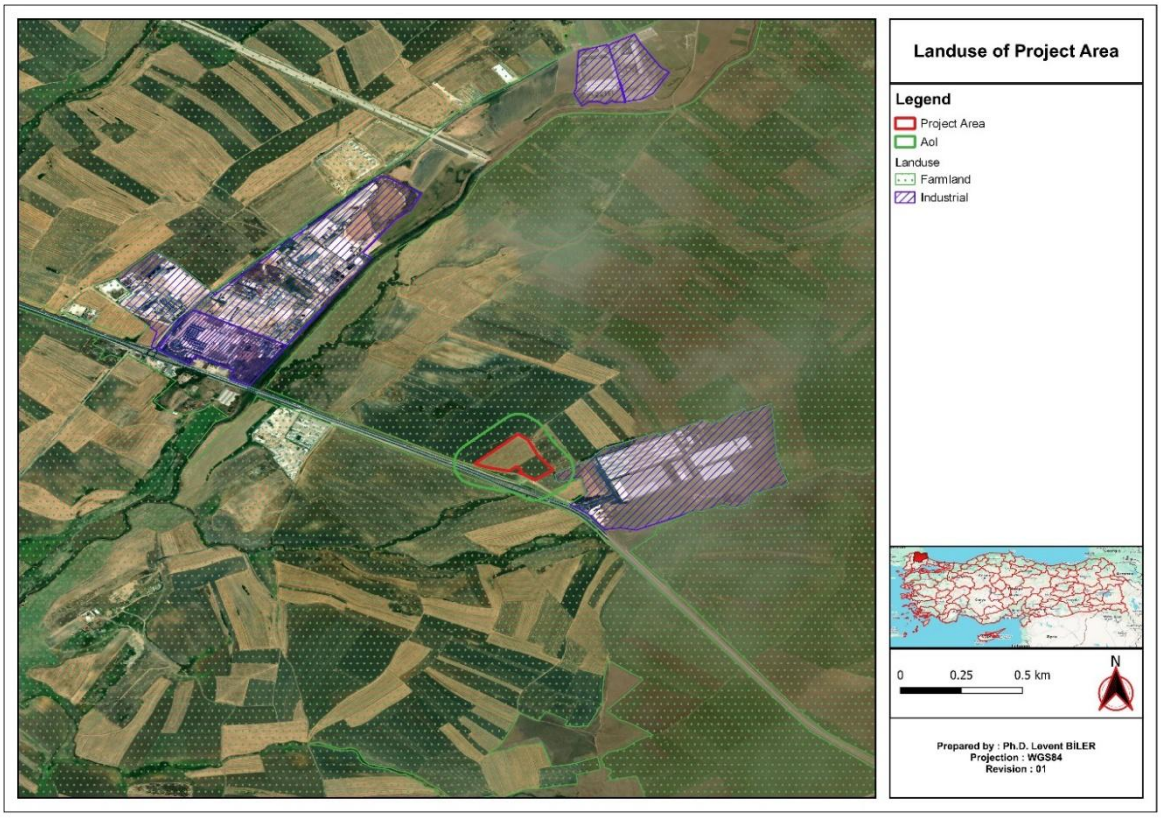

Figure 4-24. Project Area and surroundings landuse

4.7.1.3 Habitat Classification

The European Nature Information System (EUNIS) puts forward a system for identification and classification of European habitat types. Classification area is quite large including the entire European mainland and seas including islands that are close to the mainland (except for Cyprus, Iceland and Greenland), EU states' archipelagos (Canary Islands, Madeira Islands and Azore Islands) and the European mainland to the west of Ural Mountains that cover Türkiye and the Caucasus. The main objective of the EUNIS habitat classification is to create a European reference set of habitat types including a description of all types and hierarchical classification.

Habitats within the project AoI are evaluated in accordance with the EUNIS classification, which is useful in terms of not only relating the national classifications to international level, but in terms of corresponding EUNIS habitats to habitats listed in Annex I of Habitats Directive for "designation of special areas of conservation" and the European Red List of Habitats[33] for the critical habitat assessment.

The AoI includes only modified habitats like J4.2 - Road networks, V11 - Intensive unmixed crops, and V3 - Artificial grasslands and herb dominated habitats. The habitat map is given in Table 4-50.

Figure 4-25. EUNIS Habitat Map

[33] Janssen, J.A.M., J.S. Rodwell, M. García Criado, S. Gubbay, T. Haynes, A. Nieto, N. Sanders, F. Landucci, J. Loidi, A. Ssymank. 2016. European Red List of Habitats Part 2. Terrestrial and freshwater habitats. Luxembourg: Publications Office of the European Union. Access link: https://ec.europa.eu/environment/nature/knowledge/redlist_en.htm

4.7.1.4 Terrestrial Flora

To identify the flora composition of Project AoI, first sampling points representing the habitat type in the area were determined. For assessment of Project-related impacts, field surveys were conducted at different locations in the Project area. At each of the sampling locations, flora species were identified based on related findings and observations.

The only habitat in the Project area is modified habitat: V11 - Intensive unmixed crops.

The distribution and detailed information about flora components are shown below. The classification of species, their conservation and endemism statuses are indicated on the tables along with their sensitivities.

As a result of the research studies, a total of 6 taxa were identified. 1 species is listed “LC” according to the IUCN, while 5 were not evaluated. None of the species were under threat and are widespread. Their systematics information and conservation statuses are given in Table 4-51.

Table 4-51. Plants in the Project Area

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Relative Abundance	Lit./Obs.*
Asteraceae	*Cichorium intybus*	Hindiba	Common Chicory	-	LC	-	-	3	Obs.+Lit.
Geraniaceae	*Erodium cicutarium*	İğnelik	Common Stork's Bill	-	NE	-	-	2	Obs.+Lit.
Plantaginaceae	*Veronica persica*	Cırcamuk	Birdeye Speedwell	-	NE	-	-		Lit.
Poaceae	*Triticum aestivum*	Ekmeklik Buğday	Bread Wheat	-	NE	-	-	3	Obs.+Lit.
Poaceae	*Triticum durum*	Makarnalık Buğday	Pasta Wheat	-	NE	-	-		Lit.
Ranunculaceae	*Ranunculus ficaria*	Arpacıksalebi	Fig Buttercup	-	NE	-	-	2	Obs.+Lit.

IUCN:
LC: Least Concern
NE: Not Evaluated
Relative Abundance:
1: Very Rare
2: Rare
3: Medium intensity
4: Intensive
5: Very abundant

*** Obs.: Observation, Lit.: Literature**

4.7.1.5 Mammals

Direct and indirect observation techniques were used to detect mammals. Species were determined by collecting fragments such as footprints and feces. A 1/25.000 scale topographic map of the region, satellite images, Magellan handheld GPS, Nikon D7200 DSLR Camera, Sigma 18-50 mm lens, Sigma 55-300 mm lens, Nikon 8x40 binoculars, telescope, notepad, and other auxiliary materials were used during the above-mentioned studies. While creating the mammals list, species in the natural habitats in the surrounding area were also listed.

Within the scope of the Project, research regarding fauna species was carried out. According to the results 5 mammal species were listed. None of the listed species were endemic. All the species were listed “LC” according to the IUCN. 2 species are listed in Annex II of the Central Hunting Commission Decisions (MAKK 2024-2025). Detailed information about the mammalian species identified on the Project is given in Table 4-52. Since the work to be carried out in the project is in agricultural usage, there will not be any effect on fauna species.

Table 4-52. Mammal Species Identified at the Project AoI

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	MAKK*	Relative Abundance	Lit./Obs.
Canidae	*Vulpes vulpes*	Kızıl Tilki	Red Fox	-	LC	-	-	Ann-II	2	Obs.+Lit.
Erinaceidae	*Erinaceus roumanicus*	Balkan Kirpisi	Northern White-Breasted Hedgehog	-	LC	-	-	-		Lit.
Muridae	*Mus macedonicus*	Sarı Evfaresi	Macedonian Mouse	-	LC	-	-	-		Lit.
Muridae	*Rattus rattus*	Sıçan	Black Rat	-	LC	-	-	-		Lit.
Suidae	*Sus scrofa*	Yabandomuzu	Wild Boar	-	LC	-	-	Ann-II	2	Obs.+Lit.

IUCN:

LC: Least Concern

Relative Abundance:

1: Very Rare

2: Rare

3: Medium intensity

4: Intensive

5: Very abundant

**** MAKK: Central Hunting Commission Decisions***

**** Obs.: Observation, Lit.: Literature**

4.7.1.6 Birds

During the field surveys, line transect, and point transect methods were used. All heard and seen species and their numbers were recorded and identified at species level. It was evaluated which part of the area the birds use and how they use it. The birds in the Annex-I of the Birds Directive 2009/147/EC and their IUCN global and Mediterranean status were listed.

Within the scope of the Project, according to the literature and observations, 25 bird species belonging to 15 families were identified in the area and its surroundings (see Table 4-53).

There is no endemic species among the birds detected in the project area. According to the IUCN, 24 species were listed as “LC (Least Concern)”, and 1 species “NE (Not Evaluated)”. According to the Bern Convention, 14 species are in Annex-II and 8 species are in Annex-III. According to the CITES Convention, four species are listed in Annex II. Six species are listed in Annex I, and three species are listed in Annex II of the Central Hunting Commission Decisions (MAKK 2024-2025).

Table 4-53. Bird Species Identified at the Project AoI

Aile	Bilimsel Adı	Türkçe Adı	Common Name	Endemizm	IUCN	CITES	BERN	MAKK*	RDB	Bird Directive	Relative Abundance	Lit./Obs**.
Accipitridae	*Accipiter nisus*	Atmaca	Eurasian Sparrowhawk	-	LC	II	Ann-III	-	A.3	-		Lit.
Accipitridae	*Buteo buteo*	Şahin	Eurasian Buzzard	-	LC	II	Ann-III	-	A.3	-	1	Obs.
Alaudidae	*Alauda arvensis*	Tarlakuşu	Eurasian Skylark	-	LC	-	Ann-III	Ann-I	A.4	Ann-II	2	Obs.
Alaudidae	*Calandrella brachydactyla*	Bozkır Toygarı	Greater Short-Toed Lark	-	LC	-	Ann-II	-	A.3	Ann-I		Lit.
Alaudidae	*Galerida cristata*	Tepeli Toygar	Crested Lark	-	LC	-	Ann-III	Ann-I	A.3	-	3	Obs.
Apodidae	*Apus apus*	Ebabil	Common Swift	-	LC	-	Ann-III	-	A.3.1	-	4	Obs.
Ciconiidae	*Ciconia ciconia*	Leylek	White Stork	-	LC	-	Ann-II	-	A.3.1	Ann-I		Lit.
Columbidae	*Columba livia*	Kaya Güvercini	Rock Dove	-	LC	-	Ann-III	Ann-II	A.5	Ann-II	3	Obs.
Corvidae	*Corvus cornix*	Leş Kargası	Hooded Crow	-	NE	-	Ann-III	-	A.5	-		Lit.
Corvidae	*Corvus frugilegus*	Ekin Kargası	Rook	-	LC	-	-	Ann-II	A.5	Ann-II	3	Obs.
Corvidae	*Pica pica*	Saksağan	Eurasian Magpie	-	LC	-	-	Ann-II	A.5	Ann-II	2	Obs.
Emberizidae	*Emberiza calandra*	Tarla Çintesi	Corn Bunting	-	LC	-	Ann-III	Ann-I	A.4	-	3	Obs.
Falconidae	*Falco tinnunculus*	Kerkenez	Common Kestrel	-	LC	II	Ann-II	-	A.2	-		Lit.
Falconidae	*Falco naumanni*	Küçük Kerkenez	Lesser Kestrel	-	LC	II	Ann-II	-	A.2	Ann-I		Lit.
Hirundinidae	*Delichon urbicum*	Ev Kırlangıcı	Northern House Martin	-	LC	-	Ann-II	-	A.3	-	2	Obs.
Hirundinidae	*Hirundo rustica*	Kır Kırlangıcı	Barn Swallow	-	LC	-	Ann-II	-	A.5	-	3	Obs.
Laniidae	*Lanius collurio*	Kızılsırtlı Örümcekkuşu	Red-Backed Shrike	-	LC	-	Ann-II	Ann-I	A.3	Ann-I		Lit.
Laniidae	*Lanius minor*	Karaalınlı Örümcekkuşu	Lesser Grey Shrike	-	LC	-	Ann-II	-	A.3	Ann-I		Lit.
Motacillidae	*Anthus campestris*	Kır İncirkuşu	Tawny Pipit	-	LC	-	Ann-II	-	A.2	Ann-I		Lit.
Muscicapidae	*Ficedula parva*	Küçük Sinekkapan	Red-Breasted Flycatcher	-	LC	-	Ann-II	-	A.2	Ann-I		Lit.
Muscicapidae	*Oenanthe oenanthe*	Kuyrukkakan	Northern Wheatear	-	LC	-	Ann-II	Ann-I	A.3	-	2	Obs.
Muscicapidae	*Saxicola rubetra*	Çayır Taşkuşu	Whinchat	-	LC	-	Ann-II	-	A.3	-		Lit.
Paridae	*Parus major*	Büyük Baştankara	Great Tit	-	LC	-	Ann-II	-	A.3.1	-	2	Obs.
Sturnidae	*Sturnus vulgaris*	Sığırcık	Common Starling	-	LC	-	-	Ann-I	A.5	Ann-II		Lit.
Upupidae	*Upupa epops*	İbibik	Common Hoopoe	-	LC	-	Ann-II	-	A.2	-		Lit.

IUCN:

LC: Least Concern

NE: Not Evaluated

Relative Abundance:

1: Very Rare

2: Rare

3: Medium intensity

4: Intensive

5: Very abundant

MAKK: Central Hunting Commission Decisions

**** Obs.: Observation, Lit.: Literature**

4.7.1.7 Amphibians and Reptiles

The detection of amphibians and reptiles in the project area and its surroundings (influence area) is based on long-term and detailed field observations, a detailed literature study, the ecological structure of the region, and a herpetofauna survey of the people living in the region.

Field surveys started with daylight in the morning and continued until dusk for nocturnal species. In order to detect frogs and reptiles, stone and rock bottoms and rock crevices were checked during the fieldwork carried out in and around the project area.

Field studies were conducted to identify and observe habitats suitable for the life of frogs and reptiles. The "Visual Contact Research Technique, GTAT (Visual Encounter Survey, VES) was used to detect the presence of frog and reptile species during the observations". In field survey, after identifying and photographing the species caught by hand, they were released back into the wild to avoid disrupting the ecological balance.

During the detection of frogs and reptiles, species were tried to be determined by direct observation as well as indirect observation. During the above-mentioned studies, auxiliary materials such as tonk (snake catching tongs), protective leather gloves, notepads, satellite images, digital cameras with telephoto lenses were used.

The list of frogs and reptiles, which was created by combining field surveys and literature research, is given in Table 4-54. In the relevant table, information about the family, taxon name, Turkish name, Common name, endemism status, IUCN danger category, whether it is included in the supplementary lists of Bern and CITES Conventions, relative abundance, and detection method are given.

As a result of the surveys, 12 species were identified. There are no endemic species among the amphibians and reptiles identified in the project area and its surroundings. According to the IUCN, one species is “VU (Vulnerable)”, one species is “NT (Near Threatened)”, nine species are in the “LC (Least Concern)” and one species is “NE (Not Evaluated) categorized. According to the Bern Convention, eight species are in the Appendix-II list and four species are in the Appendix-III list. According to the CITES Convention, 2 species (*Testudo graeca* and *Testudo hermanni*) are listed in Annex II. The remaining 10 species are not included in the lists of the CITES Convention.

Table 4-54. Amphibian and Reptile Species Identified at the Project AoI

Family	Species	Turkish Name	Common Name	Endemism	IUCN	CITES	BERN	Relative Abundance	Lit./Obs.*
Bufonidae	*Bufo bufo*	Siğilli Kurbağa	Common Toad	-	LC	-	Ann-III		Lit.
Bufonidae	*Bufotes viridis*	Gece Kurbağası	Green Toad	-	LC	-	Ann-II		Lit.
Ranidae	*Pelophylax ridibundus*	Ova Kurbağası, Bataklık Kurbağası	Euroasian Marsh Frog, Marsh Frog	-	LC	-	Ann-III		Lit.
Lacertidae	*Lacerta viridis*	Yeşil Kertenkele, Zümrüt Kertenkele	Green Lizard	-	LC	-	Ann-II	3	Obs.+Lit.
Lacertidae	*Lacerta trilineata*	İri Yeşil Kertenkele, Yılan Ebesi	Balkan Green Lizard	-	LC	-	Ann-II	3	Obs.+Lit.
Lacertidae	*Podarcis muralis*	Duvar Kertenkelesi	Common Wall Lizard	-	LC	-	Ann-II		Lit.
Lacertidae	*Podarcis tauricus*	Trakya Kertenkelesi	Balkan Wall Lizard	-	LC	-	Ann-II		Lit.
Lacertidae	*Ophisops elegans*	Tarla Kertenkelesi, Yılan Gözlü Kertenkele	Snake-Eyed Lizard	-	NE	-	Ann-II	4	Obs.+Lit.
Natricidae	*Natrix tessellata*	Su Yılanı	Dice Snake, Tessellated Water Snake	-	LC	-	Ann-III		Lit.
Testudinidae	*Testudo graeca*	Tosbağa	Mediterranean Spur-Thighed Tortoise	-	VU	II	Ann-II	2	Obs.+Lit.
Testudinidae	*Testudo hermanni*	Trakya Tosbağası	Hermann's Tortoise	-	NT	II	Ann-II		Lit.
Typhlopidae	*Xerotyphlops vermicularis*	Kör Yılan	Worm Snake, Blind Snake	-	LC	-	Ann-III		Lit.

IUCN:
VU: Vulnerable
NT: Near Threatened
LC: Least Concern
NE: Not Evaluated
Relative Abundance:
1: Very Rare
2: Rare
3: Medium intensity
4: Intensive
5: Very abundant

*** Obs.: Observation, Lit.: Literature**

4.7.1.8 Invasive Alien Species

The CBD defines invasive alien species (IAS) as “species whose introduction and/pr spread outside their natural past or present distribution threatens biological diversity. IAS occurs in all taxonomic group of organisms; including animals, plants, fungi and microorganisms, and can affect all types of ecosystems. Invasion by alien species is reported to have caused significant degradation with negative impacts on biological diversity and people’s livelihoods according to IUCN, which requires that all projects that may provide a key pathway for invasive species are screened for their potential to accidentally introduce invasive alien species. In line with provisions of ESS6 and PS6, projects that potentially cause introduction of alien species are subject to a risk assessment. Once established, eradication of IAS requires more effort and resource allocation, prevention is the first step in management.

The Global Invasive Species Programme (GISP) is an international partnership working to address the global threat of IAS, with the main objective of conserving biodiversity and sustain livelihoods by minimizing the spread and impact of invasive alien species with the implementation of Article 8(h) of the CBD. Furthermore, managed by the IUCN’s Species Survival Commission, there is an Invasive Species Database (GISD), which currently works on establishing a Global Register of Introduced and Invasive Species (GRIIS) to develop country-wise validated, verified and annotated inventories of introduced and invasive species.

Türkiye has a wide marine IAS dataset, while studies on terrestrial ones have been rather limited. Studies that have already been conducted reveal an estimated 1.5% of plant species in Türkiye being exotics[34], although a comprehensive list of alien plants is still lacking. Türkiye is a member of EPPO, an intergovernmental organization responsible for cooperation in plant health within the Euro-Mediterranean region, which aims to protect plants by developing international strategies against the introduction and spread of pests and by promoting safe and impactive pest control methods through A1 and A2 lists of pests recommended for regulation. The species that have been recorded in the EPPO list of invasive alien plants that are present in Türkiye are; *Acroptilon repens*, *Ailanthus altissima*, *Ambrosia artemisiifolia* (*A. elatior*), *Carpobrotus edulis*, *Cortaderia selloana*, *Cyperus esculentus*, *Paspalum distichum* (*P. paspalodes*), *Oxalis pes-caprae* and *Sicyos angulatus*, while *Azolla filiculoides* and *Rhododendron ponticum* are listed in the EPPO Observation List of Invasive alien plants and *Miscanthus sinensis*, listed in the EPPO Alert List, are also recorded in the Turkish flora.

Project biodiversity studies led by field experts did not yield any data on presence of IAS. However, given the datasets in Türkiye are still limited, in terms of introduction and spread of IAS, necessary measures will be taken as per PS6. International guidelines and best practices will be followed to avoid intentional or accidental introduction of alien or non-native species, and if necessary strategies and procedures will be developed to eradicate IAS.

4.7.2 Critical Habitat Assessment

4.7.2.1 Critical Habitat Concept

As stated by PS6 habitats constitute “a terrestrial, freshwater or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment”. To meet ESS6 requirements, clients would have different obligations for different kinds of habitats. This enables to provide a better understanding of specific species and habitat requirements and establish meaningful management units to define a mitigation

[34] Arslan, Z.F., Uludag, A., Uremis, I. 2015. Status of invasive alien plants included in EPPO Lists in Türkiye. EPP/EPPO Bulletin 45 (1): 66-72.

strategy. These habitat types are modified, natural and critical, which can be a subset of natural or modified habitats. These habitat types refer to the biodiversity value of a given area, as determined by species, ecosystems and ecological processes, and are required to be identified within a project's AoI to define habitat-specific PS6 requirements accordingly.

Modified habitats, in the most general sense, are those that have been subject to some form of alteration, often resulting in agricultural land. Despite the fact that some modified habitats might lose all of their natural characteristics, it is still required to minimize further impacts. Natural habitats are composed of plant and/or animal species that are mostly of native origin, where human activity has not been significant enough to modify ecological functions and species composition within. In areas of natural habitat mitigation measures are required to be designed to achieve no net loss of biodiversity.

Critical habitats are those that are of high biodiversity value. Both natural and modified habitats may contain high biodiversity values qualifying as critical habitat. While habitat types are defined by the degree of human-induced modification, this is not necessarily an indicator of the biodiversity value of a habitat as per ESS6.

Critical habitat criteria as put forward by ESS6 that forms the basis of critical habitat assessment are as follows:

Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species
Criterion 2: Endemic or restricted-range species
Criterion 3: Migratory or congregatory species
Criterion 4: Highly threatened and/or unique ecosystems
Criterion 5: Key evolutionary processes

ESS6 requires the Borrower (clients) not to implement any project activities in areas of critical habitat unless all of the following are demonstrated:

- No other viable alternatives within the region exist for development of the project in habitats of lesser biodiversity value;
- All due process required under international obligations or national law that is a prerequisite to a country granting approval for project activities in or adjacent to a critical habitat has been complied with;
- The potential adverse impacts, or likelihood of such, on the habitat will not lead to measurable net reduction or negative change in those biodiversity values for which the critical habitat was designated;
- The project is not anticipated to lead to a net reduction in the population of any Critically Endangered, Endangered, or restricted-range species, over a reasonable time period;
- The project will not involve significant conversion or significant degradation of critical habitats. In circumstances where the project involves new or renewed forestry or agricultural plantations, it will not convert or degrade any critical habitat;
- The project's mitigation strategy will be designed to achieve net gains of those biodiversity values for which the critical habitat was designated; and
- A robust and appropriately designed, long-term biodiversity monitoring and evaluation program aimed at assessing the status of critical habitat is integrated into the Borrower's management program.

It should also be noted that Critical Habitat Assessment is independent of a project's potential impacts on biodiversity value within its AoI or an extended area. The outcome of the Critical Habitat Assessment does not indicate a particular impact associated with project activities or requirement for a mitigation measure. Rather it provides a thorough analysis of the existing biodiversity value in a given area and informs the applicability of ESS6 requirements. For the

project-related impacts, a mitigation hierarchy is to be applied and measures are defined for different phases of a project.

4.7.2.2 Critical Habitat Methodology

To identify the statuses of species that have been identified based on literature data and assessed through expert judgement, besides the IUCN Red List of Threatened Species utilized to determine endangered and critically endangered species, other criteria were also used in critical habitat assessment, wherever applicable. In determining "highly threatened and unique ecosystems", IUCN Red List categories for ecosystems were used as the main reference.

Since international, even European biodiversity assessments do not always cover Turkish habitats and species, experts' judgment was often consulted to interpret data. Since international, even European, biodiversity assessment does not always cover Turkish habitats and species, experts' judgment was often consulted to draw conclusions on the statuses of biodiversity components. Local expert judgment was also referred to because there are no officially established or widely accepted national evaluations on threat and conservation statuses of habitats and species in Türkiye.

Criterion 1: Critical (CR) and/or Endangered (EN) Species

Species threatened with global extinction and listed as CR and EN on the IIUCN Red List are considered as part of Criterion 1. Critically Endangered species face an extremely high risk of extinction, while endangered species face a very high risk of extinction in the wild.

Quantitative data on potential critical habitat triggering species' populations were assessed based on the Guidance Note (GN) 6 (2019) thresholds, which not only consider global conservation priorities but also nationally or regionally significant concentrations of species. Accordingly;

(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥0.5% of the global population AND (≥5% reproductive units of a CR or EN species),

(b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable species, the loss of which would result in the change of the IUCN Red List status to EN and meet these thresholds,

(c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species trigger designation of critical habitat.

In determining CR, EN and VU species at the Project AoI, the IUCN Red List of Threatened Species, European Red Lists, and the only IUCN correspondence in Türkiye, the Red Data Book of Turkish Plants have been utilized as the main references. Regional statuses of species, supported by expert judgment on species' current population trends in Türkiye, have also been assessed.

Criterion 2: Endemic and/or Restricted-Range Species

The updated version of GN 6 (2019) defines the term endemic as restricted-range, which refers to a limited extent of occurrence (EOO) as such:

- For terrestrial vertebrates and plants, a restricted-range species is defined as those species, which have an EOO less than 50,000 km².
- Form marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100,000 km².

- For coastal, riverine and other aquatic species in habitats that do not exceed 200 km width at any point, restricted range is defined as having a global range less than or equal to 500 km linear geographic span.

An area can be designated as critical habitat, if it holds ≥10 percent of the global population size and ≥10 reproductive units of an endemic and/or restricted-range species. Terrestrial species identified at the Project AoI were assessed with respect to their EOOs and population sizes, based on the IUCN Red List, IUCN European assessments, and expert judgment.

Criterion 3: Migratory or Congregatory Species

Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem). Congregatory species are those whose individuals gather in large groups on a cycyle or otherwise regular and/or predictable basis according to PS6. The thresholds are as following:

(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle.

(b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.

The project is not located on a main migration route.

Criterion 4: Highly Threatened or Unique Ecosystems

To identify highly threatened or unique ecosystems, World Bank requires the Client to use the IUCN Red List of Ecosystems (RLE) where formal assessments have been performed, and if not to use assessments using systematic methods at the national/regional level, carried out by government bodies, recognized institutions and/or other relevant qualified organizations. The thresholds are:

(a) Areas representing ≥5 percent of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.

(b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.

Due to no natural areas, protected areas are present in AoI, no potential critical habitat triggers as per Criterion 4 has been determined. Although the project area is within the Ergene Basin Important Plant Area, it does not trigger critical habitat because the area is located within the Organized Industrial Zone including industrial facilities and agricultural areas around it.

Criterion 5: Key Evolutionary Processes

Evolutionary processes are defined as structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation and combinations of these variables can influence evolutionary processes that give rise to regional configurations of species and ecological properties. The significance of structural attributes in a landscape that may influence evolutionary processes are required to be determined on a case-by-case basis, and determination of habitat that triggers this criterion will rely on scientific knowledge.

Examples of spatial features associated with evolutionary processes can be listed as; landscapes with high spatial heterogeneity, ecotones, edaphic interfaces, connectivity between habitats, and sites of demonstrated importance to climate change adaptation for either species or ecosystems.

Project AoI is not associated with key evolutionary processes. It does not host flora and/or fauna species that have distinct evolutionary histories with populations that show proven phylogenetic divergence from other species' other known populations.

4.7.2.3 Critical Habitat Triggering Biodiversity Features

Criterion 1: Critical (CR) and/or Endangered (EN) Species and Criterion 2: Endemic and/or Restricted-Range Species

CR, EN, VU and endemic species that were identified during the site surveys and are presumed present based on literature data were assessed against the IUCN Red List, European Red Lists, and The Red Data Book of Turkish Plants, in terms of their global and regional threat statuses. To reach an understanding of the statuses of species in the area, expert judgement was also consulted. Endangered and endemic species, which are potential critical habitat triggers, are presented in Table 4-55.

Table 4-55. Potential Critical Habitat Triggering Taxa as per Criterion 1 and 2

Biodiversity Feature	IUCN Red List Category	Endemic / Restricted-Range
Reptiles		
Testudo graeca	VU	-
Testudo hermanni	NT	-

Populations of Vulnerable and Near Threatened species listed in Table 4-55; *Testudo graeca* (Common tortoise) and *Testudo hermanni* (Hermann's Tortoise) were estimated based on expert judgement. Project AoI does not hold any significant populations of these species, the loss of which would cause a change in their Red List categories.

Although they do not trigger critical habitat, in line with PS6 impacts on these species of high conservation concern are assessed implementing the mitigation hierarchy, necessary measures were developed and implemented within the scope of the ESIA Report with no-net-loss principle.

Criteria 3: Migratory or Congregatory Species

This criterion is typically applied to areas that support significant populations of migratory or congregatory species during critical stages of their life cycles, such as breeding, feeding, resting, or overwintering. However, the area is not located within a recognized migration route and only a few migratory species have been recorded.

The area is unlikely to serve as an essential stopover or congregation site for large numbers of migratory species. The presence of a few migratory species could be attributed to incidental occurrences or the use of the area as a minor, non-essential habitat. Consequently, the ecological importance of the area under this criterion is considered low, and it is unlikely to contribute significantly to the conservation of migratory or congregatory species at a regional or global scale.

Criterion 4: Highly Threatened or Unique Ecosystems

This criterion is intended to identify areas that support highly threatened or unique ecosystems that are crucial for biodiversity conservation. These ecosystems are typically characterized by their rarity, vulnerability, or irreplaceability due to their ecological functions or the species they support.

However, the area is located entirely within a modified habitat—such as agricultural land and industrial areas, where landscapes significantly altered by human activities—is less likely to meet this criterion. Modified habitats generally lack the natural ecological characteristics and

species compositions found in highly threatened or unique ecosystems. Therefore, the area's conservation value under this criterion is considered low, as it does not support or contribute to the protection of rare or vulnerable ecosystems.

As a result of the assessment the Project is not in a "Critical Habitat".

4.7.3 Impact Assessment and Mitigation Measures

A biodiversity impact assessment is one of the tools used to ascertain potential impacts of a project on flora, fauna, and ecosystems of a particular region. It lists species and habitats together with any National Protected or Internationally Recognized Areas, such as Key Biodiversity Areas, within the area where the project is to be undertaken. This would ensure that potential threats to biodiversity are adequately considered and addressed.

Mitigation measures aim at completely avoiding, reducing, or compensating for the adverse impacts. Some of the mitigation measures include habitat restoration, buffer zones, operational limitation at sensitive periods such as during mating periods and offset schemes that improve biodiversity elsewhere. The environmental sustainability of the project is meant to be assured through maintaining ecological integrity and adherence to the national and international conservation norms.

4.7.3.1 Demolition and Construction Phase

Potential Impacts

Noise and Air Pollution: Construction equipment and activities may generate noise, dust, and emissions, potentially affecting nearby environments.

Waste Generation: Construction activities may produce solid and hazardous waste requiring proper management.

Impact on Water Resources: Potential contamination of nearby water bodies due to runoff from construction sites.

Biodiversity and Habitat Disturbance: Although unlikely in an industrial zone, any unplanned expansion or operational spillovers could impact nearby habitats. To prevent the introduction and spread of alien invasive species during the demolition and construction phase, key measures include sourcing materials locally and inspecting equipment for contaminants, using native plant species for landscaping, and disposing of organic waste properly. Construction activities should be confined to designated areas.

Mitigation Measures

Air Quality Control: Use dust suppression techniques like water spraying on unpaved roads. Ensure construction equipment is well-maintained to minimize emissions.

Noise Mitigation: Limit construction activities to designated hours. Use noise-reducing equipment and provide acoustic barriers if necessary.

Waste Management: Separate and proper disposal of construction waste. Implement measures for safe handling and disposal of hazardous materials.

Water Resource Protection: Store and manage construction materials to prevent contamination of water bodies. Design drainage systems to prevent runoff into natural watercourses.

Biodiversity: to prevent Alien Invasive Species, clean machinery before site entry, use native, certified materials, and restore disturbed areas with native plants. Slow moving animals should be relocated during construction for conservation of biodiversity.

Monitoring and Compliance

- Regularly inspect and monitor environmental controls to ensure effectiveness.
- Train construction personnel on environmental practices and compliance requirements

4.7.3.2 Operation Phase

Potential Impacts

Noise and Air Pollution: Facility activities generate noise, dust, and emissions, potentially affecting nearby environments.

Waste Management: Operational activities may generate solid and hazardous waste that requires proper disposal and handling.

Water Pollution: Discharge of untreated or inadequately treated wastewater could impact nearby water bodies.

Mitigation Measures

Noise and Air Pollution: Impact mitigation measures should be effectively implemented, and necessary analyses should be conducted.

Waste Management: Develop a comprehensive waste management plan for proper segregation, recycling, and disposal. Ensure hazardous waste is handled and disposed of following regulatory requirements.

Wastewater Management: Treat wastewater to meet regulatory discharge standards before release. Regularly inspect and maintain wastewater treatment systems.

Monitoring and Compliance

Establish environmental monitoring programs for air, water, noise, and waste to ensure compliance with environmental regulations. Perform regular environmental audits and provide training to staff on best practices in environmental management.

Impacts on biodiversity receptors, mitigation measures and significance of residual impacts are given in Table 4-56.

Table 4-56. Impacts on Biodiversity Receptors, Mitigation Measures and Significance of Residual Impacts

Impact Description	Project Phase	Receptor	Impact Magnitude					Receptor Sensitivity	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Noise and Air Pollution	Demolition and construction Operation	**(see "Noise and Vibration" and "Air Quality and Greenhouse Gas Emissions" part)**									
Waste Generation	Demolition and construction	**(see "Resource and Waste Management" part)**									
Impact on Water Resources	Demolition and construction	**(see "Water Resources, Water Quality and Wastewater Management" part)**									
Biodiversity, Habitat Disturbance and spread of Alien Invasive Species	Demolition and construction	Flora and fauna species Alien İnvasive Species	Local	Medium-term reversible	Short-term	Intermittent	Medium	Medium	**Moderate**	• Any animals discovered during vegetation clearance will be removed and relocated to an appropriate habitat. Especially, T. graeca and T. hermanii will be carried out of the construction area back to the construction area to a suitable area and will be released. • The project site's lighting will be kept to a minimum, and sensory lighting systems, rather than nightlong active lighting, will be considered. The lights will be aimed downwards. • Workers will be prohibited from killing or trapping wild animals for food or trade. Throughout the project areas, signage will be installed to reinforce the hunting ban. • The site must be protected from the introduction of invasive alien plant species. Imported materials, such building sand or filthy earthmoving machinery, require special consideration. Stockpiles should be routinely inspected, and any weeds that grow out of them should be pulled.	**Minor**
Waste Management	Operation	**(see "Resource and Waste Management" part)**									
Wastewater Management	Operation	**(see "Water Resources, Water Quality and Wastewater Management" part)**									

4.8 Socio-Economic Environment

4.8.1 Methodology and Project Standards

This chapter provides baseline information on the local conditions related to social baseline and explains the Project's approach to socio economic issues, ensuring compliance with applicable legislative requirements and international standards.

An assessment of socio-economic risks and impacts of the Project has been done in consideration of the local conditions, measures that will be inherently taken in accordance with the requirement of the national legislation, and benefit from the expert knowledge and experience of typical sectoral risks associated with the construction phase. International standards and guidelines have also been taken into consideration to develop additional measures for the management of community health and safety aspects.

Main data sources and guidance used to compile the baseline information, conduct impact assessments and develop related mitigation measures are listed below:

- International Finance Corporation's Performance Standards on Social and Environmental Sustainability
- A Good Practice Handbook for Companies Doing Business in Emerging Markets
- Good Practice: How to Support Your Company to Establish and Manage a Worker Grievance Mechanism for Sexual Harassment

In accordance with the international standards, the following general aspects have been covered in the scope of the assessment:

- Issues related to GBVH and SEA/SH,
- Communication issues with stakeholders,

The significance of the impacts was assessed based on the sensitivity of the receptors and the overall magnitude of the impact as described in Impact Assessment and Mitigation Measures.

4.8.2 Baseline Conditions

The project area is in the Evrensekiz Organized Industrial Zone, which is within the borders of Lüleburgaz district of Kırklareli province. The location of the project area in Türkiye, the borders of the province and district where it is located is shown in Figure 4-26.

Figure 4-26. Location of the Project Area

The settlements around the project area are shown in Figure 2. The project area is 11 km away from the Lüleburgaz district center by road. Other settlements close to the project area are Yenibedir village, Evrensekiz town and Büyükkarıştıran town. While Evrensekiz town consists of three adjacent neighborhoods, namely Fatih, Gündoğdu and Kırcaali neighborhoods, Büyükkarıştıran town consists of three adjacent neighborhoods, namely Fatih, Yeni and Yıldırım neighborhoods. The distance of the project area to these settlements by road is 5km, 6.5km and 8.5km, respectively.

The project area is also 36 km away from the center of Çorlu district, one of the largest districts in the region. During the stakeholder interviews, it was learned that some of the workers working in Evrensekiz OIZ, where the project will be carried out, live in Çorlu district center.

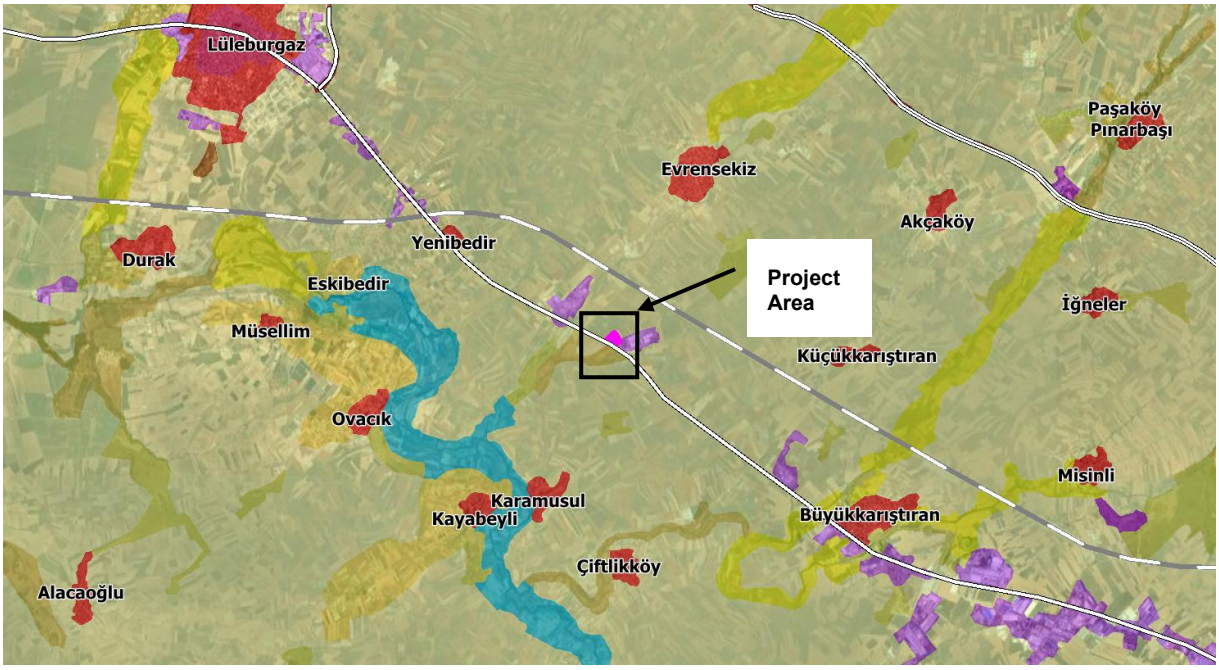

Figure 4-27. Settlements around the Project Area

Tekirdağ province and its surroundings including Lüleburgaz district of Kırklareli province have been under the pressure of Istanbul. Istanbul's gradually depleting land opportunities and some other reasons have pushed industrialization to Ergene, Çorlu, Çerkezköy and Lüleburgaz districts. As a result, these districts, which are mostly engaged in agriculture, have gradually become "Industrial Cities". As such, Ergene, Çorlu and their surroundings are among the regions where industrialization is developing most rapidly in Türkiye.[35]

The construction sector also stands out due to ongoing industrialization.

4.8.2.1 Population and Demographic structure

The population of Kırklareli province is 377,156 and ranks 52nd among 81 provinces, and Lüleburgaz is the most populous district among the 8 districts of Kırklareli with a population of 155,670.

The population of the Çorlu and Lüleburgaz districts and the Kırklareli province with the neighbouring Tekirdağ province is given in Figure 4-28.

[35] www.ergene.bel.tr

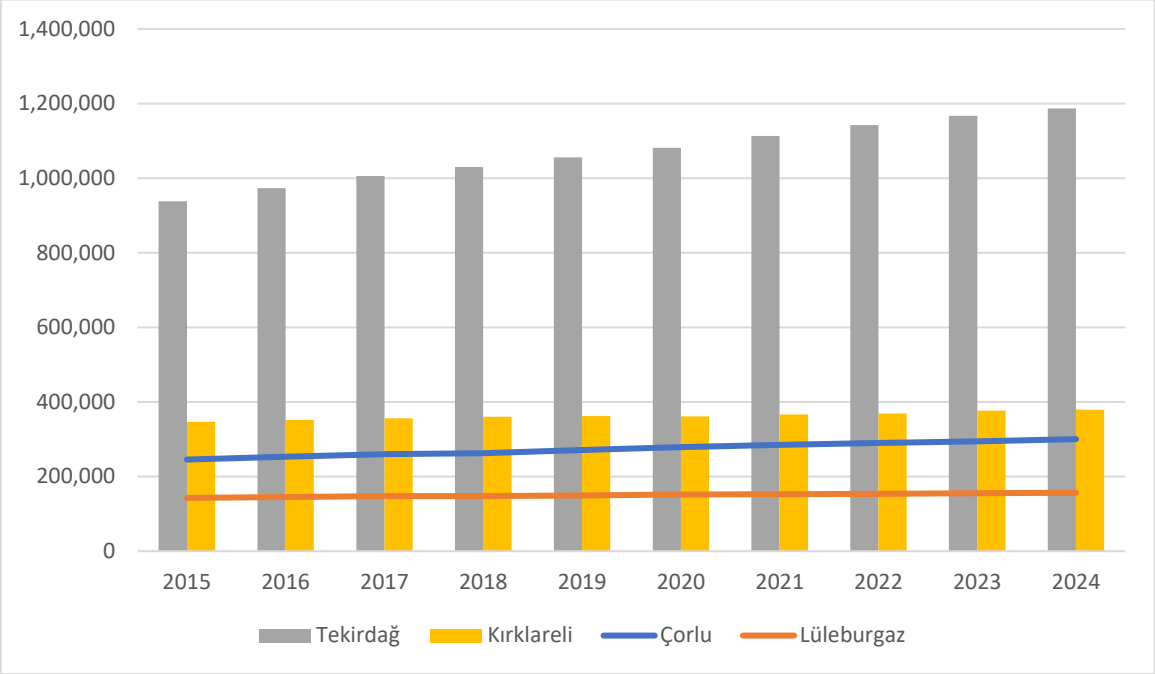

Figure 4-28. The population of Tekirdağ province and the Çorlu and Ergene Districts between 2015 and 2024

The spatial distribution of the population in 2023 around the Project area is also provided in Figure 4-29.

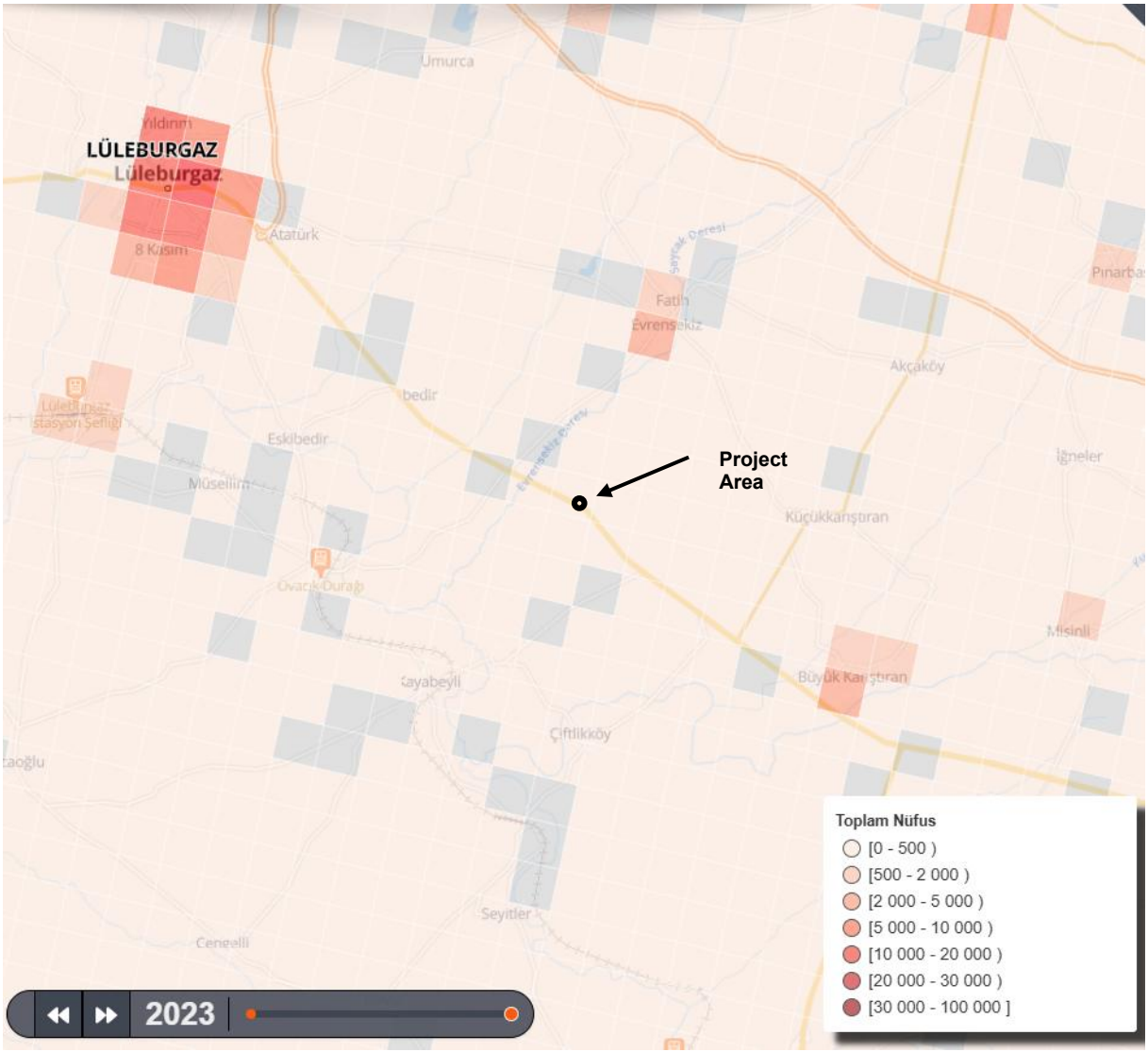

Figure 4-29. Population of the nearby settlements[36]

As is the case throughout Türkiye, there is no disproportionate distribution between the male and female population in the region.

Women play an important role in employment in the local economy and working conditions are favorable. Especially in Lüleburgaz, 28.15% of the working population is employed in the industrial sector. This has increased women's participation in the industrial sector and contributed to the economic diversity in the region. [37]

Çorlu district is also a region with intense industrialization. With the development of the industrial sector, the rate of women's participation in the workforce has increased. The rate of women working in sectors such as textile and food industry is especially high. This situation

[36] https://cip.tuik.gov.tr/

[37] https://www.kalkinmakutuphanesi.gov.tr/assets/upload/dosyalar/luleburgaz-ilce-vizyonu.pdf

provides positive contributions to women's economic independence and the socio-economic development of the region.[38]

4.8.2.2 Land and Livelihood /Employment

The Evrensekiz OIZ in Lüleburgaz, Kırklareli, serves as a converging point for industrial and agricultural activities, shaping the region's demographic and economic landscape. While farming, livestock, and industrial employment remain the primary sources of income, industrialization has increasingly become the dominant employment sector. The most commonly cultivated crops include sunflowers, wheat, and canola, though agricultural land is gradually diminishing due to the expansion of factories and industrial facilities. This transformation has led to significant economic and demographic shifts, impacting both land use and employment trends.

Despite the economic benefits of industrial growth, environmental concerns remain a pressing issue, particularly in agricultural communities. Farmers have reported a decline in crop yields over the past two decades, attributing it to air pollution, soil degradation, and industrial emissions. Additionally, water contamination in local rivers and irrigation systems has emerged as a recurring concern, directly affecting livelihoods dependent on farming and livestock. While industrial development has provided stable employment and financial security, balancing economic progress with environmental sustainability is a challenge that requires greater regulation and oversight.

The transition from an agriculture-based economy to an industrial one has been largely driven by employment security and higher wages in the manufacturing sector. The majority of the local workforce has shifted towards factory jobs, with agricultural labor increasingly being supplemented by part-time or seasonal employment. Unlike other industrial zones that attract large numbers of external migrant workers, the Evrensekiz OIZ relies primarily on local and regional labor, maintaining a socially stable employment environment. The presence of seasonal and migrant farmworkers, including a small number of Syrians, Palestinians, and Afghans, remains limited, as they are generally engaged in temporary agricultural tasks rather than industrial work.

4.8.2.3 Settlement patterns and social structure

The settlement patterns and social structure of the Evrensekiz Organized Industrial Zone (OSB) and its surrounding areas have been shaped by industrial growth, agricultural traditions, and controlled internal migration. Historically, the region was primarily agricultural, but over time, it has transitioned into an industrial hub, bringing changes to settlement trends and social dynamics. Despite industrial expansion, agriculture remains a part of daily life, with many families maintaining landholdings while also engaging in industrial employment. This dual economic model has influenced how people live, work, and interact within the community.

The majority of the population consists of local residents with long-standing family ties to the region. Settlements are scattered across rural and semi-urban areas, where privately owned, family-based housing is the norm. Most factory jobs are filled by locals, with some workers commute daily from neighboring settlements such as Çorlu. This commuter workforce structure has contributed to demographic stability, reducing the need for large-scale worker housing infrastructure.

[38] https://www.kalkinmakutuphanesi.gov.tr/assets/upload/dosyalar/tbolgesel.pdf

The limited presence of migrant laborers in the area further reinforces this stable social structure. While small groups of Syrian, Palestinian, and Afghan seasonal workers engage in temporary agricultural work, they do not form permanent settlements, primarily due to housing shortages and local reluctance to rent out properties. This has resulted in minimal cultural and ethnic diversity, keeping the community relatively homogenous.

4.8.2.4 Transportation

Lüleburgaz district, which is located on the D-100 Edirne-Istanbul Highway, is 47 km from Kırklareli city center and 125 km from Istanbul city center. The traffic volume map is provided in Figure 4-30.As seen on the map, the volume of the traffic on the segment where the project is located is very high due to the OIZs located on the D-100 highway.

Figure 4-30. State Highways Traffic Volume Map (2023) for 1st Regional Directorate of KGM

Source: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.kgm.gov.tr/SiteCollectionDocuments/KGMdocuments/Istatistikler/TrafikveUlasimBilgileri/23TrafikUlasimBilgileri.pdf

The Istanbul-Edirne Railway connecting Istanbul to Europe passes through the district center, and Lüleburgaz district is 163 km from Istanbul, 135 km from Edirne, 155 km from the Kapıkule border gate and 109 km from the Uzunköprü Greek border by railway.

Energy services in the district are provided by TREDAŞ electric company and there is no electricity problem.[39]

4.8.2.1 Services

Education

As the project location is within the OIZ, there is no nearby educational facility.

Health

As the project location is within the OIZ, there is no nearby health facility.

Çorlu and Lüleburgaz, located in the Thrace region of Türkiye, exhibit notable advancements in healthcare infrastructure, reflecting their socio-economic development.

Çorlu, as the largest district in Tekirdağ Province with a population surpassing that of 14 Turkish provinces, has experienced significant industrial growth. This expansion has been paralleled by the development of healthcare facilities to meet the increasing demands of its residents. The district hosts a variety of healthcare institutions, including state hospitals, private clinics, and specialized medical centers, ensuring comprehensive medical services for its populace.

Lüleburgaz, a prominent district in Kırklareli Province, is recognized for its socio-economic vitality. In a 2004 study by the State Planning Organization, Lüleburgaz ranked 35th among 872 districts in Türkiye in terms of socio-economic development. This high ranking is indicative of the district's robust infrastructure, including its healthcare services. The presence of well-equipped hospitals and healthcare centers in Lüleburgaz reflects its commitment to providing quality medical care to its residents.[40]

4.8.3 Impact Assessment and Mitigation Measures

Adverse impacts that may occur during the construction and operation phases of the project on the community health and safety are addressed in the following sections.

4.8.3.1 Construction Phase

As stated in Section 3.4, approximately 200 workers will be employed during the construction phase. Due to its proximity to Lüleburgaz and Çorlu district centers, which are the major districts of the region, no labor influx is expected, therefore no impact is expected on the neighborhoods near the project area.

Since the project area and transportation to the project area do not pass directly through residential areas and 27 thousand vehicles pass daily on the road to be used according to

[39] www.ergene.bel.tr

[40] https://www.kalkinmakutuphanesi.gov.tr/assets/upload/dosyalar/kbolgesel.pdf

2023 data[41], there is no increased risk to road safety. However, driver trainings will be carried on preventing accidents.

In addition, stakeholder participation and communication strategies should be developed to maintain transparency and to eliminate community concerns. Stakeholder engagement meetings with local residents should be held in order to provide information about construction activities, potential disorders and measures taken to minimize them. Creating a grievance mechanism (GM) will also allow community members to express their complaints and get quick responses.

4.8.3.2 Operation Phase

In the operational stage, approximately 191 permanent workers will be employed. Similar to construction phase no labor influx is expected. Labor training programs will be created in order to recruit from local.

The factory will not have adverse impacts on the nearby agricultural lands during the operation phase.

Similar to construction phase, no significant adverse impact is expected on traffic and road safety during the operation phase. However, driver trainings will be carried on preventing accidents.

However, to maintain transparency and to eliminate community concerns, regular reports on the environmental and social performance of the factory in Turkish will be disclosed on the website of the company. The grievance mechanism (GM) will also allow community members to express their complaints and get quick responses.

41 extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.kgm.gov.tr/SiteCollectionDocuments/KGMdocuments/Istatistikler/TrafikveUlasimBilgileri/23TrafikUlasimBilgileri.pdf

Table 4-57. Impact Significance, Proposed Mitigation Measures and Value of Residual Impact – Community Health, Safety and Security

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Communication issues with stakeholders	Construction	Nearby communities	Local	Short-term reversible	Short-term	Continuous	Low	Moderate	Minor	Client will • The requirements of the Stakeholder Engagement Plan prepared as part of the project will be implemented and updated as necessary. • Security personnel will receive appropriate training on topics such as codes of conduct, community relations, use of force, and social and cultural sensitivity. If armed security personnel are employed, psychotechnical training will be completed without exception. Any complaints from local communities regarding inappropriate behavior by security personnel will be promptly investigated. • The Grievance Mechanism will be actively utilized. External stakeholders will be informed about the functioning of the grievance mechanism.	Negligible
	Operation	Nearby communities	Local	Long-term reversible	Long-term	Continuous	Low	Moderate	Minor		Negligible
Increase of the traffic related risks	Construction	Workers, affected communities, and road users	Local	Long-term irreversible	Short-term	Intermittent	Low	High	Moderate	Contractor will • Develop health and safety plans: ○ Put in place appropriate processes, including driver training to improve driver and vehicle safety, as well as systems for monitoring and enforcement ○ Consider the safety record or rating of vehicles in purchase or leasing decisions ○ Require regular maintenance of all project vehicles ○ Employ drivers having appropriate government licensing or certification ○ Make drivers to comply with speed limits, seatbelt use, helmet use for motorcycle riders. • Develop emergency response plan to describe the contingencies in place for emergency assistance in the event of incidents and injuries in consultation with the local communities, local emergency responders, and local health authorities. • Monitor incidents and accidents, and prepare regular reports of such monitoring.	Minor
	Operation	Workers, affected communities, and road users	Local	Long-term irreversible	Long-term	Intermittent	Low	High	Moderate	Client will • Develop health and safety plans: ○ Put in place appropriate processes, including driver training to improve driver and vehicle safety, as well as systems for monitoring and enforcement ○ Consider the safety record or rating of vehicles in purchase or leasing decisions ○ Require regular maintenance of all project vehicles ○ Employ drivers having appropriate government licensing or certification ○ Make drivers to comply with speed limits, seatbelt use, helmet use for motorcycle riders. • Develop emergency response plan to describe the contingencies in place for emergency assistance in the event of incidents and injuries in consultation with the local communities, local emergency responders, and local health authorities. • Monitor incidents and accidents, and prepare regular reports of such monitoring	Minor

4.9 Labor and Working Conditions

As stated in Section 3.4, a professional local construction company will be hired for the construction of the factory and is estimated to employ around 200 people during the peak season which will consist of a variety of professionals, including construction workers, technical personnel, skilled tradespeople, supervisory staff, and logistics and support personnel.

In the operation phase, it is planned to employ 191 personnel and around 90% of the labor force will be hired locally.

The Client's human resources policy will strictly comply with the Turkish legislation and Good International Industry Practices, and national/international labor experts will be hired to provide regular guidance and supervision to the company including monitoring the construction company.

4.9.1 Baseline Conditions

The industrial labor force in the region is composed mainly of people from Evrensekiz municipality, nearby towns, and larger district centers such as lüleburgaz and Çorlu. Many workers commute daily, contributing to a dynamic yet locally anchored workforce. Women's participation is supported by regulated work environments, transportation services, and workplace protections, with no major reports of harassment or discrimination. During the operation phase the company plans to first hire employees with the project communities.

4.9.2 Impact Assessment and Mitigation Measures

4.9.2.1 Construction Phase

One of the main concerns in the operational phase is job insecurity and potential labor conflict. If employment terms are not clearly defined, workers may experience uncertainty about contract terms, salary adjustments, and career development opportunities. Lack of transparent communication between management and employees can further exacerbate workplace dissatisfaction and turnover rates.

Therefore, a Fair Employment Policy will be adopted to ensure that all construction workers receive fair wages, reasonable working hours and written contracts that comply with local labor laws. Establishing a Workers' Grievance Mechanism will provide workers with a formal channel to raise concerns about working conditions and enable timely resolution.

The construction contractor will also provide adequate on-site facilities to promote the well-being of workers, including hygienic rest areas, access to potable water and medical services. Temporary accommodation, where necessary, must meet basic health and safety standards to prevent overcrowding and unhygienic conditions.

No risk regarding child labor and forced labor is foreseen for the Project which is also supported by the key informant interviews.

4.9.2.2 Operation Phase

One of the main concerns in the operational phase is job insecurity and potential labor conflict. If employment terms are not clearly defined, workers may experience uncertainty about

contract terms, salary adjustments, and career development opportunities. Lack of transparent communication between management and employees can further exacerbate workplace dissatisfaction and turnover rates.

To address these risks, the Client will implement policies to increase employee satisfaction and retention. This will include fair wages, health insurance, retirement benefits, and career advancement opportunities. Providing regular skill development programs and internal promotions can help motivate employees and strengthen workforce stability.

A transparent communication and employee engagement strategy is also important to maintain positive employee relations. Establishing employee representation committees and holding regular meetings between employees and management will ensure that concerns are addressed promptly.

Since the factory will operate in Türkiye, the Client will allow workers to participate in labor unions or have the right to nominate a worker's representative who will work with the management to address workers concerns which are also supported by the Turkish labor legislation.

Finally, work-life balance and employee well-being should be prioritized through reasonable working hours, paid leave policies, and wellness initiatives. Creating a positive workplace culture that values biodiversity, inclusion and employee rights will contribute to long-term productivity and a reputation for being a socially responsible business.

Table 4-58. Impact Significance, Proposed Mitigation Measures and Value of Residual Impact – Labor and Working Conditions

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Harassment (including sexual harassment), intimidation, and/or exploitation among project workers	Construction	Workers	Local	Long-term reversible	Long-term	One-off	High	High	Moderate	▪ All workers, contractors, and security personnel will be required to sign and adhere to a Code of Conduct that explicitly prohibits GBVH and SEA/SH. ▪ Fair recruitment practices will be established to prevent exploitation or coercion. ▪ A GBVH and SEA/SH focal point will be assigned within the project management team to oversee and monitor the implementation of measures. ▪ Mandatory training will be provided to all project personnel, contractors, and security staff on GBVH and SEA/SH awareness, acceptable workplace behavior, and response mechanisms. ▪ Background checks will be conducted for all personnel to minimize risks, particularly for roles involving public interaction. ▪ Local communities will be engaged to raise awareness of GBVH and SEA/SH risks and to foster collaboration on mitigation strategies. • Grievance mechanisms will be implemented for GBVH and SEA/SH complaints, ensuring they are easily accessible to both workers and the community.	Minor
	Operation	Workers	Local	Long-term reversible	Long-term	One-off	High	High			
Poor working conditions which do not meet the national labor legislation, i.e. discriminatory working conditions, lack of equal opportunity, lack of clear employment terms, over time.	Construction	Workers	Local	Short-term reversible	Short-term	One-off	Medium	Medium	Minor	Discriminatory working conditions • Regular consultations with worker representatives, union representatives, and employee representatives are mandatory • WGM records are a critical tool for identifying and addressing these deficiencies • Subcontractor employees and those working for service providers should also be integrated into a unified WGM system • Training on the WGM should be provided at the start of employment, and all tools should be made accessible to all employees	Negligible
	Operation	Workers	Local	Short-term reversible	Short-term	One-off	Medium	Medium		Over time • Over Time Action Plan should be implemented • The projected employment capacity for the Project should be analyzed in conjunction with overtime requirements. • Providing training to women in areas where they are excluded from employment, in order to include them in programs. • Utilizing local and regional collaborations. • Establishing collaboration with local and regional worker organizations and associations	Negligible
Retaliation of workers as a result of any grievance they raised and/or difficulty in accessing worker grievance mechanism (WGM)	Construction	Workers	Local	Long-term reversible	Long-term	Constinuous	Medium	High	Minor	Establishing a Safe and Accessible Worker Grievance Mechanism (WGM) • Provide multiple channels for submitting grievances, including in-person, phone, email, and anonymous suggestion boxes. • Conduct regular awareness campaigns and training sessions to educate workers on how to access the WGM. • Ensure the mechanism is available in local languages and through verbal reporting for illiterate workers. Ensuring Anonymity and Confidentiality of Complaints • Develop a system that allows workers to file anonymous grievances securely. • Establish an independent committee to handle grievances, ensuring impartiality. • Maintain transparency in tracking and addressing grievances while protecting worker identities. Implementing a Zero-Tolerance Policy Against Retaliation • Develop a formal policy stating that retaliation against workers using the WGM is strictly prohibited. • Regularly communicate this policy to all employees and contractors. • Provide legal or organizational support for workers who experience retaliation. Ensuring Equal Access for Contracted Workers • Guarantee that contracted workers have the same access to the WGM as direct employees.	Negligible
	Operation	Workers	Local	Long-term reversible	Long-term	Continuous	Medium	High			Negligible

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
										• Ensure grievance mechanisms are applicable to both primary and subcontractor employees. • Include clauses in contracts with subcontractors that enforce worker protection measures. Monitoring and Feedback Mechanism • Regularly assess the effectiveness of the WGM and address any gaps. • Conduct independent audits to ensure compliance with IFC standards. • Provide workers with feedback on the status and resolution of their grievances.	

4.10 Occupational Health and Safety

4.10.1 Impact Assessment and Mitigation Measures

The impact assessment and mitigation measures of each phase of the project in terms of Occupational Health and Safety (OHS) are outlined below.

4.10.1.1 Construction Phase

The OHS risks of the Project at the construction phase and respective mitigation measures are given in the subsequent paragraphs:

- Accidents, injuries and illnesses caused by rotating and moving equipment: To minimize the risk of accidents, only trained and licensed personnel will be authorized to operate machinery, and equipment will undergo regular maintenance and inspection.
- Noise, vibration: Prolonged exposure to noise and vibration from heavy equipment presents risks of hearing damage and fatigue.
- , Contact with electricity (exposed conductor, defective electrical devices, etc.): Electrical hazards are also prevalent on construction sites, particularly from temporary wiring or exposed circuits.

  Lockout/tagout procedures will be enforced during maintenance, and only certified electricians will handle installations. Ground-fault circuit interrupters (GFCIs) will be installed, and insulated tools and personal protective equipment (PPE) will be provided to relevant personnel.
- Solid particles and/or liquid chemical sprays: Exposure to solid particles and liquid chemical sprays during construction—such as cement dust, silica, paint mists, or cleaning agents—can pose significant respiratory and skin-related health risks.

  To mitigate these hazards, the project will enforce the use of appropriate PPE, including respirators, safety goggles, gloves, and coveralls, depending on the material in use. Local exhaust ventilation systems will be installed in high-risk areas to reduce airborne concentrations, and all chemical products will be handled and stored in accordance with their Material Safety Data Sheets (MSDS). Workers will receive specific training on safe handling procedures and emergency response in case of accidental exposure.
- Welding: Welding activities present a range of occupational hazards, including exposure to intense light and radiation, toxic fumes, heat, fire, and the risk of electric shock.

  To minimize these risks, only certified welders will be authorized to perform welding operations, and proper PPE—including welding helmets with filtered lenses, flame-resistant clothing, gloves, and respiratory protection—will be mandatory. Welding will be conducted in designated areas with adequate ventilation or fume extraction systems. Fire safety measures, such as having extinguishers and fire blankets nearby, will be in place, and all welding tasks will follow hot work permit procedures to ensure safe execution.
- Industrial vehicle driving and site traffic: The movement of industrial vehicles and site traffic—such as trucks, excavators, and forklifts—poses significant safety risks, including collisions and run-over incidents.

To manage these risks, a comprehensive traffic management plan will be developed, clearly defining vehicle routes, speed limits, and loading/unloading zones. Only trained and licensed operators will be permitted to drive industrial vehicles, and all vehicles will undergo routine safety inspections. Visibility will be enhanced through the use of high-visibility clothing, signage, mirrors, and spotters where necessary. Site personnel will receive training on traffic awareness and safe conduct within vehicle operation zones.

- Working environment temperature: Extreme working environment temperatures—whether due to high heat during summer months or cold conditions in winter—can pose serious health risks such as heat stress, dehydration, hypothermia, or reduced concentration leading to accidents.

  To address these risks, the project will implement temperature-related control measures, including provision of shaded rest areas, climate-appropriate PPE, scheduled breaks, and hydration stations during hot weather. In cold conditions, workers will be provided with thermal clothing and warming shelters. Supervisors will monitor workers for signs of temperature-related illnesses, and work hours may be adjusted during periods of extreme heat or cold to ensure health and productivity are maintained.

- Ergonomic factors: Manual material handling and lifting operations can lead to musculoskeletal injuries or crush incidents.

  To address this, workers will be trained on safe lifting techniques and supported with mechanical aids such as hoists and pallet jacks.

- Working at heights: One of the most critical risks involves working at heights, particularly on scaffolding, roofs, and structural frameworks.

  To prevent fall-related injuries, the project will implement certified fall protection systems such as harnesses, guardrails, and safety nets. Workers operating at heights will receive mandatory training, and all access equipment will be subject to daily safety inspections. High-risk activities will be managed under a permit-to-work system to ensure adequate controls are in place.

- Illumination: Inadequate illumination in construction areas can lead to accidents such as trips, falls, or equipment misuse due to poor visibility.

  To ensure a safe working environment, the project will maintain sufficient lighting levels in all active work zones, access routes, stairways, and emergency exits. Temporary lighting will be installed in enclosed or nighttime work areas, and lighting equipment will be regularly inspected and maintained. Special attention will be given to areas involving detailed manual tasks or heavy machinery operation, where focused lighting may be required. Workers will also be trained to report faulty or insufficient lighting promptly.

- Air quality: Dust and airborne particulates from concrete cutting, welding, or excavation activities may cause respiratory issues.

  The project will implement dust suppression methods such as wetting surfaces and provide respirators and local exhaust ventilation where required.

- Fire and explosions: Fire and explosion risks arising from welding activities, fuel storage, or electrical faults will be managed through the designation of hot work zones, the deployment of fire extinguishers and sand buckets, and strict flammable material storage protocols. Emergency response plans, including fire drills, will be developed and practiced regularly.

- Corrosive, oxidizing, and reactive chemicals: The use of corrosive, oxidizing, and reactive chemicals during construction—such as acids, solvents, or curing agents—poses significant health and safety risks, including chemical burns, fires, toxic exposure, or dangerous reactions if mishandled.

  To mitigate these risks, all such substances will be clearly labeled, stored in secure and ventilated areas, and handled strictly according to the guidelines in their MSDS. Workers involved in chemical handling will receive specialized training and be provided with appropriate PPE, including chemical-resistant gloves, goggles, and protective clothing. Emergency eyewash stations and spill containment kits will be installed in areas where such chemicals are used or stored, and all incidents will be logged and reviewed.

In addition to these OHS risks, there are also risks related to general understanding and implementation of OHS requirements which are (i) lack of adopting behavior according to risk and (ii) resistance to use personal protective equipment (PPE) although it is readily available.

In order to avoid from and/or mitigate these risks and impacts the construction contractor will prepare an OHS Management Plan in line with the national OHS legislation and the World Bank Group Environmental Health and Safety General Guideline before the commencement of the construction works.

4.10.1.2 Operation Phase

The analysis of hazardous factors in the production process is given in the subsequent paragraphs:

- Electric Shock Hazards: The project involves a large number of electrical devices, some of which have high input voltages, posing significant risk of electric shock.
- Lifting Hazards: Project factories and warehouses use forklifts, and during lifting operations, there is a possibility of accidents such as disconnection causing injuries, steel wire ropes breaking and striking individuals, moving suspended objects colliding with people, steel wire ropes scraping individuals, and pulleys hitting people, which can result in casualties.
- Mechanical Injuries: The project utilizes production equipment such as mixers and coating machines, as well as a large number of conveyor devices. Direct contact between moving (stationary) parts of the equipment, tools, processed parts, and the human body may lead to injuries in the form of pinching, collision, cutting, entrapment, twisting, crushing, slicing, and stabbing. Exposed transmission parts of various rotating machinery (such as gears, shafts, tracks, etc.) and reciprocating motion parts can potentially cause mechanical injuries to the human body.
- Noise and Vibration: The operation of equipment inevitably generates low-frequency noise and vibration, but there may also be certain high-frequency components, with sound pressure levels ranging from 95 to 115 decibels. Workers exposed to forging vibrations may experience qualitative and functional disorders, which can reduce work capacity and affect safety.
- Protection Against Toxicity and Dust: The synthesis process generates a small amount of organic solvent waste gas; the combustion waste gas produced by the regenerative thermal oxidizer is collected by fans and exhaust pipes, and after high-temperature incineration in the RTO waste incinerator, it is discharged into the atmosphere.
- Fire/Explosion Hazards: Most of the main materials in the production process have flammable and explosive characteristics, such as natural gas and resin materials. When these materials leak into the air and encounter an ignition source, there is a risk of combustion/explosion.

- Other Hazards: High-temperature equipment is used in production, thus there is a risk of high-temperature burns.

In order to avoid from and/or mitigate these risks and impacts below safety production assurance measures and the occupational health strategies and measures will be implemented.

Safety Production Assurance Measures

1) Electrical Safety: Using structural steel columns in workshops as lightning protection grounding down conductors (concrete column factories use the main reinforcement inside concrete columns as down conductors), and utilizing the steel reinforcement within structural foundations as grounding electrodes, with grounding resistance not exceeding 1 ohm. Brick and mixed-structure buildings should install lightning protection belts at the roof and parapet, and create a lightning protection metal mesh on the roof not exceeding 20×20m, using the steel reinforcement within the structure as lightning protection grounding down conductors, and using the steel reinforcement in the foundation and ring beams as grounding electrodes for lightning protection treatment, with grounding resistance not exceeding

1-ohm Buildings equipped with lightning protection devices must ensure that the lightning protection system meets the requirements for direct lightning strikes, lightning induction, and the intrusion of lightning waves. All metal components protruding from the roof, such as metal ventilation ducts, rooftop fans, and metal trusses, must be reliably connected to the roof lightning protection system.

According to regulatory requirements, workshops should be equipped with emergency lighting and fire protection systems. For locations with special requirements, sealed or mesh-covered lighting fixtures should be used; in particularly humid areas, low-voltage or ultra-low-voltage lighting should be employed, and all electrical equipment in hazardous explosive areas must use explosion-proof products. All workshops I type lighting fixtures must be reliably grounded.

The workshop should establish a general equipotential bonding system, ensuring that all metal pipelines entering and exiting the building, the metal casings of normally non-energized equipment within the building, metal trays, and metal supports are all reliably grounded. A grounding grid made of 40×4mm hot-dip galvanized flat steel should be installed 3 meters around the building, and the galvanized flat steel of the grounding grid must be reliably connected to the steel columns. To reduce step voltage, horizontal grounding devices should be placed at building entrances and locations less than 3 meters from the sidewalk, with grounding bodies buried to a depth of no less than 1 meter or locally wrapped with a 50-80mm thick layer of asphalt.

The grounding for lightning protection, grounding of transformer neutral points, protective grounding of electrical equipment, and grounding of computer rooms should share a unified grounding electrode, with a required grounding resistance not exceeding 1 ohm. If this requirement cannot be met, additional grounding electrodes must be installed.

The workshop power distribution system adopts the TN-S system.

2) Prevention of Mechanical and Lifting Injuries: All equipment selected in the design must be equipped with safety protection and limit devices. Mechanical automation should be used as much as possible to reduce manual labor. Large parts should be transported mechanically. Lifting and transportation equipment must use products from manufacturers with production licenses and designated national production facilities. Necessary safety signs, such as "No Entry" and "Caution," must be set up in the working area of lifting equipment.

The workshop should maintain clear planned pathways, with distinct functional areas and a certain safety distance between equipment to prevent mutual interference. Safety nets or barriers must be installed for components that are transported at high altitudes or operate at high speeds to prevent foreign objects from flying out and causing injury.

The distance between adjacent devices should be greater than 3m, and the workshop passage width should be greater than 3m. Tools and devices should be arranged neatly. Moving parts of machines that are prone to causing personal accidents should be protected. Labor protection equipment should be worn properly during work.

3) Fire and Explosion Safety Measures: The structural form, fire resistance rating, fire separation distance, and building materials of each structure should be determined based on the fire and explosion hazards of production and storage. Reliable fire protection measures should be taken according to regulations for load-bearing steel frames, supports, skirts, pipe racks, etc.

The design and construction of the building will be in line with GIIP such as National Fire Protection Association (NFPA) and will be validated by a fire protection engineer/expert after commissioning.

Strengthen the sealing measures of equipment, pipelines, and valves to prevent the leakage of combustible materials such as gases, which could lead to fire/explosion accidents.

Reliable electrostatic grounding measures are implemented for equipment and pipelines that handle and transport combustible materials, which may pose electrostatic hazards. For pipelines transporting combustible gases, liquids, and other materials, measures are taken to limit flow rates to avoid electrostatic hazards caused by excessive flow rates. For vented gases containing combustible substances, if the venting speed is too high, it may generate static electricity through friction, leading to fire and explosion accidents. Therefore, the venting speed of these gases is controlled.

4) Prevention of high-temperature radiation and burns: Thermal insulation is applied to heating equipment, ensuring that the temperature of surfaces that may be touched by personnel does not exceed 50 ℃. In special cases, additional thermal insulation protection devices are added outside the furnace. Timely removal of hot components and excess material is conducted to reduce the impact of radiant heat on workers.

5) Prevention of personnel poisoning and gas leaks: Combustible and toxic gas detection alarms are installed in areas such as process equipment zones and protective gas tank areas to promptly detect and address gas leak incidents.

Remote control quick-opening valves are installed on pipelines carrying flammable materials such as natural gas, with switches for the quick-opening valves set up in the field and control room.

In the event of an emergency, pressing a single switch can quickly cut off these pipelines, preventing the situation from escalating.

6) Safety Management Measures: Establish a regulatory system for enterprise safety production, improve the emergency rescue system for safety production, establish a safety

production responsibility system, enhance safety production regulations and operating procedures, and implement the "three simultaneities" of safety facilities and main projects.

Occupational Health Strategies and Measures

1) Optimize the workshop layout; equipment should be positioned correctly to avoid crowding in one area. The workflow of workpieces should be reasonable, finished products should be moved away from the workshop, the processing should be mechanized, and good management should be implemented.

2) Heating equipment should have good airflow. The production workshop should have effective overall ventilation (well-designed natural ventilation is generally sufficient).

3) Dangerous noise sources should be enclosed or equipped with sound-absorbing panels, and workshops should be located away from residential areas. To suppress vibrations, equipment should be installed on a deep and solid foundation below the building’s foundation, and separated from all structural components.

4) All workers should undergo a medical examination before employment, followed by regular check-ups. They should be provided with personal protective equipment (especially hearing protection), and the work pace should be reasonable. Beverages should be provided during work to replenish fluids, salts, and vitamins lost through sweating. The workshop should have adequate sanitation facilities.

5) The workplace should comply with local occupational health requirements; a mechanism for occupational health supervision and inspection should be established and improved, equipped with necessary professional supervision and inspection equipment, implementing relevant regulations and measures for occupational hazard prevention and rectification, strengthening labor protection for employees, effectively preventing occupational hazards, and ensuring the "three simultaneities" of occupational disease protection measures and main engineering projects.

Table 4-59. Impact Significance, Proposed Mitigation Measures and Value of Residual Impact – Occupational Health and Safety

Definition of Impact	Project Phase	Receptor	Magnitude of Impact					Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact
			Extent	Reversibility	Duration	Frequency	Overall Magnitude				
Occupational Health and Safety negligence	Construction	Worker	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major	• An adequate OHS organizational structure will be defined, as defined by the local legislation, and necessary number of OHS officers/experts should be assigned to be at the site during working hours. • A job hazard analysis, work permit system and LOTO as part of OHS management system will be established during construction and operations phases • Project and site-specific OHS Management Plan should be developed based on construction site OHS risk assessment before commencing the works that is in line with national legislation, PS1, PS2, and WBG EHS Guidelines (both general and sector specific), and implemented on site. • Project and site-specific Emergency Preparedness and Response Plan should be developed. • OHS Personnel will daily inspect the site and if any additional risk is observed relevant plans and trainings will be renewed. • The access of local people and wildlife in the construction sites will be controlled by fencing the working area. The entry of personnel and third parties into the facility (where available) will be carried out in a controlled manner, • A brochure will be prepared by the Contractor and it will contain the sketch of the site, authorized person information to communicate in case of emergency, start date and targeted end date. The brochure will be distributed to all related buildings in the region, • Private security officers will be hired in order to provide the security of the working area. The special security applications within the scope of the project and the competent authorities will be in compliance with the provisions of the Law on Private Security Services and the Implementation of the Law on Private Security Services, • The workers will be trained in accordance with Regulations on the Procedures and Principles of Occupational Health and Safety Trainings of Employees, • Personal Protective Equipment will be provided for the workers according to the nature of work to be performed. The necessary trainings will be carried out for their use, • Smoking will be prohibited where the risks of fire is high. All the workers will be informed about the action plan in a case of fire, • All equipment will be operated in proper working order, • The necessary health and safety signs and traffic signs will be placed around the project site. Employees will be informed and alerted about the subject matter markings, • Trainings will be given to employees within the scope of the Regulation on Procedures and Principles of Occupational Health and Safety Trainings and measurement and evaluation activities will be carried out after the trainings, • Equipment that meets international standards in terms of performance and safety will be used, • Railings will be installed around all tanks and pits, • Confined Space Entry Procedure will be prepared in accordance with applicable national requirements and internationally accepted standards, • Trainings for operators who work with chemicals will be conducted regarding safe handling practices and emergency response procedures, • The compliance of all the activities with national standards and WBG EHS Guidelines will be ensured. • The design and construction of the building will be in line with GIIP such as National Fire Protection Association (NFPA) and will be validated by a fire protection engineer/expert after commissioning. • Trainings will be conducted regarding the sexual exploitation, abuse and harassment (SEAH) and GBV.	Minor
	Operation	Worker	Restricted	Irreversible	Short term	One-off/Rare	High	Medium	Major		Minor

5 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

The environmental and social management system (ESMS) to be established for the Project is a structured framework designed to identify, assess, and manage the environmental and social risks and impacts associated with a project or organization. It provides a systematic approach to ensuring compliance with applicable laws, standards, and best practices while promoting sustainable and socially responsible operations. The ESMS serves as a critical tool for integrating environmental and social considerations into decision-making processes, aligning project activities with broader sustainability goals, and enhancing stakeholder confidence.

This system is built on the principles of prevention, mitigation, and continuous improvement, addressing both direct and indirect impacts across the project lifecycle—from planning and construction to operation and eventual decommissioning. It is designed to ensure the effective management of key aspects such as biodiversity conservation, resource efficiency, waste management, community engagement, worker health and safety, and grievance mechanisms.

By providing a clear and organized approach to managing environmental and social aspects, the ESMS helps reduce risks, improve project outcomes, and align with the expectations of regulators, investors, and communities.

5.1 Organizational Responsibility

Great Rich Technologies Limited is responsible for the overall environmental and social performance of the project, including the technical performance of its contractors and subcontractors. The company will establish an effective organizational structure to ensure the smooth implementation of the project and adherence to the environmental and social management requirements outlined in the Environmental and Social Impact Assessment (ESIA). Organizational structure Great Rich Technologies Limited is presented in Figure 5-1.

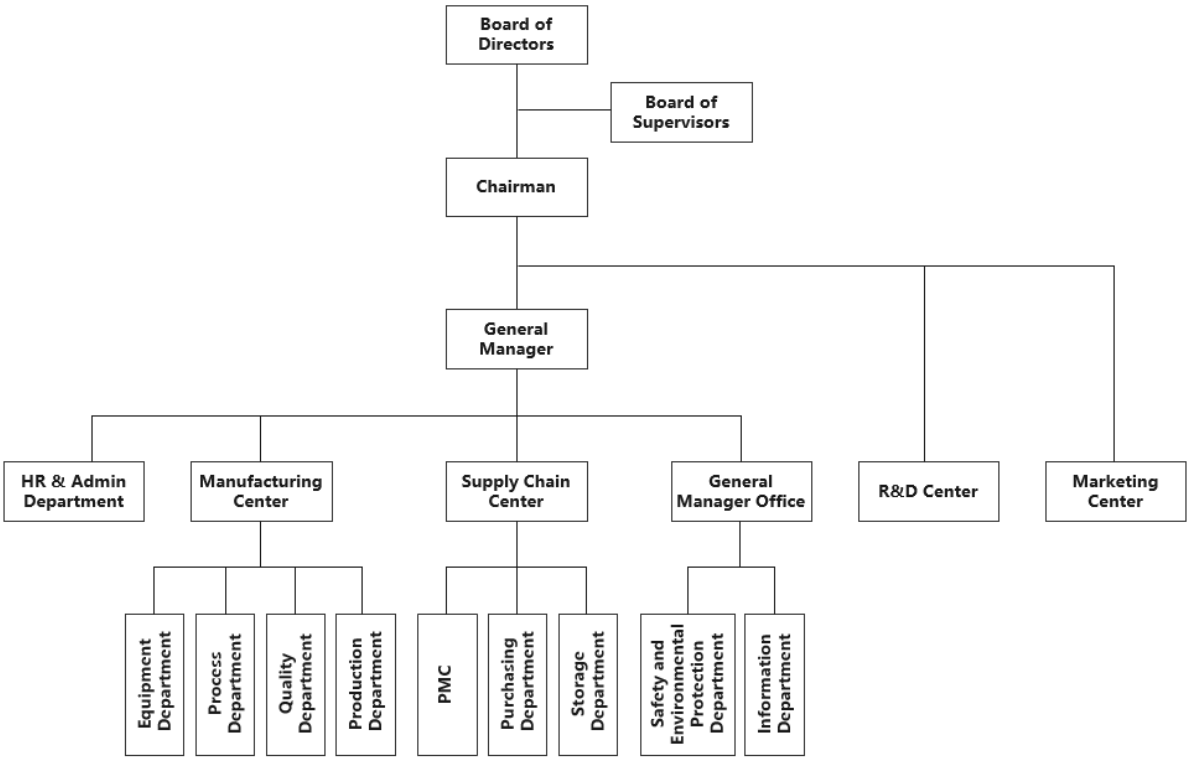

Figure 5-1. Organizational structure of Great Rich Technologies Limited

The organizational structure of Great Rich Technologies Limited is depicted in Figure 7.1. The HR&Admin Department will be responsible from the Labor and Working Conditions including the Workers' Grievance Mechanism. For the other social aspects of the Project and the environmental and OHS aspects of the Project, the E&S&OHS team under the General Manager's Office will be responsible.

The environmental engineers under the Safety and Environmental Protection Department will oversee the implementation of the Environmental and Social Management Plan (ESMP) and monitor environmental issues throughout the project lifecycle. The environmental engineer will also ensure that the project's environmental performance aligns with the commitments made in the ESIA Report and is in compliance with both national legislation and international standards.

The Information Department will manage social aspects outlined in the ESIA, including the implementation of the Stakeholder Engagement Plan (SEP) and the effective operation of the grievance mechanism. The social experts will be responsible for addressing community concerns, ensuring stakeholder engagement, and mitigating any potential social impacts.

Furthermore, Occupational Health and Safety (OHS) experts under the Safety and Environmental Protection Department will be designated to oversee the prevention of occupational health and safety risks at the workplace. This expert will ensure that the contractor and their personnel comply with the Occupational Health and Safety Management Plan (OHSMP), ensuring a safe working environment for all staff on-site.

The Client shall ensure that its tender documents for the construction of the factory and related buildings include E&S specifications which are in line with IFC requirements, so that the contractor will have legal obligations to GRT with regards to the E&S compliance. The Client shall share the RFP and tender documents for IFC's review.

The contractor will be responsible for the land preparation and construction activities as per the approved design documents. They are tasked with implementing the mitigation measures outlined in the ESIA during the construction phase. The contractor will ensure full compliance with national legislation, international guidelines, and standards, and will appoint their own environmental, social, and OHS personnel to carry out their responsibilities. Any non-conformities detected on-site will be recorded, communicated to both the contractor and the client, and corrective actions will be promptly implemented.

Additionally, the Client will be also responsible for the contractor's compliance with the ESIA and IFC requirements during construction. The Client will ensure that the contractors implement the mitigating measures accordingly.

5.2 Environmental and Social Management System

An Environmental and Social Management System (ESMS) will be established by Great Rich Technologies Limited, ensuring that the system is proportionate to the level of environmental and social impacts associated with the project. The ESMS will align with GIIPs and the nature and scale of the project. This system will be regularly monitored and updated to maintain its effectiveness and ensure that environmental and social risks are effectively managed.

To support the ESMS, a series of sub-management plans will be developed and implemented during both the construction and operation phases of the project (please see Section 5.3)..

In addition to the ESMS, the company will leverage ISO systems such as ISO90001, ISO14001, ISO45001, IATF16949, and T/AIITRE 10003 to integrate quality management, environmental management, and occupational health and safety management. These standards will ensure the project meets the highest industry standards for environmental, social, and safety performance. Additionally, Great Rich Technologies Limited possesses comprehensive testing capabilities and laboratory analysis resources, ensuring that all aspects of the project undergo thorough examination and evaluation.

5.3 Environmental and Social Mitigation Plan

The Environmental and Social Mitigation Plan (ESMP) (Annex-1) outlines specific measures to address the environmental and social impacts identified during the preparation of this ESIA. The ESMP focuses on preventing, minimizing, or mitigating adverse effects of the project on the environment and surrounding communities. Key elements of the mitigation plan includes:

- **Air Quality Management**: Implementing dust control measures such as water spraying and using barriers during construction to reduce air pollution and protect local air quality.
- **Waste Management**: Ensuring waste materials, including construction debris and domestic waste, are disposed of in accordance with local regulations. This includes the proper separation, collection, and recycling of waste where feasible.
- **Water Resource Management**: Monitoring water usage and ensuring that wastewater treatment meets regulatory standards before discharging into the municipal sewer system.
- **Noise and Vibration Control**: Minimizing noise and vibration from construction activities by using sound barriers, machinery maintenance, and limiting work hours near sensitive receptors (e.g., schools and hospitals).
- **Biodiversity Conservation**: Implementing practices to protect local wildlife and ecosystems, including habitat restoration and replanting where necessary.
- **Community Health and Safety**: Ensuring the safety of local communities by implementing health and safety protocols, such as emergency response plans and traffic management measures.

In line with the ESMP, the construction contract will develop its own ESMP (Contractor's ESMP; C-ESMP) which will include:

- Pollution Prevention and Waste Management Plan (PPWMP)
- Occupational Health and Safety (OHS) Management Plan
- Emergency Preparedness and Response Plan (EPRP)
- Labor Management Plan (LMP)
- Worker's Accommodation Plan (if the workers will be accommodated on site)
- Chance Finds Procedure (CFP)

In addition, during the operation phase the Client will develop below management plans in line with the ESMP, and also will update its Stakeholder Engagement Plan (SEP) and Labor Management Procedures (LMP) which were also prepared at the same time with this ESIA:

- Pollution Prevention and Waste Management Plan (PPWMP)
- Occupational Health and Safety (OHS) Management Plan
- Emergency Preparedness and Response Plan (EPRP)
- Labor Management Plan (LMP)

The mitigation measures will be regularly reviewed and updated based on monitoring results, ensuring their continued effectiveness throughout the project's lifecycle.

5.4 Environmental and Social Monitoring Plan

The Environmental and Social Monitoring Plan which is a section of ESMP (Annex-1) outlines the procedures for monitoring the effectiveness of the mitigation measures and tracking the environmental and social performance of the project. This plan will ensure compliance with the Environmental and Social Management Plan (ESMP) and other relevant regulations. Key components of the monitoring plan include:

- **Air and Water Quality Monitoring**: Regular air and water sampling to ensure that pollution levels remain within the acceptable limits set by national regulations and international standards.
- **Waste Management Monitoring**: Tracking waste generation, disposal, and recycling rates to ensure that waste management practices meet the project's environmental goals.
- **Occupational Health and Safety Monitoring**: Ongoing monitoring of worker health and safety, including inspections of personal protective equipment (PPE), compliance with safety standards, and accident reporting.
- **Community Engagement and Social Impact Monitoring**: Monitoring the effectiveness of community engagement activities, including the grievance mechanism and stakeholder consultation meetings.
- **Biodiversity and Ecosystem Monitoring**: Conducting periodic assessments of local biodiversity and ecosystems to ensure that mitigation efforts are achieving the intended results.

The monitoring plan will be implemented by the project's environmental and social teams, with regular reporting to management to ensure that any issues are addressed promptly.

5.5 Training

Training will be a key component in ensuring that all personnel, contractors, and stakeholders involved in the project understand their roles and responsibilities related to environmental and social performance. The training program will include:

- **Environmental Awareness**: Educating all project staff on environmental issues and the importance of complying with the ESMP. Topics may include waste management, pollution prevention, and resource conservation.
- **Social Responsibility**: Providing training on community engagement, human rights, and managing social risks such as labour conditions and local community relations.
- **Health and Safety Training**: Offering specialized training for workers to ensure they understand safety protocols, use appropriate PPE, and follow safe work practices to prevent accidents and occupational health issues.
- **Emergency Response Training**: Conducting regular drills and training sessions for both workers and local communities to ensure a prompt and effective response in case of an emergency, such as a fire or natural disaster.

Training will be conducted at the start of the project and at regular intervals throughout the construction and operation phases. Specialized training for key personnel will also be provided as necessary.

5.6 Reporting

The project will implement a robust reporting system to track progress on environmental and social performance and ensure transparency. Key elements of the reporting system will include:

- **Monthly Progress Reports**: Providing updates on the implementation of the ESMP, including compliance with mitigation measures, monitoring results, and any corrective actions taken.
- **Environmental and Social Audits**: Conducting regular audits to assess compliance with national laws, international standards, and the ESMP. Audit results will be shared with relevant stakeholders.
- **Incident and Non-Conformity Reporting**: Documenting and reporting any incidents or non-conformities, including accidents, pollution events, or deviations from the ESMP. These reports will outline corrective actions taken to prevent recurrence.
- **Stakeholder Reporting**: Preparing periodic reports for stakeholders, including local communities and regulatory authorities, detailing the project's environmental and social performance, community engagement activities, and any grievances received.

Reporting will be structured to ensure that all relevant parties, including the project owner, contractors, regulators, and the local community, are informed of the project's environmental and social performance.

6 CUMULATIVE IMPACT ASSESSMENT

The Cumulative Impact Assessment (CIA) was conducted for the Project followed the methodologies specified by relevant international guidelines. Being one of the most recent and comprehensive documents, the Good Practice Handbook on Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (IFC, August 2013) is the primary document for the methodology to be applied in this chapter, while the following additional key documents will also be resorted:

- Cumulative Impacts Assessment and Management Guidance published by International Association for Impact Assessment (IAIA) (Canter L., and William R., 2009; http://www.iaia.org/);
- European Commission's (EC) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (May, 1999);
- Cumulative Impacts Assessment Practitioners Guide prepared by the Cumulative Impacts Assessment Working Group (Hegmann, G. C. Cockling, R. Creasey, S. Dupuis, Kennedy, L. Kingsley, W. Rodd, H. Spaling and D. Stalker; February and AXYS Environmental Consulting Ltd. for the Canadian Environmental Assessment Agency (1999).
- World Banks Sample Guidelines on Cumulative Environmental Impact Assessment for Hydropower Projects in Türkiye published under the Energy Sector Management Assistance Program (ESMAP, 2012).

IFC defines cumulative impacts as "those that result from the successive, incremental, and/or combined impacts of an action, project, or activity (collectively referred as "developments") when added to other existing, planned, and/or reasonably anticipated future ones. Multiple and successive E&S impacts from existing developments, combined with the potential incremental impacts resulting from proposed and/or anticipated future developments, may result in significant cumulative impacts that would not be expected in the case of a stand-alone development (IFC, August 2013) (Figure 6-1).

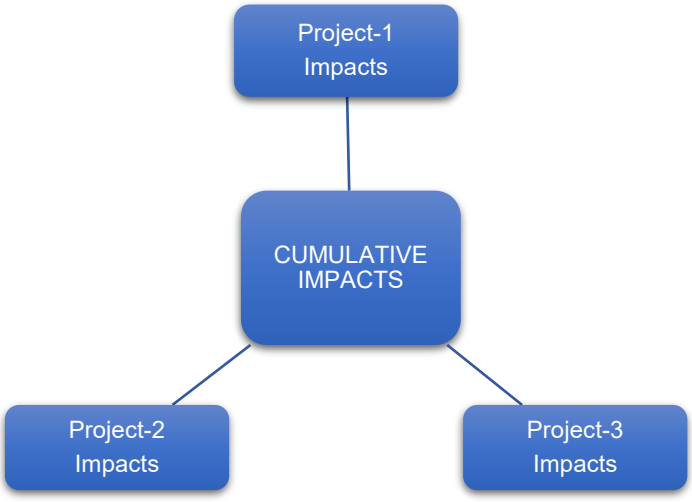

Figure 6-1. Illustration of Cumulative Impacts

The need for CIA emerges in circumstances where a series of developments, which may or may not be of the same type, is occurring, or being planned within an area where they would impact the same Valued Environmental and Social Components (VESCs), which are defined as the E&S attributes that are considered to be important in assessing risks.

The CIA process to be implemented in case of such circumstances is defined by IFC (August 2013) as:

(i) analyzing the potential impacts and risks of proposed developments in the context of the potential impacts of other human activities and natural E&S drivers on the chosen VESCs over time, and

(ii) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible. In light of the evolving global practice, IFC proposes a six-step approach for conducting Project-initiated CIA studies (IFC, August 2013).

This approach, which will be adopted in the CIA study to be conducted as a part of the Project ESIA studies, is illustrated below.

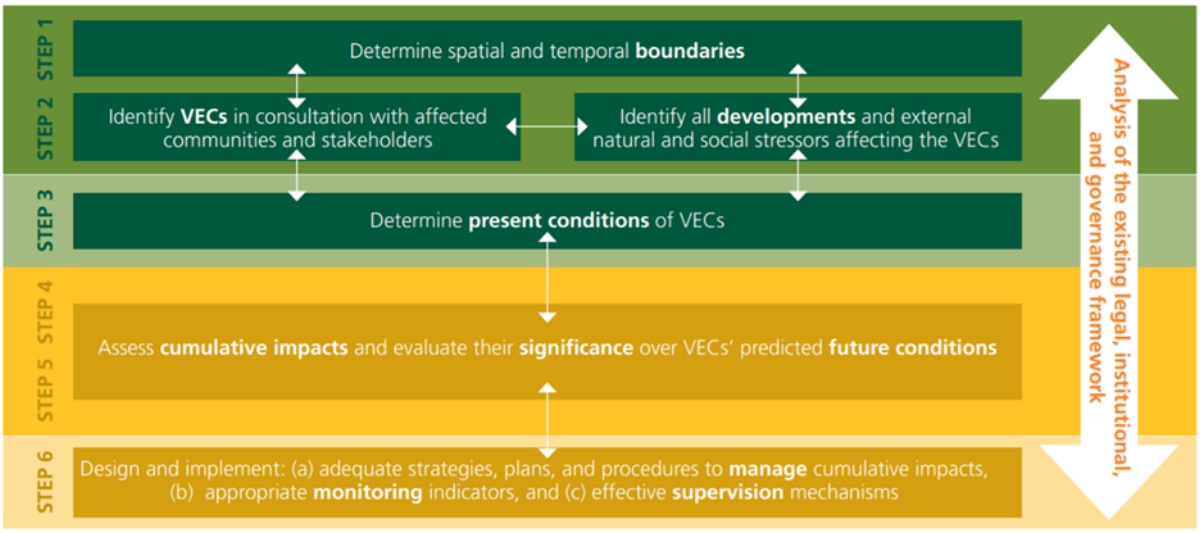

Figure 6-2. Six-Step CIA Approach

Source: IFC, August 2013

Steps to be followed in scope of the CIA study for the Project are listed below:

- Step 1: Scoping Phase I – VESCs, Spatial and Temporal Boundaries
- Step 2: Scoping Phase II – Other Activities and Environmental Drivers
- Step 3: Establish Information on Baseline Status of VESCs
- Step 4: Assess Cumulative Impacts on VESCs
- Step 5: Assess Significance of Predicted Cumulative Impacts
- Step 6: Management of Cumulative Impacts

6.1 Step 1: Scoping Phase I-VESCs, Spatial and Temporal Boundaries

In the first step of the CIA study, initially VESCs will be identified in consideration of the E&S assessments done in the previous chapters of this ESIA Report. Afterwards, time frame (spatial boundaries) for the analysis will be determined and geographical scope (spatial boundaries) of the assessment will be established as the CIA Study Area. Details of the Step 1 assessments are provided in the following sections.

6.1.1 Valued Environmental and Social Components (VESCs)

The good CIA practice suggests that the CIA studies are conducted with a focus on the environmentally or socially important natural resources, ecosystems or human values, which are in this report referred to as VESCs and may include the following:

- Physical features
- Social conditions, or
- Cultural aspects

This approach entails the CIA studies to be looked at “from the VESCs point of view”, instead of a Project centered perspective as this is the case in the ESIA studies and allows assessment of combined (i.e., cumulative) impacts of various projects/activities on each VESC.

In line with the good CIA perspectives as explained above, the CIA study for the Project will focus on the impacts on the selected VESCs that are to be affected by the Project activities. In other words, any VESC that would be affected by other projects/activities, but not the Project, will not be assessed in the scope of the CIA.

The Valued Environmental and Social Components (VESCs) identified for the project include key elements across land use (Section 4.1), water resources (Section 4.5), air quality and noise (Section 4.2 and 4.3), as well as socio-economic factors (Section 4.8). Specifically, the VESCs related to land use focus on agricultural areas, particularly arable lands. For water resources, the emphasis is placed on surface waters, including the Kavak and Evrensekiz Streams. Air emissions and noise are assessed primarily in relation to air quality and noise levels affecting settlements along the project route, notably the Yenibedir and Evrensekiz settlements. Within the socio-economic environment, VESCs encompass quality of life aspects such as access to healthcare, education, and commercial facilities, alongside concerns regarding air pollutants and noise. Additionally, traffic load is considered under the socio-economic subject to understand its impact on the surrounding communities.

The Biodiversity and Natural Resources Valued Environmental and Social Components (VESCs) identified for the project include critical habitats such as those supporting species like *Testudo graeca* and *Testudo hermanni*. Natural habitats are described in detail in Section 4.7.1, while flora and fauna species with high conservation priority are listed in Table 4.51. Additionally, the project area encompasses legally protected and internationally recognized areas of high biodiversity value, including İğneada Floodplain Forest National Park, Kavaklımeşe Nature Park, and Kasatura Bay Nature Reserve.

In consideration of the findings of the baseline and impact assessment studies conducted for the Project, valued environmental and social components to be considered in the CIA have been selected as presented in table below.

Table 6-1. Valued Environmental and Social Components (VESCs)*

E&S Subject	VESCs	Specified VESCs
Land Use	Agricultural Areas	Arable lands
Water Resources	Surface Waters	Kavak and Evrensekiz Streams
Air emissions and Noise	Air quality and noise levels in settlements along the Project Route	Yenibedir and Evrensekiz settlements
Biodiversity and Natural Resources*	Critical Habitat Natural Habitats Flora and Fauna Species with High Conservation Priority	Testudo graeca Testudo hermanni Flora and Fauna Species with High Conservation Priority
Protected Areas	Legally Protected and Internationally Recognized Areas of High Biodiversity Value	İğneada Floodplain Forest National Park Kavaklımeşe Nature Park Kasatura Bay Nature Reserve
Socio-Economic Environment	Quality of Life	Access to healthcare, education, commercial facilities
		Air pollutants and noise
	Traffic	Traffic load

6.1.2 Spatial and Temporal Boundaries

Cumulative impacts can occur (a) when there is “spatial crowding” as a result of overlapping impacts from various actions on the same VESC in a limited area, (e.g., increased noise levels in a community from industrial developments, existing roads, and a new highway or a railway; or landscape fragmentation caused by the installation of several transmission lines in the same area) or (b) when there is “temporal crowding” as impacts on a VESC from different actions occur in a shorter period of time than the VESC needs to recover. (IFC, August 2013).

For the determination of spatial boundaries of the CIA study, an iterative process has been applied. In this context, the relevant and readily available data were evaluated and a larger region covering important industrial infrastructure projects was examined. (see Figure 6-3)

6.2 Step 2: Scoping Phase II- Environmental Drivers

Environmental drivers refer to natural drivers and other stressors, such as fires, droughts, floods, predator interactions, human migration, new settlements, etc. that may exert an influence on the VESCs. For example, the fire regime in forested areas is a major driver that shapes social, ecological and economic systems (IFC, August 2013).

Based on the existing knowledge of the ecology and/or natural dynamics of the selected VESCs, no other major environmental driver that may contribute to cumulative impacts has been identified for this CIA study.

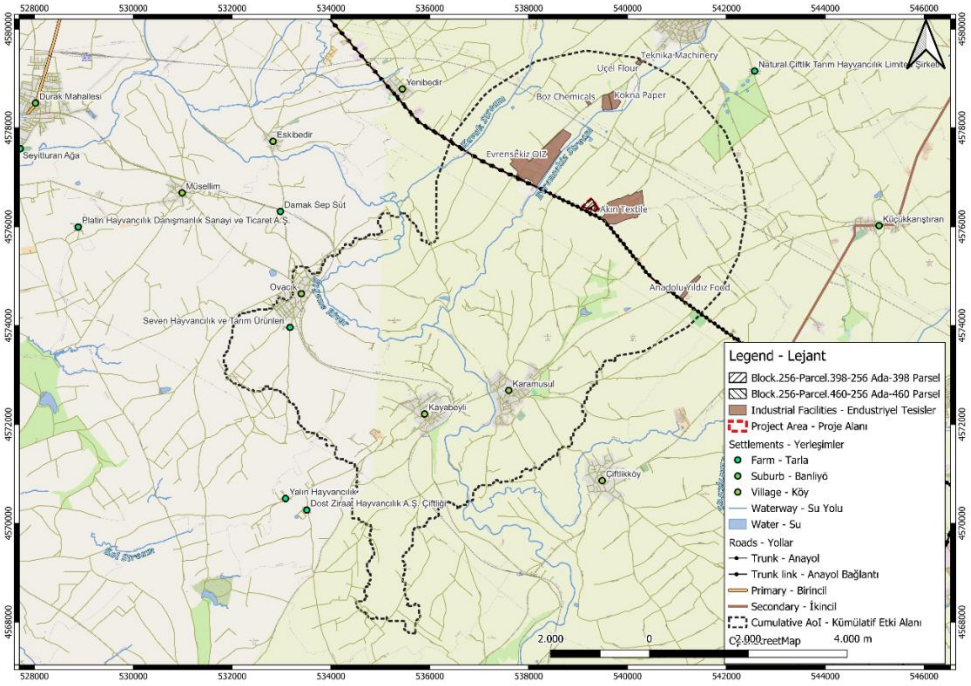

Figure 6-3. Cumulative Impact Assessment Study Area

6.3 Step 3: Establish Information on Baseline Status of VESCs

Information on the baseline status of the VESCs will be mainly based on the information gathered for each environmental and social subject in scope of the ESIA study. Thus, relevant information on the baseline status for VESCs are presented in the related chapters of this ESIA Report.

6.4 Step 4: Assess Cumulative Impacts on VESCs

Assessment of potential cumulative impacts of the Project together with other projects/activities/developments identified in the CIA Study Area on the selected VESCs has been based on a qualitative approach. The cumulative impact potential on the VESCs has been evaluated considering the projects affecting the VESC along with the Project (the Project under Assessment).

In this regard, the cumulative impact potential on each VESC has been classified as negligible, low, medium or high depending on the criteria described in Table 6-2.

Table 6-2. Criteria for Magnitude of Cumulative Impact Potential

Magnitude of Cumulative Impact Potential	Criteria
Negligible	The VESC is affected only by the Great Rich Project
Low	The VESC is affected by the Great Rich Project and 1 other project
Medium	The VESC is affected by the Great Rich Project and 2 other projects
High	The VESC is affected by the Great Rich Project and 3 or more projects

Potential impacts of the Project on social and economic environment are discussed in detail above and adverse and beneficial cumulative impacts of VESCs are evaluated in the table below.

Table 6-3. Cumulative Impacts on VESCs*

E&S Factor	VECs	Specified VESCs	*Great Rich*	*Evrensekiz OIZ*	*Boz Chemicals*	*Anadolu Yıldız Food*	*Akın Textile*	*Uçel Flour*	*Teknika Machinery*	*Sarteks Paint*
Biodiversity and Natural Resources*										
	Flora and Fauna Species with High Conservation Priority	Given in Table Table 4-51	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Protected Areas	Legally Protected and Internationally Recognized Areas of High Biodiversity Value	İğneada Floodplain Forest National Park Kavaklımeşe Nature Park Kasatura Bay Nature Reserve	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Water Source	Surface Waters	Kavak and Evrensekiz Streams	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Land Use	Agricultural Areas	Arable lands	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Air emissions and noise	Air quality and noise levels in settlements along the Project Route	Nearby Settlements	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Socio-economic Environment	Economy	Agricultural Activities	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
		Industrial activities and employment	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**
		Tourism	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**

E&S Factor	VECs	Specified VESCs	*Great Rich*	*Evrensekiz OIZ*	*Boz Chemicals*	*Anadolu Yıldız Food*	*Akın Textile*	*Uçel Flour*	*Teknika Machinery*	*Sarteks Paint*
	Traffic	Traffic Load	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Quality of Life	Access to healthcare, education, commercial facilities	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**	**Negligible**
		Air pollutants and noise	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

6.5 Step 5 and Step 6: Assessment of Significance of Predicted Cumulative Impacts and Management of Cumulative Impacts

The environmental impacts of a project on a specific receptor and/or resource may not be significant. However, when the individual impacts are considered in combination, the resulting cumulative impacts may be significant. At this point, the significance of cumulative impacts should be determined by the extent to which the impacts can be accommodated by the receptor and/or resource.

Significance of the assessed cumulative impacts are determined according to the significance levels presented below. In this regard, importance of the cumulative impact will be estimated in terms of the vulnerability and/or risk to the sustainability of the VESC assessed. Consequently, cumulative impact assessment will be directly related with the existing sensitivity/vulnerability conditions of the VESCs[42].

Table 6-4. Criteria for the Determination of Significance of Cumulative Impacts

Significance	Impact
Severe	Impacts that the decision-maker must consider as the receptor/resource is irretrievably compromised.
Major	Impacts that may become key decision –making issue.
Moderate	Impacts that are unlikely to become issues on whether the project design should be selected, but where future work may be needed to improve on current performance.
Minor	Impacts that are locally significant.
Insignificant	Impacts that are beyond the current forecasting ability or are within the ability of the resource to absorb such change.

In this regard, the importance of cumulative effects on VESCs are given in Table 6-5.

Table 6-5. Significance of Cumulative Impacts on VESCs

VECs	Significance	Description
Biodiversity and Natural Resources	Moderate	
Land Use	Moderate	There are agricultural lands in question, however, the agricultural activities are not intense but only done for household consumption.
Air emissions and noise	Minor	Impact of the Project will be temporary and after the commencing of the Project, the traffic load is expected to be decreased resulting in less air emissions and noise generation
Water Sources	Minor	Even though some factories are having a discharge at the streams no significant impact is foreseen
Socio-economic environment	Moderate	

7 STAKEHOLDER ENGAGEMENT

7.1 Objectives

The purposes of Stakeholder Engagement are:

- Define the scope of the Management Plan and set out applicable management interfaces.
- Define roles and responsibilities.
- Outline the applicable Project Standards relevant to this Management Plan;
- Define Project commitments, operational procedures and guidance relevant to this Management Plan.
- Define monitoring and reporting procedures, including Key Performance Indicators.
- Define training requirements.
- Set out references for supporting materials and information.

The objectives of Stakeholder Engagement Plan (SEP) are as follows:

- Identification of project stakeholders,
- Identify vulnerable groups and ensure their involvement in consultation processes,
- Propose and implement differentiated measures so that adverse impacts do not fall disproportionately on disadvantaged or vulnerable groups, and they are not disadvantaged in sharing development benefits and opportunities
- Defining specific engagement methods for vulnerable groups,
- Defining the most effective communication methods for stakeholder engagement activities to be carried out during the construction period, and operation period, taking into account concerns and expectations, and covering all stakeholder groups,
- To inform stakeholders in a timely and understandable manner about the construction period, and operation activities of the Project and no one will be left behind,
- Informing project management about these concerns and expectations,
- Providing stakeholders with information about the grievance mechanism and communication channels through which they can provide feedback.
- Facilitating appropriate conditions to provide fair and transparent communication opportunities for participation of stakeholders,
- Establishing transparent relations between The Company and stakeholders,
- Inform all employees working under the contractor/subcontractor about the participation processes and workers' grievance mechanism and ensure equal access rights for each employee.

The SEP applies to all activities undertaken during the construction and operation of the Project. All contractors, subcontractors, and service providers and their workforce will work in accordance with the national and international requirements set out in the SEP.

Please refer to detailed information Project specific Stakeholder Engagement Plan.

7.2 Roles and Responsibilities

The detail of the roles and responsibilities are given via Project specific SEP document.

As a summary of the responsible parts are given below;

- Head of executive committee
- Human resources manager

- Human resources specialist
- Corporate communication manager
- Corporate communication specialist
- Investment Project engineer
- Contractors

7.3 Stakeholder Identification and Analysis

Detailed information will be provided in the project-specific SEP.

As a summary approach the used definitions in line with the IFC's requirements are as follows:

Affected Stakeholders or Project Affected People (PAP) refers to individuals, groups, or communities that are directly or indirectly impacted by a project's activities. These stakeholders may face a range of negative or positive consequences as a result of the project, and their concerns, interests, and rights need to be taken into account in project planning and execution.

- Land owner of the Project location
- Farmers who have agricultural lands adjacent to the construction area
- Owners and the employees of the facilities adjacent to the construction area

Other Interested Stakeholders: This term encompasses any and all individuals, groups, organizations, and institutions that may be interested in, potentially affected by, or have the ability to influence a project. Stakeholders have an interest in the project and its outcomes, whether positive or negative, and their concerns should be identified and addressed throughout the project lifecycle. Stakeholders have an interest in the project and its outcomes, whether positive or negative, and their concerns should be identified and addressed throughout the project lifecycle.

- National Government Institutions
    - Ministry of Environment, Urbanization and Climate Change
    - Ministry of Energy and Natural Resources, General Directorate of Turkish Electricity Transmission Corporation
    - Ministry of Transport and Infrastructure General Directorate of Highways
- Local Government Institutions
    - Çorlu District Municipality of Tekirdağ
    - Lüleburgaz District Municipality of Kırklareli
    - Büyükkarıştıran Town Municipality of Lüleburgaz-Kırklareli
    - Evrensekiz Town Municipality of Lüleburgaz-Kırklareli
    - Office of the Mukhtars of the neighbourhoods and villages of the nearby settlements
        - Yenibedir Village of Lüleburgaz-Kırklareli
        - Fatih Neighbourhood of Büyükkarıştıran-Lüleburgaz-Kırklareli
        - Küçükkarıştıran Neighbourhood of Büyükkarıştıran-Lüleburgaz-Kırklareli
        - Yeni Neighbourhood of Büyükkarıştıran-Lüleburgaz-Kırklareli
        - Yıldırım Neighbourhood of Büyükkarıştıran-Lüleburgaz-Kırklareli
        - Fatih Neighbourhood of Evrensekiz-Lüleburgaz-Kırklareli
        - Gündoğdu Neighbourhood of Evrensekiz-Lüleburgaz-Kırklareli
        - Kırcaali Neighbourhood of Evrensekiz-Lüleburgaz-Kırklareli
- Local Media
    - Hürfikir Newspaper
    - Görünüm Newspaper
- Professional Organizations / NGOs
    - Lüleburgaz Chamber of Agriculture Presidency
    - Turkish Women's Union

8 GRIEVANCE MECHANISM

The spectrum of grievances ranges from major and potentially illegal issues such as discrimination or victimization in the workplace to more minor day-to-day disputes of local stakeholders or PAP.

Grievance procedures provide a clear and transparent framework for addressing and resolving difficulties in a fair and efficient manner. The grievance mechanism is a structured process that allows complainants to address disputes, fears, wishes and concerns in a fair, accessible and transparent manner.

The grievance mechanism (GM) will be communicated to stakeholders so that they are aware of the process, know about the right to file a grievance, how the GM works and how their grievance will be assessed. Usually, a grievance or concern is raised by a stakeholder or resident by telephone, in writing or, if not anonymous, by speaking to project officials.

In line with IFC standards, the internal and external GMs has been developed to adhere to the following principles

- Procedures will be kept as simple as possible and will be fair, transparent and informative for those involved.
- The process will be regularly reviewed by the project authorities. monitoring and evaluation will be carried out on a regular basis.
- The process will be confidential and impartial. No allegations or sanctions will be levelled against workers for raising concerns through such mechanisms.
- A specific time frame will be followed for providing responses and resolving the issues raised. The time frame for grievance resolution is 30 days.
- Grievances will be traceable and will be recorded in writing, in hard and electronic copies where possible.
- The grievance mechanisms do not preclude access to other judicial or administrative remedies that may be available under the law.

8.1 External Grievance Mechanism

The external GM is designed to receive and manage not only complaints, but also suggestions, queries, concerns, and positive feedback related to the project's E&S performance. Grounded in principles such as impartiality, confidentiality, accessibility, and protection against retaliation, the GM allows anonymous submissions—especially critical for sensitive cases such as sexual exploitation and abuse. It ensures complainants are informed of their right to bypass the GM and seek legal or administrative remedies at any point.

The mechanism is managed by key personnel including the social expert of the Client (staff of HR) and the Contractor's Community Liaison Officer (CLO)—available in the field during project phases. These staff will be responsible for collecting, recording, and monitoring submissions, guiding complainants where legal recourse is preferred, and ensuring the entire process is transparent and culturally appropriate. Grievances can be submitted through multiple channels including hotline, email, face-to-face meetings, or written forms available on-site.

The grievance process consists of four main steps: (1) Receiving and registering the grievance using a standardized form, allowing for anonymous submissions; (2) Evaluation of whether the issue is project-related and notifying complainants of the response timeline; (3) Resolution of the grievance through reparative actions within a maximum of 30 business days; and (4)

Closure, which includes documentation of the actions taken and signing of a closure protocol. If a grievance cannot be resolved, an independent Appeal Committee will reassess the issue.

For more information, please refer to Stakeholder Engagement Plan (SEP) of this Project.

8.2 Internal Grievance Mechanism

The Client has an established Employee Grievance/Complaint Management System, initially published on October 31, 2019, which will also be applied to this project. The system is designed to protect the rights of both employees and the company while ensuring smooth communication between employees and management. It aims to identify and address potential workplace issues proactively, fostering a harmonious labor environment in compliance with relevant laws and regulations. The policy applies to all employees and covers various types of grievances, including concerns about job positions, performance evaluations, compensation, working conditions, unfair treatment, and cases of discrimination or harassment.

To facilitate the resolution of grievances, the company has formed a Grievance/Complaint Handling Committee, consisting of the general manager, the human resources manager, the relevant department manager, and an employee representative. Employees can submit complaints either orally, in writing, or anonymously. Upon submission, the complaint is reviewed to determine whether it falls within the defined scope. If it is valid, it follows an escalation process, starting with the direct supervisor and moving through department heads, the Human Resources Department, the General Manager, and ultimately, the Board of Directors if necessary. Employees are expected to continue their work normally while their grievances are being processed.

The grievance handling process ensures that complaints are thoroughly investigated within 10 days, after which a resolution is provided. If the complainant is unsatisfied with the outcome, they have the right to escalate their case further. However, once a grievance reaches the final level—the Grievance/Complaint Handling Board—its decision is considered final, and employees must comply with it. Confidentiality is strictly maintained throughout the process, and any retaliation against complainants is met with severe disciplinary actions. Additionally, if an employee is found to have submitted a false complaint, they may face penalties in accordance with company regulations.

For more information, please refer to Labor Management Plan of this Project.