TÜRKİYE ORGANIZED INDUSTRIAL ZONES PROJECT
CONSULTANCY SERVICES FOR PREPARATION OF ENVIRONMENTAL AND SOCIAL ASSESSMENT STUDIES FOR SUB-PROJECTS (GROUP-3)

TRABZON ARSİN ORGANIZED INDUSTRIAL ZONE
SOLAR POWER PLANT PROJECT
ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

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AC	Alternating Current
ACM	Asbestos Containing Materials
AFAD	Disaster and Emergency Management Presidency
AoI	Area of Influence
APV	Air Pollution Contribution Value
BOD	Biological Oxygen Demand
CİMER	Presidency's Communication Center (Türkiye Cumhuriyeti Cumhurbaşkanlığı İletişim Merkezi)
CITES	Convention on the International Trade in Endangered Species of Wild Flora and Fauna
CLO	Community Liaison Officers
COD	Chemical Oxygen Demand
CoR	European Committee of the Regions
CORINE	Coordination of Information on the Environment
CR	Critically endangered
dB(A)	Decibel A
DC	Direct Current
DGIZ	Directorate General for Industrial Zones
DOKA	Eastern Black Sea Development Agency (Doğu Karadeniz Kalkınma Ajansı)
E&S	Environmental and Social
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EKAT	Electric High Current Facilities
EMRA	Energy Market Regulatory Authority
EN	Endangered
ENE	East-Northeast
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Monitoring Report
ESMS	Environmental and Social Management System
ESR	Environmental and Social Report
ESS	Environmental and Social Standards
EU	European Union
EUNIS	The European Nature Information System
GBV	Gender-Based Violence
GM	Grievance Mechanisms

GMR	Grievance Mechanism Report
H&S	Health and Safety
HSE	Health, Safety, and Environment
IBA	Important Bird Areas
IBRD	International Bank for Reconstruction and Development
IFC	International Finance Corporation
ILO	International Labor Organization
INA	Important Nature Area
IPA	Important Plant Areas
IUCN	International Union for Conversation of Nature
J-box	Junction Box
KBA	Key Biodiversity Areas
LC	Least Concern
LED	Light-Emitting Diode
LEL	Lower Explosive Limit
Lit	Literature
LM Plan	Labor Management Plan
LMP	Labor Management Procedure
LV	Low Voltage
MAK	Central Game Commission
MC4	Multi-Contact 4 millimeters
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoIT	Ministry of Industry and Technology
MoM	Minutes of Meetings
MoTF	Ministry of Treasury and Finance
MTA	Maden Tetkik Arama/ Mineral Research and Exploration
NACE	Nomenclature of Economic Activities
NE	Northeast (for 5.4 Climate Section)
NE	Not Evaluated (for 5.12 Biodiversity and Protected Areas Section)
NGO	Non-governmental organizations
NUTS	Nomenclature of Territorial Units for Statistics
Obs.	Observation
OG	Official Gazette
OHS	Occupational Health and Safety
OIZ	Organized Industrial Zone
PAP	Project Affected People
PBB	Polybrominated biphenyls
PBDE	Brominated diphenyl ethers
PFS	Protected Fauna Species

PID	Project Identification Document
PIU	Project Implementation Unit
PM	Particulate matter
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
PR	Public Relations
PS	Performance standard
PV	Photovoltaic
QMS	Quality Management System
R&D	Research and Development
RDB	Red Data Book
SCADA	Supervisory Control and Data Acquisition
SDS	Safety Data Sheet
SEA	Sexual Exploitation and Abuse
SEGE	Socio-Economic Development Index
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
SPFS	Strictly Protected Fauna Species
SPP	Solar Power Plant
SRC	Driver Certificate
TEDAŞ	Türkiye Electricity Production Inc.
TOIZP	Türkiye Organized Industrial Zones Project
ToR	Terms of Reference
TSE	Turkish Standards Institute
TSS	Total Suspended Solid
TurkStat	Turkish Statistical Institute
UNESCO	United Nations Educational, Scientific and Cultural Organization
VU	Vulnerable
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization
WWTP	Wastewater Treatment Plant
YİMER	Foreigners Communication Center (Yabancılar İletişim Merkezi)

EXECUTIVE SUMMARY

The Ministry of Industry and Technology (MoIT), in coordination with the Ministry of Treasury and Finance (MoTF), has secured funding from the World Bank (WB) for the implementation of the Türkiye Organized Industrial Zones Project (TOIZP). The WB will support the TOIZP through an International Bank for Reconstruction and Development (IBRD) loan, appointing the MoIT as the relevant Ministry responsible for its execution.

"Trabzon Arsin OIZ Solar Power Plant Project (the Project)" will be established within Trabzon Arsin OIZ as a sub-project of “TOIZP”, which is carried out with MoIT as the implementing agency providing the loan to Trabzon Arsin OIZ, which is the sub-borrower and the Project Owner.

To reduce the consumption of grid-supplied energy, Arsin OIZ decided to establish a rooftop solar power plant to be installed on a carport, with a total of 275 kW for its own consumption. The carport on which the solar panels will be installed, will be located on an area of 1,519.0 m^2 next to the OIZ’s administrative building, using 500 solar energy panels and 3 units (1x50 kW+2x100 kW) inverters. There will be no additional land required for the project.

The Project is not included in the scope of the Annex-1 and Annex-2 lists of the Environmental Impact Assessment (EIA) Regulation (Official Gazette dated 29.07.2022 and numbered 31907) and therefore, it is exempt from an EIA study. The EIA Exemption Letter dated 06.04.2023 and numbered 6149446 issued by Ministry of Environment, Urbanization and Climate Change (MoEUCC) for the Project is presented in Annex-1. The project is assessed as “moderate risk” as per Environmental and Social Standard 1 (ESS 1).

This Environmental and Social Management Plan (ESMP) identifies the potential risks and impacts that may arise during construction and operation phases of the Project and proposes appropriate mitigation measures to effectively address these risks and impacts. An assessment of the environmental and social impacts of the Project is included in Section 7. Section 8 and Section 9 summarize the measures to be taken to avoid/mitigate the identified impacts and monitoring activities for the pre-construction, construction and operation phases of the Project.

The TOIZP builds on an existing technical assistance relationship between the MoIT and the WB that helped develop a national framework for Green OIZs in Turkey and carried out preliminary assessments of the potential impact of OIZ investments. MoIT will be the implementing agency for the project and will provide the loan to Arsin OIZ, as the sub-borrower and the Project Owner. Arsin OIZ will be responsible for the implementation of the Project at the local level. The Construction Supervision Consultant will be responsible for monitoring and evaluating the performance of the services provided by the Contractor. The Construction Supervision Consultant, on the other hand, will provide necessary information to the Project Owner regarding compliance with the national and international legal requirements and take part in the organization of the stakeholder engagement activities. The Contractor will carry out the project activities in line with the approved design documents and will be responsible for implementing and applying the mitigation measures given in this ESMP during the construction phase. The Contractor will adhere to its responsibilities specified in this ESMP for compliance with national regulations and the WB Environmental and Social Framework (ESF) and the Environmental and Social Management Framework (ESMF) for the TOIZP.

A short-term low impact on the project area and its surroundings can be expected during the installation phase of the Project. Within the project’s scope, minor excavation works will be carried out to place the carport structures’ columns, transformer, and inverter buildings and cabling works. After column placement works, cabling and mounting works will be carried out. There will be short-term noise and dust generation during excavation works. Furthermore, the project area is located within OIZ with industrial and commercial units.

The project area consists of fill material (concrete) and vegetative soil. Some parts of the project area consist of natural vegetation and soil structure. During the site visit, it was assessed that there are approximately 27 trees in the soil area. The trees observed in the Project area are “pine” and “oak”. These trees are widely distributed species and are not included in protected species. Within the scope of the Project, 27 trees will be cut, and vegetative soil (topsoil) will be stripped. Relocation of trees are not planned. Stripped soil will not be stored in the Project area but will be utilized in green areas (park area, etc.) within the OIZ. At least twice the number of trees cut (approximately 54 trees) will be planted within the OIZ or in an area designated by the General Directorate of Forestry following the necessary correspondence with the General Directorate of Forestry by project owner.

The Project area includes an existing carport SPP. The project will be realized by expanding this SPP area. The floor of the existing SPP area is concrete. Excavation works will be carried out on this concrete floor for the SPP. The entire area within the project area, except for the carport structure, is a soil surface. There are topsoil, vegetation and trees in this non-concrete area. The inverter and transformer structures will be located on the soil surface. In this context, topsoil stripping and excavation works will be carried out on the soil surface for the transformer and inverter. Concrete will be laid in the area where the transformer and inverter will be located. Topsoil stripping and excavation work will also be carried out for cabling within the scope of the Project. After the cabling excavation, the cables will be manually covered with soil.

There is approximately 0.20 m depth of vegetative soil (topsoil) in the soil part of the Project area. There are trees in this area and trees will be cut down for the placement of the inverter and transformer structures. The remaining part will be evaluated as excavation material. The most important issue that may cause soil pollution from the project is waste and possible leakages from construction machinery. Possible impacts could be minimized if the mitigation measures given in Section 8 are implemented. The Area of Influence (Aol) of the Project has been determined as a 150 m-radius from the Project area.

The construction period will last four (4) months (120 days) and considering that the excavation works will take 5 days. Four (4) personnel will be employed during the construction phase and three (3) personnel will be employed during the operation phase of the Project.

The Project's anticipated environmental and social impacts/risks will relate to air quality, noise, waste, the socioeconomic environment, occupational health, and safety, as well as community health and safety. The Project will follow the ESMF of the TOIZP, good international industry practice, including WB Environmental and Social Standards (ESSs), World Bank Group (WBG) General Environmental, Health and Safety (EHS) Guidelines, WBG EHS Guidelines for Electric Power Transmission and Distribution and standards of the national legislation.

The ten (10) ESSs contained in the WB ESF are designed to support Borrowers’ projects through the requirements relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the WB. Out of these, six (6) ESSs establish the standards that Borrower and projects must follow throughout the project lifecycle:

- ESS1 Assessment and Management of Environmental and Social Risks and Impacts
- ESS2 Labor and Working Conditions
- ESS3 Resource Efficiency and Pollution Prevention and Management
- ESS4 Community Health and Safety
- ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS10 Stakeholder Engagement and Information Disclosure

ESS7 “Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities” and ESS9 “Financial Intermediaries” are not relevant to this project as there are no indigenous groups in Turkey that meet the definition provided in ESS7 and the project does not involve a Financial Intermediary. When any OIZ’s area is being determined, the Ministry of Culture and Tourism gives an opinion about the cultural and historical situation of the planned OIZ area. If any cultural and historical area is in that area, those areas are cut off from OIZ’s area. In addition, any project that will have adverse impacts on cultural heritage is considered ineligible and screened out from TOIZP. Therefore, “ESS 8: Cultural Heritage” is not relevant within the project, but chance find procedure is included considering the risk of chance finds during excavation works (see Annex-8). Additionally, ESS5 “Land Acquisition, Restrictions on Land Use and Involuntary Resettlement” will not be relevant for this Project since there is no land acquisition. The other six (6) ESSs are directly related to the Project. Scope and aim of the ESS’s related to the Project are explained in Section 3.2.

Additionally, all national standards and relevant regulations that will be applied within the scope of the Project are given in Section 3.
This ESMP document includes mitigation, monitoring, and institutional measures to be implemented during the pre-construction, construction, and operation phases of the Projects based on the ESMF of TOIZP. These measures are designed to eliminate, balance, or reduce adverse environmental and social risks and impacts to acceptable levels. The ESMP document primarily focuses on the following topics:

- Identifying environmental and social baseline conditions.
- Identifying potential environmental and social impacts and risks for pre-construction, construction, and operation phases.
- Detailing mitigation measures.
- Outlining monitoring activities.
- Defining roles and responsibilities for implementing mitigation measures and monitoring activities.
- Establishing the institutional structure for project management.
- Conducting interviews with stakeholders.
- Evaluating budget for implementation of ESMP.

The primary and most intensive activity that has the highest potential to create environmental and social impact within the scope of this project is the excavation works, which are essential for the installation of carport columns and inverter and transformer buildings. The anticipated environmental and social impacts/risks will relate to air quality, noise, excavation waste, vegetation, occupational health and safety, and traffic.

The environmental and social impacts addressed within the ESMP, along with the key mitigation measures, are summarized in Table 1.

Table 1. Key Mitigation Measures for the Project Implementation

Potential E&S Impacts	Key Mitigation Measures	
	Construction phase	**Operation Phase**
Air Quality	• Regular maintenance of machinery and equipment • Minimize dust from work sites by applying water spraying on the ground regularly during dry season • Construction activities are carried out at different times in different parts of the project area • Consultation with stakeholders and planning construction activities during periods that will result in least disturbance	• Regular maintenance of operation phase vehicles and equipment will be applied
Noise	• Regular maintenance of machinery and equipment • Consultation with stakeholders and planning construction activities during periods that will result in least disturbance. • Construction activities are carried out at different times in different parts of the project area	• Regular maintenance of operation phase vehicles and equipment will be applied
Water and wastewater	• Not damaging groundwater and other water resources • Minimization of water use for personnel needs	• Not damaging groundwater and other water resources • Minimization of water use for personnel needs and solar panel cleaning
Wastes	• Compliance with the waste management hierarchy (prevention-reduction-reuse-recycling-energy recovery-disposal) • Use of hazardous and non-hazardous waste storage areas • Recycling/disposal of waste by licensed companies • Keeping the project area clean • Storage of broken/ damaged solar panels in the OIZ's waste storage area and delivery of these panels to the licensed recycling/disposal company or producer depending on the agreement	• Compliance with the waste management hierarchy (prevention-reduction-reuse-recycling-energy recovery-disposal) • Use of hazardous and non-hazardous waste storage areas • Recycling/disposal of waste by licensed companies • Keeping the project area clean • Storage of broken/ damaged and end of life solar panels in the OIZ's waste storage area and delivery of these panels to the licensed recycling/disposal company or producer depending on the agreement • Raising personnel awareness on proper disposal of solar panels, specifically avoiding disposal of panels near water bodies
Soil Pollution	• Work machine and vehicle maintenance and repair operations will not be carried out in the project area. These operations will be carried out at the authorized services • Waste and wastewater management activities will be followed as described in this ESMP • Periodic maintenance and repairs of vehicles will be carried out regularly. • Response kits / spill kits to be used in emergency situations will be kept on site	• Waste and wastewater management activities will be followed as described in this ESMP • Response kits / spill kits to be used in emergency situations will be kept on site • proper maintenance of solar panels to avoid pollution to be caused by broken/ damaged solar panels
Biological Environment	• No damage to natural life in and surrounding the project area • No cutting of trees or destruction of vegetation except project area	• No damage to natural life in and surrounding the project area
Topsoil stripping	• Full stripping of topsoil from the project area (due to concrete works)	• Utilization of topsoil in green areas within the OIZ

Potential E&S Impacts	Key Mitigation Measures	
	Construction phase	Operation Phase
	• No loss during stripping and loading of topsoil.	
Tree cutting	• At least twice the number of trees cut will be planted within the OIZ or in an area designated by the General Directorate of Forestry	• No cutting of trees
Labor Conditions	• Providing transparent, non-discriminatory, equal recruitment opportunities with respect to ethnicity, religion, language, gender and sexuality • Providing Labor Management Plan (LM Plan) provisions compliant with Labour Management Procedures of the TOIZP, ESS2 and national law and provision of written contracts to workers • Providing trainings on environment, social, occupational health and safety, labor, Grievance Mechanism (GM), gender-based violence (GBV) and sexual exploitation and abuse and sexual harassment (SEA/SH) • Implementation of Grievance Mechanism • Proper adaptation of human rights policy and labor rights	• Providing transparent, non-discriminatory, equal recruitment opportunities with respect to ethnicity, religion, language, gender and sexuality • Providing trainings on environment, social, occupational health and safety, labor, Grievance Mechanism (GM), gender-based violence (GBV) and sexual exploitation and abuse and sexual harassment (SEA/SH) • Implementation of Grievance Mechanism • Proper adaptation of human rights policy and labor rights
Traffic	• Traffic scheduling • Compliance with traffic rules and speed limits • Usage of appropriate traffic signage • Traffic safety and minimum traffic flow disruptions by providing alternative routes • Prevention of storage of excavation waste and machineries on traffic lanes • Control driving speed of vehicles particularly when passing through community or nearby school, health center or other sensitive areas	• Compliance with traffic rules and speed limits • Usage of appropriate traffic signage
Community Health and Safety	• Hanging warning signs in and around the project area • Consultation with stakeholders and planning construction activities during periods that will result in least disturbance • Building temporary pedestrian walkways for safety in compliance with the requirements for the passage of individuals with physical challenges and other vulnerable/disadvantaged individuals/groups, such as pregnant, elderly, children • Rope off construction area and secure materials stockpiles/ storage areas from the public and display warning signs including at unsafe locations. Do not allow children to play in construction areas • Ensure structural openings are covered/protected adequately • Fill in all earth borrow-pits once construction is completed to avoid standing water, water-borne diseases and possible drowning	• Hanging warning signs in and around the project area • Restricted access

Potential E&S Impacts	Key Mitigation Measures	
	Construction phase	**Operation Phase**
Occupational Health and Safety	• Surrounding work areas with barriers • Ensuring that the use of construction equipment is carried out by certified persons • Ensuring that personnel use personal protective equipment • Precautions to be taken especially against working at height and fire risk • Safe working procedures • Equipment maintenance	• Hanging warning signs • Precautions to be taken especially against working at height and fire risk • Safe working procedures • Equipment maintenance • Implementation of necessary mitigation measures especially related with working at height for panel cleaning and repair/maintenance activities during operation phase
Stakeholder Engagement	• Consultation with stakeholders on project and E&S instruments • Development of Stakeholder engagement Plan (SEP) based on the Stakeholder Engagement Framework (SEF) of the TOIZP	• Implementation of GM

The implementation of mitigation measures will be followed by the monitoring activities presented in Section 9 and the intentions of these activities are to follow adverse environmental and social impacts/risks, and to measure the effectiveness of the mitigation measures, including responsibilities and schedule for implementing the monitoring activities.

1. INTRODUCTION

Türkiye is advancing with the “Türkiye Organized Industrial Zones Project (TOIZP)'', funded by the World Bank (WB) and overseen by the Ministry of Industry and Technology’s (MoIT) Directorate General for Industrial Zones (DGIZ), focusing on improved infrastructure and sustainable technologies.

The TOIZP will involve comprehensive investments in primary infrastructure, such as the establishment and improvement of roads, water and gas pipelines, power lines, and logistics facilities. These investments are intended to support the Organized Industrial Zones’ (OIZs') functioning and growth, thereby contributing to their efficiency, environmental sustainability and competitiveness.

Additionally, the TOIZP significantly emphasizes “green” infrastructure, which is pivotal for fostering environmental sustainability. Investments will be made in advanced technologies that will improve energy and water efficiency facilities, foster the development of advanced wastewater treatment plants, encourage the construction of energy-efficient buildings, and replace conventional lighting systems with Light-Emitting Diode (LED) street lighting.

Furthermore, in line with the global trend towards renewable energy sources, the TOIZP includes provisions for the establishment and expansion of renewable energy assets. These will encompass a variety of renewable technologies, such as solar, wind, and biomass, thus facilitating the transition towards a more sustainable and low-carbon industrial sector.

The MoIT, in coordination with the Ministry of Treasury and Finance (MoTF), has secured funding from the WB for the execution of the TOIZP. The WB will support the OIZs through an International Bank for Reconstruction and Development (IBRD) loan, and the MoIT as the Line Ministry will be responsible for its execution.

The specific objectives of the TOIZP are as follows:

- Energy savings from OIZ investments in basic and green infrastructure (MWh per year)
- Water savings from OIZ investments in green infrastructure (cubic meters per year)
- Reduction in CO_2 emissions due to supported investments (metric tons per year)
- Share of OIZs that attract new investments.

For Trabzon Arsin OIZ, harmonious development with nature is essential, focusing on using natural resources responsibly and adhering to environmental order. This approach is key to enhancing energy efficiency and preserving natural resources. "Carport SPP Project" and "Green Transformation Strategy and Roadmap Preparation Project" are being carried out by Arsin OIZ within the stated objectives.

The Carport SPP Project aims to ensure the green transformation and energy efficiency of Trabzon Arsin OIZ, which is growing with an eco-friendly approach, as well as to increase the international competitiveness of its members.

With the "Green Transformation Strategy and Roadmap Preparation Project", the risks, opportunities, expectations, and needs faced by the sectors are being determined to reveal the current situation of Trabzon Arsin OIZ and to create strategies for the programs to be carried out in the field of Green Consensus.

To reduce the electricity costs of the Arsin OIZ management, the method of obtaining electricity from solar energy will be used in the Project. Among the renewable energy investments in the region, the most suitable and short-term project is solar energy investment.

Therefore, "Trabzon Arsin OIZ Solar Power Plant Project (the Project)" will be established within the boundaries of “Trabzon Arsin OIZ”/”Arsin OIZ” (Project Owner) in Arsin district of Trabzon province, as a sub-project of the TOIZP, which is carried out in cooperation with the MoIT and the WB. MoIT, being the implementing agency for the project, will provide a loan to

Arsin OIZ, as the sub-borrower and the Project Owner. The Industrial Zones Directorate in MoIT will be the responsible Project Implementation Unit (PIU). The Project Owner is Arsin OIZ.

Per Annex-1 of the EIA Regulation (Official Gazette dated 29.07.2022 and numbered 31907), an EIA is mandated only for specialized OIZs during the establishment phase. As Trabzon Arsin OIZ is classified as a mixed zone, it is exempt from the national EIA requirement. Furthermore, Article 24, subparagraph c, of the Regulation specifies that the EIA process for projects planned in Organized Industrial Zones will be determined by the Ministry of Environment, Urbanization, and Climate Change (MoEUCC).

The same EIA Regulation states that solar power plants (SPPs) with a capacity of 10 MW_m or more, or those covering an area of 20 hectares or more, fall under Annex I, making them subject to the EIA procedure. Additionally, SPPs with a capacity of 1 MW_m or more, or covering an area of 2 hectares or more, are listed in Annex II, necessitating pre-examination and environmental impact assessment. According to this regulation, solar photovoltaic (PV) facade and roof systems are not subject to the EIA process. Consequently, the project planned for the carport roofs at the parking lots is not subject to EIA. In line with this, Trabzon Governorship Provincial Directorate of Environment, Urbanization and Climate Change has issued an 18.12.2023 dated and 8257554 numbered "EIA Exemption Letter" for the Project (see Annex-1).

Under the scope of this project, screening studies have been completed and the related risk assessment has been conducted. As a result of this assessment, the project is classified as "Moderate" under the World Bank Environmental and Social Framework (ESF) and Environmental and Social Standard 1 (ESS1).

Therefore, this Environmental and Social Management Plan (ESMP) and Stakeholder Engagement Plan (SEP) have been prepared by Çınar Engineering and Consulting Inc. (ÇINAR) for the Trabzon Arsin OIZ as part of the environmental and social impact and risk assessment studies for the Project. The ESMP has been prepared in compliance with the World Bank's Environmental and Social Framework (ESF), including the Environmental and Social Standards (ESSs), the Environmental and Social Management Framework (ESMF), Labor Management Procedures and Stakeholder Engagement Plan of TOIZP and the prevailing national legislation in Türkiye.

1.1 Purpose

The ESMP is designed to systematically identify, assess, and manage the potential environmental and social (E&S) impacts and risks associated with the pre-construction, construction, and operational phases of the Project. This document outlines a comprehensive strategy for evaluating these risks and impacts and implements a suite of mitigative measures aimed at either preventing or minimizing any adverse effects.

The purpose of the ESMP is to provide a practical plan for mitigating, managing and monitoring environmental and social risks and impacts and to provide the necessary management tools to ensure compliance with Project standards in achieving environmental and social objectives. Additionally, hazards, social and environmental repercussions anticipated to arise throughout the construction and operation phases are identified. The Project's potential effects are outlined, along with the steps that must be taken to minimize and/or reduce risks and/or consequences at their source. The responsible project stakeholders are identified, and monitoring and control actions are decided upon over the Project lifespan to prevent and mitigate the consequences detailed in this ESMP.

The main objectives of this ESMP are as follows:

- To cover;
  - project description including location,
  - Compliance with relevant laws and regulations,
  - Initial assessment of surrounding environment and community,
  - Organizational structure for project implementation
  - Strategies to address and oversee environmental and social impacts
  - Engagement and addressing concerns of involved parties
  - Process for addressing stakeholder complaints
- To provide an overview of the environment, ecological, health and safety (EHS), socio-economic and cultural heritage policies, standards and legal legislation that the Project is obliged to comply with,
- To ensure that pre-construction, construction and operation activities are properly checked to be in compliance with national standards, ESMF of the TOIZP, WB ESSs and WB Group's (WBG) EHS Guidelines requirements,
- To determine the roles and responsibilities of Project' parties to ensure compliance with the relevant requirements during the pre-construction, construction and operation phases of the project,
- To establish an E&S baseline for the project area and plans E&S mitigation measures,
- To ensure reporting systems are developed and streamlined to deliver the relevant requirements (national standards and WB ESSs) compliance performance,
- To follow the progress in achieving the environmental and social objectives and targets and to make improvements.

1.2 Scope

This ESMP covers the project description, legal framework, environmental and social baseline conditions, environmental and social impacts, mitigation management and monitoring plans, institutional arrangements, for the "Trabzon Arsin OIZ Solar Power Plant Project". This project is intended to be implemented in the parking lot area next to the administrative building of the OIZ in Arsin district of Trabzon province. The ESMP provides guidelines to the responsible parties with a set of mitigation measures to be conducted during all stages of the project, including pre-construction, construction, and operation phases to avoid potential adverse environmental and social impacts.

2. PROJECT DESCRIPTION

Arsin OIZ, which officially opened on 13th October 1985, consists of 91 industrial parcels in 25 building blocks, the smallest of which is 3,001.44 m^2 and the largest is 28,237 m^2, located on 983,420 m^2, currently hosts 86 active companies, which employ around 5,000 people, and five (5) more companies are under construction. In the zone, production is carried out in 16 different sectors, mainly food, metals and plastics. Companies located in the OIZ export their products to all countries of the world, especially Europe, America and Africa. Hazelnuts are the main export item.

To reduce the electricity costs of the Arsin OIZ management, the method of obtaining electricity from solar energy will be used in the project. Among the renewable energy investments in the region, the most suitable and short-term project is solar energy investment.

The project is intended to be implemented in the parking lot area next to the administrative building of the OIZ. The right to use the parking lot belongs to the OIZ management. For the system to be installed, 500 photovoltaic (PV) solar energy panels and a total of three (3) inverters of various powers will be used. The SPP will have a total capacity of 275 kWp/250 kWe. The technical detail of the system is given in Section 2.3.

2.1 Objectives of the Project

The Arsin OIZ Directorate would like to integrate the entire business operations inside the zone into a renewable energy cycle. One of the main sustainability goals of Arsin OIZ is to increase the use of renewable energy utilization in the regional directorate.

In other words, the Project is expected to contribute to boosting the level of renewable and green energy to enhance productivity and efficiency of the zone. Correspondingly, in the long term, the Directorate wants to completely redesign all its industrial ecosystems and completely integrate them with the renewable energy efforts across the globe and in line with its circular economy goals.

Arsin OIZ Directorate aims to increase the share of renewable energy in total energy use, to reduce energy costs and to benefit more from renewable energy types that will contribute to reducing greenhouse gas emissions. In addition, the OIZ legal entity has the aim of eliminating electricity energy costs.

2.2 Project Location

The Project area is located within the boundaries of Arsin OIZ that is situated in Arsin district of Trabzon province, on an area of approximately 1,519 m².

Arsin district is located 20 km east of Trabzon province on the Trabzon-Rize coastline. It is surrounded by Araklı district to the east, Yomra district to the west, Black Sea to the north and Yağmurdere sub-district of Gümüşhane province to the south. There is a seven (7) km seacoast with the Black Sea, a 28 km land border with Yomra district to the west, and a 35 km land border with Araklı district to the east. The location map of the Project area is given in Figure 1 and layout plan of the Trabzon Arsin OIZ is given in Annex-11.

The environmental area of influence (AoI) of the project has been determined as 150 m-radius from the Project area, considering the air quality and noise impacts. The AoI defined for the Project area is given in Section 7.1.1 and Figure 23.

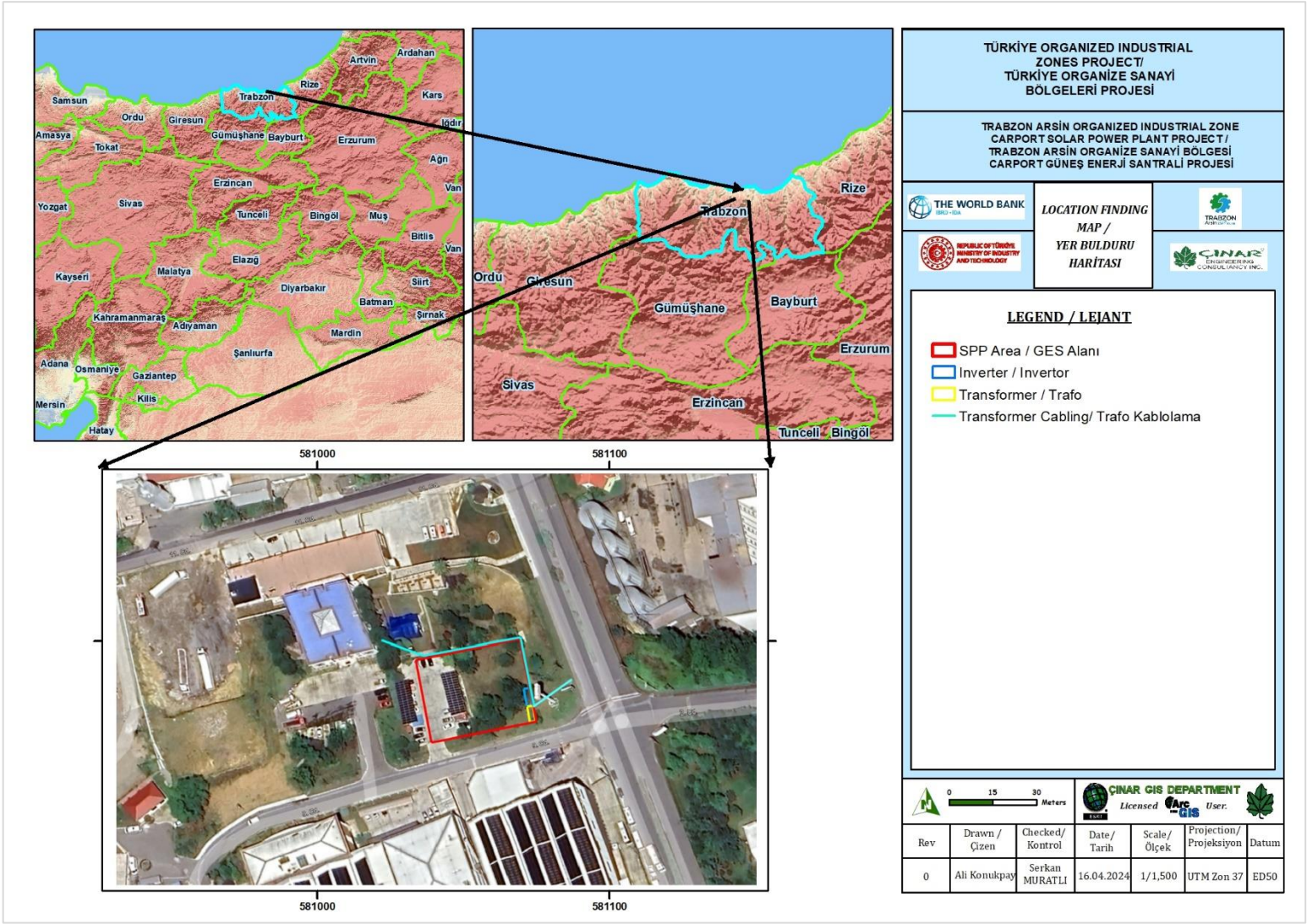


Figure 1. Project Location Map

2.3 Project Components[1]

For the system to be installed in the scope of the project, 500 photovoltaic (PV) solar energy panels and a total of three (3) inverters of varying capacities (1x50 kW+2x100 kW) along with their necessary connections will be installed at the parking lot owned by the Arsin OIZ Directorate. The SPP will have a total capacity of 275 kWp/250 kWe and is expected to generate an average of 270,000 kWh of electricity annually.

The area where the Project will be implemented is currently used as a parking lot and green area. The area where the inverter and transformer structures will be located is a green area which has soil structure within the Project area. There is vegetative soil and trees in the area. Moreover, there are no associated facilities that will be related to the Project.

The works within the scope of the project will be as follows:

1. Excavations for carport columns (concrete ground excavation), inverter and transformer buildings and transformer cabling (topsoil stripping and soil ground excavation)

2. Covering the area where the inverter and transformer will be located with concrete

3. Placement of the carport structure

4. Installation of solar panels and inverter and transformer placement

5. Cabling works

6. Repair and maintenance in the operation phase.

The equipment to be used in SPP system is detailed below.

The block diagram of a solar power plant is shown in Figure 2. Most PV modules are made from semiconductor materials, usually some type of silicon. When photons from sunlight hit the semiconductor material, free electrons are produced, and these electrons then flow through the material to generate a direct current (DC). DC current must be converted to alternating current (AC) using an inverter before it can be used in electrical appliances or supplied to the electricity grid.

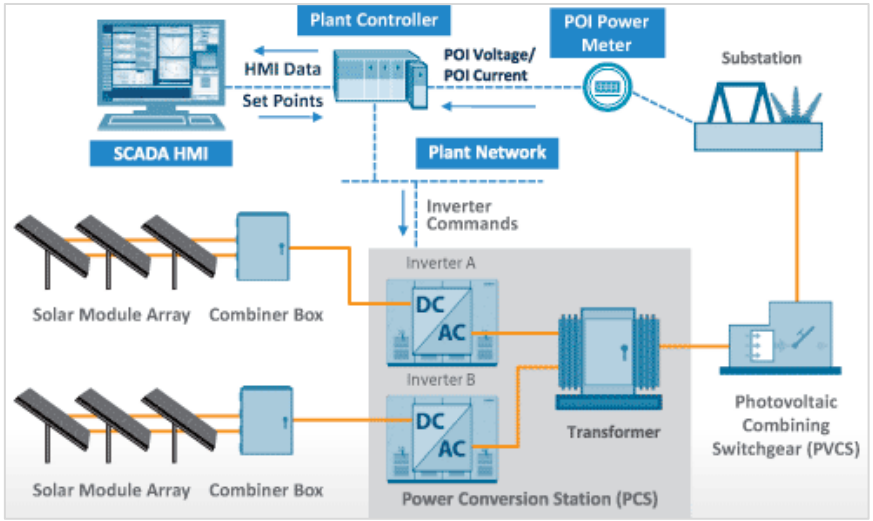


Figure 2. SPP Block Diagram

[1] **Source:** Trabzon Arsin OIZ Solar Power Plant Project Identification Document (PID), Eptisa, May 2023

PV Module

PV module is a group of photovoltaic cells mounted in an aluminum frame. Photovoltaic cells use sunlight as an energy source and generate direct current electricity. A sequence is formed by connecting PV modules in series. The components of a PV module are shown in Figure 3.

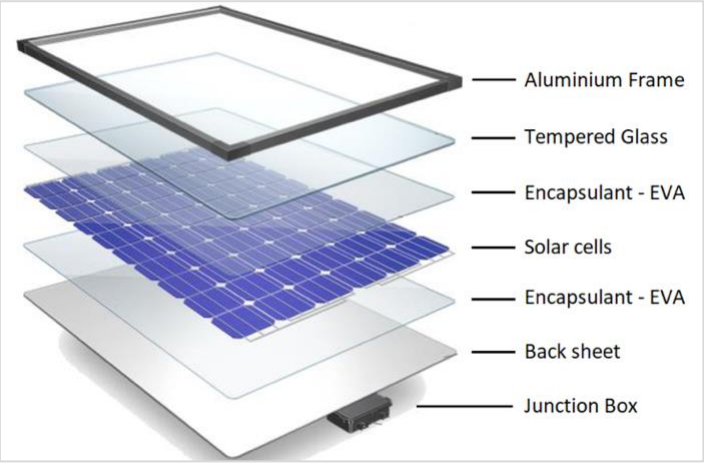


Figure 3. PV Module Components

Photovoltaic modules use light energy (photons) from the sun to generate electricity through the photovoltaic effect. Most modules use wafer-based crystalline silicon cells or thin film cells. The structural (load bearing) element of a module can be the upper layer or the back layer. Cells must be protected from mechanical damage and moisture. Most modules are rigid, but semi-flexible ones are also available. Cells are electrically connected one after another in series until the desired voltage is achieved, and then these PV module strings are connected in parallel to the inverter to increase the amperage. The wattage of the module is the mathematical product of the module's voltage and amperage. Properties on PV modules are values obtained under standard conditions.

A PV junction box (J-box) is installed behind the solar panel and acts as the output interface. Most photovoltaic modules use multi contact 4 millimeters (MC4) connectors for external connections.

String Inverters

Most small solar power systems use string inverter technology. In this solar technology, each solar panel is connected to strings. The electricity generated by the solar panel goes to the inverter, and eventually, the inverter converts direct current into alternating current by imitating the grid. Therefore, inverters will not work when the mains are cut.

Carport Mounting Structure

In flat roofs, the support system can be ballasted to prevent damage to the roof. As the parapets on the roof block strong winds from getting under the panels, the concrete blocks, panels, and support system stay in place due to their weight. The metal structure can be manufactured at the desired angle. The support system is made of hot-dip galvanized steel to ensure resistance to outdoor conditions. Purlins are constructed from aluminum. The current carport structure is shown in Photograph 1. The carport shown in Photograph 1 is located within the SPP project area and belongs to the OIZ management. Currently, the existing solar panels on the carport are in operation. The project will be implemented with the enlargement of this structure.

Photograph 1. Existing Carport Structure in the Project Area

2.4 Project Timeline and Number of Employees

The timeline of the project is given in Table 2[2]. The construction phase of the project is planned to last for four (4) months (120 days), with the excavation works having a duration of five (5) days.

Table 2. Time Schedule

Year	2023				2024				2025				2026			
Work	**I**	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**
Excavation and Installation																
Taking Into Operation																
Fault Liability Period																
Controllership																

Four (4) personnel will be employed during the construction phase and three (3) personnel will be employed during the operation phase of the Project.

[2] **Source:** Arsin OIZ Management

2.5 Permits and Management System of the OIZ

2.5.1 Management Systems of the OIZ

Arsin OIZ has an “Energy Policy[3]” and “Quality Policy”[4]. Arsin OSB has "ISO 50001 Energy Management System" certificate valid between 05.11.2021 and 05.11.2024 (see Annex-2). Arsin OIZ management declared that there are no plans to obtain another quality certificate in the current situation.

2.5.2 Permits

Organized industrial zones are regulated by the OIZ Law No. 4562, to ensure the structuring of the industry in ready-to-use industrial areas, to prevent environmental and health problems, to use resources rationally, to benefit from information and information technologies.

The procedure to be applied for the projects planned to be built in organized industrial zones is determined by the Ministry of Environment, Urbanization and Climate Change in accordance with Article 24, subparagraph c, of the EIA Regulation, which came into force after being published in the Official Gazette dated 29.07.2022 and numbered 31907. According to the Annex-1 of the EIA Regulation (29.07.2022 / 31907), at the establishment phase, EIA is required only for the specialized OIZs. Since the type of Arsin OIZ is mixed, EIA was not required for Arsin OIZ.

The Project is exempt from the EIA Regulation and the EIA Exemption Letter issued by MoEUCC for the Project is presented in Annex-1.

The WWTP of Trabzon Arsin OIZ is evaluated within the scope of Annex-1 list Article 10.1 "Common wastewater treatment facilities[1,2] belonging to the regions where industries are located collectively" of the Environmental Permit and License Regulation Annex-1 list, which entered into force after being published in the Official Gazette dated 10.09.2014 and numbered 29115 (1: Facilities exempt from environmental permits on environmental noise 2: Facilities exempt from environmental permits on air emission). In this scope, the WWTP has an "Environmental Permit" with document number 228490125.0.1 and valid between 06.05.2020-06.05.2025 (see Annex-2).

Arsin OIZ is a network operator as well as holding a distribution company license. Energy Market Regulatory Authority (EMRA) issued a 49-year distribution license to the Arsin OIZ on 22.11.2007. The License number is ED-OSB/1381-1/996 (see Annex-2). This enabled the OIZ to handle all electricity distribution systems inside OIZ.

The Right to Establish, Use and Operate Infrastructure Facilities

According to Article 20 of the OIZ Law no. 4562, OIZs have right to establish and operate infrastructure and general service facilities such as electricity, water, sewerage, natural gas, treatment facilities, roads, communication and sports facilities within the approved borders of the OIZ. Since the subproject is within the border of OIZ, Trabzon Arsin OIZ has right to establish and operate the subproject.

Relevant Legislations

The main regulations related to the design, construction and operation phases of the project are listed below:

- Electricity Market Law No.6446: Date:14/3/2013
- Renewable energy and electric energy generation Law No: 5346 Date: 10/5/2005
- Presidential Decision No: 1044 Date: 09.05.2019

[3] **Source:** https://www.tosbol.org.tr/enerji-politikamiz-TR.html
[4] **Source:** https://www.tosbol.org.tr/kalite-politikamiz-TR.html

- Regulation on Unlicensed Electric Generation Official Gazette No: 31044 Date: 19.02.2020
- Electrical Installations Project Regulation Official Gazette No: 29221Date: 30.12.2004
- Regulation on technical evaluation of solar energy-based electricity generation application Official Gazette No: 30110 Date: 30.6.2017
- Energy Market Regulatory Authority (EMRA) Board of Directors Meeting Decision Official Gazette No: 8666, Date: 20.06.2019
- EMRA Board of Directors Meeting Decision Official Gazette No: 31920 Date: 11.08.2022
- Environmental Impact Assessment Regulation (31907/29.07.2022)
- Occupational Health and Safety Law No. 6331
- 5510 Social Security and General Health Insurance Law
- 4857 Labor Code

The Electricity Market Law No. 6446 states that a license must be obtained from the EMRA for electricity generation to the market. The condition of license holders to be limited liability or joint stock companies has been introduced by the Turkish Commercial Code.

Organized Industrial Zones Law (Law No: 4562), which entered into force after being published in the Official Gazette dated 15.04.2004 and numbered 24021, contains the following statements:

"*Article 4- Representatives of the metropolitan municipality, provincial municipality, district municipality, town municipality, chamber of industry established in accordance with the Law on the Union of Chambers and Commodity Exchanges of Türkiye and Chambers and Commodity Exchanges dated 18.5.2004 and numbered 5174, or chamber of commerce and industry, or chamber of commerce, or chamber of commerce, special provincial administration or investment monitoring and coordination presidency, representatives of relevant professional organizations and organizations may take part in the OIZ establishment based on the Ministry's approval. Upon the approval of the establishment protocol signed by the representatives of the institutions and organizations involved in the establishment of the OIZ and the governor by the Ministry and its registration in the registry, the OIZ becomes a legal entity.*

Article 23-The OIZ establishment protocol shall be prepared by the institutions or organizations participating in the establishment of the OIZ and approved by the Ministry."

In this context, the "establishment protocol" is required for the OIZ to gain legal entity and start its activities. The establishment protocol (Trabzon Arsin OIZ Main Agreement) and authorization certificate of the Trabzon Arsin OIZ are presented in Annex-2.

Permits belonging to OIZ is listed below:

- Electricity Distribution License
- Establishment Protocol
- Environmental Permit

All necessary permits for the operation of the OIZ are in place. OIZ has provided all necessary permits according to the existence of the establishment protocol.

3. LEGAL FRAMEWORK

3.1 National Legal Framework

The National Legislation applicable to the management of environmental, social, health and safety aspects of the proposed Project is presented in r this section.

Turkish Environmental Law No. 2872, which was published 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. Following its first publication date of 1983, various amendments have been made.

Significant developments in the field of health and safety in the national context took place with the entry into force of the Occupational Health and Safety Law No. 6331 on 30.06.2012. With the entry into force of the law, detailed regulations on safety and health were made and a road map was drawn. Occupational health and safety legislation in Türkiye has been structured in line with the Constitution. Regulations on occupational health and safety are included in Section 7.2.9 and Annex-7.

In addition to Environmental Law and associated regulations, several laws in relation to environmental protection, pollution prevention and control, human rights, health and safety are listed in Annex-7.

3.2 International Standards

The methodology to be used for characterization of environmental and social impacts/risks arising from the implementation of the Project will be developed based on the methodologies described in the WB Environmental and Social Framework (ESF).

Within the ESF, risk categorization is a method used to evaluate projects or programs, identifying their potential environmental and social risks and impacts. This process is essential for customizing the extent of environmental and social assessment, planning, and supervision necessary for each project, taking into account its characteristics and potential risks.

WB classifies all projects into one of four classifications: High Risk, Substantial Risk, Moderate Risk or Low Risk. Based on detailed assessments conducted in the preliminary stages, and considering the potential risks and impacts associated with the project, it has been concluded that this project falls under the category of 'moderate risk'.

WB ESF consists of ten (10) Environmental and Social Standards (ESSs) that are designed to support Borrowers' projects through the requirements relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by WB (see Figure 4). Out of the 10 ESSs, six establish the standards the Borrower and the projects must adhere to throughout the lifecycle of this project.

The main objectives of the ESSs, gaps between the Turkish EIA Regulation and World Bank's ESF and environmental and social studies conducted/to be conducted to fill the gap are summarized in Table 3.

Figure 4. Environmental and Social Standards (ESSs) of ESF

Other guidelines and principles to be followed within the scope of this project are as follows:

- World Bank Group (WBG) General EHS Guidelines (2007)
- WBG EHS Guidelines: Electric Power Transmission and Distribution (2007)

International standards and conventions related with occupational health and safety are listed in below:

- ILO Conventions
  - Convention No. 155 on Occupational Safety and Health, 1981

Convention No. 155 on Occupational Safety and Health, 1981, requires the development, implementation, and periodic review of a consistent national policy concerning occupational safety, health, and the work environment. The aim of this policy is to minimize, to the extent possible, accidents and injuries related to work or arising in the course of work and to prevent occupational hazards present in the work environment.

  - Convention No. 187 on the Promotion of Occupational Safety and Health Framework. 2006,

Convention No. 187 on the Promotion of Occupational Safety and Health Framework, 2006, To gradually establish an effective framework for creating a safe and healthy working environment through national systems and programs on occupational health and safety, contribute to the continuous improvement of occupational health and safety by developing national policies, systems, and programs to prevent workplace accidents, occupational diseases, and fatalities, and aim to sustain efforts at all levels regarding the right to a safe and healthy working environment.

  - Convention No. 161 on Occupational Health Services, 1985,

Convention No. 161 on Occupational Health Services, 1985, Occupational Health Services are services responsible for advising the employer, workers, and their representatives on establishing and maintaining a safe and healthy work environment at a level that meets the most appropriate physical and mental health conditions related to work, aiming to provide employees with a healthy and safe working environment.

  - Convention No. 167 concerning Safety and Health in the Construction Industry, 1988

Convention No. 167 concerning Safety and Health in the Construction Industry, 1988, This Convention applies to all construction activities, including any processes, operations, or transport on the construction site, from the preparation of the site to the completion of the

project, encompassing all types of construction work, building construction, construction engineering, and construction and demolition activities.

- WBG General EHS Guidelines (2007)
  - 2.0 Occupational Health and Safety
  - 3.0 Community Health and Safety
  - 4.0 Construction and Decommissioning

Table 3. Relevance of WB ESSs with the Project

ESS	Scope / Aim of the ESS	Gaps between the Turkish EIA Regulation and World Bank's ESF	E&S Requirements & Measures to Be Followed in this Project to Bridge the Gap
ESS1 Assessment and Management of Environmental and Social Risks and Impacts	Evaluating the consequences of the Project's construction and operation phases on the physical, biological, and social environments. The environmental and social risks and impacts will be identified, and necessary actions and mitigation measures will be determined to avoid or minimize these risks to acceptable levels.	The main gaps between the national EIA and the ESS1 are as follows: • The process of integrating social impact assessment into the Turkish EIA has started in recent years. Especially with the EIA Regulation published in the Official Gazette dated 29.07.2022 and numbered 31907, social impact assessment has started to be included in Turkish EIA. Turkish EIA is currently open for improvement but requires a fully integrated process to reach WB ESS1 standards. • In addition, the requirement to address cumulative impacts of other concurrent projects is limited in Turkish EIA legislation. Under WB ESS1, cumulative impact assessment is in a more emphasized position. • The preparation of Environmental and Social Management Plans has been included in Turkish legislation with the latest regulation. However, the management plans prepared are less comprehensive than the ones required under WB ESS1. • There is limited emphasis on the associated facilities in the national EIA legislation.	Project specific Environmental and social assessment studies will be prepared in accordance with ESS1. In this context, the Environmental and Social Management Framework (ESMF) approved by the World Bank for the TOIZP will be the building block of the environmental and social assessments. This ESMP has been prepared in line with ESS1 to bridge the gap. The environmental and social assessment will cover cumulative impacts as defined in ESS1. Depending on the level of impacts and proposed mitigation measures, necessary additional documents such as a chance finding procedure will be included in the ESMP.
ESS2 **Labor and Working Conditions**	Implementing appropriate working conditions to ensure the safety of those working during the construction and operation phases. Risks to the employees will be identified, and preventive measures, including training, personal protective equipment, measurements, and analysis, will be applied.	Turkish national laws and regulations are generally close to the requirements of ESS2. The grievance mechanism for workers is the most important gap between the two parties. There are no specific requirements for the establishment and implementation of a grievance mechanism in Turkish national legislation.	The LMP of the TOIZP will be followed, and Contractor will prepare its own Labour Management Plan (LM Plan) in line with TOIZP's LMP. A Grievance Mechanism for workers' will be established. The grievance mechanism and guidelines for its implementation have been included in this project specific ESMP and Stakeholder Engagement Plan (SEP).
ESS3 **Resource Efficiency and Pollution Prevention and Management**	Promoting the efficient use of natural resources within the project scope. Plans and procedures will be established and monitored to minimize unnecessary resource use during the Project's construction and operation phases.	Most Turkish national laws and regulations are in line with European Union (EU) directives. There is no major gap between ESS3 and Turkish national legislation. National EIA process is quite successful in identifying impacts. With the EIA Regulation published in the Official Gazette dated 29.07.2022 and numbered 31907, sub-management plans and monitoring plans that provide more detailed mitigation methods have been included in the scope of national EIA. Furthermore, there is no major gaps between the mitigation methods in the national legislation on major environmental issues such as waste, air pollution, water resources and wastewater, noise level and WB ESS3.Mitigation methods defined by national environmental legislation are mostly in line with the WB ESS3.	The project phase specific mitigation and monitoring programs included in this ESMP will be effective in addressing the minor gaps between Turkish legislation and WB ESS3.
ESS4 **Community Health and Safety**	Ensuring the local community is not adversely affected in terms of health and safety during the projects. Necessary precautions will be implemented, and the local community will be kept informed about the projects.	In Turkish national legislation, the general principles of community health and safety are fragmented under different regulations. The general principles are similar to WB ESS4. However, labor influx and gender impacts and violence-based risks are more prominent under the WB ESS4.	The differences mentioned in the ESS4 will be covered in detail in this ESMP document and the gap will be addressed.
ESS6 **Biodiversity Conservation and Sustainable Management of Living Natural Resources**	Preserving the existing biodiversity in and around the projects area. Measures will be taken to identify and protect any endemic species and to prevent harm to the surrounding biodiversity.	Internationally recognized areas of high biodiversity value such as Key Biodiversity Areas (KBA) are not completely assessed under national legislation. However threatened species in these areas are protected according to the requirements of General Directorate of Nature Conservation and National Parks. There is no habitat assessment and critical habitat assessment requirement in national legislation.	As the Project area is located within the boundaries of the OIZ, the assessments made within the scope of this ESMP will be limited considering the location of the project and distance to the legally protected and internationally recognized areas of high biodiversity value. Additionally, this ESMP has eliminated the gaps between the national legislation and WB standards by considering the requirements stipulated in ESS6.
ESS10 **Stakeholder Engagement and Information Disclosure**	Engaging and informing organizations and individuals who might be affected by the projects. This includes establishing a mechanism for suggestions and complaints and ensuring stakeholders are well-informed throughout the Project's lifespan.	In the Turkish EIA legislation, EIA Report for the projects in the list of Annex-I will be made available to the public opinion at the headquarters of MoEUCC or provincial directorates. Following MoEUCC's final assessment of the EIA report, the Governor's Office will disclose its reasoned decision publicly. For the projects in the list of Annex-II, the final Project Introduction File (PIF) will be disclosed publicly at the Provincial Directorates. Similarly, public information and consultation meetings are held only the projects listed in Annex-I of the Turkish EIA Regulation.	The TOIZP contains a Stakeholder engagement Framework (SEF), on which basis a SEP and grievance mechanism will be prepared for this project . The SEP will establish a plan for stakeholders and stakeholder engagement and the grievance mechanism will be followed throughout the project lifetime. Draft and final versions of SEP and ESMP documents will be disclosed to public through Project Owner's website, and as hard copies in the Project Owner's and relevant mukhtar offices throughout the project lifetime.

ESS	Scope / Aim of the ESS	Gaps between the Turkish EIA Regulation and World Bank's ESF	E&S Requirements & Measures to Be Followed in this Project to Bridge the Gap
		However, according to WB ESS10, public/stakeholder consultation meetings (at least once) and information disclosure activities are performed regardless of the category of the project.	

ESS7 "Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities" and ESS9 "Financial Intermediaries" are not applicable to these Projects. There are no indigenous groups in Türkiye that fit the definition provided in ESS7, and the projects does not involve a Financial Intermediary.

When finalizing any OIZ area, the Ministry of Culture and Tourism provides information on cultural and historical areas. If any cultural or historical sites are present, they are excluded from the OIZ area. Therefore, "ESS 8: Cultural Heritage" does not apply to this project, although "chance find" procedures are incorporated due to the risk of chance finds during construction activities.

3.3 Project Standards

Project Standards are determined by considering the most stringent of the national legislation and international standards and guidelines as given in Table 4. The Project Standards provide in Table 4 will be complied with during the implementation of the project.

Table 4. Project Standards

Environmental Standards						
No	**Topic**	**National Standards/Requirements**	**Limit Values in national legislation**	**International Standards/Requirements**	**Limit Values in International legislation**	**Project Standards**
1	Noise	Regulation on Environmental Noise Control (Official Gazette (OG) Date/ Number: 30.11.2022/32029) Annex- 2 "Table-1 Limit Values for environmental noise level"	Industrial Facilities, Transportation: Day time (07:00-19:00): $LA_{eq,\ 5\ min.}$< 65 dB(A) Evening time (19:00-23:00): $LA_{eq,\ 5\ min.}$< 60 dB(A) Nighttime (23:00-07:00): $LA_{eq,\ 5\ min.}$< 55 dB(A)	WBG General EHS Guidelines: Environmental Noise Management Table 1.7.1 – Noise Level Guidelines Noise impacts should not exceed the levels specified in the Table 1.7.1 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.	Residential; institutional, educational: Day time (07:00-22:00): One Hour L_{Aeq} dB(A) < 55 dB(A) Nighttime (22:00-07:00): One Hour L_{Aeq} dB(A) < 45 dB(A) Industrial, commercial: Day time (07:00-22:00): Nighttime (22:00-07:00): One Hour L_{Aeq} dB(A) < 70 dB(A)	Residential; institutional, educational[5]: Day time (07:00-22:00): One Hour L_{Aeq} dB(A) < 55 dB(A) Night time (22:00-07:00): One Hour L_{Aeq} dB(A) < 45 dB(A)
2	Air Quality	Regulation on Air Quality Assessment and Management (OG Date/ Number: 06.06.2008 / 26898) Annex-1 B) Limit values, assessment and warning thresholds Regulation on Control of Industrial Air Pollution	**PM_{10}** 24 Hours: 50 µg/m^3 (not exceeded more than 35 times in one year) Annual: 40 µg/m^3 **SO_2** Hourly: 350 µg/m^3 (not exceeded more than 24 times in one year) 24 Hours:125 µg/m^3 Annual and winter period (October 1-March 31): 20 µg/m^3 **NO_2** Hourly: 200 µg/m^3 (not exceeded more than 18 times in one year) Annual: 40 µg/m^3 **Regulation on Control of Industrial Air Pollution** (These limits are for exhaust gas emissions from the working of construction machinery during the construction phase.) Dust: 1 kg/hour Carbon monoxide: 50 kg/hour Hydrocarbons: 3 kg/hour Nitrous oxides: 4 kg/hour Sulfoxides: 6 kg/hour	WBG General EHS Guidelines: Air Emissions and Ambient Air Quality Table 1.1.1: World Health Organization (WHO) Ambient Air Quality Guidelines Emissions should not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legal standards or in their absence, the current WHO Air Quality Guidelines or other internationally recognized sources.	**PM_{10} (µg/m^3)** **1-year** 70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline) **24 Hours** 150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline) **$PM_{2.5}$ (µg/m^3)** **1-year** 35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline) **24 Hours** 75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline) **Sulfur dioxide (SO_2) (µg/m^3)** **24 Hours** 125 (Interim target-1) 50 (Interim target-2) 20 (guideline) **10 minute (µg/m^3)** 500 (guideline) **Nitrogen dioxide (NO_2) (µg/m^3)** **1-year** 40 (guideline) **1-hour**	**PM_{10}** 24-Hour: 50 µg/m^3 (not exceeded more than 35 times in one year) Annually: 20 µg/m^3 **SO_2** Hourly: 350 µg/m^3 (not exceeded more than 24 times in one year) 24 Hours: 20 µg/m^3 **NO_2** Hourly: 200 µg/m^3 (not exceeded more than 18 times in one year) Annual: 40 µg/m^3 **$PM_{2.5}$ (µg/m^3)** **1-year** 35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline) **24 Hours** 75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline) **Regulation on Control of Industrial Air Pollution** Dust: 1 kg/hour Carbon monoxide: 50 kg/hour Hydrocarbons: 3 kg/hour Nitrous oxides: 4kg/hour Sulfoxides: 6 kg/hour

[5] Residential; institutional, educational has been selected due to availability of sensitive receptors such as mosque and school within the area of influence.

Environmental Standards						
No	**Topic**	**National Standards/Requirements**	**Limit Values in national legislation**	**International Standards/Requirements**	**Limit Values in International legislation**	**Project Standards**
					200 (guideline) **Ozone (µg/m^3)** **8-hour daily maximum** 160(Interim target-1) 100 (guideline)	
3	Water	Regulation on Water Intended for Human Consumption (OG Date/ Number 17.02.2005 / 25730) Annex-1 Parameters and Limit Values a) Microbiological Parameters b) Chemical Parameters c)Indicator Parameters There are limit values for many parameters within the scope of the Regulation. However, the parameters that must be monitored for drinking and potable water are determined according to "Table A. Control Monitoring Parameters" in Annex-2 of the Regulation.	**Control Monitoring Parameters:** Color: Acceptable by consumers and no abnormal changes. Turbidity: Acceptable by consumers and no abnormal changes. Odor: Acceptable by consumers and no abnormal changes. Taste: Acceptable by consumers and no abnormal changes. Conductivity: 2500 (at 20 °C µS/cm^{-1}) Hydrogen ion concentration (pH): ≤ 9,5-6,5≤ Nitrite: 0.50 mg/l Ammonium: 0.50 mg/l Aluminum: 200 µg/l Iron: 200 µg/l C. perfringens (including spores): 0 number/100 ml E. coli: 0/250 ml Coliform bacteria: 0/250 ml	World Health Organization (WHO) Drinking Water Guideline (Fourth edition incorporating the first and second agenda)[6] Table 7.10 Guideline values for verification of microbial quality (Page: 162) Table A3.3 Guideline values for chemicals that are of health significance in drinking-water (Page: 525)	The WHO Drinking Water Guideline include many parameters and limit values for drinking and potable water. The main parameters and limit values are given below: Nitrite: 3 mg/l Nitrate: 50 mg/l Arsenic: 10 µg/L Barium:1300 µg/L Benzene: 10 µg/L Boron: 2.4 mg/L Cadmium: 3 µg/L Chromium: 50 µg/L Fluoride: 1.5 mg/L Mercury: 6 µg/L Selenium: 40 µg/L E. coli: 0/100 ml Coliform bacteria: 0/100 ml	Color: Acceptable by consumers and no abnormal changes. Turbidity: Acceptable by consumers and no abnormal changes. Odor: Acceptable by consumers and no abnormal changes. Taste: Acceptable by consumers and no abnormal changes. Conductivity: 2500 (at 20 °C'µS/cm^{-1}) Hydrogen ion concentration (pH): ≤ 9,5-6,5≤ Nitrite: 0.50 mg/l Ammonium: 0.50 mg/l Aluminum: 200 µg/l Iron: 200 µg/l C. perfringens (including spores): 0 number/100 ml E. coli: 0/100 ml Coliform bacteria: 0/100 ml Nitrate: 50 mg/l Arsenic: 10 µg/L Barium:1300 µg/L Benzene: 10 µg/L Boron: 2.4 mg/L Cadmium: 3 µg/L Chromium: 50 µg/L Fluoride: 1.5 mg/L Mercury: 6 µg/L Selenium: 40 µg/L
4	Wastewater	Regulation on Water Pollution Control Annex- Table 19 Discharge Standards of Mixed Industrial Wastewater into the Receiving Environment (Small and Large Organized Industrial Zones and Other Industries Where Sector Identification Cannot be Made)	**Regulation on Water Pollution Control** Chemical Oxygen Demand: 250 mg/L Total Suspended Solid: 200 mg/L Oil and Grease: 20 mg/L Total Phosphorus: 2 mg/L Total Chromium:2 mg/L Chromium (Cr^{+6}): 2 mg/L Lead: 2 mg/L Total cyanide: 1 mg/L Cadmium: 0.1 mg/L Iron: 10 mg/L Fluoride: 15 mg/L Copper: 3 mg/L Zinc: 5 mg/L Mercury: 0.05 mg/L Sulphate: 1,500 mg/L Total Kjeldahl-Nitrogen: 20 mg/L Fish Bioassay (ZSF): 10 Color: 280 Pt-Co pH: 6-9	The WB EHS Guidelines do not specify limit values for discharge to sewerage but include indicative values for treated sanitary sewage discharges. Wastewater to be generated within the scope of this Project will be discharged to sewerage system of the OIZ. And the OIZ sewerage system connects to the OIZ's WWTP. Since the wastewater from the Project will be transferred to the WWTP through the sewerage of the OIZ, Table 19 of the Regulation on Water Pollution Control has been considered as the Project standard.	-	Chemical Oxygen Demand: 250 mg/L Total Suspended Solid: 200 mg/L Oil and Grease: 20 mg/L Total Phosphorus: 2 mg/L Total Chromium:2 mg/L Chromium (Cr^{+6}): 2 mg/L Lead: 2 mg/L Total cyanide: 1 mg/L Cadmium: 0.1 mg/L Iron: 10 mg/L Fluoride: 15 mg/L Copper: 3 mg/L Zinc: 5 mg/L Mercury: 0.05 mg/L Sulphate: 1,500 mg/L Total Kjeldahl-Nitrogen: 20 mg/L Fish Bioassay (ZSF): 10

[6] **Source:** https://www.who.int/publications/i/item/9789241549950

Environmental Standards						
No	**Topic**	**National Standards/Requirements**	**Limit Values in national legislation**	**International Standards/Requirements**	**Limit Values in International legislation**	**Project Standards**
						Color: 280 Pt-Co pH: 6-9pH: 6-9
Occupational Health and Safety Standards						
1	Noise	28.07.2013 dated 28721 numbered Regulation on Protection of Employees from Risks Related to Noise	Minimum exposure action values: 80 dB(A). Maximum exposure action values: 85 dB(A). Exposure limit values: 87 dB(A).	Word Bank Group Environmental, Health, and Safety (EHS) Guidelines	No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).	Minimum exposure action values: 80 dB(A). Maximum exposure action values: 85 dB(A). Exposure limit values: 87 dB(A).
2	Vibration	22.08.2013 dated 28743 numbered Regulation on Protection of Employees from Risks Related to Vibration	For hand-arm vibration: Daily exposure limit value for an eight-hour working period: 5 m/s². Daily exposure action value for an eight-hour working period: 2.5 m/s². For whole-body vibration: Daily exposure limit value for an eight-hour working period: 1.15 m/s². Daily exposure action value for an eight-hour working period: 0.5 m/s².	Word Bank Group Environmental, Health, and Safety (EHS) Guidelines	For hand-arm vibration: Daily exposure limit value for an eight-hour working period: 5 m/s². Daily exposure action value for an eight-hour working period: 2.5 m/s². For whole-body vibration: Daily exposure limit value for an eight-hour working period: 1.15 m/s². Daily exposure action value for an eight-hour working period: 0.5 m/s².	For hand-arm vibration: Daily exposure limit value for an eight-hour working period: 5 m/s². Daily exposure action value for an eight-hour working period: 2.5 m/s². For whole-body vibration: Daily exposure limit value for an eight-hour working period: 1.15 m/s². Daily exposure action value for an eight-hour working period: 0.5 m/s².

Social Standards						
No	**Topic**	**National Laws / Regulations**	**International Standards**	**Project Standards**	**Non-Compliances / Corrective Actions**	**Targets**
1	Stakeholder Engagement, Grievance Mechanism and Information Disclosure	Constitution Article 74 Laws on the Right to Information (No. 4982) Regulation on the Principles and Procedures for the Enforcement of the Law on the Right to Information Law on Use of the Right to Petition (3071) Law on the Protection of Personal Data Environmental Law	World Bank ESS1, ESS2, ESS4 and ESS10	Social procedures and issues will be carried out in compliance with the relevant WB ESSs.	-	100% compliance with the WB ESSs

4. METHODOLOGY

Desktop study

In the scope of desktop study, the agreement between ÇINAR and MoIT on the project was examined in detail and the necessary work was determined. The Project Identification Document (PID) and Screening Reports prepared during the project preparation phase were evaluated. A meeting was held with the OIZ prior to the field visits to ensure that the information in the studies was up to date. There are some technical details change in the Project which was provided in the E&S Screening preparation progress. The changes are summarized below:

- 280 kW total generation capacity has been changed to 275 kW.
- 1,614 m^2 project area has been changed to 1,519 m^2.
- 616 solar panels have been changed to 500 solar panels.
- 5 units of 60 kW inverters have been changed to 3 units of 1x50 kW+2x100 kW inverters.

Deviations are related to technical properties of the Project. Project area size, number of solar panels, total generation capacity and number of inverters have been reduced. These deviations will not cause any change in the project risk categorization which was defined as "Moderate".

Data collection

The following reports & data were requested from the OIZs to be able to provide the services demonstrably committed as per the Terms of Reference (ToR):

- Information provided by OIZ,
- Approved E&S Screening Forms and Screening Report (prepared by Eptisa Türkiye),
- Project Identification Document (PID) (prepared by Eptisa Türkiye),
- Digital data for mapping studies,
- Permits and licenses,
- Official correspondence with the relevant state authorities,
- Zoning plan,
- Documents and permits related to waste and WWTP,
- Number of workers to work for the Project,
- Timeline of the Project,
- Number and type of vehicles/work machines to be used during the Project implementation,
- Excavation dimensions.

Area of Influence definition and justification

The impact area of the Project is determined as a circle with a radius of 150 meters from the Project area. The 150-meter radius impact area has been determined considering environmental and social impacts, especially sensitive receptors in the vicinity of the project area. The impact area includes sensitive receptors which are mosque (131.0 m), hotel (100.4 m), furniture factory (15.5 m), laboratory (19.0 m) and school (141.0 m)l. And the 150-meter radius AoI has been determined considering there are no sensitive receptors behind the 150 meters and thus the noise and air emission impacts of the project are not expected to be significant after 150 meters.The mentioned facilities located nearby can host people with an approximately accurate number of users and/or individuals;

- Gündoğdu Furniture is one of the stakeholders with 400 staff.
- One of the laboratories (NEVA) has 23 employees, while the other one (UKL) employs seven personnel.

- Hotel Arsin should be considered in terms of receptor. The hotel can host around 25 guests in the winter off-season
- The number of people coming to the mosque for worship reaches its highest levels during special times like Friday prayers, signifying a congregation of around 500 to 1,000 individuals.
- The number of students enrolled in the high school (Trabzon / Arsin Organized Industrial Zone Vocational and Technical Anatolian High School[7]) is 328 with 31 educators.
- Yeşilyalı neighborhood can expect to benefit from employment opportunities within TAOIZ.

Site visits and surveys

Site visits were conducted on 18.12.2023 (see Photograph 2) and 06.10.2023 during the preparation of ESMP and SEP. The site visit within the scope of the ESMP covers the inspection of Project area and AoI. The participation form for the site visit scheduled for 18.12.2023 is provided in Annex-13.

For the preparation of SEP, interviews were conducted with the stakeholders. Photographs taken during interviews with stakeholders are included in the SEP document.

Photograph 2. Site Visit Participants (18.12.2023)

Interviews with stakeholders

WB ESS 10 sets out the following objectives/actions concerning interviews with stakeholders:

[7] https://arsinosbmtal.meb.k12.tr/

- To carry out a consultation process that gives the stakeholders a chance to voice their opinions on the project's risks, impacts, and mitigation measures, and that enables the Project Owner to take those opinions into consideration and respond.
- To consider the outcomes of the consultation process with the stakeholders when identifying project-related risks and consequences.

The aim of interview is to engage in a meaningful dialogue with stakeholders, receive input on analysis and proposed plans, discuss concerns, and inform the Borrower' s decisions, where appropriate. Security and accessibility are expected to be considered when designing a consultation program, especially in fragile and conflict-affected situations.

ÇINAR will be responsible for organizing and conducting stakeholder interview meeting(s) to inform the public on the outputs, results, and impacts of the sub-project. At least one (1) stakeholder interviews will be conducted within the scope of ESMP.

Impact assessment methodology

The primary objective of conducting an environmental and social impact assessment is to identify and evaluate potential risks and adverse effects that may arise from the activities of the project on both the natural environment and the socio-economic well-being of the local and regional population, including the community and workforce. This assessment takes into consideration the characteristics and activities of the Project as well as the existing conditions in the project area.

Following the assessment, relevant mitigation measures are devised to prevent, minimize, alleviate, or offset significant adverse impacts while also enhancing beneficial effects. Additionally, the assessment evaluates the significance of any residual adverse effects on the environment and community that may persist even after implementing the mitigation measures. Lastly, the assessment outlines planned monitoring activities aimed at assessing the effectiveness of the proposed mitigation measures.

Throughout the construction and operation phases of the project, there is a potential for environmental and social impacts or risks stemming from the project activities. During the construction phase, these impacts are typically short-term with low to medium magnitude but can be locally significant. They may involve issues such as traffic, noise, vibration, air quality, soil disturbance and contamination, waste management, community health and safety, as well as labor and working conditions, including occupational health and safety.

While adverse environmental impacts during the operation phase are not expected to be significant due to the project's public interest nature, noise, air related impacts on sensitive receptors, as well as occupational health and safety risks, may arise, particularly during maintenance and repair activities. Maintenance and repair works may result in minor environmental impacts like soil contamination and increased noise levels, which are local and short-term in nature with low significance.

To appropriately address these potential impacts, both positive and negative effects must be identified and assessed, leading to the definition of relevant mitigation measures. The evaluation of environmental and social impacts and risks is conducted based on specific criteria given below:

- the nature/type of impact (positive or negative, direct, indirect, cumulative),
- extent/area of impact (on-site/project footprint, local, regional, national),
- duration of impact (short-term, mid-term, long-term, permanent), and
- likelihood of impact occurrence (very likely/certain, likely, unlikely).

The severity of adverse impacts is assessed using these criteria, along with the sensitivity of receptors or sources exposed to the impact, whenever possible. The significance of impacts is evaluated both without mitigation measures and with proposed mitigation measures in place.

This evaluation helps determine the significance of residual impacts, which refers to impacts that remain after implementing mitigation measures.

The following impact significance matrix (see Table 10) depending on the estimated magnitude of the impact and reversibility of the change due to the impact has been used to determine the significance of the environmental, social, health and safety impacts of the project activities during the construction and operation phases.

Table 10. Impact Significance Matrix[8]

Significance of Impact				
Reversibility of the Change	**Magnitude of Impact**			
	High	**Medium**	**Low**	**Negligible/None**
Irreversible	Very High	High	Moderate	Negligible/None
Partially Reversible	High	Moderate	Minor	Negligible/None
Highly Reversible	Moderate	Minor	Minor	Negligible/None
Fully Reversible	Negligible/None	Negligible/None	Negligible/None	Negligible/None

The terms regarding the significance of an impact can be described as follows:

- ***Very High:*** An impact that causes irreversible and large-scale change, affecting a highly sensitive receptor or source, with a very likely or certain occurrence. For example, permanent loss of biodiversity or cultural heritage, or severe violation of human rights or labor standards.
- ***High:*** An impact that causes partially reversible and large or medium-scale change, affecting a moderately sensitive receptor or source, with a likely or probable occurrence. For example, significant degradation of air or water quality.
- ***Moderate:*** An impact that causes highly reversible and medium-scale change, affecting a lowly sensitive receptor or source, with an unlikely or possible occurrence. For example, moderate increase of noise or traffic levels.
- ***Minor:*** An impact that causes fully reversible and negligible change, affecting a non-sensitive receptor or source, with a very unlikely or improbable occurrence. For example, slight increase of dust or odor emissions, or minor improvement of social infrastructure or services.
- ***Negligible/None:*** An impact that causes no discernible change or has a positive effect that outweighs any negative effect. For example, no impact or net benefit on the environment or the community.

The impact assessment methodology was structured to comprehensively identify and evaluate the potential environmental and social risks and impacts arising from the Projects' activities. These assessments covered the primary activities of the Projects and also included the related operations. By adopting this comprehensive approach, it was aimed to thoroughly analyze every aspect of the Projects for potential risks, providing a holistic understanding and ensuring that effective mitigation strategies are in place.

[8] **Reversibility:** The degree to which the change caused by the impact can be restored to its original state or condition.
Magnitude: The scale or intensity of the impact, measured by its extent, duration, and likelihood.
Impact Significance Level: The overall rating of the impact, based on its reversibility and magnitude, as well as the sensitivity of the receptors or sources affected by the impact.

Approach to define the mitigation measures for the impacts

ESMPs include measures and actions in accordance with the mitigation hierarchy that aim to reduce potential adverse environmental and social impacts to acceptable levels. . The impacts of the Project are covered in detail in this plan. Following the identification and definition of the impacts, mitigation measures are planned that aim to achieve the most practical and effective reduction of the adverse impacts.

5. ENVIRONMENTAL BASELINE OF THE PROJECT

5.1 Project Location

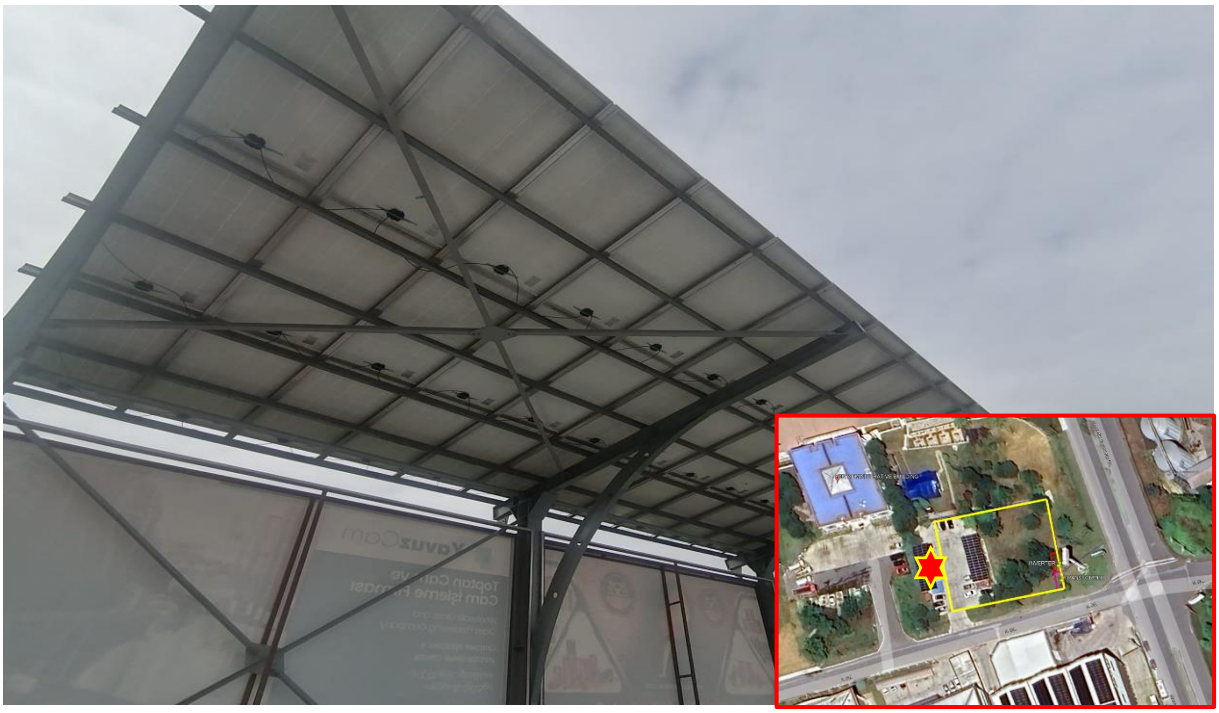
The Project area is located within the boundaries of “Trabzon Arsin OIZ” in Arsin district of Trabzon province, on an area of approximately 1,519 m^2. The Project area is in Yeşilyalı Neighborhood. The Project area (Plot:544, Parcel:2) is owned by Trabzon Arsin OIZ (see Annex-3).

Trabzon province is situated in the Black Sea Region and has borders with Black Sea to the north, Gümüşhane and Bayburt to the south and west to the Giresun. Arsin district is one of the 18 districts of Trabzon province.

Views from the Project area and its vicinity are given in between Photograph 3 and Photograph 10.

Photograph 3. Views from the Carport SPP Area-I

Photograph 4. Views from the Carport SPP Area-II



Photograph 5. View from Existing Solar Panels

Photograph 6. View from Transformer Area

Photograph 7. Entrance of the OIZ Administrative Building-I

Photograph 8. Entrance of the OIZ Administrative Building-II

Photograph 9. View to the "Gündoğdu Mobilya"

Photograph 10. View to the "Gündoğdu Mobilya" Office Building

The distances of the project area to the nearest settlement and sensitive receptors are given in Table 5 and shown in Figure 5.

Table 5. Distance of the Carports from the Nearest Settlement and Sensitive Receptors

Sensitive Receptor	Distance to the Project Area (m)	Population / Number of individuals
Gündoğdu Furniture	15.5	400
Neva Environmental Laboratory	19.0	23
UKL Company	19.0	7
Hotel Arsen	100.4	7
OSB Mosque	131.0	At least 25
Organized Industrial Zone OIZ Vocational and Technical Anatolian High School	141.0	Between 500 and 1,000
Yeşilyalı Neighborhood (Nearest Dwelling)	617.0	359

The table below provides identification of the abovementioned stakeholders (see Table 6).

Table 6. Identification of Stakeholders

Stakeholders	PAP / OIP	Interest / Relation
Gündoğdu Furniture	OIP	Direct
Neva Environmental Laboratory	PAP	Direct
UKL Company	PAP	Direct
Hotel Arsin	OIP	Indirect
OSB[9] Mosque	OIP	Indirect
Organized Industrial Zone OIZ Vocational and Technical Anatolian High School	OIP	Direct
Yeşilyalı Neighborhood (Nearest Dwelling)	PAP	Indirect

In light of the information obtained from the municipality, complaints from nearby settlements regarding the noise generated by construction activities within TAOIZ and occasional odors emanating from the stream discharge point, as indicated, highlight the sensitivity of the surrounding environment. Although the activity is located away from residential areas and does not involve discharge needs, this sensitivity should be considered in the assessment of the construction impact from the perspective of PAP.

One frequently asked question during stakeholder meetings about project awareness was whether there would be power outages during the project. Therefore, workspaces where electricity and internet connectivity are essential will be among the sensitive groups. In particular, both companies and the school within TAOIZ should be informed about potential interruptions.

[9] Organize Sanayi Bölgesi

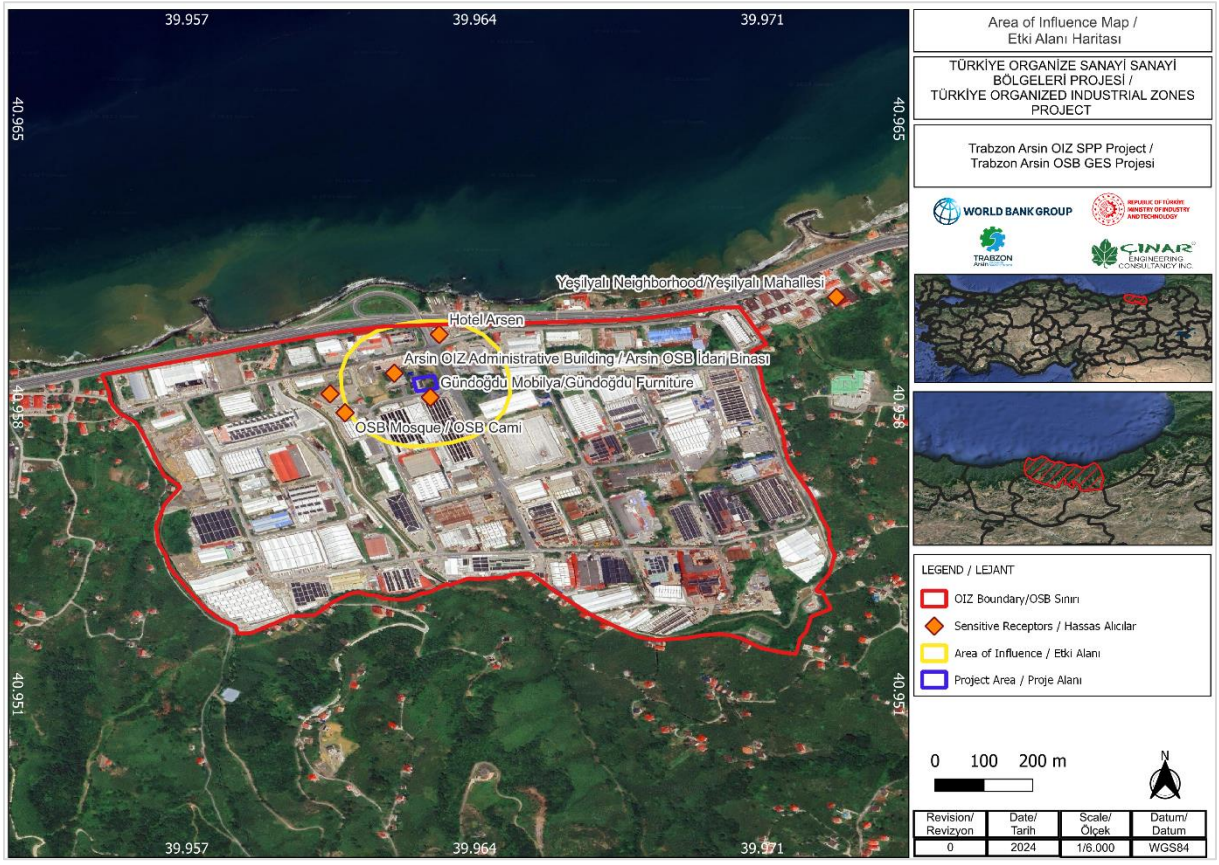


Figure 5. Project Area and Sensitive Receptors (AoI with the radius of 150 meters)

5.2 Land Use and Topography

Within the scope of Arsin OIZ, production is carried out in 86 companies and approximately 5,000 people are employed in the facilities. Currently, all parcels in the Trabzon Arsin OIZ have been allocated. Activity status and occupancy rates of industrial parcels in Trabzon Arsin OIZ is given in Table 7.

Table 7. Activity Status and Occupancy Rates of Industrial Parcels in Trabzon Arsin OIZ

Activity Status	Number of Parcel	Rate (%)
Production	73	81.12
Construction	4	4.45
Project (Including Allocation) (Number of companies suspending production)	13	14.43
Unallocated	0	0
Total	**90**	**100**
OIZ Occupancy Rate (Production+Construction+Project)/Total Parcel	**90**	**100**

The Project consists of 3 (three) main component areas which are carport SPP area, transformer building and inverter area. The project area also includes an existing carport SPP. The project will be realized by expanding this SPP area. The floor of the existing SPP area is concrete. Excavation works will be carried out on this concrete floor for the SPP. The entire

area within the project area, except for the carport structure, is a soil surface. There are topsoil, vegetation and trees in this non-concrete area. The inverter and transformer structures will be located on the soil surface. In this context, topsoil stripping and excavation works will be carried out on the soil surface for the transformer and inverter. Concrete will be laid in the area where the transformer and inverter will be located. Topsoil stripping and excavation work will also be carried out for cabling within the scope of the Project. After the cabling excavation, the cables will be manually covered with soil. Since the project area belongs to Trabzon Arsin OIZ, there will be no land acquisition. Size of the project components are given in Table 8.

Table 8. Size of the Project Components Area

Component	Area (m^2)
Inverter	17.0
Transformer	14.9
Carport + Cabling	1,487.1
TOTAL	**1,519.0**

A land use map of the region was prepared using the 2020 CORINE data and accordingly, the entire project area is defined as “industrial and commercial units” (see Figure 7). The project area consists of both concrete and soil surface. Topographic map indicating the Project area and OIZ boundary is given in Figure 8.

The project area and Trabzon Arsin OIZ are defined as "*Organized Industrial Zone"* in the "Ordu-Trabzon-Rize-Giresun-Gümüşhane-Artvin Planning Region" 1/100,000 Scale Environmental Order Plan[10] (see Figure 6).

The 1/5,000 scale Trabzon Arsin OIZ Revision Zoning Plan is given in Annex-11.

[10] **Source:** https://mpgm.csb.gov.tr/ordu---trabzon---rize---giresun---gumushane---artvin-planlama-bolgesi-i-82191

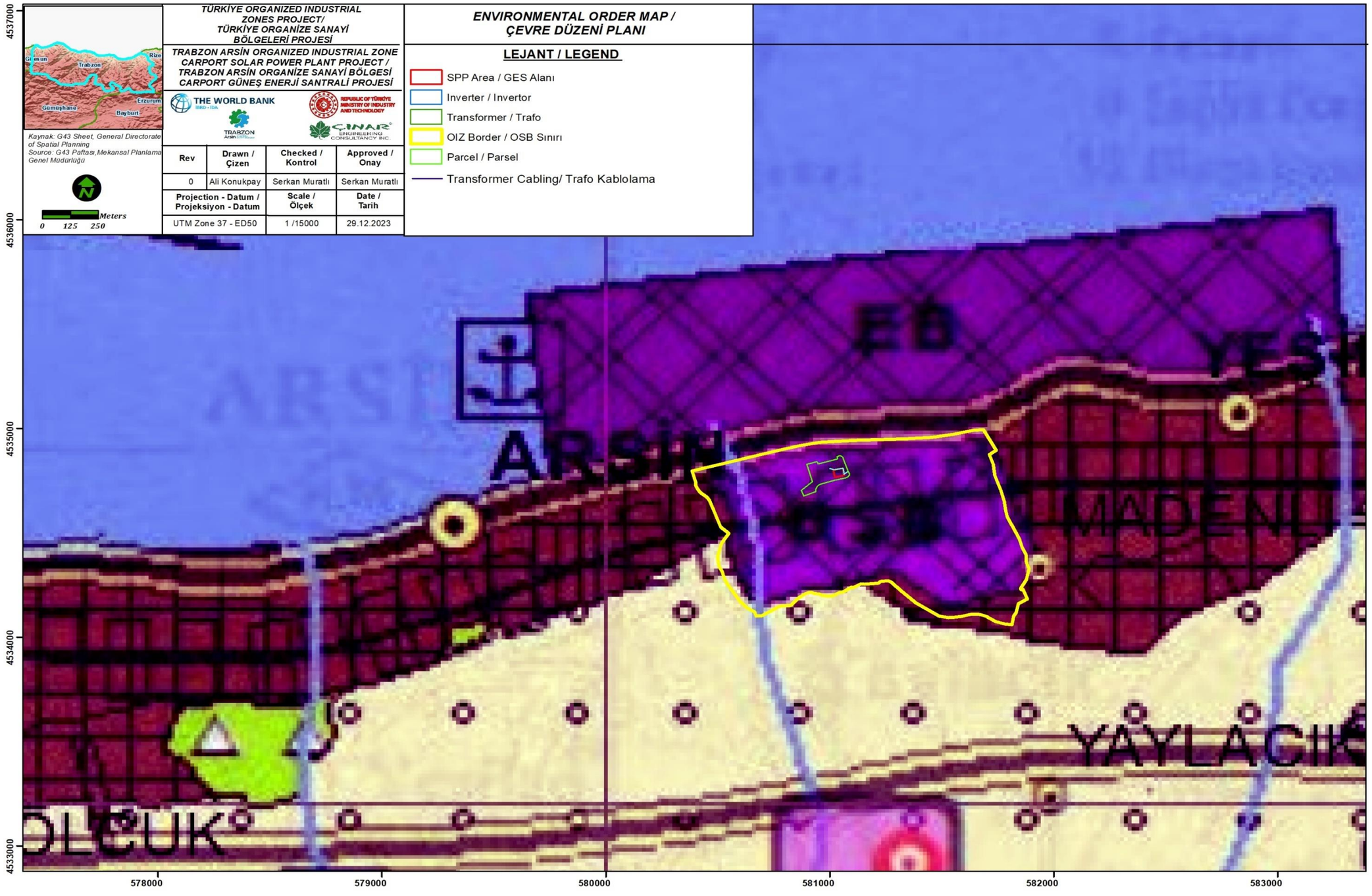


Figure 6. Environmental Plan Showing the Project Area

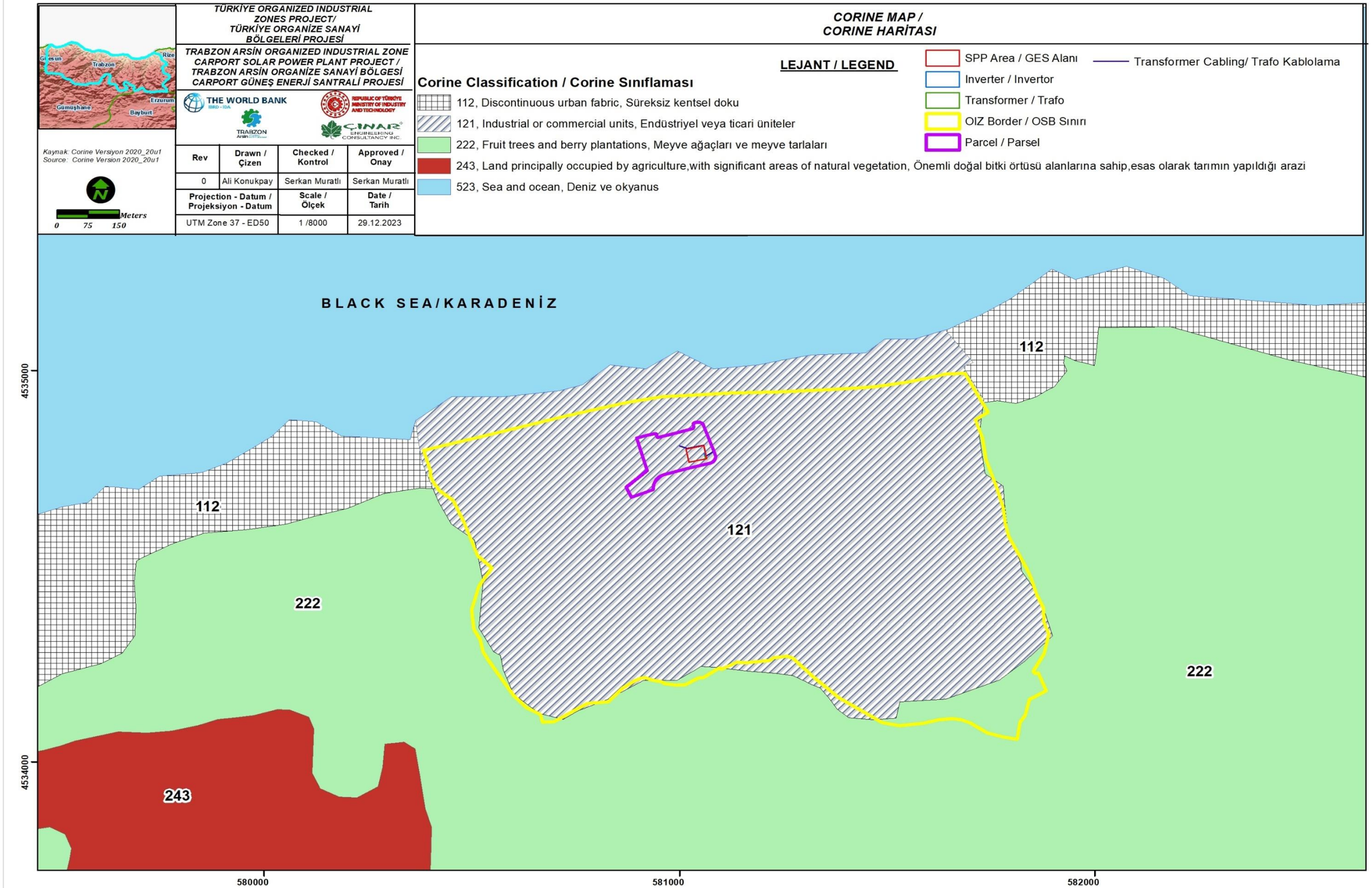


Figure 7. CORINE Map of the Project Area

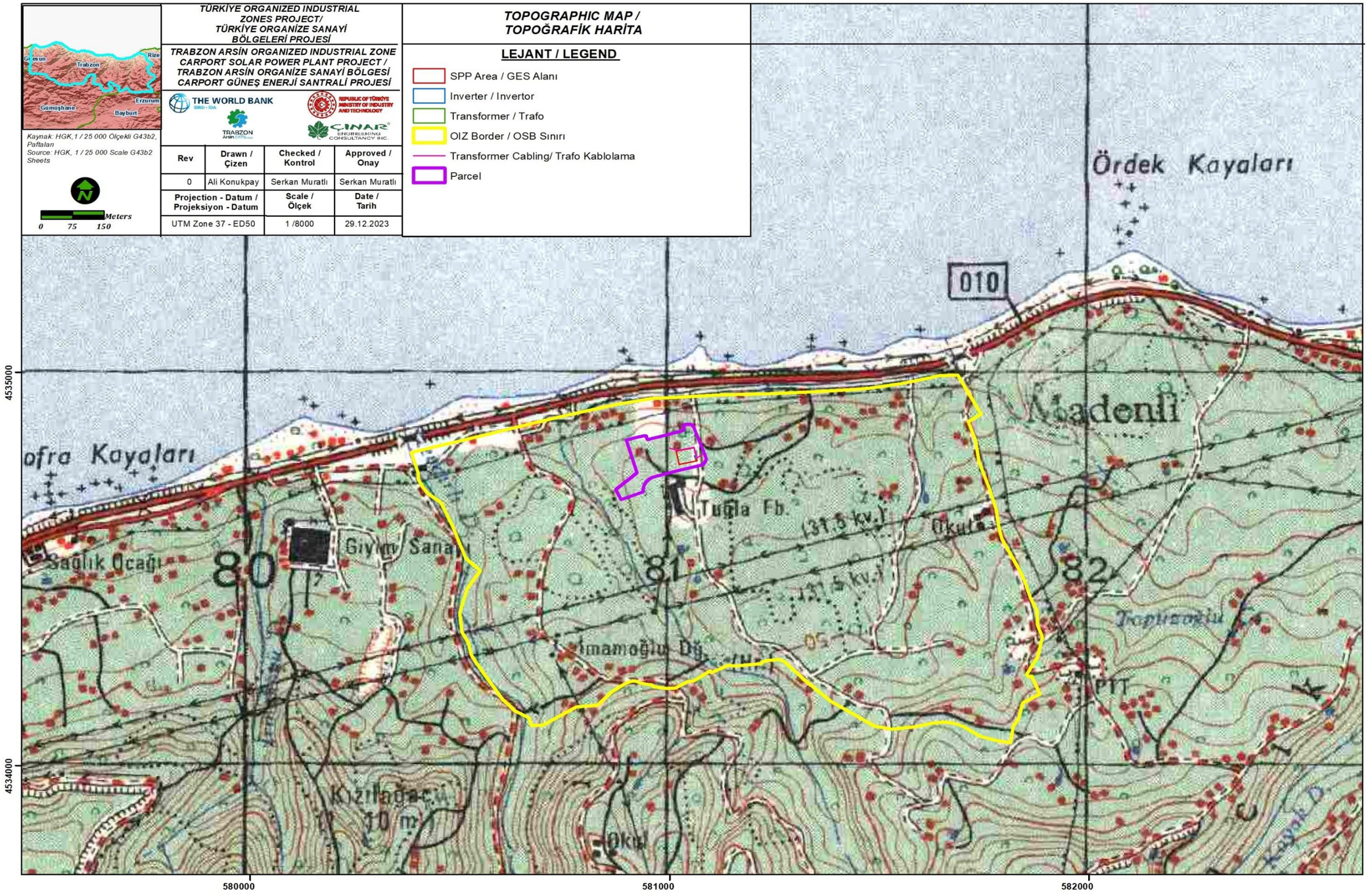


Figure 8. Topographic Map of the Project Area

5.3 Geology

Regional Geology

The Project area and its surroundings are located in the eastern part of the Pontides defined by Ketin (1966). This part of the Pontides is divided into two zones with different lithostratigraphic features. The region most intensely affected by magmatic activity in the north is the Northern zone; The region in the south, where sedimentary basin deposits outside the magmatism influence area surface, is defined as the Southern zone. Most of the project study area is in the Northern zone of the Eastern Pontides, and a very small part of the area is in the Southern zone.

In the study area, where rock units developed in the Paleozoic-Quaternary time period are exposed, volcano-sedimentary, volcanic and intrusive rocks containing the products of magmatism, which continued to develop in periods starting from the Liassic until the end of the Eocene, are common. During periods when magmatic activities paused, sedimentary deposits accumulated.

In this part of the Eastern Pontides, sequences with different lithostratigratic features are observed, namely the Northern zone and the Southern zone. The basic units of the study area, located in the eastern part of the Pontides, are Paleozoic aged metamorphic rocks. In the northern zone, from bottom to top, Paleozoic gneiss, micaschist, chloriteschist, etc. Metamorphites consisting of rocks, Liassic basalt, andesite, conglomerate, sandstone and marl etc. Hamurkesen formation consisting of rock types, Berdiga formation consisting of Upper Jurassic-Lower Cretaceous aged limestones, Upper Cretaceous aged basalt, andesite, pyroclastic, sandstone etc. Çatak formation consisting of rock types, Kızılkaya formation consisting of rhyodacite, dacite and pyroclastics, Kaçkar granitoid-I, basalt, andesite, pyroclastic, mudstone, sandstone, marl etc. Çağlayan formation consisting of rock types, Çayırbağ formation consisting of rhyolite, rhyodacite and pyroclastics, Bakırköy formation consisting of Maastrichtian-Paleocene aged sandstone, marl and clayey limestone, Kabaköy formation consisting of Eocene aged Kaçkar granitoid-II and andesite, basalt and pyroclastics.

In the southern zone, the Hamurkesen and Berdiga formations, the Kaçkar granitoid-I,II and Kabaköy formation in the northern zone, and the Mescitli formation, which consists of Turonian-Maastrichtian aged sandstone, marl, shale, tuff and clayey limestone, are observed. Pliocene aged Beşirli and Hamidiye formations and Quaternary aged formations are the youngest units of the region.

Geology of Project Area

The project area is entirely within the Trabzon Arsin OIZ, where location selection has been made before. It is located on Quaternary alluviums. The elevations in the south of the project area constitute the Çayırbağ Formation, consisting of Upper Cretaceous aged rhyolite, rhyodacite and pyroclastics, which covers large areas in the region.

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 features in the project area and its surroundings are given below, from oldest to youngest. The geological map of the project area and its surroundings is given in Figure 9.

Stratigraphy

Upper Cretaceous

Çayırbağ Formation (Kcb)

The second phase acidic lava and pyroclasts that conformably overlie the basic volcano-sedimentary sequence are called Çayırbağ formation. The Çayırbağ formation consists mainly of bluish gray colored, local coarse quartz with a yellow weathering surface, and weathered rhyolite, rhyodacite, daciders and their pyroclasts. Prismatic column structures are well developed in lavas that generally show volcanogenic dome structures. These rocks, which mostly show a porphyritic texture under the microscope, contain quartz, plagioclase, local biotite phenocrysts and a matrix consisting of albite, quartz and chlorite. Alteration is common in the unit.

Quaternary

Alluvium (Qal)

Alluviums are observed in a narrow area in the east and west of Arsin district in the coastal area. They are formations consisting of sand, silt and gravel piles in the parts close to the sea, where the valleys that arise in the inner parts of the region and flow into the Black Sea widen.

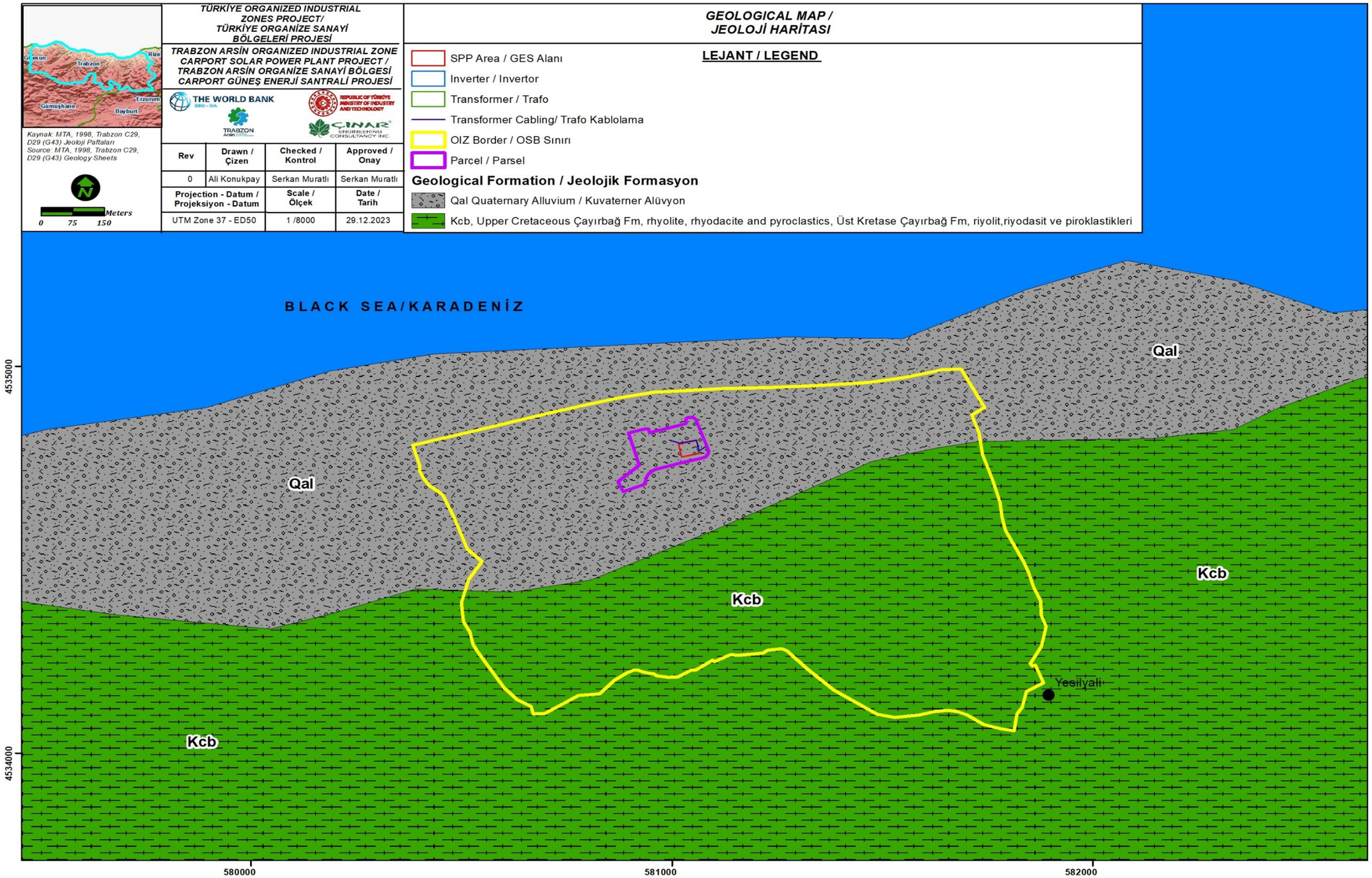


Figure 9. Geological Map of Project Area

5.4 Climate

Trabzon has a temperate climate influenced by the sea. Accordingly, especially in the coastal region, summers are generally moderate in temperature and winters are mild. However, in the mountainous regions, winter is colder and snowier than on the coast[11]. According to meteorological data, the highest monthly average temperature was 18.1°C and the lowest monthly average temperature was 11.8°C (see Figure 10 and Table 9).

The average annual precipitation is 828.0 mm and average number of rainy days is 137.2 in Trabzon region between 1927 and 2022 (see Table 9).

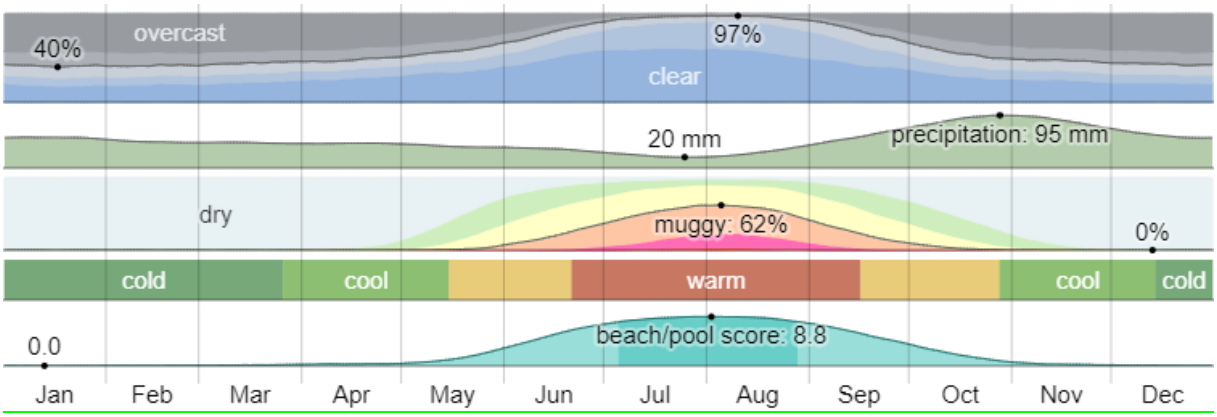


Figure 10. Trabzon Region Monthly Weather (Average between 2015-2023)[12]

The annual average temperature in the province is 14.8°C. The highest temperature value is 38.2°C and the lowest temperature is -7.4°C (see Table 9). The hottest month is August, and the coldest month is February. Temperature change of Trabzon region between 2015 and 2023 is shown in Figure 11[13].

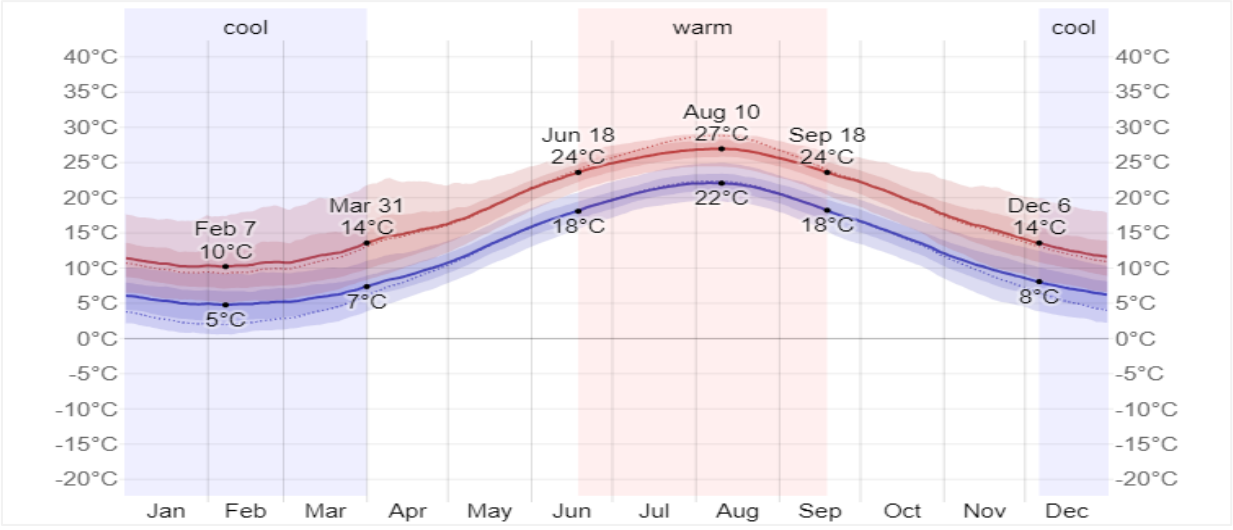


Figure 11. Trabzon Region Temperature Change (Average between 2015 and 2023)

[11] **Source:** http://www.trabzon.gov.tr/cografi-ozellikleri
[12] **Source:** https://weatherspark.com/y/101287/Average-Weather-in-Trabzon-Turkey-Year-Round
[13] **Source:** https://weatherspark.com/y/101287/Average-Weather-in-Trabzon-Turkey-Year-Round

The long-term meteorological data of Trabzon province between 1927-2022 is given in Table 9.

Table 9. Long Term Meteorological Data of Trabzon Province[14]

MONTHS	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Measurement Period (1927-2022)													
Average Temperature (°C)	7.5	7.3	8.4	11.8	15.9	20.2	23.0	23.4	20.5	16.7	13.0	9.6	14.8
Average Highest Temperature (°C)	10.8	10.8	11.9	15.6	19.2	23.2	26.0	26.6	23.8	20.1	16.5	13.0	18.1
Average Lowest Temperature (°C)	4.7	4.4	5.4	8.7	12.9	17.1	20.0	20.4	17.4	13.7	10.1	6.8	11.8
Average Sunshine Time (hour)	2.7	3.3	3.4	4.4	5.6	7.1	5.9	5.6	4.9	4.5	3.6	2.7	4.5
Average Number of Rainy Days	12.20	11.95	13.20	12.84	12.64	10.69	7.89	8.67	10.77	12.25	11.78	12.34	137.2
Average Monthly Total Precipitation Amount (mm)	83.1	63.9	59.7	56.5	52.2	51.8	35.5	48.2	78.9	113.6	99.6	85.0	828.0
Measurement Period (1927-2022)													
Highest Temperature (°C)	27.0	30.1	35.2	37.6	38.2	36.7	37.0	38.2	37.9	33.8	32.8	26.4	38.2
Lowest Temperature (°C)	-7.0	-7.4	-5.8	-2.0	4.2	9.2	11.0	13.5	7.3	3.4	-1.6	-3.3	-7.4

According to the observation records of “17037 Trabzon Regional Station” between 1960-2020, the 1st dominant wind direction is SSW (South Southwest), the 2nd dominant wind direction is SW (Southwest) and the 3rd dominant wind direction is WNW (West Northwest) (see Figure 12). The average annual wind speed in the region is 2.838 m/s[15].

[14] **Source:** https://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?k=A&m=TRABZON
[15] **Source:** 17037 Trabzon Regional Station Data for 1960-2020

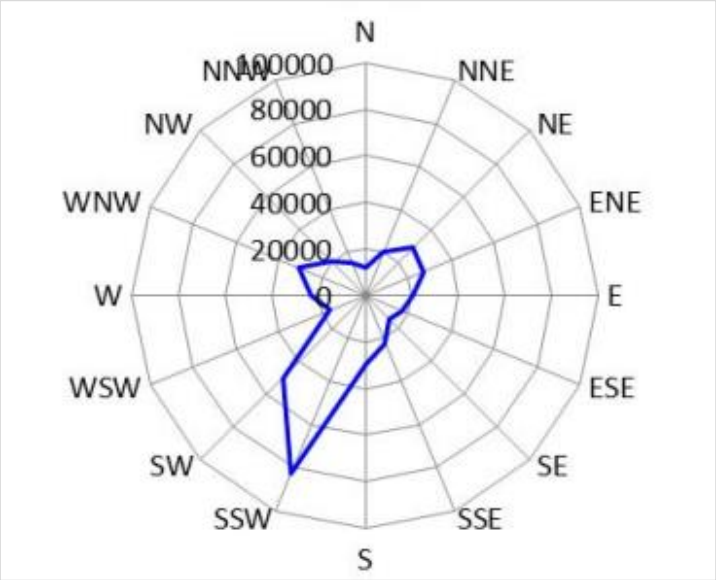


Figure 12. Predominant Wind Direction Chart of Trabzon Province

5.5 Soil Quality

The project area consists of fill material (concrete) and vegetative soil. Some part of the project area consists of natural vegetation, trees and soil structure. No soil contamination was observed in the project area during the site visit. The project area is next to the OIZ administrative building and there are domestic waste containers belonging to Arsin Municipality in front of the building. Therefore, there is no domestic waste and other wastes within the site.

The project area is within the OIZ currently. The project area has "Red Yellow Podzolic" soil group before it was used by the OIZ. It could be accepted that the topsoil structure in the project area belongs to this group.

The Red Yellow Podzolic soil group of the Eastern Black Sea Region is generally clay loam, sandy clay loam, sandy loam and loam textured, but generally medium textured. Most of the pH of the soils is strong acid and medium acid reaction and contain very little lime. The organic matter content of the soils, which do not have salinity problems, is mostly sufficient [16].

There is no site determined in Trabzon province within the scope of "Regulation on Soil Pollution Control and Point Source Contaminated Sites"[17].

5.6 Air Quality

Within the scope of Trabzon Arsin OIZ, production is carried out in 86 companies and approximately 5,000 people are employed in the facilities. Currently, all parcels in the Trabzon Arsin OIZ have been allocated. In this context, air emissions are generated from existing facilities/business.

In Trabzon province, there are four (4) national air quality monitoring stations under the supervision of MoEUCC. The closest air quality monitoring station to the project area is

[16] **Source:** M.A. Özyazıcı, M. Aydoğan, Betül Bayraklı, Orhan Dengiz, Basic Characteristics and Productivity Status of Red Yellow Podzolic Soils of Eastern Black Sea Region, May 2012

[17] **Source:** Trabzon Province Environmental Status Report (2022), Page: 77, https://webdosya.csb.gov.tr/db/ced/icerikler/trabzon-ilcdr-2022-20231018155807.pdf

"Trabzon-Meydan Air Quality Monitoring Station" with coordinates Latitude 39.7316 and Longitude 41.0045 (see Figure 13).

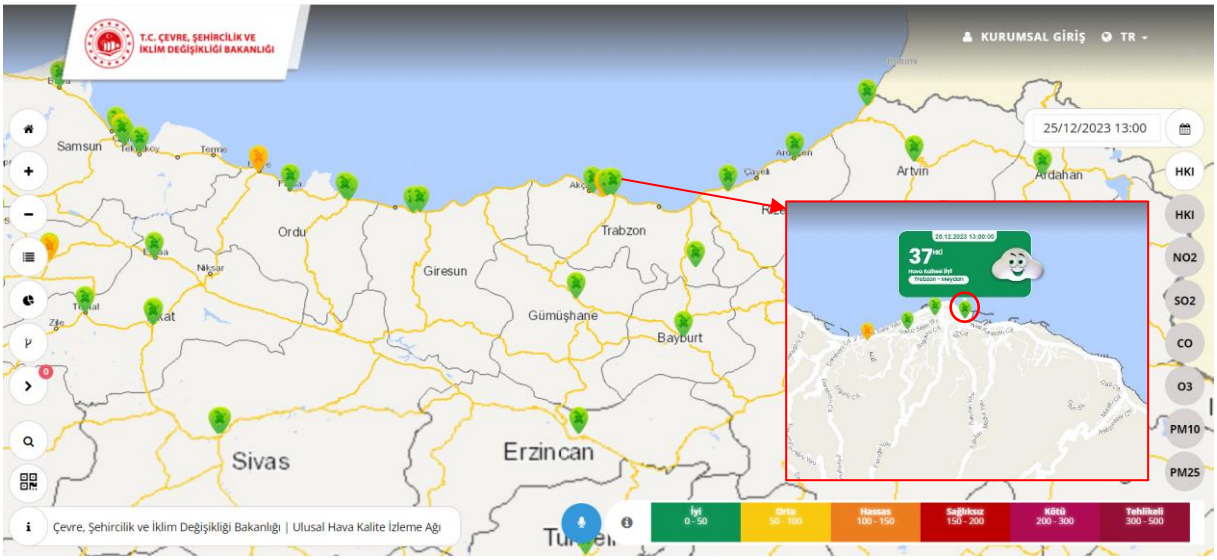


Figure 13. Air Quality Monitoring Stations in Trabzon Province (25.12.2023)[18]

The current data obtained from the National Air Quality Monitoring Network for Trabzon Meydan Air Quality Monitoring Station on 25.12.2023 are given in Table 10. When the data are analyzed, it is seen that the air quality is characterized as "good", and measured parameters comply with national legislation and international standards limit values. The definition of "good" is as follows (according to MoEUCC National Air Quality Monitoring Network): Air quality is good[19].

Table 10. Trabzon Meydan Air Quality Monitoring Station Measurement Values (25.12.2023)[20]

Parameter	Current Value (µg/m³)	Project Standard (µg/m³)
PM_{10}	48.83	50 (24 Hours Average)
SO_2	8.18	20 (24 Hours Average)
NO_2	50.55	200 (Hourly Average)
NO_x	110.29	-
NO	59.74	-

The excavation works will be short-term on an area basis during construction phase of the project and it is expected that the construction activities will not have a significant adverse impact on ambient air quality. Due to the short duration of the excavation works, it is foreseen that baseline measurement work will not be necessary in the project impact area.

[18] **Source:** MoEUCC National Air Quality Monitoring Network, https://www.havaizleme.gov.tr/
[19] **Source:** MoEUCC National Air Quality Monitoring Network, https://www.havaizleme.gov.tr/
[20] **Source:** MoEUCC National Air Quality Monitoring Network, https://www.havaizleme.gov.tr/

5.7 Noise

Across from the project area, there is a furniture production facility named “Gündoğdu Mobilya”. Near the project area, there is a reception building and an office building of Gündoğdu Mobilya. The entrances and exits for vehicles of the office and production buildings are far from the project area. During the day, there are few passenger vehicles coming to the OIZ administrative building. In this context, it has been observed that there is low traffic intensity in the project area and its vicinity. The facilities near the project area operate within enclosed structures. So, no significant noise generation was encountered in the project area and its vicinity during the site visit.

Within the scope of the project, minor excavation works will be carried out to place carport structures columns, transformer and inverter buildings and for cabling works. There will be short-term noise generation during excavation works. Noise generation is not expected during installation of solar panels.

Since the excavation and installation works of the project will be short-term and minor, and considering that the project area is within the boundaries of OIZ, it is considered that no noise baseline measurements are required.

5.8 Water Resources and Use

The project area is in the Eastern Black Sea Basin, one of the reserved water basins throughout Türkiye. The most important surface water around the project area is the Rızvan stream, which passes approximately 200 m west of the project area and flows into the Black Sea. The stream in question has been rehabilitated while passing through the borders of Arsin OIZ and has a controlled flow in its own bed. Kendirli stream, also located in the region, passes approximately 570 m west of the project area. All surface water in the region flows from the southern elevations towards the north and flows into the Black Sea. The Black Sea is approximately 280 m north of the project area.

The project area is not within the protection area of any surface water source that provides drinking and utility water. The Rızvan stream passing through the OIZ in the west of the project area has been rehabilitated against possible flood risk and have sufficiently wide sections and do not pose a danger and flood risk to the project area.

The hydrological map of the Project area and its surroundings is given in Figure 14.

The water requirement during the construction and operation phases will be supplied from the OIZ water network.

There are no groundwater resources within the project’s area of influence. Within the OIZ, potable water is supplied from well that is located in “Yanbolu”. "Groundwater Usage Certificate" for the well is provided in Annex-5. This well is located in the southeast of the project area and is approximately 4.7 km away.

Monthly water samples taken from the OIZ network are sent to the Trabzon Public Health Laboratory of the Trabzon Provincial Health Directorate of the Trabzon Governorship and analyzed, and the results of the analysis are published monthly on the OIZ website and sent to companies via e-mail[21].

The results of potable water analysis dated 20.11.2023 that are obtained from Trabzon Arsin OIZ's official website and their comparison with Project standards are given in Table 11.

[21] **Source:** https://www.tosbol.org.tr/su-analiz-raporlari-TR.html

Table 11. Potable Water Analysis Results and Comparison with Project Standards

Parameter	Unit	Result	Project Standards
Turbidity	NTU	Acceptable	Acceptable by consumers and no abnormal changes.
Odor	-	Appropriate	Acceptable by consumers and no abnormal changes.
Color	-	Appropriate	Acceptable by consumers and no abnormal changes.
Conductivity	20°C, mS/m	272	2500
Ammonium	mg/l	Not detected.	0.50
Escherichia coli	kob/100mL	0	0/100 ml
Coliform Bacteria	kob/100mL	0	0/100 ml
pH	pH Unit	7.05	≤ 9,5-6,5≤
Taste	-	Not Analyzed.	Acceptable by consumers and no abnormal changes.

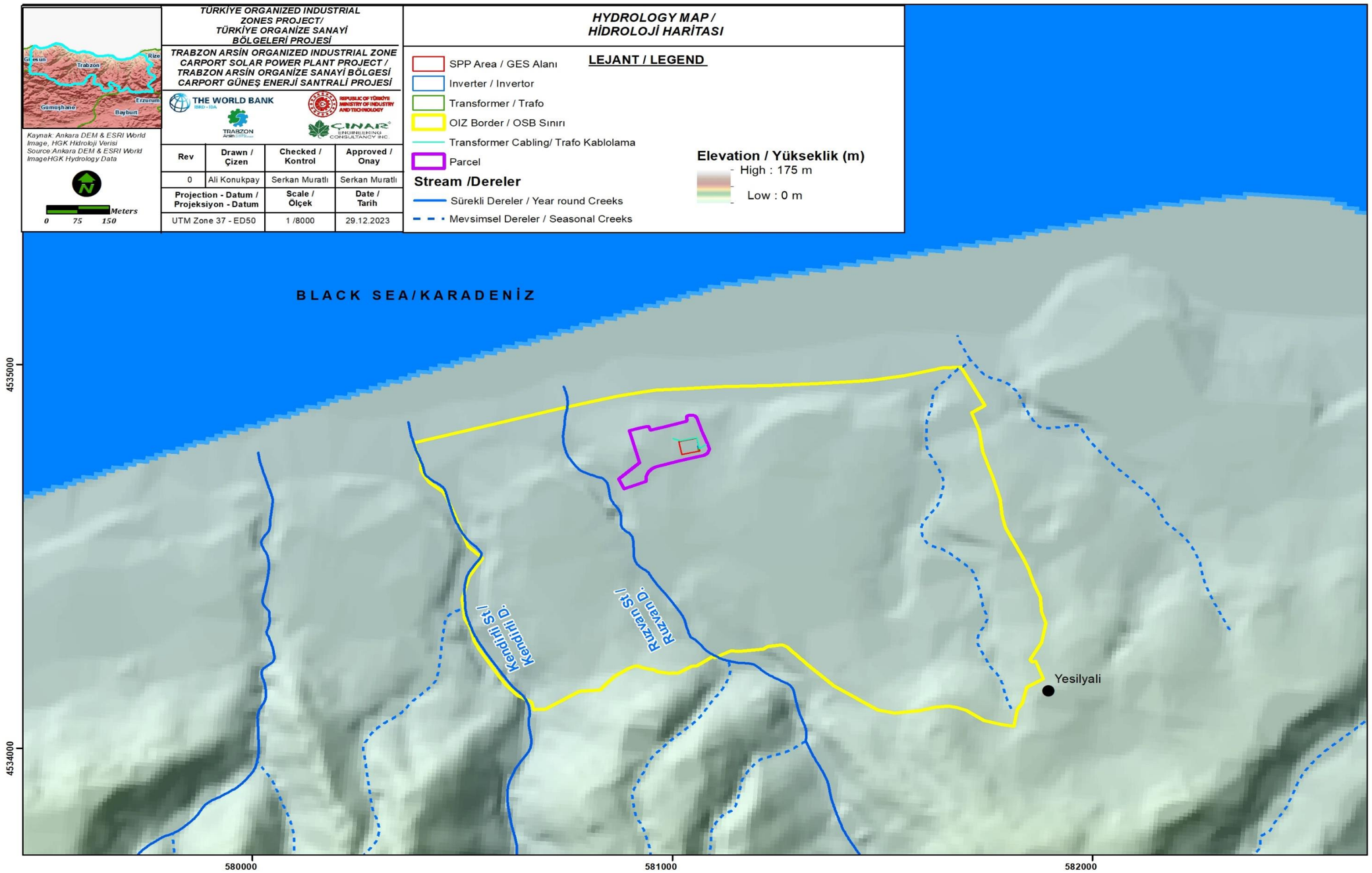


Figure 14. Hydrological Map of Project Area and Its Surrounding

5.9 Wastewater Management

Domestic wastewater generated within the OIZ and wastewater that complies with the pre-treatment and acceptance criteria defined in the Trabzon Arsin OIZ Regulation on Wastewater Treatment Plant and Connection of Wastewater to Sewerage are transferred to the WWTP via the OIZ sewerage system and treated there.

The WWTP has a capacity of 900 m^3/day and the treatment process is physical and biological. It has sufficient capacity to treat the limited wastewater to be generated due to project. The WWTP is designed as a Long Aeration Activated Sludge System. General view of the WWTP is shown in Photograph 11.

The WWTP consists of pumping unit, by-pass and distribution structure, screen and aerated oil and grit chamber, equalization basin, aeration unit, circular sedimentation tank, chlorine contact tank, recirculation reservoir and sludge dewatering units (see Photograph 12-Photograph 15). The discharge point of WWTP is Rızvan Stream (see Photograph 16 and Photograph 17). WWTP workflow diagram is given in Annex-5.

"WWTP Identification Certificate (ID: 15-127063-54, Date: 17.12.2015)" issued by the General Directorate of Environmental Management for the WWTP is presented in Annex-5.

The WWTP is evaluated within the scope of Annex-1 list Article 10.1 "Common wastewater treatment facilities[1,2] belonging to the regions where industries are located collectively" of the Environmental Permit and License Regulation Annex-1 list, which entered into force after being published in the Official Gazette dated 10.09.2014 and numbered 29115. In this scope, the WWTP has an "Environmental Permit" with document number 228490125.0.1 and valid between 06.05.2020-06.05.2025 (see Annex-2).

Internal monitoring samples are taken from the WWTP discharge point every month and inspection samples are taken every four (4) months with the Provincial Directorate of Environment, Urbanization and Climate Change.

The environmental consultant company within the scope of environmental permit and license is "Eylül Maden Mühendislik İSG Özel Eğitim Hizmetleri Danışmanlık İnşaat Ticaret Ltd. Şti.". Monthly activity reports prepared by the environmental consultant company are given in Annex-12 and it is stated in the report that WWTP currently operates in compliance with the national regulations.

Wastewater is accepted to WWTP in compliance with the limit values specified in Article 6 Table 1 of the "Regulation on Trabzon Arsin OIZ Wastewater Treatment Plant and Connection of Wastewater to Sewerage" which entered into force on 02.05.2016[22]. According to the Regulation, domestic wastewater producers from the facilities within the OIZ are obliged to have wastewater analysis conducted once a year and industrial wastewater producers are obliged to have wastewater analysis conducted twice a year.

[22]**Source:** https://www.tosbol.org.tr/atiksu-aritma-tesisi-belgeleri-TR.html

Photograph 11. General View of WWTP

Photograph 12. Aerated Grit Chamber

Photograph 13. Aeration Tank

Photograph 14. Sedimentation Tank

Photograph 15. Chlorination (Disinfection)

Photograph 16. WWTP Discharge Point (Rızvan Stream)

Photograph 17. View from Rızvan Stream

The analysis report dated 09.11.2023 regarding the wastewater sample taken on 30.10.2023 at the WWTP discharge point is presented in Annex-5 and the analysis results are compared with the limit values in national legislation and international standards in Table 12. As seen in Table 12, measured parameters meet the Project standards.

Table 12. Wastewater Analysis Results and Comparison with Project Standards

Pollutants	Units	Analysis Result	Project Standards[23]
Total Suspended Solids	mg/l	156.1	200
Oil and Grease	mg/l	<10	20
pH	-	7.7	6-9
Chemical Oxygen Demand	mg/l	224	250

[23] **Source:** Water Pollution Control Regulation, Table 19: Discharge Standards of Mixed Industrial Wastewater into the Receiving Environment (Small and Large Organized Industrial Zones and Other Industries Where Sector Identification Cannot Be Made)

5.10 Waste Management

As stated in Annex-1 of the Zero Waste Regulation published in the Official Gazette dated 12.07.2019 and numbered 30829, OIZs are obliged to establish a zero-waste management system.

In this context, Trabzon Arsin OIZ has a "Zero Waste Certificate (Basic Level)" valid between 24.12.2020-24.12.2025 (see Annex-2). In line with the zero-waste management system, there are waste boxes in the OIZ administrative building (see Photograph 20).

OIZ has an Industrial Waste Management Plan approved by the Provincial Directorate of Environment, Urbanization and Climate Change since the wastewater treatment plant of OIZ is evaluated within the scope of Annex-1 list of the Environmental Permit and License Regulation (see Annex-2).

Wastewater from the Project will be discharged to Trabzon Arsin OIZ sewerage system and treated at the wastewater treatment plant within the OIZ. In this context, treatment sludge will be generated indirectly from the Project. The wastewater treatment plant includes a sludge dewatering unit. The sludge collected in the sedimentation tanks is sent to the sludge dewatering unit, where water and sludge are separated. The water portion is returned to the beginning of the treatment plant for further treatment. The sludge is sent to a licensed waste disposal facility with waste code “19 08 12”. The treatment sludge delivery record and the analysis report for the treatment sludge are presented in Annex-4.

In the current situation, it has been stated that there is no hazardous waste delivery, and a stock record has been entered into the online mobile waste tracking system (MoTAT) system. The stock record was conducted for the year 2021, and waste delivery is realized in 2022 under the environmental permit and license (see Annex-4). Waste declaration Waste declaration of 2023 had been realized by the environmental consultant company and added to Annex-4.

Domestic wastes generated in Trabzon Arsin OIZ are placed in containers placed by Trabzon Metropolitan Municipality and collected by the Municipality. Domestic wastes will be sent to the municipality's contracted company "Evra Enerji San. Tic. A.Ş." where the waste is recycled or disposed. The environmental permit and license certificate of the facility numbered 286175762.0.1 and valid between 17.03.2022-17.03.2027 is presented in Annex-4."

Trabzon Arsin OIZ has an agreement with “Çakıroğlu Katı Atık Dönüşüm Har. İnş. Nak. ve Tic. Ltd. Şti.” within the scope of the recyclable wastes. The environmental permit and license certificate of the facility numbered 223222968.0.1 and valid between 11.03.2021-11.03.2026 is presented in Annex-4."

The enterprises/facilities within Trabzon Arsin OIZ carry out their own waste management. There is a temporary hazardous and non-hazardous waste storage areas belonging to Trabzon Arsin OIZ for the storage of wastes generated by OIZ administrative units (see Photograph 18 and Photograph 19).

Photograph 18. Hazardous Waste Storage Area

Photograph 19. Non-hazardous Waste Storage Area

Photograph 20. View from OIZ Administrative Building Zero Waste Boxes

Photograph 21. Trabzon Arsin OIZ Domestic Waste Containers

Findings and recommendations on hazardous and non-hazardous temporary waste storage areas are given below:

- There are hazardous and non-hazardous temporary waste storage areas belonging to OIZ.
- The floor of the areas is covered with concrete.
- The areas are surrounded and covered with a roof. There is a lock on the door of the areas.
- There is adequate ventilation in the areas.

- Waste is stored in the non-hazardous waste storage area within the scope of the zero-waste management system. Waste containers are labeled and separated according to waste types.
- The containers in the hazardous waste storage area are empty, but not labeled according to waste types.
- Since the hazardous waste storage area is filled with containers, the blind shaft could not be seen. If there is no blind shaft, it is recommended to be placed in case of possible leakages.
- It was observed that there are no fire extinguishers in the areas. Adequate number of fire extinguishers should be positioned in the areas.
- There is no signboard in the areas containing the information of the waste area responsible. It is recommended to provide a signboard and hang it in a visible place in the areas.

The hazardous waste stock record made through the MoTAT system is given in Annex-4 and Table 13.

Table 13. Hazardous Waste List (2022)

Waste Code	Waste Definition	Generated Waste Amount (kg)	Licensed Company
190812	Sludge from biological treatment of industrial wastewater, other than 19 08 11	500.0	"Ankara Atıktan Türetilmiş Yakıt Hazırlama ve Geri Kazanım Anonim Şirketi"
150202	Absorbents contaminated with hazardous substances, filter materials (not otherwise specified oil filters), cleaning fabrics, protective clothes	90.0	"Atıksa Entegre Atik Yönetimi Ticaret Limited Şirketi" Bursa Branch
150110	Packages containing residues of hazardous substances or contaminated with hazardous substances	30.0	

Waste management system of the OIZ is sufficient to manage the waste to be generated due to the project.

5.11 Natural Disaster Potential

Seismicity

The latest "Türkiye Earthquake Hazard Map", prepared by Disaster and Emergency Management Presidency (AFAD) and published in the Official Gazette dated 18.03.2018 and numbered 30364 and entered into force as of 01.01.2019, is given in Figure 15 and marked on the Project area. The project area was examined on the interactive earthquake hazard map published by Disaster and Emergency Management Presidency (AFAD), and the largest ground acceleration value (PGA 475) for the 475 Year Recurrence Period was determined as 0.207 g which indicates low earthquake hazard (see Figure 16).

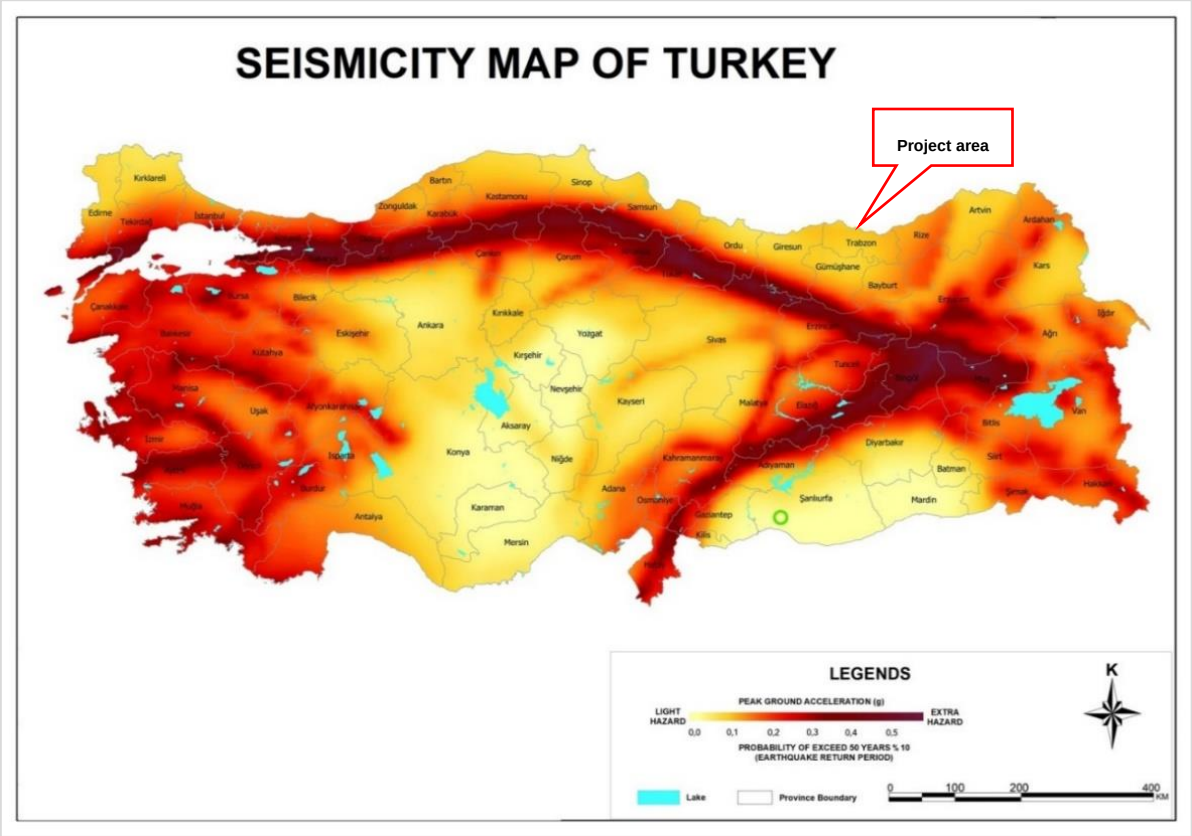


Figure 15. Earthquake Hazard Map of Türkiye[24]

Trabzon Province is not located within important earthquake zones and has not been subjected to a significant earthquake in the last century. Despite this, weak repercussions of strong earthquakes along the North Anatolian fault stretching along Erzincan-Reşadiye-Havza were felt, but these have never caused loss of life or property in history. The North Anatolian Fault Zone is approximately 132 km away from the Project area.

[24] **Source:** AFAD, 2018, Türkiye Earthquake Hazard Map

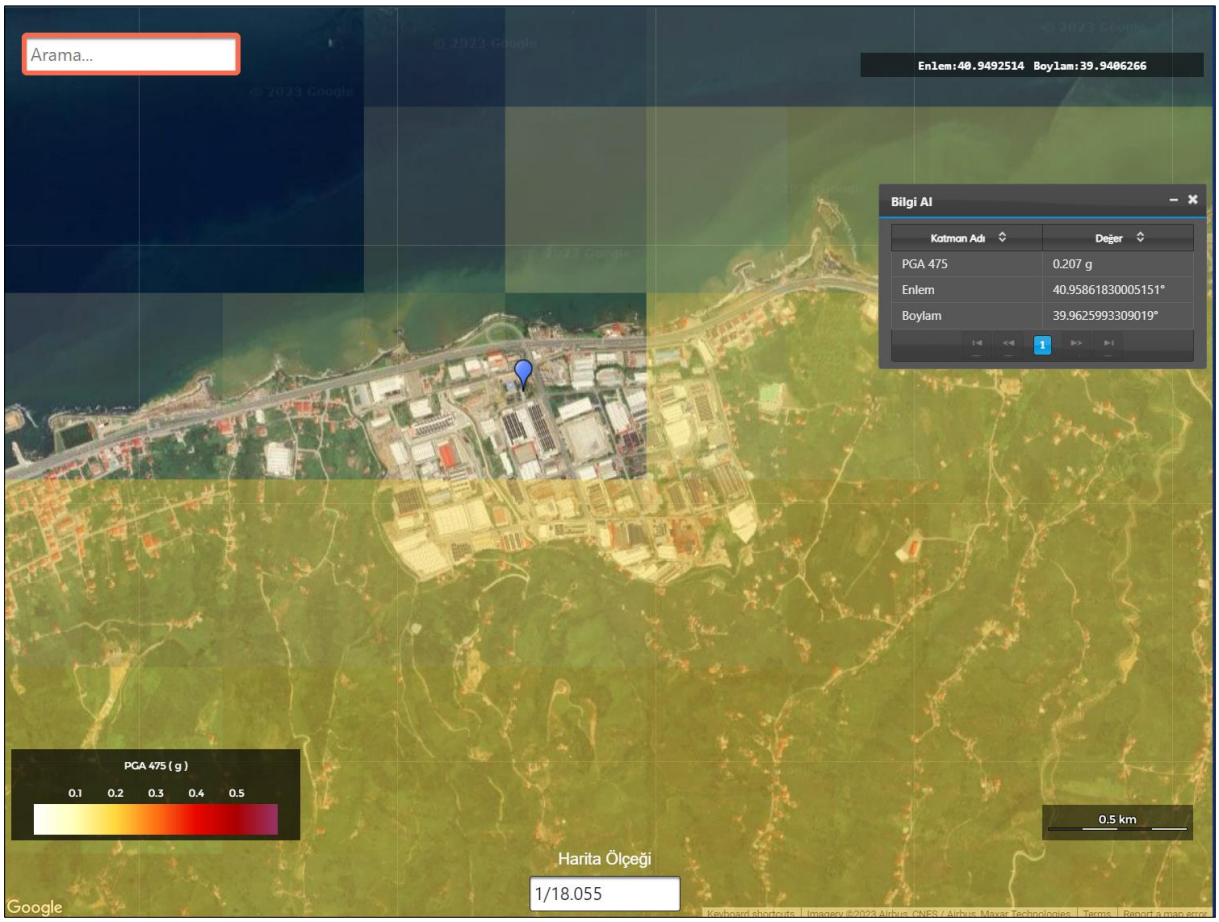


Figure 16. Project Area Maximum Ground Acceleration (PGA 475)[25]

All kinds of structures to be built within the scope of the project must comply with the principles of the "Regulation on Buildings to be Built in Disaster Areas" published in the Official Gazette dated 14/07/2007 and numbered 26582 of the Repealed Ministry of Public Works and Settlement and published in the Official Gazette numbered 30364 dated 18.03.2018 and published on 01.01.2019. The provisions of the "Turkish Building Earthquake Regulation" of the Disaster and Emergency Management Presidency, which came into force in 2019, will be strictly adhered to.

Floods, Landslides and Rockfalls

Due to the topographic, geological and climatic conditions of Trabzon Province, many types of disasters frequently happen, and the disasters cause material and human losses, and the disaster risk is extremely high. Floods, landslides, rock falls, avalanches, storms and fire disasters are more common in Trabzon Province. Among the provinces with the highest number of landslide events in the country, Trabzon ranks second after Rize in terms of the number of events and first in the order of housing transfers.

To examine the landslide situation in and around the project area, “Maden Tetkik Arama/ Mineral Research and Exploration” (MTA) Geosciences Map Viewer and Drawing Editor (http://yerbilimleri.mta.gov.tr) was examined. According to this, there is no active or old landslide areas and creeps, flows, slides, etc. as mass movements within the project area and its immediate surroundings (Figure 17).

[25] **Source:** Interactive Earthquake Risk Map, AFAD, (https://tdth.afad.gov.tr/)

In the region where the project area is located, landslide areas are located on the valley slopes of the sloping and mountainous areas in the south of the project area and generally occur within weathering zones developed on volcanic rocks. The closest landslide area to the project area is located approximately 2.1 km southeast of the project area, and active and old landslide areas in the region where the project area is located are shown in Figure 17.

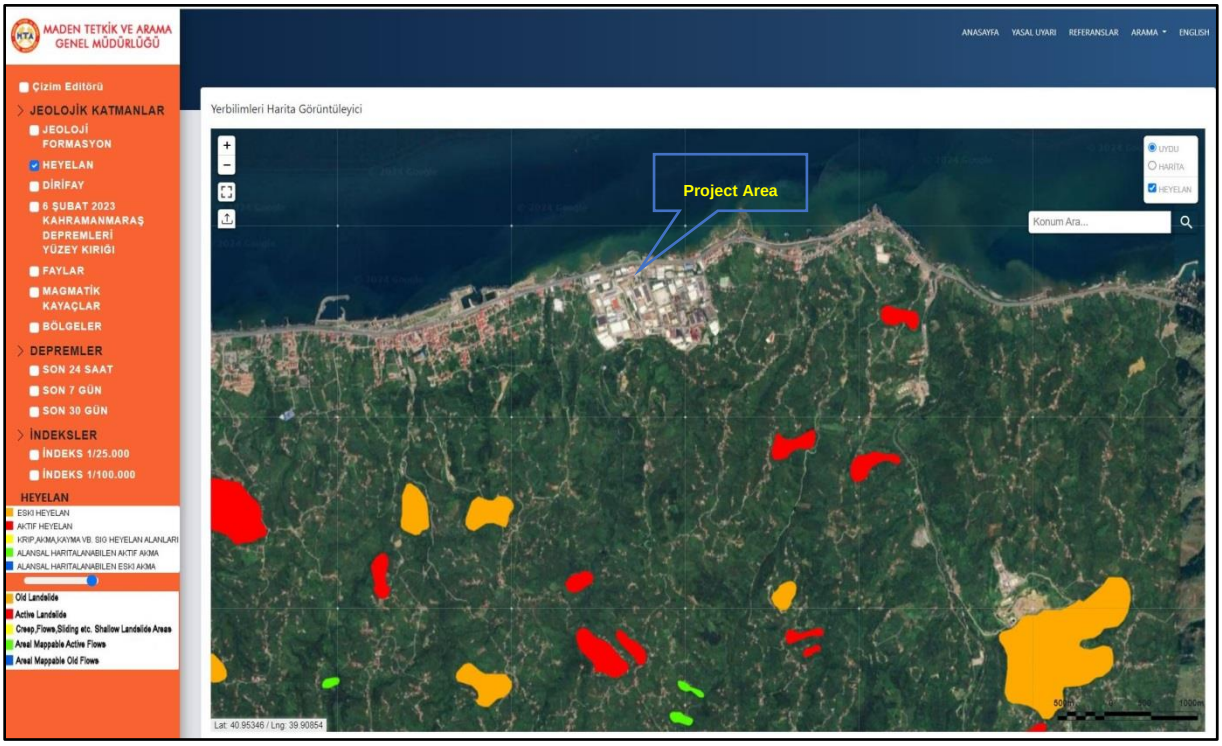


Figure 17. Landslide Risk Map of Project Area and Its Surrounding[26]

In addition, the project area is completely located within the Trabzon Arsin OIZ, for which a site selection has been made before, and the surface waters within the project area have been rehabilitated in accordance with the bed sections and their flows have been taken under control. Therefore, there is no flood or landslide risk for the project area.

Landslide events are observed in all districts, but most notably in Çaykara, Düzköy, Center (Ortahisar). The spread is increasing in the districts of Akçaabat and Akçaabat. Heavy rains on 19.06.1990 caused floods, inundation and landslide disasters in Trabzon Center, Maçka, Akçaabat, Vakfıkebir, Çarşıbaşı and Tonya Districts and many villages and neighborhoods of these districts. 56 of citizens lost their lives in disasters. The rock fall phenomenon is observed throughout the province, and is more intense in Araklı, Çaykara, Maçka, Tonya and Yomra districts.

The ground survey report for the project area is given in Annex-9.

[26] **Source:** http://yerbilimleri.mta.gov.tr

5.12 Biodiversity and Protected Areas

The topics covered under the biological environment are the legally protected and internationally recognized areas of high biodiversity value, habitat classification, terrestrial flora and fauna, and critical habitat assessment.

Methodology for Biological Environment

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, field surveys and expert judgement. The ecological study was conducted with the following objectives:

- Using various standard techniques, assess the status of major floral and faunal components of all terrestrial habitats present in the Project AoI;
- Data collection and compilation on the status of floral and faunal components and habitats;
- Provide quantitative data on various floral and faunal components.
- Identification and listing of floral and faunal species of conservation significant (Critically endangered (CR), Endangered (EN), Vulnerable (VU) and threatened and endemic species in accordance with the International Union of Conservation for Nature (IUCN) RED List) in the Project AoI; and
- Identification of conservation-sensitive areas (Protected Areas: National Parks, Nature Parks, Nature Reserves, Wildlife Development Area, Special Environmental Protection Area, Wetlands, Biosphere Reserves) in the Project AoI.

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

- In determining vantage points, locations that represent different habitat types and those that had been identified to be significant to species were considered.
- Some of the flora and fauna species were recorded through direct observations.

Field surveys were conducted in December 2023 (see Photograph 22, Photograph 23, Photograph 24 and Photograph 25).

Photograph 22. General View of The Project Area

Photograph 23. General View of The Project Area

Photograph 24. General View of The Project Area

Photograph 25. General View of The Project Area

Area of Influence (AoI) for Biological Environment

Since the project area is completely located within OIZ, the border of the organized industrial zone is accepted as the impact area for biological environment.

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 for the critical habitat assessment.

The only habitat type at the project area and AoI is "J1.4 Urban and suburban industrial and commercial sites still in active use", which is a modified habitat.

Terrestrial Flora

The Project area contains both the existing parking lot and grassy field and trees (see Photograph 22 and Photograph 24). Since the area is a recreational area, natural diversity was found to be weak and few plant species were identified. The identified flora species were given at Table 14 and the photos at Photograph 26, Photograph 27, Photograph 28, Photograph 29, Photograph 30, Photograph 31, Photograph 32 and Photograph 33. 8 plant species were identified at the Project area (observation). 5 of these species were categorized as "LC" (Least Concern), 1 as "DD" (Data Deficient), and 2 as "NE" (Not Evaluated) according to the IUCN. None of the species were listed in the Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES) and Bern Convention appendix. The identified species were all not under risk and threat.

Photograph 26. ***Prunella vulgaris***

Photograph 27. ***Hedera helix***

Photograph 28. ***Picea orientalis***

Photograph 29. ***Platanus orientalis***

Photograph 30. ***Trifolium pratense***

Photograph 31. ***Punica granatum***

Photograph 32 *Elaeagnus angustifolia*

Photograph 33. *Cotoneaster integerrimus*

Table 14. Terrestrial Flora Species

FAMILY	Species	Turkish Name	ENDEMISM	IUCN	CITES	BERN	Site Obs./Lit.
Araliaceae	*Hedera helix*	Duvar Sarmaşığı	-	LC	-	-	Site Obs.
Elaeagnaceae	*Elaeagnus angustifolia*	İğde	-	LC	-	-	Site Obs.
Fabaceae	*Trifolium pratense*	Çayır Üçgülü	-	NE	-	-	Site Obs.
Lamiaceae	*Prunella vulgaris*	Gelinciklemeotu	-	LC	-	-	Site Obs.
Lythraceae	*Punica granatum*	Nar	-	LC	-	-	Site Obs.
Pinaceae	*Picea orientalis*	Lâdin	-	LC	-	-	Site Obs.
Platanaceae	*Platanus orientalis*	Çınar	-	DD	-	-	Site Obs.
Rosaceae	*Cotoneaster integerrimus*	Garagat	-	NE	-	-	Site Obs.

Terrestrial Fauna

Due to the presence of intense human activity and traffic, only bird species could be identified among the fauna species. Also, according to the literature, only bird species were listed (see Table 15).

According to the surveys and literature research, 11 bird species were identified. Five (5) of the species were observed during site study, while the others were identified based on literature.

None of the species were under threat and in any threatened category according to the IUCN. The photos of the identified bird species are given below.

Photograph 34. *Columba livia*

Photograph 35. ***Corvus cornix***

Photograph 36. ***Erithacus rubecula***

Photograph 37. ***Fringilla coelebs***

Photograph 38. ***Phoenicurus ochruros***

Photograph 39. ***Larus sp.***

Table 15. Terrestrial Fauna Species

Family	Speciesw	Turkish Name	Endemism	IUCN	CITES	BERN	MAK	Status	RDB	Site Obs./Lit.
Columbidae	*Columba livia*	Kaya Güvercini	-	LC	-	App-III	App -II	Native	A.5	**Site** Obs.
Corvidae	*Corvus cornix*	Leş Kargası	-	NE	-	App -III	-	Native	A.5	**Site** Obs.
Anatidae	*Cygnus olor*	Kuğu	-	LC	-	App -III	-	Native	A.3.1	Lit.
Muscicapidae	*Erithacus rubecula*	Kızılgerdan	-	LC	-	App -II	-	Winter visitor	A.3	**Site** Obs.
Fringillidae	*Fringilla coelebs*	İspinoz	-	LC	-	App -III	App -I	Native	A.4	**Site** Obs.
Muscicapidae	*Phoenicurus ochruros*	Kara Kızılkuyruk	-	LC	-	App -II	-	Winter visitor	A.2	**Site** Obs.
Podicipedidae	*Podiceps nigricollis*	Karaboyunlu Batağan	-	LC	-	App -II	-	Native	A.4	Lit.
Anatidae	*Tadorna ferruginea*	Angıt	-	LC	-	App -II	-	Native	A.4	Lit.
Gaviidae	*Gavia arctica*	Karagerdanlı Dalgıç	-	LC	-	App -II	-	Native	A.1.2	Lit.
Phalacrocoracidae	*Phalacrocorax aristotelis*	Tepeli Karabatak	-	LC	-	App -II	-	Native	A.3	Lit.
Podicipedidae	*Tachybaptus ruficollis*	Küçük Batağan	-	LC	-	App -II	-	Native	A.3.1	Lit.

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6.Demirsoy, A. Yaşamın Temel Kuralları-Omurgalılar-Amniyota, 1992.
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9.Demirsoy, A. Memeliler, Çevre Koruma Genel Md., Proje Çalışması, 1996.
10.Demirsoy, A. Sürüngenler, Çevre Koruma Genel Md., Proje Çalışması, 1996.

BERN (Bern Convention)
Appendix - II: Strictly Protected Fauna Species (SPFS)
Appendix - III: Protected Fauna Species (PFS) IUCN (International Union for Conservation of Nature and Natural Resources) Red List Categories (Version 2009.1)
IUCN
LC (Least Concern): Widespread and abundant species.
NE (Not Evaluated): Species that has not yet been evaluated against the criteria.
Central Game Commission (MAK) Decrees
Appendix-I: List of game animals protected by MAK.
Appendix-II: List of game animals whose hunting is allowed for certain periods
RDB (Red Data Book) Categories for birds, Kiziroğlu, 2012

A.1.2= The populations of these species have significantly decreased nationwide in Türkiye. In the observed regions, they are represented by 1 individual to 10 pairs (1-20 individuals).
A.2= The numbers of these species range from 11 to 25 pairs (22-50 individuals) in the observed regions. They are significantly under the threat of extinction.
A.3= The populations of these species nationwide in Türkiye generally range between (52-500) individuals in the observed regions. These are also species with a sensitivity that could be depleted, posing a high risk of extinction in the wild.
A.3.1= There is a decline in the populations of these species in the observed regions. The populations of these species range from 251 to 500 pairs (502-1000 individuals).
A.4= According to the IUCN and ATS criteria, the densities of these species, although not currently under the threat of extinction in the observed regions, show a local decline, making them potential candidates for future endangerment. The populations of these species range from 501 to 5000 pairs (1002-10,000 individuals).
A.5= There is currently no situation of decline or extinction threat in the observed populations of these species.

Legally Protected and Internationally Recognized Areas of High Biodiversity Value in Project Area of Influence

There are two different types of identified protected areas: Legally Protected Areas and Internationally Recognized Areas of high biodiversity value. Legally Protected Areas as defined by WB ESS6 are those that meet the IUCN definition for a protected area, while Internationally Recognized Areas are those that are exclusively defined as United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Natural Sites, UNESCO Man and Biosphere Reserves, Key Biodiversity Areas, Important Bird Areas Alliance for Zero Extinction Sites, and wetlands designated under the Ramsar Convention. When a project is located within a legally protected or internationally recognized area, ESS6 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 and involve protected area sponsors and managers, project-affected parties including indigenous peoples and other interested parties on planning, designing, implementing, monitoring, and evaluating the proposed project, as appropriate; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims and effective 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 internationally recognized areas of high biodiversity values such as Key Biodiversity Areas (KBA), Important Bird Areas (IBA) and Important Plant Areas (IPA) were screened.

Legally Protected Areas

Legally protected areas around the project area are given in Table 16 and a map showing the locations of the protected areas with respect to the project area is presented in Figure 18. Considering the distances between the project area and the legally protected areas in the region, it is considered that there will be no project-related impacts on these areas.

Table 16. Legally Protected Areas near the Project Area

Protected Area	Air Distance to the Project Area (km)
Altındere Valley National Park	36.75 km
Uzungöl Special Environmental Protection Areas	45.29 km
Beşik Mountain Nature Park	62.69 km
Sis Mountain Nature Park	68.19 km
Kadıralak Nature Park	54.24 km
Çalcamili Nature Park	49.98 km
Kayabaşı Nature Park	43.85 km
Lake Sera Nature Park	29.12 km
Çamburnu Nature Park	21.62 km
Görmek Nature Park	31.54 km
Uzungöl Nature Park	46.29 km

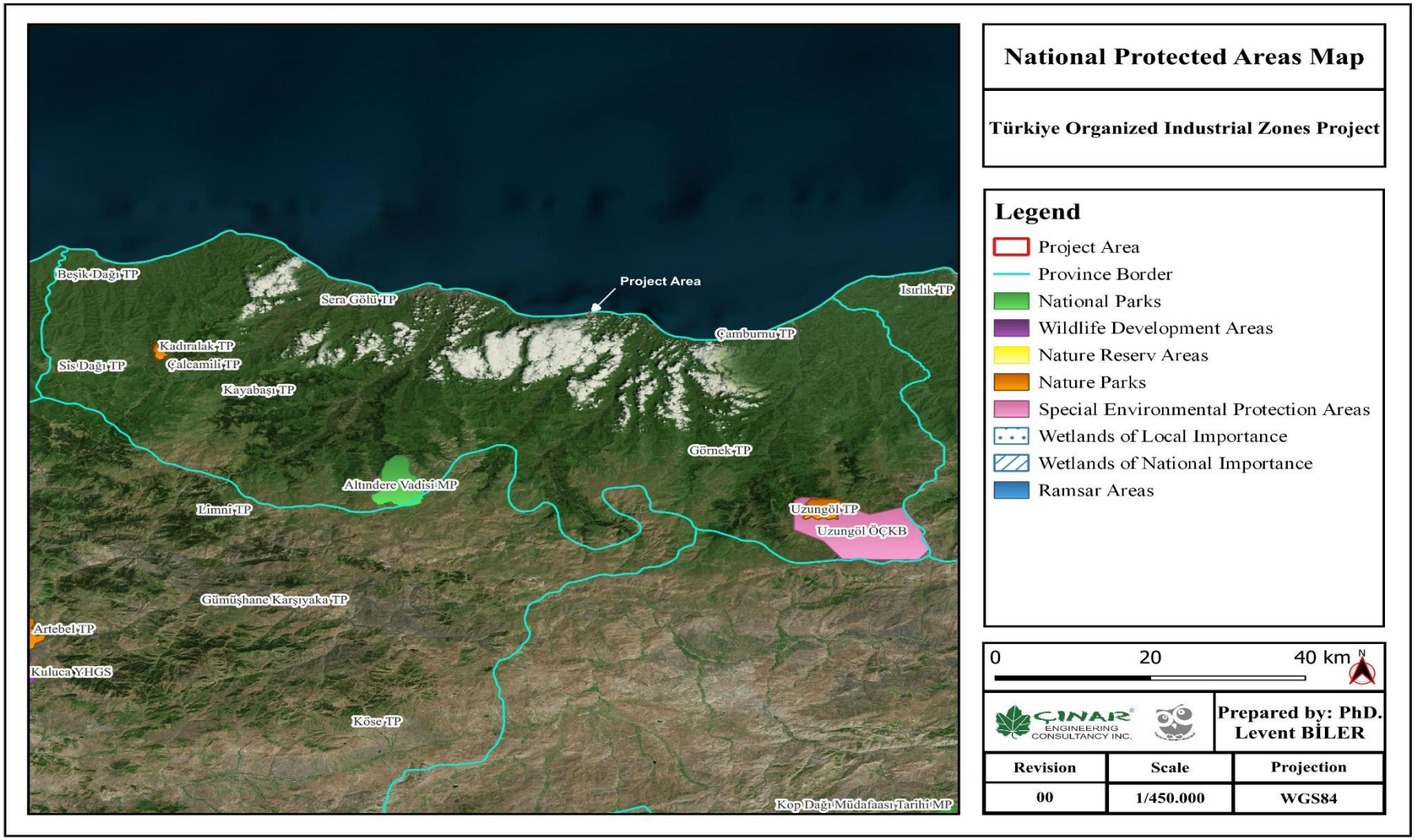

Figure 18. Legally Protected Areas near the Project Area

Internationally Recognized Areas of High Biodiversity Value

Internationally Recognized Areas of high biodiversity value are defined as "areas of recognized importance to biodiversity conservation but are not always legally protected" by ESS6. These include UNESCO World Heritage Natural Sites, UNESCO Man and Biosphere Reserves, Key Biodiversity Areas, Important Bird Areas, Alliance for Zero Extinction Sites and wetlands within the scope of Ramsar Convention on Wetlands of International Importance. Guidance Note 6 also addresses that internationally recognized areas of high biodiversity value will often qualify as critical habitat; for instance, areas that meet the criteria of the IUCN's Protected Area Management Categories Ia, Ib and II, or the majority of KBAs, which encompass, among others, Important Bird and IBAs.

In Türkiye, besides the Ministry's official work, there are various non-governmental organizations (NGOs), academic entities, as well as individual researchers and professionals who work in collaboration or independently to better understand Türkiye's natural resources and put forward impactive conservation strategies to ensure survival of habitats and species, some of which constitute unique ecosystems of global conservation value.

Doğa Derneği, published an inventory on KBAs in Türkiye in 2006 in collaboration withthe Ministry of Environment and Forestry, integrating survey results across the country with expert opinions. The preparation of the inventory was the first time the KBA approach was applied on a national scale, which was based on principles developed by BirdLife International for bird species in their "Important Bird Areas" studies. One of the fundamental functions of the inventory is defined as "providing resources for areas and species that should be worked upon to reach zero extinction".

The project area is located within the boundaries of East Black Sea Mountains (Doğu Karadeniz Dağları) Important Plant Area (IPA) and Important Nature Area (INA). The nearest Important Bird Area (IBA) is the East Black Sea Mountains IBA and it is located 2.70 km east of the project area. No impact is expected on the KBA's due to existing intense human activity in the area.

Critical Habitat Assessment

The project area is currently an active Organized Industrial Zone and does not contain any natural habitats. As a result of assessments, no species triggering critical habitats have been identified in the area through both on-site surveys and literature reviews. The 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.

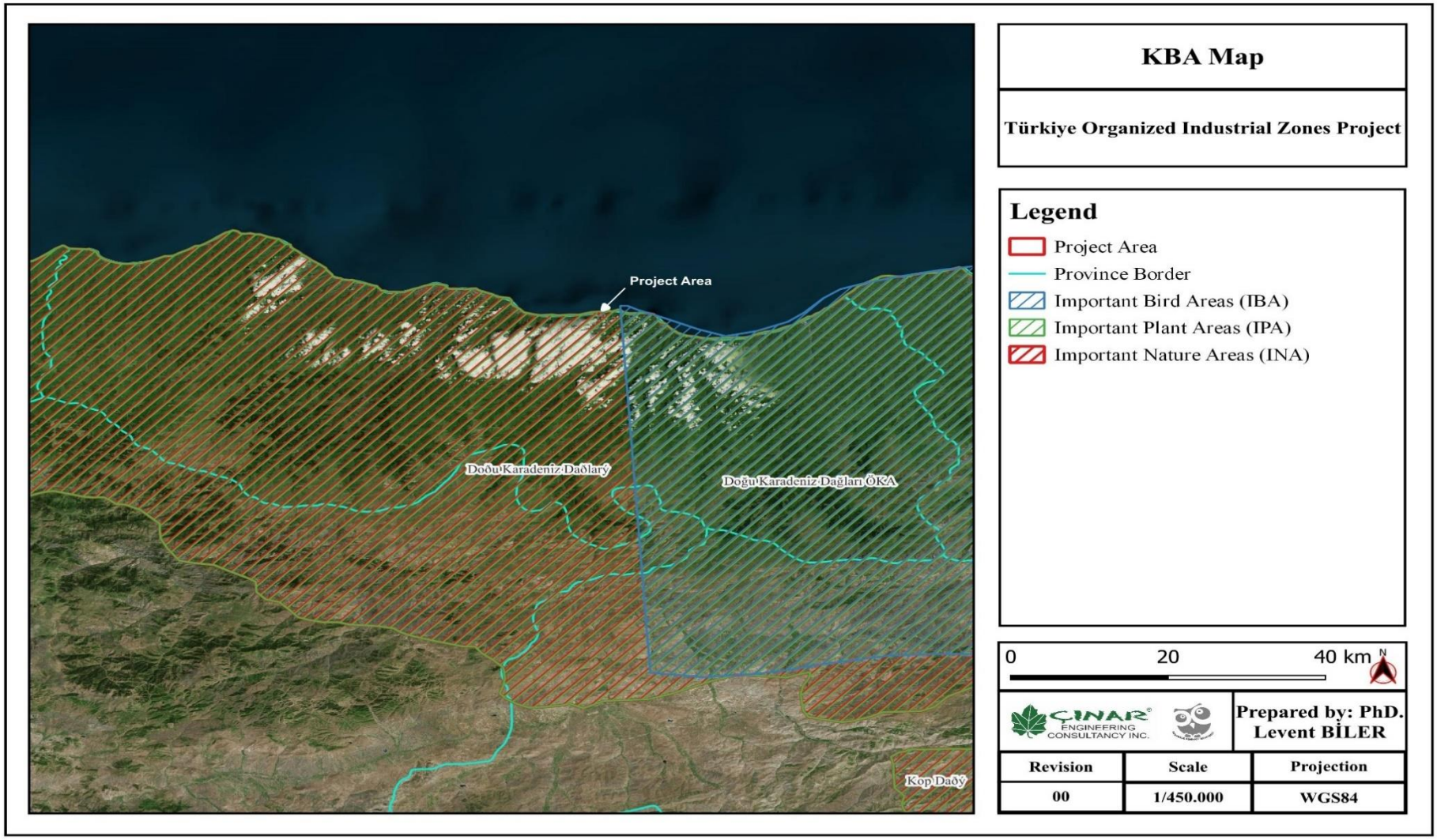

Figure 19. KBAs and the Project Area

6. SOCIAL BASELINE OF THE PROJECT

6.1 Demography and Population

Trabzon has 18 districts. Ortahisar, the central district of the city, has the most the most populous population (322,702people). Ortahisar is followed by Akçaabat, Araklı, Yomra and Of, respectively. Arsin is ranked 6th among the 18 districts with 32,717 people. The least population is observed for Dernekpazar (4,294 people) [27].

According to the population data for the year 2023, when the distribution of the population by gender is examined, the female population in all units has almost equal proportions to the male population, including Arsin District (see Table 17, and Figure 20).

The 2022 Socio-Economic Development Index (SEGE) study reveals that the third level of development includes 175 districts. In the geographical distribution of third-level developed districts, it is observed that 45 districts are from the Black Sea Region. Arsin is ranked 369th among the 973 districts in Turkey with a score of -0.083, placing it among the third-tier districts. In the 18 districts of Trabzon, it is ranked 9th[28].

Table 17. Population Indicator, 2023

Level	Neighborhood	District	Province	NUTS[29] 2	NUTS 1	Türkiye
Settlement	**Yeşilyalı**	**Arsin**	**Trabzon**	**Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane**	**East Black Sea**	
Female	Not available	16,127	415,312	1,370,725	1,370,725	42,638,306
Male	Not available	16,590	409,040	1,362,540	1,362,540	42,734,071
Total	**3,498**	**32,717**	**824,352**	**2,733,265**	**2,733,265**	**85,372,377**

[27] Turkish Statistical Institute, Address Based Population Registration System, 2023, https://biruni.tuik.gov.tr/medas/?locale=en. Access Date: February 2024.
[28] Republic of Türkiye Ministry of Industry and Technology. General Directorate of Development Agencies. SEGE 2022 Districts Socio-Economic Development Ranking Study. Publishing Number 35. Research Report 8. February 2022. https://www.sanayi.gov.tr/assets/pdf/birimler/2022-ilce-sege.pdf. Access Date: February 2024.
[29] Nomenclature of Territorial Units for Statistics

Figure 20. Gender Distribution

The distribution of companies in the industrial zone where the project area is located is approximately as follows according to sectors by alphabetical order:

- agricultural product (tea) production industry (4 companies),
- alloy material manufacturing (1 company),
- arms industry (1 company),
- chemical product marketing (3 companies),
- chemical production (3 companies),
- door and window manufacturing (1 company),
- flour production (2 company),
- forestry industry (1 company),
- furniture manufacturing (7 companies).
- garment manufacturing (1 company),
- glass industry (5 companies),
- insulation material manufacturing (2 companies),
- leather garment production (3 company),
- machinery industry (6 companies),
- newspaper and magazine printing (6 companies),
- paper and packaging manufacturing (4 companies),
- plastic product manufacturing (12 companies),

As can be seen via Table 5 there are companies to serve tourism, chemistry and furniture. In addition to these, religious areas and educational institutions located within the nearby buffer of the project.

There is no information related to land usage of the mentioned areas, however it is known that the any facility has no intersect with the project area.

6.2 Cultural Heritage

The project area is located within the boundaries of Arsin OIZ. During the site visits conducted within the scope of the Project, it was confirmed that the project area is currently used as parking lots. Therefore, it is considered that there are no known cultural assets or archaeological artifacts in the project area.

6.3 Livelihood and Employment

The economy of Trabzon Province is based on agriculture, animal husbandry and tourism. Due to the fact that it is a port city, trade is also an important economic activity.

Arsin district shares similarities with the overall structure of Trabzon, featuring historical and natural attractions. However, Arsin district being a smaller settlement compared to the central Trabzon, its tourism potential is more limited. The economy of the district is primarily based on agriculture (with the cultivation of crops such as wheat, corn, and hazelnuts) and livestock, but over time, industry and trade have also developed.

Arsin relies on agriculture and livestock, and it has seen the growth of industry and trade. The presence of a port has contributed to the vibrancy of commercial activities. Arsin benefits from its strategic location in terms of transportation. The Black Sea Coastal Highway has facilitated transportation in the district and improved accessibility to the region. This channel supports local trade and contributes to economic activities in the region. Information on the livelihoods of Arsin is given in Table 18.

Table 18. Major Economic Activities in Settlements Located in the Project AoI

Settlement	Primary Economic Activity	Secondary Economic Activity
Arsin	Paid Employment	Agriculture Livestock Commercial activities

6.4 Education and Health Services

According to the Formal Education Statistics dated 2022 from the Turkish Statistical Institute (TurkStat), the literacy rate in Arsin is 99.18% for men and 93.45% for women[30]. In the district, there are 5,094 students, 438 teachers, 248 classrooms, and 27 educational institutions. The number of students per classroom is 21 for primary and secondary schools, 20 for general middle education level, and 19 for technical education status[31].

The state universities in the province include Karadeniz Technical University, established in 1955, and Trabzon University, founded in 2018, with approximately 41,974 students. Another university in the province is Eurasia University, which is the first foundation university in the Eastern Black Sea Region[32].

Trabzon is positioned as one of Türkiye's leading healthcare centers with 1 university, 17 state hospitals, and 4 private hospitals, along with its health facilities, infrastructure, and staff. Public, private, and university hospitals provide services to both local residents, and patients from nearby regions and neighboring countries. The number of beds per 100,000 people in Trabzon is 421, surpassing the Turkish average of 294. Additionally, the total number of physicians per 1,000 people is 2.5 in Trabzon, compared to the national average of 1.8. (Compiled from TurkStat 2020 Health Statistics.)[33]

Arsin district, which ranks at the bottom of the health level ranking, has values below the average for all variables. There is no health center within the OIZ boundary. The nearest health center is “Arsin District State Hospital”. There is one educational institution which is “Trabzon

[30] Turkish Statistical Institute.Formal Education Statistics. Literacy Rates (%). https://biruni.tuik.gov.tr/medas/?locale=en. Access Date: February 2024.
[31] Arsin District National Education Directorate. https://arsin.meb.gov.tr/. Access Date: February 2024.
[32] https://www.doka.org.tr/
[33] https://www.doka.org.tr/

Arsin OIZ Vocational and Technical High School" within the OIZ boundary. There are no health within the Project's AoI (see Figure 21).

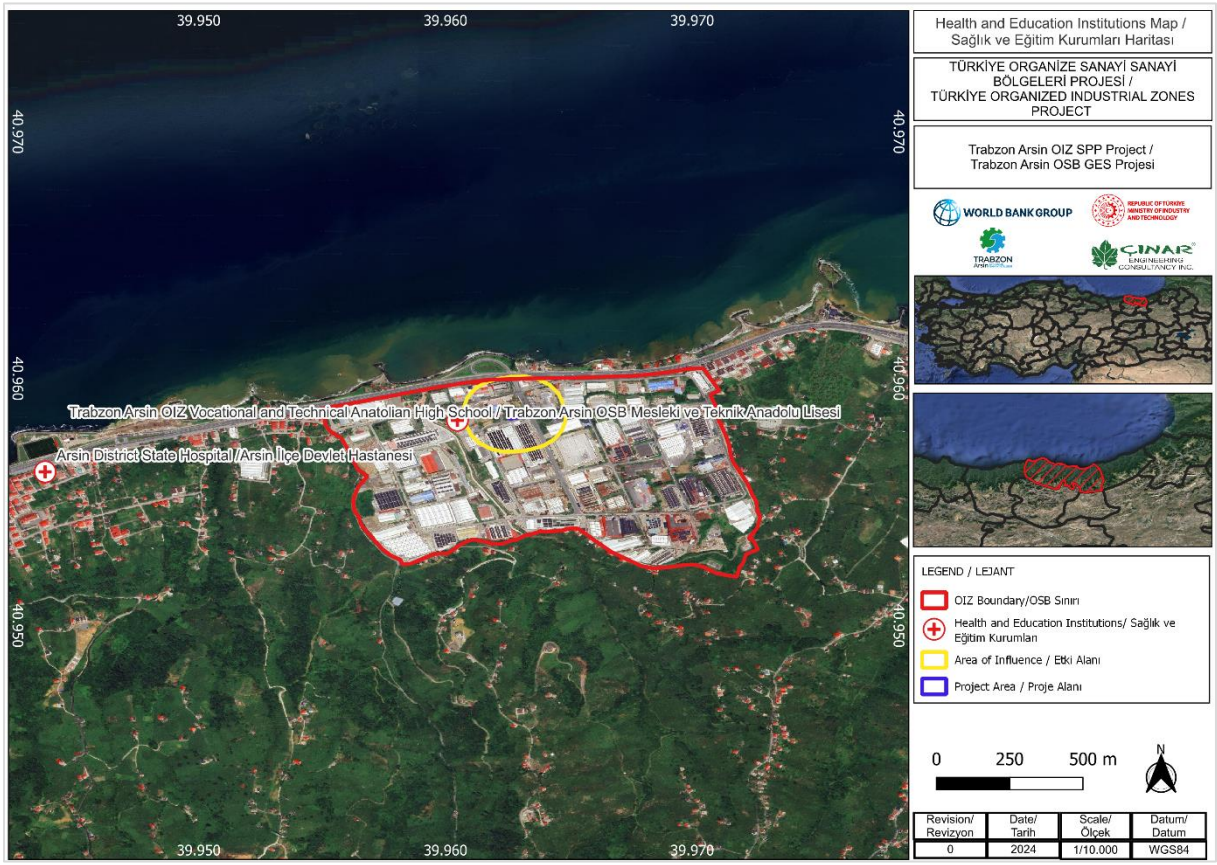

Figure 21. Health and Education Institutions

6.5 Vulnerable/Disadvantaged Individuals/Groups and Social Equity

As per ESS10, Disadvantaged or Vulnerable Individuals or Groups encompass those who encounter obstacles or difficulties in fully engaging with society or are more susceptible to risks and vulnerabilities. These challenges may stem from factors like gender, economic situation, social origins, age, disability, or other conditions. Addressing their needs may necessitate tailored assistance, support, or safeguarding measures to safeguard their rights, welfare, and access to equal opportunities.

However, there is no identified vulnerable group within the project area such as people with disabilities, refugees, as well as non-Turkish speaking people. Besides, there is no identified groups with low-income

The below identified vulnerable groups have not direct link to Project activities. Therefore, there is no need to specific communication and stakeholder engagement activities.:

- Republic of Türkiye Trabzon Governorate Private Trabzon Care Center: The center serves as residential care services for individuals with severe/advanced intellectual disability. The institution has 67 bed capacity. The approximate number of residents can change year by year. Full capacity of the institution can serve over 50 individuals[34].

[34] https://www.aile.gov.tr/trabzon/kuruluslarimiz/ozelkuruluslar/engbakmerkezleri/ot-bakimmm/

Arsin Yeşilce Private Education Vocational School: this vocational school serves individuals with mild intellectual disabilities. Number of the students is 38 with 15 teacher[35].

6.6 Infrastructure Services

The project is in the Eastern Black Sea Basin within Trabzon Arsin OIZ. Key surface water sources include the rehabilitated Rızvan stream and Kendirli stream. The Black Sea is 280 m north of the project. Water for construction and operation will be supplied from the OIZ network, sourced from a well in "Yanbolu" with a "Groundwater Usage Certificate". Monthly water samples are analyzed by the Trabzon Public Health Laboratory, and results are published on the OIZ website and in line with legislative requirements.

Trabzon Arsin OIZ's domestic wastewater is treated at a 900 m³/day capacity WWTP, employing a Long Aeration Activated Sludge System. The WWTP, evaluated under the Environmental Permit and License Regulation.

Trabzon Arsin OIZ adheres to the Zero Waste Regulation, holding a valid "Zero Waste Certificate (Basic Level)" until 24.12.2025. Waste boxes are in place within the OIZ administrative building, supporting the zero-waste management system. The OIZ has an approved Industrial Waste Management Plan.

Project wastewater, treated at the OIZ wastewater treatment plant, indirectly generates treatment sludge. Currently, no hazardous waste has been delivered, with a stock record in the MoTAT system for 2022. However, immediate action is required for prompt hazardous waste delivery in 2023 per the environmental permit and license.

Enterprises within Trabzon Arsin OIZ manage their waste, utilizing temporary storage areas for hazardous and non-hazardous waste generated by OIZ administrative units.

Infrastructure services of nearest settlement to the Trabzon Arsin OIZ are summarized in Table 19.

Table 19. Infrastructure Services

Settlement	Water Resource	Irrigation Resource	Sewerage System	Waste Management	Mass Transportation Vehicle
Yeşilyalı Neighborhood	Trabzon Drinking Water and Sewerage Administration General Directorate (Permitted well for the OIZ)	-	Trabzon Drinking Water and Sewerage Administration General Directorate's Sewarage System	Arsin Municipality	Buss

[35] https://arsinyesilceozelegitim.meb.k12.tr/

6.7 Traffic and Transportation

The nearest transportation route to the project area is D-010 Highway (Black Sea Coastal Road). Traffic load and distance to the project area to D-010 Highway are given in Table 20.

According to the 2022 Traffic Volume Maps prepared by the Ministry of Transport and Infrastructure, General Directorate of Highways (see Figure 22), traffic load of the D-010 Highway is presented in Table 20. The impact of a truck that will work during the construction activities of the Project on the traffic load of the region is negligible.

Table 20. Information About Transportation Routes

Highway Name	Distance to OIZ Boundary (km)	Traffic Load
D010	0.80	Automobile: 20472 Medium Commercial Vehicle: 2133 Bus: 237 Truck: 884 Truck+Trailer, Tow Truck+Semi Trailer: 1752 Total: 25478

Table 21. Vehicles to be Used During the Construction Phase

Vehicles	Number of Vehicles
Digger (JCB)	1
Crane	1
Truck	1
Mixer	1
Pump	1
Forklift	2

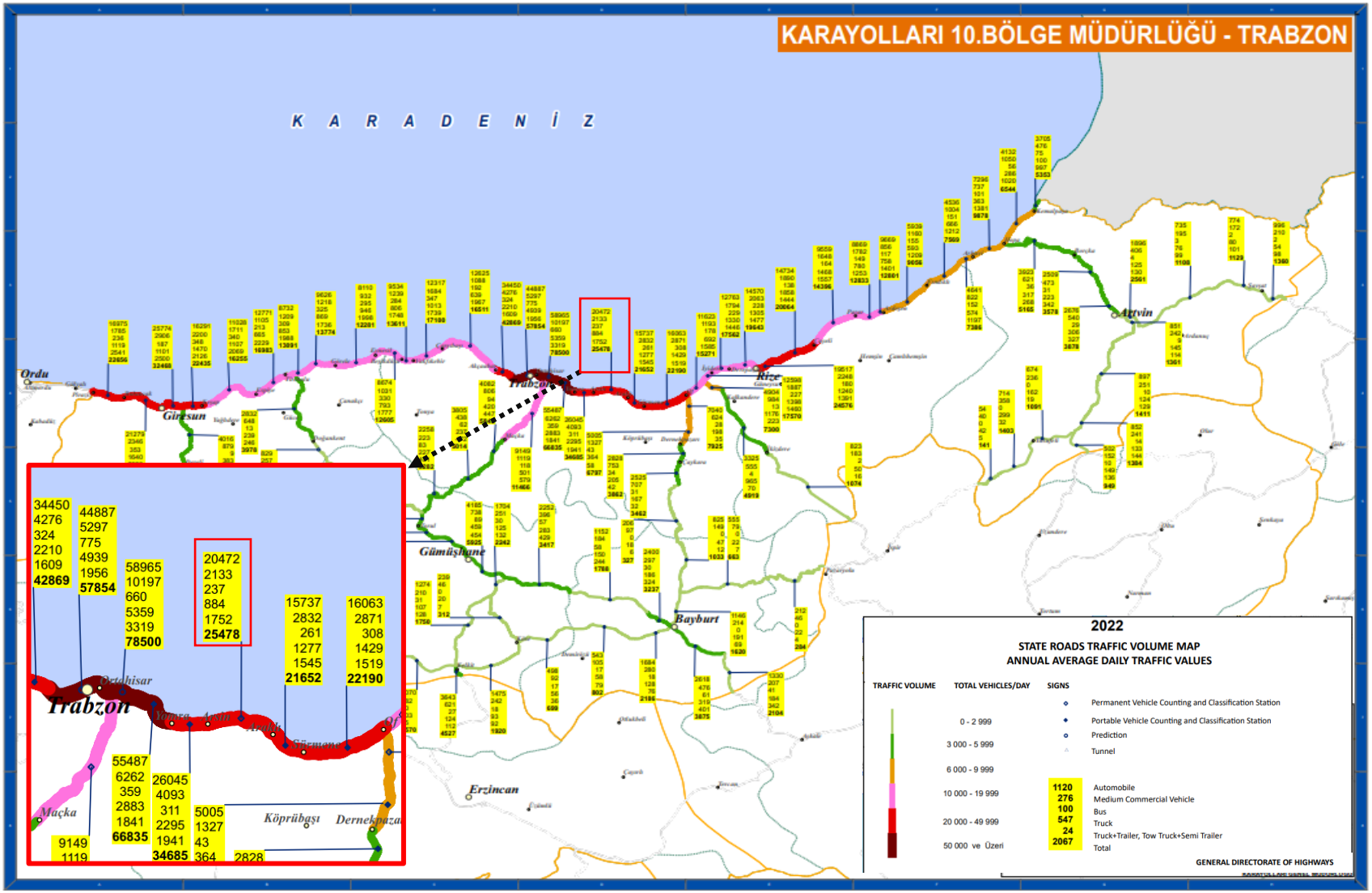

Figure 22. Highways Traffic Volume Map (2022)

7. ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS OF THE PROJECT

7.1 Environmental Risks and Impacts of the Project

7.1.1 Area of Influence (AoI)

In the EIA Regulation published in the Official Gazette dated 29.07.2022 and numbered 31907, the area of influence (AoI) is defined as "the area affected by a project planned to be realized before, during and after operation".

The environmental and social assessment is defined in WB ESS1 (Assessment and Management of Environmental and Social Risks and Impacts) Paragraph 23 as:

"The Borrower will carry out an environmental and social assessment of the project to assess the environmental and social risks and impacts of the project throughout the project life cycle. The assessment will be proportionate to the potential risks and impacts of the project, and will assess, in an integrated way, all relevant direct, indirect and cumulative environmental and social risks and impacts throughout the project life cycle, including those specifically identified in ESS2-10."

The environmental and social AoI of the Project has been determined as 150 m-radius from Project area (see Figure 23). The 150-meter radius impact area has been determined considering environmental and social impacts, especially sensitive receptors in the vicinity of the project area.

In this section, the potential impacts of the Project's construction and operation activities on air quality, water resources, noise level, waste management, soil quality and biodiversity were investigated.

In addition, estimated amount of air emissions, noise level increase, water use and wastewater to be generated because of the construction and operation activities have also been provided. The calculated values were compared with the Project Standards.

Assessments regarding the environmental and social risks and impacts that are foreseen to occur within the scope of the Project's pre-construction, construction and operation activities are presented under the following headings.

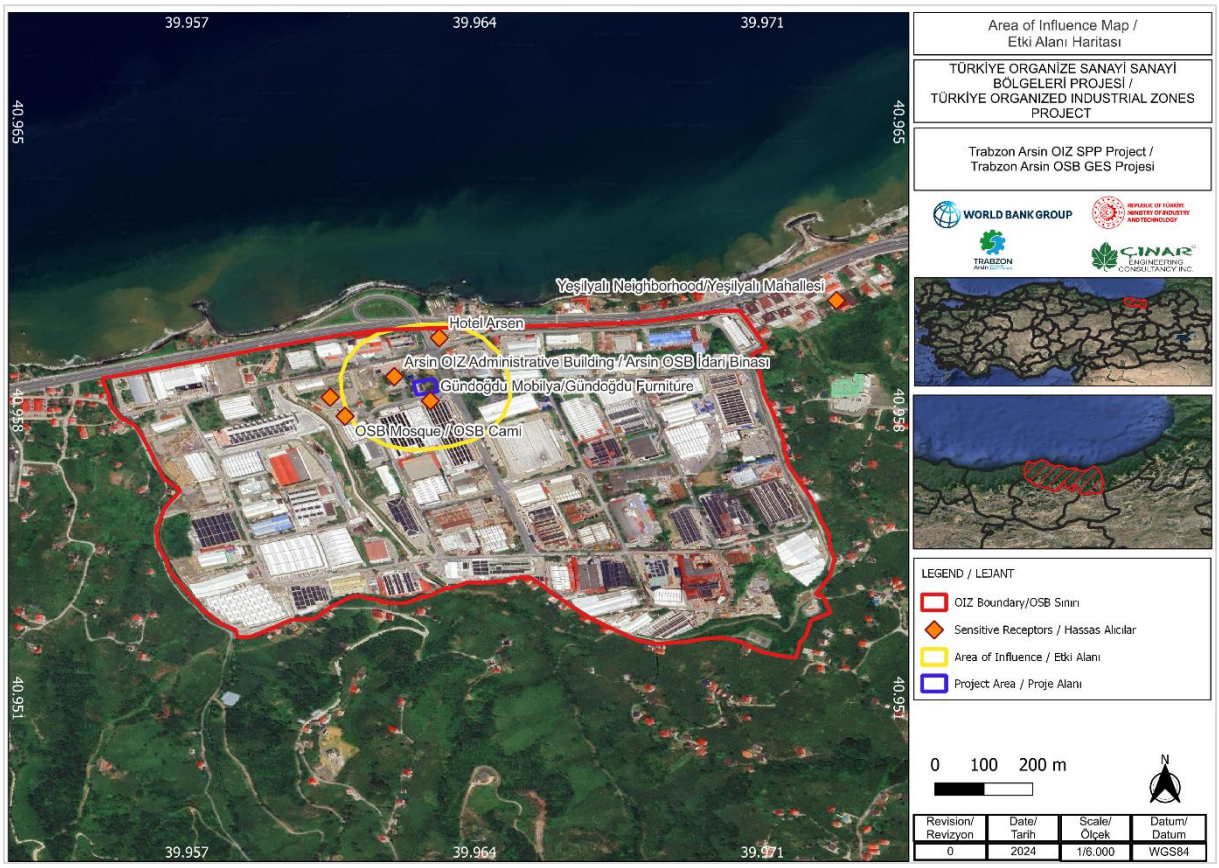

Figure 23. AoI of Project Area (150 m-radius)

7.1.2 Land Use

7.1.2.1 Construction Phase

Since the Project area is the currently used parking lot in Trabzon Arsin OIZ, no land acquisition is planned, and no economic resettlement will be caused by the Project activities. During the construction phase, all work will be confined to the areas designated for the SPP, ensuring that there will be no significant impact on land use outside of these specified zones.

7.1.2.2 Operation Phase

During the operation phase of the Project, the use of land will be strictly limited to the project area. Maintenance and repair activities will only be conducted in the event of a failure of the carport structure and solar panels. As a result, there will be no new land usage introduced during this phase. Consequently, no impact on land use is anticipated throughout the operation phase.

7.1.3 Hydrogeology

7.1.3.1 Construction Phase

The Project area is not within the protection area of any surface water source that provides drinking and utility water. The Rızvan stream passing through the OIZ in the west of the project area has been rehabilitated against possible flood risk and have sufficiently wide sections and do not pose a flood risk in the project area. There are no groundwater resources within the project's area of influence. Therefore, no significant adverse impact is expected on the existing groundwater resource status of the area due to the project activities.

With the implementation of appropriate measures, it is expected that there will be no significant impact on the region's hydrogeological structure (presence of surface water and groundwater) during the construction phase.

7.1.3.2 Operation Phase

During the operation phase of the project, solar panels will operate on the carport structure. Transformer and inverter buildings will be located within the project area. In this context, the Project will have no impact on the hydrogeology of the region during the operation phase.

7.1.4 Climate and Vegetation

7.1.4.1 Construction Phase

The project area consists of fill material (concrete) and vegetative soil. Some part of the project area consists of natural vegetation and soil structure. During the site visit, it was assessed that there are approximately 27 trees in the soil area. The trees observed in the project area are “pine” and “oak”. These trees are widely distributed species and are not included in protected species. Within the scope of the Project, approximately 27 trees will be cut, and vegetative soil (topsoil) will be stripped. Stripped soil will not be stored in the project area but will be utilized in green areas (park area, etc.) within the OIZ. Therefore, an adverse impact on vegetation in the project area is expected.

If the trees are cut down, at least twice the number of trees cut (approximately 54 trees) will be planted within the OIZ or in an area designated by the General Directorate of Forestry following the necessary correspondence with the General Directorate of Forestry by project owner.

Moreover, the works to be performed within the Project area will last a very limited period of time with a limited excavation and installation. Consequently, the project activities are not anticipated to have an adverse impact on the climate of the region.

7.1.4.2 Operation Phase

The project area consists of fill material (concrete) and vegetative soil. Some part of the project area consists of natural vegetation and soil structure. There is vegetation in the Project’s AoI.

Vegetated areas will be covered with concrete during the operation phase. The only activity during the operation phase is the possible the maintenance/repair works. Therefore, no impact on vegetation is expected during the operation phase of the Project.

In fact, since the project is of the generation of the renewable energy, the solar energy, the project has a positive impact on climate change.

7.1.5 Soil Quality

7.1.5.1 Construction Phase

The project area consists of fill material (concrete) and vegetative soil. Some part of the project area consists of natural vegetation and soil structure.

Within the scope of the Project, approximately 0.80 m of excavation will be carried out in the soil and concrete and 0.20 m of vegetative soil (topsoil) will be stripped from the soil surface.

There is approximately 0.20 m depth of vegetative soil (topsoil) in the soil part of the Project area. The remaining part will be evaluated as excavation material. The most important issue that may cause soil pollution from the project is waste and possible leakages from construction machinery. Possible impacts could be minimized if the mitigation measures given in Section 8 are implemented.

Moreover, since the waste will not be stored in the project area and the technical operations such as maintenance, refueling and oil changes of the machinery and vehicles that will work

during the construction phase of the Project will be carried out at authorized services, no soil pollution is expected from the wastes.

7.1.5.2 Operation Phase

All project area will be covered with concrete/filling material. During the operation phase of the Project, project components will not have any contact with the ground/soil. Therefore, no impact on soil quality is expected during the operation phase.

7.1.6 Air Quality

7.1.6.1 Construction Phase

Within the scope of the Project, dust will be generated from the excavation works and exhaust emissions will be of concern from the construction machines/vehicles to be used in the construction works.

The construction phase will last for 4 months (120 days), whereas the excavation works will be continued for 5 days.

Dust emission calculations details are given in Annex-6.

It is calculated that 534.31 tons /5 days = **106.86 tons/day** of excavation material, and only work for ten (10) hours during daylight hours, the amount of excavation soil waste that will result from the excavation works to be carried out before the construction activities is calculated as **10.68 tons /hour**.

Dust emission will occur during the excavation of the concrete ground material and stripping of topsoil and loading it to the truck.

Since the excavation material and topsoil will be transported on asphalt roads, dust emissions from transportation are not included in the calculation. The excess excavation material is not planned to be stored at the project area. It will be sent to the licensed excavation material storage area belonging to the Trabzon Metropolitan Municipality with the licensed vehicles. Stripped topsoil will be utilized in green areas within the OIZ and will not be stored in the project area.

Since the mass flow rate of dust emission resulting from the stripping and loading works is below 1 kg/hour, which is the limit value given for non-chimney sources in Annex-2 Table 2.1 of the Regulation on Control of Industrial Air Pollution. Hence, no modelling work was required. Hence, there is no need to calculate air quality contribution values and make a model.

It is expected that dust emission will be at a controlled level with the measures given in Section 8 and will not have a significant adverse impact on ambient air quality. Dust emissions within the scope of the Project will be short-term.

Dust and Exhaust Gas Emission from Vehicles

Dust and gas emissions will occur due to the operation of construction machinery and vehicles during the Project's construction phase. Within the scope of the project, it is assumed that the quantity of diesel fuel consumed by the construction vehicles used on the channel construction will be 20 liters per hour on average. Since the companies that will undertake the construction works for the project have not yet been determined, information about the vehicles and work machines that can be used during the construction phase was provided by Trabzon Arsin OIZ.

Necessary calculations are given in Annex-6.

Calculations are made with the assumption that vehicles/work machines will work at the same time. However, vehicles and construction machines will be used at different times and in work areas during the day.

Therefore, the pollutant emissions calculated will be much less. The concentration values of the pollutants that will originate from the construction vehicles to be used are quite low. Hence, it is not expected that the emission values from the vehicles will have significant impact on the existing ambient air quality of the region.

As seen in Table 22 the calculation results are provided with the dust emission from exhaust gas and excavation works. Since this calculation is based on the vehicles operating at full capacity, the calculated emission is expected to be lower in practice. Nevertheless, exhaust gas emissions can be reduced by measures such as keeping vehicle use to a minimum and training personnel.

Table 22. Air Quality Project Standards and Calculated Emission Values

Parameter	Unit	Calculated Emission Values	Project Standard*
Dust	kg/hour	Exhaust Gas: 0.2489 Excavation Works Uncontrolled: 0.37 kg/hour Controlled: 0.05 kg/hour	1
Carbon monoxide	kg/hour	1.2745	50
Nitrous oxides	kg/hour	3.86	4
Sulphur dioxide	kg/hour	0.0012	6
VOC	kg/hour	0.3995	3

**Please see "Section 3.3 Project Standards".*

Since the mass flow rates (0.37 kg/hour with uncontrolled and 0.05 kg/hour with controlled) of dust emission resulting from the stripping and loading works are below 1 kg/hour, which is the limit value given for non-chimney sources in Annex-2 Table 2.1 of the Regulation on Control of Industrial Air Pollution. Hence, no modelling work was required. Hence, there is no need to calculate air quality contribution values and make a model. According to the calculations, exhaust gas emissions from the construction works comply with project standards.

Dust emission calculations have been made to cover all areas. In this context, it is considered that the excavation works will be short-term on an area basis. If the excavation works coincide with the weekend, the number of people to be affected by the project can be reduced.

7.1.6.2 Operation Phase

No excavation activities will be carried out during the operation phase of the Project. There will be no use of vehicles/construction equipment for the operation phase. Therefore, no air emissions are expected to occur during the operation phase of the Project.

7.1.7 Noise

7.1.7.1 Construction Phase

It is foreseen that noise will be generated during the construction phase of the Project due to the use of work machines and equipment. The placement of solar panels on the carport structure will be carried out with the help of a crane. The installation of the solar panels will be done manually in sections. During the fixing of the panels, minor noise may occur due to the use of hand tools.

The number and sound power levels of the vehicles and work machines to be used are given in the Table 23.

Table 23. Number and Sound Power Levels of Machinery Equipment to be used for Construction Phase

Machinery Equipment Name	Number	Sound Power Level (dB)
Digger (JCB)	1	105
Crane	1	110
Truck	1	94
Concrete Mixer	1	108
Concrete Pump	1	109
Forklift	2	32

Noise level calculations results (for construction phase) which are according to the nearest dwellings are given in Table 24 and noise level changes according to distances are given in Figure 24.

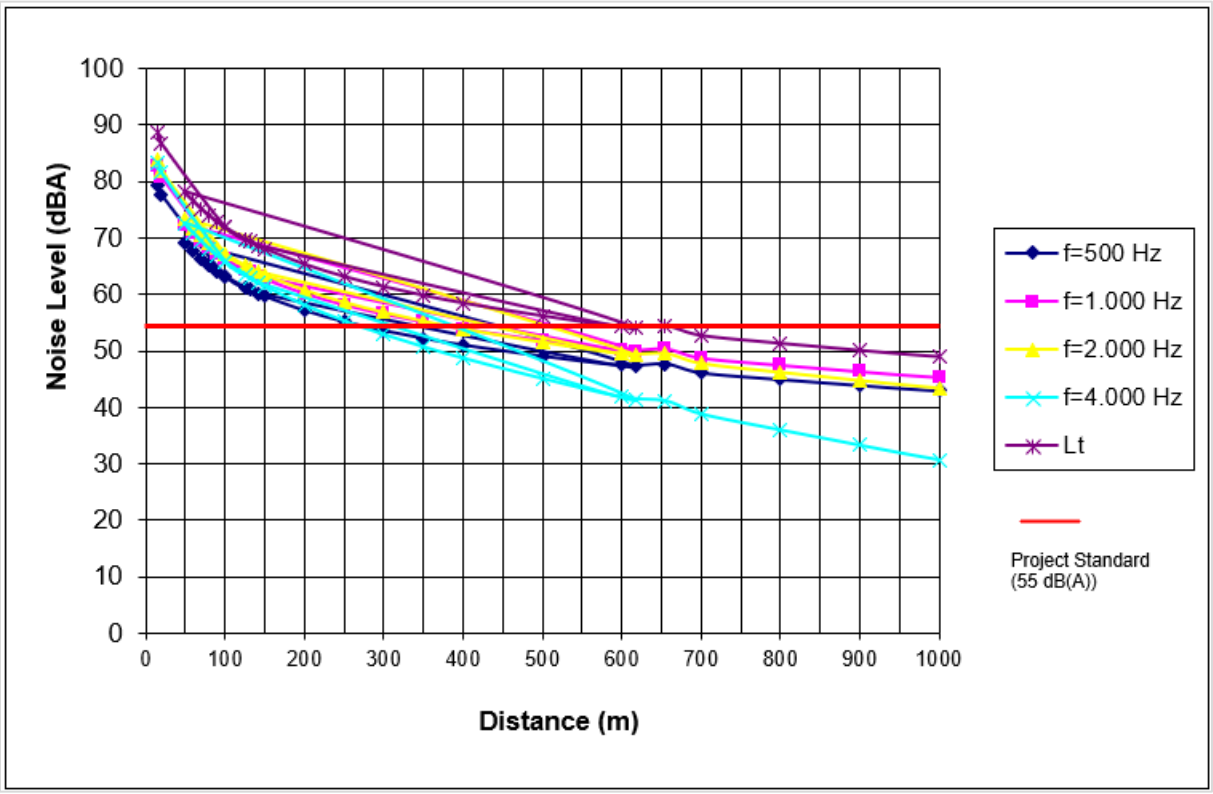

Figure 24. Noise Level According to Distances for Construction Phase

Table 24. Noise Level Project Standards and Calculated Noise Levels

Sensitive Receptor	Distance to the Project Area (m)	Calculated LT (dBA)	Project Standards (dBA)
Gündoğdu Mobilya	15.5	88.61	55
Neva Çevre Laboratuvarı	19.0	86.82	
UKL Company	19.0	86.82	
Hotel Arsen	100.4	71.85	
Organize Sanayi Mosque	131.0	69.37	
Organized Industrial Zone OIZ Vocational and Technical Anatolian High School	141.0	68.67	

Sensitive Receptor	Distance to the Project Area (m)	Calculated LT (dBA)	Project Standards (dBA)
Yeşilyalı Neighborhood (Nearest Dwelling)	617.0	54.00	

The calculations given in Table 24 are based on the sensitive receptors. Accordingly, the 55 dB(A) limit value is not met in the AoI (150-meter distance) of the Project. The noise impact will be short-term within the scope of the Project. In case of complaints from sensitive receptors, the work will be stopped and noise level measurements will be realized by an accredited laboratory. Construction works schedule will be coordinated with the sensitive receptors.

Mitigation measures given in Section 8 should be followed in these areas where the limit values are exceeded. These impacts can be managed with standard mitigation measures regarding construction activities (proper arrangement of working hours regarding noisy activities, providing necessary information to the surrounding residences, use of necessary personal protective equipment by personnel etc.). During construction any public complaints will be managed through the available Grievance Mechanism (see Section 11.4.1.).

7.1.7.2 Operation Phase

During the operation phase of the project, the sensitive receptors (school (141.0 m), mosque (131.0 m) and nearest facilities (distances of them vary between 15.5 m and 100 m)) are not expected to encounter a noise problem, since the solar panels to be installed work silently. There are no activities that may cause noise during the operation of the SPP. Therefore, no noise impacts are expected during the operation phase of the Project.

7.1.8 Water Resources and Use

7.1.8.1 Construction Phase

The drinking water and potable water requirement for the construction and operation phases will be for the personnel needs.

The water requirement during the construction and operation phases will be supplied from the OIZ water network.

Within the OIZ, potable water is supplied from a well that is located in “Yanbolu”. The "Groundwater Usage Certificate" for the well is provided in Annex-5. Therefore, groundwater will be used indirectly within the scope of the Project.

The drinking water needs of the personnel will be purchased from the market as carboy size bottled water.

The personnel, who will work during the construction phase of the project, will use the sanitary facilities in the OIZ administrative building. “The OSB Mosque” in the region can also be used, if necessary.

Water Demand for Construction Phase

The demand for water for the four (4) personnel to be employed for the construction phase is calculated as follows by assuming that the daily water withdrawal per capita in Trabzon province for the year 2022 is 269 l/person-day[36] :

4 employees x 0.269 m^3/day = 1.07 m^3/day

There will be no accommodation within the scope of the Project, as working time is 10 hours:

[36] **Source:** www.tuik.gov.tr, Daily Water Use Per Capita in Trabzon Province, 2022

1.07 m^3/day / (10 hours/24 hours) = 0.45 m^3/day

During the construction phase, the site will be wetted at regular intervals to minimize dust emissions that may be resulted from the activities, such as vehicle movements etc., on the site. The water is planned to be supplied via water trucks. It is foreseen that 2 m^3/day water will be used for wet dust suppression activities. As the water to be used for dust suppression will evaporate, no wastewater generation is foreseen.

1.66 m^3/day water will be used for concrete irrigation during construction phase. Concrete irrigation is expected to take 15 days. No water will be used in the preparation of concrete. Concrete will arrive at the site ready. Water will only be used for the irrigation of concrete (to prevent cracking). As the water to be irrigated will evaporate, no wastewater generation is foreseen.

The Project is not expected to have a significant adverse impact on water resources as the water requirement during the construction phase of the Project will be supplied from the permitted well already used by OIZ.

7.1.8.2 Operation Phase

Water Demand for Operation Phase

The demand for water for three (3) personnel to be employed for the operation phase is calculated as follows by assuming that the daily water withdrawal per capita in Trabzon province for the year 2022 is 269 l/person-day[37] :

3 employees x 0.269 m^3/day = 0.81 m^3/day

There will be no accommodation within the scope of the Project, as working time is 10 hours:

0.81 m^3/day / (10 hours/24 hours) = 0.34 m^3/day

With the commissioning of the planned project, water will be required for cleaning of the PV modules to increase the efficiency and the cleaning will be performed approximately every 6 months. Clean water will be used for panel cleaning. There will be no use of chemicals/detergents together with cleaning water.

Considering that a total of around 500 panels will be used and assuming that 2.5 liters will be required per panel (0.0025 m^3)[38], the required water is calculated as follows:

0.0025 m^3 x 500 panels = 1.25 m^3 / period (6 months)

Assuming that it will be cleaned two (2) times a year, the cleaning water requirement will be as follows:

1.25 m^3 x 2 = 2.5 m^3/year.

The water to be used for washing the panels during the operation phase will be supplied from the OIZ network and brought in bottles. Cleaning will be carried out with a brush or fabric (see Figure 25). This is the current practice used for existing solar panels on the project area.

Groundwater will be used as the water demand within the scope of the Project will be supplied from the OIZ network. The potable water of OIZ is supplied from a permitted well. No significant adverse impact on water resources is expected during the operation phase of the Project.

[37] **Source:** www.tuik.gov.tr, Daily Water Use Per Capita in Trabzon Province, 2022
[38] **Source:** https://solarpost.in/om/role-water-long-term-performance-solar-pv-plants/

Figure 25. Illustrative Views of Panel Cleaning[39]

7.1.9 Wastewater Management

7.1.9.1 Construction Phase

Four (4) personnel will be employed for construction phase of Project. Assuming that all the water used (100%) will be converted into wastewater (see Section 7.1.8.1.), 0.45 m^3/day wastewater will be generated in construction phase.

Two (2) locations are suggested to meet personnel needs during the construction phase of the Project:

- OIZ Administrative Building
- The Organize Sanayi Mosque

Wastewater generated within the scope of OIZ is currently connected to the OIZ sewerage system, treated at the WWTP, and discharged to Rızvan Stream in accordance with Regulation on Water Pollution Control.

Wastewater from the Project will be treated at this WWTP and discharged to Rızvan Stream in accordance with Project Standards. In this context, if mitigation measures, especially project standards, are complied with, no adverse impact is expected from the Project in terms of wastewater generation in construction phase.

The actions to be taken within the scope of national legislation for WWTP are as follows:

- The Environmental Permit for the WWTP must be renewed before its validity date.
- Internal monitoring samples should be conducted every month from the WWTP discharge point and audit samples should continue to be taken every four (4) months together with the Provincial Directorate of Environment, Urbanization and Climate Change.

7.1.9.2 Operation Phase

Three (3) personnel will be employed for operation phase of Project. The personnel who will work during the operation phase of the project will meet their needs from the OIZ administrative building.

Assuming that all the water used (100%) will be converted into wastewater (see 7.1.8.2.), 0.34 m^3/day wastewater will be generated in operation phase.

[39] **Sources:** https://www.forbes.com/home-improvement/solar/how-to-clean-solar-panels/ & https://www.bobvila.com/articles/how-to-clean-solar-panels/

Cleaning of the panels will be carried out by spraying method with the help of a brush or fabric (see Figure 25) and no wastewater will be generated.

Wastewater generated within the scope of OIZ is currently connected to the OIZ sewerage system, treated at the WWTP, and discharged to Rızvan Stream in accordance with Regulation on Water Pollution Control.

Wastewater from the Project will be treated at WWTP and discharged to Rızvan Stream in accordance with Project Standards. In this context, if mitigation measures, especially project standards, are complied with, no adverse impact is expected from the Project in terms of wastewater generation in operation phase.

The water requirement during the land preparation-construction and operation phases of the Project, the quantity of wastewater generated, and the disposal methods are summarized in Table 25.

Table 25. Water Usage Areas, Quantities and Wastewater Disposal Type

Period	Purpose of Use	Supply	Requirement (m^3/day)	Wastewater (m^3/day)	Disposal
Construction	Personnel domestic and drinking water	OIZ Network (from permitted well)	0.45	0.45	OIZ sewerage system OIZ WWTP
	Dust Prevention (Land Irrigation)	Transported water	2	Evaporation	-
	Concrete	Transported water	1.66	Evaporation	-
TOTAL			**4.11**	**0.45**	-
Period	**Purpose of Use**	**Supply**	**Requirement (m^3/day)**	**Wastewater (m^3/day)**	**Disposal**
Operation	Personnel domestic and drinking water	OIZ Network (from permitted well)	0.34	0.34	OIZ sewerage system-OIZ WWTP
	Panel Washing	Bottles/Drums	0.0068	Evaporation	-
TOTAL			**0.346**	**0.34**	-

7.1.10 Waste Management

7.1.10.1 Construction Phase

Within the scope of the Project, during the construction of the SPP, waste generation from materials, installation and personnel is expected. Waste generation during the construction phase will be low. Possible wastes are given in Table 26.

A zero-waste system has been established and implemented within the Trabzon Arsin OIZ.

Domestic wastes generated in Trabzon Arsin OIZ are placed in containers placed by Trabzon Metropolitan Municipality and collected by the Municipality. Domestic wastes will be sent to the municipality's contracted company "Evra Enerji San. Tic. A.Ş." where the waste is recycled or

disposed. The environmental permit and license certificate of the facility numbered 286175762.0.1 and valid between 17.03.2022-17.03.2027 is presented in Annex-4."

It is envisaged that four (4) people will be employed during the construction phase. According to Turkish Statistical Institute data, average daily municipal waste quantity is 0.72 kg/day per capita for Trabzon province in 2022.

Accordingly, daily domestic waste amount calculated for four (4) personnel in land preparation and construction phases of the project is calculated as 2.88 kg/day.

During the construction phase, the packaging wastes to be generated are paper-cardboard, plastic, glass, etc. Assuming that the quantity of packaging waste generated will be approximately 20% of the total quantity of domestic solid waste, the amount of packaging waste for the construction phase is 0.57 kg/day.

Domestic wastes to be generated by personnel during the construction phase will be placed in the containers belonging to Trabzon Metropolitan Municipality within the OIZ.

The contractor will be responsible for the accumulation of other wastes to be generated during the construction phase and sending them to licensed companies. A clause will be added to the contract between the contractor and Trabzon Arsin OIZ stating that the management of the wastes generated by the Project is the responsibility of the contractor. Hazardous and non-hazardous temporary waste storage areas of OIZ will be used for temporary storage of the waste generated.

The food needs of the personnel will be provided by purchasing from outside. In this context, no vegetable waste oil is expected to be generated within the site.
No medical waste generation is expected in the project area as the nearest hospital (Arsin District Hospital) will be applied in case of health problems of the personnel to be employed.

In case of the generation of damaged solar panels during the construction phase of the Project, damaged solar panels will be removed from the project area by contractor. Since solar panels are not placed on the soil structure, there will be no soil contamination in case of breakage. Since solar panels may include hazardous materials such as cadmium, zinc, lead, CFCs, in the event of a release of these dangerous substances causing negative environmental effects, the concrete floor can be cleaned with an absorbent cloth/fabric, and this hazardous waste will be delivered to a disposal company. The recycling/disposal of the damaged solar panels from the project area is the responsibility of the solar panel manufacturer. According to the statement of Trabzon Arsin OIZ authorities, if the damage to the solar panels is under guarantee, it is refunded, and if there is an external malfunction, the solar panel is replaced. This is the current agreement (for the solar power panels currently used by the OIZ) between OIZ and the solar panel manufacturer. To prevent any risk of accident/explosion/fire, the damaged solar panels will be temporarily stored on the concrete floor away from the existing system, and the relevant company will be promptly informed. The damaged solar panels will be removed from the project area on the same day.

Wastes to be potentially generated during the construction phase of the project are given in Table 26.

Table 26. Construction Phase Waste Table

Waste Code	Explanation	Source	Disposal		Characteristic
20 03 01	Mixed municipal waste	Personnel activities	Trabzon Municipality's Solid Waste Collection System and Evra Enerji San. Tic. A.Ş. (Trabzon Brand)		Non-hazardous
15 01 01	Paper-cardboard	Product and material packages	Licensed recycling company		Non-hazardous
15 01 02	Plastic Packaging				
15 01 03	Wooden packaging				
15 01 07	Glass Packaging				
15 01 04	Metal Packaging				
18 01 03	Wastes whose collection and disposal are subject to special treatment to prevent infection	Infirmary	Licensed Medical Waste Disposal/Sterilization Plant		Hazardous
16 01 03	End-of-Life Tires	Vehicles/Work Machineries	Licensed recycling/disposal company		Non-hazardous
16 02 14	Discarded equipment other than that mentioned in 16 02 09 to 16 02 13	End-of-life solar panels	Solar panel manufacturer	Non-hazardous	
16 06 05	Other batteries and accumulators	Vehicles/Work Machineries	Licensed recycling/disposal company		Non-hazardous
16 01 07*	Oil filters	Vehicles/Work Machineries	Licensed recycling/disposal company		Hazardous
20 01 35*	Recycled electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	Installation			
20 01 36	Discarded electrical and electronic equipment containing hazardous parts other than 20 01 21 and 20 01 23	Installation	Licensed recycling/disposal company		Non-hazardous
13 02 08*	Other engine, transmission and lubricating oils	Vehicles/Work Machineries	Licensed recycling/disposal company		Hazardous

Waste Code	Explanation	Source	Disposal	Characteristic
15 01 10*	Packaging materials containing residues of hazardous substances or contaminated with hazardous substances	Maintenance, repair or installation	Licensed recycling/disposal company	Hazardous
15 01 11*	Metallic packaging materials containing hazardous porous solid structure (e.g. asbestos), including empty pressure vessels			
15 02 02*	Absorbents contaminated with hazardous substances, filter materials (oil filters if not otherwise specified), cleaning clothes, protective clothing	Maintenance, repair, or installation	Licensed recycling/disposal company	Hazardous
15 02 03	Absorbents, filter media, cleaning cloths, protective clothing other than 15 02 02	Maintenance, repair, or installation	Licensed recycling/disposal company	Non-hazardous
20 01 26	Oils and fats other than 20 01 25	Refectory	Licensed recycling/disposal company	Hazardous
17 04 11	Cables other than 17 04 10	Cabling	Licensed recycling/disposal company	Non-hazardous
17 05 04	Excavation Materials	Excavation Works	Trabzon Metropolitan Municipality Excavation Materials Storage Area	Non-hazardous
17 04 07	Mixed Metals	Installation	Licensed recycling/disposal company	Non-hazardous
19 08 14	Sludge from the treatment of industrial wastewater by other methods except 19 08 13	Personnel activities (due to wastewater treatment)	“Kar Çevre Enerji Endüstriyel Atık Yönetimi”	Non-hazardous

7.1.10.2 Operation Phase

Waste generation from maintenance and repair activities is expected during the operation phase of the SPP. The maintenance/repair contractor will be responsible for the management of wastes arising from the maintenance and repair of the project units.

It is envisaged that three (3) people will be employed during the operation phase. These three employees will be permanent staff of the OIZ. According to Turkish Statistical Institute data, average daily municipal waste quantity is 0.72 kg/day per capita for Trabzon province in 2022.

Accordingly, daily domestic waste amount calculated for three (3) personnel operation phases of the project is calculated as 2.16 kg/day.

During the operation phase, the packaging wastes to be generated are paper-cardboard, plastic, glass, etc. Assuming that the quantity of packaging waste generated will be approximately 20% of the total quantity of domestic solid waste, the amount of packaging waste for the operation phase is 0.43 kg/day.

Domestic wastes to be generated by personnel during the operation phase will be placed in the containers belonging to Trabzon Metropolitan Municipality within the OIZ.

Wastewater from the Project will be discharged to Trabzon Arsin OIZ sewerage system and treated at the wastewater treatment plant within the OIZ. In this context, treatment sludge will be generated indirectly from the Project during operation phase.

The type and amount of waste will be low due to maintenance and repair activities. The amount of waste will vary depending on needs for maintenance and repair activities.

In case of the generation of end-of-life solar panels (including damaged/broken) during the operation phase of the Project, the end-of-life solar panels will be removed from the Project area by either the recycling company or directly by the manufacturer, depending on the agreement. Since solar panels are not placed on the soil structure, there will be no soil contamination in case of breakage. In the event of a potential release, the concrete floor can be cleaned with an absorbent cloth/fabric, and this hazardous waste will be delivered to a disposal company. The removal of the end-of-life solar panels from the project area is the responsibility of the contractor. The recycling of the solar panels will be realized by the solar panel manufacturer According to the statement of Trabzon Arsin OIZ authorities, if the damage to the solar panels is under guarantee, it is refunded, and if there is an external malfunction, the solar panel is replaced. This is the current agreement (for the solar power panels currently used by the OIZ) between OIZ and the solar panel manufacturer.. To prevent any risk of accident/explosion/fire, the end-of-life solar panels will be temporarily stored in the OIZ's waste storage area away from the existing system, and the relevant company will be promptly informed. The end-of-life solar panels will be removed from the area as soon as possible.

Therefore, the significance of the impact will be low.

Wastes to be potentially generated during the operation phase of the project are given in Table 27.

Table 27. Operation Phase Waste Table

Waste Code	Explanation	Source	Disposal	Characteristic
20 01 36	Discarded electrical and electronic equipment containing hazardous parts other than 20 01 21 and 20 01 23	Maintenance and repair	Licensed recycling/disposal company	Non-hazardous
15 01 10*	Packaging materials containing residues of hazardous substances or contaminated with hazardous substances	Maintenance and repair	Licensed recycling/disposal company	Hazardous
15 01 11*	Metallic packaging materials containing hazardous porous solid structure (e.g. asbestos), including empty pressure vessels			
15 02 02*	Absorbents contaminated with hazardous substances, filter materials (oil filters if not otherwise specified), cleaning clothes, protective clothing	Maintenance and repair	Licensed recycling/disposal company	Hazardous
15 02 03	Absorbents, filter media, cleaning cloths, protective clothing other than 15 02 02	Maintenance and repair	Licensed recycling/disposal company	Non-hazardous
17 04 11	cables other than 17 04 10	Cabling	Licensed recycling/disposal company	Non-hazardous
16 02 14	Discarded equipment other than that mentioned in 16 02 09 to 16 02 13	End-of-life solar panels	Solar panel manufacturer	Non-hazardous
20 01 35*	Discarded electrical and electronic equipment containing dangerous parts other than those mentioned in 20 01 21 and 20 01 23	End-of-life solar panels	Licensed recycling/disposal company	Hazardous
19 08 14	Sludge from the treatment of industrial wastewater by other methods except 19 08 13	Personnel activities (due to wastewater treatment)	“Kar Çevre Enerji Endüstriyel Atık Yönetimi”	Non-hazardous

7.1.11 Natural Disaster Potential

7.1.11.1 Construction Phase

All structures to be built within the scope of the project must comply with the principles of the "Regulation on Buildings to be Built in Disaster Areas" published in the Official Gazette dated 14/07/2007 and numbered 26582 of the Repealed Ministry of Public Works and Settlement and published in the Official Gazette numbered 30364 dated 18.03.2018 and published on 01.01.2019. The provisions of the "Turkish Building Earthquake Regulation" of the Disaster and Emergency Management Presidency, which came into force in 2019, will be strictly adhered to.

Trabzon Province is not located within important earthquake zones and has not been subjected to a significant earthquake in the last century. So, the project will not have any impact on the natural disaster potential of the region and the natural disaster potential of the region will not have any impact on the project.

7.1.11.2 Operation Phase

If national legislation (Regulation on Buildings to be Built in Disaster Areas) is complied with during the construction phase, no negative impact is expected from the Project in this regard during the operation phase.

7.1.12 Biodiversity and Protected Areas

There is intense human activity in the area since it is located in the OIZ. IPA and INA will not be adversely affected as the impacts from the Project are short term. In addition, the Project's AoI is determined as 150 meters' radius. Facilities, mosque and school within the OIZ are located within this area. Therefore, within the OIZ boundary, only local species and those accustomed to human activity have been identified. Furthermore, there is no sensitive habitat present. Consequently, with neither sensitive species nor habitat, no impact on the biological environment is expected. As a result, no risks are associated with the project to biodiversity.

7.1.13 Pesticide Use and Management

7.1.13.1 Construction Phase

No pesticides will be used during the construction phase of the Project. Therefore, no adverse impact is expected due to the use of pesticides.

7.1.13.2 Operation Phase

No pesticides will be used during the operation phase of the Project. Therefore, no adverse impact is expected due to the use of pesticides.

If landscaping is carried out in SPP areas during operation and pesticides are used during this work, the following issues should be complied with the scope of WB ESS3.

- Where possible, the use of persistent organic pollutants (POPs) in pesticide formulation should be avoided or minimized.
- Safety rules for storage, handling and distribution of pesticides should be followed to minimize the potential for misuse, spillage and accidental human exposure.

The use of pesticides containing chemicals listed in Annex III of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade should be avoided.

7.2 Social Impacts of the Project

7.2.1 Population/Demography

7.2.1.1 Construction Phase

The timeline of the project is given in Table 2. The construction phase of the project is planned to last for four (4) months (120 days), with the excavation works specifically continuing for a duration of five (5) days.

Four (4) personnel will be employed during the construction phase.

No accommodation will be provided for project workers, and transportation to the project area will be arranged by the Contractor. The limited number of workers ensures no impact on the population and demography of closed settlements.

7.2.1.2 Operation Phase

Three (3) personnel will be employed during the operation phase of the Project.

7.2.2 Cultural Heritage

The Project site and its surroundings have been evaluated for cultural heritage, detailed in Section 6.2. Site visits confirm no known cultural assets or archaeological artifacts in or around the project areas. In this context, a "Chance Finding Procedure" has been prepared for the construction and operation phases of the project (see Annex-8). If any archaeological remains or objects are found, the construction activities will be stopped, and the Museum Directorate will be informed immediately pursuant to Article 4 of Law No. 2863.

7.2.3 Economy/Employment

7.2.3.1 Construction Phase

The project timeline, as outlined in Table 2, indicates a four-month (120 days) construction phase, with excavation works spanning five days. The construction phase will involve the employment of four personnel.

Transportation to the site will be arranged by the Contractor. The Project Owner is responsible for providing minimum legal labor standards according to LMP of the TOIZP and as per International Labor Organization (ILO) regulations. Full compliance with all Turkish Laws and International Labor Organization Conventions regarding child labor, forced labor, discrimination, freedom of association, collective bargaining, working hours and minimum wages. Work permits will be monitored, and recruitment will adhere to legal practices, avoiding unregistered, child, or forced labor.

To mitigate adverse impacts on local communities, contractors must develop own Labour Management Plan based on the LMP of the TOIZP, and provide written contracts to employees, code of conduct training, ensuring workers understand and sign it during recruitment. The Project Owner oversees this process. The construction phase aims to offer temporary employment, prioritizing local materials and services to positively impact the local economy. Given the limited workforce and construction duration, the Project's impact on the local economy and employment is expected to be positive, local, and minor.

7.2.3.2 Operation Phase

During the operation phase of the project, three personnel will be employed. Materials for periodic maintenance work can be procured from the region, with a negligible impact on the regional economy.

7.2.4 Vulnerable/Disadvantaged Individuals/Groups

Stakeholder concerns in project meetings include inquiries about potential power outages. Workspaces relying on electricity and internet are identified as sensitive, affecting companies and the school in the OIZ.

7.2.5 Working Conditions and Labor Management

The project owner's responsibilities are outlined as follows:

The project owner's responsibilities are outlined as follows:

- Prioritize voluntary employment relationships to preserve the dignity of the workforce.
- Practice for equal opportunities and fair treatment in the workplace, eliminating discrimination and harassment based on factors such as language, race, sex, political opinion, philosophical belief, and religion in labor relations.
- Recognize the right to freedom of association without fear of reprisal and uphold the right of workers to engage in collective bargaining.
- Foster a harmonious employer-employee relationship through dialogue and negotiation to establish fair employment conditions.
- Ensure adherence to LMP, LM Plan, and ILO conventions to scrutinize working hours to prevent exploitation and establish minimum wage levels to ensure a decent standard of living
- Ensure full compliance with ethical labor practices for a socially responsible work environment.
- Implement the right to collective bargaining in accordance with Law No. 6356 on Trade Unions and 4857 Labour Law on Collective Bargaining.
- Guarantee an efficient Project grievance mechanism to address concerns.
- Provide workers with detailed written contracts encompassing job descriptions, working hours, wages, rights and responsibilities, a code of conduct, and information about the workers' grievance mechanism.
- Minimize potential impacts on surrounding neighborhoods by offering amenities within the Project Area aligned with the employees' needs.
- Support this application with a Human Resources Policy compliant with the European Convention on Human Rights and the Turkish Constitution.

The responsibilities of Contractor also mentioned as follows:

- Contractor will develop its own LM Plan. This plan will encompass various provisions, including the assurance that workers will be provided with written contracts detailing job descriptions, working hours, wages, rights and duties descriptions, and a Code of Conduct, among other aspects.
- Informing MoIT PIU of any issues related to their engagement with stakeholders
- To keep local communities informed about any environmental monitoring activities such as noise, vibration, water quality monitoring, etc.
- To ensure transparency and awareness regarding the environmental impact of the project.
- To develop and implement a GM specifically for the workforce, before commencement of any works on site, including subcontractors.

- To address and resolve any concerns or grievances that may arise among the workforces.
- Strictly adhere to international standards by prohibiting child labor and forced labor.

7.2.5.1 Construction Phase

The OIZ commits to prohibiting child and forced labor, complying with LMP of TOIZP, Turkish laws and International Labour Organization (ILO) provisions, and ESS 2. The construction phase poses risks such as accidents and OHS concerns, addressed through detailed risk assessments. Adverse but low-impact effects on labor conditions will be managed by the LM Plan, aligning with regulations and guidelines. The limited personnel requirement facilitates easy impact management. OHS risks will be addressed through an OHS Management Plan and Risk Assessment. With no labor influx expected due to the limited workforce, additional mitigation measures are detailed in Chapter 8.

7.2.5.2 Operation Phase

During the operation phase of the project, three personnel will be employed. No accommodation will be provided for project workers, and transportation to the project area will be arranged by the Contractor.

7.2.5.3 Training

Trainings to be given to the workers immediately after the recruitment process will cover OHS, workers' rights, contract requirements, Code of Conduct, grievance mechanism and contact channels, as well as gender-based violence (GBV), sexual harassment (SH), sexual exploitation and abuse (SEA). Compliance with the rules of code of conduct, including GBV and SH/SEA, which are included in the trainings to be provided, will be in the contract articles of the personnel. The sanctions for non-compliance with the code of conduct and other relevant working requirements will be clearly stated in the contract.

7.2.6 Community Health and Safety

7.2.6.1 Construction Phase

Public health and safety issues are associated with risk factors that may arise from the construction and operation phases of the Project. It is anticipated that local communities will be particularly affected by noise and dust generated during the construction phase. Dust and noise impacts will be particularly intense during excavation works.

Traffic activities are expected to intensify during the supply of materials during the construction phase. Extra care should be taken especially for construction activities to be carried out in front of and/or around areas such as schools and nursing homes. All necessary OHS measures will be taken to ensure that local people are not adversely affected by the Project. The Project Owner and the Contractor will comply with the mitigation measures specified in this ESMP to ensure that sensitive receptors near the Project area are not adversely affected.

In addition, the contractor will take necessary health and safety measures during site preparation and construction activities under the direction of the Project Owner, such as using appropriate warning signs and signage and dust suppression during dry seasons. In the course of project activities, special and careful attention will be paid to taking and implementing mitigation measures that will ensure the highest level of life safety for the people and workers in the region.

User of the facilities in the vicinity of the project area may be exposed to physical hazards associated with project components during the construction phase. In addition, confined spaces or fall hazards may occur due to unattended infrastructure. To prevent physical hazards to communities associated with the Project, the Project area will be fenced with appropriate equipment and construction activities will be announced at least 2 days in advance to affected

local people, businesses and government agencies. During the operation phase of the Project, all works such as maintenance etc. do not pose any risk.

All the staff should be integrated training sessions which include grievance mechanism, gender-based violence, sexual exploitation and abuse, sexual harassment.

7.2.6.2 Operation Phase

Three (3) personnel will be employed during the operation phase of the Project. As the panels will operate on the roof of the parking lot, there will be little contact with the local community. A service company will enter the project area only for maintenance and repair activities. Necessary measures will be taken to ensure that the public using the parking lot is not adversely affected during maintenance and repair activities.

7.2.7 Traffic and Transportation

7.2.7.1 Construction Phase

It is anticipated that no significant additional load will be of concern, considering that one truck, one crane and one digger will enter the project area during the construction works to be carried out within the scope of the Project. Traffic load assessments are detailed in Section 6.7.

The vehicles that will operate during the construction phase of the Project are given in Table 21. Among these vehicles, it is foreseen that only truck can use the transportation roads. Since other vehicles will operate in Project area, they will not leave the OIZ unless necessary. During the operation phase of the Project, no vehicles will be used by Trabzon Arsin OIZ. During the operation phase, it is considered that there may be vehicle activities by the contractor company only for maintenance and repair services in certain periods.

The times when the traffic density is low should be preferred for digger, and the necessary warning signs should be placed for the special link road. The personnel operating vehicles and heavy equipment will be dedicatedly assigned and that they will be provided with traffic and road safety training. The maintenance of the construction machinery and equipment will be carried out regularly and regulatory speed limitations will be followed for construction vehicles, and this should be included in the construction site transport and traffic management plan to be prepared by the contractor.

Prior to construction activities, the Contractor will install all signs, barriers and control devices needed to ensure the safe use of the road by traffic and pedestrians, as required by the transport and traffic management plan to be prepared.

7.2.7.2 Operation Phase

There will be no vehicle/work machine use during the operation phase of the Project. Only vehicles belonging to the maintenance service will visit the sites at regular intervals. Necessary OHS measures will be taken during maintenance operations (see Section 8). In this context, no impact on traffic is expected during the operation phase.

7.2.8 Occupational Health and Safety

The planning to be made in the project before the installation of solar power plants and the occupational health and safety measures taken accordingly are important to prevent accidents that may occur during the installation phase of solar power plants. The dangers identified before the installation phase, the risk contained in the concept of danger and factors that these risks are related to are completely prevented or the incidents that cannot be prevented are in direct proportion to the measures to be taken. Occupational health and safety measures have adopted a proactive approach rather than a reactive approach, depending on the experiences and highlighted this approach. Compliance with the planned measures will be continuously monitored during the installation, i.e., construction phase, and during the operation phase. In

this context, work will be carried out in accordance with the international standards (see Section 3) and national OHS legislation (see Annex-7).

7.2.8.1 Pre-Construction Phase

Before commencing the construction phase, a Health and Safety Plan will be prepared by contractor. The Health and Safety Plan should take into account national and international practices and encompass all necessary instructions. The Health and Safety Plan is a document prepared or ensured to be prepared by the responsible employer, project supervisor or project coordinator for the entire construction site to coordinate health and safety matters among different employers, subcontractors, self-employed individuals, and various work teams operating in the same construction area. It defines the assessment of potential risks and determines when and by whom health and safety measures, organizational structure, work methods, and related tasks should be implemented throughout the construction process.

The contractor is responsible for identifying and controlling hazards in every area, from the preparation phase of the work to the delivery phase, in all areas where the workers are involved. Additionally, mitigation measures for the pre-construction are given in Table 28.

7.2.8.2 Construction Phase

Within the scope of the project, minor excavation works will be carried out to place carport structures columns, transformer and inverter buildings and cabling works. In this context, construction equipment will be used.

To ensure the monitoring and sustainability of health and safety issues during construction, it is necessary to establish an Occupational Health and Safety (OHS) unit. This team will consist of an occupational physician conducting periodic health examinations for the employees working during the construction phase, one (1) assistant health personnel to support them, and a full-time OHS Expert, Class A.

A Risk Assessment will be conducted to identify existing or potential hazards within the workplace, both internal and external, analyze and rank risks arising from these hazards by considering factors leading to their occurrence, and determine control measures.

Risk assessment is conducted by a team formed by contractor. Risk assessment team consists of the following.

- Employer or employer's representative.
- Occupational safety specialists and workplace physicians providing health and safety services at the workplace.
- Employee representatives at the workplace.
- Employees designated to represent all units at the workplace and who possess knowledge about ongoing activities, existing or potential hazards, and risks within the workplace.

The completion of a risk assessment does not exempt the employer from the obligation to ensure occupational health and safety in the workplace. Furthermore, the employer provides the individuals tasked with risk assessment with any necessary information and documents related to risk assessment.

The emergency plan should be prepared by contractor following stages starting from the design or establishment phase for all workplaces by contractor. These stages include identifying emergencies, taking preventive, and limiting measures against their adverse effects, determining designated individuals, establishing emergency intervention and evacuation methods, documentation, conducting drills, and renewing the emergency plan.

Additionally, a project-specific emergency action plan will be developed, and drills will be scheduled. Possible emergencies in the workplace are determined based on the results of risk assessments, taking into account the following and similar aspects:

- Probability of fire and explosion.
- Probability of dissemination, poisoning, and outbreak of diseases caused by hazardous chemicals, biological, radioactive, and nuclear materials.
- Probability of natural disasters occurring.
- Probability of sabotage.

The Health and Safety Plan, Risk Analysis Report, and Emergency Action Plan should be prepared in accordance with the relevant regulations and include contagious diseases precautions.

During the construction phase, the contractor will have an Occupational Health and Safety (OHS) expert on-site. Throughout the construction period, hazards that may arise will be identified, and new risks will be analyzed, leading to the regular updating of the Risk Analysis Report. All employees involved in the construction will be provided with Personal Protective Equipment (PPE) and will receive appropriate training. Since the work primarily involves assembly, qualified labor will be employed.

Employees working in the construction phase will be engaged in tasks involving working at heights, assembly, and excavation. Within this scope, employees must utilize the following protective equipment: head protection (helmets compliant with TS EN 397+A1 standards), foot protection (shoes compliant with TS EN ISO 20345 standards), protective gloves (compliant with TS EN 388 and TS EN 420 standards), eye protection (compliant with TS 5560 EN 166 standards), fall protection equipment (must comply with all EN 361 parachute-type harness, EN 354 lanyard, EN 355 shock absorber, EN 362 connector standards), and workwear (compliant with TS EN ISO 13688 and TS EN ISO 20471 standards).

Work will not be permitted during rainy or windy weather conditions. Additionally, during assembly, there may be a risk of heat stroke depending on the season.

All employees involved in the construction phase will receive orientation training upon entry, basic Occupational Health and Safety (OHS) training, emergency response training, and basic first aid training. The selected employees for the first aid certificate will receive a separate “first aid training”. Pre and post-training assessments will be conducted, and in cases where the training is deemed insufficient, it will be repeated. Specific training will be provided to employees working at heights. As per TS 13885 standards, individuals attending training for working at heights must be over 18 years old and possess a health report confirming suitability for the training. Prior to commencing work at heights and in excavation tasks, a work permit form will be issued, and work will only proceed once appropriate conditions are ensured.

7.2.8.2.1 Working at height

Special precautions will be taken for work at height:

- The areas where work will be carried out should be of sufficient strength and durability, taking into account factors such as the working personnel, the maximum weight they may carry, and the distribution of this weight. It is essential to ensure that the supporting systems and other components of these work areas are structurally sound.
- Before commencing work at heights, it is crucial to check for any hazards or risks posed by energy transmission lines or other potential danger sources in the area. Work should only begin once these hazards have been eliminated or mitigated.
- Depending on the nature of the work being performed at heights, only personnel who are both qualified and experienced in working at heights and are in good health should be assigned to such tasks.

- Safe access to work areas should be provided for employees, along with appropriate ascent and descent equipment and tools.
- The safety of workers in work areas should primarily be ensured through collective protection measures such as safety railings, fall prevention platforms, barriers, covers, work scaffolds, safety nets, or airbags.
- In cases where collective protection measures cannot be implemented, and the risk of falling cannot be entirely eliminated, lifelines should be installed, and full-body harness systems (parachute-type safety harness) or similar safety systems should be used.
- Workers in these areas should be informed about the hazards and risks associated with working at heights and should receive the necessary training.
- Work at heights should be carried out under the supervision and control of a competent person appointed by the employer.
- Measures should be taken to prevent the falling of hand tools and other materials used in work at heights.
- Waste materials or surplus items generated during work at heights should not be dropped directly to the ground from any height. Instead, they should be lowered down in a balanced and safe manner and properly stored in a suitable location. Safe methods for waste material removal, such as chute systems, should be preferred.
- Personnel without parachute-type safety harnesses or working in areas without a lifeline will not have their work permits approved, and they will not be allowed to work.

7.2.8.2.2 Working with chemicals

Chemical hazards denote the potential for sickness or injury arising from either a single acute exposure or repeated chronic exposure to substances that are toxic, corrosive, sensitizing, or oxidative. There is also a risk of uncontrolled reactions, such as fire and explosion, if incompatible chemicals are unintentionally mixed. The most effective prevention of chemical hazards involves a hierarchical approach encompassing the following strategies:

- Substituting the hazardous substance with a less harmful alternative.
- Implementing engineering and administrative controls to prevent or minimize the release of hazardous substances into the work environment, thereby maintaining exposure levels below internationally established limits.
- Minimizing the number of employees exposed or likely to be exposed.

During the construction phase, the use of chemical substances is not of a concerning magnitude. However, in cases where working with chemical substances is necessary:

The Health and Safety (H&S) Unit will conduct assessments related to the chemicals used, and hazard cards will be created. These hazard cards, along with Safety Data Sheet (SDS) and, will be posted at accessible points in areas where chemicals are stored and used. Personnel working with chemicals will be provided with suitable equipment and PPE in accordance with the working conditions and the chemicals, and the procurement and stock process will be overseen by the respective departments.

7.2.8.2.3 Fire and Explosion

To prevent the risks of ignition, explosion, and fire, avoidance, reduction, engineering controls, and other internationally accepted control methods will be implemented.

In solar energy construction projects, internationally recognized control methods and engineering measures for fire detection, containment, and extinguishing is paramount. Within these initiatives, various safety precautions must be implemented to mitigate the risk of fire and ensure effective response in the event of a fire outbreak. Specialized detection systems such as thermal and smoke detectors can be employed for fire detection in solar energy systems. Additionally, fire suppression technologies like automatic sprinkler systems or CO_2-based extinguishing methods may be favored. Engineering measures encompass system

isolation, material selection, and assembly standards aimed at minimizing fire hazards. All these measures play a crucial role in ensuring the safety of personnel and facilities involved in solar energy construction.

Employees will be trained on what to do in emergency situations, team responsibilities and coordination, and the management and execution of operations within the scope of the emergency response plan.

7.2.8.2.4 Noise

During the construction phase, the source of noise is the work equipment. The contractor should consider the noise emission characteristics of equipment when selecting equipment for the project and select the least noisy machine available to perform the specific work. Employees should be provided with ear protection (PPE) to prevent them from being harmed by the noise.

Every employee who will work in areas with a noise level of 80 dB(A) or higher should receive training before starting work. This training should cover the potential effects of noise on hearing, the purpose of ear protectors, their advantages and disadvantages, proper usage, determining the appropriate type of protection, maintenance, and cleaning. Hearing protectors (PPE) should be distributed to employees. These training sessions should be renewed annually. Additionally, regular annual examinations and audiometric tests should be conducted for employees before and after employment to monitor potential hearing damage.

Exposure action values and exposure limit values to be complied with throughout the construction phase are provided below according to the relevant legislation.

Minimum exposure action values: 80 dB(A). When the ambient noise level reaches 80 dB(A), hearing protectors (PPE) should be readily available.

Maximum exposure action values: 85 dB(A). The effect of ear protectors is not considered in exposure action values. When the ambient noise level reaches 85 dB(A), hearing protectors (PPE) must be used.

Exposure limit values: 87 dB(A). When applying exposure limit values, the protective effect of the personal hearing protection devices used by employees is also taken into account when determining the employee's exposure.

7.2.8.2.5 Vibration

During the construction phase, the source of vibration is once again the work equipment. To prevent employees from being harmed by vibration, regular maintenance of the work equipment will be carried out. Additionally, working hours for employees will be organized.

Exposure action values and exposure limit values to be complied with throughout the construction phase are provided below according to the relevant legislation.

For hand-arm vibration:

- Daily exposure limit value for an eight-hour working period: 5 m/s².
- Daily exposure action value for an eight-hour working period: 2.5 m/s².

For whole-body vibration:

- Daily exposure limit value for an eight-hour working period: 1.15 m/s².
- Daily exposure action value for an eight-hour working period: 0.5 m/s².

To prevent or reduce exposure;

- Risks originating from exposure to mechanical vibration are eliminated or minimized at the source, considering the feasibility of combating risks with technical developments.

- Compliance with the principles of risk prevention specified Law No. 6331 is observed for preventing or reducing exposure.
- In case it is determined that the exposure action values mentioned the employer creates and implements an action plan specifically aimed at minimizing exposure to mechanical vibration and the risks it may cause, considering the following aspects.
  - Choosing alternative working methods that reduce exposure to mechanical vibration.
  - Selecting ergonomically designed appropriate work equipment that generates the lowest possible level of vibration considering the performed task.
  - Providing auxiliary equipment such as seating that effectively reduces whole-body vibration exposure, handholds that reduce transmitted vibration to the hand-arm system, and similar equipment to reduce exposure to vibration.
  - Implementing appropriate maintenance programs for the workplace, workplace systems, and work equipment.
  - Designing and arranging the workplace and working environment appropriately.
  - Providing necessary information and training to employees on using work equipment correctly and safely to reduce exposure to mechanical vibration.
  - Limiting the duration and level of exposure.
  - Regulating working hours with adequate rest periods.

7.2.8.2.6 Rotating and Moving Equipment

Injury or death can occur from unexpected starting of equipment or unapparent movements during operations, leading to entanglement, trapping, or impact on machine parts. Designing machines to eliminate trap hazards and preventing extremities from harm under normal operating conditions. Examples of proper design considerations include two-hand operated machines to prevent amputations, or the availability of emergency stops dedicated to the machine and strategically positioned.

If a machine or equipment has an exposed rotating part or an open pinch point that could jeopardize the safety of any worker, the machine or equipment should be equipped with a guard or another device that prevents access to the rotating part or pinch point. Guards should be designed and installed in accordance with appropriate machine safety standards.

The rotating components of machinery and lifting equipment used during material handling, as well as the rotating parts of hand tools that may be used during the assembly phase, can pose potential hazards. It is important to adhere to work instructions and prioritize the use of machine guards and PPE during these operations.

7.2.8.2.7 Electrical

Exposed or faulty electrical devices, such as circuit breakers, panels, cables, wires, and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices like poles, ladders, or vehicles with metal booms. Vehicles or grounded metal objects in contact with overhead wires can create an arc between the wires and the object without actual contact. All energized electrical devices and lines must be marked with warning signs. Check all electrical cords, cables, and hand power tools for frayed or exposed wires, and follow the manufacturer's recommendations for the maximum permitted operating voltage of portable hand tools. Double insulating / grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter protected circuits Power cords and extension cords should be shielded or suspended above traffic areas to protect against damage from traffic. Rubber tired construction or other vehicles that come into direct contact with, or create arcing between, high-voltage wires may need to be taken out of service for periods of 48 hours and have their tires replaced to prevent catastrophic tire and wheel assembly failure, potentially causing serious injury or death.

7.2.8.2.8 Welding / Hot Work

The welding process can generate extremely bright and intense light, posing a serious risk to a worker's eye health and, in extreme cases, leading to blindness. Additionally, prolonged exposure to the welding process can produce harmful fumes, potentially causing severe chronic illnesses. During the construction phase, if welding is required during assembly, there are important considerations to follow.

All employees involved in or assisting with welding must adhere to the work instructions. Proper eye protection, such as welding goggles and/or a full-face eye shield, must be provided for all personnel participating in or assisting with welding operations. Devices to extract and remove harmful fumes at the source may also be necessary. Paying attention to the use of PPE is crucial to reduce exposure to harmful fumes.

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result in temperature stress-related injuries or death. The use of PPE for protection against other occupational hazards may accentuate and exacerbate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided, and engineering controls and ventilation practices should be implemented for this purpose. In cases where this is not feasible, as in the assembly of the project, the following precautions should be taken:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly.
- Adjustment of work and rest periods based on temperature stress management procedures provided, considering both temperature and workload.
- Providing temporary shelters to protect against the elements during working activities or for use as a rest area.
- Use of protective clothing.
- Ensuring easy access to adequate hydration, such as drinking water or electrolyte drinks.

7.2.8.2.9 Ergonomics, Repetitive Motion, Manual Handling

Injuries caused by ergonomic factors, such as repetitive motion, overexertion, and manual handling, develop with prolonged and repeated exposures, typically requiring weeks to months for recovery. These occupational health and safety (OHS) issues should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Designing facilities and workstations with consideration for operational and maintenance workers ranging from the 5th to the 95th percentile.
- Using mechanical aids to eliminate or reduce the exertion required for lifting materials, holding tools and work objects, and implementing multi-person lifts if weights exceed set thresholds.
- Selecting and designing tools that decrease force requirements and holding times while improving postures.
- Providing user-adjustable workstations.
- Incorporating rest and stretch breaks into work processes and implementing job rotation.
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions.
- Considering additional special conditions, such as those applicable to left-handed individuals

7.2.8.2.10 Over-exertion

Over-exertion, ergonomic injuries, and illnesses such as repetitive motion, excessive effort, and manual handling are among the most common causes of injuries in constructions. To prevent and control these, construction workers should be trained in lifting and material handling techniques. Weight limits requiring mechanical assistance or two-person lifts should be determined and communicated to the workers. Additionally, planning the layout of the work area to minimize the need for manual handling of heavy loads is essential.

7.2.8.2.11 Slips and Falls

Slips and falls on the same level associated with poorly organized work areas, especially due to factors like excessive waste material, loose construction materials, liquid spills, and uncontrolled electrical cables and ropes on the ground, are among the common workplace accidents in construction. Methods to prevent slips and falls on the same level include:

- Implementing good organization practices, such as arranging waste materials or demolition debris in designated areas away from pedestrian paths
- Regularly cleaning up excessive waste material and liquid spills
- Positioning electrical cables and ropes in common areas and marked corridors
- Using slip-resistant footwear

7.2.8.3 Operation Phase

During the operation phase of the project, there will be only maintenance and repair activities. There is a risk of electric shock during transformer maintenance and repair. For this reason, maintenance and repair operations will be carried out by experts. Warning signs regarding electrical hazards will be posted. Additionally, mitigation measures for the operation phase are given in Table 30.

7.2.8.3.1 Electrical

Exposed or faulty electrical devices, such as circuit breakers, panels, cables, cords, and hand tools, can pose a serious risk to workers.

All energized electrical devices and lines need to be marked with warning signs.

During maintenance or service, devices should be locked out (discharged and left open with a controlled locking device) and tagged out (warning sign placed on the lock).

All electrical cords, cables, and hand power tools should be checked for frayed or exposed cords, and portable hand tools should follow the manufacturer's recommendations for the maximum permitted operating voltage.

Electrical equipment used in wet or potentially wet environments should be double insulated/grounded, and equipment with ground fault interrupter protected circuits should be used.

Service rooms housing high-voltage equipment ('electrical hazard') and areas with controlled or prohibited entry should be appropriately labeled, and warning signs should indicate areas where entry is controlled or prohibited.

LockOut/TagOut, which is the locking and tagging method applied to prevent any unexpected operation of a machine or device or the discharge of hazardous substances from a line that may cause harm to employees, should be implemented. This aims to minimize workplace accidents due to electric shock. Maintenance repair teams will receive training and guidance from an OHS expert to identify hazards and risks related to their work. Personnel performing maintenance and repairs are required to possess an EKAT (Electric High Current Facilities) certificate. During the operation phase of the project, there will be no permanent employment as there will be work only during maintenance and repair.

For the maintenance team, the PPE should include an electrician's helmet (EN 397+A1 and EN 50365 Class 0), electrician's footwear (EN 20345), electrician's gloves (EN 1149-1/2), and protective clothing against electric arcs. Additionally, the use of insulating mats and insulated hand tools is necessary.

7.2.8.3.2 Working at height

Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; through an opening in a work surface. Fall prevention/protection measures may also be required for specific situations when there are risks of falling from lower heights. According to national regulations, all areas with level differences are considered hazardous, posing a risk of falling. Special precautions will be taken for working at height during cleaning and repair/maintenance of solar panels.

- It is necessary to install guardrails with mid-rails and toe boards at the edge of any fall hazard area.
- The use of fall prevention devices, including safety belts and lanyard travel limiting devices to prevent access to the fall hazard area, or fall protection devices such as full-body harnesses used in conjunction with shock-absorbing lanyards or self-retracting inertial fall arrest devices attached to a fixed anchor point or horizontal lifelines, should be considered.
- Appropriate training should be provided on the use, functionality, and integrity of the necessary personal protective equipment (PPE).
- Rescue and/or recovery plans and equipment should be included in responding to workers after an arrested fall.
- The areas where work will be carried out should be of sufficient strength and durability, taking into account factors such as the working personnel, the maximum weight they may carry, and the distribution of this weight. It is essential to ensure that the supporting systems and other components of these work areas are structurally sound.
- Before commencing work at heights, it is crucial to check for any hazards or risks posed by energy transmission lines or other potential danger sources in the area. Work should only begin once these hazards have been eliminated or mitigated.
- Depending on the nature of the work being performed at heights, only personnel who are both qualified and experienced in working at heights and are in good health should be assigned to such tasks.
- Safe access to work areas should be provided for employees, along with appropriate ascent and descent equipment and tools.
- The safety of workers in work areas should primarily be ensured through collective protection measures such as safety railings, fall prevention platforms, barriers, covers, work scaffolds, safety nets, or airbags.
- In cases where collective protection measures cannot be implemented, and the risk of falling cannot be entirely eliminated, lifelines should be installed, and full-body harness systems (parachute-type safety harness) or similar safety systems should be used.
- Workers in these areas should be informed about the hazards and risks associated with working at heights and should receive the necessary training.
- Work at heights should be carried out under the supervision and control of a competent person appointed by the employer.
- Measures should be taken to prevent the falling of hand tools and other materials used in work at heights.
- Waste materials or surplus items generated during work at heights should not be dropped directly to the ground from any height. Instead, they should be lowered down in a balanced and safe manner and properly stored in a suitable location. Safe methods for waste material removal, such as chute systems, should be preferred.

- Personnel without parachute-type safety harnesses or working in areas without a lifeline will not have their work permits approved, and they will not be allowed to work.

7.2.8.3.3 Working with chemicals

During the operation phase, the use of chemical substances is not of a concerning magnitude. However, in cases were working with chemical substances is necessary, the H&S Unit will conduct assessments related to the chemicals used, and hazard cards will be created. These hazard cards, along with Safety Data Sheets (SDS), will be posted at accessible points in areas where chemicals are stored and used. Personnel working with chemicals will be provided with suitable equipment and PPE in accordance with the working conditions and the chemicals, and the procurement and stock process will be overseen by the respective departments.

7.2.8.3.4 Fire and Explosion

Electrical equipment is the main source of a potential fire hazard. In the event of fire catching a solar module, it is theoretically possible for hazardous fumes to be released and inhalation of these fumes could pose a risk to human health.

Leaching of materials from broken or fire damaged PV modules. The potential for chemical releases appears to be small since the chemicals are present in the sealed PV modules when completed installations of photovoltaic systems for power generation. Releases are likely to occur only due to fires or other unusual accidents. Cadmium could be a potential concern in this setting with thin-film technologies, as would arsenic and zinc to a lesser extent. Other chemicals that have inhalation toxicity factors are present only during the manufacturing process. Solar PV modules may contain heavy metals like lead, mercury, cadmium, chromium, polybrominated biphenyls (PBBs), or brominated diphenyl ethers (PBDEs) etc.

7.2.8.3.5 Noise

During the operational phase, no significant noise that could harm the workers is expected.

7.2.8.3.6 Vibration

During the operational phase, no significant vibration that could harm the workers is expected.

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result in temperature stress-related injuries or death. The use of PPE for protection against other occupational hazards may accentuate and exacerbate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided, and engineering controls and ventilation practices should be implemented for this purpose. In cases where this is not feasible, as in the maintenance of the project, the following precautions should be taken:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly.
- Adjustment of work and rest periods based on temperature stress management procedures provided, considering both temperature and workload.
- Providing temporary shelters to protect against the elements during working activities or for use as a rest area.
- Use of protective clothing.
- Ensuring easy access to adequate hydration, such as drinking water or electrolyte drinks.

7.2.8.3.7 Ergonomics, Repetitive Motion, Manual Handling

Injuries caused by ergonomic factors, such as repetitive motion, overexertion, and manual handling, develop with prolonged and repeated exposures, typically requiring weeks to months

for recovery. These occupational health and safety (OHS) issues should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Designing facilities and workstations with consideration for operational and maintenance workers ranging from the 5th to the 95th percentile.
- Using mechanical aids to eliminate or reduce the exertion required for lifting materials, holding tools and work objects, and implementing multi-person lifts if weights exceed set thresholds.
- Selecting and designing tools that decrease force requirements and holding times while improving postures.
- Providing user-adjustable workstations.
- Incorporating rest and stretch breaks into work processes and implementing job rotation.
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions.
- Considering additional special conditions, such as those applicable to left-handed individuals

7.2.8.3.8 Over-exertion

Over-exertion, ergonomic injuries, and illnesses such as repetitive motion, excessive effort, and manual handling are among the common causes of injuries in maintenance. To prevent and control these, workers should be trained in lifting and material handling techniques. Weight limits requiring mechanical assistance, or two-person lifts should be determined and communicated to the workers. Additionally, planning the layout of the work area to minimize the need for manual handling of heavy loads is essential.

7.2.8.3.9 Slips and Falls

Slips and falls on the same level associated with poorly organized work areas, especially due to factors like excessive waste material, liquid spills, and uncontrolled electrical cables and ropes on the ground, are among the common workplace accidents in maintenance. Methods to prevent slips and falls on the same level include:

- Implementing good organization practices, such as arranging waste materials or demolition debris in designated areas away from pedestrian paths
- Regularly cleaning up excessive waste material and liquid spills
- Positioning electrical cables and ropes in common areas and marked corridors
- Using slip-resistant footwear

8. ENVIRONMENTAL AND SOCIAL ASPECTS, AND BEST PRACTICE MITIGATION MEASURES

The E&S baseline and E&S risks and impacts are presented in Chapter 6 & Chapter 7 and considered for the assessment of the best practice mitigation measures defined for the Project. Most stringent among national legislation and WB standards and most up-to-date legislation will be complied within the scope of the project.

The mitigation plans prepared for the pre-construction, construction and operation phases are presented in between Section 8.1 and Section 8.3.

This section presents cost effective and feasible measures to reduce adverse environmental and social impacts to acceptable level. The mitigation measures, in addition to the standard mitigation measures listed below, are presented in Table 28, Table 29 and Table 30. During the implementation of the mitigation plan, Project Standards as described in Chapter 3 will be complied with.

8.1 Mitigation Plan for the Pre-Construction Phase

This section presents potential impacts, cost effective and feasible mitigation measures to reduce adverse environmental and social impacts to acceptable level, identified impact significance before and after mitigation, cost of mitigation (if substantial) and responsible parties for the pre-construction phase. The mitigation measures are presented in Table 28for pre-construction phase. During the implementation of the mitigation plan, Project Standards as described in Chapter 3 will be complied with.

Table 28. Additional Mitigations for Pre-Construction Phase

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
PR-GN-01	Disclosure	Insufficient information	Medium	• The information on the start and finish dates of construction and working periods and the permits obtained from the provincial/district municipality and other relevant institutions/organizations (if necessary) will be shown by the contractor in a signboard that is easily visible to all personnel at the construction site. • Before the start of construction works, the local people and all relevant internal and external stakeholders will be informed of the works to be performed and the measures to be taken through stakeholder consultation meeting by project owner.	Low	Included in construction costs	Project Owner (implementation)
PR-GN-02	Permits and Pre-design	Lack of legal permits and appropriate design	Low	• EIA Exemption Letter has been received for the project. Apart from this, the project should not be started before the necessary static calculations, ground survey studies, etc. related to the project design are completed. Project design is responsibility of Design Consultant.	Low	to be included in design costs	Design Consultant (implementation) Project Owner (monitoring)
PR-OHS-01	Occupational Health and Safety	Accidents and injuries resulting from incorrect conditions or behaviors	High	• Prior to the construction activities, consultations, assessments, plans (such as OHS Risk Assessments, LM Plan preparation, Emergency Response Plan preparation, etc.) and trainings (basic and technical OHS trainings, environmental and social trainings of the workers) regarding occupational health and safety as well as the labor management and working conditions will be conducted to prevent or, if not preventable, to reduce each potential risk factor that may arise during installation to an acceptable level. • All the staff should be integrated to training sessions which include grievance mechanism, gender-based violence, sexual exploitation and abuse, sexual harassment.	Low	Included in construction costs	Contractor (implementation) Project Owner (monitoring)
PR-OHS-02	Community Health and Safety	Access from outside and accidents that may occur due to lack of security of the project area	High	• The perimeter of the construction areas (i.e. SPP areas) will be enclosed with a fence/curtain, etc. • Warning signs will be hung. • Traffic planning will be conducted.	Low	Included in construction costs	Contractor (implementation) Project Owner (monitoring)
PR-SE-01	Stakeholder Engagement	Insufficient stakeholder engagement activities and public consultation	Medium	• A public/stakeholder consultation meeting will be held before the construction works including the subjects of Project and project owner's details, E&S risks and impacts, relevant mitigation and monitoring activities, stakeholder engagement activities, GM. • A Project specific SEP has been prepared and will be implemented. • An effective GM will be implemented.	Low	Included in construction costs	Project Owner (implementation)

8.2 Mitigation Plan for the Construction Phase

This section presents potential impacts, cost effective and feasible mitigation measures to reduce adverse environmental and social impacts to acceptable level, identified impact significance before and after mitigation, cost of mitigation (if substantial) and responsible parties for the construction phase. The mitigation measures for construction phase are presented in Table 29. During the implementation of the mitigation plan, Project Standards as described in Chapter 3 will be complied with.

Table 29. Additional Mitigations for The Construction Phase

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
CP-WWM-01	Wastewater Management	Soil and water pollution caused by wastewater generation due to improper practices during the construction phase	Medium	• Operations such as construction machinery and vehicle washing will not be carried out in the project area. • The personnel who will work during the construction phase will use the nearest facility for their needs from OIZ administrative building or OIZ Mosque. Wastewater will be discharged to the OIZ sewerage system that is connected to the licensed WWTP of the OIZ. • Activities should not affect the availability of water for drinking and hygienic purposes.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-AQM-01	Air Quality Management	Air pollution due to dust and exhaust emissions	High	• Minimize dust from exposed work sites by applying water on the ground regularly during dry season. • Air emission levels will comply with Project Standards. • Trucks will be covered with tarpaulins to reduce dust emission during transportation of excavation waste/soil or similar material. • Workers will be trained on the management of air emissions. • Grievance mechanism will be maintained. • Dust measurements (if needed) will be carried out by an authorized laboratory in case of any complaints from the nearest stakeholders regarding dust generation. If the measured levels indicate possible pollution from the project, additional mitigation measures will be developed for the areas where most of the dust is generated, such as windbreaks and barriers, protective covers or curtains. • It will be ensured that the periodic inspections and maintenances of the construction machinery and equipment are valid, and they are used in line with the manufacturers' statements. • Construction work will not start at the same time to reduce dust generation. • Avoid burn site clearance debris (trees, undergrowth) or construction waste materials. • Keep stockpile of Project materials covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals. • Reduce the operation hours of generators /machines /equipment /vehicles. • Control vehicle speed when driving through community areas is unavoidable so that dust dispersion from vehicle transport is minimized.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-NOI-01	Noise	Noise due to excavation and installation works	High	• Works will only be carried out during the day and not at night. • Noise measurements (if needed) will be carried out by an authorized laboratory in case of noise complaints from the nearest stakeholders. • Working hours will be reduced if necessary. • Excavation and mounting works near sensitive areas will be carried out during local community working hours (weekday/daytime) • Workers will be trained on noise management. • Grievance mechanism will be kept active. • Project Standards on noise level will be complied with. • Machinery and equipment will not be operated simultaneously. • It will be ensured that the periodic inspections and maintenances of the construction machinery and equipment are valid, and they are used in line with the manufacturers' statements. • Plan activities in consultation with communities so that noisiest activities are undertaken during periods that will result in least disturbance. • Use when needed and feasible noise-control methods such as fences, barriers or deflectors (such as planting of fast-growing trees).	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
				• Minimize project transportation through community areas. Maintain a buffer zone (such as open spaces, row of trees or vegetated areas) between the project site and residential areas to lessen the impact of noise to the living quarters.			
CP-WM-01	Waste Management	Domestic wastes from workers in the project area	Medium	• Waste management will be carried out in accordance with the "waste hierarchy". • Personnel will be made aware of waste management through trainings. • Separate collection containers will be placed for domestic waste in the Project area belonging to the Trabzon Metropolitan Municipality and the Municipality will send this waste to contracted company "Evra Enerji San. Tic. A.Ş." • The Contractor will be responsible for waste management in the project area. The Project Owner will include this issue to the Contractor's contract. Wastes will be sent by the licensed vehicles to licensed disposal/recycling companies contracted by the Contractor. Project Owner will follow up waste management implementations.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-WM-02	Waste Management	Hazardous and non-hazardous wastes from construction activities	Medium	• Segregate construction waste as recyclable, hazardous and non-hazardous waste. • Waste records will be kept regularly. • Boxes/containers will be positioned on site for hazardous and non-hazardous wastes, and wastes will be sent by the Contractor. Stored wastes will be sent to licensed disposal/recycling companies contracted by the Contractor. Project Owner will follow up waste management implementations. • Hazardous and non-hazardous wastes will be stored separately from each other in line with the national and international standards (WB ESSs). • Temporarily stored waste will be labeled with the phrase "hazardous waste" as well as the waste code, the amount of waste stored and the date of storage. • Hazardous waste will be delivered to licensed disposal / recycling facilities by using licensed transportation vehicles. Waste transportation will be carried out with the help of online mobile waste tracking system (MoTAT). Regarding the disposal of hazardous waste, the provisions of the 'Waste Management Regulation' will be complied with. • If different categories of oils are produced from the works at the construction site, these oils will be stored separately. • Containers where waste oils are stored will be kept closed and protected from rainwater. • The maintenance of the construction machinery to be used during the construction phase will be carried out at authorized services. However, if waste accumulators or end-of-life tires are generated in the project area, they will be sent to the OIZ's temporary waste storage area and delivered to licensed companies. • Wastes will be sent by the licensed vehicles to licensed disposal/recycling companies contracted by the Contractor. Project Owner will follow up waste management implementation. • Collect and properly dispose of small amount of maintenance materials such as oily rags, oil filters, used oil, etc. Never dispose spent oils on the ground and in water courses as it can contaminate soil and groundwater (including drinking water aquifer). • Need to raise community awareness on proper disposal of solar panels, specifically avoiding disposal of panels near water bodies. • Containers in the waste storage area should be labeled according to waste types. • Blind shaft should be placed in case of possible leakages in the waste storage area. • Adequate number of fire extinguishers should be positioned in the waste storage area. • A signboard should be provided and hanged in a visible place in waste storage area.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-WM-03	Waste Management	Excavation Soil, Construction and Demolition Wastes	Medium	• The excess excavation materials will be used as filling material on the site as much as possible. Wastes that cannot be used as filling material will be sent to the Trabzon Metropolitan Municipality excavation storage area. An agreement will be made with the Municipality regarding the submission, or an official cover letter will be provided from the Municipality indicating that permission has been given regarding the subject. • Topsoil will not be stored in the Project area but will be utilized in green areas (park area, etc.) within the OIZ. • After construction site is decommissioned, all debris and waste shall be cleared.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
CP-WM-04	Waste Management	Pollution potential due to inappropriate waste storage area	Medium	• The door to the waste storage area will be kept locked. The access to this area will be restricted. • Hazardous and non-hazardous wastes will be stored separately from each other. • Waste generated during construction will be removed from the project area at the end of the day. No domestic waste from workers should be stored on site. Hazardous and non-hazardous temporary waste storage areas of OIZwill be used for temporary storage of the waste generated. • Contracts made with waste transportation companies will be kept up to date. • Waste records will be kept regularly. • Spill kits and appropriate fire extinguishers will be kept in the waste area to prevent spills and fire emergencies. • A waste area responsible will be determined for the waste storage area of the OIZ. The waste area responsible will be from OIZs workers. The sign containing the name, surname and contact information of the waste area manager responsible will be placed at a visible point in the area.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-SP-01	Soil Pollution	Soil pollution caused by substances such as oil, filters, etc. from maintenance and repair of construction machinery and vehicles	Medium	• Work machine and vehicle maintenance and repair operations will not be carried out in the project area. • Maintenance and repair operations will be carried out at the authorized services. • Waste and wastewater management activities will be followed as described in this ESMP.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-SP-02	Soil Pollution	Soil pollution due to leakages such as diesel oil and oil due to malfunctions of vehicles used in project construction (accidental spillages/leakages)	Medium	• Periodic maintenance and repairs of vehicles will be carried out regularly. • Response kits / spill kits to be used in emergency situations will be kept on site. • Employees will be trained regarding spills and leaks. • Records will be kept regarding emergencies / incidents. • Soil or materials affected by the spill will be taken to a temporary waste storage area as hazardous waste.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-LU-01	Land Use	Improper area use	Low	• Before working in the SPP fields, field boundaries will be determined. • Work will not be done outside the project area. If extra land is needed, necessary permits and approvals will be obtained. • If accidental damage to adjoining land, structures or crops/assets happen, Contractor will remedy and compensate accordingly. • The areas to be excavated will be determined and excavations will not be carried out outside these areas.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-CHS-01	Community Health and Safety	Accidents that may occur due to lack of security of the project area	Medium	• The boundary of the project area will be determined, and the project area will be surrounded by fences or warning equipment such as OHS curtains. • Warning signs will be hung. • The public, and nearby institutions and organizations, and health centers and schools will be informed at least two (2) days before construction works that may cause disturbance temporarily. • The grievance mechanism officer will be introduced to the local people and updated information about the grievance mechanism will continue to be provided.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-CHS-02	Community Health and Safety	Adverse impacts that may occur in OIZ traffic due to the project	Low	• Vehicles carrying project materials will not park outside the project area. • Speed limits will be obeyed. • People who use construction equipment must have a professional qualification certificate. • Warning signs regarding the speed limit will be hung around the project area. • The working hours will be adjusted according to the peak hours of transportation. • The public, and nearby institutions and organizations, and hospitals and schools will be informed at least two days before construction works that may cause disturbance temporarily. • Contractor will take necessary health and safety measures, such as using appropriate warning signs and signboards and performing irrigation in dry seasons, under the management of the Project Owner during site preparation and construction activities.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
				• An Emergency Action Plan (ERP) will be prepared and implemented in order to be able to take and manage measures to protect public health and safety. Project employees, local people and response teams will be informed about this plan. • The project area will be fenced to avoid physical hazards to the communities associated with the project, and construction activities will be announced to the affected local people, businesses and governmental bodies at least two (2) days in advance. • Traffic management and planning will be done.			
CP-LC-01	Labor Conditions	Environmental and occupational accidents due to lack of competent and sufficient labor force. Improper Working Conditions Child labor, forced labor and unregistered employment	Medium	• At the beginning of the project, necessary training on environmental, social and OHS issues will be given to the project personnel and recorded. • Priority will be given to the local labor where possible and practical. • Workers will be provided access to the specific Workers' Grievance Mechanism and be aware about this Mechanism. • The work permits of the employees will be controlled within the scope of the Project, prohibiting child labor, forced labor, and child labor under the age of 18. • Discrimination, GBV, SEA/SH, etc. in the workplace will be eliminated through trainings. • LMP of the TOIZP, WB ESS2 and the national legislation will be complied with in the working conditions. • Contractor will develop its own LM Plan. This plan encompasses various provisions, including the assurance that workers will be provided with written contracts detailing job descriptions, working hours, wages, rights and duties descriptions, and a Code of Conduct, among other aspects. • Workers will be provided hygienic and adequate facilities. • Workers will be allowed to have access to primary healthcare on site, enabling the provision of prescriptions. • Discrimination based on language, race, gender, political thought, philosophical belief and religion will be avoided in business relations.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-EE-01	Employment / Economy	Improper Working Conditions Child labor, forced labor and unregistered employment	Low	• Care will be taken to contributing to the local economy through the use of local materials and to procuring various goods and services from local resources. • Priority will be given to the local labor where possible and practical. • Efforts will be exercised to allocate employment opportunities to the local parties and the settlements within the AoI. • The work permits of the employees will be controlled within the scope of the Project, prohibiting t child labor, forced labor, and child labor under the age of 18. • Discrimination in the workplace will be eliminated. • Necessary measures will be taken by contractor to make sure that workers coming from outside the city undergo a training program on dialogue and communication with local communities, and that there are no social or cultural issues between host communities and external workers. It is the Project owner's responsibility to ensure that the contractor complies with the determined criteria. • The adequate number of appropriate firefighting equipment will be always kept available at construction sites.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-TPS-01	Traffic and Pedestrian Safety	Direct and indirect threats posed by construction activities against traffic and pedestrians	Low	• Traffic and warning signs will be placed around and near the project area. • The project area will be made visible. • Local people will be informed about potential hazards and risks through brochures and posters left in common areas frequently used by local people such as headman's offices, hospital, health center, mosque, coffee house and marketplace. • The activities affecting the local traffic will be planned considering the rush hours of the traffic as much as possible. • All drivers involved in the project will be informed about road safety, speed limits, and traffic rules to be followed during the project, and requirements to be observed. • To prevent unauthorized access to the construction site, the construction site will be surrounded by fence/curtain/protection tape, and uncontrolled entrances will be prevented.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-CH-01	Cultural Heritage	Loss of cultural heritage	Low	• In case a cultural asset is encountered during the excavation works, the work will be stopped, and the Chance Find Procedure (provided in Annex 8) will be followed, and the nearest museum directorate will be notified.	Low	Included in construction costs	Contractor (implementation)

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
				• No disturbance of cultural or historic sites.			Construction Supervision Consultant (supervision/monitoring)
CP-BD-01	Biodiversity and Protected Areas	Protection	Low	• All natural habitats, wetlands and sites considered as protected areas in the immediate vicinity of the operations will not be damaged or misused. • No cutting of trees or destruction of vegetation other than on construction site. • No hunting, fishing, capture of wildlife or collection of plants.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-TR-01	Tree-Cutting	Tree loss	Medium	• If possible, trees will be uprooted with care taken not to damage their roots and will be replanted in a suitable area within the OIZ. • If the trees are cut down, at least twice the number of trees cut (approximately 54 trees) will be planted within the OIZ or in an area designated by the General Directorate of Forestry following the necessary correspondence with the General Directorate of Forestry by project owner.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-SO-01	Topsoil	Topsoil loss	Medium	• Topsoil will be utilized in green areas within the OIZ and will not be stored in the project area. • During excavation, topsoil will be separated from the subsoil. Depending on its depth and structure, topsoil will be stripped and temporarily stockpiled for reuse. • If there will be a need for temporary storage of topsoil, the area where the topsoil will be stored will not have a slope greater than 5%. • If topsoil is to be left exposed for a long time, it will be covered with rapidly growing plants to ensure its protection. • If the vegetative soil is stored in any area within the OIZ except the project area, channels will be created around it and covered with tarpaulin to prevent its loss by rain. • Since concrete will be laid on the area where the inverter and transformer buildings will be placed, it will be ensured that the topsoil is completely stripped. • After the topsoil is completely stripped, caution will be taken against losses while loading to the transfer vehicle. The vehicle will be covered with a tarpaulin before transfer.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-OHS-01	Occupational Health and Safety	Work stoppage due to work accident (lack of appropriate OHS measures/unsafe work environment)	High	• The workers (both regular and contractual) on the project will be provided with training on the Health and Safety policy in place, and their role in the same and refresher courses will be provided throughout the life of the project and training records will be kept. • Employees are obligated to ensure their own health and safety, as well as that of other employees affected by their actions or work, in accordance with the occupational health and safety training they receive and the employer's instructions in this regard. • Employees are obliged to use machinery, equipment, vehicles, tools, hazardous substances, transportation devices, and other production tools in compliance with the rules, use their safety features correctly, and refrain from removing or altering them arbitrarily. • Employees are required to immediately notify the employer or employee representative when they encounter a serious and immediate health or safety hazard with machinery, equipment, vehicles, tools, facilities, or buildings at the workplace, or when they observe any deficiencies in protective measures. They are obligated to collaborate with the employer and employee representative to ensure occupational health and safety measures are upheld. • Employees are obliged to use and maintain the provided personal protective equipment correctly. • Incident/accident notification will be done. • OHS records such as incident/accident, neat misses etc. will be kept. • Tidy wiring for easy maintenance and reduces the risk of accidents. MoIT shall obligate the OIZ concerned to report to the MoIT the details of any significant environmental or social incidents (e.g., fatalities, lost time incidents, environmental spills, etc.) within 48 hours after the occurrence of the incident or accident, and MoIT shall immediately notify the Bank upon receipt of such notification MoIT shall obligate the OIZ concerned to submit to MoIT an incident report, including root cause analysis, precautions and compensation measures taken within 30 business days of the incident.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
			High	• The contractor will ensure that no person is engaged in driving or operating construction machinery unless he/she is sufficiently competent and reliable, possess the knowledge of risks involved in the operation and is medically examined periodically. • The employee who will operate work equipment will possess a G-class driver's license, a psychotechnical report, a defensive driving certificate, and a professional competency training document (SRC (Driver) certificate).	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			Medium	• Contractor will prepare a site Emergency Preparedness and Response Procedure, which should be followed for the subjected project. • Contractor will prepare and implement OHS Plan (including OHS Risk Assessment).	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• Employment of individuals under the age of 18 should be prohibited during project construction.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• Adequate training will be provided to staff about raising awareness about use of Personal Protection Equipment (PPE) and emergency response measures	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			Medium	• Job responsibility and shifting chart will be prepared so that no person shall be over exhausted, which will ultimately lead to the accident or injuries;	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• Safety sign will also be marked at appropriate places.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• It shall also be ensured that good housekeeping at the construction site is maintained to avoid slips and falls.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• Dropping/lowering of construction material or tool will be restricted and undertaken only under strict supervision if required. PPEs such as safety glasses with side shields, face shields, hard hats and safety shoes shall be mandatory at a construction site.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• Use of personal fall arrest system, such as full body harnesses and other PPE as well as fall rescue procedures to deal with workers whose fall has been successfully arrested shall also be carried out.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• During the construction phase, the source of vibration is, the work equipment. All body vibration values of the equipment in use should be measured. If the measured value exceeds the exposure action value of 0.5m/s², preventive measures should be taken. To prevent employees from being harmed by vibration, regular maintenance of the work equipment will be conducted. Additionally, the working hours of employees will be adjusted.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• The contractor will ensure that the exhausts of the machinery used in excavation works are equipped with silencers (where possible) • Construction vehicles and machinery will be well maintained and not kept idling when not in use. • Earplugs shall be provided for workers placed in high noise areas.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
			High	• Risks related to the contagious diseases or any other similar will be determined for all departments through risk assessment studies.	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)
CP-SE-01	Stakeholder Engagement	Insufficient stakeholder engagement activities and public consultation	Medium	Public awareness and sufficient public engagement should provide the following informative actions; • Information about current progress of the Project	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
				• Disclosure of information about the project, E&S risks and relevant E&S instruments • Implementation of project-specific Grievance Mechanism (GM) • Use of various communication tools and consultation methods to keep open the communication channels • Providing information about MoIT and WB's grievance redress services • Grievance mechanisms and tools other than project-specific GM implementations.			
CP-GM-01	Grievance Mechanism	Insufficient and/or ineffective grievance mechanism for the internal and external stakeholders	Medium	The disclosures should include for stakeholders in line with project-specific GM implementations: • Information about current progress of the Project • Impact of changes in the Project on employees • Information on occupational health and safety • Providing information about MoIT and WB's grievance redress services • Grievance mechanisms and tools other than project-specific GM implementations. • Establishing employee codes of conduct and raising awareness among employees on this issue	Low	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)

8.3 Mitigation Plan for the Operation Phase

This section presents potential impacts, cost effective and feasible mitigation measures to reduce adverse environmental and social impacts to acceptable level, identified impact significance before and after mitigation, cost of mitigation (if substantial) and responsible parties for the operation phase. The mitigation measures are presented in Table 30 for operation phase. During the implementation of the mitigation plan, Project Standards as described in Chapter 3 will be complied with.

Table 30. Additional Mitigations for The Operation Phase

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
OP-WM-01	Waste Management	Waste generation due to maintenance and repair of SPP units	Medium	• Waste records of the maintenance and repair activities will be kept regularly. • Stored wastes will be sent to licensed disposal/recycling companies. • All hazardous and non-hazardous wastes will be stored separately from each other during the maintenance and repair activities and will be sent to the licensed recycling/disposal/recovery facilities. • Containers where waste oils are stored will be kept closed and protected from rainwater. • Wastes will be categorized based on their composition, source, types, generation rates or national legal requirements, and will be collected and transported separately (i.e., hazardous / non-hazardous, recyclable / non-recyclable) in line with the national and international requirements. • End of life solar panels will be considered as “Discarded electrical and electronic equipment containing hazardous parts other than 20 01 21 and 20 01 23” according to relevant national legislation and will be disposed of accordingly. End of life solar panels will be stored separately and send to licensed recycling facilities. • The above-mentioned mitigation measures will be added to the contracts of the maintenance and repair contractor (if any). • Need to raise workers awareness on proper disposal of solar panels, specifically avoiding disposal of panels near water bodies. • Containers in the waste storage area should be labeled according to waste types. • Blind shaft should be placed in case of possible leakages in the waste storage area. • Adequate number of fire extinguishers should be positioned in the waste storage area. • A signboard should be provided and hanged in a visible place in waste storage area.	Low	No additional cost	Project Owner
OP-WWM-01	Wastewater Management	Wastewater generation due to personnel	Low	• The personnel who will work during the operation phase will use the nearest facility for their needs from OIZ administrative building. Wastewater will be discharged to the OIZ sewerage system. • Activities should not affect the availability of water for drinking and hygienic purposes. • No chemicals and detergents will be used together with solar panel cleaning water.	Low	No additional cost	Project Owner
OP-PST-01	Pesticide Use and Management	In case landscaping is needed	Low	No pesticides will be used during the operation phases of the Project. Therefore, no adverse impact is expected due to the use of pesticides. However, if landscaping is carried out in Project area during operation and pesticides are used during this work, the following issues should be complied with the scope of WB ESS3. • Where possible, the use of POPs in pesticide formulation should be avoided or minimized. • Safety rules for storage, handling and distribution of pesticides should be followed to minimize the potential for misuse, spillage and accidental human exposure. • The use of pesticides containing chemicals listed in Annex III of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade should be avoided.	Low	No additional cost	Project Owner
OP-CHS-01	Community Health and Safety	Unauthorized access to the solar panels	Low	• Periodic safety checks will be carried out by the Project Owner. • Grounding must be done. • Safety and warning signs must be placed. • To continue GM implementation • Need to raise community awareness on electrical hazards and health and safety concerns, as well as proper maintenance of solar panels	Low	No additional cost	Project Owner
OP-LC-01	Labor and Working Conditions	Environmental and occupational accidents due to lack of competent and sufficient labor force. Improper Working Conditions	Medium	• Priority will be given to the local labor where possible and practical. • Workers will be provided access to the specific Workers’ Grievance Mechanism and be aware about this Mechanism. • The work permits of the employees will be controlled within the scope of the Project, prohibiting child labor, forced labor, and child labor under the age of 18. • Discrimination, GBV, SEA/SH, etc. in the workplace will be eliminated through trainings. • LMP of the TOIZP, WB ESS2 and the national legislation will be complied with in the working conditions.	Low	No additional cost	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)

No.	Issue	Potential Impact	Impact Significance Before Mitigation (Low, Medium, High)	Mitigation Measure	Impact Significance After Mitigation (Low, Medium, High)	Cost of Mitigation *(if substantial)*	Responsible Party/Parties
		Child labor, forced labor and unregistered employment		• Contractor will develop its own LM Plan. This plan encompasses various provisions, including the assurance that workers will be provided with written contracts detailing job descriptions, working hours, wages, rights and duties descriptions, and a Code of Conduct, among other aspects. • Workers will be provided hygienic and adequate facilities. • Workers will be allowed to have access to primary healthcare on site, enabling the provision of prescriptions. • Discrimination based on language, race, gender, political thought, philosophical belief and religion will be avoided in business relations.			
OP-OHS-01	Emergency Preparedness and Response	Fire caused by electric arc	Low	• Periodic maintenance plan of the solar panels and cables will be prepared and implemented. • Appropriate firefighting equipment will be available in the project area. • Emergency Preparedness and Response Plan will be prepared and implemented. • Emergency teams will be formed and informed. • Employees will be trained on emergency situations and fire extinguishing drills will be carried out.	Low	No additional cost	Project Owner
OP-OHS-02	Occupational Health and Safety- Work stoppage	Access from outside and accidents that may occur due to lack of security of the project area	High	• Warning signs will be hung. • The access to the rooftops where the SPPs are installed will be restricted during the operation phase. • Relevant OHS risks (to be determined by risk assessment) will be included in the OHS Plan of OIZ	Low	No additional cost	Project Owner
OP-OHS-03	Occupational Health and Safety Hazard	Working at height and working with electricity (during maintenance and repair)	High	• Use of personal fall arrest system, such as full body harnesses and other PPE as well as fall rescue procedures to deal with workers whose fall has been successfully arrested shall also be carried out during the maintenance and repair works. • Only adequately trained/ certified personnel will be allowed to work at height and/or electricity.	Low	No additional cost	Project Owner
		Tripping, slipping, and falling on uneven ground (during maintenance and repair)	Medium	• Maintenance of good housekeeping will be ensured to prevent slips and falls.	Low	No additional cost	Project Owner
		Working with chemicals	High	• Personnel working with chemicals must use equipment and PPE suitable for the working conditions and the chemicals. • Personnel will work in accordance with the hazard cards prepared by the H&S Unit.	Low	No additional cost	Project Owner
OP-SE-01	Stakeholder Engagement	Insufficient stakeholder engagement activities and public consultation	Low	• Continuation of the Project specific GM • Appointment of Community Liaison Officers (CLOs) • Institution of Public Relations (PR) office on-site • Continue to use various communication tools and consultation methods to keep open the communication channels • Considering language-based handicaps for any kind communication techniques • Providing a living document form used in disclosure process	Negligible	Included in the Project Owner's budget	Project Owner
OP-SE-01	Grievance Mechanism	Insufficient and/or ineffective grievance mechanism for the internal and external stakeholders	Low	• Continuation of the Project specific GM • Appointment of CLOs • Assignment of grievances to relevant departments • Monitoring of contractor's to be hired for maintenance and repair activities engaged in GM	Negligible	Included in the Project Owner's budget	Project Owner

9. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

The monitoring, review and audit program detailed in between

Table 31 and Table 33 will be implemented during pre-construction, construction and operation to monitor the implementation of the environmental and social commitments of the ESMP requirements. The Project Owner and Construction Supervision Consultant be responsible for ensuring that the Contractor and its contractor comply with applicable national and international requirements.

9.1 Monitoring Plan for the Pre-Construction Phase

Table 31. Monitoring Plan for the Pre-Construction Phase

Issue	**Parameters to be monitored (What parameter is to be monitored?)**	**Target/Threshold Value**	**Monitoring location (Where the parameter is to be monitored?)**	**Monitoring Method (How** *is the parameter to be monitored/ type of monitoring equipment?)*	**Timing/Frequency of Monitoring (When** *is the parameter to be monitored-frequency of measurement or continuous?)*	**Cost of Monitoring** *(What is the cost of equipment or contractor charges to perform monitoring?)*	**Responsible Party/Parties**	**Supervision observation and comments** *to be filled out during supervision with reference to adequate measuring reports*
MON-PR-GN-01	• Permits/approvals/certifications/official letters	• All Permits/approvals/certification/official letters are available and valid	• Project Owner's Administrative Building and Contractor's office	• Review and control of permits / approvals / certifications / official letters.	Before construction starts	Included in construction costs and supervision cost	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-PR-TR-01	• Trainings on grievance mechanism, gender-based violence, sexual exploitation and abuse, sexual harassment • Trainings on ESMP	• All the staff should participate in training sessions which include Code of Conduct, grievance mechanism, gender-based violence (GBV), sexual exploitation and abuse, sexual harassment (SEA/SH) prior to construction activities. • %100 Completion of ESMP training by the Environmental and Social Consultant.	• Project Owner's Administrative Building	• Review of training documents and records	Before construction starts	Supervision cost	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring) Construction Supervision Consultant Project Owner Environmental and Social Consultant (ESMP training)	
MON-PR-OHS-01	• Documents to be prepared before the commencement of construction works (OHS Plan, OHS Risk Assessment, LM Plan, etc.) • Initial E&S and OHS trainings	• %100 of documents prepared and approved (The plans have sufficient content and include COVID-19 and other contagious diseases or other outbreak precautions) • All workers trained	• Project Owner's Administrative Building • Contractor's office	• Document review • Review of training documents and records	Before construction starts	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-PR-CHS-01	• Fencing • Warnings/signs	• Project area enclosed • Warnings/signs placed at appropriate locations within the project area	• Project construction sites	• On-site inspection	Before construction starts	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-PR-SE-01	• Public consultation meeting held? • GM established? • Disclosure process managed smoothly?	• Grievances resolved in time and in mutually satisfactory manner	• Project area	• On-site inspection • Public consultation meetings	Before construction starts	Public consultation meeting cost Supervision cost	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	

9.2 Monitoring Plan for the Construction Phase

Table 32. Monitoring Plan for the Construction Phase

No.	Issue	Parameters to be monitored (What parameter is to be monitored?)	Target/Threshold Value	Monitoring location (Where the parameter is to be monitored?)	Monitoring Method (How *is the parameter to be monitored/ type of monitoring equipment?)*	Timing/Frequency of Monitoring (When *is the parameter to be monitored- frequency of measurement or continuous?)*	Cost of Monitoring *(What is the cost of equipment or contractor charges to perform monitoring?)*	Responsible Party/Parties	Supervision observation and comments *to be filled out during supervision with reference to adequate measuring reports*
MON-CP-AQM-01	Air Quality (dust and air emissions)	• Air quality grievance records • Dust and exhaust gas emissions • Air quality management implementations (such as dust suppression, use of tarpaulins during transportation of excavated materials, etc.) • Air quality measurements (PM10 measurements in case of grievance)	• • Zero non-compliance on air quality management • Zero complaint/grievance on air quality	Project area Sensitive receptor(s) (in case of grievance)	• On-site inspections • PM10 measurements to be performed by an authorized environmental laboratory at the sensitive receptor(s) in case of grievance	In case of grievance (for measurements) During excavation works (for other parameters)	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-NOI-01	Noise	• Noise grievance records • Noise management implementations (such as announcement of working schedule, periodic inspection and maintenance records of the construction machinery and equipment, etc.) • Noise measurements (in case of grievance)	• Zero non-compliances on noise management • Zero noise grievances	Project area Sensitive receptor(s) (in case of grievance)	• On-site inspections • Document review/checks (such as announcement records, machinery/ equipment inspection and maintenance records, etc.) • Noise measurements to be performed by an authorized environmental laboratory at the sensitive receptor(s) in case of grievance	In case of grievance (for measurements) Weekly	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-WM-01	Waste Management	• Waste records (amount of waste generated, waste types, disposal situations, etc.) • On-site waste management practices such as proper collection and temporary storage of wastes, etc.	• Minimization of total waste generated (less than calculated in impact section) • Minimize the ratio of hazardous waste generated to total waste (by contamination and by generation) • Increase ratio of recovered/reused/recycled to landfilled	Project area (including waste storage area(s))	• Review and control of waste records • On-site inspection regarding waste management practices such as proper collection and temporary storage of wastes, etc.	Weekly	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-WM-02	Excavation Waste Management	• Amount of refilled, stored, and disposed excavation waste/materials •	• Increase in the ratio of excavation waste generated to reused (reuse of all calculated amount in impact section) •	Construction site and excavation waste/material storage area(s)	• Review and control of excavation waste/material records • On-site inspection	Once in a week during excavation works	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-WM-03	Domestic Waste Management	• Domestic waste amount • Recovery /reuse /recycle ratio	• Minimization of domestic waste generated	Project area	• Review and control of domestic waste records • On-site inspection	Daily	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	

No.	Issue	Parameters to be monitored (What parameter is to be monitored?)	Target/Threshold Value	Monitoring location (Where the parameter is to be monitored?)	Monitoring Method (How *is the parameter to be monitored/ type of monitoring equipment?)*	Timing/Frequency of Monitoring (When *is the parameter to be monitored- frequency of measurement or continuous?)*	Cost of Monitoring *(What is the cost of equipment or contractor charges to perform monitoring?)*	Responsible Party/Parties	Supervision observation and comments *to be filled out during supervision with reference to adequate measuring reports*
			• Increase in the ratio of recovered/reused/recycled to landfilled (less than calculated in impact section)						
MON-CP-WM-04	Hazardous Waste Management	• Hazardous waste amount • Recovery /reuse /recycle ratio • Hazardous waste management practices including relevant documentation (such as Hazardous Waste Liability Insurance, availability and condition of temporary waste storage area, spill kits, fire precautions, etc.)	• Minimization of hazardous waste generated • Proper handling of hazardous wastes	Project area (including waste storage area(s))	• Review and control of hazardous waste records and documents • On-site inspection	Daily	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-WM-05	Nonhazardous Waste Management	• Nonhazardous waste amount • Recovery /reuse /recycle ratio	• Minimization of Nonhazardous waste generated • Increase in the ratio of recovered/reused/recycled to landfilled	Project area	• Review and control of nonhazardous waste records • On-site inspection	Daily	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-CH-01	Cultural Heritage	• Chance find and implementation of chance find procedure	• No cultural heritage asset is damaged	Project area	• On-site inspection • Review and control of chance find records	In case of chance find	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-BD-01	Biodiversity and Protected Areas	Alteration in the habitat	• Zero damage to natural habitats, wetlands and sites considered as protected or sensitive areas • Zero hunting, capture of wildlife, collection of plants	Project area	• On-site inspection	Daily	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-SOI-01	Topsoil	• Topsoil amount • Reuse of topsoil Topsoil striping	• Topsoil appropriately stripped (separated from the subsoil) and utilized in green areas within the OIZ • Topsoil appropriately stored when needed • No topsoil loss	• Project area Utilization area (green areas)	• On-site inspection	During topsoil stripping	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-TR-001	Trees	• Number of trees cut • Number of afforested trees	• At least twice the number of trees cut planted	• Project area Afforestation area(s)	• On-site inspection	During tree cutting and planting	Supervision cost Cost for new trees (Project Owner's budget)	Project Owner (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-TPS-01	Traffic and Pedestrian Safety	• Traffic related grievance records • Traffic warning signs • Brochures/posters delivered • Timing plan according to rush hours • Training records of the workers on the issue	• Zero number of drivers found to be exceeding speed limits or driving unsafely • Zero road traffic accidents • Zero accidental injuries and deaths • Zero traffic-related grievances	Project area	• On-site inspection • Documentation checks	Daily	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	

No.	**Issue**	**Parameters to be monitored (What parameter is to be monitored?)**	**Target/Threshold Value**	**Monitoring location (Where the parameter is to be monitored?)**	**Monitoring Method (How** *is the parameter to be monitored/ type of monitoring equipment?)*	**Timing/Frequency of Monitoring (When** *is the parameter to be monitored-frequency of measurement or continuous?)*	**Cost of Monitoring** *(What is the cost of equipment or contractor charges to perform monitoring?)*	**Responsible Party/Parties**	**Supervision observation and comments** *to be filled out during supervision with reference to adequate measuring reports*
MON-CP-CHS-01	Community Health & Safety	• Grievances • Incidents • Accidents	• Effective and satisfactory resolution of all received complaints Zero incidents • Receiving and recording complaints • Reducing the number of open complaints	Project area Residential areas around project area	• Records of comments/ suggestions/complaints • Site Audits • Training records • Incident/Accident Records (if any) • Number of communicable and non-communicable diseases and injuries • Number of community health safety & security complaints from local communities as recorded in the grievance management system • •Number of reported community health & safety incidents	Monthly	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-LC-01	Labor Conditions	• Workers' Grievances • Training records • Recruitment documentations • Number of employees	• Zero grievances not closed out within the target timeframe • All employees will be trained on OHS, GM, GBV, SEA/SH trainings and other E&S issues • All recruitment documentation complied with national and international requirements.	Project area	• Internal and external audits • Grievance records (number and nature of grievances) • Accident/incident records • Training records • Sample contracts • Human Resource Policy • Number of the local employees • Legal work permit	Monthly	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-OHS-01	Occupational Health and Safety	Use of PPE	• Specific PPE matrices will be created for work areas throughout the facility. • Personnel will be provided with equipment that is suitable for the working conditions and meets the specifications and standards outlined in the PPE matrices.	Project area	• On-site inspection • Review and control of PPE records	Daily	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
		Training	• Mandatory basic OHS training, emergency intervention training, and training on social rights will be provided to all employees and subcontracted personnel. • Orientation training will be mandatory for all personnel, subcontractor personnel, and anyone entering the facility. Competency tests will be conducted before and after the training.	Project area	• On-site inspection • Review and control of training documents and records	Continuous	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	

No.	Issue	Parameters to be monitored (What parameter is to be monitored?)	Target/Threshold Value	Monitoring location (Where the parameter is to be monitored?)	Monitoring Method (How *is the parameter to be monitored/ type of monitoring equipment?)*	Timing/Frequency of Monitoring (When *is the parameter to be monitored- frequency of measurement or continuous?)*	Cost of Monitoring *(What is the cost of equipment or contractor charges to perform monitoring?)*	Responsible Party/Parties	Supervision observation and comments *to be filled out during supervision with reference to adequate measuring reports*
			• All employees will receive accident investigation and root cause training following workplace accidents. • All training will be provided in Turkish and/or in a language suitable for the facility's employees.						
		Machinery and Equipment	• A list of all work machines throughout the facility will be compiled, and their operators will be designated. Work machines will only be operated by their designated operators. Areas without personnel access will be determined to ensure that work machines do not have unauthorized individuals in their vicinity. Periodic inspections of work machines, as required by national regulations, will be monitored, and conducted by the H&S Unit. (Regulation on Health and Safety Conditions in the Use of Work Equipment, numbered 28628 and dated 25.04.2013)	Project area	• On-site inspection • Review and control of machinery and equipment documents and records	Monthly	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
		Occupational accidents and near-miss incident records	• Records of occupational accidents and near-miss incidents will be kept systematically, and after each incident, a root cause analysis will be conducted to take measures to prevent the recurrence of the incident. • Records in Workers' GM related to OHS	Project area	• On-site inspection • Review and control of accident and near-miss incident records • Review and control of workers' GM records related to OHS	Continuous	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
		Safety Signs and Warning Signs	• Warning signs will be designed for the entire facility in accordance with national regulations and work areas, and all facility warning signs will be updated.	Project area	• On-site inspection	Continuous	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
		Work Permits	• Work permits will be obtained before commencing work involving working at heights, working electricity, hot work and excavation.	Project area	• On-site inspection • Review and control of work permits	Continuous	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
		First Aid	• A sufficient number of personnel who have received Basic First Aid Training, appropriate for the hazard class, will be provided and distributed evenly in the operational areas.(As per the First Aid Regulation (Official Gazette Date: 29 July 2015; Number: 29429) ARTICLE 19 – (1) Within the scope of occupational health and safety; a) In slightly hazardous workplaces, there must be 1 first aider for every 20 employees, b) In hazardous workplaces, there must be 1 first aider for every 15 employees, c) In highly hazardous workplaces, there must be 1 first aider for every 10 employees).	Project area	• On-site inspection • Review and control of basic first aid training records/certificates	Continuous	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	

No.	Issue	Parameters to be monitored (What parameter is to be monitored?)	Target/Threshold Value	Monitoring location (Where the parameter is to be monitored?)	Monitoring Method (How *is the parameter to be monitored/ type of monitoring equipment?)*	Timing/Frequency of Monitoring (When *is the parameter to be monitored- frequency of measurement or continuous?)*	Cost of Monitoring *(What is the cost of equipment or contractor charges to perform monitoring?)*	Responsible Party/Parties	Supervision observation and comments *to be filled out during supervision with reference to adequate measuring reports*
			• First aid materials and kits will be provided throughout the project. • First aid materials will be regularly inspected, and any deficiencies will be addressed by the health unit on a monthly basis.						
		Electrical works	• Only qualified and trained personnel will work with electricity.	Project area	• On-site inspection • Review and control of training records/related certificates	Continuous	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-SE-01	Stakeholder Engagement	• SEP implementation / public consultations records • Stakeholder engagement records	• All provisions given in the SEP will be implemented and recorded. • At least one public consultation meeting will be held.	Project area and Project management office	• Minutes of public consultation meeting • Stakeholder engagement records	Continuous	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	
MON-CP-GM-01	Grievance Mechanism	Grievances recorded (Grievance database)	• Number and nature of the grievances will be recorded, addressed, analyzed and closed with the satisfaction of the holder • All grievances will closed-out within the target timeframe.	Project area and Project management office	Grievance records (numbers of open and closed grievances, statistics regarding the nature of the grievances)	Continuous	Included in construction costs	Contractor (implementation) Construction Supervision Consultant (supervision/monitoring)	

9.3 Monitoring Plan for the Operation Phase

Table 33. Monitoring Plan for the Operation Phase

No.	Issue	Parameters to be monitored (What parameter is to be monitored?)	Target/Threshold Value*	Monitoring location (Where the parameter is to be monitored?)	Monitoring Method (How *is the parameter to be monitored/ type of monitoring equipment?)*	Timing/Frequency of Monitoring (When *is the parameter to be monitored- frequency of measurement or continuous?)*	Cost of Monitoring *(What is the cost of equipment or contractor charges to perform monitoring?)*	Responsible Party/Parties
MON-OP-WM-01	Waste Management	• Waste records (amounts, types, disposal/recycling information) • On-site waste management practices such as proper collection and temporary storage of wastes during maintenance activities (including end of life solar panels), etc.	• Minimization of total waste generated • Minimize the hazardous waste generated	Project area	• Review and control of waste records • On-site inspection regarding waste management practices such as proper collection and temporary storage of wastes (including end of life solar panels), etc.	During maintenance and repair activities	No additional cost	Project Owner (supervision/monitoring)
MON-CP-WWM	Water Management	• Amount of water used for solar panel cleaning (every six months)	• Minimization of water use for panel cleaning	Project area	• Review and control of water use records • On-site inspection while solar panels are cleaning	Every six (6) months for panel cleaning	No additional cost	Project Owner (supervision/monitoring)
MON-OP-CHS-01	Community Health & Safety	• Grievances • Incidents • Accidents • Warning signs presence	• No significant increase in injury rates • Decreasing number/ continuous improvement in number of complaints • Zero incidents per year • Zero grievances per year	Project area Residential areas around project area	• Records of comments/ suggestions/complaints • Site Audits • Training records	Monthly	No additional cost	Project Owner (supervision/monitoring)
MON-OP-OHS-01	Occupational Health and Safety	Electrical works	• Only qualified and trained personnel will work with electricity.	Operation area	• On-site inspection • Review and control of training records/related certificates	Continuous	No additional costs	Project Owner (supervision/monitoring)
		First Aid	• A sufficient number of personnel who have received Basic First Aid Training, appropriate for the hazard class, will be provided and distributed evenly in the operational areas. • First aid materials and kits will be provided throughout the project. • First aid materials will be regularly inspected, and any deficiencies will be addressed by the health unit on a monthly basis.	Operation area	• On-site inspection • Review and control of basic first aid training records/certificates	Continuous	No additional costs	Project Owner (supervision/monitoring)

No.	Issue	Parameters to be monitored (What parameter is to be monitored?)	Target/Threshold Value*	Monitoring location (Where the parameter is to be monitored?)	Monitoring Method (How *is the parameter to be monitored/ type of monitoring equipment?)*	Timing/Frequency of Monitoring (When *is the parameter to be monitored- frequency of measurement or continuous?)*	Cost of Monitoring *(What is the cost of equipment or contractor charges to perform monitoring?)*	Responsible Party/Parties
		Use of PPE	• Specific PPE matrices will be created for work areas throughout the facility. • Personnel will be provided with equipment that is suitable for the working conditions and meets the specifications and standards outlined in the PPE matrices.	Operation area	• On-site inspection • Review and control of PPE records	Continuous	No additional costs	Project Owner (supervision/monitoring)
		Training	• Mandatory basic OHS training, emergency intervention training, and training on social rights will be provided to all employees and subcontracted personnel. • Orientation training will be mandatory for all personnel, subcontractor personnel, and anyone entering the facility. Competency tests will be conducted before and after the training. • All employees will receive accident investigation and root cause training following workplace accidents. • Minimum one annual refresher training for GM, SEA/SH and GBV should be added, and all staff should participate in integrated training sessions. • All training will be provided in Turkish and/or in a language suitable for the facility's employees.	Operation area	• On-site inspection • Review and control of training documents and records	Continuous	No additional costs	Project Owner (supervision/monitoring)

No.	Issue	Parameters to be monitored (What parameter is to be monitored?)	Target/Threshold Value*	Monitoring location (Where the parameter is to be monitored?)	Monitoring Method (How *is the parameter to be monitored/ type of monitoring equipment?)*	Timing/Frequency of Monitoring (When *is the parameter to be monitored- frequency of measurement or continuous?)*	Cost of Monitoring *(What is the cost of equipment or contractor charges to perform monitoring?)*	Responsible Party/Parties
		Occupational accidents and near-miss incident records	• Records of occupational accidents and near-miss incidents will be kept systematically, and after each incident, a root cause analysis will be conducted to take measures to prevent the recurrence of the incident.	Operation area	• On-site inspection • Review and control of accident and near-miss incident records	Continuous	No additional costs	Project Owner (supervision/monitoring)
		Safety Signs and Warning Signs	• Warning signs will be designed for the entire facility in accordance with national regulations and work areas, and all facility warning signs will be updated.	Operation area	• On-site inspection	Continuous	No additional costs	Project Owner (supervision/monitoring)
		Work Permit	• Work permits will be obtained before commencing work involving working at heights.	Operation area	• On-site inspection • Review and control of work permits	Continuous	No additional costs	Project Owner (supervision/monitoring)
		Emergency Preparedness and Response (risk of fire caused by electric arc) Existence of a Periodic maintenance plan Firefighting equipment availability Emergency Preparedness and Response Plan Emergency team presence Drill records	• Periodical maintenance and repairs of solar panels and cables will be performed • Emergency Preparedness and Response Plan will be available • Emergency teams will be formed and trained. • Firefighting equipment will be available in the carport SPP area.	Administrative building Operation area	• On-site inspection • Document control • Review and control of training and drill records • Review and control of periodical maintenance plan	Continuous	Included in Project Owner's budget	Project Owner (supervision/monitoring)
MON-OP-SE-01	Stakeholder Engagement	SEP implementation / public/stakeholder consultation records	All provisions given in the SEP will be implemented and recorded.	Project area and Project management office	• Minutes of public/stakeholder consultation meeting • Stakeholder engagement records	Continuous	Included in Project Owner's budget	Project Owner (supervision/monitoring)
MON-OP-GM-01	Grievance Mechanism	Grievances recorded (Grievance database)	Number and nature of the grievances will be recorded, addressed, analyzed and closed with the satisfaction of the holder All grievances will closed-out within the target timeframe.	Project area and Project management office	Grievance records (numbers of open and closed grievances, statistics regarding the nature of the grievances)	Continuous	Included in Project Owner's budget	Project Owner (supervision/monitoring)

10.INSTITUTIONAL ARRANGEMENT AND TRAINING

10.1 Roles and Responsibilities

The Industrial Zones Directorate in MoIT will be the responsible Project Implementation Unit (PIU), which will coordinate overall project activities on a daily basis and involve other MoIT units and departments as needed. The PIU shall include environmental and social specialists (one environmental, one social, one occupational health and safety and one stakeholder engagement specialists) with sufficient qualifications and experience to manage implementation of the ESMP and respective requirements.

,Trabzon Arsin OIZ will have a project management unit that will include experts such as social expert, environmental expert, community liaison officer and OHS expert. Within the OIZ management, there are officials dealing with the issues specified under the Project. A PMU has not been officially established, but a team of existing OIZ officials with relevant expertise will be brought together to fulfill the tasks included in this ESMP. In case the financial and institutional capacity of the OIZ is not sufficient to employ experts/consultant company, MoIT will hire external consultancy or independent experts on behalf of OIZ management.

The organizational chart of Project Management Unit (PMU) of Trabzon Arsin OIZ is presented in Figure 26 and the detailed responsibilities of the experts in PMU are provided in Table 34. On the other hand, the roles and responsibilities of all project parties are provided in Table 35.

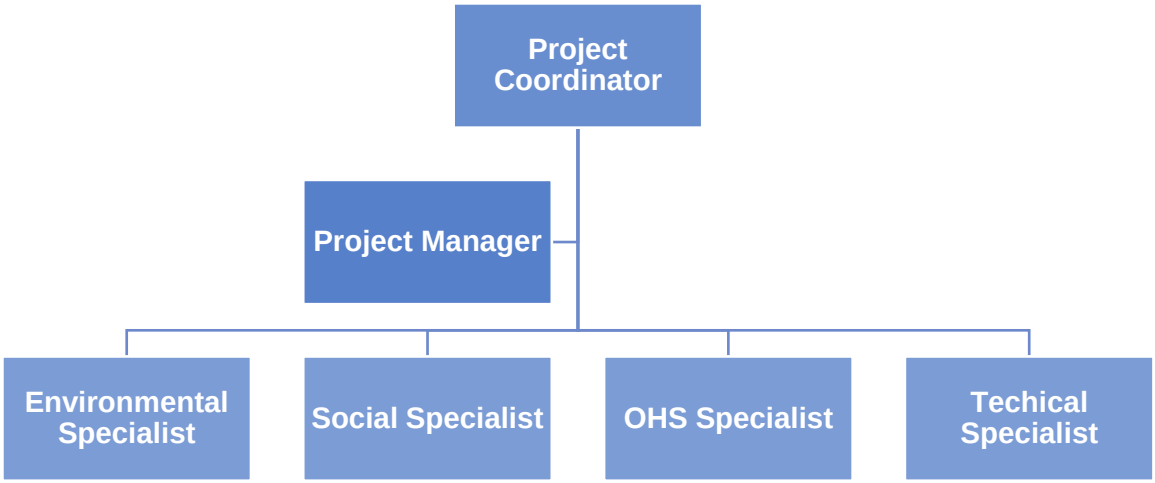

Figure 26. Organizational Chart of Project Management Unit (PMU)

Table 34. General Organization Structure of PMU for Implementation of ESMP

Roles	Responsibilities
Project Coordinator	• Overall responsibility for the ESMP implementation
Project Manager	• Ensure that ESMP provisions are implemented to mitigate environmental (including OHS) and social impacts, • Ensure that all workers, participate in training sessions on ESMP. Maintain a record of training and conduct of awareness sessions for staff to ensure compliance with environmental and safety commitments stated in ESMP, • Prepare monthly environmental and social monitoring reports for submission to MoIT PIU, • Ensure monitoring of the implementation of the ESMP and LMP

Roles	Responsibilities
Environmental Specialist	• Ensure that the environmental management systems of the project comply with the ESMP, • Monitor the environmental impacts and risks of the construction activities on site. • Ensure monitoring of the LMP implementation.
Social Specialist	• Adopt and implement Stakeholder Engagement Plan (SEP), • Establish an easily accessible and workers public grievance mechanism, • Manage and ensure effective operationalization of the GM, • Record grievances, • Disclosure to complainant, • Monitor the social impacts and risks of the construction activities on site, • Ensure that ESMP provisions are implemented to mitigate environmental and social impacts, • Undertake monitoring of the implementation of the ESMP. • Ensure monitoring of the LMP implementation.
OHS Specialist	• Ensure that implementation and supervision of Occupational Health and Safety Management Plan, • Preparedness and response to emergency situation according to Emergency Response Plan, • Notify MoIT PIU immediately if any contingencies such as labor issues, accidents and incidents. The incident report including root cause analysis, precautions and compensation measures taken, will be shared with MoIT PIU in 30 business days, • Ensure that ESMP provisions on OHS issues are implemented to avoid and mitigate OHS risks and impacts, • Undertake monitoring of the implementation of the ESMP on OHS issues. • Ensure monitoring of the LMP implementation.
Technical Specialist	• Responsible for the project design, • Coordinating the actions and evaluations in case of a change due to engineering/design changes.

Table 35. Responsibilities of Project Parties

Responsible Entity	Responsibilities
MoIT PIU	• Be the main responsible party for monitoring, supervising and ensuring the implementation of ESMF, ESMP, LMP, SEP and grievance mechanism, • Carrying out screening of the sub-projects regarding E&S risk categorization according to the WB's requirements, • Providing guidance to OIZs and E&S consultant on preparation of E&S assessment documents in accordance with the World Bank's requirements (standards, guidelines and procedures), • Providing OIZ staff and E&S consultant with guidance on the World Bank's ESSs and safeguard requirements (documentation and procedures), • Guiding OIZ and the consultant on stakeholder consultation and announcement requirements within the scope of this ESMP, • Reviewing ESA documentation, provide written comments to OIZ and E&S consultant, ultimately provide formal approval of E&S assessment documentation and procedures in accordance with the World Bank's ESSs and safeguard requirements, • Following of monitoring activities such as the implementation of this ESMP, other environmental and social mitigation measures, grievance process and Main Project's LMP, • Be open and responsive to concerns raised by affected groups and local environmental authorities regarding environmental aspects of sub-project implementation. Meet with these groups during site visits, as necessary, • Monitoring and auditing OIZs' ESMP practices and giving feedback on its performance, recommendations, and further steps to be taken within the overall project audit, • Monitoring and auditing OIZs' environmental and social issues at the sites (including OHS issues) through data collected from the site visits, • Providing training on the ESF requirements to the OIZs,

Responsible Entity	Responsibilities
	• In case of necessity, providing coordination and communication regarding the field visits. • Providing Code of Conduct, GM, GBV, SEA/SH trainings to OIZ PMU, Supervision Consultant and Contractor's Environmental and Social Specialists.
OIZ Project Management Unit (PMU)	• Assigning/hiring one environmental and one social expert with sufficient qualifications and skills • Implementation of the ESMP and SEP and achieving of all commitments under the plans. • Checking both the technical and administrative progress of contract packages. • • Providing support to implementation of the mitigation measures and commitments given in the ESMP on site. • Sharing the ESMP and SEP with the Contractor and Supervision Consultant, • Guiding the Contractor in preparing and approving the sub-management plans and Contractor's LM Plan, • Coordinating the actions and evaluations such as performing a new stakeholder consultation meeting, information disclosure, notifications to the public etc. in case of a change due to engineering/design changes, route/location changes, and legislative changes related to environmental or social issues, authorization provision changes, new environmental or social data, construction/operation strategy changes. • Updating the ESMP and SEP when necessary and sharing additional commitments with the Contractor, • E&S Monitoring Reports to be prepared monthly by the Contractor and submitted to OIZ PMU following the review of Supervision Consultant and then to be submitted to MoIT by OIZ PMU on a monthly basis after reviewing. • Auditing Contractor activities in line with ESMP requirements, • Ensuring compliance with project standards, taking urgent action in case of non-compliance within the knowledge and approval of MoIT PIU, • Suspending work in any situation that threatens environment and community and occupational health and safety and informing MoIT PIU, • Analyzing and following-up the environmental (including OHS) or social accidents/incidents. Specifically, for any significant environmental and social incidents (e.g. fatalities, lost time incidents, environmental spills etc.), the OIZs will inform MoIT PIU in 3 business days. • Notifying MoIT PIU immediately of any contingencies such as environmental, social and labor issues or accidents, incidents or loss of time that has or is likely to have a significant adverse impact on the environment, affected communities, the public or workers. The incident report including root cause analysis, precautions and compensation measures taken, will be submitted to MoIT in 30 business days. • Implementing the Grievance Mechanism in line with the ESMP and SEP and WB ESS10 and other relevant requirements. • Providing Code of Conduct, GM, GBV, SEA/SH trainings to OIZ PMU, Supervision Consultant and Contractor personnel.
Construction Supervision Consultant	• Supervision of construction and/or rehabilitation works and installation of equipment, • Identification and management of risks and impacts related to environmental, social and OHS issues, • Ensuring initiation of corrective actions where necessary, ensuring implementation of mitigation measures by the contractor, and sufficient capacity in the team (at least one Social Expert, one Environmental Expert and one full-time OHS Expert) to perform environmental and social supervision effectively within the scope of the ESMP and other ESF instruments (such management plans) and SEP in accordance with the WB requirements, • The E&S Team will be responsible for taking actions required to eliminate/minimize environmental and social impacts and risks in line with this ESMP and for putting monitoring plans into practice, • Prepare the bidding documents during the implementation, conducting bidding processes. The requirements of the WB and the Construction Contract including this ESMP, SEP and LM Procedures will be followed and cooperating with the MoIT PIU for the supervision of construction activities, • Follow up and audit the contractor's activities on a daily basis in line with the measures and commitments given in this ESMP, • Ensure and monthly report the E&S performance of the contractor to the OIZ PMU,

Responsible Entity	Responsibilities
	• Using the contractual authority and notifying MoIT PIU and the OIZ PMU on time if any non-compliances are encountered, • Monitoring and evaluating the performance of the services provided by the Contractor, • Providing guidance to the OIZ PMU and contractor on the WB's requirements (documents and procedures), • Non-conformities found during audits will be prioritized and managed according to the severity of the case, • Follow up the penalties arising from the contract, checks the suitability of the work done by the Contractor, gives warnings and directions, and notifies the OIZ PMU in a timely manner if necessary.
E&S Consultant	• Preparation and finalizing this ESMP and the SEP as per the concerns/opinions of the stakeholders of the Project for the approval of MoIT PIU and WB, • Support the PMU to organize and carry out the stakeholder consultation meeting for the first draft of this ESMP and SEP, • Organizing and delivering a training to the respective OIZ on ESMP and SEP implementations and commitments, which covers project related environmental and social impacts and risks, and corresponding measures applied to avoid, reduce, and mitigate the risks and potential adverse impacts, roles and responsibilities assigned to the relevant party, monitoring plan and reporting process prior to the construction activities are commenced.
Contractor	• Contractor will develop its own LM Plan. This plan encompasses various provisions, including the assurance that workers will be provided with written contracts detailing job descriptions, working hours, wages, rights and duties descriptions, and a Code of Conduct, among other aspects. • Fulfillment of all requirements of the ESMP, • Implementation of additional commitments to be included in the Construction Contract, • Preparation of its site-specific sub-management plans in line with this ESMP and SEP, including OHS plans before construction, as part of their method statement and submit to the OIZ PMU and MoIT PIU for reviewing and approval, • Ensuring compliance with project standards, obtaining all relevant permits and licenses, • Implementing the mitigation measures provided in this ESMP and monitoring of construction activities (including subcontractor activities) in compliance with the national legislation and WB standards, • Employment of competent Environmental, and Social (at least one Environmental and Social Expert, one full-time OHS Expert) within the scope of the project, • Training its own and subcontractor's staff on environmental, social and OHS issues, • Carrying out the environmental and social audits to monitor the ESMP practices on site and report on this to the Construction Supervision Consultant, • Submission of Environmental and Social Progress Reports (ESPRs) for safeguard issues, mitigation, results, and findings throughout the construction period to the Construction Supervision Consultant and OIZ PMU, • Notify immediately of any contingencies such as environmental, social and labor issues or accidents, incidents, or loss of time to Construction Supervision Consultant and OIZ PMU and keep an event log on site throughout the life of the Project. The incident report including root cause analysis and the corrective actions to be taken will be submitted to Construction Supervision Consultant and OIZ PMU within 30 days, • The LM Plan which will be prepared by the Contractor will also comply with the Labor Legislation (Labor Law No. 4857), Occupational Health and Safety Plan and Procedures (Occupational Health and Safety Law No. 6331) and 5510 Social Insurance Law. • Contractor will develop its own LM Plan. This plan encompasses various provisions, including the assurance that workers will be provided with written contracts detailing job descriptions, working hours, wages, rights and duties descriptions, and a Code of Conduct, among other aspects. • Developing and implementing LM Plan including working conditions, fair treatment, non-discrimination, equal opportunity, vulnerable/disadvantaged workers, GBV, SEA/SH, prohibition of child labor and forced labor issues under the project's Labor and Employment Policy for construction phase. • Establishment and implementation of project specific grievance mechanism for the Project construction activities in coordination with OIZ PMU.

10.2 Reporting

Documentation is an important element linked to the implementation of the ESMP. The Project Owner has already established Quality Management System and documentation / record keeping system, and the commitments made within the scope of ESMP will be included in the Project Company's existing management system. The Project Owner holds ISO 50001 quality certificate (see Annex-2). All procedures hold by the company will be reviewed and revised according to best practices.

Responsibilities will be assigned to relevant personnel for ensuring that the ESMP documentation system is maintained, document controlled and distributed to the identified personnel.

Reporting process that should be put into action during the implementation phase of the project is an important tool to record and chase project activities in compliance with the national and WB standards. Therefore, the requirements of such processes are presented in Table 36. Moreover, reporting process on ESMP implementation is illustrated in Figure 27.

Table 36. Responsibilities for Reporting Process

Responsible Party	Roles & Responsibility
MoIT Project Implementation Unit (PIU)	• Quarterly inform the WB with Environmental and Social Reports (ESRs) to include summary of Environmental and Social Monitoring Reports (ESMRs) on the progress and updates. Quarterly ESRs will highlight any issues arising from non-compliance with ES requirements and how it has been/is being addressed from the ESF requirements point of view. • Submitting the quarterly Grievance Mechanism Report (GMR) to WB • Site visits will be carried out quarterly and environmental and social issues will be examined on site. Findings after site visit will be included in the quarterly ESRs.
OIZ Project Management Unit (PMU)	• Review and submit monthly ESMRs to MoIT PIU • Submitting the monthly GMR to cover both Consultant's GMR and Contractor GMR to MoIT PIU
Construction Supervision Consultant	• Prepare and submit monthly ESMR to OIZ PMU including monthly Environmental and Social Progress Report (ESPR) from the contractor. Monthly ESMRs will highlight any issues arising from non-compliance with ES requirements and how it has been/is being addressed from the ES safeguards point of view. • Submit the monthly Grievance Mechanism Report to OIZ PMU prepared in line with the complaint received and combine it with monthly the Grievance Mechanism Report prepared by the Contractor
Contractor	• Prepare and submit monthly ESPRs covering the progress of the construction activities and environmental and social issues to the Construction Supervision Consultant • Submit the monthly GMR to Construction Supervision Consultant

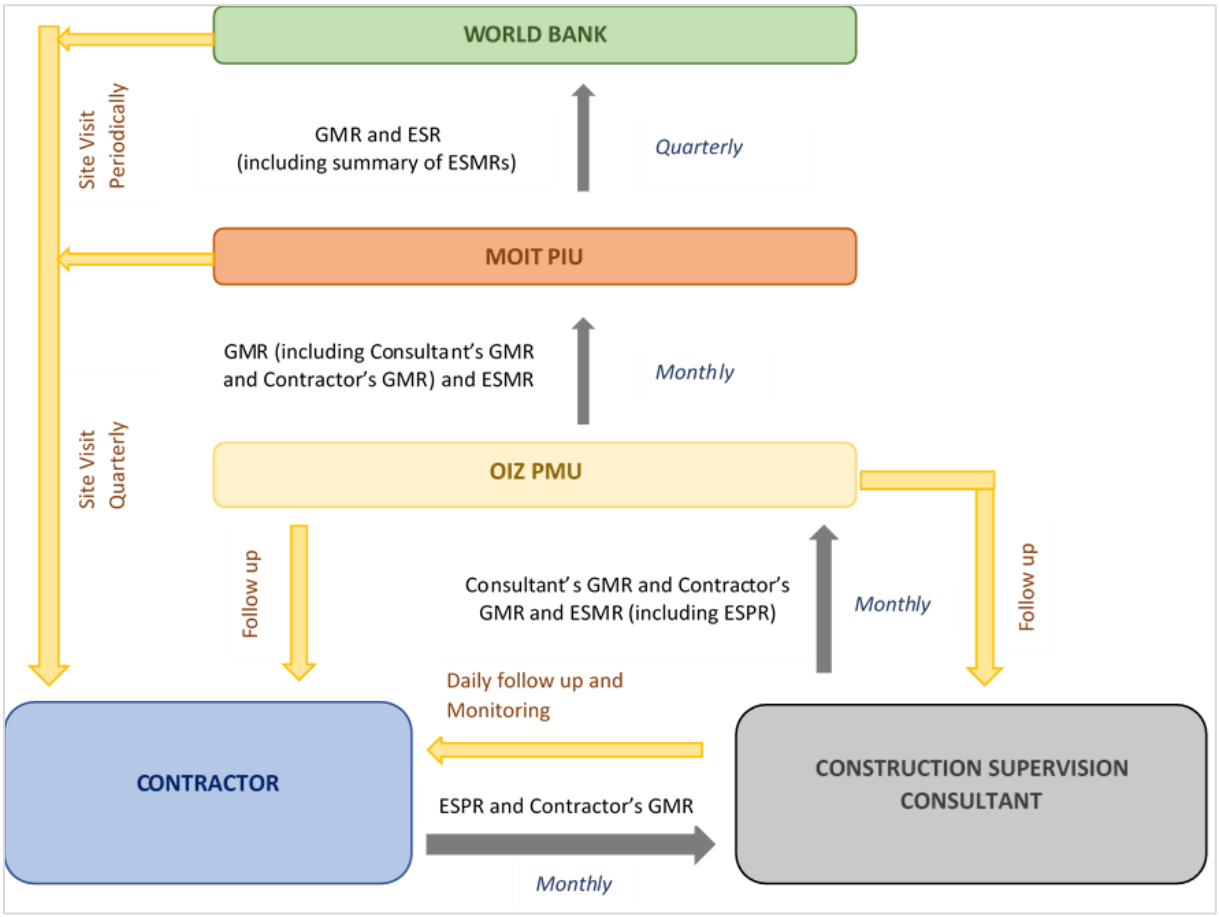

Figure 27. Reporting Process on ESMP Implementation

10.3 Training

All employees will be provided with training on environment, social, community and occupational health and safety, labor and security issues by suitably qualified personnel. The following subjects will be covered in these training programs for all employees:

- National and international legislations and its applicability to the Project,
- Occupational health and safety,
- Accident investigation and root cause,
- Roles and responsibilities,
- Environmentally sensitive areas,
- Potential effects of activities,
- The steps and timing required to protect the environment,
- Activities to be avoided,
- Requirements of equipment use in the event of incident and procedures to follow,
- Mitigation measures to implement in the Project,
- Implementation of Environmental and Social Management and Stakeholder Engagement Plan and
- Code of Conduct and GM, GBV, SEA/SH trainings

Details of the trainings within the scope of requirements of this ESMP are also presented in Table 37. This training program is a minimum and should be extended in line with the project requirements.

Table 37. Training Program

Training Topics	Responsible Party (Trainer Party)	Target Group	Timing	Duration	Cost
Induction Training[40]	Contractor OIZ PMU	Newly recruited Personnel Personnel of newly contracted subcontractor-service provider.	Whenever needed	Minimum 1 (one) day	No additional cost
OHS and Accident Investigation and Community Health and Safety	Contractor OIZ PMU	Newly recruited Personnel Personnel of newly contracted subcontractor-service provider.	Whenever needed	Minimum 16 (sixteen) hours (national legislation requirement)	No additional cost
Root Cause Training	Contractor	All personnel	Whenever needed in case of accidents and near misses	Minimum 1 (one) day	No additional cost
Environmental Management System Awareness Training	OIZ PMU	All personnel	Once in a month	Minimum 1 (one) day	No additional cost
ESMP and SEP Training	Environmental and Social Consultant	All personnel	Once before implementation	Minimum 1 (one) day	No additional cost
Training on GBV and SEA/SH	MoIT PIU	OIZ PMU Contractor Construction Supervisor	Once before implementation	Minimum 1 (one) day	No additional cost
Training on GBV and SEA/SH	OIZ PMU Construction Supervision Consultant	All personnel	Once before implementation and later whenever needed	Minimum 1 (one) day	No additional cost
Training on GM	MoIT PIU	OIZ PMU Contractor Construction Supervisor	Once before implementation	Minimum 1 (one) day	No additional cost
Training on GM	OIZ PMU Construction Supervision Consultant	All personnel	Once before implementation and later whenever needed	Minimum 1 (one) day	No additional cost
Training on Chance Find Procedure	Contractor OIZ PMU	All personnel	Once before implementation	Minimum 1 (one) day	No additional cost

[40] OIZ PMU will provide this training to the contractor and the contractor will provide this training to its new staff.

11.STAKEHOLDER MANAGEMENT UNDER ESMP

11.1 Previous Stakeholder Engagement Activities

A site visit was conducted on 18th of December, 2023. The details of the visit is presented in SEP.

11.2 Disclosure and Consultation of the ESMP

As part of the requirements of WB ESF and ESSs, this ESMP is to be publicly disclosed in the responsibility of the Project Implementation Unit / Project Owner. The final approved ESMP to be disclosed will be available locally and as hard copies at the Arsin OIZ offices and places easily accessible to affected groups through Headman's offices. Furthermore, it will be published on Arsin OIZ's website and MoIT Project page:

- https://www.tosbol.org.tr/
- https://yesilosb.sanayi.gov.tr/

The stakeholder consultation meeting documents (photos, disclosure announcements, etc.) will be added in the final version of this ESMP after the meeting is performed.

11.3 Grievance Mechanism

The main aim of the grievance mechanism is to assist in resolving complaints and grievances in a timely, effective, and efficient manner that satisfies all parties involved. The GM (and also workers' GM) will be effective during the lifespan of the project. It is intended to serve as a mechanism to:

- Allow identification and impartial, timely and effective resolution of issues affecting the project,
- Strengthen accountability of the beneficiaries, including project-affected stakeholders, and
- Provide channels for the stakeholders to provide feedback and raise concerns.
- Offer a consultation process that is clear, transparent, culturally sensitive, and easily accessible.
- Provide the option for anonymous complaints and feedback, particularly in cases related to Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).
- Recognize that grievances concerning community health, safety, and environmental risks may be urgent, especially in cases of accidents, communicable diseases, and pollution. Immediate actions must be taken to address and prevent further harm.

In addition to public GM, the ESS 2 requires the establishment of a Workers' Grievance Mechanism (WGM) for the project workers. Constitution of WGM will be under responsibility of the Contractor in accordance with its LM Plan which will be prepared in line with Project's LMP. The project workers will use the WGM to convey their concerns or suggestions regarding their working conditions and workplace.

The details such GM levels and steps of implementation on GM is presented in SEP.

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LIST OF ANNEXES