HEZ ENERJİ İNŞAAT SAN. VE TİC. A.Ş

Moralı Geothermal Power Plant Project

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

NOVEMBER 2023

ANKARA

HEZ ENERJİ İNŞAAT SAN. VE TİC. A.Ş

Moralı Geothermal Power Plant Project

Environmental and Social Impact Assessment Report (ESIA)

Version	Revision	Date	Prepared by					Quality Management By	Checked by	Approved by
Draft	A.0	August 2023	Leyla Demirçin Environmental Engineer	Şeyma Nur Geyik Sociologist	Celal Denizli Biologist		S. Selin Sert OHS Specialist	Esra Okumuşoğlu Geology Engineer	Özge Gülay Uysal Environmental Engineer	D. Emre Kaya Environmental Engineer
Final	C.0	November 2023	S. Selin Sert Environmental Engineer /OHS Specialist	Şeyma Nur Geyik Sociologist	Celal Denizli Biologist	Şevval Kurt Biologist	Deniz Dirier Sociologist	Esra Okumuşoğlu Geology Engineer	Evren Arı Atak Environmental Engineer	D. Emre Kaya Environmental Engineer

Revision Codes: A: Draft, B: Final Draft, C: Final

Project No: 23 / 004

NOVEMBER 2023

CLIENT:

HEZ enerji

Moralı Mah. Tariş Küme Evleri Mevkii Ortaklar No:118 Germencik / Aydın / Türkiye

CONSULTANT:

2U1K Mühendislik ve Danışmanlık A.Ş.

Tepe Prime İş ve Yaşam Merkezi
Mustafa Kemal Mahallesi Dumlupınar Bulvarı No: 266 B Blok Kat: 2 Daire: 38
Çankaya - Ankara / Türkiye
☎: +90 (312) 287 25 07-08
🖷: +90 (312) 285 25 09

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LIST OF ABBREVIATIONS

AoI	Area of Influence
CLO	Community Liaison Officer
DD	Data Deficient
DSİ	State Hydraulic Works
EHS	Environment, Health, and Safety
EIA	Environmental Impact Assessment
EN	Endangered
EPA	Environmental Protection Agency
EPDK	Energy Market Regulatory Authority
ESDD	Environmental and Social Due Diligence
ETL	Electricity Transmission Line
EUNIS CR	European Nature Information System Critically Endangered
GHGs	Greenhouse Gases
GIIP	Good International Industry Practice
GPP	Geothermal Power Plant
GRM	Grievance Redress Mechanism
GBV	Gender-Based Violence
HR	Human Resources
H_2S	Hydrogen Sulphide
IFC	International Finance Corporation
ILO	International Labour Organization
ISO	International Organization for Standardization
IUCN	The International Union for Conservation of Nature
KBA	Key Biodiversity Areas
LC	Least Concern
MoEUCC	Ministry of Environment and Urbanisation / Ministry of Environment, Urbanization and Climate Change
NT	Near Threatened
OHS	Occupational Health & Safety
OP	Operational Manual
ORC	Organic Rankine Cycle
PAPs	Project Affected Persons
PM_{10}	Particulate Matter smaller than 10 micrometers in size
PSs	Performance Standards
RSM	Risk Sharing Mechanism
SPP	Solar Power Plant
SEP	Stakeholder Engagement Plan
SO_2	Sulphur Dioxide
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
SEP	Stakeholder Engagement Plan

TEİAŞ	Türkiye Electricity Transmission Corporation A.Ş.
TURKSTAT	Turkish Statistical Institute
VU	Vulnerable
WWTP	Wastewater Treatment Plant

GLOSSARY

The Bank	TSKB - Türkiye Sınai Kalkınma Bankası
The Project Company – Hez Energy	HEZ Enerji İnşaat San. ve Tic. A.Ş
The Project	Moralı Geothermal Power Plant Project
GPP Project	Moralı Geothermal Power Plant Project – 24 MWe
Exploration Projects	Geothermal Resources Exploration Drilling Well Projects
The Standards	Legal requirements and IFC Performance Standards/World Bank WBG OPs (OP 4.01, OP 4.04, OP 4.11 & OP 4.12)

EXECUTIVE SUMMARY

This document presents the Environmental and Social Impact Assessment (ESIA) Report for the 'Moralı Geothermal Power Plant Project' undertaken by HEZ Enerji İnşaat San. ve Tic. A.Ş. The report has been prepared by 2U1K Engineering and Consultancy Inc. to evaluate the environmental and social impacts of the projects.

The Project involves the construction of a 24 MWe Geothermal Power Plant, and Drilling activities (including the Electricity Transmission Line (ETL) and geothermal pipeline) w the geothermal resource operation license with the 2009-138 license number area in Aydın province, Söke district, Argavlı Neighbourhood, and Germencik district Morali, Uzunkum Neighbourhoods. The project area is provided in Figure 0-1.

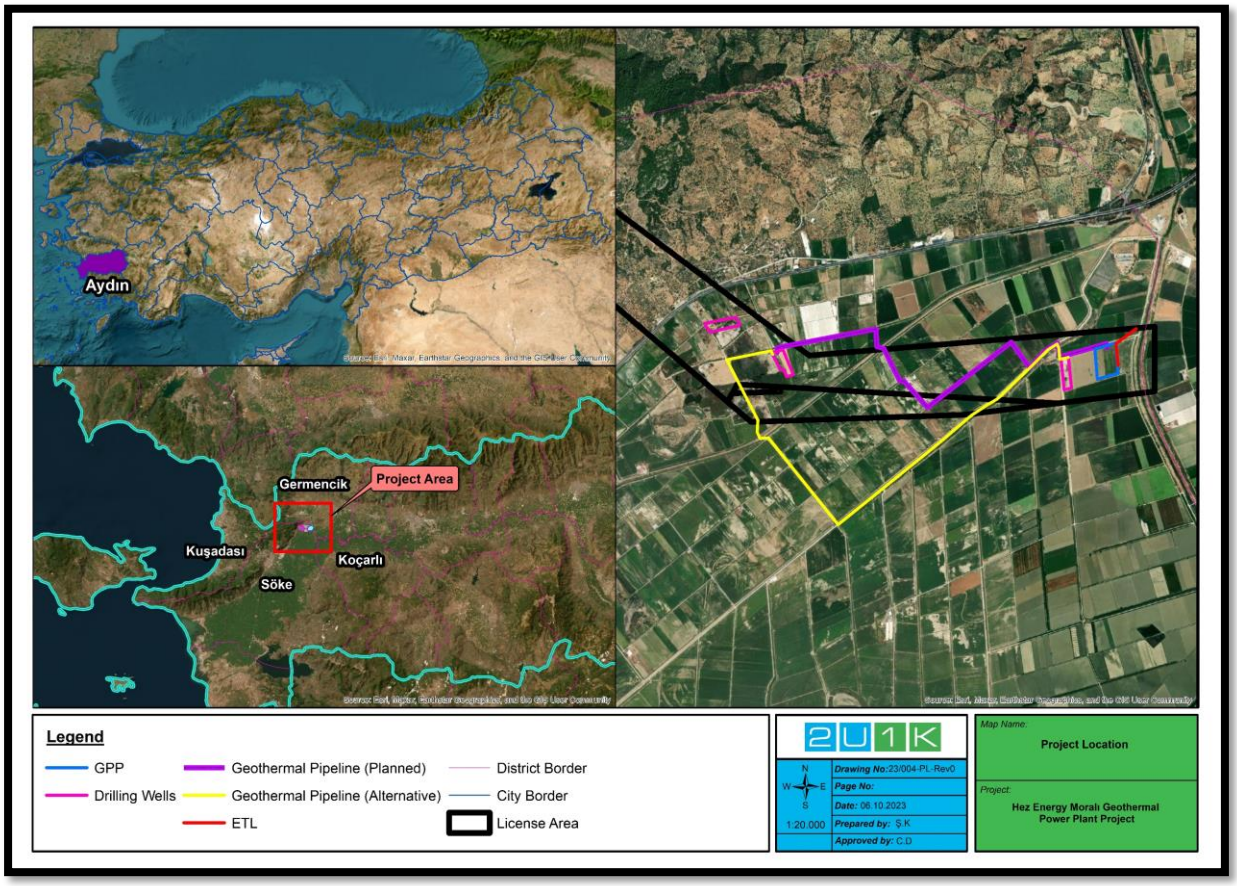


Figure 0-1. Project Location

A total of 54,577 m^2 of land acquisition has been completed for the geothermal power plant, switchyard and drilling locations. The lands were acquired through willing buyer willing seller arrangements and obtaining consent from individuals. There are no formal or informal users in the aforementioned areas.

The Project Company has determined the planned route of the geothermal pipeline within the scope of the Environmental Impact Assessment (EIA) license in the designated area. The route of the geothermal pipeline is approximately 3.30 kilometers long and runs between Argavlı Neighbourhood in Söke District and Uzunkum Neighborhood in Germencik District. The route of the geothermal pipeline is planned to pass along the roads surrounding agricultural lands, so land acquisition is not anticipated. In addition to the initially planned route for geothermal pipeline, an alternative route has been planned to run parallel to the irrigation canal. The use of the alternative route will require the approval of the General Directorate of State Hydraulic Works.

However, during the construction, if there is a boundary violation or a need for additional land arises, agricultural lands may be affected, and land acquisition or expropriation may be necessary.

Associated with the Project, the Electricity Transmission Line (ETL) will be established following the approval of TEIAS (Türkiye Electricity Transmission Corporation A.Ş). The power plant will be connected to the Kubilay GPP-Maren GPP Energy Transmission Line. The Project Company has designed a route for Electricity Transmission Lines (ETL) and submitted it for approval by TEİAŞ. Careful consideration has been given to avoid traversing through privately owned properties, with the exception of a single point where the electricity cable will cross a private property (affecting 2 parcel owners), spanning a distance of 120 meters. The Project Company will provide easement payments for the right of passage, and apart from the necessity of planting tall trees for safety purposes, the landowners' use of the affected land will not be unduly restricted. With the final decision of TEİAŞ, consultations will be held with landowners in case of any design changes.

Land acquisition needs will be clearly determined prior to construction. If land acquisition/lease/expropriation is required during the construction and operation of the geothermal pipeline and electricity transmission line, a Resettlement Action Plan for the project will be prepared to ensure that land acquisition and/or expropriation is carried out in accordance with World Bank requirements and national legislation. The plan will aim to minimize land acquisition and provide fair valuation and compensation, especially for agricultural lands. It will be ensured that no construction works can start before all land acquisition is completed, and Project Affected Persons (PAPs) are compensated in line with Bank policies as will be defined in RAP. The Project Company will consult with landowners along the route and take into account the concerns and requests of the stakeholders. Additionally, the Company will create suitable crossings (omega) to not obstruct access to field entrances.

The activities under this Project are included in Annex-I according to the Turkish EIA legislation, and therefore an EIA Report is prepared for the Project and EIA positive decision was taken in 2022.

As per WB O.P. 4.01, projects are classified in categories A, B or C depending on the severity of their potential impacts on the environment. The Project is specified as Category B+ project which resulting environmental and/or social impacts that are specific to the location of the facility and/or with impacts that could be easily identified and prevented.

ESIA, or Environmental and Social Impact Assessment, is a crucial process undertaken to evaluate the potential environmental and social consequences of proposed projects or developments. Its primary aim is to identify, predict, and assess the positive and negative impacts that a project might have on the surrounding environment and local communities. By conducting ESIA, developers and decision-makers can make informed choices, incorporating measures to mitigate adverse effects and enhance positive outcomes. The assessment typically involves comprehensive studies, stakeholder consultations, and the formulation of action plans to ensure sustainable development and minimize harm to ecosystems and society.

Significant potential impacts/risks identified in the ESIA and residual impacts after implementation of mitigation measures are presented below. Project related environmental and social mitigation measures and monitoring activities are provided in the ESMP.

Table 0-1. ESIA Impact Assessment Summary

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
Noise Generation	Construction	Negative	High	Low
Soil Pollution caused by Construction Activities	Operation	Negative	Medium	Negligible
Impact on Surface and Groundwater	Construction	Negative	Medium	Low
Impact on Surface and Groundwater	Operation	Negative	Medium	Low
Drilling Fluids,Test Water,Domestic Wastewater,Reject Water from Reinjection Well, Cleaning Water	Construction	Negative	Medium	Low
Drilling Mud and Sulfur,Sılica etc.	Construction	Negative	Medium	Low
Domestic Waste	Operation	Negative	Medium	Low
Heavy metal accumulation or loss of vitality on flora elements and poisoning,	Construction	Negative	Medium	Low

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
reproductive disorders or death on fauna				
Heavy metal accumulation or loss of vitality on flora elements and poisoning, reproductive disorders or death on fauna	Operation	Negative	Medium	Low
Impacts related to direct and indirect employment opportunities	Construction	Positive	Medium	Low
Impacts on direct or indirect local employment	Operation	Positive	High	-
Impacts on agricultural activities within the Project Site boundaries	Operation	Negative	High	Medium
Impacts related to lack of information	Operation	Negative	High	Medium
Impacts on life and fire safety	Construction	Negative	High	Low
Impacts related to health and safety	Construction	Negative	Medium	Low
Impacts on life and fire safety	Operation	Negative	High	Low
Impacts related to health and safety	Operation	Negative	High	Low
Impacts related to Land Acquisition	Construction	Negative	Medium	Low
OHS Risk / Work Accident (H2S gas release, electrical equipment failure etc.)	Construction	Negative	High	Medium
OHS Risk / Work Accident (H2S gas release, electrical equipment failure etc.)	Operation	Negative	High	Medium
Impacts on life and fire safety	Construction	Negative	High	Low
Impacts on community health	Operation	Negative	High	Low
Impacts on life and fire safety	Operation	Negative	High	Low

In essence, ESIA acts as a vital tool for sustainable project planning, promoting transparency and accountability while ensuring that development initiatives align with environmental regulations and social considerations. This process plays a fundamental role in safeguarding natural resources, preserving biodiversity, and protecting the well-being of communities impacted by development projects. By adhering to the ESIA framework, organizations can strike a balance between economic growth and ecological conservation, leading to more

responsible and environmentally conscious decision-making. There are 12 wells within the scope of Moralı GPP Project. Drilling of 6 geothermal wells, was completed. Drilling works of 2 wells are on-going and there are 4 wells which are planned.ESIA study was prepared for the planned drilling of 4 wells, namely HEZ-6, HEZ-7, HEZ-8, ARG-2, GPP, the geothermal pipelines and the ETL within the scope of Moralı GPP Project specifically.

1 INTRODUCTION

1.1 Background and Objective

This document is Environmental and Social Impact Assessment (ESIA) Report for the 'Moralı Geothermal Power Plant Project (hereinafter referred to as "the Projects") and has been prepared by 2U1K Engineering and Consultancy Inc. on behalf of "HEZ Enerji İnşaat San. ve Tic. A.Ş." (herein after 'the Project Company- Hez Energy).

Regarding the target of the Turkish Government to generate 1,000 MW of geothermal electricity by 2023 (National Renewable Energy Action Plan, 2023), HEZ Enerji İnşaat San. ve Tic. A.Ş." (herein after 'the Project Company- HEZ Enerji) applied to Türkiye Sınai Kalkınma Bankası (TSKB) for a loan to construct Moralı Geothermal Power Plant.

TSKB, which is referred to as the potential Lender, is considered to finance to construct 24 MWe Moralı Geothermal Power Plant and Exploration Drilling Projects (including the ETL and geothermal pipeline) within the geothermal resource operation license with the 2009-138 license number (4083.78 ha area) in Aydın province, Söke district, Argavlı Neighbourhood and Germencik district Moralı, Uzunkum Neighbourhoods.

The Project Company seeks potential financing from Türkiye Sınai Kalkınma Bankası (TSKB) for the construction and operation activities. TSKB required an ESDD study for the Project which evaluates the existing information on environmental, social, health and safety, and public consultation regarding national requirements and IFC (International Finance Corporation) Performance Standards (PS)/WBG Safeguard Policies (herein after "the Standards") ((IFC, 2012), (World Bank, Safeguard Policies)) and presents any gaps or non-conformities. ESDD further assesses the extent of the risk posed by each identified gap and provides an opinion as to whether the risk issue should be further evaluated and/or considered for avoidance, minimization, and mitigation, and how it should be monitored. According to the results of the ESDD, an ESIA study was required for the Project.

This ESIA report has been prepared for the Project to identify and assess the potential environmental and social impacts and define appropriate mitigation, management, and monitoring measures. The Project is committed to follow IFC (International Finance Corporation) PS, World Bank Group Safeguard Policies, as well as the Guidelines of the World Bank Group (IFC Environmental, Health and Safety Guidelines (EHSs)). This ESIA report is prepared in parallel with the Environmental and Social Due Diligence Report. For the Project Environmental and Social Action Plan (ESAP), Environmental and Social Due Diligence (ESDD), Environmental and Social Management Plan (ESMP), and Environmental and Social Impact Assessment (ESIA) are prepared.There are 12 wells within the scope of Moralı GPP Project. 2 geothermal wells, named ARG-1 and HEZ-3 wells were opened in 2016. Drilling of

4 other wells was completed in 2023. Drilling works of 2 wells are on-going and there are 4 more wells which are planned and in the scope of this ESIA study. Environmental and social studies conducted for the Project are summarized below in Table 1-1

Table 1-1. E&S Studies Conducted for the Project

Studies Conducted for the Project	Project Components
ESDD and ESAP	ARG-1, HEZ-3,HEZ-1,HEZ-3,HEZ-9,HEZ-10
ESMP	HEZ-4,HEZ-5
ESIA	ARG-2,HEZ-6,HEZ-7,HEZ-8 and GPP (inclouding ETL)

2U1K Engineering and Consultancy Inc. ("2U1K" or "the Consultant") has been engaged by the Project Company to conduct ESIA studies for the Project. As per WB O.P. 4.01, projects are classified in categories A, B or C depending on the severity of their potential impacts on the environment. Furthermore, Category B projects can be divided into two within its structure as B and B+ projects (this is a practical usage, this is not defined in OP 4.01 of WB Policy). Category B+ projects have relatively more impacts and mitigation measures comparing to Category B projects, yet the impacts and mitigation measures are not significant enough to be recognized as Category A projects. The Project is specified as Category B+ project which resulting environmental and/or social impacts that are specific to the location of the facility and/or with impacts that could be easily identified and prevented. OPs applicable to this project are OP OP 4.04, OP 4.11 and OP 4.12. When running the Project, necessary measures will be taken in consideration of the environmental and social impacts and risks provided in this ESIA.

1.2 Current Status of the Project at ESIA Stage

The Project located in Aydın province, Söke district, Argavlı Neighbourhood and Germencik district Moralı, Uzunkum Neighbourhoods. The project includes the construction of 24 MWe Moralı Geothermal Power Plant and Exploration Drilling. The construction of geothermal power plant and exploration drilling within the scope of the project has started. However, 6 of the 12 wells planned for construction have been completed. It's expected that drilling of 7th well will be completed at the end of October 2023.

This ESIA report covers the remaining construction work for Moralı Geothermal Power Plant and drilling activities Projects as well as the operation of the Project.

The "Regulation on Environmental Impact Assessment (dated July 29, 2022; No: 31907)" defines the administrative and technical procedures and principles to be followed throughout the EIA process. According to the EIA Regulation of The Ministry of Environment, Urbanisation and Climate Change (MoEUCC), an EIA Report is compulsory for geothermal power plants. Therefore, Moralı GPP, Greenhouse and Exploration Drilling Projects falls into Annex I of EIA

Regulation and that required preparing Environmental Impact Assessment Report (EIA Report). The Environmental Impact Assessment (EIA) Report of the Project was prepared by Çevtaş Araştırma Teknoloji Madencilik Mühendislik Müşavirlik Peyzaj Eğitim Danışmanlık Taahhüt Tic. Ltd. Şti. and was finalized on August 31, 2022. As a result, EIA Positive Decision was secured on September 14, 2022.

The Project Company applied to TSKB. The Project is committed to follow IFC PS, World Bank Group Safeguard Policies, as well as the Guidelines of the World Bank Group (IFC Environmental, Health and Safety Guidelines (EHSs)). This Environmental and Social Impact Assessment (ESIA) is prepared in parallel with the Environmental and Social Due Diligence Report. The Environmental and Social Due Diligence Report was drafted to assess the compliance status of the completed activities and an Environmental Social Action Plan (ESAP) was subsequently developed based on the findings from this report for the completed activities. 2U1K prepared this Environmental and Social Impact Assessment (ESIA) package, which involve the Environmental and Social Management Plan (ESMP), Stakeholder Engagement Plan (SEP), and other related documents. Subsequently, these materials will be made accessible to the public for consultation.

1.3 Structure of the ESIA

The purpose of this ESIA prepared by 2U1K is to provide a practical plan to prevent, minimize and/or manage the potential environmental and social negative impacts/risks associated with the activities under the Project, as well as to allow for meaningful and inclusive multi-stakeholder consultations and engagement throughout the lifecycle of the program.

ESIA is a systematic process that predicts and evaluates the impacts of a project on various aspects of the physical, biological, cultural and socioeconomic environment. This is followed by the identification of appropriate mitigation measures to avoid, reduce, remedy, offset or compensate for adverse impacts relevant to the nature and scale of the project. The key steps of the ESIA process are presented in Figure 1-1.

Information about the key steps outlined below is described in *Chapter 5: Scope and Methodology*.

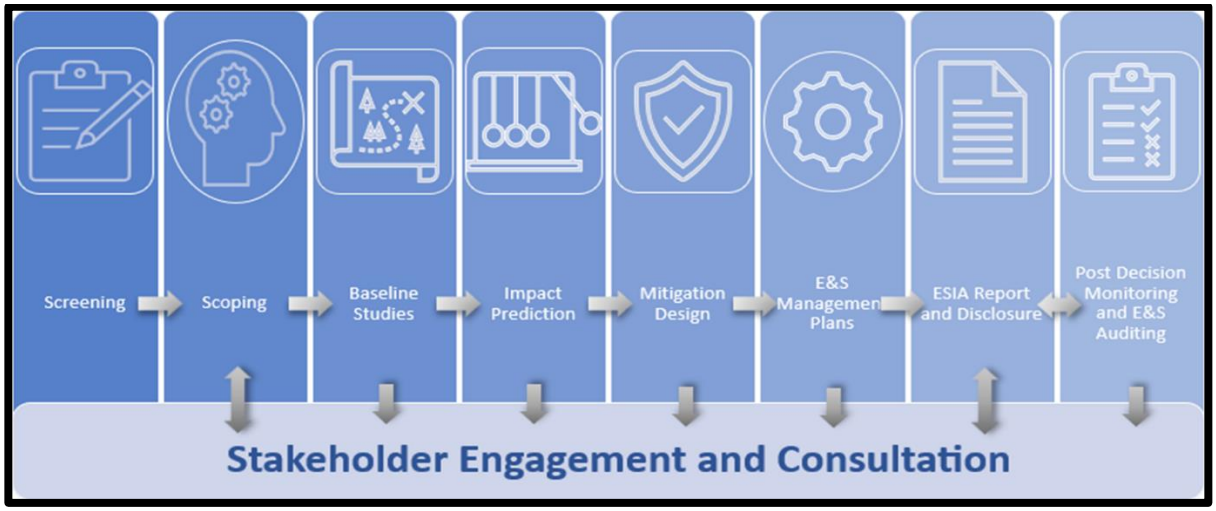


Figure 1-1. ESIA process

This ESIA Report in hand is prepared for the Project in full compliance with the WB Safeguards Policies including OPs, to ensure that the upcoming stages of the Project will meet these standards. The ESIA studies for the Project were carried out through utilization of resources including the related literature, previously prepared reports, information provided by Project Company and outcomes of the field studies that covers sampling and measurement campaigns to determine baseline conditions and surveys, interviews, and discussions made with dwellers, headmen and municipality representatives. After gathering required data from the sources, the studies were carried out with impact assessment using relevant impact assessment methodologies including mathematical calculations, geographical information systems, sampling, analysis, face-to-face surveys, and interviews, and experts' opinions.

Various documents were referred during the preparation of the ESIA Report, including legal reports, laws and regulations, technical and economic reports regarding the Project, publications on land use, natural resources, geology, socio-economic features of the area/region, maps, various data on water quality, hydrology, and climatology obtained from different agencies.

In this context, the following documents are fundamentally used regarding the details of Moralı Geothermal Power Plant Projects.

- HEZ Energy Construction, Industry and Trade Inc. Supplementary Energy Source SPP (Solar Power Plant) Integrated Project with The Extracting and Use of Geothermal Source2022,
- Çevtaş Noise Measurement Report 2022,
- Çevtaş Emission Measurement Report 2022,
- Environmental and Social Due Diligence, 2023.

Within the scope of the project, the requirements of the Lender and Financial Institution, as well as Türkiye's national legislation, have been reviewed. The Turkish Environmental Impact Assessment (EIA) procedures are generally consistent with World Bank (WB) Policies, with a few exceptions. These exceptions primarily pertain to project categorization, the extent of environmental and social assessments, and processes related to land acquisition, resettlement, and public consultation. In situations where Turkish legislation diverges from WB Policies, the stricter of the two will be applied to the project's implementation.

The following IFC and WB guidelines and standards are considered.

- The IFC General EHS Guidelines, dated April 30, 2007;
- WBG Environmental, Health, and Safety Guidelines for Geothermal Power Generation (2007).
- WBG EHS Guidelines for Electric Power Transmission and Distribution (2007),
- Environmental Assessment Policy (OP 4.01),
- Natural Habitats (OP 4.04),
- Physical Cultural Resources (OP 4.11),
- Involuntary Resettlement (OP 4.12),

The environmental and social impacts and risks were identified and evaluated in the light of all results gathered together.

Finally, the ESIA report was prepared by 2U1K, covering baseline conditions of the physical, biological, and socio-economic environments, assessments regarding the potential impact and risks associated with the Project's activities on the outlined baseline conditions, mitigation measures, environmental and social management plan (ESMP) that covers construction and operation phases, evaluation of the Project's site, as well as to allow for meaningful and inclusive multi-stakeholder consultations and engagement throughout the planned public participation activities. In addition, the World Bank Group (WBG) General Environment Health and Safety (EHS) Guidelines were also considered.

Within the scope of the project, SEP (Stakeholder Engagement Plan) was prepared to identify the project stakeholders and manage the stakeholder engagement process.

Below listed management plans were in place and used by the project subcontractor. during the ESIA studies, these management plans have been updated and project specific management plans were developed. Employees will be trained on the relevant plans to be developed.

Table 1-2. Plans/Procedures for The Project

Existing Company Management Plan (including subcontractor)	Management plan / procedure prepared by 2U1K
Emergency Plan	Emergency Response Plan
Wastewater Management Plan	Effluent Management Plan
Waste Management Plan	Waste Management Plan
Code of Conduct,	Code of Conduct
Noise Management Plan,	Noise Management Plan
Spill And Leak Response Plan	Spill Response Plan
Occupational Safety Management Plan	Occupational Health and Safety Management Plan
Camp Management Plan	Camp Management Plan
Hazardous Materials Management Plan,	Hazardous Materials Management Plan
Traffic Management Plan	Traffic Management Plan
-	Subcontractor Management Plan
-	Chance Find Procedure

1.4 Outline of ESIA Report

The structure of the ESIA report is outlined below in **Table 1-3Table 1-3**.

Table 1-3. ESIA Report Structure

Chapter	Contents
Executive Summary	Provides an overview of the results of the environmental and social impact assessment studies carried out for the Project
Chapter 1 – Introduction	Presents a brief background to the proposed Project, Project rationale, the national EIA and international ESIA processes and the purpose and structure of the ESIA report
Chapter 2 – Project Description	Describes the proposed Project components, including an overview of ancillary infrastructure / Project activities
Chapter 3 – Project Alternatives	Discusses the Project alternatives that have been considered in the ESIA process
Chapter 4 – Institutional and Regulatory Framework	Describes the legislative, policy and administrative requirements, as well as international good practice requirements applicable to the proposed Project
Chapter 5 – Scope and Methodology	Describes the ESIA Process followed for the proposed Project and the associated impact assessment methodology employed
Chapter 6 – Environmental and Social Baseline	Provides a detailed baseline assessment of environmental and social conditions including hydrology and hydrogeology, geology and soils characteristics, sediment transport, land use and zoning, natural disaster risk, material resources, climate and meteorology, air quality, noise and vibration, waste and wastewater management, biodiversity, traffic, cultural heritage and social baseline conditions.
Chapter 7 – Environmental and Social Impact Assessment and Mitigation Measures	Presents the predicted impacts to environment and socio-economic as a result of the proposed Project Presents the management and mitigation recommendations
Chapter 8 – Stakeholder Engagement	Summarises the stakeholder engagement activities undertaken for the ESIA Project to date

Chapter	Contents
Chapter 9 – Environmental and Social Management Plan	Introduces the Environmental and Social Management that present the mitigation measures for the identified environmental and social impacts with the proposed monitoring activities and responsible parties
Appendices	Contains a list of appendices within the ESIA Report

1.5 Structure and Organizational Chart of the Project Company

The Project Company, in collaboration with relevant third parties, will establish, maintain and promote, as required, a project-specific organizational structure defining roles, responsibilities and authority for the implementation of ESIA, SEP and related plans for both construction and operation phases. Sample Project Implementation unit is presented in Figure 1-2.

Specific personnel with clear boundaries of responsibility and authority are appointed, including management representatives. The project-specific organizational structure to be developed is included executives, who will coordinate and manage the Project, the technical and financial experts, who will be in charge of construction and operation phases of the Project, and at least one social expert, one environmental expert and one occupational health and safety (OHS) expert. Core environmental and social responsibilities are well defined and communicated to the relevant personnel and the rest of the Project Implementation Unit.

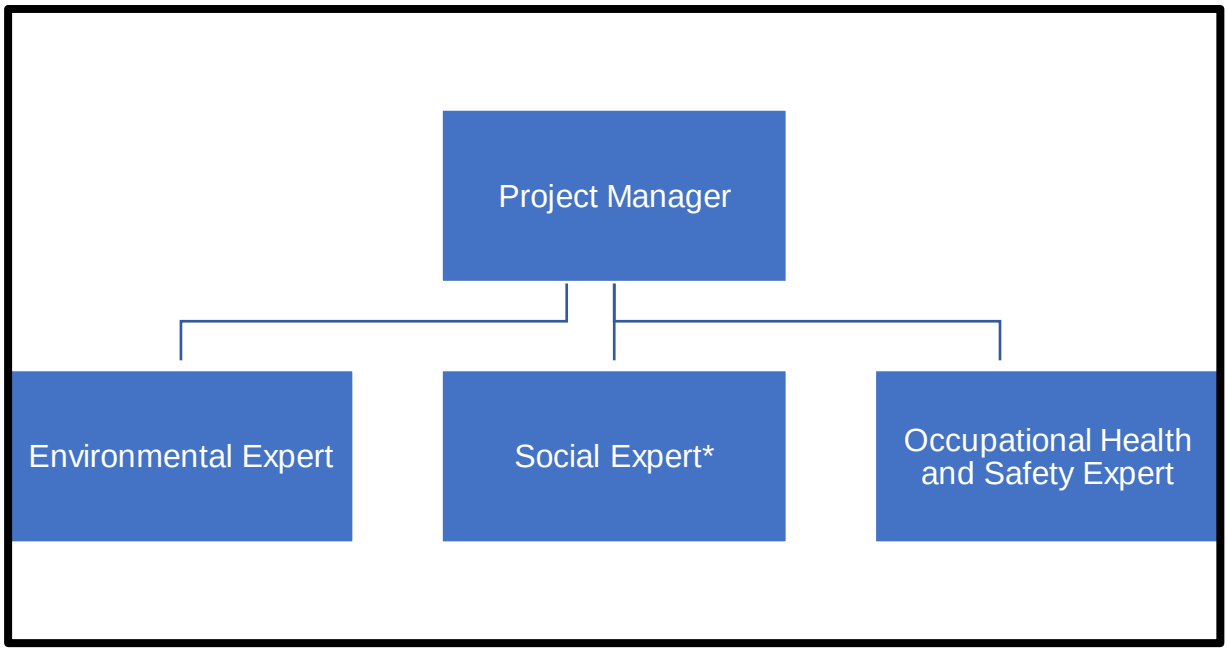


Figure 1-2. Organizational Chart of Project Implementation Unit

*Also considered as Community Liaison Officer (CLO).

The Project Company will ensure that all affected parties, especially affected settlements, local community, adjacent facilities, non-profit organizations, and public bodies in the vicinity are kept informed of Projects. These groups will be involved in the process of identifying key issues under the project.

1.5.1 Project Organizational Management

Project Implementation Unit's personnel has responsibilities as it presented in Table 1-4.

Table 1-4. Project Organizational Management

Responsible Party	Terms of Reference
Project Company	• The Project Company (HEZ Enerji İnşaat San. Ve Tic. A.Ş.) is the implementer and beneficiary of this Project. • The Project Company will be responsible for providing technical and data support during the supervision of contractor and the preparation of technical and financial feasibility reports regarding projects. • The Project Company will provide training to the contractor before the construction works on the implementation of the elements specified in the ESIA and SEP, and to the personnel who will work during the operation period before the operation. • The Project Company will be responsible for preparing the bid documents during the implementation, conducting bidding processes in accordance with the statute of the Public Procurement Authority, and the defined project requirements. The Project Company will check both the technical and administrative progress of contract packages and the implementation of the points provided in ESIA and SEP on site together with Environmental, Social and OHS Experts (at least one Social Expert, Environmental Expert and OHS Expert) who will be involved in the Project Implementation Unit. The said experts will be responsible for taking actions required to eliminate/minimize environmental and social impacts in line with ESIA and for putting monitoring plans into practice. • In addition to on-site inspections, the Project Company will review the Environmental and Social Monitoring Reports (ESMRs) to be submitted by contractor on a monthly basis, and these ESMRs will be submitted to TSKB as quarterly after being reviewed.
Contractor	• The construction works under the contract packages included in the scope of the ESIA will be carried out by contractors. • Contractors will be responsible for observing the liabilities provided in the ESIA. Issues related to the implementation of the ESIA will be examined by the contractor during the preparation of the bid, and proposals will be submitted considering the ESIA prepared by the Contracting Authority. • The ESIA includes the monitoring tables that describe the possible negative effects of the operations to be carried out during the construction phase of the project and the measures to be taken to minimize these effects and the conditions for putting these measures into action. Additionally, the said tables include the entities and organizations (project stakeholders) responsible for the aforementioned items. • During the construction phase, the contractor will provide training to the personnel who will take part in the project, including the measures within the scope of ESIA, to raise awareness of environmental, occupational and worker health and safety, community health and safety and social issues. • The Contractor will prepare a training program for the personnel on the requirements of the project and the mitigation methods to be applied

Responsible Party	Terms of Reference
	(including the plans and procedures) and will train all its personnel. The Project Company will make sure that the trainings are given. The consultant will check the suitability of the training provided and the adequacy of the training program. • Contractor will prepare monthly ESMRs and submit them to the Project Company together with Grievance Register, • In case of contingencies such as environmental, social and labor issues or accident or loss of time, the contractor will immediately inform the Project Company and the Project Company will inform the WB within three (3) working days. A report on the root causes of the incident and the corrective actions to be taken will be submitted to the WB within 30 days.

2 PROJECT DESCRIPTION

This document is Environmental and Social Impact Assessment (ESIA) for the *'Moralı Geothermal Power Plant Project'(including the ETL and geothermal pipeline)* (hereinafter referred to as "the Project") and has been prepared by 2U1K Engineering and Consultancy Inc. on behalf of "HEZ Enerji İnşaat San. ve Tic. A.Ş." (herein after 'the Project Company- Hez Energy).

Hez Energy is planning to construct 24 MWe Moralı Geothermal Power Plant, and Exploration Drilling Projects within the geothermal resource operation license with the 2009-138 license number (4083.78 ha area) in Aydın province, Söke district, Argavlı Neighbourhood and Germencik district Morali, Uzunkum Neighbourhoods. The operation license is provided in Appendix-A.

In accordance with International Finance Corporation (IFC) Performance Standard 1 (PS1), Associated Facilities specified in Table 2-1 below were also assessed in ESIA.

Table 2-1. Assessment of facilities for compliance with association criteria of the IFC

Facility	Integration with the Project	Associated criteria of the IFC			Status
		Financed as Part of the Project	Would be constructed or expanded had the Project not been implemented	Needed for the Project viability	
1. Moralı Geothermal Power Plant Project					
1.1 Geothermal Power Plant	Yes, In terms of energy production	Yes	No	Yes	The Project
2. Geothermal Resources Exploration Drilling Projects					
2.1. Exploration Wells (Production and Reinjection Wells)	Yes, In terms of supply and reinjection of geothermal fluid	Yes	No	Yes	The Project
3. Linear facilities (pipelines, roads, water supply, ETL)					
3.1. Geothermal Pipeline	Yes, In terms of supply and reinjection of geothermal fluid to the system	Yes	No	Yes	The Project
3.2 Energy transmission line (ETL)	Yes, for the transmission of energy produced	No	No	Yes	Associated Facility

A total of 54,577 m^2 of land acquisition has been completed for the switchyard, geothermal power plant and drilling locations. The lands were acquired through willing buyer willing seller arrangements and obtaining consent from individuals. There are no formal or informal users in the aforementioned areas, and questions about possible land use were asked by conducting household surveys in the social baseline studies carried out during ESIA studies. Land acquisition needs for other components are detailed in section 6.20.

The National Environmental Impact Assessment (EIA) Report of the Project was prepared by Çevtaş Araştırma Teknoloji Madencilik Mühendislik Müşavirlik Peyzaj Eğitim Danışmanlık Taahhüt Tic. Ltd. Şti. and was finalized on August 31, 2022. As a result, EIA Positive Decision was secured on September 14, 2022.nIn addition to this, as a generation pre-license numbered ÖN/10891-3/05146 valid until September 30, 2024 was secured from EPDK (Energy Market Regulatory Authority) on March 31, 2022 for 24 MWe geothermal energy production.

Within the scope of the project, the connection agreement to the electricity distribution system between the Project Company and the Distribution Company was made on 31 March 2022 presented in Appendix-B.

The Project Company seeks potential financing from Türkiye Sınai ve Kalkınma Bankası (TSKB) for the construction and operation activities. herefore, the Project Company has appointed 2U1K for the preparation of ESIA (Environmental and Social Impact Assessment) Report after an ESDD study conducted for the Project. ESIA report aims to identify and assess the potential environmental and social impacts and define appropriate mitigation, management, and monitoring measures in line with IFC (International Finance Corporation) Performance Standards (PS)/ WBG Safeguard Policies (herein after “the Standards”) ((IFC, 2012), (World Bank, Safeguard Policies)).

The Project will be monitored by an independent Consultant every 3 months during the construction periods and annually during the operational periods.

After the completion of ESDD Report and ESAP, 2U1K has drafted a comprehensive Environmental and Social Impact Assessment (ESIA), which will involve the Environmental and Social Management Plan (ESMP), Stakeholder Engagement Plan (SEP), and other supporting management plans. These materials will be made accessible to the public for consultation.

In this regard, this Report provides a compliance matrix for the Project, summarizing and comparing the Project requirements with the Standards relevant to the Project, and the extent to which these have been met and the actions required to meet them. The Report identifies the requirements for any further investigations and supplementary documentation that will

need to be prepared as well as additional procedures and activities that will need to be undertaken to meet the Standards.

It is important to note that, this Report has been prepared based on the latest project information available at the construction and operation phases of the Project.

2.1 Project Location

The Project area provided on the map given in Figure 2-1 which is located in in Moralı Neighbourhood of Germencik District; Argavlı Neighbourhood of Söke District of Aydın Province. The license area covers about 4083.78 ha hectares of which the Geothermal Power Plant area covers an area of 3.0334 ha. The map below includes the Geothermal Power Plant, wells, greenhouse, and the license area for which the Project Company secured geothermal operation license.

The geothermal resource operation license with license number 2009-138 of 4083.78 ha consists of 2 polygons.

The details of the areas that the Project components cover are summarized in Table 2-2.

Table 2-2. Project Components Location

Name of the Area	Location of the Area				Size of the Area (m^2)	Explanation
	District	Neighbourhood (location)	Block	Parcel		
Drilling Area No. 1	Germencik	Moralı	228	1	10,290	HEZ 1-2-3-9-10 wells and common units (drilling platform area, test water pool, sludge management pools, storage area, construction site)
Drilling Area No. 2	Söke	Argavlı/Korkuyu	145	7	10,877	HEZ 4-5-6-7-8 wells and common units (drilling platform area, test water pool, sludge management pools, storage area, construction site)
Drilling Area No. 3	Söke	Argavlı/Korkuyu	139	1	11,069	ARG 1-2 wells and common units (drilling platform area, test water pool, sludge management pools, storage area, construction site)
GPP Area	Germencik	Moralı	228	4, 5, 6	30,334	ORC (Organic Rankine Cycle) with 24 Mwe installed power, turbine, generator, switchyard, emergency pool, administrative and social buildings

Reference: EIA Report

In Figure 2-1 the power plants andwell locations, which are all Project components, are located and surrounded by agricultural lands are presented.

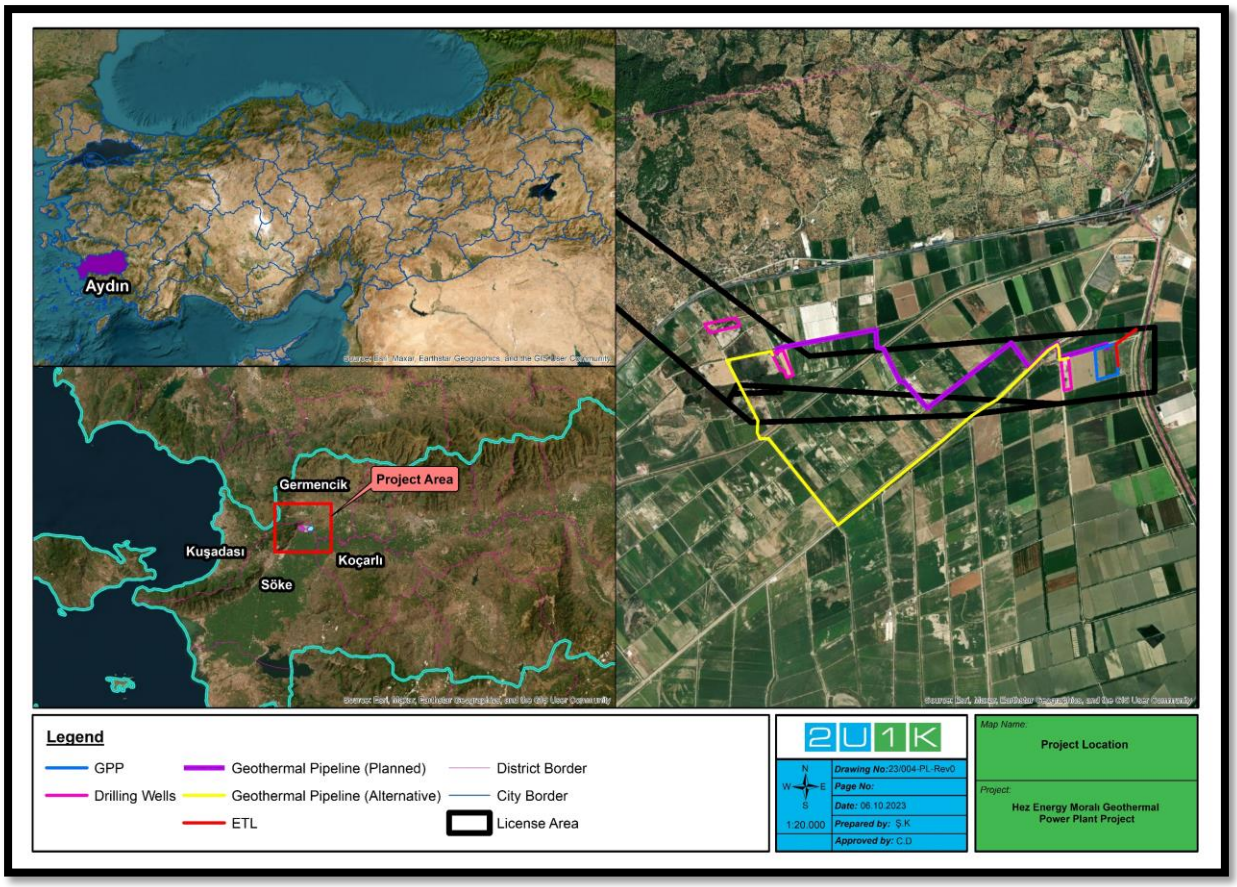


Figure 2-1. Project Location

2.2 Project Overview

The purpose to construct Moralı Geothermal Power Plant is to produce energy from geothermal fluid and using geothermal fluid in industrial greenhouse plants based on geothermal heating. Using geothermal fluid in industrial greenhouse plants based on geothermal heating is one of the usage alternatives according to the temperature of the geothermal fluid.

Moralı Geothermal Power Plant (GPP) – 24 Mwe

Moralı Geothermal Power Plant (GPP) is planned to be in operation with annual production capacity of 210,240,400 kWh electrical energy with 24 Mwe installed power in Moralı Neighbourhood of Germencik District of Aydın Province.

210,240,400 kWh/year (gross) electricity will be generated from the facility with an installed power of 24 Mwe, which can be established in the field with the assumption of the power plant's

working condition of 8760 hours per year, on the basis of working 24 hours a day, in 3 shifts throughout the year.

Moralı Geothermal Power Plant Project (GPP Project) will be located in a total area of (3.0334 ha) within the Geothermal Resources and Natural Mineral Waters Operation license area number 2009-138 (license area: 4083.78 ha). The production, reinjection wells, pipelines and geothermal power plant that are required within the scope of the project are located within the license area.

There will be ORC with 24 Mwe installed power, turbine, generator, switchyard, emergency pool, administrative and social buildings within 3.0334 ha GPP Project area.

Geothermal Resources Exploration Drilling Well Activities

The project is a geothermal resource exploration drilling activity planned within the boundaries of the "Geothermal Resources and Natural Mineral Waters Operating License" with the operation license number "2009-138 (license area: 4083.78 ha)" belonging to Hez Energy.

The licence area covers Aydin Province, Kocarli District, Tatarlar, Bıyıklı, Kasaplar, Haydarlı Neighbourhoods; Söke District Karaatlı, Sazlıköy, Bağarası, Argavlı Neighbourhoods; Germencik District, Üzümlü, Gümüş, Gümüşyeni, Moralı, Uzunkum Neighbourhoods; and Izmir Province, Selcuk District, Burgaz Neighbourhood. The license area is presented in Figure 2-2 the below.

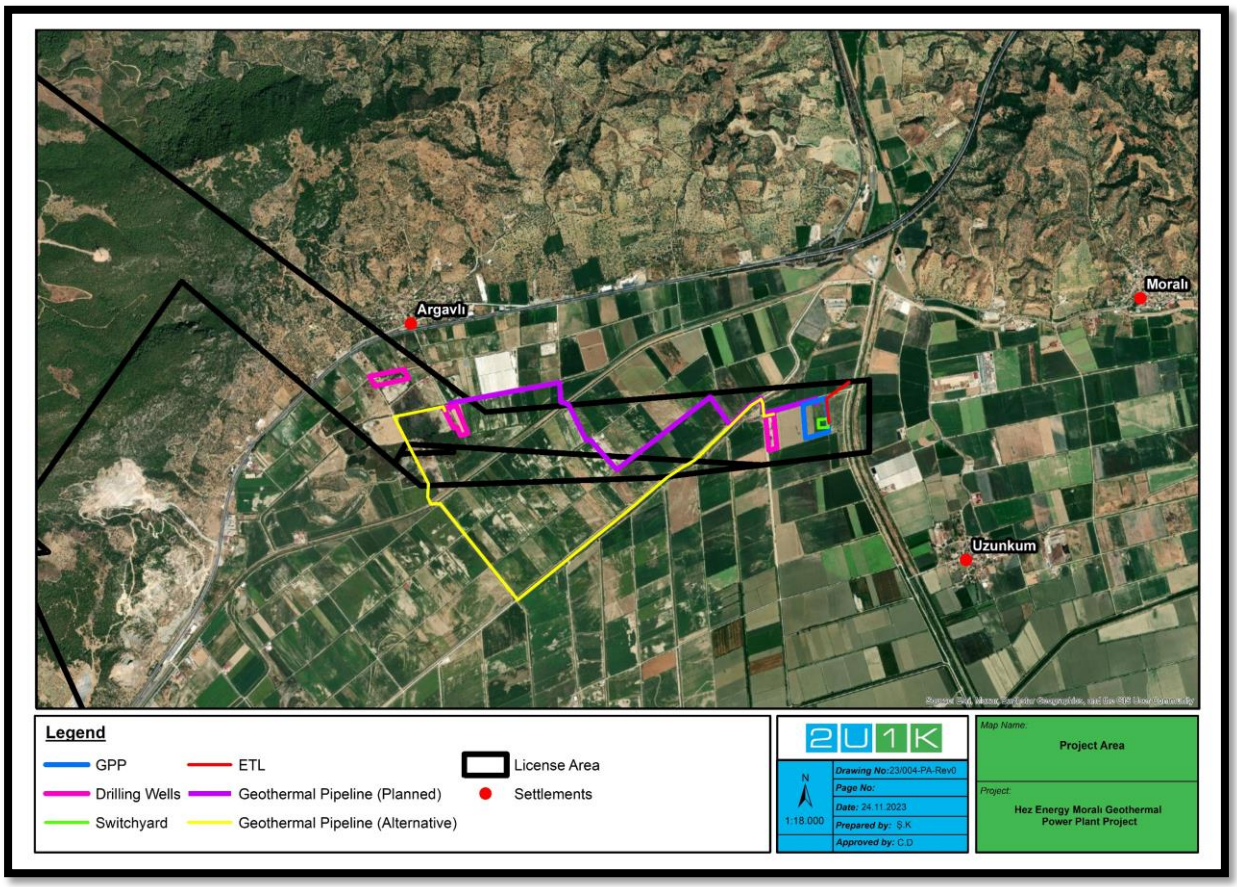


Figure 2-2. License Area

Within the scope of the planned project 12 deep boreholes (6 wells already drilled and completed) will be drilled. 8 of 12 wells will be production wells and 4 will be reinjection wells. The purpose of use will only be certain according to the information to be obtained after the drilling process is completed in the wells.

Greenhouse

Greenhouse activities are not within the scope of project finance. However, as these activities are planned to be realize by HEZ Energy these activities are considered to be associated facilities and hence, their potential impact are evaluated in the ESIA study.

Greenhouse-under EIA-3 area (Greenhouse-3)

Greenhouse-under EIA-3 area is planned to be constructed within the 145 block and 1, 2, 3, 4, 5 and 6 parcels of the Argavli neighbourhood of Söke District of Aydın Province. Area of Greenhouse-2 is 2.4713 ha and there will be greenhouse, irrigation water tanks and pumps and control center within this area.

Greenhouse-under EIA-2 area (Greenhouse-2)

Greenhouse-under EIA-2 area is planned to be constructed within the 139 block and 1 parcel of the Argavli neighbourhood of Söke District of Aydın Province. Area of Greenhouse-2 is 3.8365 ha and there will be greenhouse, irrigation water tanks and pumps and control center within this area.

Generation pre-license numbered ÖN/10891-3/05146 valid until September 30, 2024 was secured from EPDK on March 31, 2022 for 24 Mwe geothermal energy production.

2009-138 numbered operation license was secured in April 12, 2013 for a period of 30 years from the Aydın Province, Investment Monitoring and Coordination Department, Natural Resources License and Cultural Assets Directorate. The geothermal license area covers an area of 4083.78 hectares.

The chronological history of the works and transactions carried out within the scope of the investment subject to the project is given below:

- In 2011, the operation license was belonged to Koz Yer Altı Yer Üstü Kaynakları Elektrik Enerji Mak. İnş.Tur. San. Ve Tic. A.Ş. (previous owner company of the operation license).
- Along with the geothermal energy potential of the field, geological studies, previous geophysical and hydrochemical studies were carried out on different dates by different experts for the evaluation of the field and the determination of its potential thermal power. In 2011, Vertical Electric Drilling measurements were made at 25 different points with the Schlumberger system.
- In 2013, measurements were made at 15 points using the Magnetotellurics method.
- In 2013, previous owner company received an exemption opinion for the ARG-1 well and greenhouse project within the scope of the EIA Regulation (See Appendix C: The letter dated 10.07.2013, Aydın Provincial Directorate of Environment, Urbanization and Climate Change)
    - ARG-1 well was drilled at a depth of 1100 m in 139 block 1 parcel of Argavlı neighbourhood (Söke district) and the temperature of geothermal fluid at the bottom of the well was determined as static 89.97°C, but sufficient flowrate of geothermal fluid could not be obtained from the well.
- In 2016, the aforementioned license was transferred to HEZ Energy.

- In 2016, EIA Not Required decision was secured for 2 deep drillings within the scope of EIA Regulation (See Appendix D: EIA Not Required Decision dated 05.04.2016 and numbered E-2016296 of the Aydın Provincial Directorate of Environment, Urbanization and Climate Change). Location of drillings are 228 block, 1 parcel of Moralı Neighbourhood and 145 block 7 parcel of Argavlı Neighbourhood.
- In 2017, magnetotellurics measurements were made at 114 points.
- In 2018, an exemption was obtained within the scope of the EIA Regulation for additional 6 wells (HEZ 1-2-3-4-5-6) (See Appendix E).
- In 2018, HEZ-3 well was drilled (3555 m; 200 tons/h (55.6 l/s),140ºC).
- In 2021, HEZ Energy has planned the Extraction and Utilization of Geothermal Resource in the Field with License Number 2009-138 (12 Wells; 24 Mwe GPP; 5 Ha Geothermal Greenhouse) and Auxiliary Energy Resource SPP (999 kWe) Integrated Project.

2.3 Project Details and Process Overview

2.3.1 Drilling of Geothermal Wells

The exploration and reservoir evaluation activities include geological, geophysical, and drilling surveys for exploratory drilling and reservoir testing.

Production field development involves drilling steam or hot water production wells and reinjection wells and processing of the reservoir output for use in the power plant. Drilling will continue throughout the life of the project, as production and injection wells need to be periodically updated to support power generation requirements (IFC EHS Guidelines Geothermal Power Generation, 2007).

By evaluating different studies from past to present, the following conclusion has been reached in summary:

- As a result of deep drilling in the license area, the expected temperature from the reservoir is 130°C-175°C; expected gas content 0.2~1.2%; the expected flow from the wells will be 200ton/h (55.6 l/sec) at 140ºC.
- Considering the physical and chemical composition of the fluid reached, the geothermal potential in this area can be used for electricity generation, greenhouse, mushroom growing, balneological baths, soil heating, swimming pools, fermentation and distillation purposes. For this field, the power that can be obtained from the heat energy stored in the geothermal system has been calculated by the stored heat method.

Accordingly, the potential thermal power (electricity) of the site is 8.51E+07 kJ/h and is 24 Mwe with a 1.5% recovery factor. Based on the principle of working 24 hours, 3 shifts a day throughout the year, 210,240,400 kWh/year (gross) electricity will be produced from the facility with an installed power of 24 Mwe, which can be established on site, with the acceptance of the power plant's annual working condition of 8760 hours.

There are 12 wells within the scope of Moralı GPP Project. 2 geothermal wells, named ARG-1 and HEZ-3 wells were opened in 2016. Drilling of 4 other wells was completed in 2023. Drilling works of 2 wells are on-going and there are 4 more wells which are planned and in the scope of this ESIA study. The current status of the wells are provided below in Table 2-3.

Table 2-3. Geothermal Wells Details

Name of Well	Location	Current Status	Type	Depth (m)	Temperature (°C)	Flowrate (lt/sec)
ARG-1	Argavlı Neighbourhood, Block 139, Parcel 1	Drilled (2016)	Geothermal Monitoring/ Production	1,100	89,97	-
ARG-2		Planned	Production	3,500	-	-
HEZ-1	Moralı Neighbourhood, Block 228, Parcel 1	Drilled (2021-2023)	Production	3,500	-	-
HEZ-2		Drilled (2021-2023)	Production	3,500	-	-
HEZ-3		Drilled (2016)	Production	3,555	140	55,60
HEZ-9		Drilled (2021-2023)	Production	3,500	-	-
HEZ-10		Drilled (2021-2023)	Production	3,500	-	-
HEZ-4	Argavlı Neighbourhood, Block 145, Parcel 7	Drilling ongoing	Production	3,500	-	-
HEZ-5		Drilling ongoing	Reinjection	3,500	-	-
HEZ-6		Planned	Reinjection	3,500	-	-
HEZ-7		Planned	Reinjection	3,500	-	-
HEZ-8		Planned	Reinjection	3,500	-	-

During the drilling works to be carried out and to progress telescopically, insulation will be made in order to protect the groundwater while passing the loose formation on the surface. In this way, the well will be insulated from the environment, preventing the entry of cold water from the environment and the mixing of hot water into the environment.

In the drillings planned to be the subject of this report, the equipment process will not be suspended and the cementing process with casing pipe and sulphate resistant cement will be carried out until the geothermal aquifer. During drilling, surface aquifer and semi-aquifer levels

will be passed up to 2,600 meters with closed equipment. For the control of the well, wellhead control equipment will be installed at the upper level of the well.

An area will be created for mud management pools (clean water, circulation pond)test water pool, prefabricated offices (container), drilling platform area and equipment to be used within the scope of each borehole.

Since the floor of the area where the drilling rig will be placed will be concreted with cement resistant to chemicals and fluid temperature, the interaction of the wastes with the soil and groundwater will be cut off. During the drilling process, a fluid called drilling mud is pumped into the well and used to circulate and bring rock cuttings to the surface. This drilling mud may vary where different rock layers are encountered due to their varying properties.

In traditional methods, the drilling mud that needs to be disposed of, along with the materials from the wellbore, is usually discharged into a waste pit commonly known as a “mud pit.” Subsequently, these materials are disposed of using various methods, including vacuum trucks.

In the “dry location” approach which will be used by Project, typically applied in arid conditions, wet materials and drilling mud are directed into partially enclosed waste tanks equipped with advanced decanters and screening systems. The “dry location” method involves using specialized equipment to separate chemicals in the mud, allowing the liquid portion to be directed into separate tanks while allowing the recirculation of the retained water within the drilling system. Also, remaining mud will be disposed by Batı Söke Çimento through a transfer agreement.

If the geothermal source is reached after the drilling process is completed, well completion tests will be carried out. Within the scope of well completion tests, tests such as static temperature, pressure profile, water loss test, injectivity test, pressure drop test and production test will be applied. The water and steam mixture that will be released during the test will be transferred to the impermeable safety pools (test water pool) and, if necessary, to the sludge management pools to be drained, which will be sealed with a chemical-resistant concrete wall (or using the same impermeable geomembrane).

Test waters will be collected in completely impermeable areas (or in concrete-walled pits with geomembrane sealing and surface water ingress prevented, and in additionally drained sludge pools). There will be no discharge to the receiving environment. The disposal of the test waters that will arise from the geothermal drilling activities will be provided by re-injection.

2.3.2 Moralı Geothermal Power Plant (GPP)

The Organic Rankine Cycle (ORC) technology is selected to be utilized in the plant. Organic Rankine Cycle (ORC) is a type of binary system used for geothermal power generation. In a binary system, a secondary fluid with a lower boiling point than water is used to generate electricity from the geothermal heat source. The ORC system is called “organic” because the working fluid is typically an organic compound, such as refrigerants or hydrocarbons. The units to be installed in the GPP ORC system are preheater, evaporator, expander, condenser recuperator. ORC is a process used to generate electricity from low-temperature geothermal resources. The working principle of an ORC system can be summarized as follows:

- Preheater: The geothermal fluid is pumped through a heat exchanger called a preheater, where it transfers heat to a working fluid with a lower boiling point.
- Evaporator: The preheated working fluid is pumped into an evaporator, where it is heated to its boiling point by the geothermal fluid, causing it to vaporize.
- Expander: The vaporized working fluid is directed to an expander, which drives a turbine to generate electricity.
- Condenser: The exhaust vapor from the turbine is condensed back into a liquid by a cooling system, called a condenser.
- Recuperator: The cooled working fluid is then directed to a recuperator, where it transfers heat to the incoming working fluid before returning to the preheater to start the cycle again.

In summary, the ORC system works by using the natural heat of the geothermal fluid to vaporize a working fluid with a low boiling point, which then drives a turbine to generate electricity. The condensed working fluid is then cooled and recycled back into the system to start the cycle again.

In this way, the geothermal fluid remains in a closed system cycle (re-injection from the reservoir) without harmful emissions to the atmosphere and without passing through the turbine. In these systems, completely closed loop and zero gas emission can be achieved.

In order to avoid extensive water, use and prevent wastewater generation, an air-cooled condenser is employed. In this way, with the use of an air-cooled condenser, water resources are not consumed, no emissions are generated, no hot water discharge is made into the creek. Furthermore, dry cooling systems require very low maintenance.

The Process and ORC flow charts are presented in Figure 2-3 and Figure 2-4 respectively.

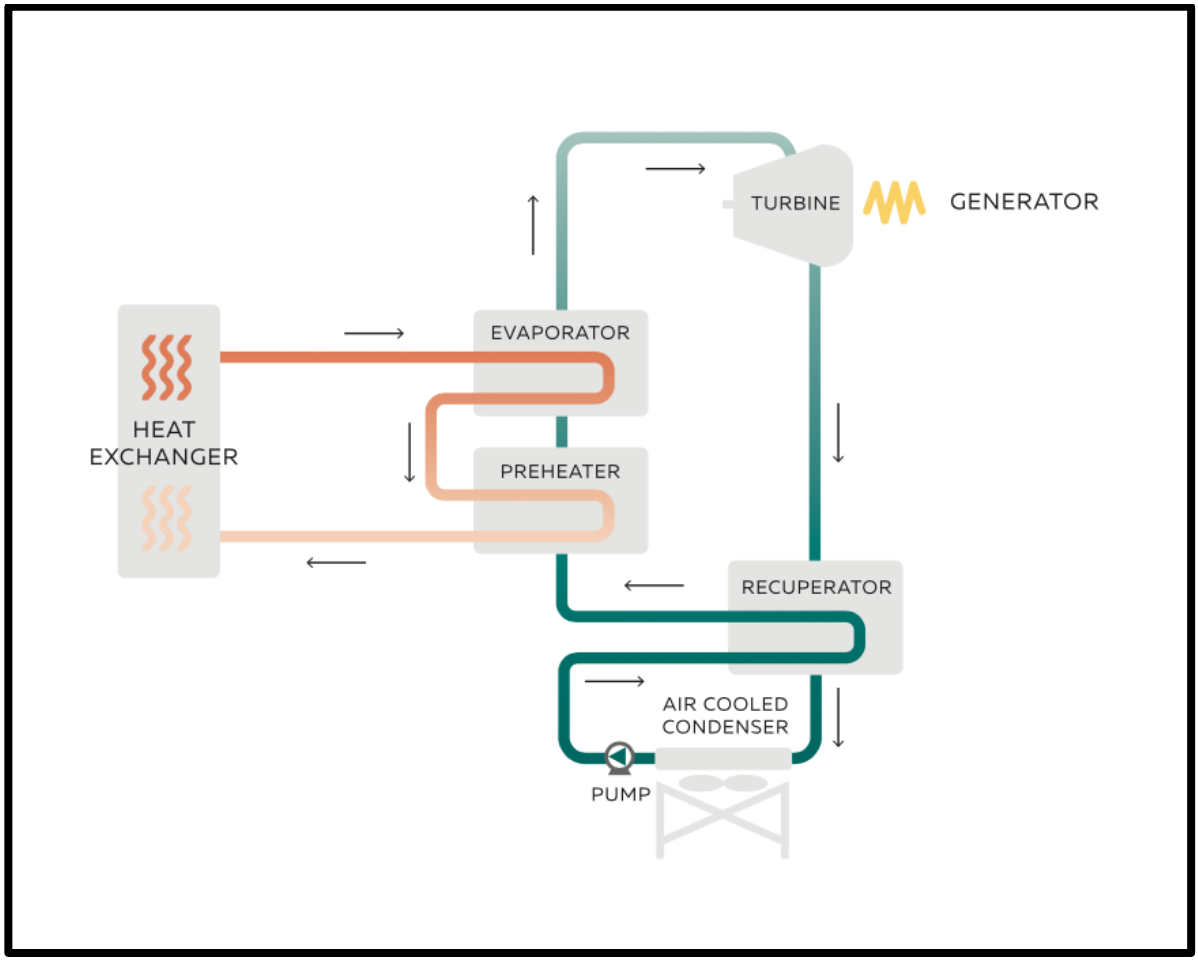
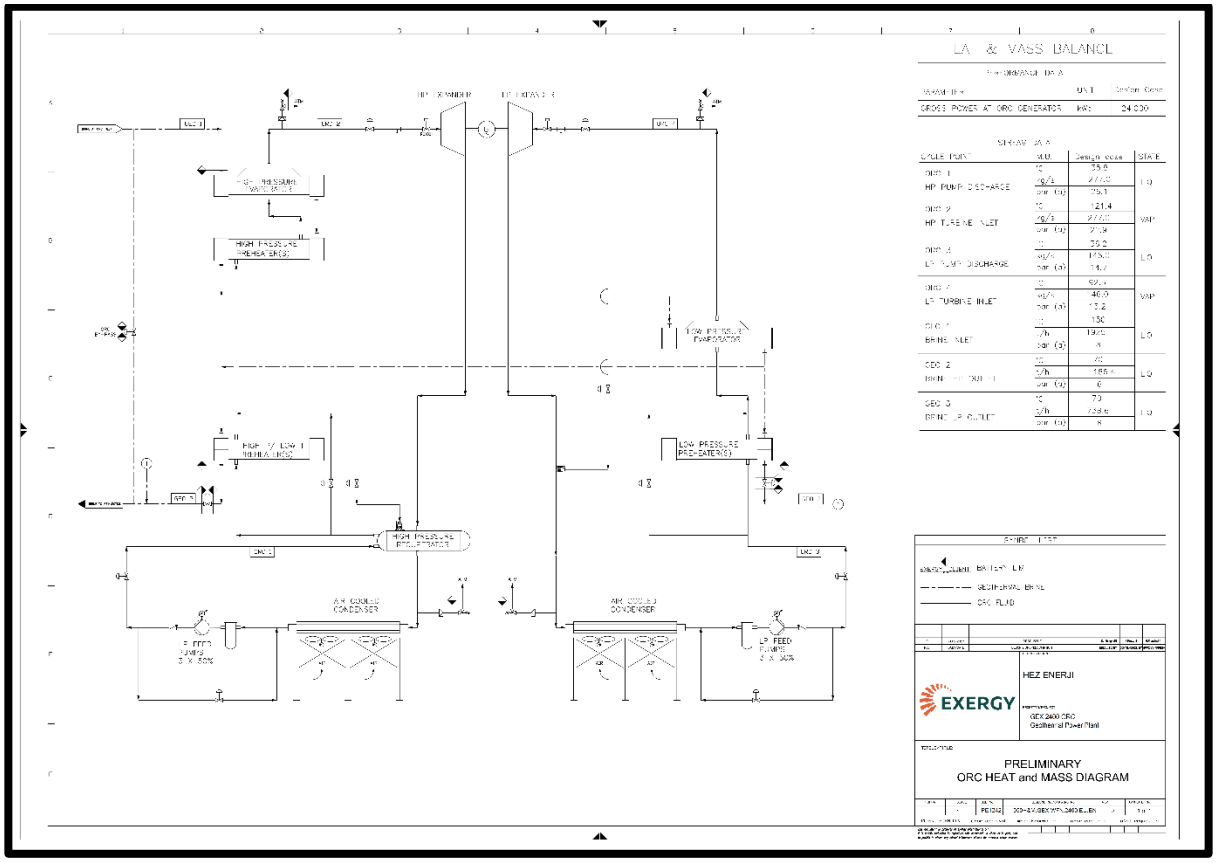


Figure 2-3. Process Flow Chart **(Exergy, 2023)**



Source: (HEZ Energy)

Figure 2-4. ORC Flow Chart

Chemical Use

The main chemical will be used at the Project are hydrocarbons such as n-butane, n-pentane, iso-pentane, isobutane. These hydrocarbons are used as secondary fluids in binary cycles. The purpose of use of organic chemicals lowers the boiling point. Since the secondary fluids used have lower boiling temperatures compared to water, electricity generation from geothermal sources with low reservoir temperature is provided in this way.

The main chemicals used in ORC systems is the secondary fluid used for generation of electricity. This fluid, namely n-butane, is supplied from international sources and delivered on-site in special containers by means of trucks or trailers under special security measures. N-butane storage is not conducted on-site and is directly fed to the system, which is a closed-loop system where n-butane is continuously recirculated.

The geothermal fluid will be brought to the surface by applying LSP and ESP pump technologies from the reservoir. The aim here is to provide the management control and skill of the fluid brought to the surface as a single or double phase. Thanks to the selected pump

technologies, the pressure at the wellhead can be kept at the desired level. Thus, it is possible to participate in the cycle in a mixed state of 100% liquid

Other main hazardous materials required for Project activities are inhibitors that are used to prevent carbonate, sulphate, and silicon dioxide accumulating and creating a crust on inner walls of pipes, which if allowed may lead to leakages and failures in addition to decreased generation efficiency. The remaining hazardous materials such as oil/lubricants to be used in the equipment in the system are mainly associated with operation and maintenance.

2.3.3 Geothermal Pipeline

Geothermal fluid obtained from the production wells will be transported to the plant with pressure-resistant and heat-insulated geothermal pipelines. The Project Company has two alternative routes for the geothermal pipelines. First alternative goes through existing roads between private lands. Second alternative line will runs parallel to the DSI channel and predominantly traverses public lands, minimizing the impact on private properties. Geothermal pipeline alternatives are presented in

Figure 2-5.

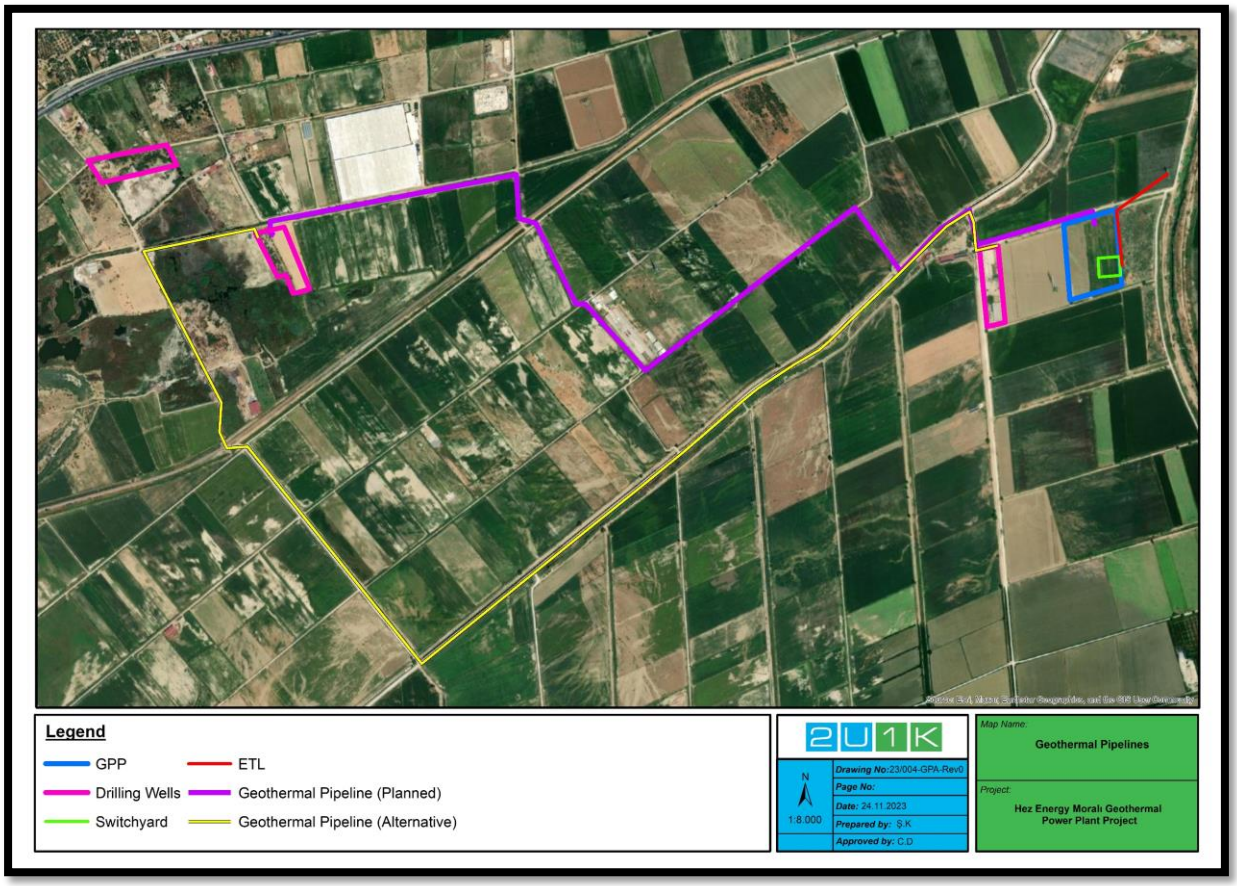


Figure 2-5. Geothermal Pipeline Alternatives

2.3.4 Associated Facilities

Electricity Transmission Line

Associated with the GPP Project, the Electricity Transmission Line (ETL) will be established following the approval of TEIAS. The power plant will be connected to the Kubilay GPP-Maren GPP Energy Transmission Line.

2.4 Permits and Management System of the Project Company

2.4.1 Management Systems of the Project Company

The Company plans to secure ISO (International Organization for Standardization) 14001:2015 (Environment Management System) certificate, ISO 9001:2015 (Quality Management System) certificate, and ISO 45001:2018 certificate.

In addition to these quality systems, a project specific ESIA Report and SEP will be developed for construction and operation phases of the Projects.

The ESIA will present the mitigation measures for the expected environmental and social impacts of the Projects. Accordingly, the ESIA will identify the need for the revisions and implementation of several management plans as part of the Management Systems of the Project Company. In this respect, company will revise its own Environmental and Operational Management System in line with the requirements stipulated in the ESIA.

2.4.2 Environmental Impact Assessment Decisions

The “Regulation on Environmental Impact Assessment (dated July 29, 2022; No: 31907)” defines the administrative and technical procedures and principles to be followed throughout the EIA process. According to the EIA Regulation of The Ministry of Environment, Urbanisation and Climate Change (MoEUCC), an EIA Report is compulsory for geothermal power plants. Therefore, Moralı GPP and Exploration Drilling Activities falls into Annex I of EIA Regulation and that required preparing Environmental Impact Assessment Report (EIA Report). The Environmental Impact Assessment (EIA) Report of the Project was prepared by Çevtaş Araştırma Teknoloji Madencilik Mühendislik Müşavirlik Peyzaj Eğitim Danışmanlık Taahhüt Tic. Ltd. Şti. And was finalized on August 31, 2022. As a result, EIA Positive Decision was secured on September 14, 2022.

EIA Regulation related decisions list for the Projects are given in Table 2-4 below:

Table 2-4. EIA Decisions Related to the Project

Project Name/Issue	Date (Number)	Details
Moralı Geothermal Power Plant (24 Mwe)	September 14, 2022 (6819)	EIA Positive Decision
Greenhouse-2		
HEZ 8		
HEZ 10		
ARG-2		
ARG-1 – already drilled (Argavlı Neighbourhood, Block 139, Parcel 1)	10.07.2013	Out of Scope Aydın Provincial Directorate of Environment, Urbanization and Climate Change
HEZ-3 – already drilled (Moralı Neighbourhood, Block 228, Parcel 1)	05.04.2016 (E-2016296)	EIA Not Necessary Decision Aydın Provincial Directorate of Environment, Urbanization and Climate Change
HEZ-4 (Argavlı Neighbourhood, Block 145, Parcel 7)		
HEZ 1-2-9	03.05.2018	Out of Scope Aydın Provincial Directorate of Environment, Urbanization and Climate Change
HEZ 5-6-7		

2.4.3 Permits

In addition to the EIA decisions, further permits via the opinions of the relevant official authority will be secured specifically for the Project.

Building Construction Permit

According to Construction Law, a Building Construction Permit will be obtained prior to the construction of non-industrial structures associated with the projects. A permit that is allowing the construction of the facility is issued based on an engineering review of the plans for structures such as an administration building. This permit is required for construction of administrative and social buildings of industrial facilities.

Construction permit should be secured prior to construction of administrative and social buildings etc.

Environmental Permit

According to Article 5 of the Environmental Permits and Licenses Regulation, projects listed in Annex I and II should secure “Environmental Permit or Environmental Permit and License”.

The projects that are listed in Annex I should apply to the MoEUCC and the projects listed in Annex II should apply to PDoEUCC.

The Project is included in the Annex II of the Environmental Permits and Licenses Regulation. Therefore, environmental permit and license should be secured for operation period of the Projects.

As a result of the measurements carried out during the EIA studies in the project area, H2S (Hydrogen Sulphide) (100 µg/m3 (1-hour limit value); 20 µg/m3 (short-term limit value) 150 µg/m3 within the scope of the Industrial Air Pollution Control Regulation (IAPCR) WHO Ambient Air Quality Guide Values). (24-hour limit value), PM10 (Particulate matter smaller than 10 micrometer in size) (50 µg/m3 (24-hour limit value);40 µg/m3 (annual limit value),3 mg/Nm3 (facilities located here) filling, separation, screening, transportation, crushing, grinding operations are carried out), SO2 (60 µg/m3 (long-term limit value), 40 µg/m3 (24-hour limit value)) does not exceed the limit values.

.Additionally, the noise emission calculations for the operational phase indicate that the noise emission at the nearest residential unit to the project site will be 68.74 dBA at a distance of 55 m and 65.92 dBA at a distance of 75 m. It is expected that the limit value of 68 dB for daytime specified in the Environmental Noise Management Regulation will not be exceeded during operation phase of the Project since the closest sensitive receptor is at a distance of more than 75 m. The measures to be taken in case of exceeding the noise limit are specified in 7.2.**Building Usage Permit**

According to Construction Law, it is compulsory to get a building use permit to use the building after the completion of the construction. The permitting authority will determine whether the building has been constructed in accordance with the approved project and scientifically there is no problem to use the building. Upon completion of the construction, the permitting authority, generally the municipality determines whether the buildings have been constructed according to the codes and standards stated in the Building Construction Permit. After the inspection of the structures, the permitting authority issues a Building Use Permit.

Building Usage Permit should be secured for operation period of the Projects.

Production License

As a generation pre-license numbered ÖN/10891-3/05146 valid until September 30, 2024 was secured from EPDK on March 31, 2022 for 24 Mwe geothermal energy production.

Operations Permit

The facilities which have completed their construction should secure an Operations Permit in order to operate. Operations Permit is issued in case the facility has secured an EIA Positive Decision or EIA is not Required Decision and other related documents required for the permit.

Operations Permit is issued in case the facility is found to be appropriate in accordance with the Regulation Related to Workplace Opening and Operation Permits.

Operations permit for the Projects should be secured for operation period of the Projects.

Operations License

2009-138 numbered operation license was secured on April 12, 2013 for a period of 30 years from the Aydın Province, Investment Monitoring and Coordination Department, Natural Resources License and Cultural Assets Directorate. The geothermal license area covers an area of 4083.78 hectares.

2.5 Project Schedule

Work within the scope of the project continues according to the project schedule. Project schedule is provided below in Table 2-5.

Table 2-5. Project Schedule

NO	YEAR	2021	2022				2023				2024			
	MONTHS (Q1: January, February, March- Q2: April, May, June- Q3: July, August, September- Q4: October, November, December)	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.	**ASSOCIATE DEGREE PROCESS**													
1,1	Associate Degree Process and Modification Procedures													
1,2	TEIAS (Turkish Electricity Transmission Corporation) Connection Review and Signing of Connection Agreement													
2.	**EIA (Environmental Impact Assessment) PROCESS**													
2,1	Issuance of Public Interest Decision													
2,2	Preparation of Soil Protection File													
2,3	Completion of the Process													
3.	**DETERMINATION AND PROCUREMENT PROCESS OF POWER PLANT SITE**													
4.	**PREPARATION OF THE POWER PLANT SITE FOR THE PROJECT**													
4,1	Conducting Soil Surveys and Reporting													
5.	**SELECTION AND PROCUREMENT PROCESS FOR THE POWER PLANT COMPANY**													
5,1	Preliminary Discussions													
5,2	Evaluation of Bids													
5,3	Negotiation and Completion of Procurement													
6.	**SELECTION OF CONSULTING COMPANY**													
7.	**ESP (Electric Submersible Pump) PROCUREMENT PROCESS**													
7,1	Preliminary Discussions with Companies													
7,2	Evaluation of Bids													
7,3	Completion of Procurement Process													
7,4	Delivery of Pumps and Drivers													
8.	**ARTESIAN WELL TEST PROCESS**													
8,1	Procurement of Mechanical Installation Materials													
8,2	Manufacturing of Above-Ground Production Lines for Wells													

NO	YEAR	2021	2022				2023				2024			
	MONTHS (Q1: January, February, March- Q2: April, May, June- Q3: July, August, September- Q4: October, November, December)	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
8,3	Conducting Production and Inflow Tests													
8,4	Preparation of Test Report													
9.	**ESP WITH WELL TEST PROCESS**													
9,1	Capacity Expansion of Transformers													
9,2	Installation of Transformers and Drivers													
9,3	Initial Pump Descent Process													
9,4	Well Flow Test													
9,5	Preparation of Well Test Report													
9,6	Completion of ESP (Electric Submersible Pump) Output and Storage with Maintenance Process													
10.	**SELECTION OF PROJECT COMPANY AND DESIGN**													
10,1	Preliminary Discussions													
10,2	Evaluation of Bids													
10,3	Final Decision													
10,4	Preparation of Construction Projects													
10,5	Preparation of Mechanical Projects and Material Lists													
10,6	Preparation of Electrical Projects and Material Lists													
11.	**DELIVERY OF POWER PLANT BASIC DESIGN AND MATERIALS**													
11,1	Delivery of Basic Design Projects													
11,2	Delivery of ACC (Air Cooled Condenser) Materials													
11,3	Delivery of Pipes Prepared as Spools													
11,4	Delivery of Hex Materials													
11,5	Delivery of Electrical Panels													
11,6	Delivery of Turbine, Generator, and Pump Groups													
	Delivery of Automation Panels													
11,7	Delivery of Valve Groups and Measurement Instruments													

NO	YEAR	2021			2022												2023												2024							
	MONTHS (Q1: January, February, March- Q2: April, May, June- Q3: July, August, September- Q4: October, November, December)	Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
12.	**MECHANICAL PROCUREMENT PROCESSES**																																			
12,1	Procurement and Delivery Processes of Pump Groups																																			
12,2	Procurement and Delivery Processes of Fittings Groups																																			
12,3	Procurement and Delivery Processes of Pipe Groups																																			
12,4	Pre-Insulation of Re-injection Pipes																																			
12,5	Procurement Processes for Manual Valve Groups																																			
12,6	Procurement Processes for Control Valve Groups																																			
12,7	Procurement Processes for Instrumentation Groups																																			
12,8	Procurement Processes for Pressurized and Non-pressurized Tank Groups																																			
12,9	Procurement and Supply Process for Fire Groups																																			
12,10	Procurement Process for Compressor Room Equipment																																			
13.	**ELECTRICAL PROCUREMENT PROCESSES**																																			
13,1	Procurement Processes for Transformer Groups																																			
13,2	Procurement Processes for Cable Groups																																			
13,3	Procurement Processes for Driver Groups																																			
13,4	Procurement Processes for Generator Groups																																			
13,5	UPS (Uninterruptible Power Supply) Procurement Processes																																			
13,6	Procurement Processes for Grounding Groups																																			
14.	**AGREEMENT WITH CONSTRUCTION CONTRACTOR AND CONSTRUCTION PROCESS**																																			
14,1	Gathering Proposals for Construction Projects																																			
14,2	Evaluation of Proposals and Selection of the Contractor																																			
14,3	Mobilization and Construction Site Setup																																			
14,4	Filling, Leveling, and Soil Improvement																																			
14,5	Construction of Environmental Security Wall																																			
14,6	Preparation of ORC ACC Group Foundations																																			

NO	YEAR	2021	2022				2023				2024			
	MONTHS (Q1: January, February, March- Q2: April, May, June- Q3: July, August, September- Q4: October, November, December)	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
14,7	Preparation of ORC Power Block Foundations													
14,8	Manufacturing of Emergency Discharge Pool													
14,9	Construction of Fire Pump Station Foundation and Hydrant Lines													
14,10	Construction of Administrative Buildings and Electrical Panel Rooms													
14,11	Construction of Workshops and Warehouses													
14,12	Construction of Foundations in Well Regions													
14,13	Landscaping and Fence Installation													
14,14	Repair of Affected Areas													
15.	**AGREEMENT WITH MECHANICAL CONTRACTOR**													
15,1	Gathering Proposals for Mechanical Projects													
15,2	Evaluation of Proposals and Selection of the Contractor													
15,3	Mobilization and Construction Site Setup													
15,4	ORC Installation Process													
15,5	Production Pipe Line Installation Process													
15,6	Re-injection Pipe Line Installation Process													
15,7	Re-injection Pump Station Installation Process													
15,8	Wellhead Installation Process													
15,9	Compressor Room and Air Line Installation Process													
15,10	Fire Suppression System Installation													
15,11	Instrument Installations													
15,12	Insulation Works													
15,13	Testing and Commissioning													
16.	**AGREEMENT WITH ELECTRICAL CONTRACTOR**													
16,1	Gathering Proposals for Electrical Projects													
16,2	Evaluation of Proposals and Selection of the Contractor													

NO	YEAR	2021	2022				2023				2024			
	MONTHS (Q1: January, February, March- Q2: April, May, June- Q3: July, August, September- Q4: October, November, December)	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
16,3	Mobilization and Construction Site Setup													
16,4	ACC (Air Cooled Condenser) AG and Instrumentation Cabling													
16,5	Installation of AG-OG (Above Ground – Overhead Ground) Electrical Cables in Well Regions													
16,6	Installation of Electrical and Instrumentation Cables in Well Regions													
16,7	Transformer Installations													
16,8	Installation of Electrical Panels and Circuit Breakers													
16,9	Installation of ORC AG-OG and Instrumentation Cables													
16,10	Installation of Fire Detection and Suppression System Cabling													
16,11	Installation of ORC Automation Panels													
16,12	Testing and Commissioning													
17.	**DRILLING PROCESS**													
17,1	Discussions with Drilling Companies													
17,2	Gathering of Bids													
17,3	Agreement													
17,4	Opening Process of 1st Region Wells													
17,5	Opening Process of 2nd Region Wells													
18.	**SUBSTATION FACILITY CONSTRUCTION PROCESS**													
18,1	Gathering Proposals for Electrical Projects													
18,2	Evaluation of Proposals and Selection of the Contractor													
18,3	Presentation of the Project to TEIAS (Turkish Electricity Transmission Corporation) and Approval of the Project													
18,4	Mobilization and Construction Site Setup													
18,5	Conducting Soil Surveys and Site Preparation													
18,6	Construction of Substation Foundations and Buildings													
18,7	Installation of Switchgear													

NO	YEAR	2021			2022												2023												2024											
	MONTHS (Q1: January, February, March- Q2: April, May, June- Q3: July, August, September- Q4: October, November, December)	Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
18,8	Installation of Transformers																																						
18,9	Installation of Transmission Lines																																						
18,10	Cabling and Equipment Installations																																						
18,11	Testing and Commissioning																																						
18,12	AYDEM (Aydın Electricity Distribution Company) TEIAS Acceptance Process																																						
19.	**OTHER PROCESSES**																																						
19,1	Completion of EPDK (Energy Market Regulatory Authority) Processes																																						
19,2	Completion of TEIAS Processes																																						
19,3	Completion of Urban Planning Processes through the Ministry																																						
19,4	Completion of Pipeline Permit Processes																																						
19,5	Completion of AYDEM (Aydın Electricity Distribution Company) Processes																																						
20.	**RESERVOIR PROCESSES**																																						
20,1	Purchase of Inhibitor Dosing Systems																																						
20,2	Manufacturing Process of Inhibitor Dosing Systems																																						
20,3	Construction of Inhibitor Preparation System																																						
20,4	Purchase of Reverse Osmosis (RO) System																																						
20,5	ESP (Electric Submersible Pump) Installations and Commissioning																																						
20,6	Installation of Inhibitor Systems																																						
21.	**TEMPORARY ACCEPTANCE AND COMMISSIONING**																																						
21,1	Conducting ORC (Organic Rankine Cycle) Pressure and Vacuum Tests																																						
21,2	Testing of BOP (Blowout Preventer) Pipelines and Wellheads																																						
21,3	Initial Startup and Commissioning of Pipelines																																						
21,4	Initial Startup and Commissioning of ORC Systems																																						

NO	YEAR	2021	2022				2023				2024			
	MONTHS (Q1: January, February, March- Q2: April, May, June- Q3: July, August, September- Q4: October, November, December)	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
21,5	Ministry Approval													
22.	**COMMERCIAL PRODUCTION AND OPERATION PROCESS**													
22,1	Employment of Operations Personnel													
22,2	Training of Operations Personnel													
22,3	Commercial Production													

3 IDENTIFICATION OF ALTERNATIVES

This section summarizes the alternatives to and in the Project and briefly explains why the current features are selected according to EIA Report.

3.1 No-Project Alternative

This is the scenario where the Project will not be realized. Not to carry out the project; the disposal of the geothermal resource, which completes its cycle in the geothermal power plant and leaves at low temperature, is directly reinjected into the reservoir, in other words, removing the greenhouse from the scope of the project have been considered as 'no project' alternatives.

3.2 Technology Alternative

Drilling Studies

According to EIA Report, drilling equipment technology using rotary impact drilling (combined) technique was chosen as the planned exploration technology. Drilling types can be classified according to the depth, the diameter of the well, the location and purpose of the drilling, and the technology used. The drilling, which is planned to be carried out in selected locations, is a type of drilling based on large-scale deep geothermal resource exploration and combined (rotary impact) drilling technique will be used. Two basic methods are generally used in exploration drilling. These are percussive and rotary drilling. Combined (pulsed rotary) drilling technique will be used in the exploration drillings that are the subject of the project. PCD (diamond-tipped) and three-cone rotary drills are used.

GPP Project

There are different cycle types in which the heat energy of the geothermal resource, which will be circulated in a completely closed system for the purpose of generating electricity from the reservoir reached by the drilling technology selected within the scope of the project, will first be converted into mechanical energy and then electrical energy. The suitability of cycle technologies varies according to the characteristics of the fluid and the management principle. The technology chosen in the planned project was "Binary Cycle". Although water-cooled systems are more efficient during the operation phase, air-cooled systems were preferred in order not to create pressure on water resources and not to cause intense steam emissions.

Greenhouse

In Türkiye, greenhouse cultivation includes production in greenhouse and plastic tunnels. Modern greenhouse cultivation is carried out in the vast majority of new facilities. The aim of innovative technologies in greenhouse is to increase the "Life Cycle Quality".

The purpose of sustainable greenhouse systems should be a system that protects resources, socially supported, commercial, competitive, environmentally friendly, has reliable production technology, reduces the need for energy, water and chemical pesticides, and does not produce waste as much as possible.

To this end:

- Effective management of solar radiation, air temperature, humidity and CO_2 concentration in the greenhouse in order to create a suitable production environment for plants and save energy,
- Increasing energy efficiency and using renewable energy sources instead of fossil energy sources,
- The use of cover material produced with new technologies in greenhouse and degradable after use,
- Ensuring the optimization of water and plant nutrients in the greenhouse,
- Control plant diseases in greenhouse with less agricultural chemicals is recommended.

In individual geothermal greenhouse facilities, the fluid that loses its heat in the greenhouse heating pipes is sent to the in-hole heat exchanger to be reheated, and the system circulates continuously in this way, ensuring the heating of the facility. In addition, with this system placed in the well, the in-hole heat exchanger is deactivated, making it possible to bring the geothermal fluid to the surface in the same closed system and use it for greenhouse heating, and to reinject it into the same well from the surface. One of the advantages of the planned investment being an integrated project is that the fluid that enters the cycle for electricity generation and leaves the cycle at the end with low temperature will be passed through the greenhouse heating systems along the reinjection line, making the system sustainable and there will be no need for heat exchanger and accumulator applications.

Along with these, as stated in the Final Report of the Best Practices Guide of the Ministry of Environment, Urbanization and Climate Change within the scope of the Cumulative Impact Assessment of Geothermal Resources in Türkiye Project, in case of using geothermal resources instead of traditional energy in greenhouse cultivation, approximately 80% of the fuel costs and 5-8% of the total operating costs. Is calculated to decrease.

3.3 Project Area Alternatives

It is known that the high geothermal resource potential in the region where the project subject investment is planned will be effective in increasing the geothermal energy capacity of the country. The investor company has the Geothermal Resources Operating License numbered 2009-138 pursuant to the Geothermal Resources and Natural Mineral Waters Law No. 5686. The planned activities must be within the license area. Geothermal resource licenses represent

a project-based permit in order to carry out resource exploration or operation activities in a defined area. As can be understood from this, a geothermal reserve has been identified as a result of the activities carried out during the exploration period in order to find geothermal resources, geothermal-origin gas and natural mineral water that can be economically operated.

For the purpose of site selection, various surveys and research studies have been carried out within the license area and other license areas in the region from past to present, and information has been obtained from the areas that have been put into operation. Elements of the geothermal system, which can be listed as the determination of the feeding area, reservoir, cover rock, heater rock and source outlet area, were investigated. Geophysical studies have been carried out to extract the resistivity structure of the geothermal field in Aydın, which belongs to Hez Energy. Based on the measurements carried out in the license area, two-dimensional resistivity models were developed by evaluating the data obtained by different geophysical methods and the geothermal potential of the region was investigated. In order to determine the hydrogeochemical properties of the hot waters around the license area, the anion-cation concentration evaluations of the water samples previously taken from the region were used. License boundaries in the determination of well locations, the existence and locations of previously opened licenses, elements of the geothermal system, geological, tectonic, hydrogeological, hydrogeochemical, geophysical assessments, environmental precautions, criteria in the current legislation, distances to settlements, morphological quality, land quality, agricultural integrity played an important role. In addition to these studies in the field, remote sensing, satellite image processing and geographic information systems studies and evaluations were also effective during site selection.

The power plant site was selected to be in a strategic position relative to the production and reinjection wells and to shorten both the pipeline and the electricity transmission line, the ground structure, tectonics, hydrogeology, geophysical evaluations, environmental precautions, criteria in the current legislation, distances from the settlements. The morphological nature of the land was chosen by considering the characteristics of the land.

As for the location of the project, alternatives were evaluated not at the scale of the license area, but at the scale of the area where the exploration activity is carried out. For this reason, both environmental criteria and the feasibility of the investment were evaluated while creating project location alternatives for exploration activities.. These alternatives created were also included in the 3 EIA areas, the coordinates of which are given by being reflected in the EIA Application File and the Public Participation during national EIA Process. In this respect, alternative areas were created for exploration activities.. Project location alternatives were farther from protected areas and settlements, the Great Plain Conservation area, olive groves and forest areas rich in forest wealth, they are higher in topographic terms and have the same meteorological, hydrological and hydrogeological characteristics, any water surface, stream bed, does not remain in the floodplain.

4 LEGAL FRAMEWORK

The scope of ESIA and the examination of the compliance with the relevant legislation and standards covers the followings:

- The national legislation for Environment, Health, and Safety (EHS) subjects as well as employee rights (or worker rights or labourer rights),
- IFC Performance Standards (2012),
- IFC Environment, Health, and Safety Guides, and
- World Bank Safeguard Policies (Ops).

4.1 Overview of the National Requirements

4.1.1 National Environmental, Health and Safety (EHS) Legislation

"Environmental Law", which is ratified in August 1983 (amended with the Law dated May 29, 2013; No: 6486), is one of the principal legislations related to the Project. Several by-laws and decrees are enforced under Environmental Law.

The "Regulation on Environmental Impact Assessment (dated July 29,2022; No: 31907)" defines the administrative and technical procedures and principles to be followed throughout the EIA process.

These and the rest of the Project-relevant national environment, health, and safety legislation are given in Table 4-1.

Table 4-1. Turkish EHS Legislation Related to the Project

Legislation	Official Gazette Date	Official Gazette Issue	Implications for the Project Stages
Waste Management Regulation	02.04.2015	29314	• Disposal of wastes generated by construction staff during the construction stage and by operation staff during the operation stage. • Hazardous wastes generated at construction and operation stages
Water Pollution Control Regulation	31.12.2004	25687	• Discharge of wastewater generated by site staff at construction stage and by operation staff during the operation stage
Regulation on Landfill of Wastes	26.03.2010	27533	• Disposal of drilling mud generated
Waste Oil Management Regulation	21.12.2019	30985	• Waste oils generated at construction and operation stages
Waste Vegetable Oil Control Regulation	06.06.2015	29378	• Waste vegetable oils generated at construction and operation stages

Legislation	Official Gazette Date	Official Gazette Issue	Implications for the Project Stages
Packaging Waste Control Regulation	26.06.2021	31523	• Packaging wastes generated at construction and operation stages
Medical Waste Control Regulation	25.01.2017	29959	• Medical wastes generated at construction and operation stages
Regulation on the Control of End-of-life Tires	25.11.2006	26357	• End-of-life tires generated at construction and operation stages
Regulation on the Control of Waste Batteries and Accumulators	31.08.2004	25569	• Waste batteries and accumulators generated at the construction and operation stages
Zero Waste Regulation	12.07.2019	*30829*	• Establishment, development, monitoring, recording and documentation of the zero-waste management system
Regulation on the Construction of Septic Tanks at Places Where Sewer Construction is Not Feasible	19.03.1971	25569	• Septic tanks for the collection of domestic wastewaters generated at construction and operation stages
Regulation on the Noise Emission in the Environment from Equipment for Outdoor Use	30.12.2006	26392	• Noise levels caused by noise sources within the Project site at the construction and operation stages
Industrial Air Pollution Control Regulation	03.07.2009	27277	• Dust emissions at the construction stage and H_2S emissions at the operation stage
Regulation on Assessment and Management of Air Quality	06.06.2008	26898	• Emissions originating from the Facility during the operation stage
Regulation on the Control of Odorous Emissions	19.07.2013	28712	• Odorous emissions generated during the operation stage
Regulation on Assessment and Management of Environmental Noise	31.11.2022	32029	• Noise emissions at construction and operation stages
Regulation on Soil Pollution Control and Point Source Polluted Areas	08.06.2010	27605	• Risks of soil contamination at construction and operation stages
Regulation on the Control of Excavation Soil, Construction and Debris Wastes	18.03.2004	25406	• Transportation and disposal of excavation waste and construction debris at the construction stage
Law on Occupational Health and Safety (6331)	20.06.2012	28339	• Health and safety measures to be taken during construction and operation stages

Legislation	Official Gazette Date	Official Gazette Issue	Implications for the Project Stages
Türkiye Building Earthquake Regulation	18.03.2018	30364	• Construction works within the scope of the Project
Civil Law	08.12.2001	24607	• Real property rights and restrictions are defined under relevant section. The provisions of the Civil Law will be considered and met in all phases of the Project.
Law On the Right to Information	24.10.2003	25269	• The Law on the Right to Information states that the public has the right to receive information and complain about the progress and implementation of projects.
Law On the Use Of Right To Petition	01.11.1984	3071	• Turkish citizens have the right to apply in writing to the Turkish Grand National Assembly and the associated authorities with regard to the requests and complaints concerning themselves or the public according to Article 3 of said Law.
Geothermal Resources and Natural Mineral Waters Law	03.06.2007	5686	• Effective exploration, research and development of geothermal and natural mineral water resources during the construction and operation phases.
Regulation on Amending the Application Regulation of The Law on Geothermal Resources and Natural Mineral Waters	30.05.2014	29015	• Effective exploration, research and development of geothermal and natural mineral water resources during the construction and operation phases.

4.1.2 National Legislation on Energy

Energy related national legislation is given in Table 4-2.

Table 4-2. Turkish Energy Legislation Related to the Project

Legislation	Official Gazette Date	Official Gazette Issue	Implications for the Project Stages
Electricity Market Law No. 6446 (as amended with the Law numbered 6639) and relevant regulations	30.03.2013	28603	Rights and responsibilities of the Project Company regarding electricity production and transmission Expropriation of private properties
The Law No. 5346 on the Use of Renewable Resources for the Generation of Electrical Energy (as amended with the Law numbered 6446) and relevant regulations	18.05.2005	25819	Procedures and principles of the conservation and utilization of renewable energy resource areas Certification of the energy generated from the utilization of these resources

4.1.3 National Legislation on Land Use

Receiving the required Land-use permits is an obligation for the Project Company. Project-related Turkish Legislation on Land-use is presented in Table 4-3.

Table 4-3. Project-related Turkish Legislation on Land-Use

Legislation	Official Gazette Date	Official Gazette Issue	Implications for the Project Stages
Law on Soil Conservation and Land Use No. 5403 (as amended with the Law numbered 6537) and relevant regulations	19.07.2005	25880	Permission(s) required for land use
Expropriation Law	08.11.1983	18215	The administration action of the expropriation process is done in line with said Law according to its purpose, authorisation, procedure, reason and subject of the action.

4.2 International Standards related to the Project

Since the TSKB is the lender, is the Projects will be in compliance with good international practices, including World Bank (WB) Safeguard Policies, EHS Guidelines, and best practices documents alongside the National EHS Legislation.

4.2.1 IFC Performance Standards (2012) and relevant EHS Guidelines

The IFC is an international financial institution, which offers investment, advisory, and asset management services to encourage private sector development in projects. It was established in 1956 as the private sector arm of the World Bank Group to advance economic development by investing in strictly for-profit and commercial projects, which reduce poverty and promote development. To provide a means of managing the social and environmental risks and impacts on projects, the IFC have developed their Performance Standards on Social and Environmental Sustainability (IFC, 2012). The Performance Standards are designed to help avoid, mitigate, and manage risks and impacts as a means of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project level activities. In other words, IFC requires the Subcontractor to carry out an environmental and social assessment of Project-related impacts according to the PSs, which are listed as follows:

- PS1: Assessment and Management of Environmental and Social Risks and Impacts;
- PS2: Labour and Working Conditions;
- PS3: Resource Efficiency and Pollution Prevention;
- PS4: Community, Health Safety and Security;

- PS5: Land Acquisition and Involuntary Resettlement;
- PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- PS7: Indigenous Peoples[1]; and
- PS8: Cultural Heritage.

The following guidelines of the IFC, which are deemed relevant to the Project, to be followed during the ESIA study are as follows:

- The IFC General EHS Guidelines, dated April 30, 2007;
- IFC Environmental, Health, and Safety Guidelines Geothermal Power Generation (2007),
- IFC Environmental, Health, and Safety Guidelines Electric Power Transmission and Distribution (2007),

4.2.2 World Bank (WB) Policies

WB manages projects and activities with Conservation Policies to ensure that they are carried out in an environmentally, financially, and socially sound manner. Conservation Policies include Environmental Assessments and other policies that define the environmental and social negative impacts of projects as well as their mitigation and prevention. These policies are expanded in the "World Bank Operations Manual", which also provides guidance on the Operational Policies (OP) and composition.

Environmental Assessment Policy (OP 4.01)

The purpose of this policy;

- To ensure that the projects proposed for bank financing are environmentally and socially valid and sustainable,
- Informing decision makers about the nature of environmental and social risks,
- To increase transparency and participation of decision makers in the decision-making process.

[1] IFC Performance Standard 7 recognizes that indigenous people as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population and sets objectives to anticipate and avoid adverse impacts of Projects on them through ensuring appropriate management and consultation principles. No Indigenous Peoples were also identified as part of the field surveys and consultations conducted as part of the ESIA process. As there are no indigenous people in Türkiye the requirements set out in this PS are not considered applicable to the Project.

Under the WB O.P. 4.01, projects are classified under categories A, B or C according to the degree of their potential impact on the environment:

Category A projects; Projects with impacts that could potentially result in significant and diverse environmental and/or social impacts and problems in the future and that are not easily detected at the time of classification,

Category B projects; Projects whose environmental and/or social impacts are site-specific and/or have easily detectable and preventable impacts, Furthermore, Category B projects divide in two within its structure as B and B+, based on the special circumstances of the project in question,

Category C projects; Projects with minimal or no environmental and social impacts.

FI projects; Financial intermediation activities.

Natural Habitats (OP 4.04);

- To conserve natural habitats and their biodiversity
- To avoid significant conversion/degradation of critical natural habitats
- To ensure the sustainability of services and products provided to human society by natural habitats.

Physical Cultural Resources (OP 4.11);

- To ensure the identification and protection of Physical Cultural Resources (PCR), including archaeological and historical sites, historic urban areas, sacred sites, graveyards, burial sites and unique natural values
- To ensure the compliance with national legislation regarding the protection of physical cultural property

Involuntary Resettlement (OP 4.12);

- To avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs;
- To assist displaced person in improving their former living standards; it encourages community participation in planning and implementing resettlement;
- To provide assistance to affected people, regardless of the legality of title of land.

4.2.3 International Agreements

Türkiye is a signatory to many international agreements, including the:

- Stockholm Convention on Organic Pollutants.
- Convention on Long-range Trans-Boundary Air Pollution (CRLTAP).
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.
- Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal.
- Kyoto Protocol regarding to the United Nations Framework Convention on Climate Change.
- Montreal Protocol on Substances that Deplete the Ozone Layer.
- Convention on the Conservation of European Wildlife and Natural Habitats
- Convention on International Trade in Endangered Species of Wild Fauna and Flora
- Barcelona Convention for the Protection of Marine Environment and the Coastal Region of the Mediterranean.
- Vienna Convention for the Protection of the Ozone Layer.
- The Protocol on Environmental Protection to the Antarctic Treaty.
- ILO Conventions;
    - ILO Convention on Forced Labor,
    - ILO Convention on Freedom of Association and Protection of the Right to Organize,
    - ILO Convention on Right to Organize and Collective Bargaining,
    - ILO Convention on Equal Remuneration,
    - ILO Convention on Abolition of Forced Labor,
    - ILO Convention on Discrimination (Employment and Occupation),
    - ILO Convention on Minimum Age,
    - ILO Convention on Worst Forms of Child Labor.

Paris Agreement

The Paris Agreement sets out a global framework to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. It also aims to strengthen countries' ability to deal with the impacts of climate change and support them in their efforts.

The Paris Agreement is the first-ever universal, legally binding global climate change agreement, adopted at the Paris climate conference in December 2015. The EU and its Member States are among the close to 190 Parties to the Paris Agreement. The EU formally ratified the agreement on 5 October 2016, thus enabling its entry into force on 4 November 2016. For the agreement to enter into force, at least 55 countries representing at least 55% of global emissions had to deposit their instruments of ratification.

The Agreement entered into force in Türkiye by being published in the Official Gazette dated 07.09.2021 and numbered 31621.

The Turkish EIA procedures are, with some exceptions, in line with the WB Policies. The primary exceptions are in project categorization, the scope of environmental and social assessment, and land acquisition, resettlement, and public consultation. In cases where the Turkish legislation differs from WB Policies, the more stringent one will apply to the implementation of the project.

5 METHODOLOGY

5.1 Overview

The ESIA assists in ensuring environmentally and socially sound management of the Project during its entire lifetime (construction, operation, decommissioning). The Environmental and Social Impact Assessment presented in this section will be limited to the construction and operation phases only due to the unavailability of sufficient relevant information on the decommissioning phase activities. Nevertheless, requirements mentioned in E&S Management Framework for Geothermal Development Project Additional Finance Loan October 2021 are considered for assessment of the decommissioning phase activities.

The basic approach for the ESIA Is adopted for conducting the environmental and social impact study for the proposed project to assess the existing baseline in the AoI (Area of Influence), where the components and activities of the project having potential environmental and social impacts. Environmental and Social impact assessments are framed with the prevailing institutional and legislative setup provided in Chapter 4 Legal Framework.

The main approaches for the assessment covers:

1. Identification and analysis of potential positive and negative impacts, direct and indirect impacts, and short-term and long-term impacts likely to result from project implementation;

2. Identification of feasible and cost-effective mitigation measures to avoid or to minimize negative impacts, and to provide technical guidance to the engineering design for the implementation of proposed mitigations.

3. Identify potential opportunities for environmental enhancement;

Preparation of Environmental and Social Management and Monitoring Plan for effective implementation of environmental mitigation measures at different stages of the project.

5.2 Scoping of the Impacts

The potential environmental and social impacts of the Project are summarized below:

- The Construction Phase activities, which comprises pre-construction including detailed design and construction phases. In this respect, this phase covers all detailed design and construction activities as well as decommissioning of the temporary construction facilities.
- The Operational Phase considers all operational activities including:

- Operation of the Project, which may potentially result in impacts such as the generation of noise and vibration, occupational health and safety risks, community health and safety risks as well as killing of crossing animals and generation of various waste streams;
- Maintenance activities of the Project which may potentially result in impacts such as on the occupational health and safety and public safety during the maintenance.

The potential impacts (adverse and positive) of all planned project activities have been identified and the interaction between the project activities in all these phases and the natural, physical environment and social-economic aspects are addressed.

5.3 Key Steps of the ESIA Process

This subsection presents the methodology used to conduct the impact assessment. The overall ESIA approach is illustrated in Figure 5-1. The ESIA Process consists of a multi-stage iterative approach in order to predict and evaluate the potential effects the Project could have on the physical, biological, social and cultural environment. Measures are then identified that the Project will take to avoid, minimize, mitigate or compensate for any adverse impacts; and to enhance positive impacts where possible. Results continue to be revisited and modified as the assessment progresses and as Project effects are monitored.

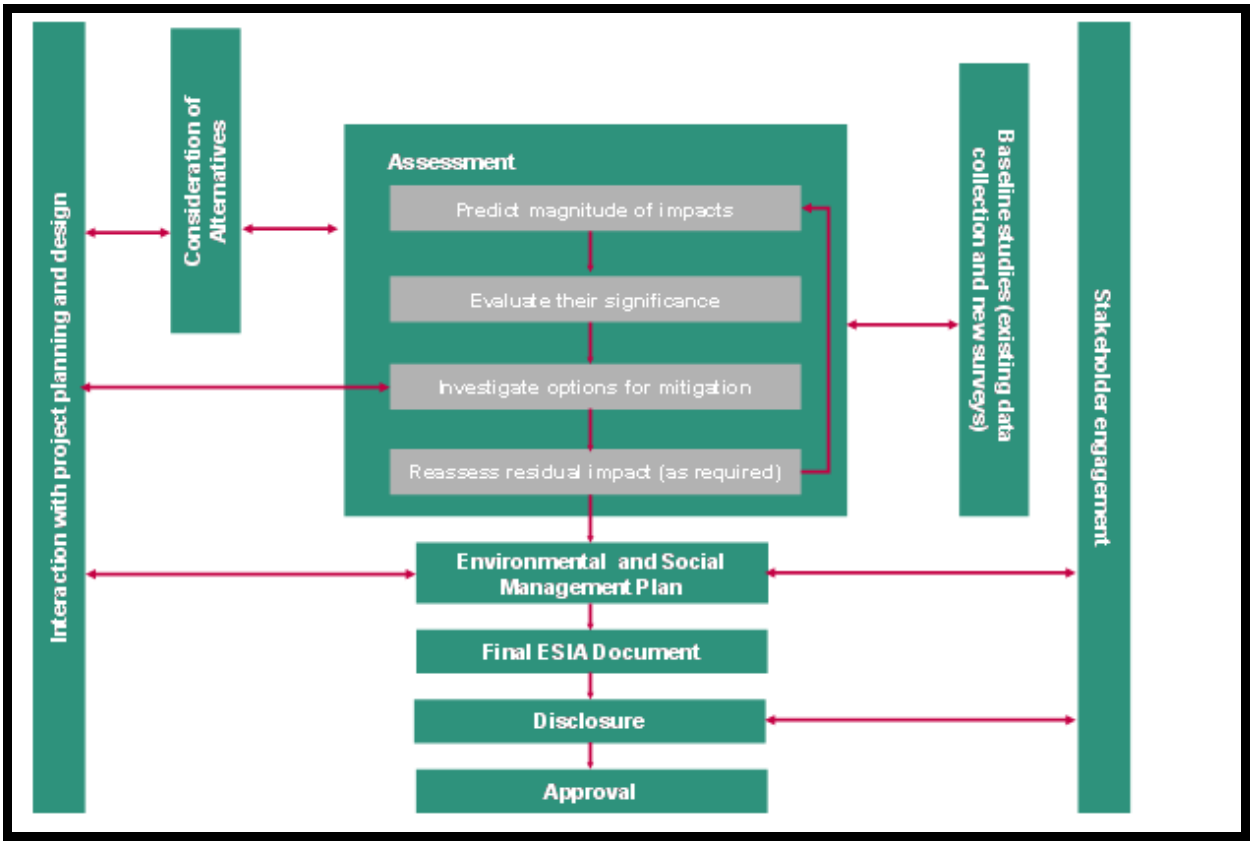


Figure 5-1. ESIA Methodology

5.3.1 Screening

The first step in the ESIA process is the screening stage which determines whether an impact assessment is required to be undertaken for a specific project. As the Project Company is planning to use finance from multinational Financial Institutions (fIs), there is a need to undertake an ESIA study to meet the requirements of the lenders. By considering the IFI's general approach for this type of complex and big industrial investments, which have potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented, the Project is suggested as Category B+.

5.3.2 Scoping

Scoping is a crucial step in an ESIA process that:

- defines the limits of what is included in the ESIA and what it is not necessary to include;
- gives a clear focus which environmental and social issues will be addressed in the ESIA;
- starts the process of understanding regulations and standards and their context for the ESIA;
- provides provisional identification of the impacts;
- provides an indication of what additional baseline information is required and how to get it;
- provisionally describes the assessment methods to be used;
- includes a preliminary identification of alternatives which should be investigated.

Scoping is the stage at which consultations with stakeholders are initiated, which is an important part of the ESIA process. At the initial phase of the Project, ESIA Studies are started without Lenders presence. In this respect, National EIA process was considered for scoping exercise together with general experience of the ESIA Team.

5.3.3 Area of Influence

The Area of Influence (AoI) is an important element in assessing environmental and social impacts of a proposed development since it informs upon the physical and/or social extent unto which the assessment should be performed. According to the definition given in IFC PS 1, the AoI encompasses:

- The area likely to be affected by: (i) the project[2] and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project[3]; (ii) impacts from unplanned, but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.
- Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable[4].
- Cumulative impacts[5] that result from the incremental impact, on areas or resources used or directly influenced by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The Area of Impact (AoI) for the Project was divided into two distinct categories: environmental and social impacts. The environmental AoI primarily focused on assessing the effects within the Projec''s footprint and its 500-meter vicinity, with a particular emphasis on air emissions during the construction phase. In special cases where a contamination determination cannot be made for the Modeling Examination Area included in the EIA report, the dimensions of the examination area are considered to be 500 meters. To evaluate construction and operational noise levels resulting from the Project, the closest sensitive receptors – namely, Moralı, Uzunkum, and Argavlı Neighborhoods – were included in the AoI. Environmental AoI is given in the map Figure 5-2 below.

[2] Examples include the project's sites, the immediate air shed and watershed, and/or transport corridors.

[3] Examples include power transmission corridors, pipelines, canals, tunnels, relocation and access roads, borrow and disposal areas, construction camps, and contaminated land (e.g., soil, groundwater, surface water, and sediments).

[4] Associated facilities may include railways, roads, captive power plants or transmission lines, pipelines, utilities, warehouses, and logistics terminals.

[5] Cumulative impacts are limited to those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities. Examples of cumulative impacts include: incremental contribution of gaseous emissions to an airshed; reduction of water flows in a watershed due to multiple withdrawals; increases in sediment loads to a watershed; interference with migratory routes or wildlife movement; or more traffic congestion and accidents due to increases in vehicular traffic on community roadways.

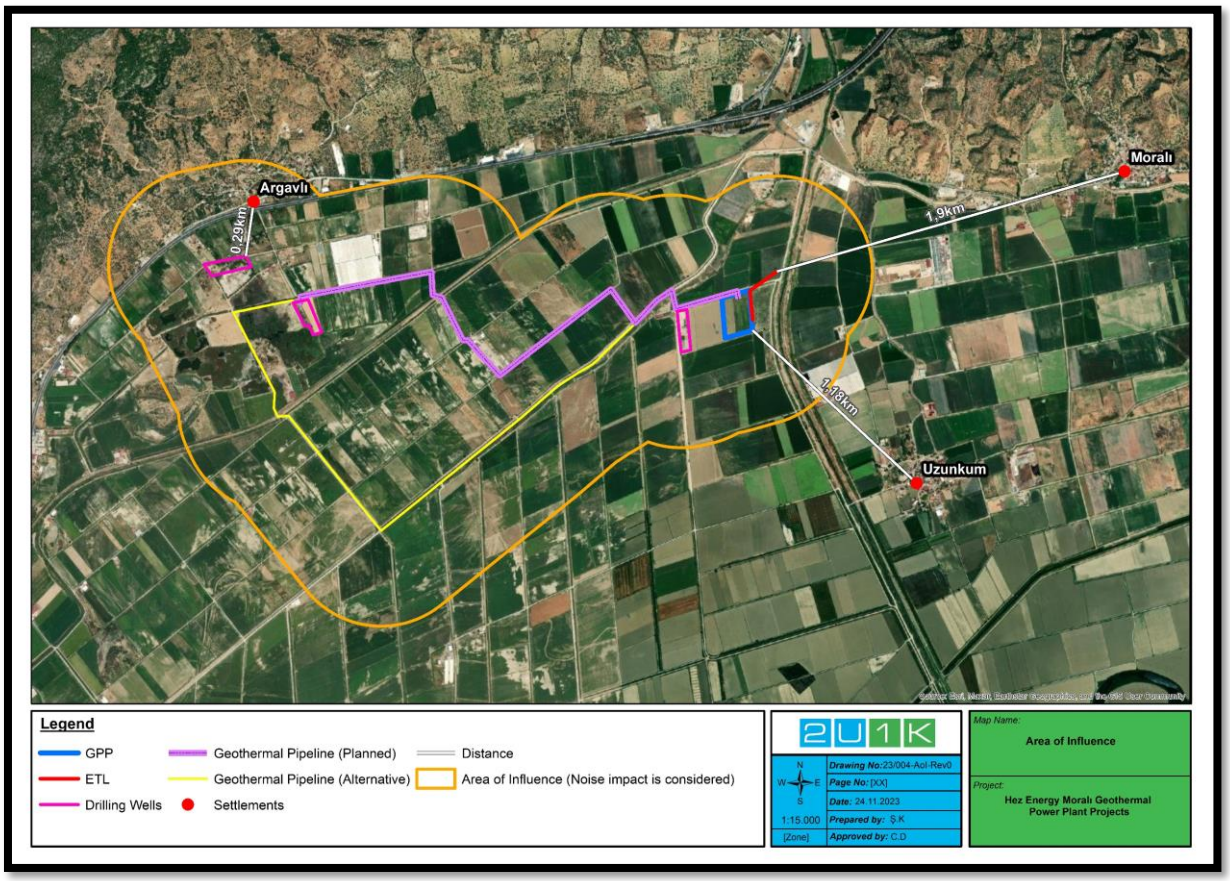


Figure 5-2. Area of Influence

On the other hand, the AoI for social impacts encompassed various aspects, taking into account transportation activities, recruitment, and employment of workers throughout the Project's construction phase. Additionally, it addressed concerns related to noise and dust generation during both construction and operation, along with air quality impacts associated with construction activities. The social impact area encompasses the three nearest neighborhoods to the project area, namely Moralı, Argavlı, and Uzunkum. By conducting these separate assessments for both environmental and social impacts, a comprehensive understanding of the Project's potential effects on the surrounding areas was achieved.

5.3.4 Baseline Data Collection

The next step of the ESIA process is the collection of data to establish the existing baseline conditions (i.e., conditions in the absence of the proposed development), which the impacts of construction and operation of the Project can be assessed against. In undertaking the ESIA study, information on the current environmental and social baseline conditions was gathered using, among others, the following sources:

- technical reports prepared by the Project Company and its consultants including EIA consultants;

- secondary data sources (published materials and documents, maps by government agencies, research organizations and other relevant organizations);
- review of aerial photographs of the Project site and its surroundings;
- field study results.

The Social Baseline methodology describes the approach adopted for data collection to develop a socio-economic baseline survey for the Project. This baseline study was performed in order to:

- understand characteristics of the social context that may be subject to change, either as:
  - a result of the Project's direct and indirect potential impacts; or
  - independent from the Project impacts. This will enable monitoring of the socio-economic situation in the social context over time, using the present baseline as the pre-Project comparison point;
- understand what resources are available at the household level in terms of livelihoods strategies and coping/resilience mechanisms through profiling households' economic, social, and cultural activities;
- identify particular groups deemed vulnerable in the local context and potentially less able to cope with the changes brought about by the Project and its activities, or less able to benefit from its positive effects.

The primary data collection will focus on verification or supplementation, where existing data were insufficient. The objective of primary data collection is to gather recent data, to triangulate it with secondary data and to gather first-hand information from potentially impacted communities.

The first field visit was conducted on February 13-14, 2023 to collect primary data. During this field visit, interviews were conducted with the project company, 14 project staff and the headmen of 3 neighborhoods within the scope of the project. In addition, a sensitive receptor interview was conducted with the farm owner 0,04 km from the EIA 1 site.

In the second field visit conducted within the scope of ESIA, household surveys were conducted in Moralı, Argavlı and Uzunkum Neighborhoods within the project area. The survey was conducted with 25 people in Moralı Neighborhood, 14 people in Argavlı Neighborhood and 12 people in Uzunkum Neighborhood. In addition, key informant interviews were conducted with Aydın Provincial Directorate of Forestry, Germencik District Food, Agriculture and Livestock Directorate, Germencik District Health Directorate and Germencik Municipality. In addition, as part of the sensitive receptor interviews, the owner of a restaurant located 0,14

km from the EIA-2 area and the owner of a farm located 0,4 km from the EIA-2 area were interviewed.

Table 5-1 below provides a summary of the first and second site visits.

Table 5-1. Surveys and interviews conducted by 2U1K

Type of Survey/ Interview	Number of Interviews/ Meetings
Household Interview	51
Headman survey	3
Key Informant Interviews (KIIs)	4
Unstructured interview with sensitive receptor	3
Workers Interview	14

5.3.5 Method to Assess Environmental and Social Impacts

Impact Types and Definitions

Impacts may occur as positive, negative, direct, indirect and cumulative. Determination of the type of impact is the important step of the assessment process. The determination of the impact type is based on geographical size, sensitivity of receptor, duration, significance and likelihood of the impact. Impact types are provided in Table 5-2.

Table 5-2. Impact Types and Definitions

Impact Type	Definition
Positive	Impacts that make positive changes over the current conditions.
Negative	Impacts that lead to new and undesirable changes over the current conditions.
Direct	Direct impacts occur through direct interaction of an activity with an environmental, social, or economic component.
Indirect	Impacts which are not a direct result of the project, often produced away from or as a result of a complex impact pathway.
Cumulative	Impacts that consist of an impact that is created as a result of the combination of the project evaluated in the current project together with other projects causing related impacts.

Assessment

The impact assessment process predicts and describes impacts that are expected to occur for different phases of the Project. Where possible, impacts are quantified to the extent practicable, which may include size of land affected; increase in noise or air pollution levels above acceptable standards; volume of waste or water discharged, number of households affected, etc. For each impact, its significance is evaluated by defining and evaluating two key aspects:

- The magnitude of the impact; and
- The sensitivity of the feature or receptor that will be impacted.

Impact Magnitude

Impact magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. Magnitude rating tends to reflect a combination of the size of an area that may be affected, the duration over which the aspect may be altered, and the size, degree or scale of that change. In essence, magnitude is a descriptor for the degree of change that is predicted to occur in the resource or receptor.

For positive impacts (which are mostly socio-economic impacts) magnitude is generally categorised as 'Positive' unless sufficient information is available to support a more robust characterisation. For instance, if the number of jobs to be assigned to local community members is confirmed or if the size or value of the contribution to the national, regional or district economy is known then a magnitude rating can be assigned. If not, then the significance rating is assigned based on the sensitivity of the feature impacted by a specific activity or change.

The term 'magnitude' therefore encompasses all the characteristics of the predicted impact including:

- Geographic Extent;
- Duration;
- Intensity;
- Frequency; and
- Likelihood (only for unplanned events).

The definitions for characteristics of magnitude used during the impact assessment are summarized in Table 5-3.

In the case of intensity and frequency, these characteristics are not assigned fixed designations, as they are typically numerical measurements (e.g., number of acres affected, number of times per day, etc.).

The terminology and designations are provided to ensure consistency when these characteristics are described in an impact assessment deliverable. However, it is not a requirement that each of these characteristics be discussed for every impact identified.

For unplanned events (e.g., accidental release of hazardous materials) the likelihood of the impact occurring is taken into consideration in deriving the magnitude rating. The likelihood of an impact occurring as a result of an unplanned event is expressed as a probability and is designated using a qualitative scale (or semi-quantitative, where appropriate data are available), according to the attributes described in Table 5-3.

Likelihood is estimated on the basis of experience and/or evidence that such an outcome has previously occurred. It is important to note that likelihood is a measure of the degree to which the unplanned event is expected to occur, not the degree to which an impact or effect is expected to occur as a result of the unplanned event.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation. There is an inherent challenge in discussing impacts resulting from (planned) Project activities and those resulting from unplanned events. To avoid the need to fully elaborate on an impact resulting from an unplanned event prior to discussing what could be a very low likelihood of occurrence for the unplanned event, this methodology incorporates likelihood into the magnitude designation (i.e., in parallel with consideration of the other impact characteristics), so that the "likelihood- factored" magnitude can then be considered with the resource/receptor sensitivity/vulnerability/importance in order to assign impact significance. Rather than taking a prescriptive (e.g., matrix) approach to factoring likelihood into the magnitude designation process, it is recommended that this be done based on professional judgment, and assisted by quantitative data (e.g., modelling, frequency charts) where available.

Once the impact characteristics are understood, these characteristics are used (in a manner specific to the resource/receptor in question) to assign each impact a magnitude. In summary, magnitude is a function of the following impact characteristics:

I. Geographical Extent (G);
II. Duration (D);
III. Intensity (I);
IV. Frequency or Likelihood (F or L);
V. ReversibilityI).

Impact Magnitude = (G+D+I+F (or L)) x R

The magnitude can also be defined as the severity of the potential impact seriousness, indicating whether such an impact is reversible or irreversible. If a project's adverse effects can be mitigated, then the overall impact's magnitude should not be classified as very high.

magnitude essentially describes the degree of change that the impact is likely to impart upon the resource/receptor. As in the case of extent and duration, the magnitude designations themselves (i.e., negligible, low, medium, high and very high) are universally used and across resources/receptors, but the definitions for these designations will vary on a resource/receptor basis, as is discussed further below. The universal magnitude designations are:

- Negligible;
- Low;

- Medium;
- High; and
- Very High

The magnitude of impacts takes into account all the various dimensions of a particular impact in order to make a determination as to where the impact falls on the spectrum (in the case of adverse impacts) from negligible to large. Some impacts will result in changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes can be regarded as essentially having no impact and should be characterised as having a negligible magnitude.

Table 5-3. Criteria for Determining Impact Significance

Aspect	Score	Definition
Geographic Extent (G) is the area within which the impact occurs.	**1**	**Project Site:** (i.e. the impact is confined within the facilities owned or exclusively controlled by the project)
	2	**Local** (i.e. the impact extends to areas or communities around the project site)
	3	**Regional** (i.e. the impact extends to an area beyond the surroundings of the project site and to regional physical (airshed, watershed, etc) or administrative boundaries)
	4	**National:** (i.e. the impact extends throughout several regions or to the entire country)
	5	**International:** (*i.e the impact is transboundary*)
Duration (D) is the duration of the impact and can vary from short to long terms.	**1**	**Very Short** (<1 Month)
	2	**Short** (1 Mo–th - 1 year)
	3	**Medium** (1-2 years)
	4	**Long** (2-5 ye–rs - the impact will cease after the operational life span of the project)
	5	**Very Long** (over 5 Ye–rs - no mitigation measure of natural process will reduce the impact after construction)
Intensity (I) is a measure of the physical, economic or social severity of the impact.	**1**	**Negligible**: the impact cannot be easily detected or perceived and is unlikely to cause detectable change in environmental or social components.
	2	**Low**: the impact can be detected or perceived but the effects are unlikely to cause tangible changes in environmental or social components
	3	**Medium**: the impact are well within legal standards or accepted practices and/or are likely to cause tangible changes in environmental or social components.
	4	**High**: the impact is near the limit of legal standards or accepted practices and/or are likely to cause serious impairment of environmental or social components.
	5	**Very high:** the impact may result in exceedances of legal standards or accepted practices and/or is likely to cause very serious to catastrophic damage to environmental or social components.
Frequency (F): is the frequency of the	**1**	**Single event**
	2	**Infrequent:** a few events evenly or randomly distributed over time
	3	**Recurrent:** numerous events evenly or randomly distributed over time

Aspect	Score	Definition
impact (not the activity causing the impact).	**4**	**Frequent:** a high number of events evenly or randomly distributed over time
	5	**Continuous:** no interruption over time.
Likelihood (L) (unplanned events)	**0**	**Improbable:** The event is extremely unlikely to occur during implementation (construction and operation) of the Project. (Probability; less than 1%).
	1	**Unlikely:** The event is unlikely but may occur at some time during implementation (construction and operation) of the Project. (Probability; less than 5%, greater than 1%)
	3	**Likely:** The event is likely to occur at some time during implementation (construction and operation) of the Project. (Probability; less than 50%, greater than 5%)
	5	**Probable:** The event will occur during implementation (construction and operation) of the Project (i.e., it is essentially inevitable). (Probability; greater than 50%)
Reversibility (R)	**1**	**short term:** if the initial condition of the component can be restored within weeks or months after the cessation of the impact source and/or with restoration activities.
	2	**short/mid-term:** if the initial condition of the component can be restored within a few months to one year after cessation of the impact source and/or with restoration activities.
	3	**mid-term:** if the initial condition of the component can be restored within one to five years after cessation of the impact source and/or with restoration activities.
	4	**long term:** if the initial condition of the component can be restored within five to 25 years after cessation of the impact source and/or the restoration activities.
	5	**Irreversible:** if it is not possible to achieve restoration of the initial conditions.

Sensitivity

In addition to characterising the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity/vulnerability/importance of the impacted resource/receptor to the type of activity proposed (e.g., habitat clearance, topsoil removal, etc.) or the impact of a Project activity (e.g., dust, noise, water pollution, or induced population influx). This requires a range of physical, biological, cultural or human factors to be taken into account and may also need to include other factors such as legal protection, government policy, stakeholder views and economic value.

Characterisation of sensitivity for a physical or biological resource or receptor (e.g., a water feature or parameter, cliff, vegetation type) will take into account its conservation status and importance (on a local, national and international scale), its vulnerability to disturbance, and its resilience to recover or withstand a specific impact or type of impact. Where the receptor is human or cultural, the value of that social and cultural heritage receptor/s and its vulnerability to the impact is considered, taking into account the receptor's resilience, including ability to adapt to change or use alternatives where available.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The universal sensitivity/vulnerability/importance designations are:

- Low;
- Medium; and
- High.

Receptor sensitivity definitions are provided in Table 5-4.

Table 5-4. Receptor Sensitivity

Receptor Sensitivity (S)[6] describes the ability of the receptor to withstand adverse impacts. It takes into consideration not only activity-impact-receptor pathways, but also social and environmental characteristics of the receptor that might make it more or less resilient to change.	**1**	**Low:** Local community and/or environment is fully equipped/has the tools to manage changes of life quality: • Species and/or population has high capacity to absorb or adapt to change (i.e. has capacity to move away from or adapt to the project impact), and is potentially unaffected or marginally affected; • People being least vulnerable to change or disturbance (i.e. ambient conditions such as air quality are well below applicable legislation and international guidance,); • Individuals who are able to quickly adapt to temporary disruption in their living conditions, livelihood status or a change in the status of public infrastructure.
	3	**Medium:** Local community and/or environment is partially equipped/has the tools to manage changes of life quality. For example: • Internationally threatened species /protected area within the area impacted by the project activities outside of period of high sensitivity or during routine or reliably predictable peak presence; • Species and/or population which has moderate capacity to absorb or adapt to change (i.e. has capacity to move away from or adapt to the project impact), leading to potential temporary but sustainable effect which does not substantially alter character or result in significant loss of ecological functionality; • People being vulnerable to change or disturbance (i.e. ambient conditions such as air quality are below adopted standards; • Negative change in livelihood status, household assets/income or living conditions. Temporary disruption to businesses resulting in a small drop in business revenue; • Increased risk to public health that can be controlled using detailed mitigation measures; and • Disruption to public infrastructure that results in an inconvenience to other users.

[6] Receptors may be humans, ecological and physical components of the environment. Receptor sensitivity considers how a particular receptor may be more or less susceptible to a given impact. More sensitive receptors may experience a greater degree of change, or have less ability to deal with the change, compared with less sensitive receptors that may be more resilient or adaptable.

	5	**High:** Sensitive local community and/or environment not equipped or prepared to cope with social and environmental impacts such as changes of life quality. For example: • Internationally threatened species /protected area within the area impacted by the project activities during period of high sensitivity (e.g. during breeding, spawning or nesting) and during routine or reliably predictable peak presence; • Species and/or population which has little or no capacity to absorb or adapt to change (i.e. little or no capacity to move away from or adapt to the project impact), leading to potential for substantial change of character and/or loss of ecological functionality; • Most vulnerable groups (i.e. ambient conditions such as air quality are at or above adopted standards; • Individuals with a marginal livelihood, low socio-economic income or poor quality living conditions; • Individuals who are vulnerable due to their age, disability or other reason and who may require special assistance during engagement activities; and • Businesses with a marginal economic existence which are not able to easily adapt to change.

Determination of the Overall Impact

For impacts resulting from unplanned events (typically accidents, such as a major oil spill or other event that cannot be reasonably foreseen), the above methodology is applied but likelihood is also considered when assigning the magnitude designation.

The Impact significance is calculated by multiplying the Impact magnitude by the Sensitivity Score:

Impact Significance = Impact magnitude x S

Table 5-5. Description of the Impact Significance

Score of the Impacts		
Value	**Score**	**Definition**
4-25	**Negligible**	An impact of "**Negligible"** significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variation–.
26 - 75	**Low**	An impact of "**Low"** significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standard–.
75 - 150	Medium	An impact of "**Medium"** significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently–

Score of the Impacts		
Value	**Score**	**Definition**
150 - 250	**High**	An impact of "**High"** significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of impact assessment is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project–
250 - 500	**Very High**	An impact of "**Very High"** significance after all feasible mitigation measures have been identified and assessed warrants the highest level of attention and concern. As with residual impacts of major significance, the regulators and stakeholders will need to closely evaluate whether the positive impacts of the project outweigh residual negative impacts of very high significance. In many cases residual critical impacts can be considered as a potential fatal flaw of the project.

Development of Mitigation Measures and Enhancement Plans

One of the aims of an Environmental and Social Impact Assessment consists of suggesting mitigation measures in order to limit any potential negative impacts affecting all physical, biological and socioeconomic resources as well as receptors due to Project activities. Mitigation measures are defined against each significant adverse impact by making use of avoidance, minimization, restoration and remediation as appropriate. Mitigation measures provided in each impact assessment table are also grouped under each project phase such as design, pre-construction, post construction and operation. In general, mitigations suggested for operation phase are directly related to the Project design, in this respect these mitigations are also grouped under design phase.

A hierarchy of mitigation options is considered, with avoidance at the source of the impact as a priority and compensatory measures or offsets to reduce the impact significance as a last resort. The mitigation hierarchy that is utilised in identification of mitigation measures are presented in Table 5-6 below.

Table 5-6. Hierarchy of Options for Mitigation

Options	Explanation
Avoid at Source; Reduce at Source	Avoiding or reducing at source is designing the project so that a feature causing an impact is designed out (e.g., avoiding constraint areas during site selection) or altered (e.g., reduced waste volume).
Abate on Site	This involves adding something to the design to abate the impact (eg, pollution controls).
Abate at Receptor	If an impact cannot be avoided, reduced or abated on-site then measures can be implemented off-site (e.g., noise screening at properties).
Repair or Remedy	Some impacts involve unavoidable damage to a resource. Repair essentially involves restoration and reinstatement type measures.

The aim of the mitigation measures is to prevent or reduce the importance of negative impacts whilst optimizing the feasibility and potential benefits of the Project. Impact mitigation objectives are often established on the basis of legal standards or by referring to best practice. In the absence of any existing benchmarks, objectives specific to the project are established. Mitigation activities are supported with management plans linked to potential impacts, and they include monitoring requirements detailing what will be monitored, the method of monitoring, frequency, and measurable targets. Steps for determination of mitigations in line with "Mitigation Hierarchy" provided below:

- Avoid at Source, Reduce at Source: avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity). For this purpose, Constraint Maps regarding no-go areas and sensitive locations are prepared to serve as a Guiding document for the detailed design as well as Sub-management and monitoring plans;
- Abate on Site: add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping);
- Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site);
- Repair or Remedy: some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures;
- Compensate in Kind, Compensate Through Other Means: where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

The priority in mitigation is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

Taking into account how mitigation will reduce a predicted impact, receptor sensitivity and significance of the after-mitigation impacts, residual impacts are identified. Some mitigation measures may directly address the impact on the predicted receptors, in which, the overall impact after applying the mitigation measures will result in reducing the impact on the sensitive receptors.

Where significant residual impacts or risks remain, further options for mitigation are evaluated and impacts are re-assessed until they are considered to be low and technically and financially feasible for the Project and would be deemed to be within acceptable levels.

The effectiveness of the mitigation measures defined in the ESIA are assessed using expert judgement and the findings from the previous application of the measures to similar projects. The definitions of the mitigation effectiveness are:

- Low: the measures can reduce the impacts by less than 20% of the expected magnitude;
- Medium low. the measures can reduce the impacts by 20% - 40% of the expected magnitude;
- Medium: the measures can reduce the impacts by 40% - 60% of the expected magnitude;
- Medium high: the measures can reduce the impacts by 60% - 80% of the expected magnitude;
- High: the measures can reduce the impacts by more than 80% of the expected magnitude.

The Mitigation effectiveness is measured on a scale 1 – 0.2 (1=minimum effectiveness; 0.2=maximum effectiveness). Residual impacts will be identified by taking into account the mitigation effectiveness.

Residual Impact Assessment

Once mitigation measures are declared, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

5.3.6 Cumulative impacts

Cumulative impacts are defined as the successive, incremental, and/or combined effects of a Project or activity, accumulated with other Projects or activities. Given that the Project is complying with the IFC PS, potential cumulative impacts are evaluated pursuant to IFC's Cumulative Impact Assessment (CIA) Guidance - Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for Private Sector in Emerging Markets (IFC, 2013).

Cumulative Impact: Impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity added to other existing, planned, and/or reasonably anticipated actions, projects, or activities. For practical reasons, the identification, assessment,

and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concern and/or concerns of Project-Affected Communities (PACs).

CIA: Process to identify and evaluate cumulative impacts.

Other Projects: Existing, planned, or reasonably expected future developments, projects and/or activities potentially affecting Valued Environmental Components (VECs).

External Drivers: Sources or conditions that could affect or cause physical, biological, or social stress on VECs, such as natural environmental and social drivers, human activities, and external stressors. These can include climate change, population influx, natural disasters or deforestation, among others. These are typically less defined and planned than Other Projects.

Valued Environmental Components (VECs): Environmental and social components considered as important by the scientific community and/or potential PACs. VECs may include:

- Physical features, habitats, wildlife populations (e.g., biodiversity, water supply);
- Ecosystem services (e.g., protection from natural hazards, provision of food);
- Natural processes (e.g., water and nutrient cycles, microclimate);
- Social conditions (e.g., community health, economic conditions); and
- Cultural heritage or cultural resources aspects (e.g., archaeological, historic, traditional sites).

VECs reflect the public and scientific community's "concern" or special interest about environmental, social, cultural, economic, or aesthetic values (IFC, 2013). According to the IFC's methodology, VECs are considered the ultimate recipients of cumulative impacts because they tend to be at the ends of ecological pathways.

Unlike an ESIA, which focuses on a project as a generator of impacts on various environmental and social receptors, a CIA focuses on VECs as the receptors of impacts from different projects and activities. In a CIA, the overall resulting condition of the VEC and its related viability are assessed.

The CIA was derived from desktop reviews of publicly available information, information obtained during the ESIA process. The assessment follows the six steps for a CIA (Figure 5-3). The process is iterative and flexible, with some steps having to be revisited in response to the results of others. For example, the VEC selection step usually needs to be adjusted after the potential impacts of the Project are identified. The steps are described in detail below.

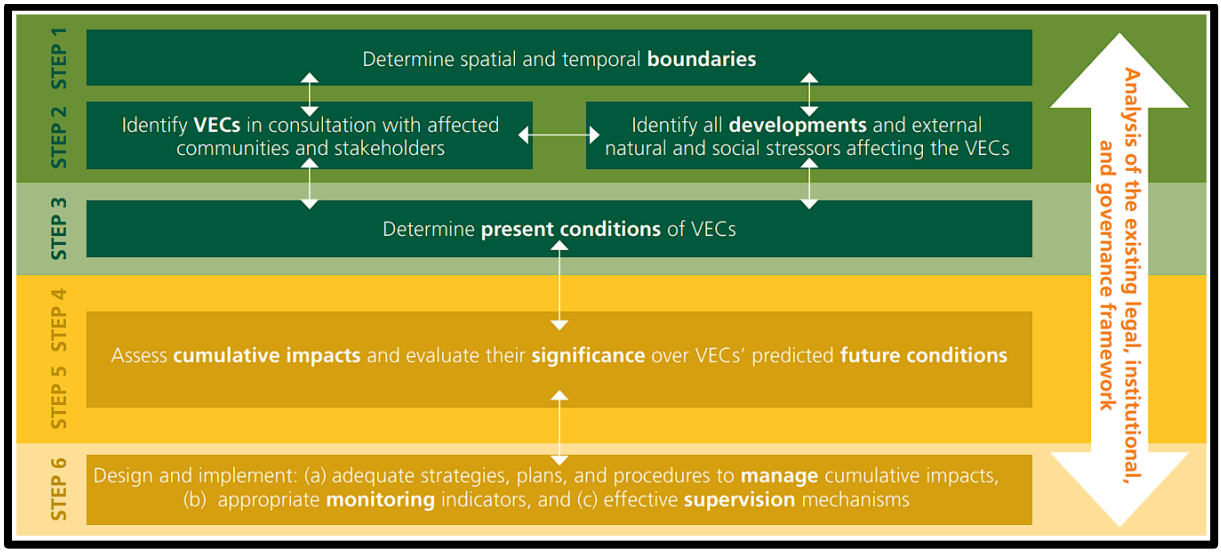


Figure 5-3. Summary of the Cumulative Impact Assessment Methodology, Source: **(IFC, 2013)**

5.3.7 Environmental and Social Management Plan (ESMP)

An ESMP has been developed as part of the ESIA study including the description of the mitigation measures for each impact during construction and operation phases of the Project, responsible parties for the implementation of the mitigation measures, the timing, monitoring and audit requirements. The ESMP focuses on the avoidance of impacts, and where this is not possible, presents technically and financially feasible and cost-effective mitigation measures to minimize or reduce potential impacts to acceptable levels. The ESMP should be kept up to date with any required additional mitigation throughout the Project lifecycle.

Implementation of the ESMP will be accomplished within the framework of a Project specific Environmental and Social Management System (ESMS) to be developed by the Project Company in accordance with the requirements of international standards (i.e., for environment: ISO 14001, IFC PS1, EBRD PR1).

6 ENVIRONMENTAL AND SOCIAL BASELINE

Baseline assessment is comprised of field studies and desk-top review of various sources of information. Baseline assessment is focused on a series of environmental components, as listed below:

- Hydrology and Hydrogeology;
- Geology and Soils Characteristics;
- Land Use and Zoning;
- Natural Disaster Risk;
- Material Resources;
- Climate and Meteorology;
- Air Quality;
- Noise and Vibration;
- Waste and Wastewater Management;
- Biodiversity;
- Traffic;
- Cultural Heritage;
- Community health and safety,
- Labour and working condition,
- Socio-economy.

The Project is specified as Category B+ project which resulting environmental and/or social impacts that are specific to the location of the facility and/or with impacts that could be easily identified and prevented. In this respect, the ESIA Report is based on onsite baseline measurements and social surveys, as well as environmental and social reports developed formerly for the Project.

Table 6-1. Scoping of Environmental Issues

Project Activities	Environmental Issue	Possible Impacts	Baseline Parameters
Drilling	Effluent discharge	• Discharge of drilling fluids including extracted water from exploration and operational wells during testing. • Discharge of domestic wastewater from camp site	• Groundwater quality • Soil quality • Surface water quality
Drilling	Drilling Mud	• Storage and disposal of drilling mud including cuttings	• Groundwater quality • Soil quality
Drilling	Groundwater contamination	• Contamination of groundwater resources in case of percolation of thermal groundwater during drilling and testing.	• Groundwater quality
Drilling	Solid Waste	• Storage and disposal of solid waste.	• Soil quality • Groundwater quality

Project Activities	Environmental Issue	Possible Impacts	Baseline Parameters
Drilling	Noise	• Drilling rig, generators, traffic, etc.	• Environmental noise
Drilling, Construction,	Air Emissions	• Possible toxic gas emissions during drilling and well testing (hydrogen sulfide) • Dust emission due to site activities, arrangement of drilling rig area, traffic etc.	• Climate • Air Quality (PM10, H_2S)
Drilling and Construction	Ecosystem	• Disturbance of natural habitats from construction, e.g. dust, noise, un-seasonal working, poor siting of new works, disposal of untreated wastes, etc.	• Flora • Fauna
Drilling and Construction	Soil	• Loss of topsoil during preparation of rig sites, or disposal of excavated materials • Damage to soil structure due to material storage, traffic, etc. • Erosion due to uncontrolled surface run-off where vegetation is cleared	• Soil quality
Drilling	Emergency and environmental safety	• Well blowout during drilling	-
Drilling and Operation	Water Resources	• Possible over flow from mud pit. • Contamination/pollution of resource, drilling chemicals, fuel & oil, hazardous wastes, wastewater, etc.	• Soil and groundwater quality

6.1 Area of Influence

The Area of Influence (AoI) is an important element in assessing environmental and social impacts of a proposed development since it informs upon the physical and/or social extent unto which the assessment should be performed. According to the definition given in IFC PS 1, the AoI encompasses:

- The area likely to be affected by: (i) the project[7] and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project[8]; (ii) impacts from unplanned, but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.

[7] Examples include the project's sites, the immediate air shed and watershed, and/or transport corridors.

[8] Examples include power transmission corridors, pipelines, canals, tunnels, relocation and access roads, borrow and disposal areas, construction camps, and contaminated land (e.g., soil, groundwater, surface water, and sediments).

- Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable[9].

- Cumulative impacts[10] that result from the incremental impact, on areas or resources used or directly influenced by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The AoI for the Project was determined separately for environmental and social impacts.

AoI for Environmental Impacts

The environmental AoI was determined mainly to cover the impacts on the footprint and the 500 m vicinity of the Project as well as the impact area regarding air emissions during construction. In special cases where a contamination determination cannot be made for the Modeling Examination Area included in the EIA report, the dimensions of the examination area are considered to be 500 meters. For the assessment of construction and operation noise levels due to the Project the closest sensitive receptor which are Moralı, Uzunkum and Argavlı Neighbourhoods were included in the AoI. The Environmental Impact Area is given in Figure 6-1.

[9] Associated facilities may include railways, roads, captive power plants or transmission lines, pipelines, utilities, warehouses, and logistics terminals.

[10] Cumulative impacts are limited to those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities. Examples of cumulative impacts include: incremental contribution of gaseous emissions to an airshed; reduction of water flows in a watershed due to multiple withdrawals; increases in sediment loads to a watershed; interference with migratory routes or wildlife movement; or more traffic congestion and accidents due to increases in vehicular traffic on community roadways.

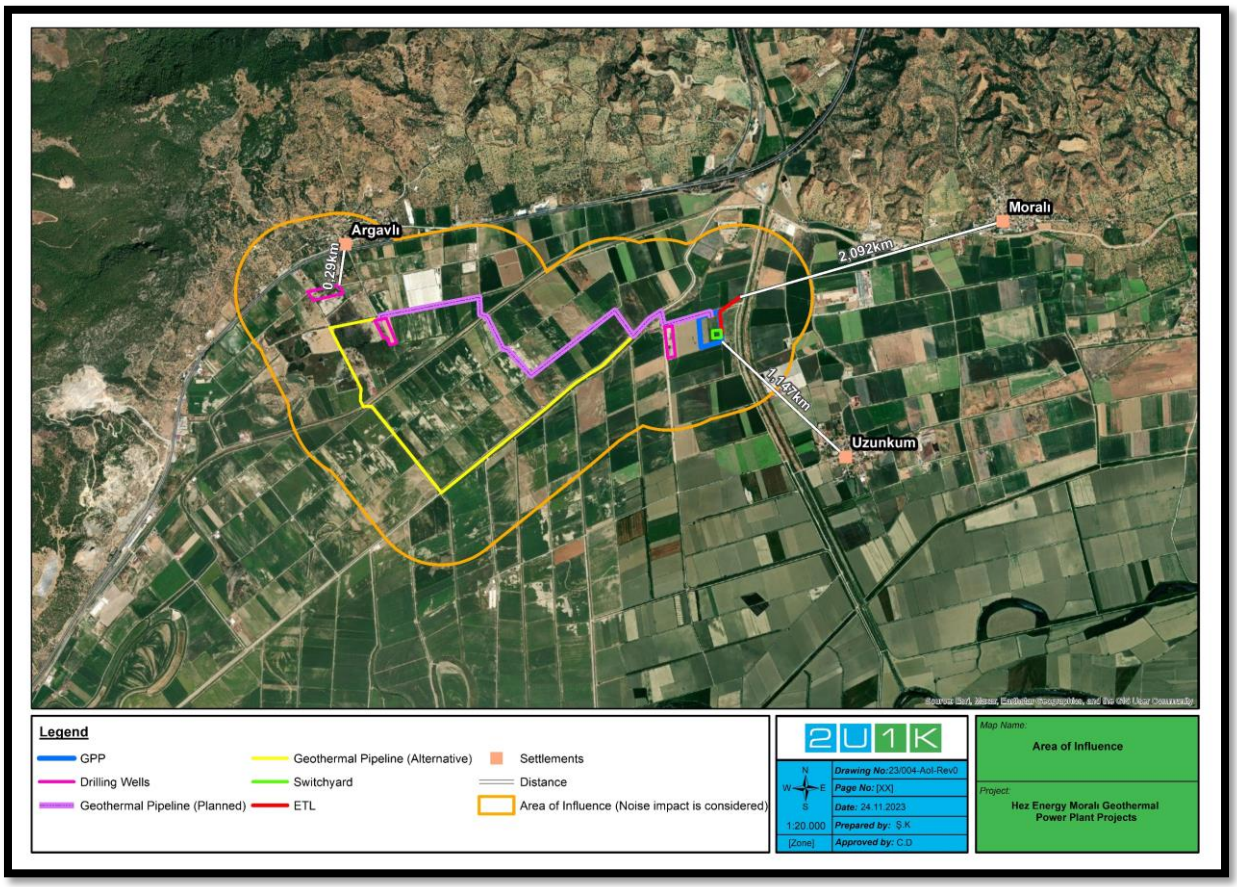


Figure 6-1. Environmental Area of Influence

AoI for Social Impacts

The AoI for social impacts was determined by considering transportation activities, recruitment, and use of workers during construction of the Project, noise and dust generation during construction and operation of the Project, and air quality impacts related to construction activities. At this stage, an area including 3 (three) neighbourhoods was initially selected as the primary social impact area. The camp area for the construction phase of the Project is also located within the Project site. Non-local employed labourers stay in this camp area. The camp site was visited during the site visit and the information about the camp area is mentioned in detail in Labour and Working Conditions section. During the site visit, the owner of the farm within the project area, which was identified as a sensitive receptor, was also interviewed. Detailed information about the interview is given in the Stakeholder Engagement section. The distance of the Projects to the neighbourhoods, camp area and sensitive receptor (Farm) are given in Figure 6-2.

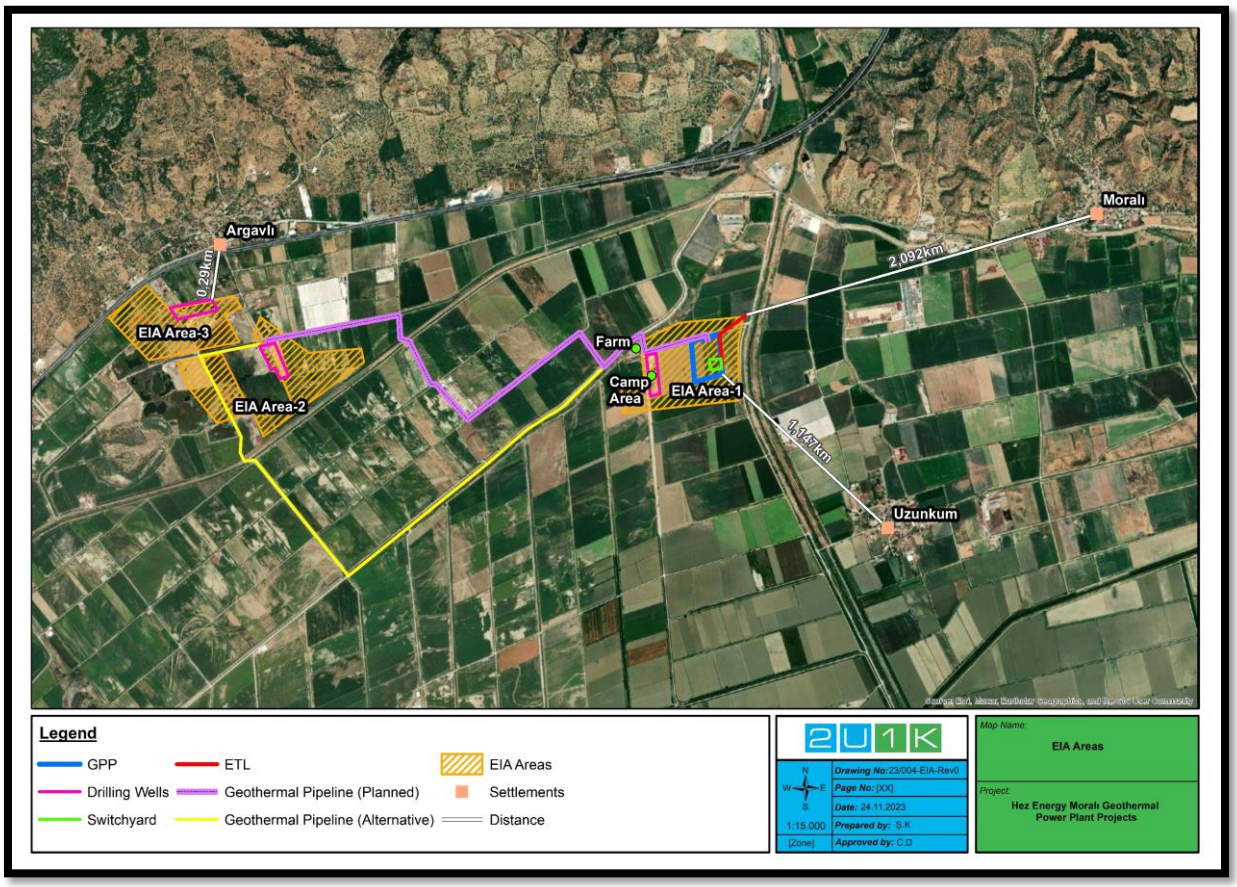


Figure 6-2. Distance to the Neighbourhoods

Moralı and Argavlı Neighbourhoods, which are the closest settlements that may be exposed to direct environmental and social impacts and are exposed to almost all of the land acquisition for the Project, are considered within the first impact zone.

6.2 Land Use and Zoning

Cultivated agriculture is carried out in all areas which will be used within the scope of the Projects.

As shown in Figure 6-2, drilling area included in EIA-1 area was used for non-agricultural purposes.

The drilling area included in EIA-2 area is also cultivated agricultural land, and the construction activities of the SPP project, which is planned for a different entrepreneur, are being carried out on the western façade. While the road passes from the north side, agricultural activities are carried out in the west and south.

There is a geothermal gradient well in a part of the drilling area included in EIA-3 area. Although the remaining part of this parcel is agricultural land, it has been observed that there is no use for this purpose. There are structures such as barns, shelters, and swampy areas around it,

where livestock activities are carried out. Greenhouse areas is located adjacent to the well areas, and there are areas with no agricultural production but cultivated irrigated agricultural land and reed swamp areas in these areas where there are piles of excavation and rubble from place to place.

6.3 Climate and Meteorology

Climate properties of the Project region are summarized in the following section based on the information provided in the EIA report. The macroclimate in the project area is Mediterranean. The Mediterranean climate can be seen in the plains and the valleys surrounding the plains. Although the Mediterranean climate type is common in the region where the Ruhat area is located, the region is under the influence of the Coastal Aegean climate type due to the influence of the Aegean Sea, which is a side extension of the Mediterranean Sea. This climate type has the characteristics of the Mediterranean climate in terms of summer and winter. Summers are dry and hot and winters are mild and rainy. The region lies in the semi-humid belt.

Like the valley of the Büyük Menderes River basin and the Aegean plains in other sub-basins, it remains in a more sheltered closed area than a gutter opening towards the sea in the west. Therefore, the warming effect of the sea and the rate of the winds that bring precipitation create a dew effect on the soil surface. Due to the effect on the sea and the topographical differences on the land, it is seen that the winds are generally winds that go between the sea-land and valley-hill. Due to the fact that the mountains around the plains are not high enough to block the effect of the sea and they are perpendicular to the sea, the effect of the sea is felt to a decreasing extent from west to east.

According to the Germencik Meteorology Station observation records, the annual average local pressure value is 1012.4 hPA. The highest local pressure was observed in January with 1037.5 hPa, and the lowest local pressure was observed in March with 983.8 hPa. According to the Germencik Meteorology Station observation records; the lowest temperature was recorded in February with -13.5 ^{0}C and the highest temperature was recorded in July with 44 ^{0}C; The annual average temperature is 16.7 ^{0}C. According to the Germencik Meteorology Station observation records, the annual average total precipitation was recorded as 707 mm. The maximum amount of precipitation per day was measured as 174.1 mm.

According to the records of the Germencik Meteorology Station, the annual average humidity is 62.4%. According to the observation records of the Germencik Meteorology Station, the annual average number of snowy days is 0.4; the annual average number of snow covered days is 0.43; the average number of foggy days per year was 2.89; the number of full days per year is 2.32; The annual average number of frosty days was 15.26, and the annual average number of orange days was 0.48.

Table 6-2. Temperature Values (^{0}C)

Parameter	Monthly Average Temperature (^{0}C)		Monthly Peak Temperature (^{0}C)		Monthly Minimum Temperature (^{0}C)	
Observation Station and Year	Aydın 80 Years	Germencik 7 Years	Aydın 80 Years	Germencik 7 Years	Aydın 80 Years	Germencik 7 Years
January	8,10	8,20	23,20	22,00	-11,00	-7,90
February	9,30	10,60	27,40	26,40	-5,40	-3,60
March	11,80	12,70	32,40	26,20	-5,00	0,30
April	15,90	16,40	35,40	34,20	-0,80	1,00
May	20,90	21,20	42,60	42,40	4,60	6,10
June	25,60	25,30	44,40	43,00	8,40	10,90
July	28,20	28,60	44,80	43,50	13,40	15,50
August	27,70	28,60	43,80	40,90	11,80	16,80
September	23,70	24,30	43,30	40,50	7,60	8,40
October	18,60	19,30	39,50	37,10	1,60	1,20
November	13,50	13,80	30,70	30,10	-4,70	0,00
December	9,5	9,60	25,90	22,60	-5,30	-5,50
Yearly Average	17,70	18,20	44,80	43,50	-11,00	-7,90

6.4 Geology, Geochemistry and Soil Characteristics

6.4.1 General Geology

The morphology of the Aegean region was formed during the third and fourth geological periods. Due to the compression caused by the influence of Alpine folds from the north and south, significant depression areas, fractures, and fault lines were created. This morphology is evident today in the form of mountains descending steeply into the sea, with valleys in between. The project area is surrounded by hilly highlands that encircle a crescent-shaped plain containing vast agricultural lands.

The entire study area, which forms the designated investigation zone for the project, falls within the Greater Menderes River Basin and the Aydın-Söke Sub-Basin.

In the Aydın-Söke Sub-Basin, the foundational rock units consist of autochthonous rock formations. At the bottom, there is the Pre-Cambrian-aged Eşme Metamorphites, followed by the Triassic-aged Ortadağ Formation and the Jurassic-aged Ağaçlı Formation, both comprising limestone units. The allochthonous units in the region belong to the Likya Nappes, including the Bodrum Nappe and the Marmaris Ophiolite Nappe. Overlying sedimentary rocks in the area consist of the Paleocene-Eocene-aged Söbütepe Formation with sandstones, siltstones, and limestones, followed by the Başçeşme Formation with clastic rocks. On top of these, the Oligocene-aged Hacıbekir Group is present with siliciclastics of various grain sizes. In the Miocene, the Aksu and Gebeciler Formations consist of sandstones, mudstones, marl sequences, and the Çameli Formation includes ‘mudstone’ and 'limestone' members. Pliocene and Plio-Quaternary deposits include young volcanic products such as dacite, rhyolite,

andesite, latite-trachyte, as well as pyroclastics and alternating sand and gravel sedimentary rocks. The Quaternary period includes alluvial deposits formed by the sediment filling of the channels and floodplains of the Greater Menderes River and its tributaries, travertine formations, talus and debris cones in front of the bedrock, and alluvial fans that are fed by these formations, along with ancient river terrace deposits.

Geological Map derived from MTA Geological map is presented Figure 6-3.

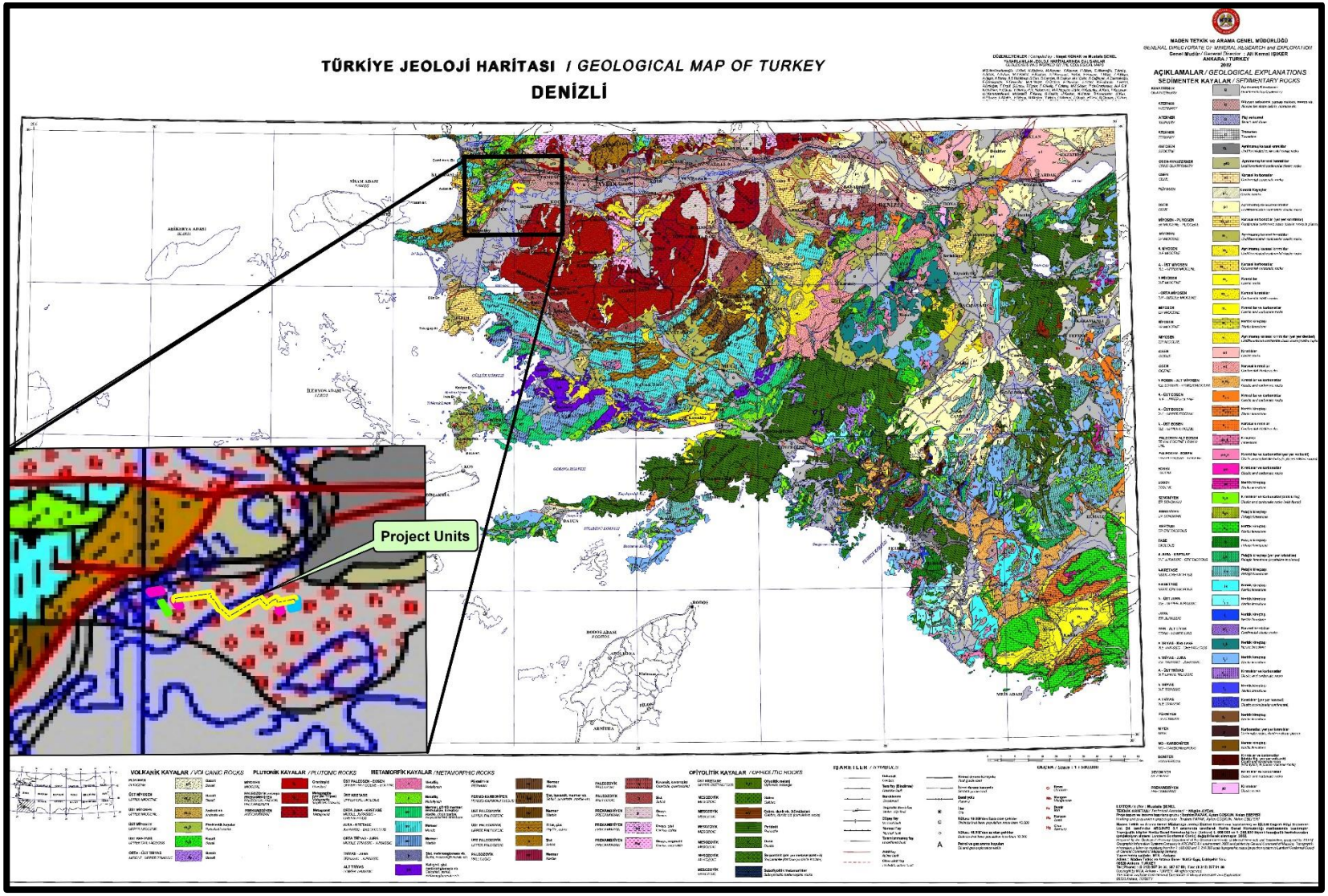


Figure 6-3. Geological Map of the Project Area

6.4.2 Stratigraphy

Stratigraphic section of the Project Area is presented at Figure 6-4.

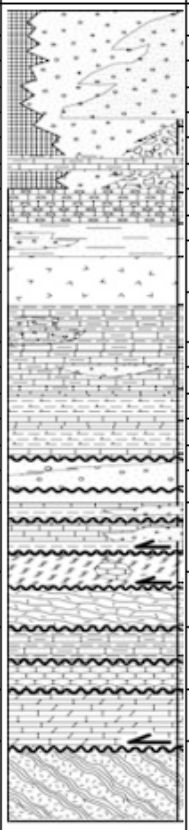
Era	System	Age	Stratum	Symbol	Lithology	Explanation
Cenozoic	Quaternary		Pleistocene	Qp		Beach deposits
				Qal		Alluvion
				Qkk		Scrub
				Qvm		Slope wash and
				Qav		alluvial fan
				plQg		clay limestone
				plQt		Travertine
	Tertiary	Neogene	Upper Pliocene	plQ		Conglomerate, Sandstone, Siltstone
			Middle Pliocene	plQv		Dacit, Rhyolite, Andesite, Latite, Trachyte
				plçk		Clay limestone, Limestone, Travertine, Conglomerate, Sandstone, Mudstone
			Upper Miocene	Tmg		Claystone, marl, siltstone, limestone, conglomerate, sanstone
				plçç		Mudstone, Marl, Clay limestone
				Tmaç		Sandstone, mudstone, Marne
		Paleogene	Oligocene	Toa		Conglomerate, Sandstone, Mudstone
			Upper Eocene	Teb		Conglomerate, Sandstone, Siltstone, Claystone
			Oligocene	Eo		Sandstone, Claystone, Claystone
Mesozoic	Cretaceous		Aptian Cretaceous	Kmof		Metaophiolite, Metaolistostromal marble
				Kmoi		Amphibolite, Marble, Metabasalt, Metachert
				JKb		Micrite, Sparite Micrite, Calciturbidite
				JKmr		Marble
	Triassic		Upper Triassic	TRjo		Dolomite, Dolomitic Limestone, Crystallized Limestone, Marble, Calcareous Sandstone
Precambrian	Proterozoic		Archean Proterozoic	Pze		Gneiss, Migmatite, Metagranitoid, Metagabbro, Amphibolite, Marble

Figure 6-4. Aydın-Söke Lower Basin Stratigraphic Column Section (EIA Report)

Menderes Massif Metamorphic (PMmm)

The Menderes Massif is a geologically significant area located in Türkiye, covering an area of approximately 200 x 300 km. It is surrounded by various geological units such as the Lycian nappes to the south, the Izmir-Ankara Zone, and the Cycladic Complex to the north and northwest. The Massif is divided into three tectonic units: Demirci-Gordes, Odemis-Kiraz, and Cine graben systems.

Geologically, the Menderes Massif consists of a Precambrian "core" and a surrounding series of Paleozoic to Early Tertiary" "cover" rocks. Earlier studies suggested that the stratigraphy of the Massif was relatively simple and regular. However, recent research has shown that the region experienced significant tectonic compression during the Late Alpine period, leading to major thrust faults and substantial changes in the initial stratigraphy.

The core of the Massif is composed of metamorphic rocks, primarily represented by gneisses, schists, and marbles. The core is believed to have undergone multiple phases of Pan-African orogeny, resulting in granulite, eclogite, and amphibolite facies conditions. The metamorphic core is intruded by various plutons, including granitoids and gabbros.

The cover series, which overlies the core, includes Paleozoic sedimentary rocks. The base of the cover series consists of muscovite-quartz schists derived from pure quartz sandstones. Above this, there are metamorphosed quartz pebble conglomerates, interpreted as channel fills from the Pan-African core. The cover series is characterized by a succession of metamorphic rocks, including various schist types and marbles, with different colors such as gray, white, greenish, and bluish shades.

Overlying the Paleozoic series, the Mesozoic units start with mica schists containing meta-conglomerates. These schists are unconformably deposited on the Paleozoic rocks and are followed by dolomite formations. The dolomites contain rudist fossils, which indicate a Late Triassic to Early Jurassic age. The uppermost unit in the Menderes Massif is the Kazikli Formation, comprising a matrix of sandstone and shale-derived from quartz and marbles. This formation is considered to be of Middle Paleocene to Early Eocene age.

Mesozoic Middle Triassic-Jurassic Meta-Ophiolite Complex (Kmof)

The unit called the Meta-Ophiolite Complex (Kmof) is composed of metaophiolite and metaolistostromal marbles, forming distinct outcrops within the Menderes Massif rock groups. This complex series consists of metagabbro, metadiorite, metabasalt, epidote-actinolite schist, chlorite-epidote schist, chlorite schist, and serpentines. The metabasic and metaultramafic rocks have been emplaced onto the Menderes Massif units through thrusting and subsequently folded and metamorphosed in later processes (Aysal, 2002).

Cenozoic Plio-Quaternary Undifferentiated Clastic Units (plQ)

This unit is observed along an east-west trending line in the northern part of the basin and is characterized by loosely consolidated conglomerates, sandstones, and mudstones. These sediments are the products of former lake shores, rivers, and slope debris and are considered to be of Late Pliocene-Quaternary age. They mainly occur in front of topographic highs formed by Triassic-Jurassic aged carbonate units within the study area. The unit is highly permeable and exhibits aquifer characteristics.

Quaternary Alluvial Fan Deposits (Qay)

The alluvial fan deposits are found in elevations along the right and left banks of the Menderes River in the Aydın-Söke Basin. These deposits are composed of gravel, sand, and block-sized materials that generally advance in a northward direction. They primarily originate from metamorphic rocks to the north and secondarily from Miocene-Pliocene units to the south.

Slope Debris (Qym)

Slope debris accumulates in front of steep slopes, controlled by gravity. It is predominantly found in the eastern parts of the study area along a narrow zone along the basin's edge. This unit is mostly composed of loosely consolidated gravel and block-sized materials. In the Aydın-Söke Alt Basin, the occurrence of slope debris is relatively limited, with most of it found within Pliocene-aged sedimentary units, and a smaller portion within Paleozoic-aged metamorphic units to the northwest of the basin.

Alluvium (Qal)

The primary source of the Quaternary alluvium in the Aydın-Söke Basin is the Great Menderes River and its tributaries. These alluvial deposits have a fluviatile character, consisting of clay-gravel sized particles, and are mostly red-colored silt-clay deposits and floodplain sediments. They have an average thickness ranging from 5 to 50 meters across the basin. However, the alluvium's composition of fine-grained clay layers has reduced its hydraulic conductivity, affecting its groundwater yield.

6.4.3 Geochemistry

Geothermal fluids in the Germencik Geothermal Field have a meteoric origin and the tritium content indicates a minimum age of fifty years. All the thermal waters in the study area are sodium, bicarbonate, and chloride water types but hot waters from deep wells are of the sodium, chloride, and bicarbonate water type. The chemistry of these thermal waters is probably dominated by a combination of mixing with cold waters, mineral dissolution - saturation reactions and ion exchange reactions.

Electrical conductivity and pH values and major ion concentrations of thermal waters do not change temporarily during a year. However, bicarbonate concentrations increase during the spring and summer seasons reflecting less mixing of thermal waters with cold groundwaters. Depending on the mineral saturation indices, carbonate and silica minerals in thermal springs and carbonate waters in deep wells are expected to cause scaling in wells. Activity diagrams show that thermal waters produce montmorillonite as alteration minerals. The high boron concentrations of thermal waters of the Germencik geothermal fields cause boron contamination of the cold groundwaters and surface waters used in irrigational purposes in the area. This boron contamination in ground and surface waters causes the soil to be contaminated with boron. To prevent boron contamination in cold groundwater aquifers, thermal waters should be reinjected to their own reservoir.

The measured reservoir temperatures from deep wells of Germencik geothermal fields are–200º C - 232º C. According to the results of chemical geothermometers, the reservoir temperatures are–150º C - 230º C. When correlated with the measured reservoir temperatures, Na/K and Na-K-Ca geothermometers are appropriate for estimating reservoir temperatures for the Germencik geothermal fields. The enthalpy-silica mixing model indicates that hot water

components of thermal spring waters are between 42 % and 83 %. Therefore, thermal spring waters are not fully equilibrated (Filiz, Tarcan, & Gemici, 2000).

The map of the Gediz Graben, where the Project Area is located, is presented in the Figure 6-5.

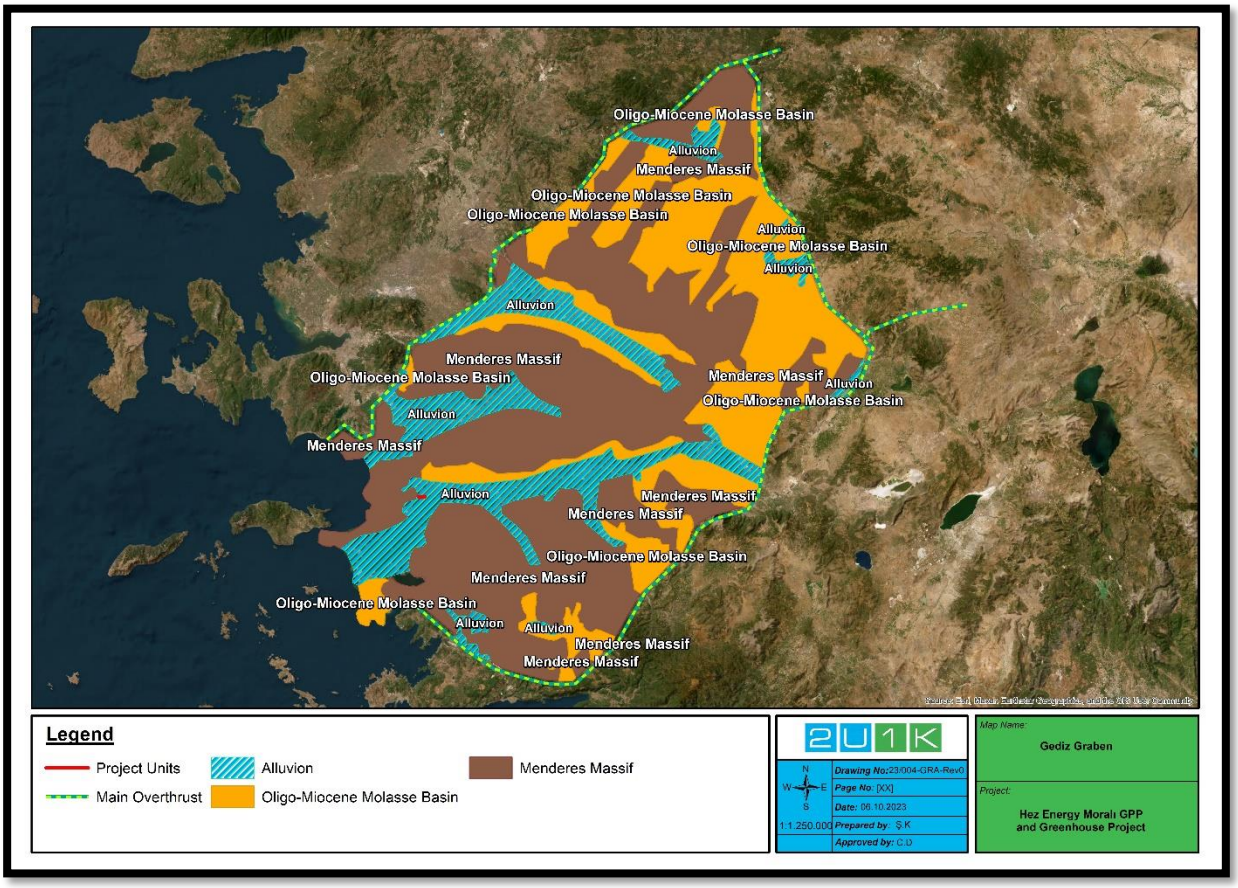


Figure 6-5. Map of Gediz Graben where the Project Area is located

6.4.4 Seismicity

The study area is located within the Menderes graben system, where major fault lines generally trend in a northwest-southeast direction. Notably, the Atburgazı-Söke-Ortaklar fault is prominent, showing distinct fault mirrors at certain locations. In the vicinity of Argavlı (Aydın M18b3 & M19a4) village, the northwest-southeast trending vertical fault intersects with northeast-southwest trending strike-slip faults to form a complex fault pattern. The basic rocks underlying the northern part of the basin, comprising the Germencik-Gümüş and Söke-Sazlıköy geothermal fields, belong to the Paleozoic metamorphic unit known as the Menderes Massif. These rocks include gneisses, mica schists, marbles, and schist in ascending order. The Menderes Massif experienced intense tectonic activity during a period of stratigraphic hiatus, followed by Tertiary sedimentation.

The Tertiary sediments unconformably overlie the Menderes Massif. The Upper Miocene deposits outside the area consist of gravel and sandstones transitioning into siltstone and claystone, with a thickness ranging from 500 to 550 meters. The lower levels of the Pliocene deposits, reaching a total thickness of 500 meters, comprise conglomerates, sandstones, siltstones, and claystones. The uppermost part of the sequence is composed of loosely consolidated Plio-Quaternary deposits.

The area is characterized by abundant fractured marbles and sandstones near fault zones, gneisses, and other units, making them potential reservoir rocks for geothermal exploitation.

The faults observed in the field generally trend in a northwest-southeast and northeast-southwest direction, running almost parallel to each other. The developing transfer fault zones exhibit high permeability and porosity due to deformation, making them essential structures for the geothermal system.

In the study area and its vicinity, fault-related morphologies reflecting the dynamic evolution of the graben are extensively observed. The region between the Great Menderes Graben (BMG) and the Incirliova Segment, which is an extension of the Söke fault, can be considered a typical graben (depression area). The BMG region experienced K-G extension during the Plio-Quaternary period, with deformation and migration of the sedimentary basin towards the hanging wall block of the Big Menderes Detachment Fault (BMSF). Secondary faults and seismic active branches indicate an active detachment system in the region. The K-G extension in the BMG can be attributed to the combined effect of two processes ongoing in the Aegean region. The first process involves back-arc extension or the rollback of the African slab beneath the Southern Aegean Arc, which is responsible for the shift in stress direction from D-B tension to K-G extension. The second process is related to the northward escape of the Anatolian block along the North Anatolian Fault in a GB direction.

The graben and the fault zone that bounds it generally have a northwest-southeast strike in the area until Ortaklar, where it changes to a northwest-southeast direction toward the Aegean Sea. The study area, known as the Söke Basin, lies west of the northwest-southeast trending graben and can be defined as a sub-basin.

The morphologies formed by the northwest-southeast trending fault scarps are prominent in the field. Intense fracturing, asymmetrical ridges, and displaced valleys are commonly observed along t’e basin's edges. The fault scarps, asymmetrical ridges, depression areas, tilted young units, and colluvial deposits in front of the fault all indicate active and young tectonics in the study area and its vicinity, suggesting that the region is a seismically active zone (Figure 6-6).

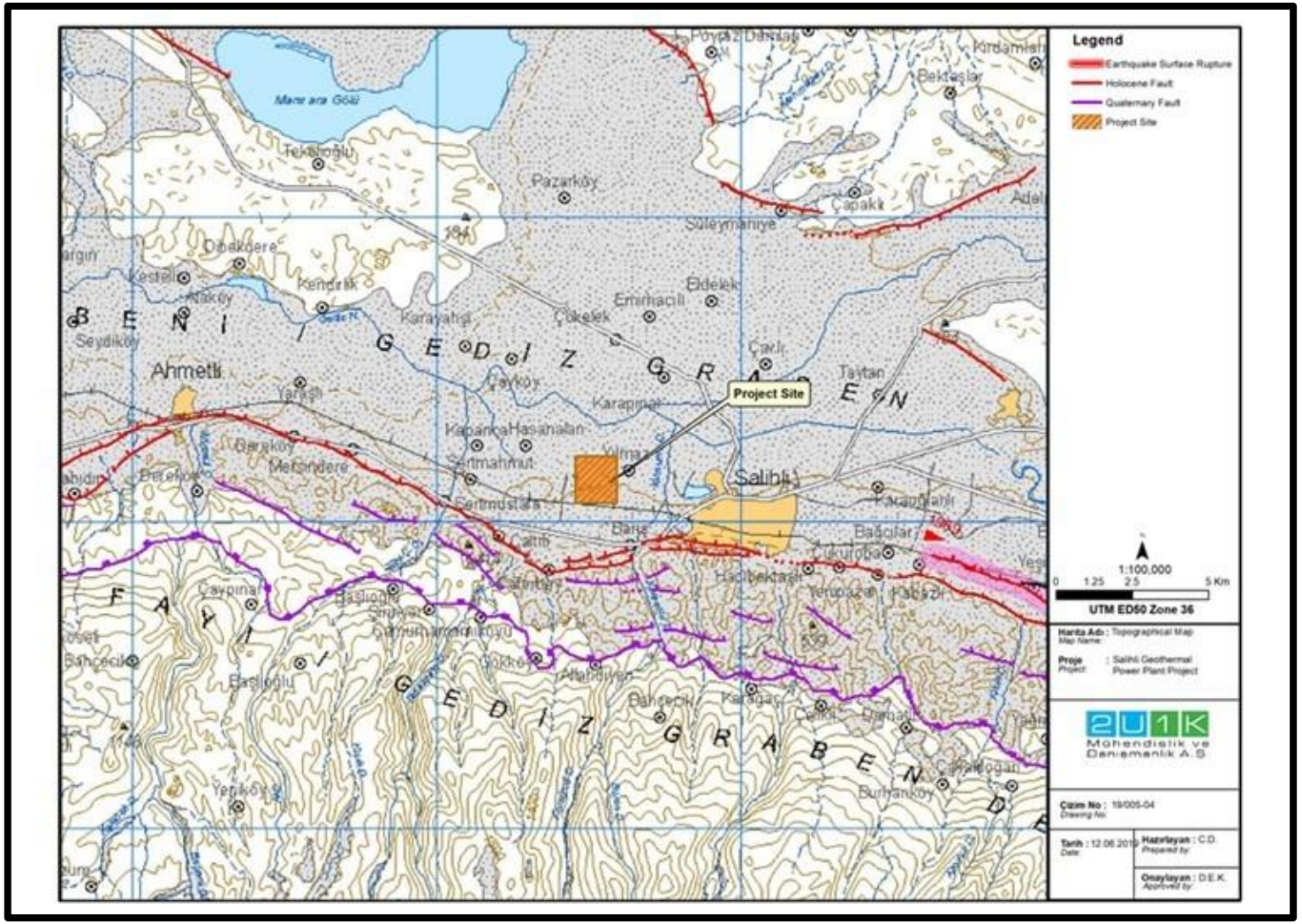


Figure 6-6. Fault Map of the Region

Aydın Province is within 1. Degree Earthquake Risk Zone. There were 15 earthquakes with a magnitude of over 5 on the West Anatolian Fault Line.

The basement rocks of the Büyük-Menderes Basin consist of three main tectonic belts along the İzmir-Ankara Zone, namely the Pontides in the north and the Anatolide-Tauride Platform in the south (Şengör and Yılmaz, 1981). The Anatolide-Tauride Platform, in which the study area is located, is one of the tectonic zones that have undergone deformation and regional metamorphism.

6.4.5 Soil Quality

During the Project EIA process, soil quality analysis was carried out in the Project area to determine the baseline soil conditions. The range of parameters analyzed in soil samples includes: pH, conductivity, Phosphorus, Nitrogen, Oil-Grease, Heavy metals, copper, boron, mercury, cadmium, zinc, lead. Test results are given below in Table 6 3.

Table 6-3. Results of Soil Quality Analysis

Parameters	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
	11.02.2022 N-0193/22	11.02.2022 N-0194/22	11.02.2022 N-0195/22	1.02.2022 N-0196/22	11.02.2022 N-0197/22	11.02.2022 N-0198/22	11.02.2022 N-0199/22	11.02.2022 N-0200/22
	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
pH	8,23	8,15	8,23	8,71	8,64	8,10	8,52	8,19
Conductivity (µS/cm)	155	257	217	121	137	168	199	127
Phosphorus (mg/kg)	1,06	1,53	2,72	5,30	1,95	8,67	1,44	0,41
Nitrogen (mg/kg)	1.393	951	241	951	1.664	936	476	979
Oil-Grease (mg/kg)	<50	<50	<50	<50	<50	<50	<50	<50
Boron (mg/kg)	<2,5	<2,5	<2,5	46,8	3,52	<2,5	<2,5	<2,5
Copper (mg/kg)	7,41	7,86	8,76	11	6,07	6,41	7,16	8,26
Zinc (mg/kg)	30,5	28,4	27,3	45,2	26,3	22,5	14,9	26,8
Hydrargyrum (mg/kg)	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Lead (mg/kg)	2,57	2,73	3,47	4,37	3,25	3,29	2,48	2,98
Iron (mg/kg)	23.634	22.337	24.243	47.643	15.769	19.024	19.884	22.453
Manganese (mg/kg)	440	436	447	1.946	409	418	436	431
Cadmium (mg/kg)	<0,02	<0,02	<0,02	0,022	0,030	0,021	0,023	0,022
Arsenic (mg/kg)	14,4	14,3	18,8	29,3	12,2	11,8	5,20	17,9

6.5 Hydrology and Hydrogeology

The Project area is within “Büyük-Menderes Basin”. It is planned to drill 4 more wells -in the same parcel- next to the HEZ-3 well that was opened in the 228 block 1 parcel, which is within the EIA area no. 1 and connected to the Moralı neighborhood of the Germencik district. It is planned to drill 5 wells in 145 block 7 parcel in Söke district Argavlı neighborhood, which is within the EIA No. 2 area. It is planned to drill 1 more well in the same parcel, next to the existing ARG-1 well in parcel no. 139, which is within the EIA area no. 3 and in the Argavlı neighborhood of Söke district. The nearest surface water to EIA Area No. 1 is the Moralı Stream, which passes 40 m to the west. The EIA area no1 is 2,620 m away from the Büyük Menderes River. The nearest surface water to EIA No. 2 is the dry stream, which is 435 m away. EIA Area 2 is 830 m away from Moralı Stream and 4,150 m away from Büyük Menderes River. The nearest surface water to EIA Area 3 is a dry stream passing 285 m away. EIA Area 3 is located at a distance of 1,300 m from the Moralı Stream and 4,620 m from the Büyük Menderes River. All EIA sites are located in the downstream part of the Büyük Menderes river basin. Monitoring points have been identified in all flowing surface waters and have been included in the monitoring programme. The distances of the streams closest to the EIA areas are also summarised in the table below.

There will be no water use from surface water during project activities.

During construction phase, water will be required for;

Table 6-4. Water Use

Water Use	Amount of Water	Source of Water Supply
Domestic and drinking water use for drilling site	6.09 m3/day	Drinking water consists of drinking water complying with the Turkish Food Codex or packaged spring water; Drinking water will be supplied from the groundwater well in the area (∑50ton/day).
Domestic and drinking water use for construction site	30.45 m3/day	
Creation of drilling mud for drilling processes	1.80 m3/day	
Dust suppression operations	12.94 m3/day	
Well completion tests performed by drilling/flooding method	800~1.675 m3	The fluid brought to the surface will be used. It will be reinjected and disposed of, and the needed water will be provided.
Grand total (Except for well completion tests performed by drilling/flooding method)	45.79 m3/day	Well flow rate 50 m3/day

Water required for drilling and dust suppression will be provided from an existing well in the drilling site. The Project has secured the use permit of this existing well from DSİ (State Hyrdaulic Works) on 01.07.2016. According to the permit, water with an amount of 50 ton/day (with a total amount of 5000 ton/ year) can be used for Project purposes. Since the total required amount of water is 45.79 m^3/day, the existing well meets the required amount for the construction phase of the project.

On the other hand for the operation phase, Hez Enerji will apply DSI for additional permit for groundwater use considering that the required water amount will be a total of about 16.713 ton/year.

The analysis results of the existing well is given in Table 6-4 below:

Table 6-5. Characteristics of the Groundwater Well

Parameter	Result	Regulation on Water Intended for Human Consumption
Taste	Suitable	-
Odor	Suitable	-
Turbidity	Suitable	-
Colour	0,38 (Pt-Co)	Max 20,0 (Pt-Co)
pH	7,77	5,5-8,5
Total Salt	203,5 mg/lt	-
Electrical Conductivity	318,0 µs/cm	2500 µs/cm
Carbonate	0,00 mg/lt	-
Bicarbonate	54,92 mg/lt	-
Boron	0,00 mg/lt	1 mg/lt
Chloride	16,87 mg/lt	250 mg/lt
Sodium	8,30 mg/lt	200 mg/lt
Calcium	19,81 mg/lt	100 mg/lt
Magnesium	6,50 mg/lt	50 mg/lt
Sodium Absorption Rate	0,412	-
Suspended Solids	0,00 mg/lt	-

6.6 Natural Disaster Risk

Due to its geological situation and climatic characteristics, Aydın Province is located in disaster risk areas in terms of disasters and emergencies such as earthquakes, meteorological and climatic disasters, floods, landslides, rock falls, fires, industrial accidents.

The area falls within the high seismic hazard zone according to the AFAD earthquake hazard map, with significant earthquakes ranging from M=6.0-6.9 occurring. Earthquakes with magnitudes larger than M>6.5 have been distributed around the borders of Aydın province, particularly in the area of the Great Menderes Graben, as well as in neighboring provinces such as İzmir, Manisa, Muğla, and Denizli. Notably, the most impactful earthquake in the region occurred in 1928, 37 km away from Aydın, known as the Tire-İzmir earthquake.

AFAD Türkiye Earthquake Hazard Map is presented at Figure 6-7.

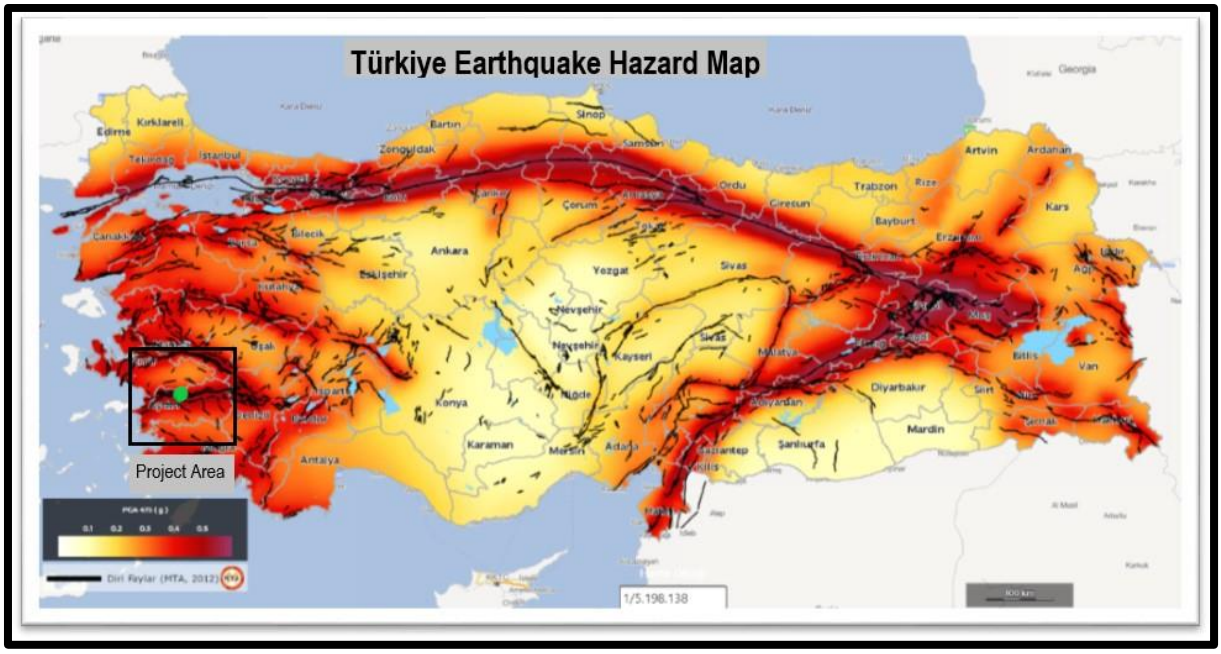


Figure 6-7. AFAD Türkiye Earthquake Hazard Map

Settlement and agricultural areas within the provincial borders, etc. Flood protection facilities, etc., by DSI in order to eliminate the causes of flooding in the regions, prevent floods and reduce damages. constructions are underway. (Aydın Provincial Disaster Risk Reduction Plan, 2022)

6.7 Air Quality

During EIA process, air quality sampling studies were conducted by Febas Environmental Laboratory on January-April 2022. H_2S and SO_2, PM_{10} and settled dust concentrations were measured to determine the background conditions. Measurement locations have been chosen considering prevailing wind directions (i.e., NNW-NNE) and sensitive receptors.

Passive diffusion method was used to determine the concentration levels of H2S and SO2 concentrations. The measurements were performed in a measurement period of 30 days according to the Industrial Air Pollution Control Regulation. Measurement points were determined by choosing to represent the baseline condition studies and to consider the dominant wind direction and existing facilities. Table 6-6 presents H_2S and SO_2 measurement results.

Table 6-6. H_2S and SO_2 Measurement Results Comparison

Parameter	Measurement Location	Measurement Results (µg/m³)		Limit–Values - Industrial Air Pollution Control Regulation (IAPCR)	WHO Ambient Air Quality Guideline Values
		1. Period	2. Period		
H_2S	HK-1	<0.90	<0.90	100 µg/m³ (1-hour limit value); 20 µg/m³ (short-term limit value)	150 µg/m³ (24-hour limit value)
	HK-2	<0.90	<0.90		
	HK-3	<0.90	<0.90		

Parameter	Measurement Location	Measurement Results (µg/m³)		Limit–Values - Industrial Air Pollution Control Regulation (IAPCR)	WHO Ambient Air Quality Guideline Values
		1. Period	2. Period		
	HK-4	<0.90	<0.90		
	HK-5	<0.90	<0.90		
	HK-6	<0.90	<0.90		
	HK-7	<0.90	<0.90		
	HK-8	<0.90	<0.90		
	HK-9	<0.90	<0.90		
	HK-10	<0.90	<0.90		
	HK-11	<0.90	<0.90		
	HK-12	<0.90	<0.90		
SO_2	HK-1	28.36	21.01	60 µg/m³ (long-term limit value)	40 µg/m³ (24-hour limit value)
	HK-2	23.46	19.99		
	HK-3	30.20	18.97		
	HK-4	21.63	18.97		
	HK-5	24.28	25.09		
	HK-6	20.81	23.05		
	HK-7	21.01	23.05		
	HK-8	19.99	15.51		
	HK-9	18.16	17.75		
	HK-10	21.42	16.73		
	HK-11	27.95	18.36		
	HK-12	18.16	18.57		

PM10 and settled dust were also measured at 4 locations. The results are given in Table 6-7 presents PM10 and settled dust measurement results.

Table 6-7. PM_{10} and Settled dust Measurement Results Comparison

Parameter	Measurement Location	Average Measurement Results	Limit–Values - Industrial Air Pollution Control Regulation (IAPCR)
PM10 (µg/m³)	PM10-1	19.18	50 µg/m³ (24-hour limit value); 40 µg/m³ (annual limit value)
	PM10-2	18.04	
	PM10-3	0.79	3 mg/Nm³ (facilities where filling, separation, screening, transportation, crushing, grinding operations are carried out)
	PM10-4	0.91	
Settled Dust (mg/m²day)	1. Location	90.5 (short-term) 135 (long-term)	390 mg/m²day (short-term limit value) 210 mg/m²day (long-term limit value)
	2. Location	81 (short-term) 140 (long-term)	
	3. Location	72.5 (short-term) 138 (long-term)	
	4. Location	68.5 (short-term) 129 (long-term)	

According to Measurement Report prepared by Febas Environmental Laboratory dated April 26, 2022, PM_{10} and settled dust measurement results are below the regulatory limits.

6.8 Noise and Vibration

Noise measurements were conducted by Febas Environmental Laboratory on February 10, 2022 at ten locations near to the Projects area. The measurement results are given in Table 6-8 below:

Table 6-8. Noise Measurement Results Comparison-February 2022

Location	Measurement Results (dBA)
G-1	39.8
G-2	38.5
G-3	40.5
G-4	42.5
G-5	46.9
G-6	37.3
G-7	47.1
G-8	37.5
G-9	38.4
G-10	38.7

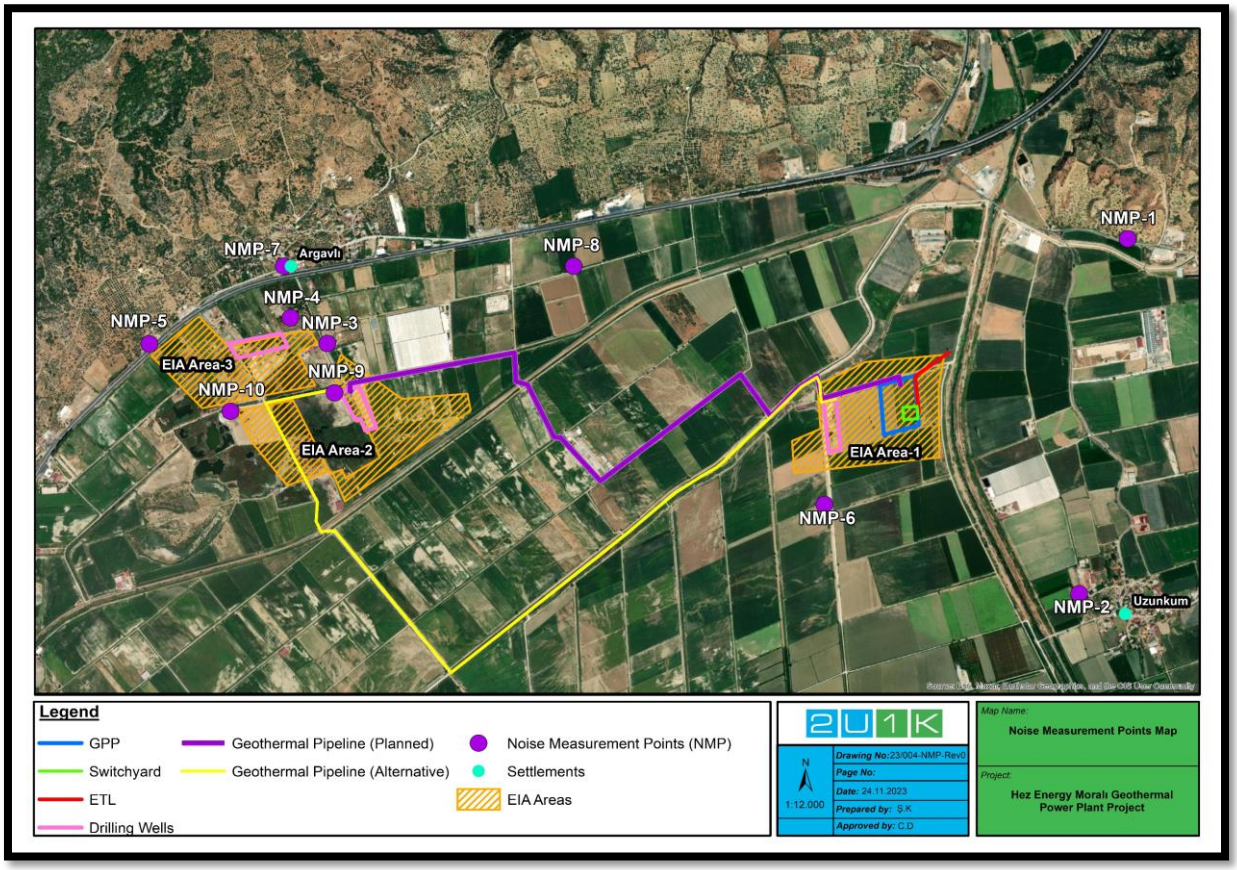


Figure 6-8. Noise Measurement Points

National regulation regarding environmental noise by industry is set in Regulation on Assessment and Management of Environmental Noise (RAMEN), while for international standards, IFC EHS Guideline for Environmental Noise Management also sets standards, which are discussed below. Within the scope of the Project, the calculations and precautions regarding the vibration and noise that will occur during the construction phase were assessed in the acoustic report within the National EIA.

Noise will be generated during the construction phase due to the activities of construction vehicles at Project sites. The noise emission generated due to the construction activities was calculated in the EIA Report and it is concluded that the noise emissions at the closest house to Project site will be 69.11 dBA at 55 m and this value will not exceed the noise limit (70dBA for daytime) given in Regulation on Management of Environmental Noise and noise level limit given in Table 6-9 of IFC General EHS Guideline. The closest residential area to the construction site is at 90 meters distance and it is observed that noise levels decrease with increasing distance from the source. Also the modelling studies are based on the assumptions that all construction machines and equipment work at the same time therefore the expected noise level is lower than the calculated noise level for construction period of the Project.

Since the modelling studies are based on the assumptions that all construction machines and equipment are working at the same time, the expected noise level is lower than the calculated noise level for construction period of the Project.

During construction phase of Projects, in case of any complaints, noise measurements should be conducted at least for 48 hours in line with IFC General EHS Guideline.

Table 6-9. IFC General EHS Guideline- Noise Levels

Areas	$L_{day\text{-}time}$ (dBA) (07:00-22:00)	$L_{evening}$ (dBA) (22:00-07:00)
Residential; institutional; educational	55	45
Industrial Areas	70	70

Source: Noise Level Guidelines, GENERAL EHS GUIDELINES: ENVIRONMENTAL

6.9 Waste and Wastewater Management

Waste Management

Solid wastes generated during the construction stage are generally domestic solid wastes produced by the staff, packaging wastes, waste batteries and accumulators, medical wastes, hazardous wastes, drilling mud and excavations wastes. These wastes are collected separately in waste separation bins. Solid waste collection services are provided by the municipalities of Söke and Germencik. In addition, the Kuşadası Landfill, which is the closest landfill to the project, is presented Figure 6-5.

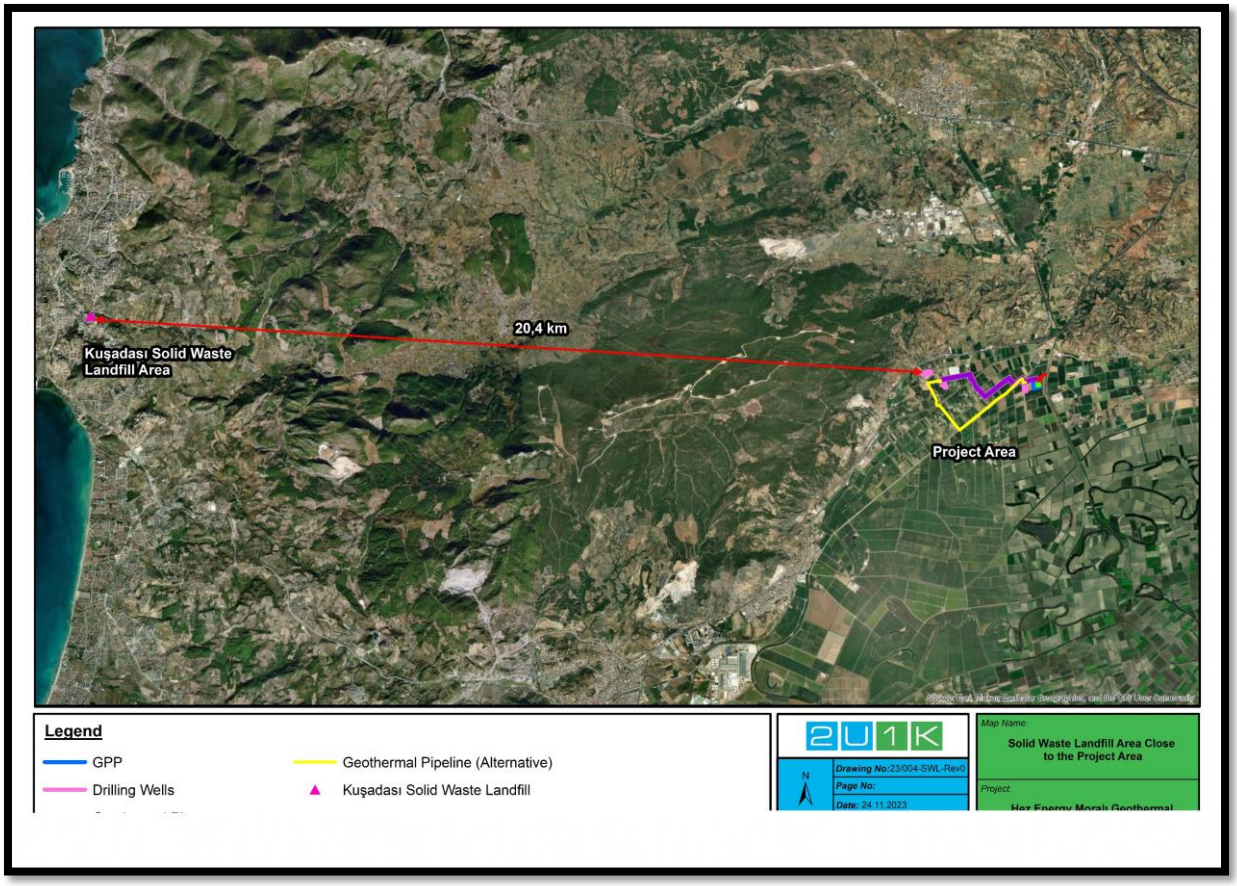


Figure 6-9. The distance of the nearest treatment plant to the project area

Summary information on solid wastes generated during land preparation and construction are presented in the table below.

Table 6-10. Wastes Generated during Land Preparation and Construction Phase (EIA Report)

Waste Type	Amount	Description
Domestic Solid Wastes	120.96 kg/day	Paper and Cardboard Glass Plastics
Packaging Wastes	51.84 kg/day	Paper, Cardboard Packaging Plastic Packaging Composite Packaging Mixed Packing Glass Packaging
Waste Battery	23±7 piece/year	Nickel Cadmium Batteries
Medical Wastes	1.81 kg/day	Wastes whose collection and disposal are subject to special treatment in order to prevent infection
Hazardous Wastes	1.72 kg/day	Cloths and Clothing Oil Filter Waste Contaminated Packaging
Excavation Wastes	3.3 kg/day	-
Drilling Mud	292 m^3	Drilling muds containing dangerous substances

The main national regulation on solid waste management is Regulation on Waste Management.

Internationally, the IFC EHS Guideline on Waste Management expect from the Projects that waste generation should be avoided altogether. When this and the waste reduction means are already applied and still there is a waste generation, it should comply with national and international standards and in their absence, GIIP (Good International Industry Practice).

Wastewater Management

There will be domestic wastewater and geothermal water, drilling mud generation during construction phase of the Project.

There is not wastewater collection network within the Argavlı, Uzunkum and Moralı neighbourhoods. Domestic wastewater is being collected in septic tanks and drawn with vacuum trucks and sent to Aydın Metropolitan Municipality Treatment Plant for disposal. The nearest wastewater treatment plant to the project area is the Söke Wastewater Treatment Plant.

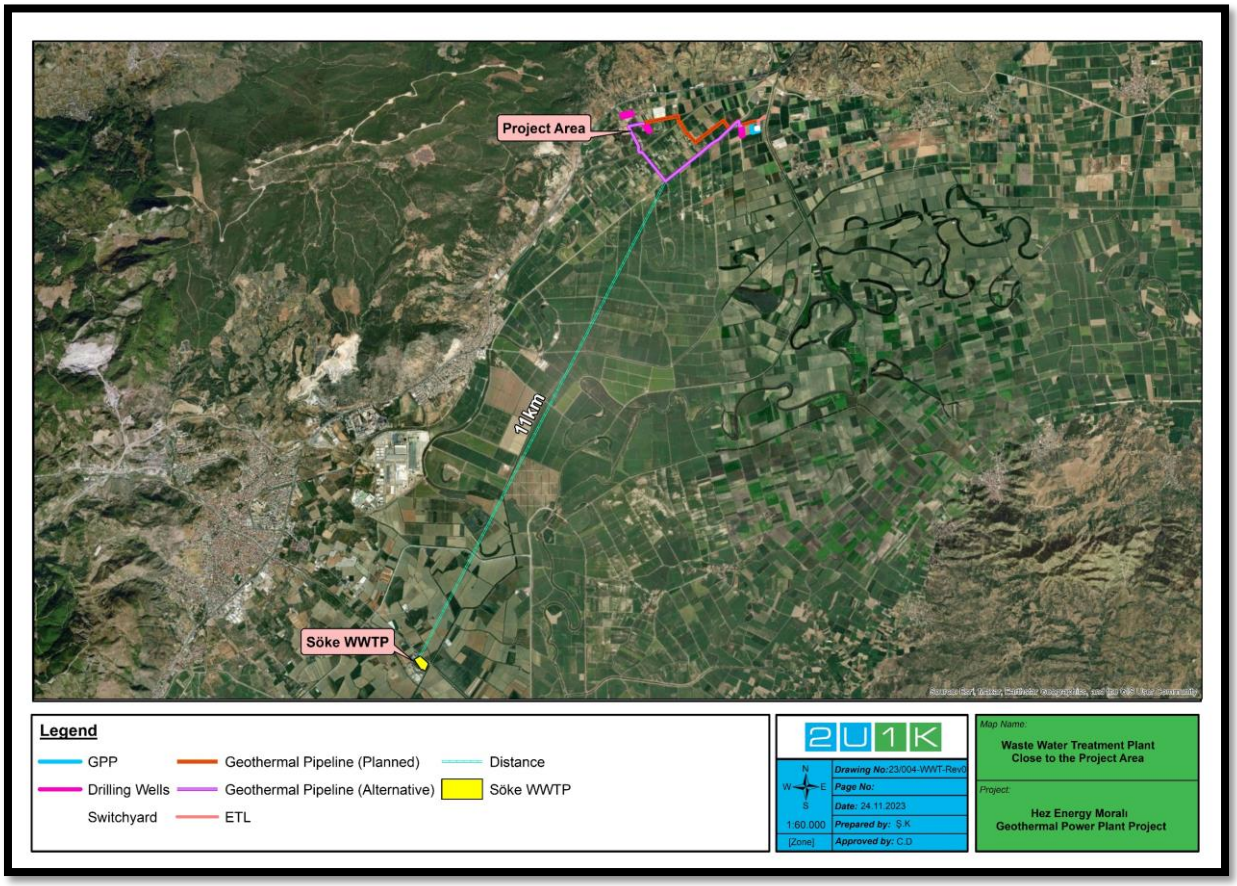


Figure 6-10. The distance of the nearest treatment plant to the project area

Domestic wastewater generated at the drilling locations will be collected in the impermeable septic tank established in the drilling area will be transported to the appropriate sewer system or treatment plants by being removed from the area with vacuum trucks. According to EIA Report, within the scope of the project, it is planned to employ of 30 people per day at drilling location. The amount of drinking and utility water required by the personnel at a drilling location has been calculated as 6.09 m^3/day. The total amount of domestic wastewater to be generated as a result of water use will be 6.09 m^3/day, assuming that all of the drinking and utility water to be used will be wastewater. It is planned to employ 150 people at construction site of the Project. The amount of drinking and domestic water that the personnel will need is calculated as 30.45 m^3/day. The total amount of domestic wastewater that will be generated as a result of water use will be 30.45 m^3/day, assuming that all of the drinking and utility water to be used will be wastewater. The resulting wastewater will be treated in the package wastewater treatment plant which will be established and discharged to the receiving environment after Water Pollution Control Regulation discharge standards are met.

Table 6-11. Water Pollution Control Regulation Discharge Standards (Table 21.)

Parameter	Unit Load (g/person-day)	Expected Total Load (kg/day)
BOD5	45-54	6.75-8.10
COD	1.6-1.9 x BOD5	1.62-0.02
Total Organic Carbon	0.6-1.0 x BOD5	0.61-1.22
Total Solids	170-220	25.50-33.00
Suspended Solids	70-145	10.50-21.75
Chloride	4-8	0.60-1.20
Total Nitrogen	6-12	0.90-1.80
Total Nitrogen	6-12	0.90-1.80
Free Ammonia	0.6 x Total Nitrogen	81.00-162.00
Nitrate Nitrogen	(0.0-0.05)xTotal Nitrogen	6.75-13.50
Total Phosphorus	0,6-4,5	0,09-0,68

Ditches with sufficient capacity will be designed around the project area to transport stormwater and fire water to collection pits. The water accumulated in the collection pits will be removed from the area to be delivered to appropriate treatment facilities when necessary, thanks to two separate lines and valves in the lines to be established at the exit of the collection pits.

Major effluents of drilling projects are spent geothermal fluids, reject water from injection wells, well cleaning water (for clogging) and domestic wastewater. There will be no fluid discharge during drilling since dry location method be used.

Drilling fluid/mud is used in the circulation system required in deep well drilling, it is the general name given to the fluids that ensure the healthy progress of well drilling. It contains organic and inorganic chemicals, minerals from the cut formation and fresh water. For this reason, it is another pollution parameter that is very essential to manage in terms of environmental threats.

Table 6-12. Liquid waste generated during the site preparation and construction phases of the project (including drilling) and measures to be taken

Source and Type of the Wastewater	Amount	Explanation	Wastewater Description	Waste Code	Waste Management
1- Domestic Usage Water Need of Drilling Site Workers	6,09 m^3/day	Due to Domestic Water Usage	Septic Water	biodegradable	It will accumulate on Septic Tank (cesspool)
2- Domestic Usage Water Need of Facility Construction Site Workers	30,45 m^3/day				WW treated on package wastewater treatment plant discharges to environment according to WPCR
3- Waste Grease occurrence on Drilling Site	30 lt	Due to Maintenance of the machinery	Easily biodegradable engine, shaft and oils for oiling	13 02 07*	Will be given to recovery companies
4- Waste Grease occurrence on Facility Construction Site	-	Due to the construction, there will be no additional oil and no waste oil will be formed			
5- Drilling Liquid Mud on Drilling Site	At max 60 m^3	After precipitation of the drilling mud the liquid above the water			The "dry location" method will be used for the management of drilling mud waste. With the dry location method, water from the drilling mud is separated by the use decanters and sieves and recirculated within the system. Remaining drilling mud is collected within crescent-shaped waste tanks and transferred to licensed disposal companies.
7- Geothermalwater formation on drilling site	At max 1.675 m^3	Due to Well construction	Geothermal originated hot water		It will be deposited in the sealed pool. From the same well, the geothermal aquifer will be reinjected back and disposed of by being , Geothermal fluids and test waters will be managed in compliance with national regulations. They will be analyzed, and the required permits will be obtained from authorities before reinjection.[11]

[11] Implemation regulation for Law on Geothermal Resourses and natural mineral water, (Official Gazette Dated 11.12.2007 and Numbered .26727) Its be should be noted that all geothermal power plant having in stold power capacity 5 MWe are subjucted to Environmental Permit and Liaence Regulation.

Drilling Mud

The disposal method for drilling mud is currently undefined in the regulations due to the repeal of the previous directive, 2012/15, titled "Disposal of Drilling Mud and Waste Resulting from the Physical Processing of Chreme Ore." Moreover, geothermal activities are excluded from the definition of mining waste in the Mining Waste Regulation (Ministry of Environment, Urbanization and Climate Change, Official Gazette Date: 15.07.2015, No: 29417), making it impossible to establish disposal methods for solid waste generated from geothermal projects within the scope of this regulation.

However, the hazardous class and disposal method for drilling mud are determined based on the hazardous properties provided in Annex-2 of the Regulation on the Land Disposal of Waste and the limit values provided in Annex-3/A of the Waste Management Regulation.

Drilling fluid, also known as drilling mud, plays a vital role in deep drilling operations, serving specific functions to ensure smooth progress. It contains organic and inorganic chemicals, minerals from the cut formation, and fresh water, making it a significant pollution parameter that requires careful environmental management. The drilling fluid used during drilling is managed in three separate pools:

Fresh Water Pool: Used for preparing the drilling fluid before its use in the drilling process.

Dry Location Method: In the "dry location" approach, wet materials that come to the surface, including those floating in the drilling mud, are directed into crescent-shaped waste tanks equipped with advanced decanters and screening systems. Subsequently, they undergo a dewatering process, are dried, and then transferred to a licensed company for disposal while the remaining water is directed into reserve water tanks for reuse within the system.

The estimated amount of mud produced in the project from one deep well at a depth of 3,500 m is 292 m^3, and the total amount of mud expected from 10 planned wells in this project is expected to be approximately 2,920 m^3. This calculated amount represents the solid material coming out of the well, which is separated by a sieve from the solid material carried by the drilling fluid in the mud pond and is not returned to the circulation. The settled solid mud is sent for disposal before the pool reaches its full capacity. The total volume of the pools, including the air content, where the sludge is managed, amounts to 602 m^3. Cuttings may be classified as hazardous depending on the concentration and potential for leaching of silica compounds, chlorides, arsenic, mercury, vanadium, nickel, and other heavy metals. In such cases, cuttings need to be disposed of appropriately.

6.10 Biodiversity

In this section, biological environment was investigated which included habitat structures of the Project area and close vicinity, Nationally Protected Areas, and Internationally Recognized Areas (such as Key Biodiversity Areas). For this purpose, desktop studies and field surveys

were carried out. Site visits were conducted by Biologist Celal Denizli and Şevval Kurt on 03.05.2023-05.05.2023. Also during the EIA phase, site visits were made by field ornithologist in the fall of 2021 and spring of 2022 and an ornithological evaluation report was prepared.

The research's methodology was established, and subsequent fieldwork and literature research were conducted by biologists Celal Denizli and Şevval Kurt. The data collected encompassed the following aspects:

- Biological components on terrestrial environment,
  - Terrestrial habitats and ecosystems
  - Terrestrial flora and ecosystems,
    - Flora species
  - Terrestrial fauna components
    - Amphibians and reptiles,
    - Aves,
    - Mammals,
- Key biodiversity areas,
- Important Bird Areas,
- Important Wetlands (Ramsar Sites),
- Potential sensitive areas.

The methodology to determine the baseline conditions included the following:

- Review of pertinent literature and previous works.
- Field studies carried out in the Project Area.
- Satellite image interpretation, as available.
- Communication with the inhabitants in the study area during the field studies.

The data review included an extensive review of published scientific literature, websites and other sources. General aspects of the baseline studies are provided below:

I. Within the scope of the field studies, a review of the existing information was undertaken and ecological composition of the Project area in terms of terrestrial flora and fauna elements; potential sensitive areas and sensitive species were identified.

II. Distribution, population, ecology and reproductive biology of the threatened and endemic plant species that are likely to occur within study area of interest were studied. The literature surveys were intended to give information on identification of endemic, endangered, and rare species and species defined under the national and international conservation status. Accordingly, species that are under the risk of being affected due to the Project and therefore, require special attention and protection measures were determined.

III. A species inventory for the baseline conditions are established as well as description of the habitats, having been recorded in a systematic way. Also, Endemic, restricted

range, CR (Critically Endangered), EN (Endangered) and VU (Vulnerable) category flora and fauna species were determined as the target species within the scope of the study.

6.10.1 Definition of the Study Area

Project area is located in Argavlı, Uzunkum and Moralı neighborhoods of Söke district of Aydin province. The Mediterranean climate is dominant and the coastal Aegean climate is also observed in the project area. The presentation of the Project Area is given in Figure 6-11.

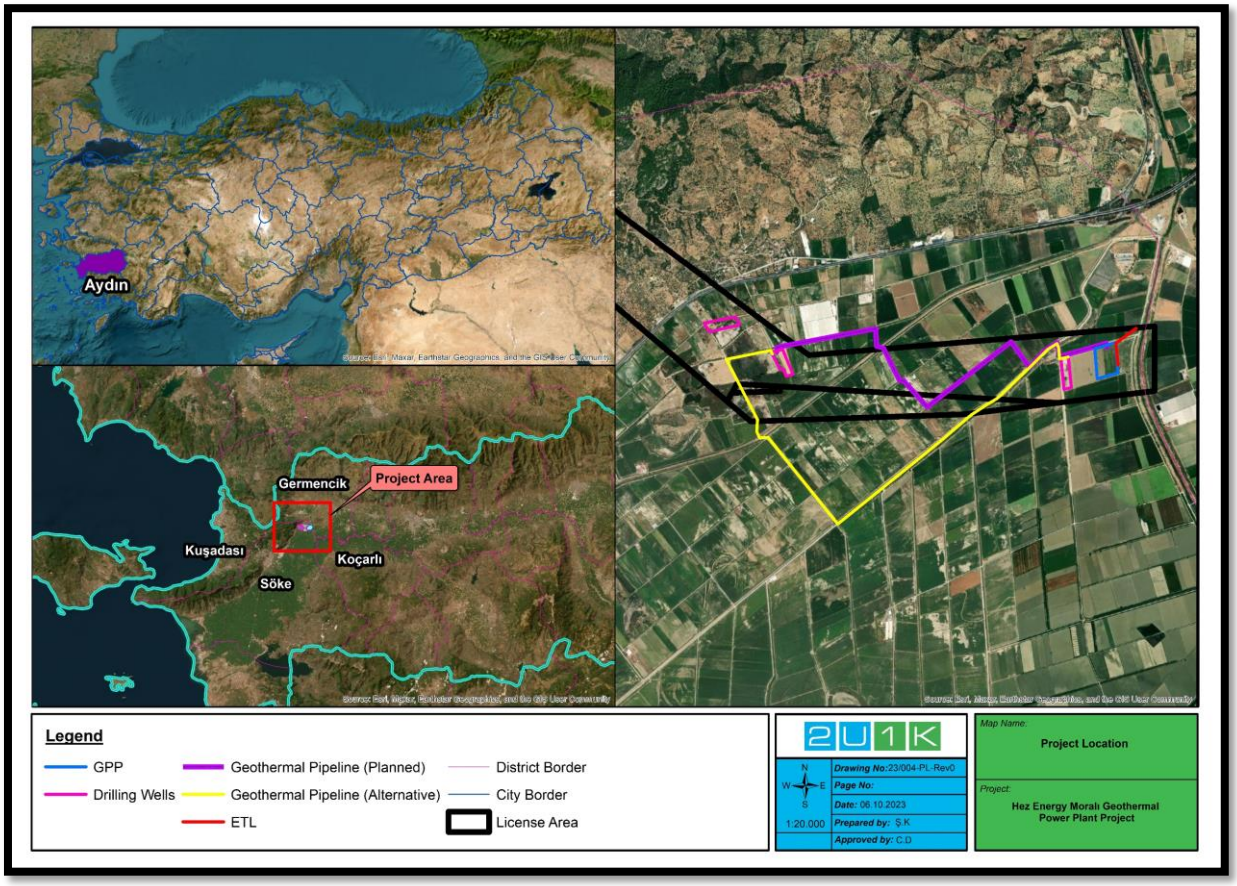


Figure 6-11. Project Location

The project area is predominantly surrounded by agricultural areas. Due to anthropogenic impact observed in the project area, there is a notable suppression in the distribution of flora and fauna. The prevalent flora species mainly comprise ruderal species. On the other hand, the fauna in the project area consists of species that demonstrate tolerance towards the effects associated with agricultural activities, including human presence and noise. General view of the Project Area and surrounding habitats are shown in Figure 6-12 and Figure 6-13

Figure 6-12. General view from the Project Area-1.

Figure 6-13. General view from the Project Area-2.

6.10.2 Flora

Vegetation and plant species of the Project site and its immediate environment have been assessed as a result of field studies and literature survey. The entire flora species of the region that is included in the resource “Flora of Türkiye and the East Aegean Islands, Volume 1-11, University Press, Edinburgh, 1965-1988 by Davis P.H.” have been reviewed in order to eliminate any potential errors. Endemic species with possible existence due to their habitat characteristics have been considered in particular.

Field studies have been conducted in addition to previous studies for determining the plant species within the Project site, and the information obtained have been supported by literature data. Determination of flora species has been based on field investigations while studies in the literature have been made use of for undefined plant species.

Field surveys were carried out as part of the EIA during the months of October to November 2021 and March to April 2022. Additionally, within the ESIA studies, field studies were conducted on 15-16 February and on 3-5 May, 2023. Data collected during the EIA field surveys was cross-referenced and utilized as supplementary information during the ESIA studies. Field studies on the project area were carried by biologist Celal Denizli and Şevval Kurt. The habitats at each point determined during the field studies were examined in detail and the field notes were recorded in the field book. Species observed in the field were photographed and species were identified. The habitat-based species in the floristic list were prepared based on the findings and observations.

The project area is predominantly characterized by agricultural lands and features a flat topography. In addition, the habitat where Drilling Well 2 and 3 partially intersects with the D5.3 "Swamps and marshes dominated by *Juncus effusus* or other large *Juncus spp*." habitat in accordance with the EUNIS (European Nature Information System) classification. Although this habitat is natural in character, heavily grazing and trampling in the area has resulted in its degradation and the spread of *Juncus* spp. in the area. Field surveys indicate that the natural vegetation has been destructed by anthropogenic impacts and has been replaced by cultivated plants. The herbaceous vegetation on the Project Site was not in good form, being quite degenerated. The surroundings of the Project area are also composed of highly modified habitats surrounded by road networks, residential buildings and agricultural lands.

The results of EUNIS based habitat classification obtained as a result of the analyzes made in the GIS environment are given in Table 6-13 and Figure 6-14. In this table, spatial information regarding the overlaps of project components and associated facilities with habitats is also provided.

Table 6-13. Habitat Types and EUNIS Codes

Habitat Class	EUNIS Code	Habitat	Description	Distribution	Project Footprint Overlaps with the Habitats (ha)		
Natural	D5.3	Swamps and marshes dominated by *Juncus effusus* or other large *Juncus* spp.	Stands of large juncus spp. invading heavily grazed and trampled marshes or fens or eutrophicated poor fens and bogs	Intersects with the project area	0.99	Drilling Well 2	0.54
						Drilling Well 3	0.45
	E2.1	Permanent mesotrophic pastures and aftermath-grazed meadows	Regularly grazed mesotrophic pastures, fertilised and on well-drained soils	Adjacent to the project area	0		
	E5	Woodland fringes and clearings and tall forb stands	Stands of tall herbs or ferns, occurring on disused urban or agricultural land, by watercourses, at the edge of woods, or invading pastures.	Immediate vicinity.	0		
	G2.9	Evergreen orchards and groves	Mostly olive orchards	Immediate vicinity.	0		
	G4	Mixed deciduous and coniferous woodland	Forest and woodland of mixed broad-leaved deciduous or evergreen and coniferous trees	Immediate vicinity.	0		
	X10	Mosaic landscapes with a woodland element (bocages)	Mosaic landscapes with a woodland element (bocages)	Immediate vicinity.	0		
Modified	I1.1	Intensive unmixed crops	Cereal and other crops grown on large, unbroken surfaces in open field landscapes.	Intersects with the project area	5.86	GPP	3.08
						Drilling Well 1	1.11
						Drilling Well 2	0.71
						Drilling Well 3	0.95
	J1.2	Residential buildings of villages and urban peripheries	Residential buildings in suburbs and villages.	Immediate vicinity.	0		
	J3.3	Recently abandoned above-ground spaces of extractive industrial sites	Disused sites that were formerly quarries or open-cast mines of type	Immediate vicinity.	0		

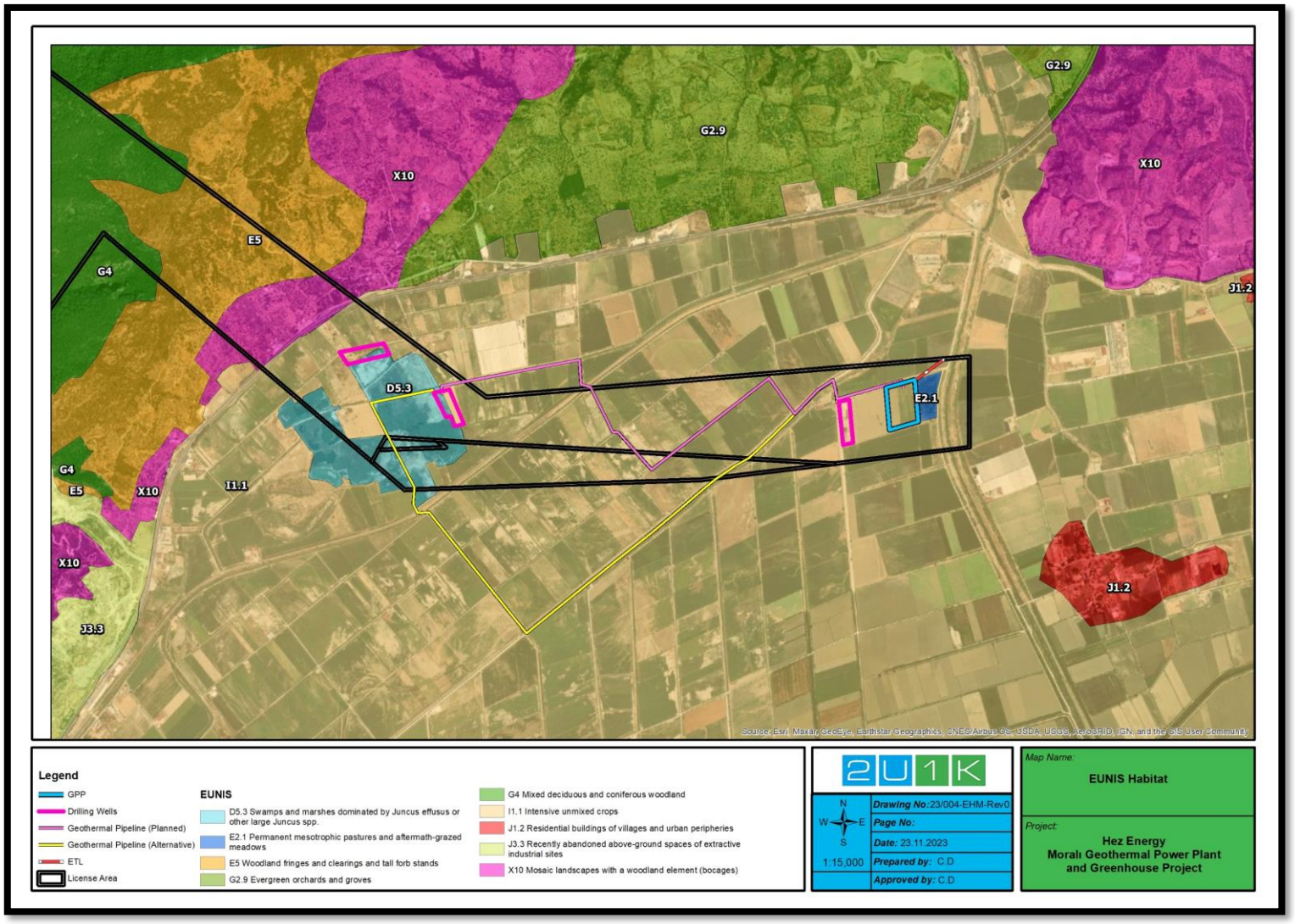


Figure 6-14. EUNIS Habitat Distribution within the project area and its surroundings.

During the conducted fieldwork, a comprehensive survey revealed a total of 100 species within the observation area. It is important to note that apart from *Ajuga bombycina*, none of the identified species were categorized as Endangered or endemic. Remarkably *Ajuga bombycina* with a flowering period from early April to late May stands out as an endemic species, as its presence was not observed during the fieldwork, and it is solely documented in literature records. The vast majority of the flora elements that identified during the studies area are widespread species for the Aegean Region. The region is located the Mediterranean phytogeographical region (see. Figure 6-15).

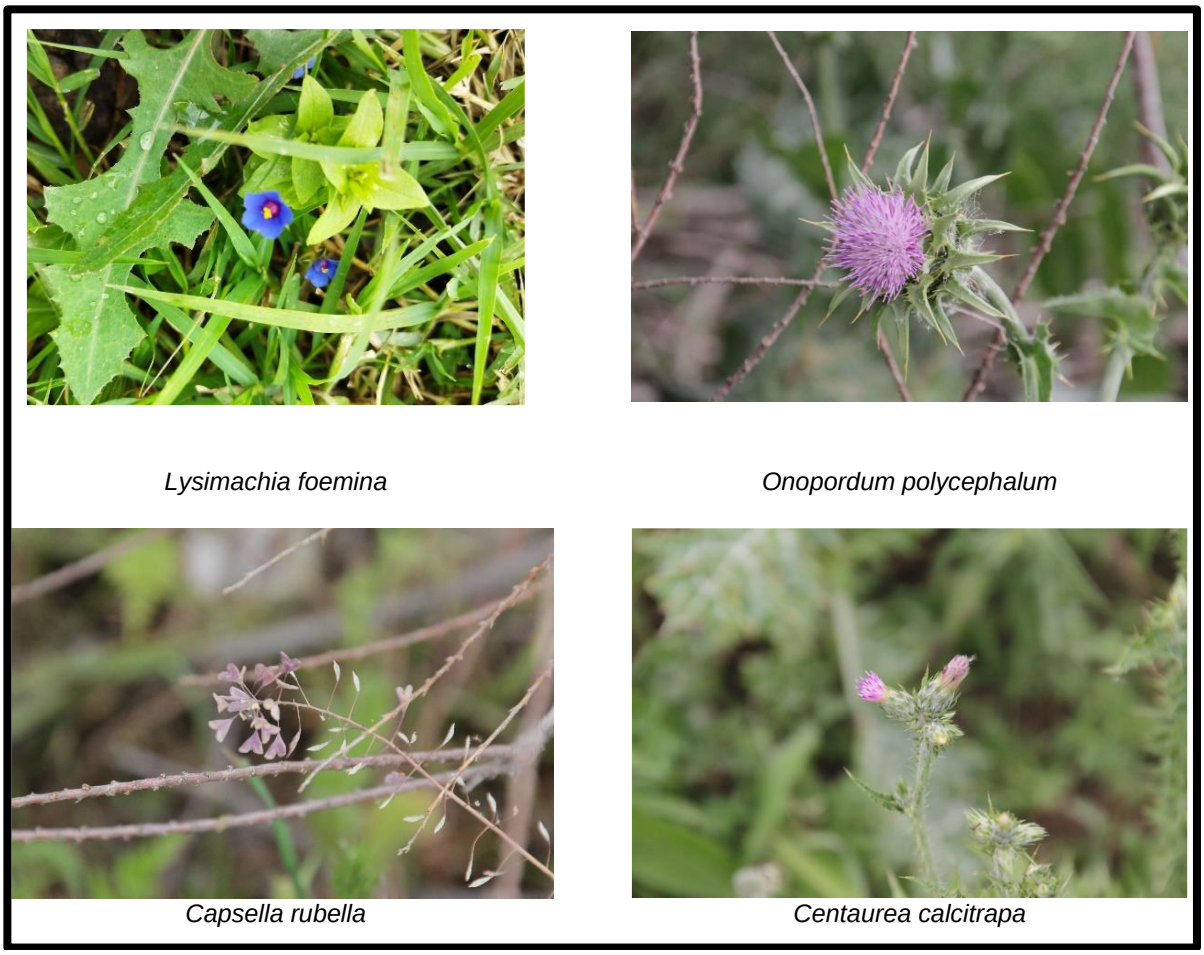


Figure 6-15. Some Flora Species identified in the Project Area

The recorded flora in the region exhibits typical traits associated with anthropogenic habitats, specifically resembling those found in industrial sites and agricultural areas. Plant Species Found or Potentially Present in the Project Area are listed in the Table 6-14.

Table 6-14. Flora Species

Family and Species Name	Common Name	Endemism	IUCN	BERN	CITES	Relative Abundance (**)	Source
Amaranthaceae							
Amaranthus albus L.	-	-	-	-	-	3	L
Apiaceae							
Artedia squamata L.	-	-	-	-	-	3	L
Bupleurum gracile D´URV.	-	-	-	-	-	3	L
Orlaya daucoides (L.) Greuter	Flat-Fruited Orlaya	-	-	-	-	3	L
Torilis arvensis (Huds.) Link subsp. arvensis	Spreading Hedge Parsley	-	-	-	-	4	L
Onopordum polycephalum BOISS.	Cotton Thistle	-	-	-	-	4	L, O
Bupleurum gracile D'URV.	-	-	-	-	-	4	L
Scandix pecten-veneris L.	Shepherd's-Needle	-	-	-	-	4	L
Asteraceae / Compositae							
Anthemis cretica L. subsp. pontica (Willd.) Grierson	Cretian Mat Daisy	-	-	-	-	4	L
Aster subulatus Michaux	Eastern Annual Saltmarsh Aster	-	-	-	-	3	L
Bellis perennis L.	English Daisy	-	-	-	-	4	L, O
Centaurea calcitrapa	Purple Star Thistle	-	-	-	-	3	L, O
Centaurea solstitialis L. subsp. solstitialis	Barnaby's Thistle	-	-	-	-	3	L
Centaurea virgata Lam.	Squarrose Knapweed	-	-	-	-	3	L
Cichorium intybus L.	Chicory	-	-	-	-	4	L
Conyza canadensis (L.) Cronquist	-	-	-	-	-	3	L
Crepis foetida L. subsp. rhoeadifolia (Bieb.) Celak	Stinking Hawksbeard	-	-	-	-	4	L
Echinops viscosus DC. subsp. viscosus BORNM.	-	-	-	-	-	4	L, O

Family and Species Name	Common Name	Endemism	IUCN	BERN	CITES	Relative Abundance (**)	Source
Onopordum polycephalum BOISS.	-	-	-	-	-	4	L, O
Pilosella piloselloides (Vill.) Sojak subsp. piloselloides	Glaucous King Devil	-	-	-	-	3	L
Pulicaria dysenterica (L.) Bernh.	Meadow False Fleabane	-	-	-	-	3	L
Senecio vernalis WALDST. ET KIT.	Eastern Groundsel	-	-	-	-	3	L
Scolymus hispanicus L.	Common Golden Thistle	-	-	-	-	2	L
Sonchus asper (L.) Hill Subsp. glauescens (Jordan) Ball	Spiny Sowthistle	-	-	-	-	4	L
Taraxacum scaturiginosum G.Hagl.	-	-	-	-	-	3	L, O
Urospermum picroides (L.) F.W.Schmidt	Prickly Goldenfleece	-	-	-	-	3	L
Xanthium spinosum L.	Bathrust Burr	-	-	-	-	4	L
Xanthium strumarium L. subsp. strumarium	Rough Cocklebur	-	-	-	-	3	L
Boraginaceae							
Alkanna tinctoria Taus'h.	Dyer's Alkanet	-	-	-	-	3	L
Anchusa azurea Miller var. azurea	Alkanet	-	-	-	-	3	L
Cerinthe major L.	Honeywort	-	-	-	-	1	L, O
Echium italicum L.	Italian Viper's Bugloss	-	-	-	-	4	L
Echium parviflorum MOENCH	Small Flowered Viper's Bugloss	-	-	-	-	1	L, O
Echium plantagineum L.	Purple Viper's Bugloss	-	-	-	-	1	L, O
Heliotropium europaeum L.	European Heliotrope	-	-	-	-	3	L
Brassicaceae / Cruciferae							
Brassica tournefortii GOUAN	African Mustard	-	-	-	-	3	L
Diplotaxis tenuifolia (L.) DC.	Lincoln's-Weed	-	-	-	-	4	L

Family and Species Name	Common Name	Endemism	IUCN	BERN	CITES	Relative Abundance (**)	Source
Sisymbrium officinale (L.) SCOP.	Common Hedge Mustard	-	-	-	-	3	L
Capsella rubella REUTER	Shepherd's-Purse	-	-	-	-	4	L, O
Cardamine hirsuta L.	Hairy Bittercress	-	-	-	-	3	L
Cardaria draba (L.) DESV. subsp. draba (L.) DESV.	Whitetop	-	-	-	-	3	L
Caryophyllaceae							
Silene conoidea L.	Weed Silene	-	-	-	-	4	L
Chenopodiaceae							
Chenopodium album L. subsp. album var. album	Baconweed	-	-	-	-	3	L
Dipsacaceae							
Dipsacus laciniatus L.	Cutleaf Teasel	-	-	-	-	4	L
Knautia integrifolia (L.) BERT. var. integrifolia (L.) BERT	-	-	-	-	-	4	L
Knautia orientalis L.	-	-	-	-	-	4	L
Scabiosa hispidula BOISS.	-	-	-	-	-	4	L
Euphorbiaceae							
Euphorbia helioscopia L.	Sun Spurge	-	-	-	-	3	L
Euphorbia terracina L.	Carnation Spurge	-	-	-	-	3	L, O
Fabaceae							
Coronilla (=Securigera) varia L. subsp. varia L.	Purple Crown Vetch	-	-	-	-	2	L
Hymenocarpus circinnatus L. Savi	Disk Trefoil	-	-	-	-	4	L
Lotus angustissimus L.	Slender Bird's-Foot Trefoi	-	-	-	-	3	L
Melilotus sp.							
Trifolium arvense L. var. arvense	Rabbitfoot Clover	-	-	-	-	4	L, O

Family and Species Name	Common Name	Endemism	IUCN	BERN	CITES	Relative Abundance (**)	Source
Trifolium repens L. var. giganteum Lag.-Foss.	White Clover	-	-	-	-	3	L, O
Trifolium resupinatum L.	Persian Clover	-	-	-	-	2	L
Fagaceae							
Quercus pubescens WILLD.	Downy Oak	-	LC	-	-	1	L, O
Quercus infectoria subsp. boissieri (REUTER) O. SCHWARZ	Aleppo Oak	-	LC	-	-	1	L, O
Frankeniaceae							
Frankenia hirsuta L.	Hairy Sea Heath	-	-	-	-	**1**	L, O
Gramineae / Poaceae							
Briza maxima L.	Big Quaking-Grass	-	-	-	-	4	L, O
Bromus hordeaceus L. subsp. hordeaceus L.	-	-	-	-	-	3	L
Vulpia muralis (KUNTH) NEES	Wall Fescue	-	-	-	-	3	L
Guttiferae		-	-	-	-	3	L
Hypericum perforatum L.	St. Johnwort	-	-	-	-	3	L
Hypericum triquetrifolium TURRA	Curled Leaved St. John's Wort	-	-	-	-	3	L
Juncaceae							
Luzula sylvatica (HUDSON) GAUDIN	Greater Wood Rush	-	-	-	-	1	L, O
Juncus sp.		-	-	-	-	1	L, O
Lamiaceae							
Ajuga bombycina BOISS.	Bugle	+	-	-	-	1	L
Malvaceae							
Malva sylvestris L.	Common Mallow	-	-	-	-	3	L, O
Moraceae							

Family and Species Name	Common Name	Endemism	IUCN	BERN	CITES	Relative Abundance (**)	Source
Ficus carica L. subsp. carica (ALL.) SCHINZ ET THELL.	Common Fig	-	LC	-	-	3	L, O
Oleaceae							
Olea europaea L. var. europaea L.	Common Olive	-	-	-	-	3	L, O
Orchidaceae							
Ophrys fusca LINK	Brown Bee Orchid	-	LC	-	-	1	L
Ophrys tenthredinifera WILLD.	Sawfly Orchid	-	LC	-	-	1	L
Ophrys umbilicata DESF. subsp. umbilicata DESF.	-	-	LC	-	-	1	L
Papaveraceae							
Fumaria densiflora DC.	Dense Flower Fumitory	-	-	-	-	3	L
Fumaria parviflora LAM.	Fineleaf Fumitory	-	-	-	-	3	L, O
Glaucium oxylobum Boiss. & Buhse	-		-	-	-	2	L, O
Chelidonium flavum Crantz.	Yellow Horned Poppy	-	-	-	-	4	L
Hypecoum imberbe SIBTH. ET SM.	Sicklefruit Hypecoum	-	-	-	-	4	L
Papaver gracile BOISS.	-	-	-	-	-	4	L, O
Papaver hybridum L.	Rough Poppy	-	-	-	-	4	L
Plantaginaceae							
Plantago lanceolata L.	Narrowleaf Plantain	-	-	-	-	4	L
Plumbaginaceae							
Limonium vulgare	Mediterranean Sea Lavender	-	-	-	-	2	L
Polygonaceae							
Polygonum arenarium Waldst. & Kit.	European Knotweed	-	-	-	-	4	L
Rumex tuberosus L. subsp. tuberosus	Tuberous Dock	-	-	-	-	3	L, O
Primulaceae							

Family and Species Name	Common Name	Endemism	IUCN	BERN	CITES	Relative Abundance (**)	Source
Lysimachia foemina	-	-	-	-	-	3	L, O
Rubiaceae		-	-	-	-	3	L
Asperula arvensis L.	-	-	-	-	-	3	L
Ranunculaceae							
Consolida orientalis (Gay) Schröd.	Oriental Knight's Spur	-	-	-	-	3	L
Delphinium staphisagria L.	Stavesacre	-	-	-	-	3	L
Nigella elata BOISS.	-	-	-	-	-	3	L
Ranunculus repens L.	Creeping Buttercup	-	-	-	-	4	L, O
Ranunculus rumelicus GRISEB.	-	-	-	-	-	3	L
Salicaceae							
Populus nigra L. subsp. nigra	Black Popular	-	DD	-	-	4	L, O
Salix alba L.	White Willow	-	LC	-	-	3	L, O
Solanaceae							
Datura stramonium L.	Jimsonweed	-	-	-	-	4	L
Solanum dulcamara L.	Bittersweet Nightshade	-	-	-	-	3	L
Tamaricaceae							
Tamarix africana	African Tamarisk	-	LC	-	-	3	L, O
Umbelliferae							
Seseli tortuosum L.	-	-	-	-	-	4	L
Urticaceae		-	-	-	-	3	L
Urtica pilulifera L.	The Roman Nettle	-	-	-	-	3	L, O
Urtica urens L.	Annual Nettle	-	-	-	-	3	L
Zygophyllaceae							
Tribulus terestris L.	Puncture Vine	-	-	-	-	4	L, O

6.10.3 Fauna

Field studies on the project area were conducted from May 3rd to May 5th, 2023, under the supervision of biologists Celal Denizli and Şevval Kurt. The assessment also extended to the surroundings of the pond located near the project area, where various amphibian, bird, and reptile species were identified.

While examining the literature and referring to previous studies, a comprehensive inventory of fauna species was assembled. The investigations were categorized into four major groups: reptiles, amphibians, birds, and mammals. These efforts enabled a thorough examination of the existing fauna and contributed to a comprehensive understanding of the biodiversity in the project vicinity.

Amphibians and Reptilians

Based on the location of the Project site, general habitat types, general distribution of species in Türkiye, literature data, and expert experiences, a comprehensive list of 11 amphibian species belonging to 5 families and 15 reptilian species belonging to 8 families has been compiled for the Project site.

It has been determined that these species are also present in areas outside the project area and are alternative areas that will survive.

According to the IUCN (The International Union for Conservation of Nature) Red List, most of the listed species in the Project site fall under the category of "Least”Concern" (LC), indicating that they are not currently facing significant conservation threats. However, there are a few species with different conservation statuses.

Testudo graeca (Common Tortoise) is classified as "Vulnerable" (VU). Additionally, there are three species categorized as "Near Threatened" (NT). These species are: *Triturus vittatus ophryticus* (Northern Banded Newt), *Elaphe quatuorlineata* (Four Lined Snake) and *Emys orbicularis* (European Pond Turtle). Furthermore, there is one species listed as "Data Deficient" (DD), which means there is insufficient information to assess its conservation status. This species is: *Bufotes variabilis* (Varying Toad).

According to Demirsoy[12], the population density of *Testudo graeca* in Türkiye is relatively high. The species is listed as "not in danger" in Türkiye. It has a wide distribution across the country, except for the Eastern Black Sea region. This indicates that *Testudo graeca* is abundant and not facing significant conservation threats in most parts of Türkiye.

[12] Demirsoy, 2006, Reptiles of Türkiye

Figure 6-16. *Emys orbicularis* Identified in Pond Near the Project Area.

Figure 6-17. *Testudo graeca* Identified Near the Project Area

According to BERN Convention Appendices, 12 species at the Project site are listed in Ann-II, and 13 species in Ann-III.

There is no endemic, rare or any amphibian and reptilian species. They consist of cosmopolitan species.

Table 6-15. Amphibian and Reptile Species

Species	Common Name	IUCN	BERN	CITES	Source
Amphibians					
Bufonidae					
Bufo bufo	Common Toad	LC	Ann-III	-	L
Bufotes variabilis	Varying Toad	DD	Ann-III	-	L
Bufo viridis	Green Toad	LC	Ann-II	-	L, O
Hylidae					
Hyla arborea	European Tree Frog	LC	Ann-II	-	L
Pelobatidae					
Pelobates syriacus	Syrian Spadefoot	LC	-	-	L, O
Ranidae					
Rana ridibunda	Marsh Frog	LC	Ann-III	-	L, O
Pelophylax bedriagae	Bedriaga's Frog	LC	Ann-III	-	L
Rana dalmatina	Agile Frog	LC	Ann-II	-	L
Rana camerani	Brusa Frog	LC	Ann-III	-	L
Salamandridae					
Triturus vittatus ophryticus	Northern Banded Newt	NT	Ann-III	-	L
Triturus karelinii	Southern Crested Newt	LC	Ann-II	-	L
Reptiles					
Testudinidae					
Testudo graeca	Common Tortoise	VU	Ann-II	-	L, O
Gekkonidae					
Hemidactylus turcicus	Turkish Gecko	LC	Ann-III	-	L
Agamidae					
Stellagama stellio	Starred Agama	LC	Ann-II	-	L
Geoemydidae					
Mauremys caspica	Caspian Turtle		Ann-II	-	L
Lacertidae					
Lacerta trilineata		LC	Ann-III	-	L, O
Ophisops elegans	Snake-eyed Lizard	LC	Ann-II	-	L, O
Typhlopidae					
Typhlops vermicularis	Eurasian Blind Snake	LC	Ann-III	-	L
Colubridae					
Coluber najadum	Dahl's Whip Snake	LC	Ann-II	-	L
Coluber ravergieri ravergieri	Spotted Whip Snake	LC	Ann-III	-	L
Coluber schmidti	Red Bellied Racer	LC	Ann-III	-	L
Eirenis modestus	Ring Headed Dwarf Snake	LC	Ann-III	-	L
Elaphe quatuorlineata	Four Lined Snake	NT	Ann-II	-	L
Natrix natrix	Grass Snake	LC	Ann-III	-	L
Natrix tessellata	Dice Snake	LC	Ann-II	-	L
Emydidae					
Emys orbicularis	European Pond Turtle	NT	Ann-II	-	L, O

Birds

Based on the comprehensive analysis of observations, literature data, survey studies, and habitat investigations, a total of 76 bird species, belonging to 31 families, have been identified to inhabit or visit the project area and its immediate surroundings. The inclusion of these species in the lists was based on a combination of direct observations and information gathered from local residents and literature references (see. Table 6-16).

The bird species found within and around the project area encompass a diverse range, consisting of both common and non-endangered species.

According to the IUCN red list, *Pelecanus crispus* (Dalmatian Pelican), is in the “NT” (=Near Threatened) category, *Streptopelia turtur* (European Turtle-dove) and *Aquila heliaca* (Eastern Imperial Eagle) are in the “VU” (=Vulnerable) while the remaining species are in the “LC” (=Least Concern) category.

According to Bern Convention, 53 species are in the list of Annex-II and 16 species are in the list of Annex-III. None of the bird species are endemic. However, it is composed of widely spread species.


Fulica atra


Acrocephalus scirpaceus


Egretta garzetta


Emberiza melanocephala

Figure 6-18. Some of the Bird Species observed in the Project Area

Table 6-16. Bird Species

Species	Common Name	IUCN	BERN	CITES	Source
Falconidae					
Falco subbuteo	Eurasian Hobby	LC	Ann-II	-	L
Falco peregrinus	Peregrine Falcon	LC	Ann-II	App-I	L
Falco columbarius	Merlin	LC	Ann-II	-	L
Falco tinnunculus	Common Kestrel	LC	Ann-II	-	L
Falco naumanni	Lesser Kestrel	LC	Ann-II	-	L
Pelecanidae					
Pelecanus crispus	Dalmatian Pelican	NT		App-I	L
Paridae					
Parus major	Great Tit	LC	Ann-II	-	L, O
Corvidae					
Corvus corax	Common Raven	LC	Ann-III	-	L
Corvus corone	Carrion Crow	LC	-	-	L
Corvus monedula	Eurasian Jackdaw	LC	-	-	L, O
Pica pica	Eurasian Magpie	LC	-	-	L, O
Ciconiidae					

Species	Common Name	IUCN	BERN	CITES	Source
Ciconia ciconia	White Stork	LC	Ann-II	-	L, O
Alaudidae					
Alauda arvensis	Eurasian Skylark	LC	Ann-III	-	L, O
Galerida cristata	Crested Lark	LC	Ann-III	-	L, O
Melanocorypha calandra	Calandra Lark	LC	Ann-II	-	L, O
Melanocorypha leucoptera	White-winged Lark	LC	Ann-II	-	L
Melanocorypha bimaculata	Bimaculated Lark	LC	Ann-II	-	L
Sturnidae					
Sturnus vulgaris	Common Starling	LC	-	-	L, O
Accipitridae					
Buteo buteo	Eurasian Buzzard	LC	Ann-II	-	L
Buteo rufinus	Long-legged Buzzard	LC	Ann-II	-	L
Circaetus gallicus	Short-toed Snake-eagle	LC	Ann-II	-	L
Haliaeetus albicilla	White-tailed Sea-eagle	LC	Ann-II	App-I	L
Circus aeruginosus	Western Marsh-harrier	LC	Ann-II	-	L
Accipiter brevipes	Levant Sparrowhawk	LC	Ann-II	-	L
Accipiter nisus	Eurasian Sparrowhawk	LC	Ann-II	-	L
Aquila chrysaetos	Golden Eagle	LC	Ann-II	-	L
Aquila heliaca	Eastern Imperial Eagle	VU	Ann-II	App-II	L
Pernis apivorus	European Honey-buzzard	LC	Ann-II	-	L
Aquila fasciata	Bonelli's Eagle	LC	Ann-II	-	L
Hieraaetus pennatus	Booted Eagle	LC	Ann-II	-	L
Threskiornithidae					
Platalea leucorodia	Eurasian Spoonbill	LC	Ann-II	App-II	L
Emberizidae					
Emberiza calandra	Corn Bunting	LC	Ann-III	-	L, O
Emberiza melanocephala	Black-headed Bunting	LC	Ann-II	-	L, O
Emberiza hortulana	Ortolan Bunting	LC	Ann-III	-	L
Anatidae					
Anas platyrhynchos	Mallard	LC	Ann-III	-	L, O
Ardeidae					
Egretta garzetta	Little Egret	LC	Ann-II	-	L, O
Ardea cinerea	Grey Heron	LC	Ann-III	-	L
Fringillidae					
Carduelis carduelis	European Goldfinch	LC	Ann-II	-	L, O
Linaria cannabina	Common Linnet	LC	Ann-II	-	L, O
Carduelis chloris	European Greenfinch	LC	Ann-II	-	L
Fringilla coelebs	Common Chaffinch	LC	Ann-III	-	L
Serinus serinus	European Serin	LC	Ann-II	-	L, O

Species	Common Name	IUCN	BERN	CITES	Source
Podicipedidae					
Tachybaptus ruficollis	Little Grebe	LC	Ann-II	-	L, O
Acrocephalidae					
Acrocephalus scirpaceus	Common Reed-warbler	LC	Ann-II	-	L, O
Acrocephalus melanopogon	Moustached Warbler	LC	Ann-II	-	L, O
Acrocephalus arundinaceus	Great Reed-warbler	LC	Ann-II	-	L
Iduna pallida	Olivaceous Warbler	LC	Ann-II	-	L, O
Remizidae					
Remiz pendulinus	Eurasian Penduline-tit	LC	Ann-III	-	L, O
Hirundinidae					
Hirundo rustica	Barn Swallow	LC	Ann-II	-	L, O
Cecropis daurica	Red-rumped Swallow	LC	Ann-II	-	L
Cisticolidae					
Cisticola juncidis	Zitting Cisticola	LC	Ann-II	-	L, O
Laniidae					
Lanius collurio	Red-backed Shrike	LC	Ann-II	-	L, O
Turdidae					
Turdus pilaris	Fieldfare	LC	Ann-III	-	L
Turdus merula	Eurasian Blackbird	LC	Ann-III	-	L, O
Oenanthe hispanica	Black-eared Wheatear	LC	Ann-II	-	L
Oenanthe oenanthe	Northern Wheatear	LC	Ann-II	-	L, O
Strigidae					
Athene noctua	Little Owl	LC	Ann-II	-	L
Bubo bubo	Eurasian Eagle-owl	LC	Ann-II	-	L
Otus scops	Eurasian Scops-owl	LC	Ann-II	-	L
Scotocercidae					
Cettia cetti	Cetti's Warbler	LC	Ann-II	-	L, O
Sylviidae					
Sylvia communis	Common Whitethroat	LC	Ann-II	-	L
Phylloscopidae					
Phylloscopus trochilus	Willow Warbler	LC	Ann-II	-	L, O
Regulidae					
Regulus regulus	Goldcrest	LC	Ann-II	-	L
Rallidae					
Fulica atra	Common Coot	LC	Ann-III	-	L, O
Columbidae					
Columba livia	Rock Dove	LC	Ann-III	-	L, O
Columba palumbus	Common Woodpigeon	LC	-	-	L, O
Streptopelia decaocto	Eurasian Collared-dove	LC	Ann-III	-	L, O
Streptopelia turtur	Eurasian Turtle-dove	VU	Ann-III	-	L

Species	Common Name	IUCN	BERN	CITES	Source
Motacillidae					
Motacilla citreola	Citrine Wagtail	LC	Ann-II	-	L
Motacilla alba	White Wagtail	LC	Ann-II	-	L, O
Anthus campestris	Tawny Pipit	LC	Ann-II	-	L
Passeridae					
Passer montanus	Eurasian Tree Sparrow	LC	Ann-II	-	L, O
Passer domesticus	House Sparrow	LC	-	-	L, O
Passer hispaniolensis	Spanish Sparrow	LC	Ann-III	-	L
Caprimulgidae					
Caprimulgus europaeus	European Nightjar	LC	Ann-II	-	L
Muscipidae					
Muscicapa striata	Spotted Flycatcher	LC	Ann-II	-	L

Mammals

The project area is situated in agricultural lands with low fertility, resulting in anthropogenic impacts that have rendered the area unsuitable for mammal species, particularly larger mammals that necessitate significantly extensive habitats.

Based on the assessment of habitat characteristics and survey results, a total of 21 mammal species are likely to be present in the Project Areas and their immediate surroundings (see. Table 6-17).

Among these mammal species, 5 are listed under the Bern Convention Annex-II and 9 mammal species are listed under the Bern Convention Annex-III. Furthermore, it has been identified that 7 mammal species are not included in the annexes of the Bern Convention.

Regarding their conservation statuses in the IUCN Red List Categories List, the majority of the mammal species, except for DD (Data Deficient) and NT (Near Threatened) categories, are classified as LC (Least Concern). This implies that most of the mammal species are not currently facing significant conservation threats according to the IUCN assessment.

Figure 6-19. *Vulpes vulpes* footprint found in the project area

Table 6-17. Mammal Species

Species	Common Name	IUCN	BERN	CITES	Source
Erinaceidae					
Erinaceus concolor	Southern White-breasted Hedgehog	LC	-	-	L, O
Vespertilionidae					
Pipistrellus pipistrellus	Common Pipistrelle	LC	Ann-III	-	L
Spalacidae					
Spalax (= Nannospalax) leucodon	Lesser Mole Rat	DD	-	-	L, O
Leporidae					
Lepus europaeus	European Hare	LC	Ann-III	-	L
Cricetidae					
Microtus nivalis	European Snow Vole	LC	Ann-III	-	L, O
Arvicola terrestris	European Water Vole	LC	-	-	L
Cricetulus migratorius	Grey Dwarf Hamster	LC	-	-	L
Soricidae					
Crocidura leucodon	Bicolored Shrew	LC	Ann-III	-	L, O
Sorex minutus	Eurasian Pygmy Shrew	LC	Ann-III	-	L
Sorex araneus	Common Shrew	LC	Ann-III	-	L
Rhinolophidae					
Rhinolophus ferrumequinum	Greater Horseshoe Bat	LC	Ann-II	-	L
Rhinolophus hipposideros	Lesser Horseshoe Bat	LC	Ann-II	-	L
Sciuridae					
Sciurus anomalus	Caucasian Squirrel	LC	Ann-II	-	L
Muridae					
Rattus norvegicus	Brown Rat	LC	-	-	L

Species	Common Name	IUCN	BERN	CITES	Source
Apodemus mystacinus	Eastern Broad-toothed Field Mouse	LC	-	-	L
Canidae					
Vulpes vulpes	Red Fox	LC	-	-	L, O
Canis lupus	Grey Wolf	LC	Ann-II	App-II	L
Mustelidae					
Mustela nivalis	Least Weasel	LC	Ann-III	-	L
Lutra lutra	Eurasian Otter	NT	Ann-II	App-I	L
Meles meles	Eurasian Badger	LC	Ann-III	-	L
Suidae					
Sus scrofa scrofa	Wild Boar	LC	Ann-III	-	L, O

Field data and literature research have provided evidence that the project area and its surroundings are inhabited by species that are known to thrive in habitats affected by anthropogenic activities. This indicates that these species have demonstrated adaptability and resilience to human-induced changes in their environment.

Legally Protected and Internationally Recognized Areas

Legally protected and internationally recognized areas in the region have been determined as a result of field surveys and literature review.

The nearest legally protected area to the Project site is Meryemana Nature Park, located at a distance of 14.36 km.

Moreover, there are three internationally recognized Key Biodiversity Areas (KBAs) in the around of the Project area, namely Dilek Peninsula KBA 11.9 km, Lesser Menderes Delta KBA situated at a distance of 15.2 km and Batı Menteşe Mountains KBA located at a distance of 14.6 km from the Project area.

In the context of this study, a thorough examination of the region's protected area network has been conducted, and the potential effects of the Project on these wildlife sanctuaries have been carefully assessed. The purpose of this analysis was to demonstrate that the Project area, as well as its influence zone, is situated at a significant distance from the Legally Protected and Internationally Recognized Areas. Legally Protected and Internationally Recognized Areas around the Project area is provided in Figure 6-20.

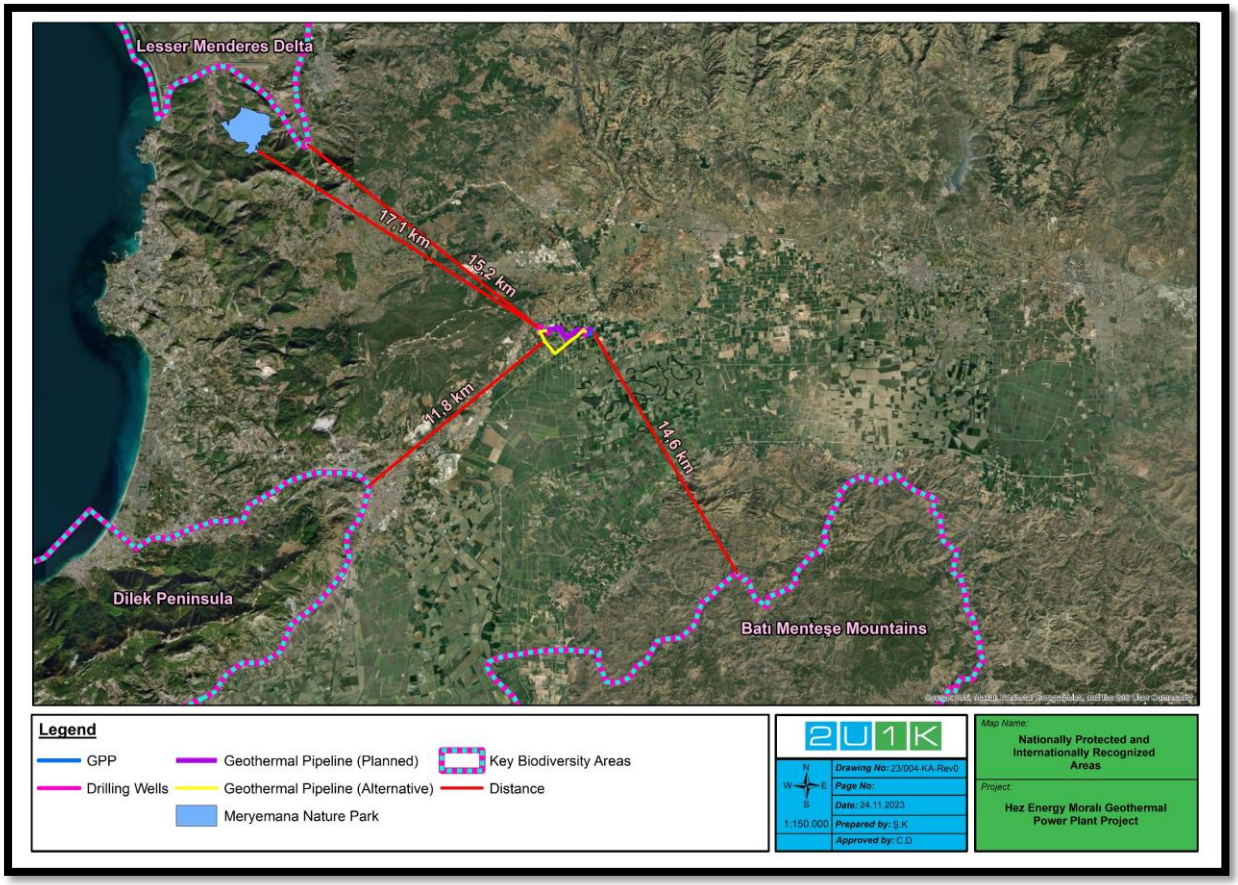


Figure 6-20. Legally Protected and Internationally Recognized Areas

6.10.4 Critical Habitat Assessment

Critical habitats are areas of high biodiversity value that include at least one or more of the five values specified in IFC-PS6 and/or other recognized high biodiversity values. Each criterion has the same importance for making critical habitat designations or for determining compliance with PS6. Critical habitat criteria are as follows and should form the basis of any critical habitat assessment (CHA):

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species
- Criterion 2: Endemic or restricted-range species
- Criterion 3: Migratory or congregatory species
- Criterion 4: Highly threatened and/or unique ecosystems
- Criterion 5: Key evolutionary processes

Projects that are located within internationally and/or nationally recognized areas of high biodiversity value may require a critical habitat assessment. Examples include the following:

- Areas that meet the criteria of the IUCN's Protected Area Categories Ia, Ib and II.

- Key Biodiversity Areas (KBAs), which encompass Important Bird and Biodiversity Areas (IBAs).

Consultation with the relevant national and international organizations that designate some areas is required. These areas should be identified during the assessment of critical habitat and brought to the attention of IFC as early as possible in the financing process. They include the following:

- UNESCO Natural and Mixed World Heritage Sites
- Sites that fit the designation criteria of the Alliance for Zero Extinction (AZE)

Identification of Area of Analysis

The information on the region's ecology was carried out to define an ecologically appropriate Area of Analysis (AoA), to determine the presence of features that may qualify for Critical Habitat. The AoA is identified at a scale larger than the project site or impact area itself, considering large-scale ecological processes where appropriate. This approach ensures that all potential risks within the project footprint and surrounding vicinity are taken into consideration.

The AoA (1549 km^2) was defined using a combination of topographic information, and legally protected areas and/or internationally recognized areas of high biodiversity value information. The map showing the defined AoA is given in Figure 6-21.

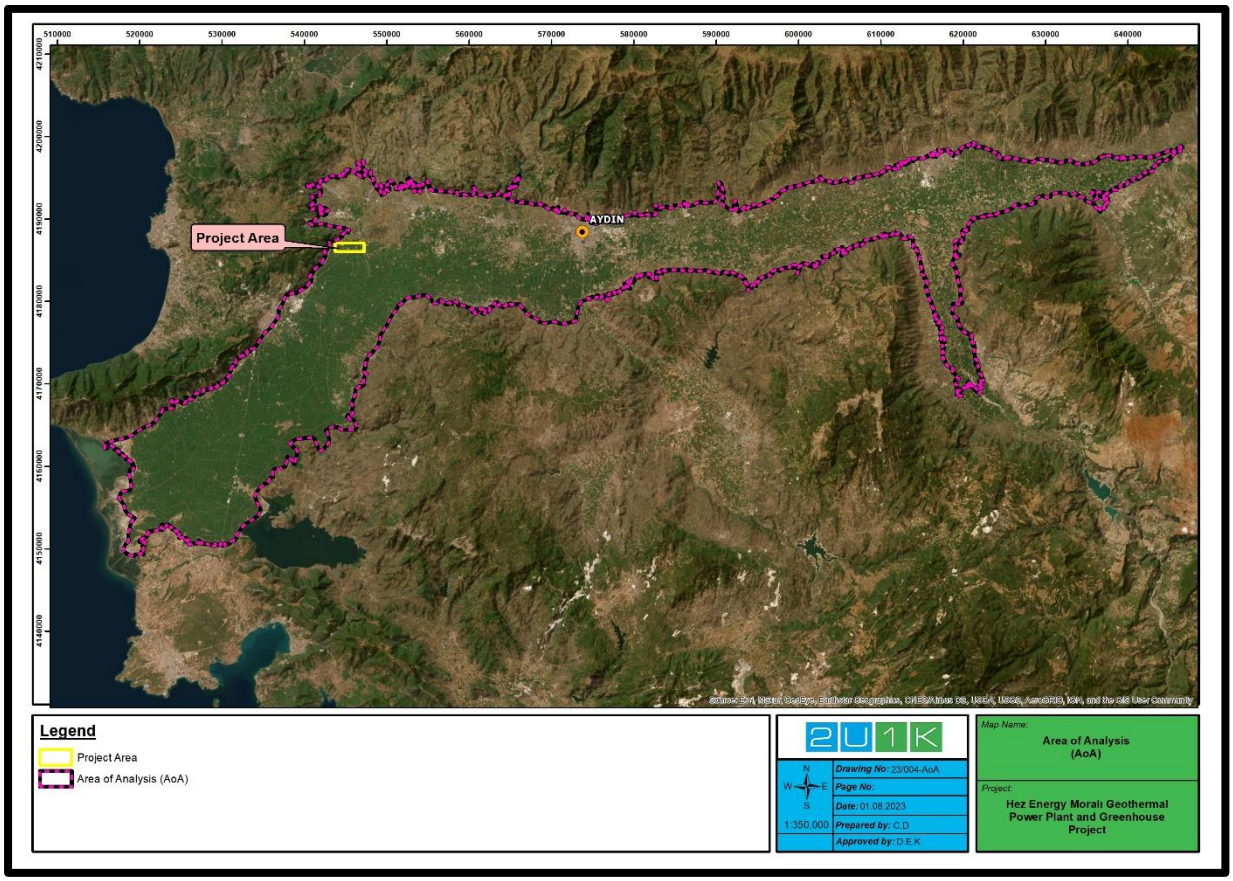


Figure 6-21. Area of Analyses

Determination of Critical Habitat

Criterion 1: Critically Endangered and Endangered Species

Species threatened with global extinction and listed as CR and EN on the IUCN *Red List of Threatened Species* shall be considered as part of Criterion 1. Critically Endangered species face an extremely high risk of extinction in the wild. Endangered species face a very high risk of extinction in the wild.

Thresholds for Criterion 1 are the following:

(a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥0.5% of the global population and ≥5 reproductive units of a CR or EN species).

(b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR.

(c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.

Criterion 2: Endemic and Restricted-range Species

For purposes of Criterion 2, the term endemic is defined as restricted-range. Restricted range refers to a limited extent of occurrence (EOO).

- For terrestrial vertebrates and plants, restricted-range species are defined as those species that have an EOO less than 50,000 square kilometers (km^2).
- For marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100,000 km^2.
- For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

The threshold for Criterion 2 is the following:

a) Areas that regularly hold ≥10% of the global population size and ≥10 reproductive units of a species.

Criterion 3: Migratory and Congregatory Species

Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem). Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis. Examples include the following:

- Species that form colonies.
- Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (for example, foraging and roosting).
- Species that utilize a bottleneck site where significant numbers of individuals of a species occur in a concentrated period of time (for example, for migration).
- Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (for example, wildebeest distributions).
- Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species).

Thresholds for Criterion 3 are the following:

(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle.

(b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.

Criterion 4: Highly Threatened or Unique Ecosystems

The IUCN is developing a Red List of Ecosystems, following an approach similar to the Red List for Threatened Species. The client should use the Red List of Ecosystems where formal IUCN assessments have been performed. Where formal IUCN assessments have not been performed, the client may use assessments using systematic methods at the national/regional level, carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally recognized NGOs).

The thresholds for Criterion 4 are the following:

a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.

b) Other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.

Criterion 5: Key Evolutionary Processes

The structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, and combinations of these variables, can influence the evolutionary processes that give rise to regional configurations of species and ecological properties. In some cases, spatial features that are unique or idiosyncratic of the landscape have been associated with genetically unique populations or subpopulations of plant and animal species. Physical or spatial features have been described as surrogates or spatial catalysts for evolutionary and ecological processes, and such features are often associated with species diversification. Maintaining these key evolutionary processes inherent in a landscape as well as the resulting species (or subpopulations of species) has become a major focus of biodiversity conservation in recent decades, particularly the conservation of genetic diversity. By conserving species diversity within a landscape, the processes that drive speciation, as well as the genetic diversity within species, ensures the evolutionary flexibility in a system, which is especially important in a rapidly changing climate.

For illustrative purposes, some potential examples of spatial features associated with evolutionary processes are as follows:

- Landscapes with high spatial heterogeneity are a driving force in speciation, as species are naturally selected based on their ability to adapt and diversify.
- Environmental gradients, also known as ecotones, produce transitional habitat, which has been associated with the process of speciation and high species and genetic diversity.
- Edaphic interfaces are specific juxtapositions of soil types (for example, serpentine outcrops, limestone, and gypsum deposits), which have led to the formation of unique plant communities characterized by both rarity and endemism.
- Connectivity between habitats (for example, biological corridors) ensures species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from “crest to coast.”
- Sites of demonstrated importance to climate change adaptation for either species or ecosystems are also included within this criterion.

The significance of structural attributes in a landscape that may influence evolutionary processes will be determined on a case-by-case basis, and the determination of critical habitat will be heavily reliant on scientific knowledge. In the majority of cases, this criterion will apply in areas that have been previously investigated and that are already known or suspected to be associated with unique evolutionary processes. While systematic methods to measure and prioritize evolutionary processes in a landscape do exist, they are typically beyond a reasonable expectation of assessments conducted by the private sector.

Critical Habitat Assessment Findings

Criterion 1: Critically Endangered and Endangered Species and Criterion 2: Endemic and Restricted-range Species

CR and EN species in the AoA identified during the studies have been screened based on their threat statuses according to the IUCN Red List, European Red Lists and for plant species; the Red Data Book of Turkish Plants. Potential critical habitat triggering species identified in the AoA as per Criteria 1 and 2 are listed in Table 6-18.

Table 6-18. Potential Critical Habitat Triggering Species as per Criteria 1 and 2

Scientific Name	IUCN	Endemic / Restricted Range	Global Distribution	IFC PS6 Criteria	The Extent of Occurrence (km^2)	Justification
Plants						
Ajuga bombycina	LC	Endemic	Central, Northern, Southern and Western Türkiye (including European Part)	Criterion 2a: Restricted-range species	200.817	The AoA overlaps with approximately 0,77% of the distribution range and it is unlikely that more than 10% (the threshold for Criterion 2a) of the global population is present in the AoA. *This species does not trigger critical habitat criteria.*
Reptiles						
Testudo graeca	VU	-	This species ranges from the Mediterranean basin, east to Iran, with populations in North Africa, southern Europe and West Asia.	Criterion 1b: Critically Endangered and Endangered species	1 .000.000	The AoA overlaps with approximately 0,15% of the distribution range and the loss of this species unlikely to result in the change of the IUCN Red List status to EN or CR. *This species does not trigger critical habitat criteria.*
Birds						
Aquila heliaca	VU	-	The species is a breeds in Eastern Europe and Western and central Asia.	Criterion 1b: Critically Endangered and Endangered species	14.900.000	The AoA overlaps with approximately 0,01% of the distribution range and the loss of this species unlikely to result in the change of the IUCN Red List status to EN or CR. *This species does not trigger critical habitat criteria.*
Streptopelia turtur	VU	-	The species is a widespread migrant breeder across much of central and southern Europe, Central Asia, the Middle East and North Africa	Criterion 1b: Critically Endangered and Endangered species	7.080.000	The AoA overlaps with approximately 0,021% of the distribution range and the loss of this species unlikely to result in the change of the IUCN Red List status to EN or CR. *This species does not trigger critical habitat criteria.*

CHA is an attempt to provide an understanding of the biodiversity value of the AoA and define the significance of this as per PS6 to set forth effective mitigation measures and management controls for the rest of the project life cycle.

Based on the above assessments, the project does not trigger a designation of Critical Habitat. Species that were identified within the AoA were not meeting the thresholds of Criterion 1 and 2.

It should be noted that *Ajuga bombycine, Testudo graeca Aquila heliaca and Streptopelia turtur* considered as species of high conservation concern and will be subject to the mitigation hierarchy to ensure no net loss in the populations in the area.

Criterion 3: Migratory and Congregatory Species

It is known that the project is situated within a region that serves as a migratory bird corridor. Furthermore, within the Project site area, there exists a pond where birds are likely to pause during their migrations. In this context, field observations were conducted during the spring migration period at the pond near the Project site. However, it was noted that the pond is not extensively utilized by birds.

For Criterion 3, due to the limited information to estimate numbers of individuals of potentially qualifying species within the AoA, expert opinion has been applied to evaluate the importance of the identified potential Critical Habitat in terms of global populations. The Extent of occurrence (EOO) of species has been applied as a surrogate for local population data. This means that a precautionary approach was applied in the evaluation against PS6 thresholds. Global EOO information was obtained from the IUCN Red List Database which covers all of the potential Critical Habitat trigger species.

In the assessments conducted for migratory species, it has been determined that none of the species exceeded the threshold value of 1% stipulated by Criterion 3. As a result, the project does not trigger Criterion 3.

Criterion 4: Highly Threatened or Unique Ecosystems

None of the ecosystems of Türkiye has been assessed according to the IUCN's Red List of Ecosystems. Therefore, there are no available quantitative thresholds for assessing the Project under CH criterion 4.

None of the habitats identified during the studies are listed as Priority Habitat under Annex 1 of the Habitats Directive.

Criterion 5: Key Evolutionary Processes

The Project is not substantially different from the surrounding landscape in terms of elevation or moisture gradients, or any other geological, ecological or evolutionary factors that would

suggest that the area is vital for sustaining unique or distinctive evolutionary processes. There is no any isolation, spatial heterogeneity and wealth of environmental gradients. Therefore, the Project does not trigger Criterion 5.

6.11 Socio-Economy

This section compiles the quantitative and qualitative data regarding the social baseline condition of the Project. The socio-economic baseline study is intended to describe socio-economic conditions and trends in areas that are potentially affected by the Project to have an understanding of potential impacts and to develop appropriate mitigation measures.

The socio-economic baseline identifies major socio-economic issues in the province and local communities and develops a socio-economic database that can be leveraged to monitor any post-Project changes in affected communities.

In this section, economic activities and demographic characteristics of Aydın province, Germencik and Söke districts; Moralı, Argavlı and Uzunkum neighbourhoods are presented to the extent possible.

AoI for Social Impacts

The AoI for social impacts was determined by considering transportation activities, recruitment, and employment of workers during construction of the Project, noise and dust generation during construction and operation of the Project, and air quality impacts related to construction activities. The social impact area encompasses the three nearest neighbourhoods to the project area, namely Moralı, Argavlı, and Uzunkum.

The locations of nearby neighbourhoods and sensitive receptors in the vicinity of the Project area are illustrated in Figure 6-22.

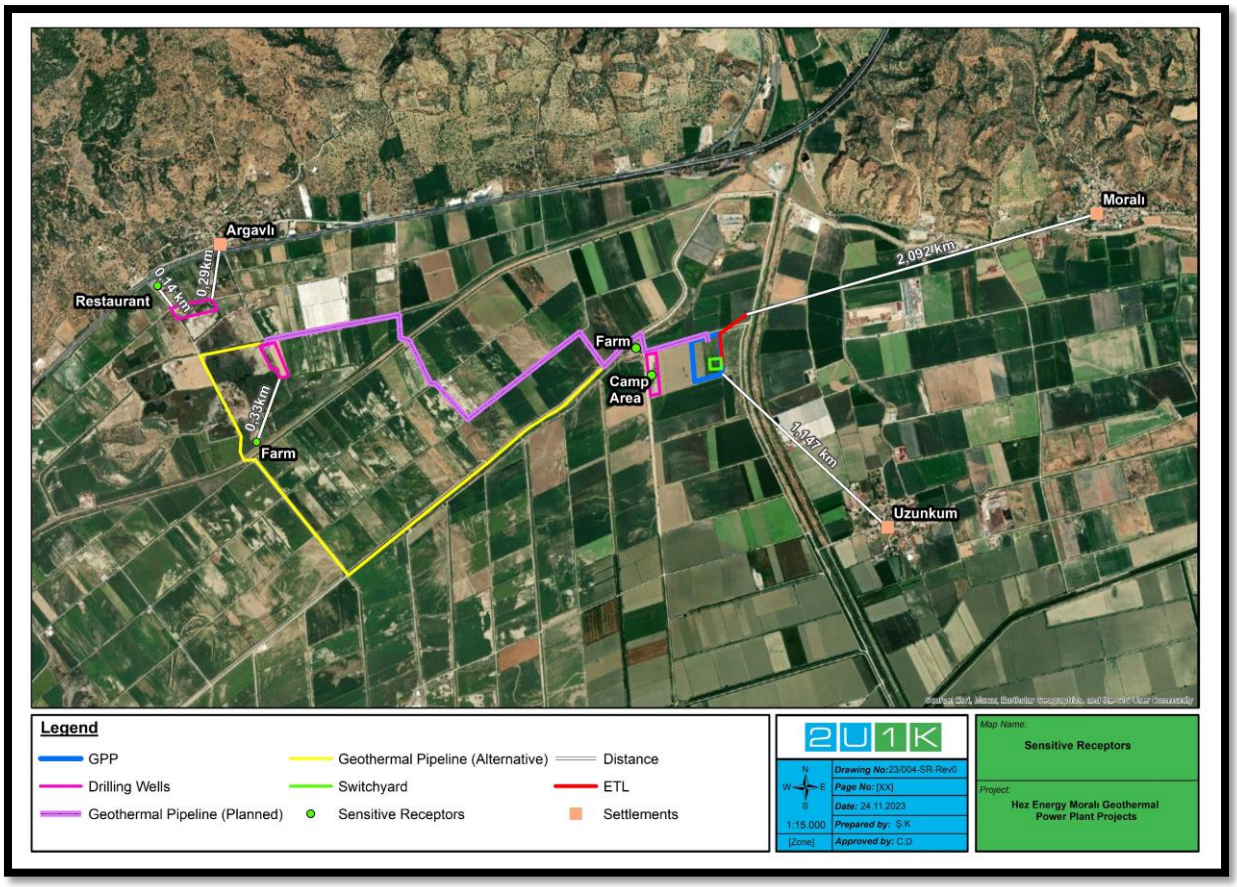


Figure 6-22. Nearby neighbourhoods and sensitive receptors in the vicinity of the Project area

Table 6-19. Social Area of Influence

Province	District	Neighborhoods	Description of Potential Impacts
Aydın	Söke	• Argavlı	Argavlı is the closest settlement to the Project site. During construction and operation periods: impacts caused by dust, noise and vibration; labor influx; impacts of traffic; impacts of life and fire risks; impacts of employment opportunities and local procurement are expected.
Aydın	Germencik	• Uzunkum	During construction and operation periods: impacts caused by dust, noise and vibration; impacts by conflicts caused by labor influx; impacts of traffic; impacts of life and fire risks; impacts of employment opportunities and local procurement are expected.
Aydın	Germencik	• Moralı	

The first field visit of 2U1K was conducted on February 13-14, 2023 to collect primary data. During this field visit, interviews were conducted with the project company, project staff and neighborhood mukhtars within the scope of the project. In addition, a sensitive receptor interview was conducted with the farm owner 0,04 km from the EIA 1 site.

In the second field visit held on May 23-25, 2023, household surveys were conducted in Moralı, Argavlı and Uzunkum Neighbourhoods within the project area. The survey was conducted with 25 people in Moralı Neighborhood, 14 people in Argavlı Neighborhood and 12 people in Uzunkum Neighborhood. In addition, key informant interviews were conducted with Aydın Provincial Directorate of Forestry, Germencik District Food, Agriculture and Livestock Directorate, Germencik District Health Directorate and Germencik Municipality. In addition, as part of the sensitive receptor interviews, the owner of a restaurant located 0,14 km from the EIA-2 area and the owner of a farm located 0,11 km from the EIA-2 area were interviewed.

The following topics were selected to discuss the socio-economic indicators of the settlements around the project area:

- Demography and Population,
- Livelihoods and Employment,
- Education,
- Health,
- Vulnerable Groups,
- Infrastructure and Services,
- Land Acquisition,
- Cultural Heritage,
- Traffic and Transportation,
- Level of Information about the Project.

Secondary data has also an important role in understanding the socio-economic baseline and potential social risks and impacts. The information obtained from secondary data enhances the quality of baseline studies. This set of data was collected and prepared using regional and national statistics and project documents. The information on the social baseline in the below subsections was obtained from the websites of Aydın Governorate and Germencik Municipality.

6.12 Population and Demographics

This section presents general demographical information of Aydın Province, Germencik District and Söke District respectively and move on to further details within the borders of the AoI.

Aydın Province, situated in Aegean Region of Türkiye, covers an area of 8.116 km² and has been recorded as the 19th most populated city in Türkiye with a population of 1.148.241 (Turkish Statistical Institute, 2022). The annual population growth rate is 12,5% in 2022.

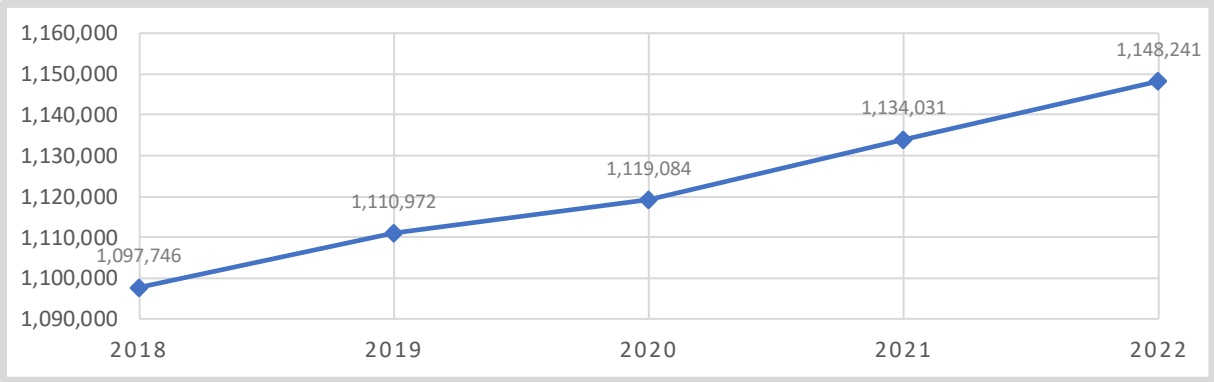
There are 17 districts within the Province borders. The most populous district in Aydın Province is Efeler with 303,772 inhabitants, on the other hand the least populous district is Karpuzlu with 10,590 inhabitants. The population of Germencik District, which is within the impact area of the Project, is 44,172, while the population of Söke District is 123,301 (Turkish Statistical Institute, 2022).

According to the 2022 data obtained from the address-based population registration system, the population of Aydın is 1,148,241, including 578,950 females and 569,291 males. The population data from official sources regarding Aydın and its change in the last 5 years are presented in Table 6-20 and Figure 6-23.

Table 6-20. Population Data of Aydın Province

Settlement	Female (2022)	Male (2022)	Total Population (2022)
Aydın	578,950	569,950	1,148,241

(TurkStat, 2023)



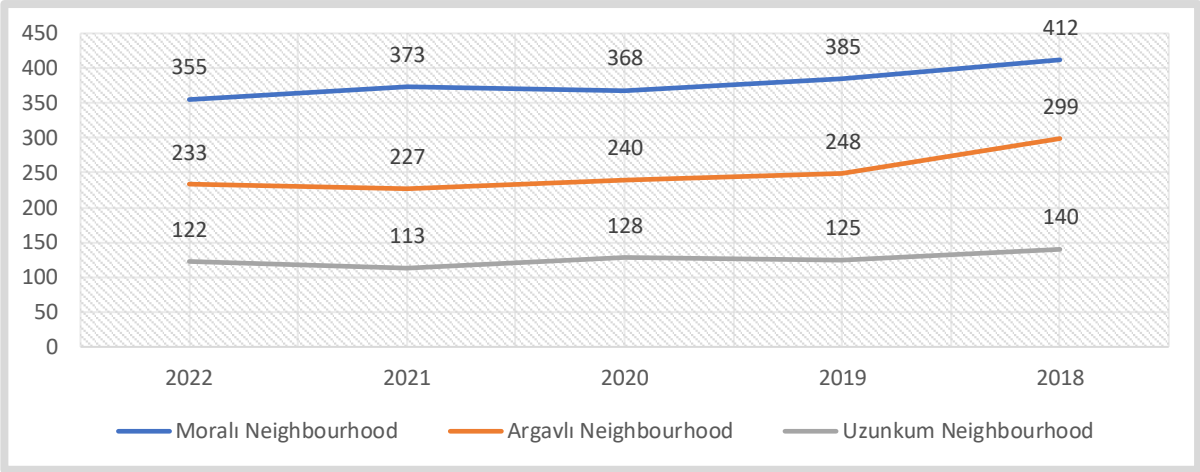
(TurkStat, 2023)

Figure 6-23. Population Data for the Last Five (5) Years in Aydın Province

The Project will be located in Germencik Distict with a total population of 44,172 including 21,944 men and 22,228 women (TurkStat, 2022). According to the year 2022, the population of Soke is 123,301 in total, consisting of 61,740 males and 61,561 females.

The closest settlements to the project area are Moralı, Argavlı and Uzunkum Neighbourhoods. According to headmen of Moralı, Argavlı and Uzunkum Neighbourhoods, the population is respectively 503, 250 and 198 in 2023. According to field study, Uzunkum neighbourhood has the lowest population figures, whereas, Moralı neighbourhood has the highest population figures.

Population changes of the districts and neighbourhoods within the Project impact area in the last five years are given in Figure 6-24.



(TurkStat, 2023)

Figure 6-24. Data on Population for the Last Five (5) Years in the Closest Settlements to the Project Area

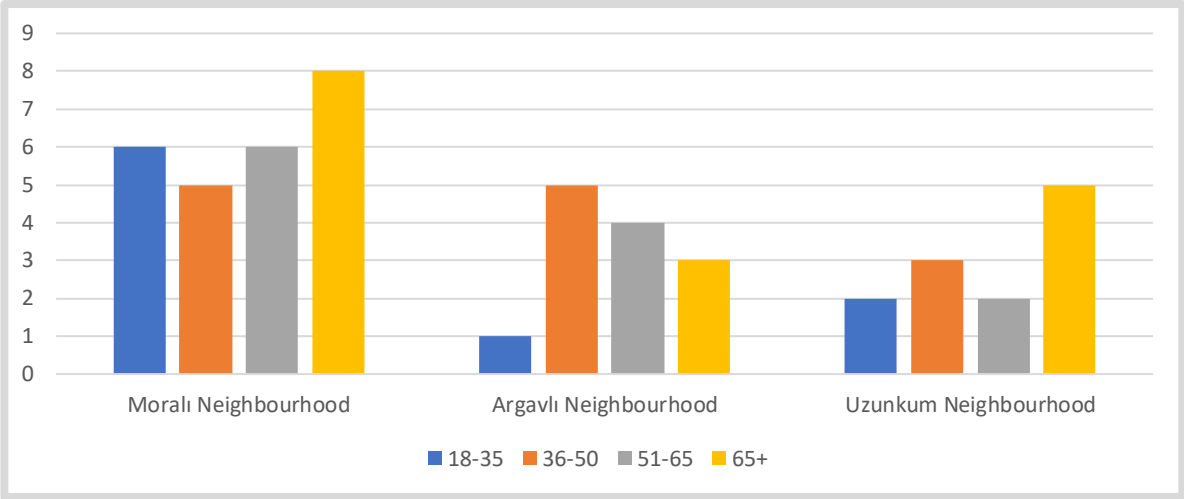
The average household size in Aydın, the region encompassing these neighborhoods, is reported as 2.77, indicating a relatively consistent socio-cultural structure among the population in these areas.

To conduct a survey within the impact area of the project, statistical measures were implemented. With a confidence level of 90% and a margin of error set at 10%, a total of 51 surveys were carried out in the three neighborhoods. These surveys aimed to gather representative data on the population's characteristics and opinions within the respective areas.The distribution of surveys within each neighborhood was determined based on their population proportions. Specifically, 7% of the population in Moralı, 6% of the population in Argavlı, and 10% of the population in Uzunkum were selected to be surveyed.

In summary, utilizing the ABPRS data and considering the socio-cultural homogeneity of the neighborhoods, 51 surveys were conducted with a 90% confidence level and a 10% margin of error. The samples were distributed proportionally to the population size in each neighbourhood - 7% in Moralı, 6% in Argavlı, and 10% in Uzunkum. These surveys aimed to provide valuable insights into the characteristics and preferences of the population within the impact area of the project.

Upon evaluating the age range of participants engaged in household interviews, significant differences were observed among the three neighborhoods. In Moralı and Uzunkum, the majority of participants were aged 65 years and above, indicating a higher representation of older individuals in these areas. Conversely, in Argavlı, the majority of participants fell within the age range of 36-50 years, suggesting a relatively younger demographic profile compared to the other two neighborhoods. These findings highlight the diverse age distributions among the surveyed population in each neighborhood.

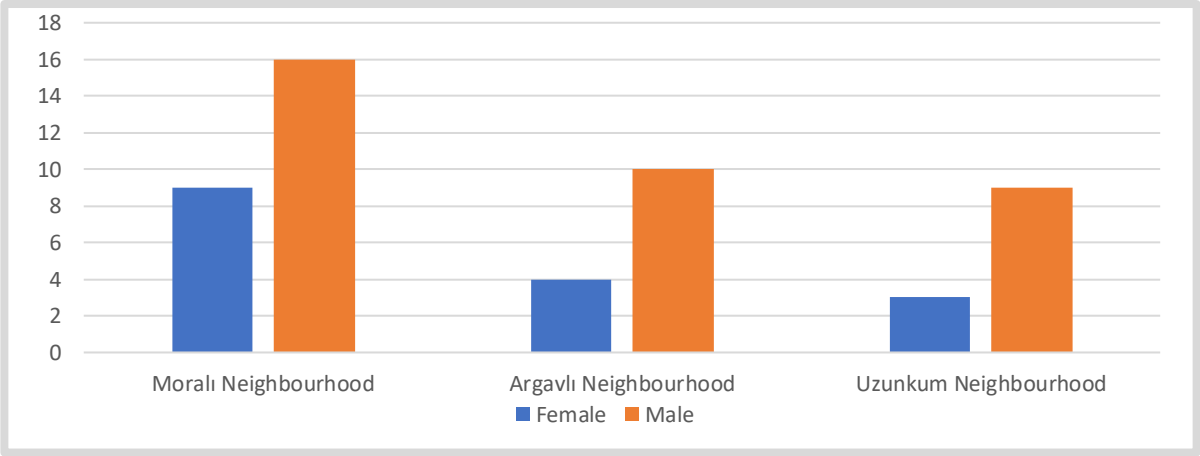
Detailed age ranges are presented in the figure.



Source: Field study 2023

Figure 6-25. Age range of Participants

In addition, 67% of the participants in the household interviews were male and 31% were female. The number of participants by neighborhood and gender is given in the figure.



Source:Field Survey, 2023

Figure 6-26. Gender distribution of participants

Based on the most recent data obtained from our field study, it is evident that all three neighborhoods have undergone significant population changes. After conducting an interview with the headman of Moralı Neighborhood, it became apparent that the primary reason for the population decrease in this area is the absence of secondary or high schools, which has led families to move away in search of better educational opportunities for their children.

Similarly, in Argavlı and Uzunkum, the declining population can be attributed to the lack of job opportunities within the neighborhoods. This scarcity of employment options has prompted many residents to seek livelihoods elsewhere, resulting in labor migration.

Furthermore, it has been observed that those working in the agricultural sector have faced increasing difficulties in sustaining their livelihoods in the region. This, in turn, has contributed to the phenomenon of labor migration as individuals seek better prospects in other areas where their skills and expertise are in demand.

In conclusion, the population changes in these three neighborhoods are intricately linked to the availability of education and job opportunities, particularly in the context of the agriculture sector's challenges. Addressing these issues may hold the key to revitalizing and stabilizing the local communities.

6.13 Traffic and Transport

This section presents general traffic and transportation information for Germencik and Söke Districts of Aydın Province within the Project AoI.

During the land preparation and construction phases, the following vehicles will pass through the project site for mobilization, drilling, and rehabilitation operations in a drilling area: 1 crane, 2 passenger vehicles, 2 commercial vehicles, 1 fuel tanker, 2 trucks, 1 excavator-loader, 2 concrete mixers, and 1 commercial off-road vehicle. Additionally, during land preparation, construction, and installation activities for energy production and greenhouse areas, the following vehicles will pass through the project site: 1 crane, 10 passenger vehicles, 5 commercial vehicles, 1 fuel tanker, 4 trucks, 2 excavator-loaders, 12 concrete mixers, 1 concrete pump, and 1 commercial off-road vehicle. The project will involve the simultaneous passage of 30 heavy vehicles, 7 commercial vehicles, and 12 passenger vehicles.

Based on the traffic volume assessments conducted by the General Directorate of Highways along the İzmir-Söke road, which falls within the impact area of the Project, a considerable number of vehicles are observed to use this route on a daily basis. The data reveals that approximately 22,424 cars, 2,038 medium-load commercial vehicles, 134 buses, 1,156 trucks, and 1,965 vehicles with trailers, summing up to a total of 27,717 vehicles, traverse this road each day.

Considering that a total of 40 personnel will be employed during the operational phase of the project, there will be an average daily passage of 10 passenger vehicles (3650 annually) and 3 minibuses (1095 annually) for providing transportation to the nearest district centers for personnel services. In addition to this, during the operation of the Geothermal Power Plant facility, it is anticipated that a varying number of trucks/trailers, ranging from 6 to 16, will pass through within a range of 200-500 tons of chemicals (pentane, isobutane, inhibitors, etc.) used within one year.

Furthermore, the General Directorate of Highways categorizes the traffic intensity of the Izmir-Söke road as "Level 5," signifying a substantial volume of traffic on this route. As the impact area of the Project is directly influenced by this road's traffic flow, careful consideration of these statistics is vital during the assessment and planning stages to ensure smooth and efficient

integration of the Project with the existing transportation infrastructure. Traffic volume on state roads is shown in Figure 6-27.

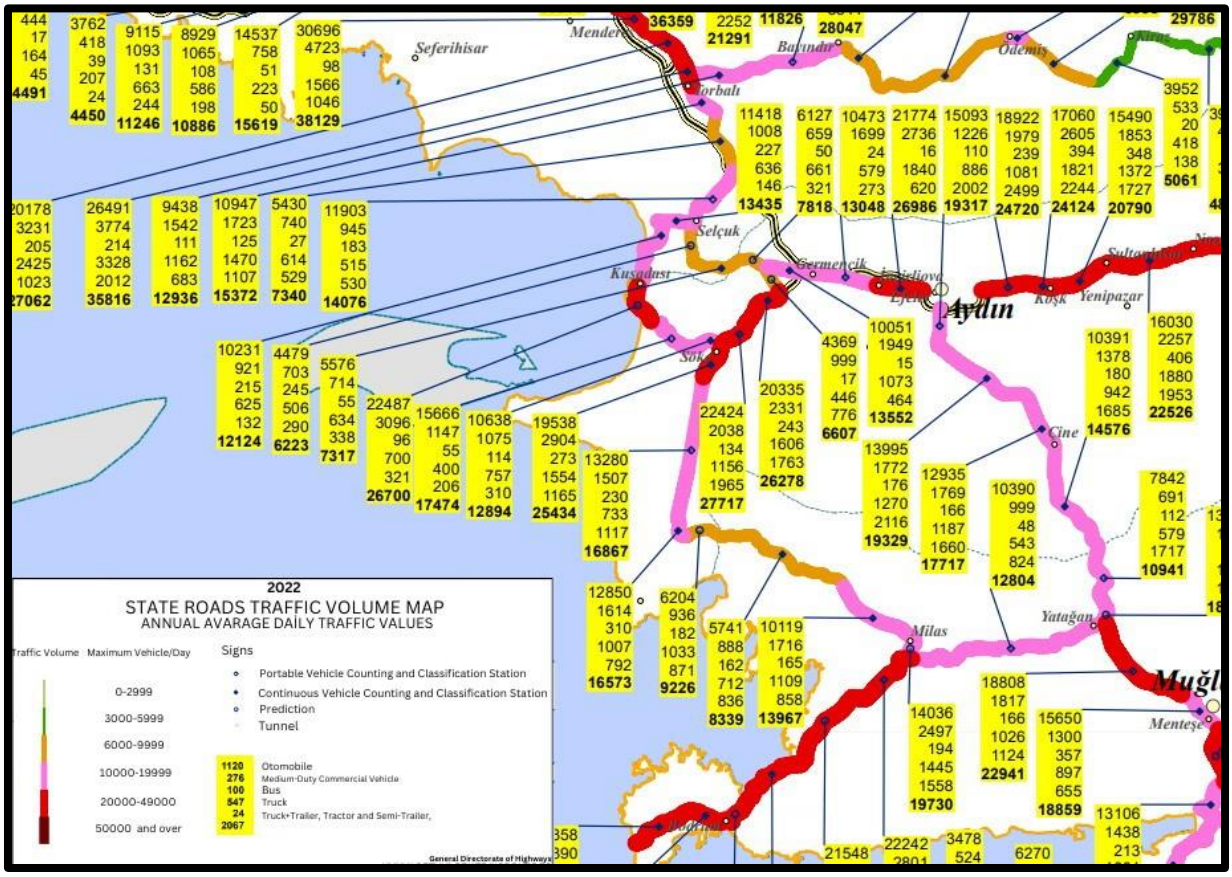


Figure 6-27. 2022 State Road Traffic Volume Map

6.14 Livelihoods and Employment

According to Aydın Chamber of Commerce, Aydın Province is known as a city of agriculture and tourism. 55% of the population makes a living from the agricultural sector. Figs, olives, cotton and chestnuts are mostly grown in Aydın Province.

Tourism is the second most important sector after agriculture. Aydın, which has hosted many civilizations, has 23 ruins and many historical, cultural, touristic and natural values (Aydın Chamber of Commerce).

According to interviews with headmen, the main source of livelihood in Moralı, Argavlı and Uzunkum Neighbourhoods are agriculture. The most commonly grown crops are figs, olives, corn, cotton and sunflower.

Furthermore, the distribution of participants engaged in animal husbandry varied across the three neighbourhoods. In Moralı, 37.5% of the participants were involved in this activity, while in Argavlı, the percentage was 28.5%, and in Uzunkum, it was 41.6%. The predominant types of animals raised among the participants were cattle, sheep, and goats.

As a result of the interviews with the neighbourhoods within the project impact area, it was learned that more than half of the participants have an annual income of 105,000 TL or less. Detailed information on participants' annual income is given in the table.

Table 6-21. Annual income of participants

Annual Income / Neighborhoods	Moralı	Argavlı	Uzunkum	Total
105.000 TL ve altı	12	7	5	24
105.000 TL ve 205.000 TL	1	2	1	4
205.000 TL-500.000 TL	6	4	4	14
500.000 TL ve üstü	4	0	1	5
Total	23	13	11	47

Source:Field Survey, 2023

Based on the household interviews conducted, the distribution of respondents living on pensions varied among the three neighbourhoods. In Moralı, 37.5% of the respondents reported living on pensions, while in Argavlı, the percentage was 46.1%, and in Uzunkum, it was 45.4%. Detailed information on livelihoods is presented in the Table 6-22.

Table 6-22. Livelihoods by Neighbourhoods

Livelihood/Neighbourhoods	Moralı Neighborhood	Argavlı Neighborhood	Uzunkum Neighborhood	Total
Salary	3	3	0	6
Retirement Salary	6	6	5	17
Husbandry	2	2	2	6
Agriculture	9	1	3	13
Small Business	1	1	0	2
Age Pension	0	0	1	1
Other	3	0	0	3
Total	24	13	11	48

Source: Household survey, 2023

Upon evaluating the employment status of the participants, distinct patterns emerged in each neighbourhood. In Moralı, 36% of the participants were identified as housewives, while in Argavlı, the majority, accounting for 42.8% of the participants, were retired. In contrast, in Uzunkum, a significant proportion of 50% of the participants were engaged in farming. The working situation in the specified neighbourhoods is presented in Table 6-23.

Table 6-23. Employment status by Neighbourhoods

Livelihood/Neighbourhoods	Moralı Neighborhood	Argavlı Neighborhood	Uzunkum Neighborhood	Total
Salaried Employee	1	3	0	4
Self-Employed	3	2	0	5
Retired	3	6	3	12
Student	0	0	1	1
Housewife	9	2	2	13
Non-Continuous Employee	1	0	0	1
Farmer	8	1	6	15
Total	25	14	12	51

Source: Household survey, 2023

6.15 Education

In Aydın Province, there are 876 schools, 9,695 classrooms, 16,366 teachers and 189,827 students (Aydın Provincial Directorate of National Education). In Germencik District, there are 38 schools, 436 classrooms, 609 teachers and 7,402 students (Germencik District Directorate of National Education) In Söke District, there are 108 schools, 1,159 classrooms, 1.772 teachers and 21,638 students (Söke District Directorate of National Education).

Based on interviews with headmen, there are no schools in Moralı, Argavlı and Uzunkum Neighbourhoods. According to household interviews, all three neighbourhoods are in the transportation system. Transported education is carried out from Moralı Neighbourhood and Uzunkum Neighbourhood to Mursallı Neighbourhood, which is 2-3 km away. In Argavlı Neighbourhood, it was stated that students mostly go to Sazlı Neighbourhood.

During the household interviews conducted in the three neighborhoods within the project impact area, a statistical analysis of the participants educational qualifications revealed interesting insights. In Moralı, approximately 26.1% of the participants had completed primary school, making it the most prevalent educational level among the respondents. Similarly, in Argavlı, approximately 21.4% of the participants were primary school graduates, indicating a comparable trend. In the case of Uzunkum, it was observed that an equal proportion of participants, approximately 50%, were divided between primary school graduates and high school graduates, highlighting a more evenly distributed educational background in this neighbourhood. The statistical breakdown of educational qualifications provides valuable information about the educational landscape in these neighbourhoods, underscoring the predominance of primary school graduates in Moralı and Argavlı, while showcasing a balanced distribution of primary and high school graduates in Uzunkum. In addition, the table below shows the educational attainment levels of the participants according to their gender.

Table 6-24. Education Level in AoI

Education Level	Gender		Frequency	
	Female	Male	Total	(%)
Illiterate	2	0	2	4,7
Primary education	10	14	24	57,1
Secondary school	0	2	2	4,7
High school	2	12	14	33,3
Bachelor's degree	0	0	0	0
Total	14	28	42	100

Source: Field Study, 2023

6.16 Health Services

There are total of 12 state hospitals in Aydın province, one each in Germencik and Söke districts. According to interviews that held on with headmen, there are no health centers in Moralı, Argavlı and Uzunkum neighbourhoods. Household surveys revealed that residents of Moralı Neighbourhood go to Germencik District, residents of Argavlı Neighbourhood go to Söke District and residents of Uzunkum Neighbourhood go to Mursallı District to receive health services.

6.17 Infrastructure Services

Information regarding to existing insfrasture and services of each settlements within the AoI was questioned during the Community Level Surveys and following information have been conducted during the interviews.

During the household interviews and mukhtar interviews, it was stated that there is no major infrastructure problem in all three neighborhoods. However, it was learned that residents of Moralı and Argavlı have complaints about roads. Detailed information on infrastructure and services in the neighborhoods is given in Table 6-25.

Table 6-25. Availability of infrastructure and services within neighbourhoods

Infrastructure and services	Moralı	Argavlı	Uzunkum
Electricity infrastructure	Yes	Yes	Yes
Drinking water source	Mains Water	Mains Water	Mains Water
Tap Water	Mains Water	Mains Water	Mains Water
Irrigation water	Spring water	Spring water	Spring water
Wastewater Disposal	Cesspool	Cesspool	Cesspool
Heating	Wood/Coal	Wood/Coal	Wood/Coal
Telephone/Internet Access	Available	Available	Available
Road	Available	Available	Available
Waste management	Municipality collects from waste bins	Municipality collects from waste bins	Municipality collects from waste bins
Availability of public transportation	Municipality bus to district center	Municipality bus to district center	Municipality bus to district center
Cooperative/Association	Tariş Cooperative	-	Milk and dairy products cooperative
Other	Hunters Club	-	-

Source: Field Study, 2023 & Headmen Interview, 2023

6.18 Vulnerable/Disadvantaged Individuals and Groups

The social baseline study also seeks to identify any potentially vulnerable or disadvantaged group or individuals in the local community. According to the Wo'ld Bank's standards, vulnerable groups are categorized as seasonal agricultural workers, children, people over the age of 65, people with chronic diseases or in need of special care, people with disabilities, people without health insurance, people earning below the minimum wage/receiving grants from the state or foundations, and female-headed households. As a result of the interviews with headmen, it was determined that vulnerable groups in the neighborhoods are seasonal workers, low-income groups, female heads of households, mentally and/or physically disabled people, and people over the age of 70 who live alone.

Seasonal agricultural workers: Informal employment in Türkiye is very common, especially in the agriculture sector. This group is considered as vulnerable since their income is seasonal.

People who are over 65 years of age: Elderly people have limited participation in decision-making, which can lead to certain concerns they may have been overlooked;

Disabled people: The participation of people with mental or physical disabilities in decision-making processes may be hindered from time to time. In addition, various activities of the Project may have a greater impact on persons with disabilities;

People earning below the minimum wage/receiving donations from state or foundations: People who have low income can experience adverse impacts of the Project more than other people since they have less opportunity to solve problems on their own and might require support;

Female-headed households: There are females which are responsible for covering needs of their families on their own. According to researches, females heading households are forced to play multiple, conflicting roles after losing their spouses, leaving their spouses or being alone, and have to work in marginal, part-time, informal, and low-income jobs due to lack of access to high-paying jobs (BMC Women Health, 2020). These adversities make female-headed households vulnerable.

The following information were conducted from interviews with Moralı, Uzunkum and Argavlı Neighbourhoods' headmen:

- In the 25 household surveys conducted in Moralı Neighbourhood, a total of 4 citizens in need of care, 2 citizens receiving assistance, 2 physically disabled citizens, 1 mentally disabled citizen and 1 citizen aged 70 and over living alone were reported. Besides, based on the interview that held on with Moralı Neighbourhood headman, there are 5 female heads of households who support the household alone for various reasons and there is one child who is the head of the household.

- In the 14 household surveys conducted in Argavlı Neighbourhood, a total of 1 citizen receiving social assistance and 1 citizen over the age of 70 and living alone were identified. According to interview that held on with headman, there are 10 households in Argavlı Neighbourhood living on state assistance. There are 2 disabled citizen among the neighbourhood residents. There are 10 female heads of households who support the household alone for various reasons. There are 4 people in the neighbourhood who need special care. Finally, there are 13 people aged 65 and over living alone.
- In 12 household surveys conducted in Uzunkum Neighbourhood, 2 citizens in need of care, 1 citizen receiving social assistance and 1 physically disabled citizen were identified. According to interview that held on with headman, there are 5 households in Uzunkum Neighbourhood living on state assistance. There are 3 disabled citizen among the neighbourhood residents. There are 4 female heads of households who support the household alone for various reasons.

Further information regarding the vulnerable groups is given in Table 6-26 below.

Table 6-26. Vulnerable Groups

Settlement	Seasonal Worker	Low Income Group	Female Household Head	Mentally and / or Physically Handicapped	People who are aged 70 and living alone
Moralı Neighborhood	-	-	5	1	-
Argavlı Neighborhood	30-40	10	-	2	13
Uzunkum Neighborhood	-	5	-	3	4

Source: Interviews with headmen, 2023

6.19 Cultural Heritage

Cultural heritage encompasses the rich tapestry of tangible and intangible elements that represent the collective history, traditions, and values of a society. This includes artifacts, historical sites, traditional practices, folklore, and other forms of cultural expression. Protecting cultural heritage is of paramount importance as it preserves our shared identity and fosters a sense of continuity and pride in our past.

The cultural heritage of Aydin Province in Türkiye is a blend of ancient history and diverse influences. This region is renowned for its archaeological sites, such as the ancient cities of Ephesus and Aphrodisias, which reflect the Greco-Roman legacy. Aydin's cultural tapestry also includes the historical heritage of the Seljuk and Ottoman periods, with well-preserved monuments like the Isa Bey Mosque and the Castle of Aydın. Aydin's cultural heritage is a testament to the confluence of various civilizations and the preservation of their legacies in this picturesque part of Türkiye.

Söke District is home to the ancient city of Priene, an archaeological gem with well-preserved Greek and Roman ruins, including the famous Temple of Athena.

Germencik District boasts archaeological sites, including the ancient city of Magnesia, with its well-preserved theatre dating back to the Hellenistic period. The ruins of the ancient city of Magnesia in Tekin Village of Germencik District of Aydın Province are approximately 2.40 km away from facilities to be constructed within the scope of the project.

As per the Project's Environmental Impact Assessment (EIA), it has been established that there are no cultural, historical, or natural areas designated as Cultural Heritage or Natural Heritage under the auspices of the Ministry of Culture, in accordance with the 1nd and 2nd articles of the Convention for the Protection of the World Cultural and Natural Heritage. This indicates that the project is not likely to impact such protected sites or assets, including cultural and archaeological treasures and natural sites.

Therefore, there is no foreseeable threat to the existing tourism income or potential stemming from potential damage or degradation of cultural or archaeological assets, or the natural beauty and significance of the region. The Projects' EIA findings provide reassurance that the proposed development will not jeopardize the valuable cultural and natural heritage of the area, ensuring the preservation of its historical and environmental integrity for the benefit of present and future generations.

6.20 Land Ownership

The Project Company determined a price based on the sales prices obtained from neighbourhood headmen, local residents, real estate offices and advertisements of fields for sale on the internet. Land acquisition was carried out with a willing seller and buyer approach, and price negotiations took place between the Project Company and landowners.

According to the information obtained from the project company, an agreement was reached for a price approximately 2 times higher than the market value. Importantly, during negotiations, landowners were given the right to refuse before the sale transaction took place.

A total of 54,577 m^2 of land acquisition has been completed for the switchyard, geothermal power plant and drilling areas. The lands were acquired through willing buyer willing seller arrangements and obtaining consent from individuals. There are no formal or informal users in the aforementioned areas, the affected landowners/shareholders were reached and consulted during ESIA studies.

The parcel no. 1 on block 228, where the drilling and testing greenhouse[13] (greenhouse that is not within the scope of the project and used by the project company for testing purposes) area is located, consists of a total area of 10921 m^2. It was purchased with the consent of four (4) shareholders in 04.03.2016. The price paid for the land is approximately two (2) times more

[13] The project company is planning to establish a greenhouse in the future (excluding project scope and financing). For the purpose of creating a groundwork for this, a greenhouse has been set up for testing in the drilling area located on parcel 1 of the 228 block, and the total area is 1,240 m^2

than the current value determined in the year the purchase was made. During the field visit, one of the four shareholder was called for an interview, but he stated that he was not willing to meet and was satisfied with the land price he had received and that the purchase was made by consent.

The parcel no. 11 of the 228 block to be used for the switchyard consists of a total of 31656 m^2. It was purchased by consent on 09.05.2022 from two (2) shareholders who own the land. During the site visit, a phone call was made with one of the owners and he stated that he was satisfied with the price he received and that he did not have any problems during the sales process.

The parcel no. 7 of the 145 block to be used for drilling consists of a total of 11952 m^2. On 04.03.2016, the purchase process was completed with the consent of the land owner.

Detailed information on land acquisition is presented in Table 6-27.

Table 6-27. Land Parcels' Status

Parcel/ Block	Total Area	Landowner - Prior to Land Acquisition	Presence of Structures / Buildings at the Land Parcel	Acquisition type	Date of Purchase	Purpose of land transfer	Is the land rented by someone else or used by an unregistered user?	Land Acquisition Status (already acquired / in process)
228/1	10921 m^2	Multiple private owners (four shareholders)	No buildings /structures	Willing Buyer Willing Seller	16.03.2016	Drilling	No	Already acquired
228/11	31656 m^2	Multiple private owners (2 shareholders)	No buildings /structures	Willing Buyer Willing Seller	09.05.2022	Switchyard	No	Already acquired
145/7	12000 m^2	Private	No buildings /structures	Willing Buyer Willing Seller	04.03.2016	Drilling	No	Already acquired

The Project Company has determined the planned route of the geothermal pipeline within the scope of the Environmental Impact Assessment (EIA) license in the designated area. The route of the geothermal pipeline is approximately 3.30 kilometres long and, it runs between Argavlı Neighbourhood in Söke District and Uzunkum Neighborhood in Germencik District. The route of the geothermal pipeline is planned to pass along the roads surrounding agricultural lands, so land acquisition is not anticipated. With the final decision of TEİAŞ, consultations will be held with landowners in case of any design changes.

However, during the construction, if there is a boundary violation or a need for additional land arises, agricultural lands may be affected, and land acquisition or expropriation may be necessary. Before construction, the land acquisition needs will be identified clearly and if land acquisition is needed, Resettlement Action Plan will be prepared to cover this component along with Electricity Transmission Line (as explained below). It will be ensured that no construction works can start before all land acquisition is completed, and PAPs are compensated in line with Bank policies as will be defined in RAP. the Project Company will consult with landowners

along the route and take into account the concerns and requests of the stakeholders. Additionally, the Company will create suitable crossings (omega) to not obstruct access to field entrances.

In addition to the initially designated route, an alternative route has been planned to run parallel to the irrigation canal. The use of the alternative route will require the approval of the General Directorate of State Hydraulic Works. The planned geothermal pipeline and electricity transmission line are given in Figure 6-28.

Electricity Transmission Line related to the GPP Project will be established following the approval of TEİAŞ. The power plant will be connected to the Kubilay GPP-Maren GPP Energy Transmission Line. The Project Company designed the route of the Electricity Transmission Lines and submitted it to TEİAŞ for approval. The route chosen by the Project Company does pass through private properties. The length of the electricity transmission line is 175 meters in total, 120 meters of which pass through private property at only a single point (two shareholders). For this reason, the Project Company will lease these lands under the easement right. The Resettlement Action Plan will be used as a guide document to determine compensation and manage this process. Compensation will be paid for the right of way' and one's land use will not be restricted except for the obligation to plant tall trees for safety reasons.

A Resettlement Action Plan to be prepared for the project will ensure that any land acquisition and/or expropriation, if necessary, is carried out in accordance with World Bank requirements and national legislation during the construction and operation of the geothermal pipeline and electricity transmission line. The plan will aim to minimize land acquisition and ensure fair valuation and compensation, especially for agricultural land.

Appropriate measures to mitigate adverse impacts on Projected Affected Persons (PAPs) (including informal users) due to land acquisition/expropriation will be carefully planned in the RAP and will be implemented throughout the lifetime of the project. The plan will ensure the implementation of the following items:

- The relevant Turkish legislation and World Bank OP 4.12 will both be followed, in cases where there are gaps between the national legislation and the OP4.12, measures will be taken to meet the standards set in OP 4.12;
- The property and inheritance rights of persons will be respected;
- Potential economic and social impacts of land acquisition/resettlement on PAPs (on livelihood of them also) will be assessed;
- Categories of stakeholders, including vulnerable/disadvantaged individuals/groups, will be identified and consulted with;

- Categories of affected persons and their respective entitlements will be identified;
- The public will be fully informed and processes will be transparent. Furthermore, affected persons will be meaningfully consulted, they will be given opportunities to participate in planning and implementation of resettlement programs;
- All possible steps will be taken to minimize acquisition of productive, privately owned land and to avoid acquisition of residential areas (and thus involuntary resettlement) through careful selection of the needed sites;
- Valuation of land, businesses, and other assets for which compensation is given will be based on the full replacement cost as defined in OP 4.12 ;
- In the case of agricultural land, valuation of the land will include crops value as well as other land related livelihoods and assets;
- In cases when there are people working on the affected land or businesses but they are not land owners (tenants, users, or wage earners), the compensation should be in an amount or manner to ensure that they will not be worse off than before the project;
- Regardless of the formality of ownership, for those whose livelihood depends on land and common resources, (including common lands), the compensation provided would be at the level to ensure that the affected people could restore their livelihood to pre-displacement levels;
- In the case where land is needed in a temporary basis, owners will be compensated in full market rental price for the period during which the land is used and the land will be given back to the owner in the same condition as before it was rented;
- In exceptional cases if resettlement is unavoidable, in addition to the full replacement cost, affected people will be provided assistance for relocation and related expenses in line with the resettlement plans. Resettlement activities will be conceived and executed as sustainable development programs, providing sufficient investment resources to enable displaced persons to share in project benefits;
- Special assistance programs for vulnerable/disadvantaged individuals/groups (if any) including the persons without any immovable property, will be provided;
- The Grievance Redress Mechanism (GRM) and implementation and monitoring of RAP will be prepared in line with the LARPF of the project and WB policy guidelines;
- Land acquisition and resettlement activities will be monitored and reported on a regular basis to ensure timely and effective implementation of RAP;

- Preparation and implementation of the RAP will be done in a transparent manner with the participation of affected persons and relevant institutions;
- All relevant stakeholders will be informed and updated as deemed necessary on the project land requirements, RP implementation process, entitlements, and GRMs, etc.;
- Any such infrastructure facilities as roads, water pipelines, and communication networks etc. disrupted by the construction of project will be replaced;
- All needed steps will be taken to ensure compensation, registration and transfer issues are resolved with owners without seeking court intervention, unless unavoidable;
- Affected people will be compensated in full before construction begins and all activities and procedures will be formally documented;

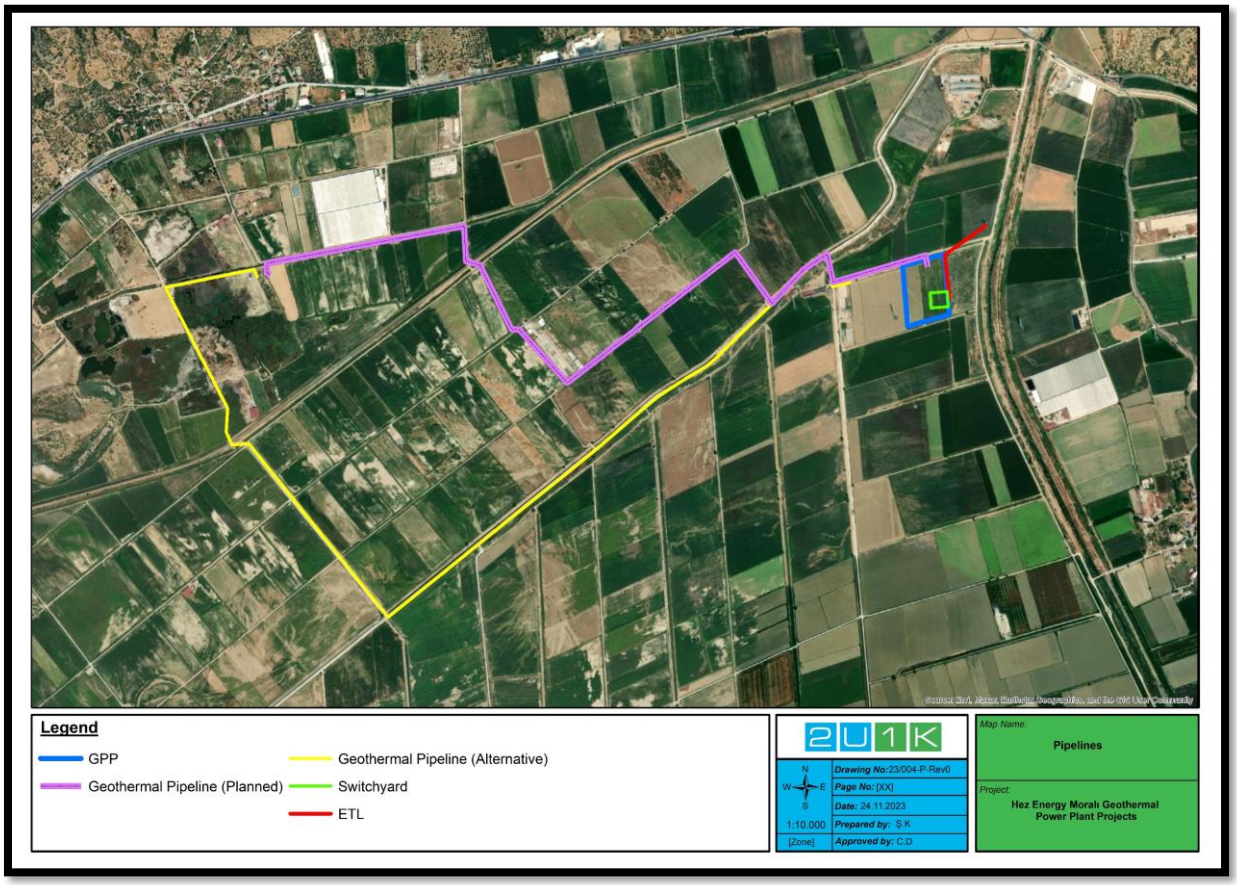


Figure 6-28. Geothermal Pipeline and Electricity Transmission Line

6.21 Site Specific Findings

In the initial planning of the project, it was envisaged that the switchyard area to be built on plot 228, parcel no. 11 would overflow to the pasture area next to the plot in question, but in line with the new survey studies, it was stated that the land numbered 228/11 to be used for

the GES is sufficient and the said pasture area will not be used. However, the residents of the neighbourhood have no information about the new design and that the pasture area will not be used. They are concerned about the use of the pasture area. The Project Company should inform the residents of the neighbourhood transparently about the issue through appropriate consultation methods.

According to the information obtained from the neighbourhood headmen, 4-5 families use this pasture area for approximately 10 animals. They stated that if the pasture areas are used within the scope of the Project, the residents of the neighbourhood will be disturbed by this situation.

The possible reaction of people to the usage of the pastureland by the SPP project could be due to several reasons. One reason could be that the region has limited pasture lands, which means that the available pastureland is already being used to its full capacity. If the SPP project uses this pastureland, it may result in a shortage of pastureland, which could lead to a decrease in the availability of food for the animals. This situation can negatively impact the livelihoods of the families who depend on this pastureland for grazing their animals.

The families who use this pastureland for their animals may be dependent on it for their livelihoods. If the SPP project uses this pastureland, it could disrupt their daily routine and livelihoods. They may need to find alternative pastureland, which may not be as suitable as the current one, resulting in a decrease in the quality of the animal's food and an increase in their expenses. This situation can have a significant impact on their income and their ability to provide for their families. By taking into consideration the concerns stated by headmen, Project Company gave up to use this pastureland. Thus, no interviews were conducted in order not to raise the level of concerns of these families about the project.

Furthermore, the families who use this pastureland may have a strong emotional attachment to the land. This attachment could be due to the fact that their families have been using this land for generations, and it holds significant cultural value. If the SPP project uses this land, it could result in the loss of a significant cultural heritage for the families who depend on it.

According to the final design, pastureland will not be used and the public should be informed through the consultation methods outlined in the Project's SEP to address local residents' concerns.

6.22 Results of interview with sensitive receptors

The environmental area of interest (AoI) primarily encompasses the Project's footprint and the 500-meter vicinity, with a focus on air emissions during construction. The neighborhoods most affected in this region are Moralı, Argavlı, and Uzunkum.

Sensitive receptors identified within the Project area include two farms and a restaurant. The first farm lies 0.04 km from the drilling well in EIA 1, while the second farm is situated 0.11 km

from the greenhouse in EIA 2. The restaurant, which falls under EIA 2, is located 0.14 km from the drilling well.

To gather further insights into the project area, two field visits were conducted. During the first visit, an unstructured interview was held with a farm owner identified as a sensitive receptor in EIA 1. The farmer expressed satisfaction with the Project, as the construction company effectively addressed their electricity connectivity issues.

In the second site visit, interviews were conducted with the owner of Yörük Ali Baba Restaurant and another farm owner in EIA 2. The restaurant owner expressed a desire for more comprehensive information about the Project, particularly regarding the construction timeline. Dust release during the construction phase was a concern, and potential damage to the road due to heavy vehicles passing in front of the restaurant was also mentioned. Then the wife of the farm owner was interviewed. She did not have any information about the project. It was learned that the farm is engaged in ovine and poultry farming. It was stated that their biggest problem was power cuts. The wife of the farm owner stated that they do not have any problems arising from the Aldo Solar Panel, which is close to the farm, and it was learned that they have dust problems due to the existing roads passing around the house.

In summary, the AoI was determined to assess the impacts on the Project's immediate vicinity, considering air emissions during construction. The sensitive receptors include two farms and a restaurant, with concerns raised about dust and road damage during the construction period.

6.23 Community Level Information Provided by Headmen

As part of the Environmental and Social Impact Assessment (ESIA) process, interviews were conducted on February 13-14, 2023 with the headmen of three neighborhoods: Moralı, Argavlı, and Uzunkum. These interviews shed light on various aspects concerning the project and its potential implications on the communities.

According to the headman of Moralı Neighborhood, it was observed that citizens are facing challenges in their livestock and agricultural activities. Specifically, problems were reported land division, due to multiple inheritors of land, and damages caused to agricultural products by wild boars in the vicinity of Moralı neighborhood. These issues may have significant socio-economic impacts on the local residents.

On the other hand, the headman of Argavlı Neighborhood stated that their community currently does not experience any economic or social problems. During the interviews with the headmen, no complaints were raised regarding traffic, infectious diseases, noise, or odor resulting from the project. They express confidence that the project's distance from Argavlı would likely result in no negative impact on their neighborhood.

During the interview with the headman of Uzunkum neighborhood, a pertinent concern regarding the water quality was raised. The neighborhood currently relies on purified water

due to the detection of arsenic in their well water during measurements conducted in 2010. The headman attributed these issues to the presence of numerous geothermal power plants in the region. Consequently, there is a strong call for the new geothermal power plant proposed within the project to be equipped with a reinjection system. The project already has a reinjection system. Technical information about the project was presented to stakeholders through informative brochures distributed to the public during the EIA meeting and within the scope of ESIA studies.

Furthermore, it is evident from these interviews that the headmen possess knowledge about the technical aspects of the project, likely due to the existence of other geothermal power plants in the region. There is a shared concern that past problems caused by other companies might recur in this project as well.

In the household surveys, it was determined that the local people were mostly unaware of the project. Those who were aware of the project reported that their knowledge was insufficient. The adequacy of information on the project is presented in Table 6-28.

Table 6-28. Adequacy of neighbourhoods' level of knowledge about the Project

Knowledge level adequacy/Neighbourhoods	Moralı Neighborhood	Argavlı Neighborhood	Uzunkum Neighborhood	Total
Yes	2	0	0	**2**
No	14	11	4	**29**
Partially	4	1	1	**6**
Total	**20**	**12**	**5**	**37**

Source: Household survey, 2023

6.24 Results of Community Level Information Provided by Public Institutions

Key informant interviews are a common data collection technique during the stakeholder engagement process since the key informants are well informed on their community and its inhabitants as a result of their professional background, leadership responsibilities or personal experience, key informants have specific knowledge or expertise about some aspects of the emergency, the area, the community, a specific sector or a sensitive issue. Typically, a key informant represents a non-governmental institution and academy. The Table 6-29 summarizes the information level of the interviewees.

Table 6-29. Information level of the Governmental and Non-Governmental Organizations regarding the Project

Name of the Institution	Project Information
Germencik District Municipality	As a result of the interview with the Director of Zoning Affairs of Germencik District Municipality, the project will be beneficial for the economic development of the region. Apart from this, it is foreseen that there will be noise and odor complaints arising from the project. Within the scope of the project, it was stated that it may be useful to support the greenhouse activities of the people of the region.
Aydın Provincial Directorate of Agriculture and Forestry	As a result of the interview with Aydın Provincial Directorate of Agriculture and Forestry, it was learned that the authorities have detailed information about the project. It is thought that the project should not only be used to generate electricity but also have other benefits. It was stated that there are nearly 40 geothermal power plants in Aydın province and in the past, the hot water released as a result of power plant activities was discharged uncontrollably into streams. This has caused damage to natural resources and agricultural land, and the public has reacted. It was suggested that the project should learn from the past and give importance to informing the public.
Germencik District Directorate of Agriculture and Livestock	After discussions with the district directorate of agriculture and forestry, it was learned that they had received complaints from the public about agricultural inefficiency in other geothermal power plants in the region. It was stated that they could not take action to address these complaints because they had no scientific data on the damage caused. Apart from these, it was also stated that there is an odor problem in Menderes due to industrial wastes. It was said that the project and its impacts should be transparent to the public.
Germencik District Health Directorate	During the interviews with the doctor working under the Germencik district health directorate, it was learned that he did not have sufficient information about the project. He stated that the effects of the geothermal power plant on public health should be investigated.

Source: Institution interviews, 2023

6.25 Labor and Working Condition

In this section, baseline labour and working conditions of the Project are prepared presented according in accordance with to IFC PS 2 Labor and Working Conditions.

During the site visit, the Sociologist of 2U1K interviewed with managers of the Project Company to assess any discrimination, working conditions, access to drinking water, access to sanitary facilities, access to the grievance mechanism, wages, overtime, and compensation.

Baseline Labour Conditions

Currently, a total of five (5) personnel, one (1) blue-collar and four (4) white-collar are employed directly by the Project Company. In terms of subcontractor services, there are a total of 67 personnel working for 13 different companies. The total of direct and indirect employees is 72. All subcontractors are organized by the drilling contractor Geopet Inc. There are three (3) non-Turkish male personnel working for the subcontractor company in the Project. The Project Company does not have a written Subcontractor Management Plan. This situation was identified during ESDD studies, and a plan was prepared.

The work permits of the employees and the hiring procedures are followed by the Project Company within the framework of legal practices. There are no disabled employees.

Details of the direct and indirect employment figures of the Project are presented in Table 6-30.

Table 6-30. Employment Figures of the Direct and Indirect Employees

	Blue-Collar Employees	White-Collar Employees	Total
Female	1	2	3
Male	54	15	69
TOTAL	**55**	**17**	**72**

Local employment is a goal of Project Company to hire people who live close to the place of work. It is beneficial for stakeholder engagement and transportation costs. A total of 32 personnel, 29 male and 3 female, were directly employed locally. Consultations were held with headmen for employment opportunities. Local employment and purchasing are given priority. Aydın, Germencik and Söke districts are prioritized in purchasing.

All workers (including sub-contractors) are hired through contracts and wages and over-time payments are paid accordingly. A copy of the worker's contract is presented in Appendix-F. After the contract is verbally explained to the employees, it is signed, and a copy is given to the employee. All employees are insured, and the insurance is started from the date of employment. Personal protective equipment (PPE) and clothing for workers are provided.

Workers' working days are regulated as 20 days of non-stop work (8 hours in a day) and followed by 10 days of non-stop leave. While one of the shifts is on leave, the other two shifts are working. Working hours are 07:00-19:00 in the morning and 19.00-07:00 in the evening. Working hours of white-collar employees are 09:00-18:00.

Employees have the right to establish unions and higher organizations, and to freely join and withdraw from their membership without obtaining permission, but there is no trade union to represent the common interests of workers. There are 2 male worker representatives elected by the Project employees.

The Project Company conducts a survey every 20 days at every shift change to measure employee satisfaction. In the interviews with the employees, they stated that they prefer to express their wishes and demands verbally.

The Project Company implements Geopet's Human Resources Procedure and this procedure complies with IFC standards. Human resources procedure clearly prohibits child labour and forced labour. Recruitment is done online through career portals. During the field visit, employee interviews and site inspection were conducted, and no cases of forced, uninsured or child labour were detected.

The documents required from the employees before starting work are listed below:

- Tc. identity Card;
- Driving License (if any);
- Residence Document;
- Criminal Record Certificate;
- Passport Photo;
- Diploma;
- Military Service Status;
- Certificate etc document (if any);
- Blood group Card;
- Full-fledged Medical Report (including lung film);
- Social Security Institution (SGK) Registration Number;
- Psychotechnical Document (if any);
- Vaccination Card;
- Bank İnformation.

Şahdem Security has been assigned by the Project Company. 3 security employees are working on the Project. The working hours of the employees are 08:00-20:00 and 20:00-08:00. Employees work as 2 days of work and 2 days of leave.

Geopet, a Subcontractor Company, provides transportation services to a total of 15 people with one private vehicle and one shuttle vehicle. In addition, a separate vehicle has been allocated for the white-collar employees of the Project Company. All travel expenses (including plane tickets) of employees coming from outside the city are covered by the Project Company. There are shuttles from the airport, station, or bus terminals to the Project site.

All recruited personnel are provided with training by the project company. These trainings:

- Commissioning and Occupational Health and Safety,
- First aid;
- Emergency,
- Work at Height;
- Environmental Awareness;
- Waste Management and Zero;
- Basic Drilling;
- Community Health, Safety and Security(which includes sexually transmitted disease awareness);
- Grievance Redress Mechanism;
- Code of Conduct;
- Gender Equality;
- SEA, SH, SA and GBV;

- Wildlife.

During the site visit, security personnel was interviewed, and he stated that he provided transportation by bicycle and bus and, stated that service could not be provided due to the low number of employees. Depending on the shift hours, he can sometimes provide transportation by a vehicle given to white-collar personnel. He stated that he was satisfied with the working conditions and the food service provided.

In addition to this interview, the personnel of the greenhouse[14] located in the drilling area (228/1) were also interviewed. Greenhouse personnel work from 09:00 to 18:00 and provide transportation to the Project Area with their own vehicle. He stated that he was satisfied with the working conditions.

Containers have been set up for non-locally employed workers. In the drilling area, there are 30 workers living in containers, each of them in single-person rooms. There are sanitary facilities and a television in the container. Employees stated that they could pray in their rooms. In addition, there is also a place that can be used as a resting area. International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD) and WB standards are followed in the evaluation of the camp sites during the site visit.[15]

Resting and accommodation area are presented in Figure 6-29.

[14] The project company plans to establish a greenhouse in the future (not within the scope and financing of the project). A greenhouse was established for testing purposes in the drilling area located on parcel 1, block 228 within the Project area with a total of 1,240 m2.

[15] https://documents1.worldbank.org/curated/en/604561468170043490/pdf/602530WP0worke10Box358316B01PUBLIC1.pdf

Figure 6-29. Resting and Accommodation Area

During the employee interviews, the employees staying in the accommodation area stated that they do not need to go out after the shift hours as all their needs are met but they are provided with vehicles to provide transportation when necessary.

In the interviews with the employees, some employees stated that they went to the nearby villages for prayers on Fridays. In the meetings with the headmen, this issue was asked of the headmen, and they stated that there were no complaints or disagreements.

Containers are used as dining halls. During the site visit, the containers were checked, and the service provided complies with the hygiene conditions. During the interviews with the employees, no complaints were received about the quality, hygiene, and portion of the food. Dining Hall/Container is presented in Figure 6-30.

Figure 6-30. Dining Hall/Container

Sanitary Facilities have been placed at the Project Area for the employees and they are cleaned in accordance with the hygiene standards.

Employees use the Project Company's well water as domestic water (well licence is provided at Appendix-G). There were no water-health problems. Packaged water is used as drinking water, there is no problem for employees to reach drinking water.

Employees are provided with cash support during religious holidays and during Ramadan. As a social responsibility project, the Project Company distributed saplings in 3 neighbourhoods (Moralı, Uzunkum, Argavlı). Upon the request of Moralı neighbourhood, the Project Company provided the installation of security cameras. Stream channel and road arrangements have been made. In addition, the company provides electricity free of charge to the farm owner identified as sensitive receptor.

6.26 Community health and safety

Construction activities may pose certain risks to health and safety of local communities and other stakeholders in absence of adequate control of public access to the site. The closest residential communities are Moralı, Argavlı and Uzunkum Neighborhoods which are located at 2.11 km, 1.16 km and 0.33 km distance from Project components.

During the interviews conducted with the neighbourhood headmen, it has been stated that there has been no problem regarding community health and safety so far. Apart from this, the Project Company has regulated the dirt road and smoothed it with asphalt in order to provide access to the GPP area and placed traffic signs thru the road. However, community health and

safety problems are related to the risk factors that may arise from the construction and operation phases of the Project.

The area of the GPP has been surrounded with secure fence during early stage of the construction phase. The security team is on duty 7/24 and the team is aware of how to act responsibly and avoid harmful interactions with the general.

7 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND MITIGATION MEASURES

This section describes potential environmental and social impacts (as defined by National Requirements and International Standards) resulting from construction, drilling and operation phase activities. Using the approach defined in Section 5, first an assessment is made of unmitigated potential impacts. Secondly, project responses or mitigation measures are described, and finally the significance of the residual impact is defined. For every project activity, the following potential impacts have been considered:

- Air quality;
- Noise;
- Geology and Soil Quality;
- Surface and Groundwater Quality;
- Wastewater Management;
- Waste Management;
- Biodiversity;
- Traffic and Transport;
- Labor and Working Conditions;
- Land Acquisition;
- Cultural Heritage;
- Vulnerable/Disadvantaged Individuals and Groups;
- Occupational Health and Safety;
- Community Health, Safety, and Security.

As described in Section 5, the assessment of impact significance both before and after mitigation is defined by the severity of any possible impact, the sensitivity of environmental receptors and the probability that an event will occur. In this section potential impacts with no net change to environmental conditions are not reported. Residual Impacts Sections provides a summary of the residual environmental significance (after mitigation) of identified impacts.

7.1 Air Quality

Geothermal power plants have the potential to emit air pollutants during construction, drilling, and operation.

7.1.1 Impacts during Construction

During the construction phase of the geothermal project, air emissions are primarily associated with land clearing and various construction activities. The preparation of the land has already been completed for both sites, and drilling operations are currently underway. GPP construction will start after the drilling.

Since there will be no new access roads constructed, the existing village roads will be used, which may result in dust emissions during transportation and construction activities. Dust emissions can also be observed during drilling activities and minor transportation (vehicle), as a natural consequence of geothermal operations.

NCGs, which stands for Non-Condensable Gases, are gases that are produced during the drilling process in geothermal exploration and development. These gases are released from the geothermal reservoir and can include various components such as nitrogen, carbon dioxide, methane, and other trace gases. NCGs are typically released along with steam and hot fluids from the wellbore during drilling operations. The well testing may emit H_2S that has potential to cause adverse health effects due to short-term exposures (e.g., one hour or less). The amount of H2S emitted would vary from well to well based on the number of steam entries discovered during drilling.

Sulfur dioxide (SO_2) and hydrogen sulfide (H_2S) gases are the primary sources of air pollution emitted from geothermal power plants during drilling. Exposure to these gases can irritate the airways and lead to respiratory problems, such as asthma. SO_2 gases can adversely affect plant growth and contribute to the formation of acid rain in the atmosphere.

The Table 7-1 below presents the limit values set by the World Health Organization (WHO) and the Regulation on the Control of Industrial Air Pollution (Official Gazette No: 27277, dated 03.07.2009):

Table 7-1. WHO-Türkiye-Industrial Air Pollution Control Regulation limit

Air Pollutant	Emission Threshold (microgram/m^3) (daily) (WHO global air quality guidelines	Emission Threshold (microgram/m3) (daily) (WHO Air Quality for Europe)	Regulation on the Control of Industrial Air Pollution
Carbon Monoxide (CO)	4	-	-
Nitrogen Dioxide (NO_2)	25	-	40
Sulphur Dioxide (SO_2)	40	-	60
H_2S	-	150	20

Table 7-2. Summary of Impact Significances of the Receptors during the Construction Phase-Air Quality

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reverlility I	Receptor Sensitivity (S)	Impact Significance (Magnitude x Receptor Sensitivity)
PM_{10}, NCGs (H_2S, SO_2) Emissions due to Construction Activities	Negative Direct	Emission is expected during 6 months construction phase (drilling, well testing and GPP construction), and waste transportation. Emission limited to proje157rganizationconstruction period will last approximately 6 months.	Construction activities (land preparation, drilling, well testing and GPP construction) will not be performed simultaneously, hence emission intensity will be low.	During construction activities will continue for 6 months.	-	During the construction phase, there will be no permanent impacts.	Receptors (agricultural land) are mostly located at the boundaries of the Project Area. There will be no major change in the life quality of the receptors during the construction period.	**Negligible**	
Score		Local	Short	Low	Frequent		Short term	Low	
Value		2	2	2	4		1	1	
Impact Magnitude (G+D+I+F (or L)) x R		10							10

Impacts described above are predicted at the baseline measurement points (sensitive receptors) that are mostly located at the boundaries of the Project site and will be also monitored during the construction activities. The emissions are expected to decrease with increased distance from the emission source. In other words, receptors that are away from the source of emissions will have impacts less than described above and impact significance is expected not to be as major.

The emissions are expected to disperse to the community area in the short-term during construction at low levels. However, their concentrations in the air are expected to be restored after the drilling is completed. Thus, the sensitivity of the impact is considered low, without mitigation the impact is considered to have negligible significance.

Mitigations

- Exhaust emissions from drill rigs will be controlled by the contractor by ensuring that emissions are minimized through regular servicing of machinery to meet the relevant emission standards;
- Drill rigs used in the project shall comply with recognized performance design standards (WHO and Regulation on the Control of Industrial Air Pollution).
- Secure the well location and establish safe and dangerous zones around the exploration areas;
- Equipping the workers with proper PPE, especially to those located in dangerous zones;
- Drilling and well testing shall include an H_2S response plan and early warning alarm;
- Install danger signage and barriers including wind socks/wind direction flag, signage of strictly prohibited to enter construction area for unauthorized personnel;
- Exhaust emissions from off-road and on-road equipment operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions are minimized through regular servicing of machinery to meet the relevant emission standards;
- Ensure that the engines of all vehicles and machinery on site are not left running unnecessarily;
- Schedule of vehicle movement and number of vehicles in transit at any given time to limit emissions generation; and
- Plant and equipment to be used in the project to comply with recognized performance design standards;
- To regulate gas and chemical emissions, planting vegetation nearby the power plants.

7.1.2 Impacts during Operation

During the operational phase, a very low amount of PM emissions can be released from water-cooled geothermal power plants when the condensation evaporates from the cooling tower. Since it is possible to address dust emissions resulting from geothermal resource utilization through mitigation measures, this parameter has been considered as an emission that can be largely controlled.

The fluid taken from geothermal sources consists of 95-98% steam and Non-condensable gases (NCG). NCGincludes approximately CO_2 (95%), CH_4 (2-3%), H_2S (1-2%) and NO_2. These percentages vary for each power plant, depending on the geological structure. Among these, CO_2 and H_2S have the highest ratio whereas other emissions are released in trace amounts.

Mainly release of these gases can lead to occupational health and safety problems, especially in confined spaces within power plants and wellhead cellars and during initial discharge. However, depending on the chemical characteristics of geothermal resource, release of these gases can lead major air emissions and corresponding impacts. Greenhouse gas (GHG) emission from geothermal projects is commonly smaller as compared to fossil fuel combustion sources.

Geothermal CO_2 can also be used to enhance photosynthesis in green houses, production of paint and fertilizer, fuel synthesis, and for enhanced oil recovery. Since geothermal is largely considered a non-CO_2 emitting renewable energy source, there are currently no emission standards in Türkiye that constrain CO_2 emissions from geothermal power plants and developers are not required to monitor or report their gas emissions either.

The open contact condenser / cooling tower systems is another source of air emissions during operation of the power plant. Well-field and plant-site vent mufflers can also be potential sources of hydrogen sulfide emissions, primarily during upset operating conditions when venting is required.

GPPs emit only trace amounts of NO_2, SO_2 or particulate matter, the primary pollutant some GPP must sometimes abate is H_2S. According to Continuous Emission Measurement System Statement dated 06/11/2020, H_2S emissions should be monitored continuously. With the use of abatement measures, emissions of H_2S can be maintained below the Türkiye's Industrial Air Pollution Control Regulation limits (Table 7-3) in geothermal dry steam- and flash-type power plants. But, binary systems which selected for the Project emit small amounts of H_2S which can be kept under allowed limits with continuous monitoring. Emission may result due to maintenance activities and equipment failure. Continuous emission is not expected since the GPP will be operated with binary system.

In this binary GPP project, as the geothermal steam which contains NCG will be limited and reinjection will be implemented, CO2 emissions are expected to be low.

Since the Project is introduced with a close looped process and , zero emissions of CO2, SO2 and H2S are expected. Released non-condensable gases will be recompressed and reinjected together with the fluid through reinjection wells. Therefore non-condensable gas emissions into the atmosphere is not expected during the operation. In facilities where H2S is emitted, chemical treatment and/or desulfurization systems are used to manage and eliminate the emission. In the EIA report, air quality modelling study was carried out for the Project regarding below two scenarios:

- NGC emissions if non-condensable gases recompression is not applied or chemical treatment and/or desulphurization systems are not applied;
- NGC emissions through evaporation if geothermal fluid is stored in emergency pool with adequate volume in case of emergency or malfunction at drilling wells or the power plant.

Scenario 1- Emissions from point sources (from stack)

H2S emission value is calculated as 7.83 kg/h according to the air quality modelling study.

According to Industrial Air Pollution Control Regulation (IAPCR) Annex 5, Geothermal Power Plants with a capacity of 20 Mwe – 50 Mwe, H2S emissions can not exceed 10 kg/h. According to the calculations, H2S mass flow of 7.83 kg/h is lower than the limit value. It is estimated that the measured values will be lower that the calculated values.

Table 7-3. H_2S limit values

Capacity	H2S Emission Quantity (kg/hour)
Less than 20 Mwe	6 kg/hour
20 Mwe up to 50 Mwe (Project: 24 Mwe)	**10 kg/hour**
50 Mwe and above	15 kg/hour

On the other hand; according to the Industrial Air Pollution Control Regulation (IAPCR) Annex-2 Table 2.1, emission limit value which is 4 kg/h for H_2S is exceeded and therefore air quality modelling is conducted.

Scenario 2. Emissions from emergency discharge pool

The drilling fluid between production wells and reinjection wells is calculated as about 15,700 m^3. Emergency discharge pool is designed to include the operation volume of 16,000 m^3 which is used for calculations.

Table 7-4. Emissions from emergency discharge pool

Parameter	Mass Flow (kg/h)
CO2	99,4975
H2S	**0,0699**
CH4	0,1608

Parameter	Mass Flow (kg/h)
N2	0,2686
H2	0,0001
NH3	0,0116
Total	100,00

According to the results H_2S value is lower than the limit value of 0.4 kg/h as stated in IAPCR Annex-2 Table 2.1.

Air Quality Modelling Results

Air Quality Modeling study for H_2S was conducted using AERMOD. The results are presented below in Table 7-5.

Table 7-5. Operation Phase Air Quality Results

Parameter	Period	Scenario	Maximum ground level concentration value reached as a result of modeling
H2S	1-hour	Scenario 1	70.25 µg/m3
		Scenario 2	17.80 µg/m3
	Short Term Value (STV)	Scenario 1	16.86 µg/m3
		Scenario 2	1.29 µg/m3

Scenario 2, considers the condition where malfunction occurs every 3 months which is not likely to occur.

The modelling study calculated the values at the baseline measurement points as presented in the Table below.

Table 7-6. Values at Key Measuring Points

Receiving Point	Parameter	Period	Unit	Maximum ground level reached as a result of modeling	
Measuring Point No. 1	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 2	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70,25
				Scenario-2	Maximum value:17,80
		STV		Scenario-1	Maximum value:16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 3	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29

Receiving Point	Parameter	Period	Unit	Maximum ground level reached as a result of modeling	
Measuring Point No. 4	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 5	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 6	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 7	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 8	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 9	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 10	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 11	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29
Measuring Point No. 12	H2S	hourly	µg/m3	Scenario-1	Maximum value: 70.25
				Scenario-2	Maximum value: 17,80
		STV		Scenario-1	Maximum value: 16,86
				Scenario-2	Maximum value:1,29

A cumulative pollution assessment is conducted taking into consideration both the measurement results and the air quality modelling.

Table 7-7. Cumulative Evaluation Results

Parameter	Period	Scenario	Limit Value	Modelling Results	Measurement Results	Cumulative Assessment
H_2S µg/m^3	Hourly	1	100	Maximum value: 70.25	<0,9	<71,15
		2		Maximum value: 17.80		<18,70
	Short Term Duration	1	20	Maximum value: 16.86		<17,76
		2		Maximum value:1.29		<2,16

According to the results of baseline measurements and the air quality modelling study; the emissions are expected to be below the limit values of Industrial Air Pollution Control Regulation.

H_2S emissions during operational phase of geothermal power plant can cause odor formation at the Project area and surroundings. H2S has an odor detection threshold of 0.2-2.0 µg/m^3, depending on its purity. H_2S can cause odor-related nuisance and can pose health risks at high concentrations. The World Health Organization (WHO) recommends that the concentration of H_2S gas in the air should not exceed 7.0 µg/m^3 in an average period of 30 minutes. Regular maintenance and monitoring will be conducted for the Project during both construction and operation of the Project where Odor Emission Control Regulation and the WHO Ambient Air Quality requirements will be taken into consideration.

Mitigation

- Continuous Emission Monitoring: Regularly measure and monitor gas emissions from the geothermal power plant by using Continuous Emission Monitoring Systems (CEMS[16]). CEMS provide real-time data to detect deviations from acceptable emission levels and enable corrective actions to be taken promptly. In case of non-compliance, relevant regulation on continuous emission monitoring gives authority to governorship and Ministry of Environment Urbanization and Climate Change to implement necessary action on the plant.
- H2S Monitoring Plan: H_2S monitoring plan including the installation of H_2S monitoring and warning systems wil be developed. Monitoring plan will include contingency actions to be taken in case of unexpected H2S release. Workers will be provided with personal exposure monitoring equipment and also required PPEs. Communication methods and

[16] The Regulation on Control of Industrial Air Pollution includes limit values for H2S parameter, which will be applicable after 30/06/2021, and continuous H2S monitoring requirements for the GPPs with more than 5 MWe installed capacity with Continuous Emissions Monitoring Systems (CEMS). H2S limits defined for different installed capacities are given in this above referred regulation. In this project with installed capacity of 24 MW limit values for H2S emissions 10 kg/h.

contacts will be defined including the nearby communities and related local organizations.

- Management of Wellhead Gas: Efficient practices for managing wellhead gas should be implemented to control the release of gases during the production process. One possible practice is re-injection of non-condensable gases back into the geothermal reservoir to minimize emissions.
- Controlling Odor: Use odor control technologies, such as biofilters or activated carbon filters, to reduce the release of unpleasant-smelling gases, like hydrogen sulfide (H_2S), which can cause inconvenience to the nearby population.
- Regular maintenance and inspection: Routine maintenance and inspections should be conducted on equipment, pipelines, and wellheads to prevent leaks and malfunctions that may result in increased emissions.
- Community engagement: Engage with local communities and stakeholders to address their concerns about air quality and odor.

Table 7-8. Summary of Impact Significances of the Receptors during the Operation Phase-Air Quality

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Magnitude x Receptor Sensitivity)
PM_{10}, NCGs (H_2S, SO_2) Emissions due to Operation Activities	Negative Direct	Emission is limited to project area but the impact emission may affect the local population	The operation period will last 30 years.	A large amount of release is not expected since the GPP will be operated with binary system.	During operation, emission may cause due to maintenance activities and equipment failure. Continuous emission is not expected since the GPP will be operated with binary system.	-	During the operation phase, there will be no permanent impacts due to emissions.	Receptors (agricultural land) are mostly located at the boundaries of the Project Area. There is a possibility to effecting receptors under failure conditions.	**Low**
Score		Local	Very long	Low	Recurrent		Short term	Medium	
Value		2	5	2	3		1	3	
Impact Magnitude (G+D+I+F (or L)) x R		**12**							**36**

At the operation phase, impact of the emissions is expected to decrease with increased distance from the source of emissions. Therefore, receptors that are further from the source of emissions are likely to experience impacts less than described above.

7.1.3 Residual Impacts

During the construction period, the calculated impacts have turned out to be low; therefore, no residual impacts are expected after implementing the proposed mitigations.

For the operation phase the residual impacts from emissions generated by the operation of the proposed Project are predicted be low provided that necessary mitigation measures are undertaken and periodic inspections and monitoring are performed to prevent any continuous releases or emissions of the air pollutants. The Residual Impact Significances for the operation phase are given in Table 7-9.

Table 7-9. Residual Impact Significances-Air Quality

Subject	Residual Impact
Impacts on Air Quality due to operation activities	Negligible

7.2 Noise

High noise levels, especially during the drilling phase, can be observed in geothermal projects. While completely eliminating noise generation is not practically or economically feasible, it has been recognized that it is an environmental component that can be largely mitigated with appropriate reduction measures. In this regard, it is considered that preventing the accumulation of effects is possible by taking necessary precautions to address noise pollution.

7.2.1 Impacts during Construction

During the construction phase of geothermal power plants, several sources of noise can arise due to various activities involved in building the facility. These noise sources may include:

Drilling Noise: Geothermal power plants require drilling deep wells to access the geothermal reservoirs. The drilling process involves the use of heavy machinery, such as drilling rigs and percussive drills, which can generate significant noise levels.

Construction Equipment: Various construction activities, including earthmoving, foundation construction, and installation of equipment, involve the use of heavy machinery and construction equipment that can produce noise.

Pile Driving: If pile foundations are used for supporting structures, pile driving operations can generate substantial noise levels. Pile driving involves driving large steel or concrete piles into the ground with impact hammers, which can create loud noise and vibrations.

Transportation: Increased traffic of construction vehicles and trucks to transport materials and equipment to the construction site can contribute to noise pollution, especially if construction activities are located near residential areas.

As described in detail in the baseline noise section, in order to predict the impacts of the Project on the existing background noise levels, noise level calculation study was conducted. Insitu background noise monitoring at two receptor points identified in the vicinity of the Project site revealed that noise levels are below the IFC / WHO standards (Table 7-10) and national limits at all points.

Table 7-10. IFC and WHO Noise Level Guidelines

Receptor	One Hour Laeq (dBA)	
	Daytime 07:00 – 22:00	Night time 22:00 – 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

It is important to note that there may be other noise sources that were not foreseen at this stage and may have an additional impact on noise levels. For this reason, it is important that regular monitoring is conducted, particularly at sensitive receptor points during high noise generating activities such as drilling.

In addition, acoustic measurements were conducted as part of the EIA (Environmental Impact Assessment) report. The planned construction activity falls under the scope of Article 23 of the 'Regulation on the Assessment and Management of Environmental Noise,' which was published in the Official Gazette with the number 27601 on June 4, 2010, and came into effect. The noise levels emitted from the construction site during the construction phase can be evaluated as per the framework of a construction site.

The noise levels emitted from the construction site to the surrounding environment and the criteria for noise prevention are specified below:

The noise levels emitted to the environment from the types of activities on the construction site should not exceed the limit values provided in the table below in Appendix-VII.

Table 7-11. The noise levels emitted to the environment from the types of activities on the construction site

The type of activity (construction, demolition, and repair)	Ldaytime (dBA)
Building	70
Road	75
Other Sources	70

The sound pressure level to be generated is evaluated within the scope of Article 23 of the 'Regulation on the Assessment and Management of Environmental Noise' published in the Official Gazette with the number 27601 on June 4, 2010, and the daytime limit value of 70 dBA specified as' other sources' in Table-5 of Appendix-VII of the regulation, is provided at a distance of 55 meters. There are residential areas within a 90-meter radius from the construction site."

Table 7-12. Construction Phase Noise Impact Magnitudes

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L) Reversibility I	Receptor Sensitivity (S)		Impact Significance (Magnitude x Receptor Sensitivity)
Noise Generation due to Construction Activities	Negative Direct	Noise generation is expected during 6 months construction phase (drilling, land and GPP construction), and waste transportation. Noise generation is limited to project area but can reach nearby residentials.	The construction period will last approximately 6 months.	Noise impacts in the region is not estimated to exceed medium intensity since the potential impact is expected to be mostly limited to machinery and equipment in the case that no measures are taken during construction.	During construction activities (drilling, land and GPP construction).	-	Due to the potential nature and intensity, the relevant impacts are expected to be reversible in the short term when the construction is completed.	Receptors (agricultural land) are mostly located at the boundaries of the Project Area. There will can be minor changes in the life quality of the receptors during the construction period.	Low
Score		Local	Short	Low	Frequent		Short term	Medium	
Value		2	2	2	4		1	3	
Impact Magnitude (G+D+I+F (or L)) x R		10							**30**

The intermittent character and short duration of the impact are expected to keep the impact significance low. Additionally, the impact will directly cease with the stopping of the activities.

Mitigations

- Residents living near the project area will be informed during the drilling phase.
- Drilling works will be planned in consultation with local communities, and operations with the highest noise generation potential will be scheduled during the time of the day that will cause minimum disturbance.
- Selecting equipment and machinery with lower noise emissions or employing noise-reducing technologies.
- Scheduling noisy activities during daytime hours and avoiding construction work during night hours (excluding drilling).
- Establishing noise barriers and sound insulation measures around the construction site to limit noise propagation to surrounding areas in case of any grievances.
- Engaging with local communities to inform them about construction schedules and potential noise impacts, addressing their concerns, and implementing necessary adjustments when possible.
- Regular inspections and maintenance of machinery and equipment should be carried out to minimize noise emissions during their operation.
- In instances where noise prevention at the source is not feasible, sound insulation barriers should be employed.

7.2.2 Impacts during Operation

Main sources of noise during operation are cooling towers, powerhouse, and transformer.

In the Project water-cooled towers will be used which have higher noise emissions than air-cooled condensers, noise impact in operation phases could be kept at acceptable levels. Still noise measurements must be conducted periodically, and applicable minimizing measures must be elaborated where necessary. In existing buildings within the scope of the Regulation on Assessment and Management of Environmental Noise; Sources such as cooling fans, air conditioning systems, air ducts, clean and waste water installations, generators, hydrophores, compressors, incineration boilers, elevators, garbage chimneys located in plumbing rooms or anywhere inside or outside the building; The noise level transmitted to sensitive users through common partition elements, intermediate floors, ceiling and adjacent walls or air cannot exceed the background noise level in terms of Leq noise indicator by more than 5 dBA. Main impacts on local communities should be monitored according to Environmental Noise Control Regulation and WBG EHS Guidelines. While it is preferable to use hearing protection for any period of exposure to noise exceeding 85 dB(A), achieving an equivalent level of protection by limiting the duration of noise exposure is less easily managed. For each 3 dB(A) increase in

'Sound levels' the 'permissible' duration of exposure should be reduced by 50 percent. Interacting with the grievance mechanism and stakeholder engagement activities, noise measurements may be required depending on the condition change with respect to baseline measurement data.

Excessive noise exposure can have adverse effects on health, especially for vulnerable groups such as children, the elderly, and individuals with pre-existing health conditions. It may lead to stress, anxiety, and even cardiovascular problems if noise levels are consistently high. Also have an impact on the local wildlife and ecosystem. It may disrupt natural behaviors, breeding patterns, and migration routes of animals, leading to ecological imbalances.

Within the scope of the EIA (Environmental Impact Assessment) report, acoustic measurements have been conducted. A sound plan has been prepared for the operational phase of the planned activity. Criteria for environmental noise levels emanating from operations, facilities, workshops, manufacturing plants, and workplaces are specified in Article 22, paragraph 1, sub-paragraph b, titled 'Environmental Noise Criteria for Operation, Facilities', and Workplaces.' These criteria will be compared according to the area categories provided in Table 4 of Appendix-VII of the Regulation. The sound pressure level to be generated is evaluated within the scope of Article 22 of the 'Regulation on the Assessment and Management of Environmental Noise' published in the Official Gazette with the number 27601 on June 4, 2010, and the environmental noise values specified in Table-4 of Appendix-VII of the regulation are presented in the table.

Table 7-13. The environmental noise limit values for industrial facilities

AREA	L Daytime (dBA)	L Evening ("BA)	L Night (dBA)"
Areas where commercial structures and noise-sensitive uses coexist with areas densely populated by workplaces	**68**	**63**	**58**

The distribution of the resulting equivalent noise levels, evaluated within the scope of the EIA (Environmental Impact Assessment), is shown below.

Table 7-14. The environmental noise limit values for industrial facilities

Distance (m)	L (dBA)
35	**72,81**
55	**68,74**
75	**65,92**
100	**63,26**

The noise emission for the operational phase has been calculated in the Environmental Impact Assessment (EIA) Report. It has been determined that the noise emission at the closest residential unit to the project site will be 68.74 dBA at 55 m and 65.92 dBA at 75 m. It has been concluded that this value exceeds the noise limit of 68 dBA.

As a result of the calculations based on atmospheric attenuation, it is observed that noise values decrease as one moves away from the sources. These values will decrease as noise insulation measures are implemented for the facility's noise sources. During the monitoring program, if it is determined that the noise levels exceed the limit values in the closest sensitive areas, all necessary noise reduction measures will be taken."

Table 7-15. Operation Phase Noise Impact Magnitudes

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Magnitude x Receptor Sensitivity)
Noise Generation due to Operation Activities	Negative Direct	Noise generation is expected operation phase. Noise generation is limited to project area but can reach nearby residentials.	The operation period will last 30 years.	Based on the results of the baseline measurements, it can be concluded that the IFC / WHO noise limit values will be exceeded during construction phase at the nearest sensitive receptors.	Noise impacts will continue throughout the life of the project.	-	Due to the potential nature and intensity, the relevant impacts are expected to be irreversible if hearing loss in livestock and humans due to prolonged exposure.	Receptors (agricultural land) are mostly located at the boundaries of the Project Area. There will can be minor changes in the life quality of the receptors during the operation period.	High
Score		Local	Ver Long	Medium	Continuous		Irreversible	Medium	
Value		2	5	3	5		5	3	
Impact Magnitude (G+D+I+F (or L)) x R		75							**225**

Mitigations

- All the mitigation measures proposed for the construction period will also be valid during the operation period;
- In case of any complaints, Noise measurement will be carried out in accordance with the international standard,
- Installing acoustic enclosures around noisy equipment such as cooling towers, powerhouse, and transformers can significantly reduce sound propagation and attenuate noise levels;
- Erecting sound barriers between the noise sources and sensitive receptors can act as physical shields, blocking or reducing the direct transmission of noise to residential areas;
- Ensuring regular maintenance and proper functioning of equipment can prevent the development of excessive noise due to wear and tear;
- Conducting awareness programs for the local community to educate them about the project's noise mitigation efforts and encouraging open communication can foster understanding and cooperation;
- In locations where sound insulation is feasible, insulation should be applied, and high sound-dampening barriers can be installed in the switchboard area. Additionally, the operational schedules of pump systems, turbines, ventilation systems, compressors, generators, etc., should be programmed, considering the proximity to sensitive areas like nearby settlements;
- Natural elements such as landscapes, trees, bushes, and forests also contribute to sound absorption, creating a masking effect. Alternatively, a combination of trees, shrubs, and acoustic walls can be utilized for optimal noise reduction.

7.2.3 Residual Impacts

Construction phase noise impacts will be temporary and can be mitigated with the implementation of measures mentioned above. It is expected that the residual impact would be minimised to negligible through the mitigation measures.

At the operation phase, prolonged exposure to excessive noise levels, despite mitigations, can lead to various health issues. It may cause stress, anxiety, sleep disturbances, and even cardiovascular problems, especially for vulnerable groups such as children, the elderly, and individuals with pre-existing health conditions. It may disrupt natural behaviours of animals, interfere with their breeding patterns, and alter migration routes, ultimately causing ecological imbalances. Hence, operation phase noise and vibration residual impact would be minimized to low.

Table 7-16. Residual Impact Significances-Noise and Vibration

Subject	Residual Impact
Noise and Vibration impact due to operation activities	Low

7.3 Geology and Soil Quality

7.3.1 Impacts during Construction

Construction of the Project will not expose significant volumes of the earthworks in the scope of the Project. Though relevant measures are required to be taken into consideration, in order to avoid significant impacts on the soil environment.

The potential impacts of the land preparation and construction activities on the soil environment are summarized as;

- Disturbance such as loss of fertile top layer;
- Mixing of soil layers and types;
- Soil contamination due to unexpected leakages or spills; and
- Improper handling of test water
- Geothermal fluid leakages that can also result in loss or damage to crops.

Pipe leakage may occur during the well testing, releasing geothermal fluid to the soil. Small leaks are more likely to occur rather than major pipeline leakage at the connection between pipes.

In case of not implementing the mitigation measures, topsoil itself or its vegetative properties in the Project Area may be lost due to mixing with coarse or contaminated soils.

Seismic risks would be of concern for the construction of the Project as detailed in Seismicity Section in Baseline.

Table 7-17. Summary of Impact Significances of the Receptors during the Construction Phase-Geology, Soil Quality

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood(L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Magnitude x Receptor Sensitivity)
Impacts on soil during construction activities	Negative Direct	Potential contamination due to accidental spills of oil, fuel, or chemicals or due to poor material management and handling of chemicals, wastes or construction materials, poor manag176rganizati on water.	The176onstructi on period will last approximately 6 months.	Potential contamination of the soil is expected to create contaminant concentrations above the national legislative limits and some impairments might be expected regarding environmental elements	-	In the case of poor management, handling and storage of chemicals, construction material and/or fuel impact on soil is considered to be likely.	Unless proper mitigation measures are taken contamination and combined impacts may continue for very long-term depending on the nature of the potential pollutants (e.g., fuels, mineral oils, and geothermal fluid)	Project area is located at alluvium and high permeability soil.	Low
Score		Local	Short	High	NA	Likely	Short/Mid-term	Mid-term	
Value		2	2	4		3	2	3	
Impact Magnitude (G+D+I+F (or L)) x R		10							**66**

Unless proper mitigation measures are taken, and good practice means are followed during construction, potential impacts on soil will be noticeable.

Mitigations

- In case of not implementing the mitigation measures, topsoil itself or its vegetative properties in the Project Area may be lost due to mixing with coarse or contaminated soils. Thus, topsoil management measures will be applied in the scope of the Project especially for GPP construction;
- If any contamination is detected during construction works, soil sampling studies will be conducted and remediation plan will be prepared according to the sampling study results in line with type of the contaminants;
- All equipment and facilities at well pads will meet international design standards for safe storage and dispensing of chemicals, lubricants and fuels, containment of spilled materials, including bunded areas, perimeter drains and interception traps;
- Barriers, containment systems and pollution interception measures will be inspected regularly as part of operations to ensure suitability for purpose, proper function and condition; and
- Corrosion control and inspection at wellhead and pipes;
- Use of blowout prevention equipment such as shutoff valves and other related well control equipment;
- Any accidental spills will be managed in accordance with spill response plan.
- Building Earthquake Regulation of Türkiye (O.G. date/no: 18.03.2018/30364) will be complied with during construction of all Project structures.

7.3.2 Impacts during Operation

Geothermal fluid contains chemicals that can potentially contaminate the soil if not properly managed. Improper disposal or leakage of these fluids can introduce pollutants into the soil, affecting its quality. In the scope of the Project reinjection of water with closed System will be applied. However, geothermal fluid may flow out during maintenance or during a failure.

During the operation phase, soil contamination risks may be caused by the improper handling of the hazardous materials to be generated in operation activities and leakage/spill of fuels, chemicals, etc. during the unexpected accidents. In that case, the associated impacts would be similar to the impacts described for the construction phase.

Last, seismic risks would be of concern for the entire operational life of the Project.

Table 7-18. Summary of Impact Significances of the Receptors during the Construction Phase-Geology and Soil Quality

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Magnitude x Receptor Sensitivity)
Impacts on soil during construction activities	Negative Direct	Potential contamination due to accidental spills of oil, fuel, or chemicals or due to poor material management and handling of chemicals, wastes or construction materials, poor management of test water.	Unless proper mitigation measures are taken, contamination and combined impacts may continue for very long-term depending on the nature of the potential pollutants (e.g., fuels, mineral oils, and other chemicals)	Potential contamination of the soil is expected to create contaminant concentrations above the national legislative limits and some impairments might be expected regarding environmental elements	-	In the case of poor management, handling and storage of chemicals, construction material and/or fuel impact on soil is considered to be likely.	Unless proper mitigation measures are taken contamination and combined impacts may continue for very long-term depending on the nature of the potential pollutants (e.g., fuels, mineral oils, and geothermal fluid)	Project area is located at alluvium and high permeability soil.	Medium
Score		Local	Very Long	High	NA	Likely	Short/Mid-term	Mid-term	
Value		2	5	4		3	2	3	
Impact Magnitude (G+D+I+F (or L)) x R		28							**84**

Unless proper mitigation measures are taken, and good practice means are followed during construction, potential impacts on soil will be noticeable.

Mitigations

All the mitigation measures proposed for the construction period will also be valid during the operation period.

7.3.3 Residual Impacts

With the implementation of above-mentioned mitigation measures and use of good site practices, the magnitudes and significances of the residual impacts can be estimated to be negligible for both construction and operation phases.

Table 7-19. Residual Impact Significances-Noise and Vibration

Subject	Residual Impact
Impact on Soil Quality due to construction activities	Negligible
Impact on Soil Quality due to operation activities	Negligible

7.4 Surface and Groundwater Quality

7.4.1 Impacts during Construction

Surface exploration activities are likely to have minimal or no effect on surface water. However, temporary impacts on surface water may occur when geothermal fluids are released during well testing if proper containment measures are not in place. Geothermal fluids, being hot and highly mineralized, have the potential to cause thermal changes and alter water quality if released into surface water. Unintentional spills of geothermal fluids could also happen due to well blowouts during drilling, leaks in piping or wellheads, or overflow from sump pits.

Survey activities would typically have little or no impact on groundwater. If geothermal drilling is carried out according to best practices regarding use of drilling fluids and well casing, it is very unlikely that geothermal water can contaminate ground water aquifers. However, casing failures in either production or reinjection wells may create pathways for geothermal fluids to mix with groundwater at shallow levels. The depth of the casing leak will determine whether the geothermal fluids will flow out of the well or groundwater will flow into it.

Water based mud, a polymer based liquid, is injected during well drilling in exploration to support the well and remove cuttings. The drilling waste, composed of liquid waste (mud) and solid waste (cuttings), is transferred to a shale shaker to separate the cuttings from mud. Since most of the water-based drilling mud is likely to be reused or returned to the drilling process, it is expected that there will be a limited amount of excess water during typical drilling operations.

Accidental release or spill of drilling waste, fluid, and mud will result to temporary turbidity if this is released to a water body. While water-based drilling muds are non-toxic, it takes time before the fine clays of the drill muds are settled out of the water column. Temporarily, spilled drill mud (depending on volume spilled) would manifest as a plume on the water surface which will impact baseline water clarity and disrupt local photosynthetic activities.

For the water usage purposes during the construction phase, which include:

- Drinking and domestic water supply for drilling area construction site personnel (6.09 m^3/day).
- Drinking and domestic water supply for facility areas construction site personnel (30.45 m^3/day).
- Creation of drilling mud for drilling processes (1.80 m^3/day).
- Dust suppression operations (12.94 m^3/day).
- Well completion tests performed by drilling/flooding method (800~1.675 m^3)
- Grand total (Except for well completion tests performed by drilling/flooding method (45.79 m^3/day)

Water required for drilling and dust suppression will be provided from an existing well in the drilling site. The Project has secured the use permit of this existing well from DSİ on 01.07.2016. According to the permit, water with an amount of 50 ton/day (with a total amount of 5000 ton/ year) can be used for Project purposes. Since the total required amount of water is 45.79 m^3/day, the existing well meets the required amount for the construction phase of the project.

Based on the results of the hydrogeological survey, observation wells will be determined at the Project area for potential impact of drillings on groundwater. Chemical parameters specified within the scope of the Regulation on the Protection of Groundwater Against Pollution and Deterioration (such as Temperature, Salinity, Electrical Conductivity, pH, Dissolved Oxygen, Hydrogen Sulfide, Alkalinity, Boron, Copper, Zinc, Mercury, Lead, Iron, Manganese, Cadmium, Arsenic, Boron, Total Suspended Solids, Total Organic Matter, Carbon, Nitrite, Nitrates, Ammonium, Chloride, Sulfate, Trichloroethylene, Tetrachloroethylene, Total Phosphorus/Phosphates, Cyanides, Organohalogen compounds, and substances capable of forming such compounds in or around water, Persistent hydrocarbons, and persistent and biologically accumulative organic toxic substances, Substances and preparations or derivatives proven to have carcinogenic or deformative (mutagenic) properties or capable of affecting aquatic environments or aquatic environments through or via endocrine-related activities related to steroidogenic, thyroid, reproductive, or other endocrine functions) will be analyzed.

Table 7-20. Construction Phase Impact on Surface and Groundwater

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Magnitude x Receptor Sensitivity)
Impacts on surface and groundwater during construction activities	Negative Direct	Potential contamination due to poor material management and test water on Gediz basin.	The181onstructi on period will last approximately 6 months.	Impacts on surface and ground waters in the region is not estimated to exceed medium intensity since the potential impact is expected to be mostly limited to short-term discharges and disruptions.	-	Considering the distance of the perennial surface waters to the Project site the impact is expected to be unlikely.	Unless proper mitigation measures are taken contamination and combined impacts may continue for very long-term.	There are no perennial watercourses that support aquatic habitats or provide ecosystem services in the vicinity of the Project site but project area is located at alluvium and high permeability soil.	Medium
Score		Regional	Short	Medium	NA	Unlikely	Long-term	Medium	
Value		3	2	3		1	4	3	
Impact Magnitude (G+D+I+F (or L)) x R		36							**108**

Unless proper mitigation measures are taken, and good practice means are followed during construction, potential impacts on surface and groundwater will be noticeable. Accidental release of liquid drilling waste is unlikely to occur since the Project has proper design to manage this impact.

Mitigations

- Construct ponds with impervious lining such as HDPE or geomembranes underlain by clay to catch drilling muds in case of accidental spills;
- Design capacity of the pond for collection should be equal if not exceed volume of drill fluid required during initial hydraulic test;
- Install oil traps on the pond inlet; and
- Spill Response Plan must be followed.
- Caliper test and cement bond test should be performed during drilling, and studies will be conducted within this scope. The caliper log used in the caliper measurement test measures the borehole diameter using multiple arms, ensuring accurate calculation of the required cement. Properly executed cementing is essential in effectively preventing geothermal fluid leakage to undesirable levels. Additionally, cement bond measurement tests assess the quality of the cement bond between the casing pipe and the well formation, thereby avoiding any potential leaks during production. Regular cement bond logs will be taken after cementing, and repeat logs at certain intervals throughout the cement's lifespan are beneficial, considering factors such as cement quality, casing pipe condition, or seismic activities in the region.
- Drilling fluids that decompose in the upper phase of the drilling mud and become wastewater will be reinjected.
- Considering the fact that none of the reinjection wells can be used, an "emergency pool" will be created to meet the amount of fluid in the system. The only situation where geothermal water leaves the closed loop system is when it is kept in the emergency pool. The crest elevation of the emergency pool to be built in the power plant area will be higher than the natural ground and there will always be a margin of turbulence. This pool will provide the required amount of storage volume during extraordinary conditions and emergency shutdown of the power plant, and approximately 16,000 m3 of storage volume will be provided by leaving a loading limit of 0.3 meters. Reinforced concrete structures will be constructed in accordance with ACI requirements, cement contrast will be prepared to produce temperature, sulphate and chemical resistant concrete, mortar will be prepared with a mixture of thoroughly sieved aggregate and sand with a maximum grain size of 20 mm, its tightness, hardness, risk of collapse, ground and surcharge loads, earthquake The loads will be tested by making static calculations, if necessary, they will be strengthened with steel rods, crack control will be done and they will be coated with epoxy.

- Mitigations provided in the Wastewater management section should be followed.

7.4.2 Impacts during Operation

Both surface and groundwater resources may be utilized during well drilling, and facility operation. For operation, water is required for cooling systems, hence Project can be classified as significant water consumers. There is a possibility of adverse effects on surface and groundwater quality due to the direct discharge of wastewater during failure and poor maintenance.

Casing failures in either production or reinjection wells may create pathways for geothermal fluids to mix with groundwater at shallow levels. The depth of the casing leak will determine whether the geothermal fluids will flow out of the well or groundwater will flow into it.

Casing leakages will, in both cases, reduce the productivity of the geothermal wells and may degrade the quality of shallow groundwater aquifers. If important freshwater aquifers overlie geothermal reservoirs that are under production it is important to install monitoring wells to monitor ground water composition and temperature. It is particularly important to ensure that well casings are leak proof in wells that undergo acid treatment for mineral deposit removal.

Extracting geothermal fluids could also cause drawdowns in connected aquifers, potentially affecting flow from geothermal springs. The potential for these types of adverse effects is moderate to high depending on the hydrological conditions.

Based on the annual 5000 tons of water allocated according to the EIA and 45.79 m3 per day, there is a need for approximately 16,713 tons of water per year. For the operation of the Project DSI administration will be contacted and exploration and usage documents will be obtained for the additional wells.

Table 7-21. Construction Phase Impact on Soil Quality Magnitudes

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Magnitude x Receptor Sensitivity)
Impacts on surface and groundwater during operation activities	Negative Direct	Potential contamination due to poor material management geothermal fluid effluent can impact gediz basin.	The operation period will last approximately 30 years.	Impacts on surface and ground waters in the region is not estimated to exceed medium intensity since the potential impact is expected to be mostly limited to short-term discharges and disruptions.	-	Considering the distance of the perennial surface waters to the Project site the impact is expected to be unlikely.	Unless proper mitigation measures are taken contamination and combined impacts may continue for very long-term.	There are no perennial watercourses that support aquatic habitats or provide ecosystem services in the vicinity of the Project site but project area is located at alluvium and high permeability soil.	Medium
Score		Regional	Short	Medium	NA	Unlikely	Long-term	Medium	
Value		3	5	3		1	4	3	
Impact Magnitude (G+D+I+F (or L)) x R		48							**144**

Unless proper mitigation measures are taken, and good practice means are followed during operation, potential impacts on surface and groundwater will be noticeable especially in long term.

Mitigations

- Install groundwater monitoring wells around geothermal production and reinjection wells to monitor groundwater composition and temperature. This will allow early detection of any potential impacts and facilitate timely remediation measures. Monitoring wells should also be opened to monitor water levels.
- For wells that undergo acid treatment for mineral deposit removal, employ specialized casing materials and design to withstand the chemical exposure. Conduct thorough testing and monitoring during and after the acid treatment to ensure the integrity of the well casings.
- Implement water conservation and recycling practices to reduce water consumption during cooling system operation.
- Mitigations provided at Wastewater management section should be followed.

7.4.3 Residual Impacts

With the implementation of above-mentioned mitigation measures and use of good site practices, the magnitudes and significances of the residual impacts can be estimated to be negligible for both construction and operation phases.

Table 7-22. Residual Impact Significances-Surface and Groundwater

Subject	Residual Impact
Impact on Surface and Groundwater Quality due to construction activities	Low
Impact on Surface and Groundwater Quality due to operation activities	Low

7.5 Wastewater Management

In geothermal energy production, improper practices can have detrimental effects due to the composition of geothermal fluids. These effects can lead to negative consequences for soil quality, if the wastewater is not properly handled.

According to Article 27 of the Water Pollution Control Regulation (SKKY) issued by the Ministry of Environment, Urbanization and Climate Change (Official Gazette Date: 31.12.2004, No: 25687), if the flow rate of geothermal resource waters extracted from underground for various purposes such as energy production and heating exceeds 10 L/s, it is mandatory to dispose of the water by re-injection into the formation it was extracted from. Failure to dispose of the water through re-injection will result in the denial of an operating license.

In the same Regulation, Article 31 specifies the discharge standards for industrial wastewater from the coal preparation, processing, and energy production sector, including processes such as coal and lignite preparation, coke and gas production, thermal power plants, nuclear power plants, geothermal power plants, closed-loop industrial cooling waters, fuel-oil and coal-fired steam boilers, and similar facilities.

Table 7-23. Water Pollution Control Regulation," Table 9.5: Sector: Coal Preparation, Processing and Energy Production Facilities (Geothermal Resources and Hot Water Used for Various Purposes)"

Parameter	Unit	Composite Sample 2-hour	Composite Sample 24-hour
Chemical Oxygen Demand (COD)	mg/L	60	30
Oil and Grease	mg/L	20	10
Total Cyanide (CN^-)	mg/L	-	0.5
Temperature	°C	-	35
pH	-	6-9	6-9

7.5.1 Impacts during Construction

Effluents of geothermal development projects can be classified drilling fluids, reject water from injection wells, well cleaning water (for clogging), and domestic wastewater.

Drilling Fluids: One of the main freshwater consumption derived from the drilling fluid (circulation water) during drilling in the production zone of the reservoir. The purpose of the drilling fluid is to cool and lubricate the drilling equipment and carry rock cuttings out of the well. In some case synthetic drilling polymers are injected to form high-viscosity polymer slugs to facilitate clean-out. Commonly used drilling polymers include xanthan gum and starch and cellulose derivatives.

Test Water: During geothermal drilling substantial amounts of solid waste are generated. Apart from drilling mud, other wastes produced by drilling include used oil and filters, spilled fuel, spent and unused solvents, scrap metal, pipe dope, etc.

Domestic Wastewater: These effluents are produced as a result of daily activities of workers during land preparation and drilling.

Reject Water from Reinjection Well: These effluents are produced during reinjection of geothermal water. This is a small amount, which is rejected by the geothermal source due to pressure.

Cleaning Water: During the operation of wells, periodical cleaning is sometimes done using chemicals including strong acids, most commonly hydrochloric acid. The acids dissolve and remove mineral deposits from the wells and the surroundings. Before wells are subjected to acid treatment, it needs to be ensured that the well casings are leak proof to prevent any leakage of the acids to shallow groundwater aquifers. The acids are partially neutralized by dissolving the deposited minerals and then diluted through post-injection of fresh water or

geothermal brine and finally by mixing with geothermal fluids in the reservoir before discharge. According to the Water Pollution Control Regulation, geothermal waters flow rate of 10 L/sec or more, should be re-injected; if the re-injection is not possible discharge parameters must comply with the limit values defined by the regulations. COD, oil and grease, CN-, temperature (˚C) and pH should be monitored and comply with the regulatory limit values.

Contamination of groundwater can occur during the reinjection of wastewater or fluids, or as a result of infiltration of water held in well blowdown ponds and drilling fluids. The use of these waters as a source can cause contaminants to rise to the surface, increasing their concentration and degrading their quality through precipitation in water and soil.

Table 7-24. Summary of Impact Significances during the Construction Phase-Wastewater Management

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency I	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
Drilling Fluids,Test Water,Domestic Wastewater,Reject Water from Reinjection Well, Cleaning	Negative Direct	Definition	Considering potential impacts during the construction activities the geographical extent of the im188rganizationted to be regional.	The construction period will last approximately 6 months.	Wastewater may be generated in wells that have the potential to return to the production well during the exploration and testing phases of geothermal resource development.	During construction activities (drilling, land and GPP construction).	-	Due to the waste potential and intensity, the relevant impacts are expected to be reversible in the short/mid-term.	Due to the potential nature and intensity, the relevant impacts are expected to be medium.	Medium
		Score	Regional	Short	High	Frequent		Short/mid Term	Medium	
		Value	3	2	4	4		2	3	
Impact Magnitude (G+D+I+F (or L)) x R			26							**78**

Mitigations

- 'Domestic wastewater that cannot be connected to the sewerage system will be collected in sealed septic tanks and proper disposal of this wastewater will be ensured by municipalities or other authorized institutions where necessary.
- The disposal of test waters arising from geothermal drilling activities will be achieved through re-injection into the well.In cases where test water should be strored re-injection feasible, impermeability measures and safety precautions will be implemented, ensuring that the waters are sent to appropriate treatment facilities without any discharge into the receiving environment. Specifically, containment walls around wells will have a crest elevation naturally higher than the ground by a minimum of 30 cm, with this portion always reserved as an air gap, preventing overflow or surface water entry into the containment pools designed for collecting test waters. Consequently, the safety pool volume will adequately accommodate the expected fluid flow, with sufficient capacity.
- Geothermal fluid and reject water will be reinjected and will remain in a closed loop. There will be no discharge of fluids to the environment. In cases where re-injection is not possible, impermeability measures and safety precautions will be implemented, ensuring that the waters are sent to appropriate treatment facilities without any discharge into the receiving environment.

7.5.2 Impacts during Operation

Re-injection of the GPP facilities into the formation where the fluid is present under normal conditions is mandatory under the relevant legislation. For this reason, no continuous wastewater generation is expected from the facilities.

Table 7-25. Summary of Impact Significances during the Operation Phase-Wastewater Management

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
Wastewater	Negative Direct	Definition	Considering potential impacts during the operation activities the geographical extent of the impact is expected to be regional.	The construction period will last 30 years.	Not much waste water is expected other than domestic waste water.	Wastewater impacts will continue throughout the life of the project.	-	Due to the waste potential and intensity, the relevant impacts are expected to be reversible in the short/mid-term.	Due to the potential nature and intensity, the relevant impacts are expected to be medium.	Low
		Score	Regional	Very Long	Low	Infrequent		Short/mid term	Medium	
		Value	3	5	2	2		2	3	**72**
Impact Significance = Impact Magnitude (G+D+I+F (or L)) x R		24								

Mitigations

- Domestic wastewater should be collected in sealed septic tanks and, where appropriate, collected by municipalities. The “dry location” approach, which will be employed by the project and is typically utilized in arid conditions, involves channeling wet materials and drilling mud into partially enclosed waste tanks equipped with advanced decanters and screening systems. The “dry location” method utilizes specialized equipment to separate chemicals from the sludge, with retained water being permitted to circulate within the drilling system. Furthermore, the remaining mud will be disposed of through a transfer agreement with the Cement company.
- Proper disposal should be ensured by the authorized or approved institutions.
- An Effluent Management Plan has been prepared, setting out the wastewater management measures Geothermal fluids and test waters will be managed in compliance with national regulations. Geothermal fluid will be collected in an impermeable pond and will be reinjected into the geothermal aquifer from the same well. They will be analyzed, and the required permits will be obtained from authorities before reinjection.
- If all the geothermal fluid is not re-injected at the facilities (in cases where maintenance and repair periods are prolonged and the capacity of the emergency holding pool is insufficient, etc.), wastewater discharge standards must be met, and the necessary permits obtained.
- Chemical, biological and physical tests of the geothermal fluid should be carried out to determine the characteristics of the effluent. The geothermal fluid (wastewater) should be collected with a vacuum truck and sent to a suitable treatment plant.
- Depending on the reported flow rate of the well, drain ponds should be constructed in the well areas with a volume that can accommodate the flow for at least 1 hour. A pumping system should be installed on these ponds and the water in these ponds should be sent to the emergency/discharge/hold pond (cool pit) at the power station via a separate pipeline with the discharge pumps.

7.5.3 Residual Impacts

The main wastewater sources expected for the construction period will be Drilling Fluids, Test Water, Domestic Wastewater, Reject Water from Reinjection Well, Cleaning Water.

Considering potential impacts during the operation phase and the geographical extent of the impact for lifetime of the Project, water usage, wastewater impacts and wastewater related risks, impact significance is expected to be medium.

All types of waste/waste water and liquids, including during site preparation, construction and operation, will be prevented from entering streams, canals and other receiving waters that may leak underground, and will not be discharged in any way.

Table 7-26. Residual Impact Significances-Wastewater Management

Subject	Residual Impact
Effluents of geothermal drilling phase	Low

7.6 Waste Management

During the land preparation and construction phase, the waste generated in each drilling area will be managed in temporary waste storage areas established in each drilling area as indicated in the site plan. Additionally, within the facility construction area, a separate temporary waste storage area, also depicted in the site plan, will be created to handle waste generated during facility construction, installation, and operational phases.

Solid waste, in accordance with the "Waste Management Regulation," will be stored in covered waste containers on the construction site in a manner that does not pose a threat to environmental health. Recyclable materials (such as paper, plastic, glass, etc.) and non-recyclable materials (e.g., food scraps, organic waste) will be collected separately and accumulated in sealed garbage bins within the construction site. These waste containers will be regularly collected and disposed of at collection points by Germencik Municipality, in line with the provisions of Article 5, paragraph 1, of the "Waste Management Regulation," published in the Official Gazette on 02.04.2015, numbered 29314.

Packaging waste, including low packaging waste, will be separated from other waste types, collected, and stored according to the "Regulation on Control of Packaging Wastes," published in the Official Gazette No. 30283 on 27.12.2017 and effective from 01.01.2018. They will be delivered to waste collection centers and/or licensed recycling facilities, ensuring compliance with the waste hierarchy.

Waste batteries, anticipated to be generated due to the use of electronic items and devices at low drilling locations in the construction site/administrative building, will be collected separately from domestic waste. These batteries will be delivered to designated collection points (TAP boxes) established by businesses or municipalities involved in the distribution and sale of battery products. If any other waste generation occurs, it will be collected and disposed of in accordance with the "Regulation on the Control of Waste Batteries and Accumulators," which came into effect after being published in the Official Gazette on 31.08.2004, numbered 25569.

Hazardous waste, including drilling muds and other drilling wastes containing dangerous substances (01 05 06*), packaging containing residues of or contaminated with dangerous substances (15 01 10*), oiled oakum, gloves, etc. (15 02 02*), oil filters from vehicle

maintenance (16 01 07*), waste batteries (16 06 02*), and fluorescent lamps (20 01 21), will be managed in accordance with the appropriate regulations and codes.

During the drilling process, a fluid called drilling mud is pumped into the well and used to circulate and bring rock cuttings to the surface. This drilling mud may vary where different rock layers are encountered due to their varying properties.

In the “dry location” approach which will be used by Project, typically applied in arid conditions, wet materials and drilling mud are directed into partially enclosed waste tanks equipped with advanced decanters and screening systems. The “dry location” method involves using specialized equipment to separate chemicals in the mud, allowing the recirculation of the retained water within the drilling system. Also, remaining mud will be disposed to Batı Söke Çimento through a transfer agreement.

Maintenance and repair of machinery and equipment to be used during geothermal resource exploration activities at drilling locations will be carried out by authorized services. As a result of storing the sifted drilling mud in the mud pool, the liquid component remaining on the surface and the evaporation at the end of sedimentation will ultimately be disposed of by pumping into the well during and after the drilling process. The remaining solid substance content in the mud pool, though not conclusively classified as highly hazardous waste, will be considered potential hazardous waste (coded as 010506*). Prior to disposal by licensed institutions, the hazardous nature of such waste will be determined through hazard analysis conducted by laboratories authorized by the Ministry.

Other potential waste, such as oiled oakum, gloves, and oil resulting from vehicle maintenance (coded as “15 02 02*”), and oil filter waste (coded as “16 01 07*”), will not exceed a maximum of 25 kg (0.083 kg/day).

7.6.1 Impacts during Construction

Water based drilling mud is sometimes used as a drilling fluid in geothermal drilling, particularly when drilling through the cap rock of the reservoir. Drilling is done with a polymer-based fluid. Additives are used to control the viscosity and density of the mud. These additives include xanthan gum and starch and cellulose derivatives for viscosity control and solid barium sulfate for density control. The drilling mud is recycled during drilling and the rock cuttings are separated from the mud in on shaker boards. Drilling muds are processed with activated carbon and reused.

If the rock cuttings consist of environmentally benign rock types they can be reused, for example, in brick making according to characteristics of the drilling mud. However, cuttings may be classified as hazardous depending on the concentration and potential for leaching of silica compounds, chlorides, arsenic, mercury, vanadium, nickel, and other heavy metals. In such cases, cuttings need to be disposed of appropriately in hazardous waste landfills.

Table 7-27. Summary of Impact Significances during the Construction Phase-Waste Management

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
Drilling Mud and Sulfur,Silica etc.	Negative Direct	Definition	Considering potential impacts during the construction activities the geographical extent expected to be regional.	The194onstruction period will last approximately 6 months.	The most significant waste sources are expected to be drilling mud and equipment waste. Sulfur, silica, and carbonate precipitates are other typical wastes collected from cooling towers, air scrubber systems, turbines, and steam separators	Waste impacts will continue throughout the construction phase of the Project.	-	Due to the waste potential and intensity, the relevant impacts are expected to be reversible in the short/mid-term.	Due to the potential nature and intensity, the relevant impacts are expected to be medium.	Medium
		Score	Regional	Short	Medium	Infrequent		Short/mid Term	Medium	
		Value	3	2	3	2		2	3	
Impact Magnitude (G+D+I+F (or L)) x R			20							**60**

Mitigations

- Waste Management Plan will be prepared prior to drilling and applied.
- Hazardous waste, waste oil, used accumulators and batteries, electrical and electronic waste, recyclable waste, domestic waste, medical waste, and other similar materials will be classified, stored separately at source, and disposed of in compliance with relevant regulations and the WBG EHS Guidelines.
- During the construction phase, the primary waste streams comprise excavation residues resulting from land preparation and construction activities. Firstly, the preservation of topsoil is crucial, and it should be carefully stored in designated areas to facilitate its later utilization in land arrangement processes.
- Regarding the excavation wastes, they can be put to beneficial use in land arrangement processes if deemed suitable, alternatively, they should be transported and appropriately disposed of by competent companies adhering to the relevant regulatory requirements.
- In parallel, specific waste types like contaminated packaging, scrap, wood, metal, and other byproducts arising from construction activities necessitate dedicated storage facilities. These segregated waste materials must then be entrusted to licensed waste management companies for either recycling or proper disposal, ensuring adherence to sustainability principles and minimizing any adverse environmental impact.

7.6.2 Impacts during Operation

Domestic waste will be produced during operation phase. During the operation phase of the project, maintenance and system equipment will be carried out regularly in the region where they are installed. No hazardous waste will be generated during the maintenance and repair of the GPP, and the only hazardous waste generated during the operation phase of the project will be from the transformer centres located in the substation. Transformer oils, which will be generated in the system where 1 transformer will be installed, will be changed by the authorised service by taking them to the area with a maximum tank of 100 lt. The transformer waste oil (PCB component[17]) generated will be stored in a temporary storage area consisting of separate sections with concrete floors, marked with hazardous or non-hazardous waste, waste code, amount of waste stored and date of storage, and kept in a sealed, closed condition with the floor kept closed. It will be sent to an authorised hazardous waste facility within one month.

[17] It aims to apply and replace the requirements of the Stockholm Convention on all equipment (transformers, capacitors, capacitors and barrels) with more than 500 ppm. All transformers and capacitors containing more than 50 ppm but less than 500 ppm of PCBs can continue to be used until 2025, but after 2028 no transformers, capacitors or equipment must contain PCBs. (Guide for the Environmentally Compatible Management of Polychlorinated Biphenills (PCBs) in Türkiye, Ministry of Environment, Urbanization and Climate Change)

Table 7-28. Summary of Impact Significances during the Operation Phase- Waste Management

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
Domestic Waste	Negative Direct	Definition	Considering potential impacts during the operation activities the geographical extent of the impact is expected to be regional.	The operation period will last 30 years.	Domestic waste will be produced during operation phase.	Waste impacts will continue throughout the operation phase of the Project.	-	Due to the waste potential and intensity, the relevant impacts are expected to be reversible in the short/mid-term.	Due to the potential nature and intensity, the relevant impacts are expected to be medium.	Medium
		Score	Regional	Very Long	Medium	Infrequent		Short/mid term	Medium	
		Value	3	5	3	2		2	3	
Impact Significance = Impact Magnitude (G+D+I+F (or L)) x R			26							**78**

Mitigations

- During the operational phase of a geothermal plant, the primary hazardous wastes stem from contaminated packages resulting from the use of chemicals and oils during maintenance and repair activities. Additionally, domestic solid wastes are generated from the business buildings on-site. To effectively manage waste and uphold environmental stewardship, prioritized planning should be undertaken to minimize the generation of waste during plant operations.
- To maintain site hygiene and cleanliness, it is imperative to temporarily store the wastes in suitable tanks, pools, or dedicated areas, distinct from other materials and equipment. These storage units must be appropriately 197onstruc and diligently maintained to prevent any leakage or soil contamination.
- Depending on the waste type, which may include packaging, rubber, lubricating oil, chemicals, scrap metal, or lumber, the site contractor bears the responsibility of ensuring the proper transfer of waste to licensed waste recovery or disposal facilities. This approach ensures limited impact on both the environment and human well-being. By adhering to these practices, geothermal plants can mitigate their waste footprint and foster sustainable operations.
- During operation, cooling towers, air scrubber systems, turbines, and steam separators commonly collect sulfur, silica, and carbonate precipitates. The sludge formed at the bottom of cooling towers and emergency holding pools can be categorized as hazardous, depending on its concentration of silica compounds, chlorides, arsenic, mercury, vanadium, nickel, and other heavy metals. It is recommended that these waste products be stored in a sealed-floor area prior to being disposed of at a waste facility that has the appropriate licences. If the sludge does not contain high levels of leachable metals and is of acceptable quality (classified as non-hazardous waste), it may be considered a possible disposal option to reuse it as backfill material. Whenever possible, third parties should recycle recoverable solid wastes, such as sulfur cake (for example, they can be used in the manufacture of agricultural fertilizers).
- If different categories of oils are generated from the works at the drilling rig, these oils will be stored separately.
- During the storage, transport and disposal of the wastes, all kinds of measures will be taken against leaks and spills and storage will be made in an area where there are barriers against leakage.

7.6.3 Residual Impacts

The waste impact is limited to the region and is short-lived during the construction phase. The main expected sources of waste are drilling mud and equipment waste. Furthermore, wastes including sulfur, silica, and carbonate precipitates are collected from cooling towers, air cleaning systems, turbines, and steam separators.

During the operational phase, domestic waste will be generated.

No waste will be dumped or stored in the lakes, rivers, streams and creeks surrounding the project area The required mitigation measures during construction and operation will reduce waste through the use of management practices and appropriate waste disposal procedures.

Table 7-29. Residual Impact Significances-Waste Management

Subject	Residual Impact
Impacts related to Waste Management	Low

7.7 Biodiversity

7.7.1 Impacts during Construction

During the construction phase of a project, it is possible to encounter both direct and indirect impacts. Examples of direct impacts encompass the loss of habitat and biodiversity. However, it is noteworthy that the intended Project is scheduled to be executed within an area that has already undergone modification. In this context, the absence of critical natural vegetation that serves as a habitat for wildlife indicates that there will be no sensitive habitat or vegetation loss resulting from the Project's construction activities.

An additional direct impact stemming from the construction phase will arise due to vehicular traffic associated with the construction activities. Fauna species with limited mobility are particularly susceptible to mortality as a consequence of this vehicular movement. The peril of fatality due to crushing will be heightened when these animals attempt to traverse the roadways.

During the construction phase, the introduction and spread of alien invasive species can lead to a range of ecological and environmental disturbances. Alien invasive species are non-native organisms that establish themselves and proliferate in ecosystems outside their natural range. The presence of these species can disrupt the balance of native flora and fauna, leading to habitat degradation, loss of biodiversity, and altered ecological processes.

The inadvertent introduction of alien invasive species can occur through various pathways, such as the transportation of construction materials, equipment, and vehicles. Disturbed habitats and open soil resulting from construction activities can create favorable conditions for the establishment and rapid growth of these species. Moreover, disturbed areas may provide a foothold for invasive plants to outcompete native vegetation, altering ecosystem dynamics and diminishing the availability of resources for local wildlife.

Internationally Recognized and Nationally Protected Areas

There are not any internationally recognized and nationally protected areas within the Project Area. There is no impact of construction activities on internationally recognized and nationally protected areas.

Flora

The most significant impacts of such projects on the environment are usually habitat and vegetation loss or damage. However, the Project will be constructed in modified habitats with poor vegetation cover. There are many man-made structures around the Project area. Therefore, there are no sensitive habitats or flora species and there will be no such impact.

The construction activities will give rise to impacts, one of which is the generation of dust. While the production of dust may exert effects on plant species situated in the proximity of the project area, these effects are projected to be temporary in nature. By implementing requisite measures and upon completion of the construction activity, it is anticipated that the plant species composition will gradually revert to its initial state over time.

To conclude, the impacts on the biological environment during construction will be limited. It is considered that all the impacts will be minimized or eliminated completely if necessary precautions are taken.

Fauna

Construction activities may have impacts on fauna species in the area. These impacts will mostly consist of secondary impacts. Construction activities may result in disturbed fauna species and mortality due to traffic collisions. Noise, visual disturbance and vibration from construction activities may also have a negative impact on fauna species. All these impacts can be eliminated by taking appropriate measures.

Table 7-30. Summary of Impact Significances of the Receptors for the Construction Phase

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
Habitat Loss	Negative Direct and Indirect	Potential impact on vegetation will be directly and indirectly related to the construction activities. The direct impact is immediate destruction or damage of vegetation in the course of construction. The indirect impact is a change in the plant communities' growth conditions induced by the construction activities. The200onstruct impacts on habitats in the Project area will include: • loss of plant resources; • inhibition of plant growth due to emissions of dust from construction activities and harmful substances;	Habitat loss will be in the project site and its impact will be in the project site	Construction activities at the Project site will continue for 6 months.	Impacts related to Habitat Loss the impact can be detected or perceived but the effects are unlikely to cause tangible changes in environmental or social components	-	Habitat loss will occur due to the construction works to be carried out.	Impacts related to Habitat Loss are expected to be reversible in the medium term.	The 200onstrut area and its surroundings consist of modified habitats.	**Low**
		Score	Project Site	Short	Low	N/A	Probable	Mid-term	Low	
		Value	1	2	2	-	5	3	1	

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
	Impact Magnitude (G+D+I+F (or L)) x R		**30**						**1**	**30**
Loss or damage of flora species	Negative Direct	Vegetation clearing during the construction phase may result in the destruction of floral species of conservation concern.	Impacts on plant species will be in the project site	Construction activities at the Project site will continue for 6 months.	The impact on plant species is within legal standards or accepted practices and is likely to result in tangible changes	-	Loss of plant species will occur due to the construction works to be carried out.	Impacts related to plant species are expected to be reversible in the short to medium term.	There is no distribution of protected or sensitive flora species in the project area. *Ajuga 201onstruct* is an endemic species documented only in literature, as it was not observed during fieldwork.	**Negligible**
		Score	Project Site	Short	Medium	N/A	Likely	Short/mid-term	Low	
		Value	1	2	3	-	3	2	1	
	Impact Magnitude (G+D+I+F (or L)) x R		**18**						**1**	**18**
Loss of fauna species	Negative Direct	Small and less mobile species can become trapped, injured and killed during vegetation clearing and earth works. Fauna of particular concern in this context include: • Fossorial mammals;	Impacts on fauna species will be in the project site and its surroundings	Construction activities at the Project site will continue for 6 months.	The impact on fauna species is within legal standards or accepted practices and is likely to result in tangible changes	-	Loss of fauna species likely to occur due to the construction works to be carried out.	Impacts related to fauna species are expected to be reversible in the short to medium term.	*Testudo graeca, Aquila 201onstruc and Streptopelia turtur* is in the VU category according to the IUCN Red List and	**Low**

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
		• Nesting birds (ground and tree nesting); and • Reptiles and amphibians. Other common causes of fauna injury, death or disturbance during the construction include: • Vehicle-fauna collisions. • Hunting, trapping and poisoning of fauna by construction workers and contractors; and • Fauna trapped/caught in infrastructure, such as fences and excavations. Three species of conservation concern have been recorded in the Project Area, *Testudo graeca, Aquila 202onstruc and Streptopelia turtur* as VU							can be found occasionally in the project area.	

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
		Score	Local	Short	Medium	N/A	Likely	Short/mid-term	Medium	
		Value	2	2	3	-	3	2	3	
	Impact Magnitude (G+D+I+F (or L)) x R		**20**						**3**	**60**
Disturbance and displacement of resident fauna due to noise, visual nuisance and vibration	Negative Indirect	The disturbance and displacement of resident fauna species within the footprint will primarily be caused by light, noise and vibration impacts during construction. Noise, light and vibration disturbances have the potential to influence breeding, roosting or foraging behaviour of fauna. During the construction phase temporary impacts from the Project are expected. Noise will be the primary disturbance of this nature due to vegetation clearing, excavation, movement of materials and general construction activities. These activities will introduce noise	Impacts related to noise, visual nuisance and vibration will be in the project site and its surroundings	Construction activities at the Project site will continue for 6 months.	Impacts related to noise, visual nuisance and vibration is within legal standards or accepted practices and is likely to result in tangible changes	-	Impacts related to noise, visual nuisance and vibration likely to occur due to the construction works to be carried out.	Potential impacts related to noise, visual nuisance and vibration are expected to be reversible in the short term.	*Testudo graeca, Aquila 203onstruc and Streptopelia turtur* is in the VU category according to the IUCN Red List and can be found occasionally in the project area.	**Low**

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
		sources to areas not currently exposed to these disturbances. In addition, there may be vibration associated with activities and the movement of any vehicles/machinery.								
		Score	Local	Short	Medium	N/A	Likely	Short-term	Medium	
		Value	2	2	3	-	3	1	3	
	Impact Magnitude (G+D+I+F (or L)) x R		**10**						**3**	**30**
Impacts on flora due to dust emission	Negative Indirect	Land preparation has the potential to generate dust which may settle on vegetation adjacent to the construction area. Excessive dust deposition on flora may act to suppress growth through limiting photosynthesis and the dusted foliage may also become unpalatable to foraging fauna.	Impacts related to dust emission will be in the project site and its surroundings	Construction activities at the Project site will continue for 6 months.	Impacts related to dust emission can be detected or perceived but the effects are unlikely to cause tangible changes	-	Impacts related to dust emission likely to occur due to the construction works to be carried out.	Potential impacts related to flora species are expected to be reversible in the short term.	There is no distribution of protected or sensitive flora species in the project area.	**Negligible**
		Score	Local	Short	Low	N/A	Likely	Short-term	Low	
		Value	2	2	2	-	3	1	1	
	Impact Magnitude (G+D+I+F (or L)) x R		**9**						**1**	**9**
Heavy metal accumulation	Negative Indirect	Geothermal fluid leakages to	Potential impacts related	Construction activities at	Potential impacts	-	Potential impacts related to	Potential impacts related	There is no distribution	**Medium**

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
or loss of vitality on flora elements and poisoning, reproductive disorders or death on fauna		receiving environment during exploration period	to leakages of geothermal fluid will be regional	the Project site will continue for 6 months.	related to leakage of geothermal fluid is likely to cause tangible changes in environmental components		leakage of geothermal fluid likely to occur due to the construction works to be carried out.	to leakage of geothermal fluid are expected to be reversible in the in the long-term.	of protected or sensitive flora species in the project area. *Testudo graeca, Aquila 205onstruc and Streptopelia turtur* is in the VU category according to the IUCN Red List and can be found occasionally in the project area.	
		Score	Regional	Short	Medium	N/A	Unlikely	Long-term	Medium	
		Value	3	2	3	-	1	4	3	
	Impact Magnitude (G+D+I+F (or L)) x R		**36**						**3**	**108**
Spreading of Alien invasive species	Negative Direct	Clearance of vegetation and disturbances caused by earthworks can create conditions conducive to the establishment and rapid spread of alien invasive vegetation. If left uncontrolled, alien species can spread	Spreading of Alien invasive species will be in the project site and its surroundings	Construction activities at the Project site will continue for 6 months.	Impacts related to Spreading of Alien invasive species may result in exceedances of legal standards or accepted practices and/or is	-	Spreading of Alien Invasive Species unlikely to occur due to the construction works to be carried out. No invasive species were found in the area during the studies.	In addition to the natural processes, with proper restoration potential impacts during construction is expected to be reversible in the medium term.	The205onstrut area and its surroundings consist of modified habitats.	**Low**

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity (S)	Impact Significance (Impact Magnitude x Sensitivity)
		exponentially, suppressing or replacing native vegetation. This may lead to disruption of ecosystem functioning and loss of biodiversity. Alien invasive plants can potentially be established in all areas where construction activities will disrupt existing vegetation.			likely to cause very serious to catastrophic damage to environmental					
		Score	Local	Short	Very High	N/A	Unlikely	Mid-term	Low	
		Value	2	2	5	-	1	3	1	
	Impact Magnitude (G+D+I+F (or L)) x R		**30**						**1**	**30**

Mitigations

- The clearance of natural vegetation will be limited to the strip of land needed for the occupation of the project and the adjacent working width,
- If *Ajuga 207onstruct* is encountered during construction activities within the project area, it is recommended that the seeds be collected during the months of May and June and subsequently planted in appropriate habitats.
- Mobilization area and excavation material temporary storage area will not be located in natural habitats.
- Contractor will be keen on environmental protection matters and prohibit unnecessary disturbance, damage and harm to natural habitats, through clear delineation of the boundaries of the work area to avoid encroachment into any critical, natural or modified habitats.
- Project activities such as tree cutting, plant cleaning, soil stripping, road construction and ground preparing activities may result in some habitat, amphibians, reptiles, bird and mammal losses. Therefore, it is recommended that all trees and shrubs will be cut and the floor will be cleaned before stripping the surface soil in the construction site to protect and reduce negative impacts on amphibians, reptile and mammal species.
- Surface clearing and stripping activities will not be implemented in birds' breeding period between February and early June in order to avoid the damage on bird species. In the parts of the Project site where surface clearing and stripping are already in progress, the construction activities may continue to be undertaken. In some parts of the Project site where breeding burrows do not exist, construction activities will be performed during this season between February and early June. If construction activities, especially surface clearing and stripping, are undertaken within the breeding season, it is important to check the breeding activities and presence of any breeding burrows.
- Particular attention should be given to the vulnerable *Testudo graeca* to prevent loss of individuals due to Project activities. This species will be screened before the commencement of the construction activities in the Project site. If this species is identified in the area, they will be carefully relocated/transported to another safe location. During the construction activities, relocation works for species will continue.
- Where vegetation clearing is required, thorough pre-clearing checks for all forms of fauna need to be conducted. A proactive approach will be used to prevent the loss of fauna without obstructing construction activities. The following procedures will be applied:
- After cleaning the ground and transporting the amphibians, reptiles and mammals encountered on the construction site, surface soils will be striped carefully. While stripping, some amphibians, reptiles and mammals may be seen again in excavated soil. All these animals will be collected and transported to a suitable nearby habitat.

- During surface clearing and stripping activities in the construction phase, biodiversity experts shall be present and accompany the construction team. The experts will collect all animals encountered and affected during the construction phase and transfer them to appropriate habitats around the Project site.
- If any active burrows are encountered during the construction phase of the Project, marking tape will be placed on the section/area where the burrow was encountered, and necessary signage will be placed. The construction activities on this section/area will be suspended, while construction activities in other sections of the Project site are continued.
- Implement measures to ensure safe handling of chemicals and fuels, in accordance with the Hazardous Material Management Plan.
- Any contaminated sites that develop as a result of accidental spills will be remediated according to a Spill Response Plan that will be developed.
- Waste management measures and facilities that avoid creating opportunities for food scavengers will be developed and implemented.
- Strictly prohibit unnecessary destruction of habitats, cutting of trees or vegetation found outside the area absolutely needed for the project.
- Prohibit hunting, trapping and intentional killing of wild animals by the project workers and drivers.
- Faunal protection policies will be developed and enforced that prohibit all forms of hunting, any killing of animals and keeping of pets.
- Awareness programs will be developed for staff and contractors to raise the awareness of the diversity of animals present, risks associated with large wildlife and how to react when confronted by different species of large wildlife, and requirements to actively prevent the loss of any animals including snakes and species commonly considered to be vermin.
- Increase the awareness of drivers and equipment operators towards wildlife conservation and encourage them to avoid or minimize animal fatalities.
- Biodiversity awareness creating measures will be taken both for the construction workers as well as to the surrounding community.
- Training will be delivered to constructions workers prior to the start and during construction works to increase their awareness and responsibilities concerning the surrounding natural values.
- Where free-ranging wildlife occurs, vehicle speeds will be reduced through implementation of speed control measures and the regular enforcement.
- Post appropriate signs and apply speed limits for the sections passing through important wildlife areas by setting speed limits to safe levels, (around 30km/h)

monitoring and enforcing it.

- Apply good site practices incorporating appropriate mitigation measures that reduce nuisance noise levels.
- Lighting for construction and security purposes will be inward and downward facing to minimise light pollution in remote areas, and to minimize the disturbance to nocturnal wildlife, birds.
- Reduce light contamination into natural habitats at night.
- All areas that have been cleared of vegetation and/or where the soil surface has been disturbed need rehabilitation of the vegetation to minimise the establishment of alien invasive species, with consideration of the following aspects:
    - Revegetation of disturbed sites will be implemented within the same spring season, or within the upcoming spring season for disturbances occurring during the dry season.
    - Only non-invasive species are to be used for rehabilitation. These species will be native species.
- The topsoil will be stripped and stored prior to construction and the stripped vegetation will be used to make the surrounding natural. The topsoil will not be used in any other area. Also will not be stored next to existing alien invasive species infestations.
- Topsoil will not be imported from elsewhere / if importation is necessary this will be from a reputable supplier with certification that the material does not contain alien invasive species. Local species will be used in landscaping/planting studies. Non-native plant species will not be used.
- Invasive species will not be used in replanting/reseeding works to be carried out due to the project. It should be ensured that the species to be used in replanting/reseeding studies are not invasive.
- The measures detailed in the Air Quality, Soil Quality, Surface and Groundwater Quality and Wastewater section will be followed in addressing the impacts associated with geothermal fluid leakages.

7.7.2 Impacts during Operation

During the operational phase of the project, the absence of critical natural vegetation within the designated area signifies that there will be no direct sensitive habitat or vegetation loss resulting from the project's construction activities. As a result, the operational phase is poised to have relatively fewer direct impacts on biodiversity and habitat compared to projects that are conducted in pristine or ecologically sensitive areas.

Table 7-31. Summary of Impact Significances of the Receptors for the Operation Phase

Potential Impact	Impact Type	Definition	Nature of Impacts (Magnitude designations)							
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	Impact Significance (Magnitude x Sensitivity)
Habitat Alteration	Negative Direct	Alteration of habitat due to the area covered by the project	Habitat Alteration will be in the project site and its impact will be in the project site	The operational period will last for 30 years. During this period, Impacts related to Habitat Alteration will occur.	Impacts related to Habitat Alteration is within legal standards or accepted practices and is likely to result in tangible changes	-	Habitat Alteration will occur during the operational phase.	In addition to the natural processes, with proper restoration potential impacts is expected to be reversible in the Mid term.	The210onstruct area and its surroundings consist of modified habitats.	**Medium**
		Score	Project Site	Very Long	Medium	N/A	Probable	Mid-term	Low	
		Value	1	5	3	-	5	3	1	
	Impact Magnitude (G+D+I+F (or L)) x R		**42**						**1**	**42**
Habitat Fragmentation	Negative Direct	Geothermal fluid pipelines can contribute to habitat fragmentation by physically dividing habitats and disrupting natural wildlife corridors. This division can lead to isolated habitat fragments with altered	Impacts related to Habitat Fragmentation will be in the project site and its surroundings	The operational period will last for 30 years. During this period, Impacts related to Habitat Fragmentation may occur.	Impacts related to flora and fauna species can be detected or perceived but the effects are unlikely to cause tangible changes	.	Impacts related to Habitat Fragmentation may occur due to the operational phase.	Impacts related to flora and fauna species are expected to be reversible in the short-term.	*Testudo graeca* is in the VU category according to the IUCN Red List and can be found occasionally in the project area.	**Low**

Potential Impact	Impact Type	Definition	Nature of Impacts (Magnitude designations)							
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	Impact Significance (Magnitude x Sensitivity)
		edge effects, potentially harming species movement and genetic exchange.								
		Score	Local	Very Long	Low	-	Unlikely	Short-term	Medium	
		Value	2	5	2	-	1	1	3	
	Impact Magnitude (G+D+I+F (or L)) x R		**10**						**3**	**30**
Heavy metal accumulation or loss of vitality on flora elements and poisoning, reproductive disorders or death on fauna	Negative Indirect	Geothermal fluid leakages to receiving environment during operation period	Potential impacts related to leakages of geothermal fluid will be regional	The operational period will last for 30 years. During this period, Impacts related to leakages of geothermal fluid may occur.	Potential impacts related to leakages of geothermal fluid is likely to cause tangible changes in environmental components	-	Potential impacts related to leakages of geothermal fluid likely to occur during the operational period.	Impacts related to leakages of geothermal fluid are expected to be reversible in the in the long-term .	There is no distribution of protected or sensitive flora species in the project area. *Testudo graeca*, *Aquila 211onstruc* and *Streptopelia turtur* is in the VU category according to the IUCN Red List and can be found occasionally in the project area.	**Medium**
		Score	Regional	Very Long	Medium	N/A	Likely	Long-term	Medium	

Potential Impact	Impact Type	Definition	Nature of Impacts (Magnitude designations)							
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	Impact Significance (Magnitude x Sensitivity)
		Value	3	5	3	-	3	4	3	
	Impact Magnitude (G+D+I+F (or L)) x R		**56**						**3**	**168**
Disturbance and displacement of resident fauna due to noise and light	Negative Indirect	The disturbance and displacement of resident fauna species within the footprint will primarily be caused by light, noise and vibration impacts during operation. Noise, light and vibration disturbances have the potential to influence breeding, roosting or foraging behaviour of fauna. During the operation phase permanent impacts from the Project are expected. Noise will be the primary	Impacts related to noise and light will be in the project site and its surroundings	The operational period will last for 30 years. During this period, Impacts related to noise and light may occur.	Impacts related to noise and light is within legal standards or accepted practices and is likely to result in tangible changes	-	Impacts related to noise and light likely to occur during the operational period.	Impacts related to noise and light are expected to be reversible in the short term.	*Testudo graeca, Aquila 212onstruc and Streptopelia turtur* is in the VU category according to the IUCN Red List and can be found occasionally in the project area.	**Low**

Potential Impact	Impact Type	Definition	Nature of Impacts (Magnitude designations)							
			Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	Impact Significance (Magnitude x Sensitivity)
		disturbance of this nature due to operational activities.								
		Score	Local	Very Long	Medium	N/A	Likely	Short-term	Medium	
		Value	2	5	3	-	3	1	3	
	Impact Magnitude (G+D+I+F (or L)) x R		**14**						**3**	**42**
Collision with power lines and electrocution from electric pylons while perching	Negative Direct	Birds may use power line towers as perches during hunting, nesting, and rest, where they can be exposed to electrocution depending on the design and insulation of the electric pylons. Large birds can also die through collisions with power lines. Birds will certainly use and pass through the areas crossed by ETL. The more relevant	Impacts related to collision and electrocution will be in the project site.	The operational period will last for 30 years. During this period, Impacts related to noise and light may occur.	Impacts related to collision and electrocution is within legal standards or accepted practices and is likely to result in tangible changes	-	Impacts related to collision and electrocution likely to occur during the operational period.	Impacts related to collision and electrocution are expected to be reversible in the short term.	*Aquila 213onstruc and Streptopelia turtur* is in the VU category according to the IUCN Red List and can be found occasionally in the project area.	**Low**

Potential Impact	Impact Type	Definition	Nature of Impacts (Magnitude designations)							
			Geographical Extent (G)		Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	Impact Significance (Magnitude x Sensitivity)
		impact in such a case could be the collision with power lines.									
		Score	Project Site	Very Long	Medium	N/A	Likely	Short-term		Medium	
		Value	1	5	3	-	3		1	3	
	Impact Magnitude (G+D+I+F (or L)) x R					**13**				**3**	**39**

Mitigations

- Vegetation will need to be rehabilitated in all areas that have been cleared of vegetation and/or where the soil surface has been disturbed.
- Revegetation of disturbed sites will be implemented within the same spring season, or within the upcoming spring season for disturbances occurring during the dry season.
- Only non-invasive species are to be used for rehabilitation. These species will be native species.
- The geothermal fluid pipelines located on the surface will be positioned above the ground to allow for the passage of animals, and these gaps will be maintained without being obstructed by any material that could impede animal passage.
- The measures detailed in the Noise and Vibration section will be followed in addressing the impacts related to noise.
- Lighting for security purposes will be inward and downward facing to minimise light pollution in remote areas, and to minimize the disturbance to nocturnal wildlife, birds.
- Reduce light contamination into natural habitats at night.
- Bird markers and diverters on ETL towers and power lines will be installed. These visual cues can help birds detect the presence of these structures and avoid collisions.
- Bird-friendly designs for towers will be implemented to reduce the risk of electrocution. This may involve modifying the tower structures to make them less hazardous for perching or nesting birds, and ensuring proper insulation to prevent electrical hazards.
- The measures detailed in the Air Quality, Soil Quality, Surface and Groundwater Quality and Wastewater section will be followed in addressing the impacts associated with geothermal fluid leakages.

7.7.3 Residual Impacts

No critical residual impact is expected if necessary mitigation measures are taken. The residual impacts on biodiversity is estimated to be less significant and the summary of the residual impact significance are shown in Table 7-32 and Table 7-33.

Table 7-32. Construction Phase Residual Impact Significance

Subject	Construction Phase Residual Impact
Habitat Loss	Negligible
Loss or damage of flora species	Negligible
Loss of fauna species	Negligible
Disturbance and displacement of resident fauna due to noise, visual nuisance and vibration	Negligible
Impacts on flora due to dust emission	Negligible
Heavy metal accumulation or loss of vitality on flora elements and poisoning, reproductive disorders or death on fauna	Low
Spreading of Alien invasive species	Negligible

Table 7-33. Operation Phase Residual Impact Significance

Subject	Operation Phase Residual Impact
Habitat Alteration	Negligible
Habitat Fragmentation	Negligible
Heavy metal accumulation or loss of vitality on flora elements and poisoning, reproductive disorders or death on fauna	Low
Disturbance and displacement of resident fauna due to noise and light	Negligible
Collision with power lines and electrocution from electric pylons while perching	Negligible

7.8 Traffic and Transport

Transportation activities in geothermal facility construction are typically temporary and intermittent. It can be said that they are limited to low-volume light commercial and personal vehicles. The development of geothermal projects in the area will lead to a temporary increase in industrial traffic, including the construction or improvement of access roads, drilling operations, well testing, and construction activities situation can result in effects such as an increase in airborne particulate matter (GHG) emissions, especially from gasoline and diesel engines.

7.8.1 Impacts during Construction

Considering the overall context of the Project, no negative impacts on traffic and transportation are expected. Transportation activities in geothermal facility construction are typically temporary and intermittent. It can be said that they are limited to low-volume light commercial and personal vehicles. The development of geothermal projects in the area will lead to a temporary increase in industrial traffic, including the construction or improvement of access roads, drilling operations, well testing, and construction activities. In addition, no complaints about traffic and transportation were received as a result of interviews with neighborhood headmen.

During the construction period, the simultaneous passage of 30 heavy vehicles, 7 commercial and 12 passenger vehicles will be observed within the scope of the Project. The planned project will create a maximum of 1% additional load to the existing traffic load in a one-year period. Considering that the determined vehicle load is not high, it is seen that it will not negatively affect the current traffic load if all precautions are taken.

Regarding the traffic effect caused by the project, once the drilling works are completed, the rig will be relocated from the field. Traffic Management Plan was prepared as a result of ESDD studies conducted in the Project area. Based on the results of the household survey conducted in Moralı, Argavlı, and Uzunkum neighborhoods, there has been no observed increase in traffic or traffic accidents resulting from the Project thus far.

Regarding the traffic effect caused by the project, once the drilling works are completed, the rig will be relocated from the field. Additionally, there are vehicles utilized by both white and

blue-collar personnel during the construction phase to commute to and from the site. However, it is important to note that the worker's accommodation area is already situated within the project site, and the number of workers is not substantial.

Considering this data, it is expected that there will be no significant traffic impact during the construction period of the Project.

Potential receptor are communities around the Project area.

Table 7-34 shows the summary of the impact significances during construction phase.

Table 7-34. Construction Phase Impact Significances

Nature of Impacts (Magnitude designations)									
Potential Impact	**Impact Type**	**Geographical Extent (G)**	**Duration (D)**	**Intensity (I)**	**Frequency (F)**	**Likelihood (L)**	**Reversibility I**	**Receptor Sensitivity (S)**	**Impact Significance (Magnitude x Receptor sentitivity)**
Impacts related to Traffic	Negative Direct	During the construction of the Project, traffic density will be experienced only around the site. Therefore, the impact will be local.	The218onstructio n phase will be last six (6) months.	The traffic resulting from the construction will be regulated according to legal standards. Besides, major changes that will affect community are not expected.	Construction vehicles will cause tidal traffic. Even though it is a natural affect due to the building process, residents can be slightly affected from the traffic density. However, it will not cause major impacts.	-	After the construction phase, there will be no permanent impacts.	The expected traffic impact during the construction period is low.	**Negligible**
Score		Local	Short	Low	Infrequent		Short-Term	Low	
Value		2	2	2	2		1	**1**	
Impact Magnitude (G+D+I+F (or L)) x R		**8**							**8**

7.8.2 Impacts during Operation

The existing traffic density in the region has been determined through traffic volume maps created as a result of traffic measurements conducted by the Transportation and Infrastructure Ministry, General Directorate of Highways, Strategy Development Department, Transportation Cost and Efficiency Branch. According to data from the nearest portable vehicle count and classification station to the project area, the annual average daily traffic values are as follows: 15,590 cars, 1,769 medium-sized commercial vehicles, 200 buses, 1,336 trucks, and 1,388 trucks + trailers + tractors, resulting in a total of 20,283 passages observed.

It is concluded that there will not be a significant increase in vehicle passages when comparing the 2020 average daily traffic values with the vehicle passages due to all on-site and off-site transport activities during the operation of the geothermal power plant facilities.

Table 7-35 shows the summary of the impact significances during operation phase.

Table 7-35. Operation Phase Impact Magnitude

		Nature of Impacts (Magnitude designations)							
Potential Impact	**Impact Type**	**Geographical Extent (G)**	**Duration (D)**	**Intlity (I)**	**Frequency (F)**	**Likelihood (L)**	**Reversibility I**	**Receptor Sensitivity (S)**	**Impact Significance (Magnitude x Receptor sentitivity)**
Impacts related to Traffic	Negative Direct	During the operation phase, due to the waste transportation, traffic density is expected. In addition, there will be employee (10) services. Therefore, the impact will be local.	The operation period will last approximately 30 years. Therefore, the impact is very long.	The traffic resulting from the construction will be regulated according to legal standards. Besides, major changes that will affect community are not expected.	Due to the waste transportation, there will be tidal traffic during the operation phase. However, it will not cause major impacts	-	During the operation phase, there will be no permanent impacts of traffic density.	The expected traffic impact during the construction period is low.	**Negligible**
Score		Local	Very Long	Low	Infrequent		Short-Term	Low	
Value		2	5	2	2		1	1	
Impact Magnitude [(G+D+I+F (or L)) x R]		**11**							**11**

Mitigation Measures

- The Project Company has prepared and will implement a site-specific Traffic Management Plan to adequately manage traffic on access roads used by communities.
- In case of deterioration of existing access roads, the Project Company and its contractors will be responsible for restoring the roads. Communities will be informed about transport programs as well as safety and security measures to be taken at the individual level.
- Coordinate with local authorities during abnormal road transport (especially for timing and route selection).
- To give traffic and road safety trainings to all personnel and to give special trainings to personnel who will use industrial vehicles (defensive driving, road and anti-slip, etc.).
- Warning signs will be placed at the entrance and exit of the construction site vehicles.
- Establishing rights of way, job site speed limits, vehicle inspection requirements, operating rules and procedures (eg prohibiting the operation of forklifts with the forks down), and control of traffic patterns or direction.
- Coordination with emergency response teams to ensure that appropriate first aid is provided in the event of an accident.
- Using locally sourced materials whenever possible to minimize transport distances.

7.8.3 Residual Impacts

No critical residual impact is expected if necessary mitigation measures are taken. The residual impacts on traffic is estimated to be less significant and the summary of the residual impact significance are shown in Table 7-36 and Table 7-37.

Table 7-36. Construction Phase Residual Impact Significance

Subject	Construction Phase Residual Impact
Traffic Density	Low

Table 7-37. Operation Phase Residual Impact Significance

Subject	Construction Phase Residual Impact
Traffic density	Negligible

7.9 Socio-Economic Impacts

7.9.1 Impacts during Construction

The Project is expected to have a positive impact on employment, including direct (i.e. on-site employment), indirect (i.e. suppliers or support services) and induced employment (i.e. created due to spending by new employees). Local employment is a goal of Project Company to hire people who live close to the place of work. In addition, household surveys and mukhtar interviews indicated that there are expectations for local employment.

One of the two boreholes planned for the project has been drilled. In this process, 32 people, 29 men and 3 women, were employed locally. Consultations were held with headmen for employment opportunities. Local employment and purchasing are given priority. Aydın, Germencik and Söke districts are prioritized in purchasing.

In addition to the direct employment benefits of the Project, indirect and induced employment benefits will also arise. Indirect employment is created by the provision of goods and services during the construction phase, and induced employment benefits are created by the earnings of direct and indirect workers being spent in the economy.

According to the household surveys conducted in Moralı, Argavlı and Uzunkum neighbourhoods, it was learned that the existing power plants in the region generally affect agriculture and animal husbandry. During the interviews, it was specifically mentioned that the yields of olive and fig trees have decreased and dried up. In addition, it is thought that the wastewater is poured into the lakes in the vicinity, damaging the fish and animals that drink from these lakes. There are public concerns as the new facilities to be constructed under the Project are also expected to have the above-mentioned environmental impacts. Since the geothermal power plants to be constructed within the scope of the Project will have a closed system cycle (re-injection from the reservoir), the problems experienced by the local communities due to other geothermal power plants in the region will not be repeated. Failure to inform the local community about the system to be used in the project can raise concerns and may damage the sustainability and reputation of the project.

Potential receptor are communities around the Project area.

Table 7-38 shows the summary of the impact significances during construction phase.

Table 7-38. Construction Phase Impact Magnitude

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)						Impact Significance (Magnitude x Sensitivity)		
		Geographical Extent (G)	Duration (D)	Iinsity (I)	Frequency (F)	Likelihood (L)		Reversibility I	Receptor Sensitivity	
Impacts related to direct and indirect employment opportunities	Positive Direct	Construction activities will direct or indirect job opportunities regionally.	The construction phase will be last six (6) months. The duration of potential impacts is expected to be short.	Considering the number of people to be recruited and prioritizing local workers, positive effects are expected to be high.	-	The Project will lead to employment opportunities.		Construction activities will take 6 months. There is the possibility of employment throughout this process	Neighbourhoods in the project area will be positively affected in terms of direct and indirect job opportunities during the construction period.	**Low**
Score		Regional	Short	Medium	N/A	Probable		short/mid-term	Medium	
Value		3	2	3	-	5		2	3	
[Impact Magnitude (G+D+I+F (or L)) x R]		26								**78**
Impacts related to lack of information	Negative Direct	A regional impact due to lack of knowledge among local	The construction phase will be last six (6) months. The duration of potential impacts is expected to be short.	If the activities within the scope of the project are not explained transparently enough to the local people, a moderate impact may be observed.	-	There is a possibility that the system to be used in the project (that it will not pollute the soil, air and the environment) is not explained well enough.		If transparent information about the project is not provided to local people, the223onstructi and sustainability of the project may be affected in the long term.	Neighbourhoods in the project area will be negatively affected in terms of misperception.	**Negligible**
Score		Regional	Short	Medium	N/A	Likely	Long term	Medium		
Value		3	2	3	-	3	4	3		
[Impact Magnitude (G+D+I+F (or L)) x R]		**15**								**45**

Mitigation Measures

- The Project will develop Personnel Selection and Employment Procedure. This will include the aim to provide opportunities for employment of local workforce to the extent possible considering unskilled, semi-skilled and skilled workforce;
- The Project will seek to maximize the benefits from the Project to local communities in terms of direct and indirect employment and purchasing of local goods and services during construction. This will include measures such as adopting local employment and purchasing policies, establishing tenders for procurement of subcontracted goods and services at a scale that local businesses can respond to, ensuring opportunities are advertised locally;
- Project Company will ensure that all workers will have contracts that clearly state the terms and conditions of their employment and their legal rights;
- The Project Company will adopt a Human Resources policy which observes wage standards, working hour regulation, freedom of association and staff encouragement in line with the IFC PS 2 / EBRD PR 2. The policy will also make provisions on child and forced labour, discrimination on the basis of religion, language, gender or social status, bullying and harassment. This policy will be developed by the Project Company to cover local employment and training of local people. It will also apply to the Project contractors;
- Workers will be provided with information including, but not be limited to, entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity / paternity, or holiday);
- Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights prior to any employment contract to be signed
- The Project and all contractors will put in place a formal worker grievance mechanism;
- Project should seek to maximize the benefits for local communities in terms of both direct and indirect employment opportunities and purchasing of local goods and services;
- Procurement Procedure will be developed and implemented. Project should adopt measures within its purchasing policy to provide opportunity for local scale businesses to tender for procurement of subcontracted good and services (e.g., advertising locally);
- The Company will check the indebtedness of companies and monetary relationships with local businesses before hiring contractors to work on site;
- A grievance redress mechanism through which the local community can raise concerns, report problems or seek clarification on project issues has been established and will be implemented throughout the life of the project;

- In the household surveys, it was determined that the local people had insufficient information about the project. The project company will organize regular meetings in the neighborhoods and establish clear communication in order to increase the public's level of knowledge about the project;
- Organize community meetings and workshops to educate the local population about the closed geothermal system and reinjection technology;
- Clearly communicate the benefits of the closed system in minimizing environmental impacts.

Impacts during Operation

Since there will be no employees other than a security who is constantly working on the site during operation, no local employment during the operation period of the Project is expected. In addition, agricultural lands, which are an important source of livelihood for local people during the operation period of the project, need to be protected from the negative impacts of the project. Failure to inform the local community about the system to be used in the project can raise concerns and may damage the sustainability and reputation of the project.

Potential receptor are communities around the Project area.

Table 7-39 shows the summary of the impact significances during operation phase.

Table 7-39. Operation Phase Impact Magnitude

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								Impact Significance (Magnitude x Significance)
		Geographical Extent (G)		Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	
Impacts on direct or indirect local employment	Positive Direct	The project area covers Moralı, Argavlı and Uzunkum neighborhoods. The geographical extent is expected to be local.		The operation period will last approximately 30 years. Therefore, the impact is very long.	There will be a small number of local employments during the operation period of the project. In addition, the materials needed will be procured from local producers. Therefore, impact intensity can be considered as low.	-	The project will have positive impacts on local employment during the operation period.	Local employment opportunities will be provided, albeit to a lesser extent, during the operation period of the Project.	Neighbourhoods in the project area will be positively affected in terms of direct and indirect job opportunities during the operation period.	High
Score			Local	Very Long	Low	N/A	Probable	Long-term	Medium	
Value			2	5	2	-	5	4	3	
Impact Magnitude (G+D+I+F (or L)) x R					**56**				**168**	
Impacts on agricultural activities within the Project Site boundaries	Negative Direct	The project area covers Moralı, Argavlı and Uzunkum neighborhoods. The geographical extent is expected to be local.		The operation period will last approximately 30 years. Therefore, the impact is very long.	After the Geothermal Power Plant is established, the productivity of agricultural lands in the project impact area may be affected.	-	Negative impacts on agricultural production are likely to be observed.	Reduced yields in agricultural production can have a long-term impact that is difficult to reverse.	Agricultural activities of PAPs can be negatively affected during the operation period of the Project.	High
Score			Local	Very Long	Medium	N/A	Probable	Long Term	Medium	
Value			2	5	3	-	5	4	3	

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	Impact Significance (Magnitude x Significance)
Impact Magnitude (G+D+I+F (or L)) x R		**60**						**180**	
Impacts related to lack of information	Negative Direct	A regional impact due to lack of knowledge among local people.	The operation period will last approximately 30 years. Therefore, the impact is very long	If the activities within the scope of the project are not explained transparently enough to the local people, a moderate impact may be observed.	-	There is a possibility that the system to be used in the project (that it will not pollute the soil, air and the environment) is not explained well enough.	If transparent organization about the project is not provided to local people, the reputation and sustainability of the project may be affected in the long term.	Neighbourhoods in the project area will be negatively affected in terms of misperception.	High
Score		Regional	Very long	Medium	N/A	Likely	Long-term	Medium	
Value		3	5	3	-	3	4	3	
Impact Magnitude (G+D+I+F (or L)) x R		**56**						**168**	

Mitigation Measures

- The Project will seek to maximize the benefits from the Project to local communities in terms of direct and indirect employment and purchasing of local goods and services during construction. This will include measures such as adopting local employment and purchasing policies, establishing tenders for procurement of subcontracted goods and services at a scale that local businesses can respond to, ensuring opportunities are advertised locally;
- Project Company will ensure that all workers will have contracts that clearly state the terms and conditions of their employment and their legal rights;
- The Project Company will adopt a Human Resources policy which observes wage standards, working hour regulation, freedom of association and staff encouragement. The policy will also eliminate child and forced labour, discrimination on the basis of religion, language, gender or social status, bullying and harassment. This policy will be developed by the Project Company to cover local employment and training of local people;
- Workers will be provided with information including, but not be limited to, entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity / paternity, or holiday);
- All workers will be able to join trade unions of their choice and have the right to collective bargaining;
- Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights prior to any employment contract to be signed;
- Wages, benefits and conditions of work offered will be comparable to those offered by equivalent employers;
- The Project and all contractors will put in place a formal worker grievance mechanism;
- Project should seek to maximize the benefits for local communities in terms of both direct and indirect employment opportunities and purchasing of local good and services;
- Procurement Plan will be developed and implemented. Project should adopt measures within its purchasing policy to provide opportunity for local businesses to tender for procurement of subcontracted good and services (e.g., advertising locally);
- The Company will check the indebtedness of companies and monetary relationships with local businesses before hiring contractors to work on site;
- According to the current information, there will be no work on the pasture land in Moralı Neighborhood. However, if there are any plans to use the pasture land in the future during the operation phase of the project, the project company will inform the local community using this land. The community will be prevented from worrying about their

socioeconomic future. Adequate compensation will be given in case of permanent deterioration of livelihood.In case the pasture land is used, a new pasture land will be allocated in consultation with the local community and local authorities, taking into account factors such as distance and transportation.

- During the headmen interviews, it was stated that agricultural productivity has decreased due to other geothermal power plants operating in the region. Local community is concerned that the geothermal power plant to be built within the scope of the project will cause the same thing. A binary cycle (secordary fluid) will be created to prevent the sulfur generated during the operation period from negatively affecting agricultural productivity and the points where geothermal energy is extracted will be covered to prevent leakage into the soil. The geothermal power plant will undergo regular inspections and an emergency plan will be made in case of any leakage.
- A grievance redress mechanism through which the local community can raise concerns, report problems or seek clarification on project issues has been established and will be implemented throughout the life of the project.
- In the household surveys, it was determined that the local people had insufficient information about the project. The project company will organize regular meetings in the neighborhoods and establish clear communication in order to increase the public's level of knowledge about the project;
- Organize community meetings and workshops to educate the local population about the closed geothermal system and reinjection technology.
- Clearly communicate the benefits of the closed system in minimizing environmental impacts.

7.9.2 Residual Impacts

Providing local employment and local procurement during the construction and operation period of the Project will positively affect Moralı, Argavlı and Uzunkum Neighborhoods in terms of socioeconomic aspects. In addition, as mentioned above, as a result of the use of the pasture land used by the residents of Moralı Neighborhood within the scope of the project, negative socioeconomic impacts of the project can be observed. It has also been determined that if the geothermal power plant is not managed well during the operation period of the project, fresh water resources and agricultural lands in the region will be negatively affected and the residents of the neighbourhood may suffer economically. The measures to be taken by the project company to prevent the negative impacts of geothermal energy will not be effective enough if other geothermal power plants in the region do not take the same measures. The summaries of the residual impact significance are shown in Table 7-40.

No negative residual impact is expected during the construction period of the Project.

Table 7-40. Operation Phase Residual Impact Significance

Subject	Operation Phase Residual Impact
Impact on pastureland users	Medium
Impacts on agricultural activities within the Project Site boundaries	Medium

7.10 Labour and Working Conditions

7.10.1 Impacts during Construction

Depending of the location, scale and nature of construction project, the impacts on labour and working conditions can vary and construction can have both positive and negative impacts and risks on labour and working conditions.

If working conditions are not well managed, the following impacts may arise:

Discrimination

- Gender discrimination/gender-based violence;
- Discrimination based on race, nationality, etc.

Lack of a grievance mechanism

- Failure to register complaints;
- Receiving complaints verbally;
- Sexual abuse and harassment.

The risks are particularly relevant for the construction phase during the involvement of Project (sub)contractors and gaps between national requirements and international standards. In particular, the lack of a grievance mechanism and the failure to record grievances from workers may lead to adverse impacts not being addressed.

Potential receptor are employees and communities around the Project area.

Table 7-41. Construction Phase Labour and Working Conditions Impact Significances

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duraln (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	Impact Significance (Magnitude x Significance)
Impacts related to labour conditions	Negative Direct	The construction works will be in the Project site. Therefore, the impact will be local.	The231onstruction period is limited to 6 months.	Effects are unlikely to cause tangible changes in environmental or social components.	-	The frequency of impacts from working conditions during the construction period is unlikely.	Potential impacts related to labour conditions are considered to be short/mid-term.	The effect on labour conditions are 231onstructi.	Low
Score		Local	Short	Low	N/A	Unlikely	short/mid-term	Medium	
Value		2	2	2	-	1	2	3	
Impact Magnitude (G+D+I+F (or L)) x R			**14**					**42**	
Impacts on life and fire safety	Negative Direct	Life and fire risks impacts during the construction period will be locally limited	The231onstruction period is limited to 6 months. Therefore, life and fire risks are limited to 6 months.	During the construction phase of the project, depending on the area where the fire has spread, risks may arise that may affect especially construction workers and local people..	-	The risk to life or fire is likely to occur at any time during the construction phase of the Project.	After the finish of the construction works, there will be no risk associated with the construction of the Project. It may not be possible to reverse the life safety and fire related impacts of the necessary plans and procedures are not followed.	Impacts on life and fire safety are 231onstructi.	High
Score		Local	Short	Very High	N/A	Likely	Irreversible	Medium	
Value		2	2	5	-	3	5	3	
Impact Magnitude (G+D+I+F (or L)) x R			**60**					**180**	

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geographical Extent (G)	Duraln (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility I	Receptor Sensitivity	Impact Significance (Magnitude x Significance)
Impacts related to health and safety	Negative Direct	Impacts on worker health and safety during the construction period will be limited to workers working At the project site.	The construction period is limited to 6 months. therefore, health and safety risks are limited to 6 months.	The impact on health and safety is within legal standards or accepted practices and is likely to result in tangible changes to the social component	-	If necessary, precautions are not taken during the construction of the project, serious risks are likely to occur in terms of worker health and safety.	If necessary precautions are not taken and major accidents/injuries occur, the impact is irreversible.	Impacts related to health and safety are manageable.	Medium
Score		Project Site	Short	Medium	N/A	Likely	Irreversible	Medium	
Value		1	2	3	-	3	5	3	
Impact Magnitude (G+D+I+F (or L)) x R		**45**						**135**	
Impacts related to Workers' accommodation	Negative Direct	Accommodation facility will be in the project site and its impact will be in the project site	The construction period is limited to 6 months.	Accommodation facility will be regulated according to legal standards, but it is likely to result in tangible changes in the social components	-	Although the number of workers is low during the construction period, it is likely that there will be an impact due to accommodation.	Potential impacts related to accommodation facilities are expected to be reversible in the short to medium term.	Impacts from accommodation in the Project area are manageable with necessary precautions..	Low
Score		Project Site	Short	Medium	N/A	Likely	Short/mid-term	Medium	
Value		1	2	3	-	3	2	3	
Impact Magnitude (G+D+I+F (or L)) x R		**18**						**54**	

Mitigation Measures

- The Project Company will develop a HR (Human Resources) Policy to cover the key provisions of IFC PS 2 and EBRD PR2. The HR Policy will also apply to all Project (sub)contractors and attached to all the contracts (including supply chain) concluded; The Contractor personnel who will work on the Project will also be recruited in accordance with this policy and it will be ensured that all employees have equal rights and conditions.
- Equal conditions for all employees will be guaranteed by the HR policy and Labour and Working Conditions Management Plan.
- All mitigation measures given within the scope of the Project are valid for the contractor and supply chain employees. The Project Company is responsible for the contractors to comply with the specified standards and mitigations;
- The Project Company will ensure that international standards are applied to all Project workforce (including (sub)contractors' employees) and where Turkish legislation differs from international standards, the stricter one will apply to the Project;
- All prohibitions on child labour and forced labour will be specified in the HR policy;
- There will be no discrimination or retaliation against workers who join these unions and engage in collective bargaining.
- In the event of retrenchment in accordance with international legislation, the Project Company will develop a plan to mitigate the adverse impacts on employees in consultation with employees, their organization and, in some cases, the government. Information on retrenchment will be given in the HR policy;
- Workers will have contracts in place prior to commencement, setting out working conditions, terms of employment and EHS responsibilities;
- The project company will ensure the continuity of the training program including CoC, SEA, SH, SA, GBV, Gender Equality, Community Health, Safety and Security (which includes sexually transmitted awareness) and ensure that all personnel (including contractor personnel) receive training.
- All of the Project Workers including subcontractors will sign the Code of Conduct along with their employment contract, which includes punitive measures against GBV (Gender-Based Violence), SEA, and SH upon starting employment;
- The Project Company will organize awareness-raising meetings to train all Project Management Unit and Contractor Management Unit personnel on this subject;
- Code of Conduct will be developed in compliance with the national legislation. Hard copies will be provided both in English and the native languages of the workforce;
- All workers (including expats) will be trained in their native languages about the Code of Conduct and dismissal policy in particular in criminal cases;

- Occupational Health and Safety Management Plan will be prepared by Project Company for both phases of the Project to ensure OHS issues are properly managed;
- A grievance mechanism will be developed for employees and included in the ESMS. Employees will be informed about this mechanism at the time of hiring. All employees will be trained on the use and scope of the grievance mechanism. Project Company will ensure that non-employee (subcontractor's workers) workers have access to an effective grievance mechanism that meets the requirements of the PR2. In cases where the third party is not able to provide a grievance mechanism, the Project Company will provide an effective grievance mechanism to serve workers engaged by the third party and associated facility;
- Subcontractors will also be required to follow the requirements of IFC PS2 and EBRD PR2/4. Contracts to be signed with subcontractors will include EHS requirements.
- All workers (including subcontractors) will be trained on health and safety, and "Emergency Preparedness and Response Plan" to respond timely to potential incidents;
- Insurance will be provided to all workers under Social Security Institution;
- All accidents and incidents will be recorded. The efficiency of health and safety practices will be monitored through internal and external audits and corrective actions will be taken if required.
- Workers' accommodation will be managed in line with the provisions of IFC PS2 and EBRD PR2 provisions and the Guidance Note on Workers' Accommodation published by IFC and EBRD (Workers' Accommodation: Processes and Standards), and a relevant procedure will be set out in the ESMS. Accommodation services to be provided to (sub)contractors' workers should also meet these standards. The Project Company will be responsible for ensuring this.
- All construction site facilities shall be constructed in accordance with the specifications and regulations of the Turkish and IFI Environmental, Health and Safety (EHS) standards. Project Company shall ensure that accommodation of workers and provision of basic services to workers are managed in line with the guidance note on worker's accommodation published by International Finance Corporation (IFC) and European Bank for Reconstruction and Development (EBRD) (Worker's Accommodation: Processes and Standards)
- Labour and Working Conditions Management Plan will be developed and implemented for the Project;
- Dust emissions and noise generation will be minimized to the extent possible with the implementation of mitigation measures mentioned in Section 7.1 : Air Quality and Section 7.2 : Noise;

- Workers (including subcontractors) will be provided safety briefings every day before the work starts and provided with necessary personal protective equipment;
- Work permits will be required for high-risk activities such as working at heights, operation of heavy equipment and similar.

7.10.2 Impacts during Operation

In this section, the implementation of the WB OP/BP 4.01 and WBG General EHS Guidelines for the Project will be guided. The number of personnel to be employed in the construction of the Project is not yet known. However, local people will be given priority by Project Company in recruitment processes. In general, labor and working conditions during the construction and operation phases will include the following issues:

- Management of working conditions,
- Protection of the workforce,
- Commitments to the conditions of workers employed by third parties and the supply chain.

National laws on labor conditions:

- Labor Law (No. 4857),
- Occupational Health and Safety Law (No. 6331).

Türkiye is a signatory to many ILO (International Labour Organization) conventions. Within the scope of the Project, the rules that ESKİ is legally obliged to comply with, including but not limited to:

- Prevent forced labor,
- Being against child labour,
- Giving workers the right to organize and collective bargaining,
- Providing social security,
- Being against discrimination in the workplace,
- Ensuring occupational health and safety conditions.

Potential receptor are employees and communities around the Project area.

Table 7-42. Operation Phase Labour and Working Conditions Impact Significances

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								Impact Significance (Magnitude x Significance)
			Geographical Extent (G)	DItion (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility (R)	Receptor Sensitivity	
Impacts related to labor conditions	Negative Direct	Definition	During the operation phase, the works will be conducted at the Project site.	The operational period will last for 30 years. During this period, impacts on working conditions may occur.	Working conditions will be regulated according to legal standards, but it is likely to result in tangible changes in the social components.	-	Considering the number of workers, effects related to working conditions can be expected.	Potential impacts related to labour conditions are expected to be irreversible	Impacts related to labour conditions are low	Low
		Score	Project Site	Very Long	Medium	N/A	Likely	Irreversible	Medium	
		Value	1	5	3	-	3	5	1	
	Impact Magnitude (G+D+I+F (or L)) x R			**60**					**60**	
Impacts on life and fire safety	Negative Direct	Definition	Impacts is expected to remain at the local level.	Life and fire safety risks will exist throughout the operational period.	If the plans and procedures prepared for the Project are not followed, the intensity of the impacts may increase.	-	If the plans and procedures prepared for the Project are not followed, the likelihood of impacts will increase.	Given the life-threatening nature of the accidents, the effects would be irreversible.	When we look at the duration of the operation period and the intensity of the impact, the impacts on life and fire safety may be negative.	High
		Score	Local	Very long	High	NA	Likely	Irreversible	Medium	
		Value	2	5	4	-	3	5	3	
	Impact Magnitude (G+D+I+F (or L)) x R			**70**					**210**	

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								Impact Significance (Magnitude x Significance)
			Geographical Extent (G)	DItion (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility (R)	Receptor Sensitivity	
Impacts related to health and safety	Negative Direct	Definition	Impacts on worker health and safety during the operation period will be limited to workers working at the project site.	Impacts will cease after the operational life span of the project.	The impact on health and safety is within legal standards or accepted practices and is likely to result in tangible changes to the social component..	-	If necessary, precautions are not taken during the operation of the Project, serious risks are likely to occur in terms of worker health and safety.	If the necessary precautions are not taken, accidental release of pathogens can leave irreversible impacts for the project workers.	Nonconformities in health and safety conditions are considered impacts of high importance. Failure to comply with the required laws and mitigation measures may result in accidents, injuries, and death.	High
		Score	Project Site	Long	Medium	N/A	Likely	Irreversible	Medium	
		Value	1	4	3	-	3	5	3	
	Impact Magnitude (G+D+I+F (or L)) x R		**55**							**165**

Mitigation Measures

- The Project Company will develop a HR Policy to cover the key provisions of IFC PS 2 and EBRD PR2. The HR Policy will also apply to all Project (sub)contractors and attached to all the contracts (including supply chain) concluded; The Contractor personnel who will work on the Project will also be recruited in accordance with this policy and it will be ensured that all employees have equal rights and conditions.
- Equal conditions for all employees will be guaranteed by the HR policy and Labour and Working Conditions Management Plan.
- All mitigation measures given within the scope of the Project are valid for the contractor and supply chain employees. The Project Company is responsible for the contractors to comply with the specified standards and mitigations;
- The Project Company will ensure that international standards are applied to all Project workforce (including (sub)contractors' employees) and where Turkish legislation differs from international standards, the stricter one will apply to the Project;
- The project company will ensure the continuity of the training program including CoC, SEA, SH, SA, GBV, Gender Equality, Community Health, Safety and Security (which includes sexually transmitted awareness) and ensure that all personnel (including contractor personnel) receive training.
- All prohibitions on child labour and forced labour will be specified in the HR policy;
- There will be no discrimination or retaliation against workers who join these unions and engage in collective bargaining.
- In the event of retrenchment in accordance with international legislation, the Project Company will develop a plan to mitigate the adverse impacts on retrenchment on employees in consultation with employees, their organisation and, in some cases, the government. Information on retrenchment will be given in the HR policy;
- Workers will have contracts in place prior to commencement, setting out working conditions, terms of employment and EHS responsibilities;
- All of the Project Workers including subcontractors will sign the Code of Conduct along with their employment contract, which includes punitive measures against GBV, SEA, and SH upon starting employment;
- The Project Company will organize awareness-raising meetings to train all Project Management Unit and Contractor Management Unit personnel on this subject;
- Code of Conduct will be developed in compliance with the national legislation. Hard copies will be provided both in English and the native languages of the workforce;
- All workers (including expats) will be trained in their native languages about the Code of Conduct and dismissal policy in particular in criminal cases;

- Occupational Health and Safety Management Plan will be prepared by Project Company for both phases of the Project to ensure OHS issues are properly managed;
- A grievance mechanism will be developed for employees and included in the ESMS. Employees will be informed about this mechanism at the time of hiring. All employees will be trained on the use and scope of the grievance mechanism. Project Company will ensure that non-employee (subcontractor's workers) workers have access to an effective grievance mechanism that meets the requirements of the PR2. In cases where the third party is not able to provide a grievance mechanism, the Project Company will provide an effective grievance mechanism to serve workers engaged by the third party and associated facility;
- Subcontractors will also be required to follow the requirements of IFC PS2 and EBRD PR2/4. Contracts to be signed with subcontractors will include EHS requirements.
- All workers (including subcontractors) will be trained on health and safety, and "Emergency Preparedness and Response Plan" to respond timely to potential incidents;
- Insurance will be provided to all workers under Social Security Institution;
- All accidents and incidents will be recorded. The efficiency of health and safety practices will be monitored through internal and external audits and corrective actions will be taken if required.
- Labour and Working Conditions Management Plan will be developed and implemented for the Project;
- Dust emissions and noise generation will be minimized to the extent possible with the implementation of mitigation measures mentioned in Chapter 9: Air Quality and Chapter 10: Noise;
- Workers (including subcontractors) will be provided safety briefings every day before the work starts and provided with necessary personal protective equipment;
- Work permits will be required for high-risk activities such as working at heights, operation of heavy equipment and similar.
- Project Company will place and check all warnings and signs present and required to be placed as a security measure in the designated locations within the Project site. Moreover, Project Company will perform necessary security arrangements in accordance with the Turkish regulatory requirements;
- Project Company will ensure that the employed personnel fully obey all the published process instructions/manuals related to (but not limited to) safety, provisions of contract and other relevant legislation;

- Risks from hazardous material and hazardous wastes will be minimized through the Hazardous Material Management Plan and Waste Management Plan. These plans will be developed, implemented and monitored;
- Project Company will ensure that all the personnel undergo the training as stipulated in the health and safety legislation;
- Project Company will ensure that the installations, equipment, systems, buildings and utilities do not form a threat to anyone in terms of work health and safety;
- Confined space entry and working at height procedures will be prepared and implemented. Entry to confined spaces and working at height will be controlled and avoided where possible;
- The measures related to Disaster Management, which includes crisis management against unplanned events (spill, fire, leakage, etc.), will be evaluated within the EPRP and the plan will be implemented;
- Indoor air quality monitoring will be conducted, and signage will be placed to locations where there are elevated levels of emissions and personal protective equipment (PPE) is required;
- Leak Detection and Repair (LDAR) program will be applied where necessary.

7.10.3 Residual Impacts

Risks that may arise from the Project, such as occupational accidents and fire hazards, will have minimal impact on the local community and project workers if necessary, precautions are taken. Impacts on life and fire safety and impacts related to health and safety during the operation period are higher than during the construction period because the construction period of the project is longer. Thus, the probability of accidents is also high. Nevertheless, the effects during the operation period will be low if necessary precautions are taken. The Residual Impact Significances for the construction and operation phases are given in Table 7-43 and Table 7-44, respectively.

Table 7-43. Construction Phase Residual Impact Significance

Subject	Operation Phase Residual Impact
Impacts on life and fire safety	Low
Impacts related to Health and Safety	Low

Table 7-44. Operation Phase Residual Impact Significance

Subject	Operation Phase Residual Impact
Impacts on life and fire safety	Low
Impacts related to Health and Safety	Low

7.11 Labor Influx

In case when personnel or material or services required for the works to be carried out in a construction project cannot be sourced from local sources; technical personnel with adequate capacity or materials that meet international standards must be brought from outside the project area. In such cases, suppliers, potential suppliers and potential jobseekers might move to the close vicinity of the project area to provide goods and services to the Project and create an influx in the region. In order to call this situation as workforce influx, which can be observed in any project, people who will work on the project or provide goods and services to the Project should be settled quickly in the region. In such a case, people who settle in the area due the project may have a negative impact on the local population (especially if the area is rural, remote and small).

In order to avoid the negative impacts of the workforce influx and give employment opportunities to locals, Project Company will give priority to the local people in recruitment, and this will be added to the terms of the contracts of the Contractor and possible subcontractors in order to ensure this. In contract process, Project Company will request the contractor to plan the workforce and request from the contractor to prepare a Workforce Management Plan if the requirement for a workforce other than the one specified in this ESIA is seen.

7.11.1 Impacts during construction

During the construction period of the project, local and external labor will be hired. Despite the small number of workers and the provision of accommodation for workers there will be an influx of labor.

Potential receptor are employees and communities around the Project area.

Table 7-45. Construction Phase Labor Influx Impact Significances

Nature of Impacts (Magnitude designations)									
Potential Impact	**Impact Type**	**Geographical Extent (G)**	**Duration (D)**	**Intensl (I)**	**Frequency (F)**	**Likelihood (L)**	**Reversibility (R)**	**Receptor Sensitivity (S)**	**Impact Significance (Magnitude x Receptor sentitivity)**
Impacts related to Traffic	Negative Direct	The project area covers Moralı, Argavlı and Uzunkum neighbourhoods. The geographical extent is expected to be local.	The construction period is limited to 6 months.	Considering the number of employees during the construction period of the project, the influx of workers will have a major impact on the project area.	-	It is estimated that there will be no labor influx to Moralı, Agavlı and Uzunkum neighborhoods affected by the project.	After the construction period of the project is over, it is anticipated that the effect of labor influx will end in a short time.	Labor influx from the project is manageable.	**Negligible**
Score		Local	Short	Low	N/A	Unlikely	Short-Term	Medium	
Value		2	2	2	-	1	2	**3**	
Impact Magnitude (G+D+I+F (or L)) x R		**14**						**42**	

7.11.2 Impacts during operation

No accommodation will be provided by the company during the operation phase of the project, but it is anticipated that there will be labor influx considering the employees who will commute to and from the project area.

Table 7-46. Operation Phase Labour InfluxImpact Significances

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)								
			Geographical Extentl)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility (R)	Receptor Sensitivity	Impact Significance (Magnitude x Significance)
Impacts related to Labour Influx	Negative Direct	Definition	The project area covers Moralı, Argavlı and Uzunkum neighbourhoods. The geographical extent is expected to be local.	The operational period will last for 30 years. During this period, impacts on working conditions may occur.	Considering the number of employees during the operation period of the project, the influx of workers will have a major impact on the project area.	-	It is estimated that there will be no labor influx to Moralı, Agavlı and Uzunkum neighborhoods affected by the project.	After the construction period of the project is over, it is anticipated that the effect of labor influx will end in a short time.	Labor influx from the project is manageable.	Low
		Score	Local	Very Long	Low	N/A	Unlikely	Short/mid-term	Medium	
		Value	4	5	2	-	1	2	3	
	Impact Magnitude (G+D+I+F (or L)) x R		**24**						**72**	

Mitigation Measures

- The Project will provide job opportunities for the residents of nearby settlements to the extent possible;
- Code of Conduct will be developed in compliance with the Turkish legislation and international standards. Hard copies will be provided in Turkish and English. It will outline expected behaviour with respect to their daily interactions with local residents and users of public amenities. In particular, it will cover issues related to ban on alcohol and drugs use, GBVH, etc.;
- The grievance mechanism, and a designated organization (e.g. NGO) or local women organization will be used to identify and overcome problems related to GBVH, alcohol and drug use;
- The Project Company and contractors will conduct mandatory regular training and awareness raising for staff on the availability of a grievance mechanism to report cases of gender-based violence and GBV against local community members and coworkers, especially women;
- Project staff will be made aware of laws and regulations that make GBV a criminal offense subject to criminal prosecution;
- Ensure that there is representation of women on the Project team, acting as a contact person or CLO (Community Liaison Officer) for GBV issues;
- The Project Company will work closely with local authorities in investigating any complaints related to GBV in local communities involving Project staff;
- Develop a monitoring system to track GBVH activities to assess the effectiveness of controls, including monitoring GBVH related complaints and actions implemented to address them;
- Training to the Project workers will be conducted with regard to community health, safety and security issues (including on the Code of Conduct and workers' awareness of risk of sexually transmitted diseases (particularly HIV/AIDS), and on availability of confidential consultation services at the medical center(s) when an infection is suspected);
- Community Health, Safety and Security Plan will be developed and implemented;
- Temporary loss of, or access to infrastructure or services should be avoided by

providing alternative routes and roads, as necessary;

- Local communities will be informed on program and sequence of works;
- In case of using local roads for transportation, repair works will be made in collaboration with the local authorities;

- The Company will coordinate with relevant authorities and/or relevant social infrastructure facilities (health care and educational facilities, etc.) as relevant in case additional strain on these facilities is anticipated;
- Implementation of the SEP will also contribute to maintaining regular communication with affected parties and timely identification of potential issues associated with workers' influx and relevant impacts;
- The Project Company will establish and implement a grievance mechanism.

See Chapter 15.

7.11.3 Residual Impacts

Since the impact significance of the labor influx during the construction and operation phases of the Project is low, no residual impact is expected.

7.12 Land Acquisition

The land acquisition has been completed for the switchyard, drilling location and the greenhouse area located in one of the drilling areas. The lands were acquired through willing buyer willing seller arrangements and obtaining consent from individuals. There are no formal or informal users in the aforementioned areas According to interviews with shareholders, it was stated that there were no problems in obtaining the land purchase.

The route of the geothermal pipeline is planned to pass through the roads surrounding agricultural lands, so land acquisition is not anticipated. It is possible that stakeholders on the line route will be affected by construction activities or maintenance-repair activities during the construction and operation period of the project.

As given in the baseline section, the Electricity Transmission Line passes through only a single point (two shareholders) with a distance of 120 meters from private property. The project company will lease these lands under the easement right.

7.12.1 Impacts during construction

The areas designated for drilling, geothermal power plant, and greenhouse activities are currently owned by the Project Company.

The route determined for the construction of the geothermal pipeline passes through roads between agricultural lands, therefore there is no need for land acquisition/expropriation. However, during the construction, if there is a boundary violation or a need for additional land arises, agricultural lands may be affected, and land acquisition or expropriation may be necessary.

This can impact property loss and the usability of the agricultural lands for landowners. The availability of agricultural land may be restricted or lost, leading to a decrease in agricultural income. Disputes may arise concerning the compensation amount and payment terms during the expropriation or land acquisition process. Environmental impacts can occur during the construction of the geothermal transmission line, especially issues such as soil erosion or contamination of water sources may arise. The construction of the geothermal pipeline can lead to issues of societal acceptance. Opposition or concerns from the local community can hinder the progress of the project.

According to the current plan, the electrical cable passes through private property and affects two individual land parcels. The Project Company will compensate for the right of passage. The Resettlement Action Plan will be used as a guide document to determine compensation and manage this process. Except for the obligation to plant long trees for security reasons, the individual's land use will not be restricted. Disputes may arise over the amount and payment terms of compensation. The right of way implies an intervention in the property rights of landowners, which can limit their use of the land and impact the value of their properties. During the duration of the right of way, proper maintenance and operation of the cables must be ensured. Maintenance deficiencies or failures can lead to risks. The Project Company should prefer a voluntary agreement with the landowners of the individual parcels; otherwise, this situation can affect the sustainability and success of the project.

The specific Resettlement Action Plan to be prepared for the project will ensure that any land acquisition and/or expropriation, if necessary, is carried out in accordance with World Bank requirements and national legislation during the construction and operation of the geothermal pipeline and electricity transmission line. The plan aims to minimize land acquisition and ensure fair valuation and compensation, especially for agricultural land.

7.12.2 Impacts during operations

Although no land acquisition is expected during the operation period, the effects and measures of any future land acquisition have been determined.

Mitigation Measures for the construction and operation period

- Prior to construction, land preparation, or maintenance work, a thorough examination and mapping of the relevant area will be conducted. This will assist in identifying field boundaries and sensitive areas. Collaboration and consultation with the local community where the work will take place are crucial. Input and opinions from the local community will be sought. Consultations with local agricultural experts will also be held.

- The work schedule will be organized taking into account agricultural seasons and harvest periods. Particularly during harvest seasons, efforts may be made to minimize interference with landowners.

- Marking sensitive areas and creating physical barriers can aid in preserving field boundaries. Temporary fences or markings can be used to limit the entry of construction or maintenance equipment into fields.

- Ensuring that construction or maintenance equipment utilizes agreed-upon safe transport routes with landowners is essential. This will help reduce damage to fields.

- In case of any damage occurring during construction or maintenance work in the construction or operational phase, fair compensation and, if necessary, repair commitments will be offered to landowners.

- Before commencing construction of pipeline, the Project Company will consult with landowners along the geothermal pipeline route and take into account the concerns and requests of the stakeholders. Additionally, the Company will create suitable crossings (omega) to not obstruct access to field entrances.

- In addition to the initially designated route, an alternative route has been planned to run parallel to the irrigation canal. The use of the alternative route will require the approval of the General Directorate of State Hydraulic Works.

- In case additional land is required for the geothermal pipeline or if it passes through the irrigation channel determined as an alternative route (on the right or left side), land owners will be determined. Stakeholder analysis will be carried out. Informal users will be identified and appropriate compensation measures will be defined when necessary. If land acquisition becomes necessary, the first choice will be purchase of land on a voluntary basis. Compensation will be determined in accordance with the current market value and the full replacement cost. In case of expropriation, the strictest standard will be applied, taking into account the legal gaps between national legislation and World Bank standards. The resettlement action plan to be prepared within the scope of the project will be the guiding document to manage this process, conduct a simple, transparent evaluation process and carry out consultations with stakeholders.

- It will be ensured that the compensation offered for the easement right is fair and equitable, taking into account the market value of the affected land for the electricity transmission line.

- Transparent and participatory negotiations will be conducted with affected landowners to reach a mutual agreement on compensation terms.

- A comprehensive social and environmental impact assessment will be conducted through the resettlement action plan to identify potential risks and impacts on affected land and its owners.

- No high-rise construction or tree planting will be allowed on the lands over which electricity wires will pass. For this reason, the project company will lease these lands under the easement right. Healthy relationships will be established with landowners and they will be encouraged to use the grievance mechanism in order to prevent any landowner from experiencing negative impacts from the project.
- Public consultations and meetings will be held with the local community to gather feedback, share project information and address questions or concerns.
- Grievance Redress Mechanism will be disclosed to the affected community and will be provided as a means of encouraging affected people to state their grievances about the land acquisition. A community liaison officer has been appointed to address concerns of affected landowners and keep them informed about the progress of the project, ensuring transparent communication throughout the life of the project.
- In the case of land acquisition in future, the Project Company will choose to directly purchase land on voluntary basis. Furthermore, land valuation will be made by independent organizations during the direct purchase process, and will be as transparent as possible by disclosing the valuation strategy.
- The Project Company will monitor the expropriation process together with the Project Manager. Conducting regular meetings with the public and keeping records of the meetings about expropriation process.
- The Project Company will organize cooperation activities with Project affected local communities. This will include social responsibility projects for the benefit of the affected community.

Table 7-47. Construction and Operation Phases Land Acquisition Impact Significances

Nature of Impacts (Magnitude designations)									
Potential Impact	**Impact Type**	**Geographical Extl (G)**	**Duration (D)**	**Intensity (I)**	**Frequency (F)**	**Likelihood (L)**	**Reversibility (R)**	**Receptor Sensitivity**	**Impact Significance (Magnitude x Significance)**
Impacts related to Land Acquisition	Negative Direct	The project area covers Moralı, Argavlı neighbourhoods. The geographical extent is expected to be local.	The construction period is limited to 6 months. And the operation period will last approximately 30 years.	Future land acquisition may lead to tangible social changes.	-	The likelihood of this happening is very low.	If a possible land acquisition/expropriation process arising from the project does not implement the land acquisition/expropriation regulations determined by the World Bank and national legislation, the livelihoods of local people may be long term affected.	Land acquisition related impacts of the project is manageable	Medium
Score		Local	Very Long	Medium	N/A	Unlikely	Long term	Medium	
Value		2	5	3	-	1	4	3	
Impact Magnitude (G+D+I+F (or L)) x R			**44**					**132**	

7.12.3 Residual Impact

The expropriation of the drilling areas and greenhouse area within the scope of the project has been completed. According to the current plan, expropriation is not foreseen for the geothermal pipeline. However, possible risks are evaluated within ESIA and mitigation methods are given. Land lease will be carried out within the scope of easement right for the electricity transmission line. The Resettlement action plan to be prepared will be used as a guiding document for future rental, land acquisition and expropriation issues for the electricity transmission line and geothermal pipeline. Therefore, it has been determined that the impacts related to land acquisition are low.

7.13 Cultural Herritage

7.13.1 Impacts During Construction

During the construction phase (land preparation and construction works) of these types of projects it is possible to discover unknown archaeological locations or findings. In this context, a potential damage to archaeological or cultural heritage elements in the project area is possible. Uninformed employees cannot identify and warn about possible chances for findings. Thus, it is possible to lose or destroy important undiscovered archaeological locations, together with potentially valuable evidence. With a properly managed chance finds procedure this impact can be mitigated.

Project Company will make efforts to avoid any temporary and/or permanent damage or loss that may occur during the construction. In addition, contracts made with contractor and sub-contractors will include clauses to cover the damages given during the construction period stemming from civil works. As required by Article 4 of Law on the Conservation of Cultural and Natural Properties (2863 Numbered Law), chance finds procedure will be implemented during land preparation and construction works.

In this context, related Civilian Authority or Museum Directorate will be informed latest in three days in case of finding any movable or immovable cultural asset by chance during construction works. Construction works will be stopped immediately. In case of result of any damage on protected areas or cultural assets due to the Project during construction phase, the damage will be compensated by the Contractor. In case of a chance find, the communication with the relevant stakeholders will be performed.

Besides, any artifacts that found during the construction works will be indicated and recorded as “chance finds”. A “Chance Find Procedure” has been prepared for the steps to be followed and implemented after the chance finding.

Potential receptor is cultural heritage around the Project area.

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Table 7-48. Construction Phase Cultural Heritage Impact Significances

Nature of Impacts (Magnitude designations)									
Potential Impact	**Impact Type**	**Geographical lent (G)**	**Duration (D)**	**Intensity (I)**	**Frequency (F)**	**Likelihood (L)**	**Reversibility (R)**	**Receptor Sensitivity**	**Impact Significance (Magnitude x Significance)**
Impacts on Cultural Heritage	Negative Direct	The project area covers Moralı, Argavlı and Uzunkum neighbourhoods. The geographical extent is expected to be local.	The construction period is limited to 6 months.	Activities during the construction phase may result in the discovery of tangible or intangible historical heritage. If necessary, precautions are not taken, these items may be damaged.	-	The likelihood of this happening is very low.	If the necessary precautions are not taken during the construction period, any piece of cultural heritage found may be damaged and irreversible.	Impacts on Cultural Heritage of the project is under control due to the Chance Find Procedure.	Low
Score		Local	Short	Medium	N/A	Unlikely	Irreversible	Medium	
Value		4	2	3	-	1	5	1	
Impact Magnitude (G+D+I+F (or L)) x R		**50**						**50**	

7.13.2 Impacts During Operation

No impacts on cultural heritage in the project area are expected during the operation phase of the Project.

7.13.3 Residual Impacts

Cultural heritage impacts from the Project are expected to be low. Therefore, no residual impact is expected.

7.14 Vulnerable/Disadvantaged Individuals and Groups

7.14.1 Impacts during construction

Based on the interviews conducted, it has been found that there are no refugees or foreigners residing in Moralı, Uzunkum, and Argavlı Neighborhoods. Furthermore, household surveys and headmen interviews carried out within the Project area indicate that no significant impacts on vulnerable groups are anticipated during the construction phase.

Sensitive receptor identified as the farm owner nearby the drilling well. According to unstructured interview, the farm owner has no complaints about the Project. Since Project Company is providing free electricity to the farm owner, relationships between them and the sensitive receptor are positive.

7.14.2 Impacts during operation

During the operation period of the Project, it is anticipated that there will be no impacts on vulnerable groups.

Mitigation Measures

- In order to ensure that vulnerable or disadvantaged groups do not suffer any harm during the construction or operation period of the project, the project company will be in constant communication with the muhtars of Moralı, Argavlı and Uzunkum Neighborhoods within the project impact area.
- In addition, a public grievance mechanism will be a platform for vulnerable and disadvantaged groups to raise their grievances.

7.15 Occupational Health and Safety

During construction, the project area may be exposed to physical hazards associated with the wells, pipeline and GPP components of the project. In addition, confined space or fall hazards may occur due to unattended infrastructure. Accidents that threaten occupational health and

safety may occur because construction sites are not fully fenced, and necessary warning signs are not posted.

Occupational exposure to geothermal gases, particularly hydrogen sulphide gas, at the project may occur during non-routine releases of geothermal fluids (e.g. pipeline failures) and maintenance work in confined spaces such as pipelines, turbines and condensers. The significance of the hydrogen sulphide hazard may vary depending on the site-specific location and geological formation.

7.15.1 Impacts during construction

Specific health and safety issues in geothermal power projects include the potential for exposure to geothermal gases, confined spaces, heat and noise.

Occupational exposure to geothermal gases, mainly hydrogen sulfide gas, may occur during non-routine release of geothermal fluids (for example, pipeline failures) and maintenance work in confined spaces such as pipelines, turbines, and condensers. The significance of the hydrogen sulfide hazard may vary depending on the location and geological formation particular to the facility. H2S gas concentrations in geothermal facilities can vary greatly. Higher concentrations mean workers and the facility are at higher risk. Therefore, every project must be carefully evaluated for the presence and concentration of H2S gas.

Wind speed and direction can affect the way H2S gas disperses. Additionally, local population and proximity to settlements may affect the potential for the hazard posed by H2S gas to spread.

Noise is mainly related to well drilling, steam flashing and venting. Other sources include equipment related to pumping facilities, turbines, and temporary pipe flushing activities. Noise abatement technology includes the use of rock mufflers, sound insulation, and barriers during drilling, in addition to silencers on equipment in the steam processing facility.

Potential receptor are communities around the Project area.

Table 7-49. Impact Significances of the Receptors during the Construction Phase-OHS

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		GeographicIExtent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility (R)	Receptor Sensitivity (Rs)	Impact Significance (Magnitude x Receptor Sensitivity)
OHS Risk / Work Accident (H2S gas release, electrical equipment failure etc.)	Negative /Direct	It covers all activities to be carried out in the project area throughout the construction. In addition, accidents may occur outside the project area (ie traffic accidents).	The construction period is limited to 6 months.	The high number of employees during the construction period of the project will have an impact on the probability of an accident in the project.	-	The risk to work accident is likely to occur at any time during the construction phase of the Project.	If the necessary precautions are not taken during the work in and around the project area, it may leave effects that will cause loss of limb or injury accidents for the employees.	In the project area, sensitivity is low as experts will work.	High
Score		Local	Short	High	-	Likely	Irreversible	Medium	
Value		2	2	4		3	5	3	
Impact Magnitude (G+D+I+F (or L)) x R		**55**							**165**

Mitigation

The Project Company will take reasonable precautions in order to prevent occupational accidents, injuries and diseases on site, including measures to reduce and prevent the risk of exposure to harmful levels of ambient factors and chemicals, as well as the risk of injury or disease that may arise from the use of equipment and machinery. Mitigation measures for construction and operation are listed below;

- Fixed and mobile detectors for H_2S gas should be used.
- Fire precautions for flammable liquids used as working fluid in facilities (bi-binary systems) should be increased. Cooling-extinguishing measures must also be developed for the stock tanks of these liquids.
- Unauthorized persons must be prevented from accessing the field during drilling operations.
- Non-employees should not be allowed close to the drilling machine during drilling operations.
- Implementing safety measures in the crane zone during lifting operations, including those involved in drilling, construction, and facility installation, clearing the area, and refraining from passing materials over other workers.
- During the drilling and construction phases, there is frequent use of heavy vehicles such as trucks and cranes. Vehicles and machines are to be manoeuvred under supervision.
- Minimizing the duration of tasks conducted in high-temperature settings and guaranteeing availability of drinking water.
- Protecting surfaces where workers interact closely with heated machinery such as generators and pipes.
- Employing suitable personal protective gear, including insulated gloves and footwear.
- Enforcing relevant safety protocols throughout the exploratory drilling procedure.
- No employee should endure exposure to noise levels surpassing 85 dB(A) for more than 8 hours daily without the use of hearing protection. Additionally, unprotected ears should not be subjected to peak sound pressure levels exceeding 140 dB(C).
- The proactive enforcement of hearing protection is mandated when the equivalent sound level over 8 hours reaches 85 dB(A), peak sound levels reach 140 dB(C), or the average maximum sound level hits 110 dB(A). The provided hearing protective devices must be capable of reducing ear sound levels to at least 85 dB(A).
- While it is preferable for individuals to use hearing protection for any duration of noise exposure exceeding 85 dB(A), an equivalent level of protection can be achieved, although less conveniently, by limiting the duration of noise exposure. For every 3

dB(A) increase in sound levels, the permissible exposure period will be reduced by 50 percent.

- Regular medical hearing assessments will be conducted for workers exposed to elevated noise levels.
- Implementation of engineering and administrative control measures to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits.

7.15.2 Impacts during operation

During geothermal power plant operation, there are several occupational health and safety considerations that need to be addressed to ensure a safe working environment for employees. Some of the potential effects and concerns related to occupational health and safety in geothermal operations are as follows:

- Geothermal power plants operate in high-temperature settings, and employees may be exposed to elevated heat levels. This can lead to heat-related illnesses, such as heat exhaustion and heatstroke.
- Geothermal fluids may contain hazardous chemicals, including hydrogen sulfide (H2S) and other toxic substances.
- Power plant operations, including drilling and machinery, can generate significant noise levels.
- Geothermal power plants involve electrical equipment, which can pose electrical hazards.
- In areas with geothermal activity, there may be a risk of induced seismicity due to fluid injection or extraction.
- Engineering measures should be taken to prevent noise during the drilling and operation phases. This can help to reduce worker exposure to noise and appropriate personal protective equipment should be provided.

Table 7-50. Summary of Impact Significances of the Receptors during the Operation Phase-OHS

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geograplal Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility (R)	Receptor Sensitivity (Rs)	Impact Significance (Magnitude x Receptor Sensitivity)
OHS Risk / Work Accident (H_2S gas release, electrical equipment failure etc.)	Negative /Direct	It covers all activities to be carried out in the project area throughout the construction. In addition, accidents may occur outside the project area.	The construction period will last 30 years	Occupational accidents that may be caused by geothermal, electric shock, noise and H_2S gas explosions may occur during operation.	-	The OHS risk is likely to occur at any time during the operation phase of the Project.	Potential impacts related to OHS Risk are expected to be irreversible.	In the project area, sensitivity is low as experts will work.	**High**
Score		Local	Very Long	High	-	Likely	Irreversible	Medium	
Value		2	5	4		3	5	3	
Impact Magnitude (G+D+I+F (or L)) x R		**70**						**210**	

Mitigation

- Entrances to electricity generation and connection sections must be prevented during the operational phase.
- An Explosion Protection Document should be prepared for potential H_2S gas explosions originating from production in the facilities or explosions caused by liquids used in the process.

7.15.3 Residual Impacts

During the construction and operation phase, by carrying out suggested mitigation measures, periodic inspections, implementing a functional Occupational'Health and Safety (OHS) management system, and adopting appropriate measures, the project's impact on occupational health and safety can be reduced to a minimum.

Table 7-51. Construction Phase / Operation Phase Residual Impact Significances

Subject	Residual Impact
Impacts related to OHS Risk/Work Accident	Medium

7.16 Community Health, Safety, and Security

7.16.1 Impacts during Construction

The risk that the Project will pose to public health and safety is expected to be mostly in the construction phase. During the construction phase of the project, nearby residents might face adverse effects from dust, noise, H2S emissions, and air pollutants. Moreover, heavy vehicles traveling to and from the site could damage the roads and disrupt daily life in the neighborhoods. Pollutants originating from the vehicles and equipment to be used during the construction phase, waste storage, dust generation, odor and noise may pose a risk to the society. To ensure safety, it is essential to implement proper fencing around the construction area to prevent potential accidents and unauthorized access by neighborhood residents.

Vehicles such as trucks and construction equipment to be used in construction works will cause traffic problems. A plan for mitigation will be implemented in order to reduce the accidents related to the increase in traffic.

Another risk would be community encroachment to the active worksites. This may include gender-based violence (GBV) and sexual exploitation and abuse/sexual harassment (SEA/SH). Sexual Exploitation and Abuse (SEA) is defined as the actual or attempted abuse of a position of vulnerability, differential power or trust for sexual purposes, including, but not limited to, for monetary, social or political gain from the sexual exploitation of another person. Sexual exploitation is also defined as "actual or threatened physical assault of a sexual nature by force or under unequal or coercive circumstances".

Sexual Harassment (SH)) is defined as unwanted sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature.

SEA occurs against a beneficiary or community member. On the other hand, SH occurs between staff of an organization or company and any unwelcome sexual advances or unwelcome verbal or physical conduct of a sexual nature. The distinction between the two is important so that the organization policies and staff training may include specific instructions on each reporting procedure.

The concept of consent is crucial in the context of SEA and SH, signifying an individual's voluntary decision regarding any action that may affect them physically or emotionally. Any sexual activity in which an individual's consent is not within the scope renders such an action a criminal offense.

The risks associated with these issues would be mitigated to low significance through implementation of mitigation measures presented in Section 5.7.2.1. Mitigation measures related to community health and safety are also provided in Table 7 1.

Potential receptor are communities around the Project area.

Table 7-52. Construction Phase Community Health and Safety Impact Significances

Potential Impact	Impact Type	Nature of Impacts (Magnitude designations)							
		Geogrlical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility (R)	Receptor Sensitivity	Impact Significance (Magnitude x Significance)
Impacts on community health	Negative Direct	Community health impacts during the construction period will be locally limited.	The construction period is limited to 6 months.	Expected impacts on community health is within legal standards or accepted practices and is unlikely to result in tangible changes to the social component.	During the construction phase of the project, a few events evenly or randomly distributed over time. There is no major negative impact is expected.	-	Activities concerning community health during the construction period will end with the completion of the construction.	Residential area and residential buildings in the vicinity of the Project area	Low
Score		Locally	Short	Medium	Recurrent	N/A	Short-term	Medium	
Value		2	2	3	3	-	1	3	
Impact Magnitude (G+D+I+F (or L)) x R		**10**						**30**	
Impacts on life and fire safety	Negative Direct	Life and fire risks impacts during the construction period will be locally limited	The construction period is limited to 6 months.	During the construction phase of the project, depending on the area where the fire has spread, risks may arise that may affect especially construction workers and local people.	-	The risk to life or fire is likely to occur at any time during the construction phase of the Project.	After the finish of the construction works, there will be no risk associated with the construction of the Project. It may not be possible to reverse the life safety and fire related impacts of the necessary plans and procedures are not followed.	Residential area and residential buildings in the vicinity of the Project area	High
Score		Local	Short	Very High	N/A	Likely	Irreversible	Medium	
Value		2	2	5	-	3	5	3	
Impact Magnitude (G+D+I+F (or L)) x R		**60**						**180**	

Mitigations

- Development and implementation of Community Health, Safety and Security Plan for the Project construction stage;
- Protective barriers / fences with warning signs will be provided at the construction sites;
- Security personnel will be provided at the main construction sites and/or regular patrol inspections shall be arranged in the area to prevent unauthorized access;
- Development and implementation of the Code of Conduct which will include but not be limited to the following aspects:
    - Respect and polite attitude to the local residents and other stakeholders;
    - Prevention of harm to property of local residents and local environment;
    - Restrictions on use of alcohol and drugs;
    - Neutral attitude and non-involvement in any situations which may lead to potential conflict;
    - Respect to cultural heritage of the local population;
- Provision of induction training for personnel of the Company and contractors on the issues of interaction with local people;
- Training will be implemented to make personnel aware of the risk of transmitted diseases (particularly HIV/AIDS, tuberculosis, STDs), and on availability of confidential consultation services at the medical center(s) – particularly when an infection is suspected;
- Specific healthcare clinics providing sexual health testing will be identified for the Project and communicated to workers;
- Condoms will be available to the workers on open access at the on-site medical center(s) where any worker may take it anonymously;
- Provide hygiene materials for free and monitor the use of preventive tools for Covid-19. Conduct periodic medical checks for personnel and provide opportunity for vaccination and/or other mitigating measures when required;
- Conducting information disclosure and consultation activities with communities and other stakeholders in line with the Stakeholder Engagement Plan (SEP). The stakeholder engagement activities will include the community meetings with the vulnerable and marginalized groups such as children and young persons (including visits to schools) and local postings to inform the public regarding the relevant hazards for particular locations;
- Details of the nature of the emergency will be communicated and the EPRP Plan will be published and made accessible for the local communities;

- The structural elements and components of the Project will be designed and built according to national regulations and international best practice. All structures will be built taking into account the regulatory requirements. Regarding design of the buildings within the Project site, the Building Earthquake Regulation of Türkiye (O.G. date/no: 18.03.2018/30364) will be complied with during all construction works at the terrestrial section within the Project site. Strict adherence to the design codes and standards are required. Similarly, provisions of Technical Earthquake Regulation on Construction of Coastal and Marine Structures, Railways, Airports (O.G. date/no: 18.08.2007/26617) will be followed during construction of the marine section. As reported by the Project Company, propane tank is designed as such seismic isolators will be used to reduce seismic risks. The impact significance related to seismic risks can be taken as negligible given that the structures will be designed and built according to appropriate legislation and standards and seismic isolators will be placed at the propane tank;
- To control emissions, techniques may need to be implemented. For example, chemical processes for H2S removal or filtration and purification systems can be used to reduce air pollutants. It is important to inform and engage the local community about the risks of H2S'and air pollutant emissions. This is necessary to address concerns and enhance the community's trust in the project;
- Emissions and environmental impacts should be monitored and reported regularly. This helps in evaluating the project's environmental performance. Plans should be developed for emergencies such as H2S leaks or air quality issues. This ensures a rapid response;
- Pursuant to Regulation on Prevention of Major Industrial Accidents and Mitigation of Resulting Impacts (O.G. Date / No: 02.03.2019/30702), a Safety Management System shall be established, and Safety Report and Internal Emergency Plan shall be prepared. The abovementioned Emergency Preparedness and Response Plan to be developed within the scope of the ESMS system will be integrated into the internal emergency plan.

7.16.2 Impacts during operation

Failure to properly dispose of wastes during the operation phase may pose a risk to community health and safety. In addition, the uncontrolled processing of the waste sludge that will arise during the operation phase will reveal the possibility of increasing the impacts.

Traffic during the operation phase will have less impact compared to the construction phase.

Potential receptor are communities around the Project area.

Table 7-53. Operation Phase Community Health and Safety Impact Significances

Potential Impact	Nature of Impacts (Magnitude designations)								
	Impact Type	GIraphical Extent (G)	Duration (D)	Intensity (I)	Frequency (F)	Likelihood (L)	Reversibility (R)	Receptor Sensitivity	Impact Significance (Magnitude x Significance)
Impacts on community health	Negative Direct	Community health impacts (transport of hazardous materials) will be locally limited.	The operation period will last approximately 30 years. Therefore, the impact is very long.	Incidents during transport of hazardous materials may result in exceedances of legal standards or accepted practices.	-	If the plans and procedures prepared for the Project are not followed, the likelihood of impacts will increase.	If the necessary precautions are not taken incidents during transport of hazardous materials can leave irreversible impacts for the communities.	Residential area and residential buildings in the vicinity of the Project area	**High**
Score		Locally	Long	Very High	N/A	Likely	Irreversible	Medium	
Value		2	4	5	-	3	5	3	
Impact Magnitude (G+D+I+F (or L)) x R		**70**						**210**	
Impacts on life and fire safety	Negative Direct	Impacts is expected to remain at the local level.	Life and fire safety risks will exist throughout the operational period.	If the plans and procedures prepared for the Project are not followed, the intensity of the impacts may increase.	-	If the plans and procedures prepared for the Project are not followed, the likelihood of impacts will increase.	It may not be possible to reverse the life safety and fire related impacts of the necessary plans and procedures are not followed.	Residential area and residential buildings in the vicinity of the Project area	High
Score		Local	Very long	High	NA	Likely	Irreversible	Medium	
Value		2	5	4	-	3	5	3	
Impact Magnitude (G+D+I+F (or L)) x R		**70**						**210**	

Mitigation

- Details of the nature of the emergency will be communicated and the EPRP Plan will be published and made accessible for the local communities;
- All hazardous materials will be stored in designated areas having secondary containment and handled with care by authorized staff in order to prevent potential spills in accordance with the Hazardous Material Management Plan to be prepared and applied;
- Provide hygiene materials for free and monitor the use of preventive tools for Covid-19;
- Conduct periodic medical checks for personnel and provide vaccination and/or other mitigating measures when required;
- A Community Health, Safety and Security Plan is required for the operation phase and should include detailed risks, mitigation measures and monitoring actions associated with the specific phase of the Project;

- To control emissions, techniques may need to be implemented. For example, chemical processes for H2S removal or filtration and purification systems can be used to reduce air pollutants. It is important to inform and engage the local community about the risks of H2S and air pollutant emissions. This is necessary to address concerns and enhance the community's trust in the project;
- Emissions and environmental impacts should be monitored and reported regularly. This helps in evaluating the project's environmental performance. Plans should be developed for emergencies such as H2S leaks or air quality issues. This ensures a rapid response.

7.16.3 Residual Impacts

Mitigation measures are expected to minimise such impacts to short and intermittent events that will be reversible in a short-term by the effect of the natural processes. The Residual Impact Significances for the construction and operation phases are given in Table 7 55 and Table 7 56, respectively.

Table 7-54. Construction Phase Residual Impact Significance

Subject	Construction Phase Residual Impact
Impacts on life and fire safety	Low

Table 7-55. Operation Phase Residual Impact Significance

Subject	Operation Phase Residual Impact
Impacts on community health	Low
Impacts on life and fire safety	Low

7.17 Cumulative Impacts/Risks

There are a total of three facilities within the impact area: one geothermal power plant (GPP) currently under construction, one geothermal greenhouse (under operation), and one additional geothermal power plant (GPP) that falls within the impact area but does not directly overlap with the other facilities. These facilities are shown on the satellite image (Figure 7-1) as follows:

- Kubilay Geothermal Power Plant (Operational), owned by Beştepeler Enerji Üretim Tic. A.Ş.
- Geothermal Greenhouse (Operational), owned by PACO Tarım Ürünleri San. ve Tic. A.Ş.
- ALDO Geothermal Power Plant (Under Construction), owned by Aldo Enerji San. ve Tic. A.Ş.

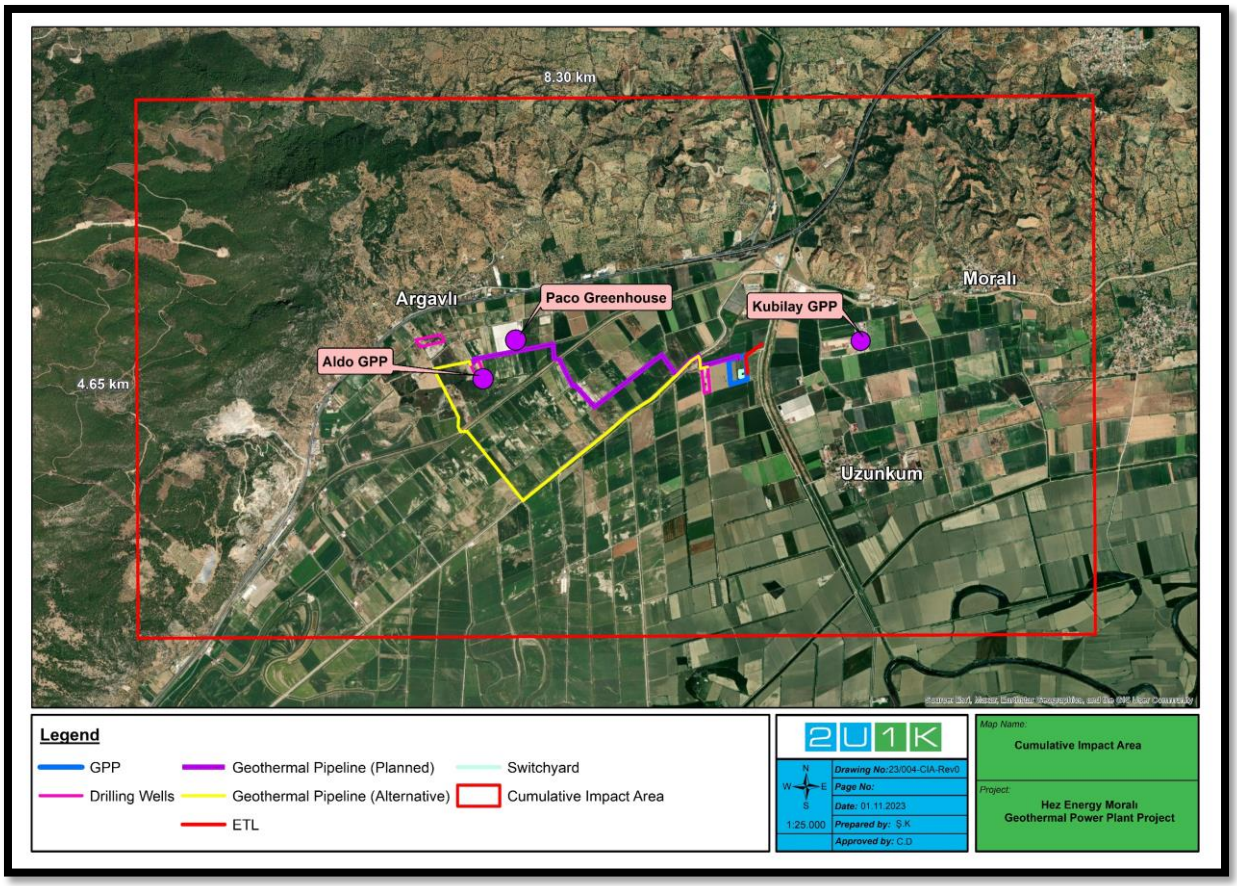

Figure 7-1. Facilities in Cumulative Impact Area

The cumulative impact assessment takes into account the combined effects of all these facilities during their respective construction and operational phases on the surrounding environment.

During the operation of the GPP and greenhouse, there are potential impacts on both surface and groundwater resources. The direct discharge of wastewater during failures and poor maintenance may lead to adverse effects on the quality of surface and groundwater. Casing failures in production or reinjection wells can create pathways for geothermal fluids to mix with groundwater at shallow levels, potentially affecting the productivity and quality of shallow groundwater aquifers.

To mitigate these impacts, it is important to install monitoring wells to track groundwater composition and temperature, especially if important freshwater aquifers overlay the geothermal reservoirs under production. Proper casing design and regular monitoring can help prevent casing leakages, reducing the potential harm to groundwater quality. Additionally, careful planning and design of the reinjection process can help increase the amount of heat that can be extracted from the reservoir while minimizing the cooling effects.

Furthermore, during the operation of geothermal energy plants and greenhouse activities, the geothermal fluid carries heavy metals and toxic chemicals such as arsenic, lead, zinc, boron, along with significant amounts of carbonates, silica, sulfates, chlorides, and gases like carbon dioxide (CO_2) and hydrogen sulfide (H_2S). Proper management and disposal of geothermal fluids, particularly re-injection, are crucial to prevent the release of harmful substances into the environment. Regular analysis of the geothermal fluid can provide valuable information about the concentration of dissolved gases and chemicals, aiding in their proper handling.

Emissions to the atmosphere from geothermal energy plants mainly consist of non-condensable gases (NCGs), which are released during the discharge of non-condensable gases in the steam flow. These gases mainly consist of carbon dioxide (CO_2) (98-99%) along with trace amounts of methane (CH_4), hydrogen sulfide (H_2S), hydrogen (H_2), nitrogen (N_2), oxygen (O_2), argon (Ar), ethane (C_2H_6), propane (C_3H_8), and other non-condensable gases. Among these, carbon dioxide (CO_2) and hydrogen sulfide (H_2S) are the parameters that need to be assessed from an air quality perspective. Monitoring and detection systems, including fixed and portable detectors, will be installed within the facility to dete266rganizationsulfide (H_2S) gas.

8 STAKEHOLDER ENGAGEMENT

A stakeholder is defined as any person, organization or group that may be affected by the project or has an interest in the project and its impacts. Stakeholder participation is considered a critical element in the project. It can significantly influence the project's success and sustainability. Engaging stakeholders allows for a more effective project design and implementation by considering the needs and concerns of local communities.

Moreover, stakeholder participation helps ensure the project is more readily accepted by the community, enhancing its long-term success. It is essential to exert special effort in identifying disadvantaged and vulnerable stakeholders who may be disproportionately or differently affected by the project or may face difficulties in participating in development processes.

Vulnerable groups are people who might be directly and differentially or disproportionately affected by a Project because of their disadvantaged or vulnerable status. This disadvantaged or vulnerable status may stem from an individual's or group's race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status (IFC PS1)

The identification of stakeholders is an ongoing process that requires regular review and updates. Different issues are likely to concern different stakeholders. Therefore, stakeholders are grouped according to their connection to the subproject. Understanding a stakeholder group's connections to the project helps identify key objectives of engagement.

A Stakeholder Engagement Plan (SEP) has been prepared for this project in order to identify project stakeholders and create participation methods for the future of the project. Internal and external stakeholders (including vulnerable individuals/groups) are defined in the table below to identify which stakeholders will be directly or indirectly" - positively or negatively - affected ("affected parties") or have an interest in the project ("other interested parties").

Of the stakeholders within the affected party, the key primary stakeholder group will be the local communities around the Project site including neighbouring land users (particularly related to impacts during construction), those directly affected by land acquisition and the general public.

Interested parties include authorities at national, regional and district level, and non-governmental organizations (NGOs). A number of different have been identified for the Project with responsibilities and interests relevant to the Project and its impacts.

Information on the vulnerable groups were obtained from the Community Level Survey with the head of neighborhoods. The criteria used for evaluating an individual or group as vulnerable was based on the IFC definition described above and included:

- Race;
- National or social origin;
- Color;
- Language;
- Age;
- Disability;
- Poverty
- Civil Status;
- Living off the unique resources of a project area.

Table 8-1 presents the interested and affected stakeholders within the scope of the Project. Table 8-2 presents the needs of stakeholders.

Table 8-1. Stakeholder Groups

Stakeholder Groups	Stakeholder Type	Impact/Interest Reason	Impact/ Interest Level
Internal Stakeholders			
• Project Company	Project-affected party	Project Development, Implementation and Employment	High
• Project Workers (including contractor workers)	Project-affected party	Employees who will ensure the realization of the Project during construction	High
Government / Authorities			
• Aydın City Health Authority • Aydın Provincial Directorate of Family and Social Services • Aydın Provincial Directorate of Environment, Urbanization and Climate Change • Aydın Metropolitan Municipality • Germencik Municipality • Aydın Provincial Directorate of Agriculture and Forestry • Germencik District Directorate of Agriculture and Livestock	Project-interested party	Local government authorities responsible for health, environment, social services in Aydın province	Medium

Stakeholder Groups	Stakeholder Type	Impact/Interest Reason	Impact/ Interest Level
• Germencik District Health Directorate			
Sensitive Receptors			
• Yörük Ali Baba Restaurant • 2 Farms	Project-affected party	Affected by dust, noise and traffic intensity during the construction and operation phases of the project	High
Neighbourhood			
• Moralı Neighbourhood • Argavlı Neighbourhood • Uzunkum Neighborhood	Project-affected party	Commissioning, Potential noise and dust emission during the construction phase	High
Landowners			
• Neighboring land owners in the geothermal pipeline • 2 shareholders through whom the electricity transmission line passes	Project-affected party	Being affected in case of any land acquisition	High
Local and National Media			
• Local and National Media	Project-interested	Delivering news at local and national level	High
Vulnerable/Disadvantaged Groups			
• Seasonal workers • Low income group • Female household head • Mentally and/or physically handicapped • People who are aged 70 and living alone	Project-affected party	Commissioning, Potential noise and dust emission during the construction phase, project design to consider the special needs of vulnerable groups	High
Associations / Non-Governmental Organizations			
• National and international non-governmental organizations	Project-affected party	Non-governmental organizations working on environmental protection	High

Table 8-2. Project Stakeholder Needs

Community	Stakeholder group	Key characteristics	Language needs	Preferred notification means (e-mail, phone, radio, letter)	Specific needs (accessibility, large print, child care, daytime meetings
Moralı, Argavlı and Uzunkum Neighbourhoods	Project affected settlements	Being within the impact area of the project	Turkish	Written information, phone, face to face	Be aware of project phases. To be informed about the plans and activities within the scope of the project
Sensitive Receptors	Two (2) farms and one restaurant	Being affected by the activities during the construction and operation periods of the project	Turkish	Written information, phone, face to face	Be aware of project phases
Neighboring land owners in the geothermal pipeline 2 shareholders through whom the electricity transmission line passes	Landowners	Being economically affected in case of any land acquisition	Turkish	Written information, phone, face to face	Establishing transparent communication when it comes to any land acquisition
Vulnerable/ Disadvantaged Groups	Seasonal workers Low income group Female household head Mentally and/or physically handşcapped People who are aged 65 and living alone	Individuals with the potential to be more affected by project work	Turkish	Written information, phone, face to face	Be aware of project phases,
Associations / Non-Governmental Organizations	National and international non-governmental organizations	Non-governmental organizations working on environmental protection	Turkish	Written information, phone, face to face	Be aware of project phases,

8.1 Stakeholder Engagement Approach

The parties that may be directly or indirectly affected by the project will be considered when identifying stakeholders. Addition of new stakeholders will be unhindered throughout the project lifecycle. New stakeholders will be added if deemed necessary by the project company upon feedback or if requested externally.

To ensure constant stakeholder engagement in the project, the Project Company will:

- Use stakeholder engagement tools to disclose information about the project progress,
- Follow up any feedback for being able to handle environmental and social risks,
- Take mitigation measures against risks,
- Keep communication channels open to allow stakeholders to convey their concerns of any kind, and
- Implement grievance redress mechanism procedures.

The engagement process will be continued in all phases of the project.

8.2 Stakeholder Engagement Tools

A range of tools will be used for stakeholder engagement within the scope of this Project. Stakeholder engagement will continue using these already established communication mechanisms, with new mechanisms employed as required to ensure efficient and effective engagement throughout the life of the Project. The Project has and will continue to use the following methods for engaging with stakeholders:

- Informal/formal face-to-face or online meetings with affected communities and other stakeholders –can be the main form of consultation throughout the lifetime of the Project. Stakeholders will be informed about these consultation meetings by telephone, brochures, posters, and e-mail. The meeting or any information sharing activity to be held with the stakeholders will be informed to the parties ten (10) days in advance.
- Project Company website – a publicly available site for project announcements, documents, reports, etc. The SEP documents prepared for the Project will be published in English and Turkish via the Project website. Information on the application of the grievance redress mechanism created by the Project Company will be also announced on the website together with the contact details of the GRM responsible person. At the same time, all up-to-date information about the Project will be made available to the public via the website.
- Written materials – Handbooks, banners, brochures, leaflets, posters, informative booklets, etc. to enable stakeholders to learn about the Project. – Materials will provide information about the Project and inform Stakeholders about all communication methods and stakeholder engagement tools created for the Project.
- Grievance Redress Mechanism – aimed particularly at directly affected stakeholders. The mechanism has been and will continue to be widely disclosed to the affected public.
- Media advertisements – invitations to participate in meetings, information disclosure, etc.

8.3 Previous Stakeholder Engagement

According to analyses of social experts, it has been determined that the residents living in Argavlı, Uzunkum and Moralı Neighbourhoods will be affected by the Project. In accordance with Article 9 of the EIA Regulation dated 25.11.2014 and numbered 29186 regarding the project within the 3 EIA areas subject to the EIA Application File, a Public Participation Meeting was held at 14.00 on 24.01.2022 at the address of Uzunkum Mahallesi, Uzunkum Street, Muhtarlık Binası, Germencik/Aydın, determined by the Ministry of Environment, Urbanisation and Climate Change, to inform the public about the project and to receive their opinions and suggestions regarding the Project.

The date, time and place of the meeting were announced 10 days before the date of the meeting in 2 separate local and national newspapers. Announcements regarding the meeting were made by the mukhtars' offices and announcement texts were posted on the notice boards, announcement texts were announced on the notice boards of Germencik District Governorship. Public participation within the scope of the process, brochures containing information about the project were distributed.

The meeting was attended by:

- Aydın Governorship;
- Representative of the Ministry of Environment, Urbanization and Climate Change;
- Germencik mayor's office;
- Representatives of political parties;
- Citizens who are members of non-governmental organizations such as AYÇEP, Germencik Environment and Nature Association, Aydın Environment and Culture Association;
- Members of the local press;
- Local people and citizens from surrounding neighbourhoods (Argavlı, Moralı, Mursallı, Hıdırbeyli) and districts;
- Lawyers from the Aydin Bar Association;
- Çevtaş Research Technology Mining Engineering Consultancy Landscaping Training Consultancy Contracting Tic. Ltd. Sti. Representatives;
- Project company representative.

Representatives of Project Company made a presentation on the Project. The presentation provided detailed information on the Project location, scope of activities, social and environmental impacts and mitigation measures, Reasons for needing the project, the legislative framework with which the project will comply, possible environmental impacts during

the construction and operation phase, contact information for suggestions and opinions of the participants.

8.4 Future Stakeholder Engagement

Stakeholder engagement will continue throughout Project's lifespan. Key stakeholders will be kept informed about the progress of the Project, have the opportunity to provide feedback on the effectiveness of mitigation and enhancement measures, and to raise any concerns or grievances.

Information to be shared with the implementation of this Report will include (but is not limited to) the following:

- the impacts that have been identified as a result of the Project,
- the impacts and mitigation or enhancement measures that are being implemented,
- roles and responsibilities,
- monitoring and management measures, and
- information on the grievance redress mechanism for the Project.

The Project Company will engage with the affected stakeholders and other interested parties as structured by this Plan.

The level of engagement and measures taken to prevent lack of information / misleading information will be closely followed during the monitoring phase of the Project.

The Project Manager will be responsible for engagement with stakeholders as an on-going process throughout the life of the Project.

Grievances can be an indication of growing stakeholder concerns (real and perceived) and can escalate if not identified and resolved. Identifying and responding to grievances supports the development of positive relationships between projects, communities, and other stakeholders.

With the implementation of this Report, the formal grievance redress mechanism will be established for internal/external stakeholders at no cost and will not impede access to other judicial or administrative remedies.

Internal and external stakeholders will be able to share their opinions and grievances via a range of options such as Project Company's website, letters, and face to face meetings with the implementation of the Stakeholder Engagement Plan.

Grievance procedures will be coordinated through the Project Manager, which is the primary interface between the community and the Project Company. Confidentiality procedures will be put in place to protect the complainant, as appropriate.

8.5 Grievance Redress Mechanism

The purpose of the Grievance Redress Mechanism (GRM) is foremost to give access to a problem-solving procedure to Project affected people including affected communities and project workers. Grievances can be an indication of growing stakeholder concerns and can escalate if not identified and resolved. Identifying and responding to grievances supports the development of positive relationships between Project worker's, local communities, and other stakeholders.

The structured GRM will ensure that grievances associated with the Project are addressed through a transparent and impartial process. From the early stages of the Project lifecycle, the grievance procedure has been and will continue to be disclosed to the public through individual or group meetings, printed materials, notice boards.

The grievances will be acknowledged by the GRM officer or CLO assigned by the Project Company and timeframe for the provision of response or for further consideration will mainly depend on the complexity of the issue raised, however, ideally, it is expected to not exceed 14 days after receiving the grievance.

The methods used to publicize the availability of the grievance redress mechanism should be culturally appropriate and in accordance with how stakeholders usually acquire information. Women and men may access information differently and it needs to be ensured that both have equal access to information. Stakeholders will be able to share their opinions and grievances via a range of options such as letters, e-mail, grievance boxes, and face to face meetings throughout the Project's lifespan.

All stakeholders initiating a grievance will have an opportunity to claim their case in a confidential manner. The Project Company will ensure that the name and contact details of the complainant are not disclosed without their consent.

If the stakeholder fail to reach a satisfactory solution through the channels provided above, they will be able to reach the Presidency's Communication Centre (CİMER), the Foreigners Communication Center (YİMER) and the relevant legal institutions.

Presidency's Communication Center (CİMER):

- CİMER Website (www.cimer.gov.tr);
- CİMER Call Center (150) ;
- CİMER Phone Number: +90 312 525 55 55 - Fax Number: +90 312 473 64 94;
- Mail addressed to Republic of Türkiye, Directorate of Communications;
- Individual applications at the community relations desks at governorates, ministries and district governorates.

Foreigners Communication Center: The Foreigners Communication Center (YİMER) has been providing a centralized complaint system for foreigners:

- YİMER Website (www.yimer.gov.tr);
- YİMER Call Center (157) ;
- YİMER Phone Number: +90 312 5157 11 22 - Fax Number: +90 312 920 06 09;
- Mail addressed to Republic of Türkiye, Directorate of Communications;
- Individual applications at the Republic of Türkiye General Directorate of Migration Management.

Applicants whose complaints could not been resolved through existing grievance redress mechanism or whose complaints contain sensitive issues can always apply to the relevant legal institutions. Relevant Institutions can be summarized as, but not limited to, as follows:

- Civil Courts of First Instance;
- Administrative Court;
- Commercial Courts of First Instance;
- Labor Courts, and;
- Ombudsman (https://ebasvuru.ombudsman.gov.tr/).

In case a sensitive complaint ((Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Gender Based Violence (GBV)) is received by the Contractor they will be responsible for conveying the issue directly to the Project Company GRM focal point. The Project Company is also responsible for forwarding sensitive complaints to the bank immediately.

The GRM official who will manage the Grievance Redress Mechanism will be knowledgeable about the guidelines prepared by the World Bank to prevent sexual exploitation, abuse and harassment cases for the projects financed under construction works. Grievances of gender-based violence, exploitation and harassment can result in a culture of silence due to negative reactions from the community. For the avoidance of this, it is highly important that the stakeholders raise the grievances involving these issues about the Project anonymously. In addition, the authorities handling the grievances should address such issues with in confidence and by an unbiased approach[18].

The Project Company will provide training on SEA/SH and GBV cases and prevention methods to both its own staff and contractor personnel (including the Management Unit).

[18] https://thedocs.worldbank.org/en/doc/741681582580194727-0290022020/original/ESFGoodPracticeNoteonGBVinMajorCivilWorksv2.pdf

8.6 Grievance Register

All incoming grievances will be reflected in a Grievance Log to assign an individual reference number. Verbal complaints will also be recorded in the grievance log by the GRM officer.

The Grievance Log will also be used to track the status of a grievance, analyses the frequency of complaints arising, typical sources and causes of complaints, as well as to identify prevailing topics and any recurrent trends.

All complaints will be recorded in the respective Grievance Log with the following information:

- Grievance reference number,
- Date of the grievance,
- Location where the grievance was received and in what form (for grievance boxes),
- Complainant's contact details (in case of non-anonymous grievances)
- Content of the grievance,
- Parties responsible for the addressing the issue,
- Dates when the investigation of the grievances initiated and completed,
- Results of the investigation,
- Information on the proposed corrective actions to be sent to complainant (in case of non-anonymous) and the date of the sent,
- Deadlines for required actions by the Project staff,
- Indication on whether the corrective action was satisfactory or a reason for non-resolution of the grievance,
- The of the close-out, and;
- Any outstanding actions for non-closed grievance cases.

8.7 Roles & Responsibilities

Responsibilities of the GRM officer include but not limited to:

- Ensure the GRM complies fully with all employment legislation;
- Ensuring the GRM is reviewed on a regular basis as a result of changes to employment legislation and lessons learned from its operation;
- Communicate the GRM to all direct and indirect employees through means of communications structured for the Project;
- Ensure the GRM is a dedicated topic during the new employee orientation;

- Provide confidential advice to employees on matters they are reluctant to discuss with their Supervisor;
- Provide advice and support to Subcontractor supervisors and management on their roles and responsibilities for the successful implementation and operation of the GRM;
- Acceptance of issues from employees;
- Log of issues.

8.8 Grievance Procedure

8.8.1 Public Grievance Redress Mechanism

Complaints should be reviewed as soon as possible in order to prioritize for resolution. Regardless of general response and resolution timeframes, some complaints may require immediate attention, for example, an urgent safety issue or where it concerns the livelihood of locals.

There are 10 steps that complete the grievance redress mechanism. This process has been detailed in the text below:

Step 1: Identification of grievance through personal communication with appropriately trained and advertised by GRM Officer.

This could be in person, by phone, letter, grievance boxes or email.

Step 2: Grievance is recorded in the 'Grievance Log' (paper and electronic) within one day of identification. The grievance log will managed by the assigned GRM Officer. The significance of the grievance will then be assessed within five to seven days.

Significance Criteria is outlined in the list below:

Level 1 Complaint: A complaint that is isolated or 'one-off' (within a given reporting period - one year) and essentially local in nature.

Note: Some one-off complaints may be significant enough to be assessed as a Level 3 complaint e.g., when a national or international law is broken (see Level 3).

Level 2 Complaint: A complaint that is widespread and repeated (e.g., noise from the facilities, dust, etc.).

Level 3 Complaint: A one-off complaint, or one which is widespread and/or repeated that, in addition, has resulted in a serious breach of the Project's policies or National law and/or has led to negative national/international media attention, or is judged to have

the potential to generate negative comment from the media or other key stakeholders (e.g., inadequate waste management).

In the case the complaint is assessed to be out of the scope of the Grievance Redress Mechanism, a grievant should be notified through the desired communication method and an alternative mode of solutions should be suggested.

Step 3: Grievance is acknowledged through a personal meeting, phone call, grievance boxes or letter as appropriate, within a target of 14 working days after submission (except the complaints that require immediate attention). If the grievance is not well understood or if additional information is required, clarification will be sought from the complainant during this step.

Step 4: The GRM Officer is notified of Level 1, 2 or 3 grievances the Project Company is notified of all Level 3 grievances. The senior management of Project Company, as appropriate, supports the Project Manager in deciding who should deal with the grievance, and determines whether additional support for the response is necessary.

Step 5: The GRM Officer delegates the grievance within five to seven days via e-mail to relevant department(s)/personnel to ensure an effective response is developed (e.g., human resource, relevant administrative departments etc.)

Step 6: A response is developed by the delegated team within 14 days in which may include GRM Officer with input from senior management of related departments as necessary. The response should identify a suitable resolution to the grievance, in which could involve further information to clarify a situation, taking measures to mitigate problems or compensate for any damages that has been caused during the Project activities though financial compensation.

Step 7: The response is signed-off by the senior manager of related departments for level 3 grievances and the GRM Officer for Level 2 and Level 1 grievances within 14 days. The sign-off may be a signature on the grievance log or an e-mail which indicates agreement, which should be filed by the GRM Officer and referred to in the grievance log.

Step 8: Communication of the response should be carefully coordinated. The GRM Officer ensures that an approach to communicating the response is agreed and implemented.

Step 9: Record the response of the complainant to help assess whether the grievance is closed or whether further action is needed. The GRM Officer should use appropriate communication channels, most likely telephone or a face to face meetings, to confirm whether the complainant has understood and is satisfied with the response.

In case the complaint was made anonymously, a summary of the grievance and resolution should be posted on notice boards located around the Facility as well as within the Project affected villages and GRM Officer should contact the head of villages on the anonymous grievances and resolutions as well.

If possible, the complainant's response should be recorded in the Grievance Log including notes on the mitigation measures to prevent recurrence of the grievance in future.

In case the GRM Officer or other managerial department are not able to address the particular issue raised through the grievance redress mechanism GRM Officer will provide a detailed explanation/ justification on why the issue was not addressed. The response will also contain an explanation on how the person that raised the complaint can proceed with the grievance in case the outcome is not satisfactory.

Step 10: Close the grievance with a sign-off from the GRM Officer. The GRM Officer assesses whether a grievance can be closed or whether further attention is required. If further attention is required, the GRM Officer should return to Step 2 to re-assess the grievance. Once the GRM Officer has assessed whether the grievance can be closed, he/she will sign off or seek agreement from the related management departments for level 3 grievances, to approve closure of the grievance. The agreement may be a signature on the grievance log or an equivalent e-mail, which will be filed by the GRM Officer and referred to in the grievance log.,

8.8.2 Worker Grievance Redress Mechanism

Worker Grievance Redress Mechanism is defined as complaints from Project employees (including both direct and indirect employees).

This mechanism is structured with an intention of it being an effective approach for early identification, assessment and resolution of grievances throughout the Project's lifespan.

The scope of the Worker GRM can be summarized as but not limited to; any worker with a concern of pertaining to onsite work such as occupational health and safety, terms of employment, wages, issues with the local community or among co-workers, hygiene issues in the common areas, insufficient amount of food and / or concerns regarding the security of the workers.

The GRM will be informed to all Project workers through written and verbal communications. Each worker should be informed about the grievance redress mechanism at the time they are hired, and details about how it operates should be easily available, in employee handbooks for example.

Confidentiality is quite significant to some workers; therefore, workers can submit their complaint and remain anonymous. However, grievances lodged anonymously may prevent the GRM Officer of the Project Company from resolving the matter and providing feedback. Nevertheless, Project workers wishing to lodge grievances anonymously should be allowed to do so. The Project Manager will open the complaint boxes located within the Facility every 5 days and will assess to determine whether the issue raised by the complaint fall within the scope of Worker GRM or not. Employee contracts is encourage employees to use the grievance mechanism. It is also be clearly stated in employee contracts that any grievance

raised is not result in retaliation, such as dismissal or punishment. Thus, employees are protected by their contract with the project company when submitting their grievances. Additionally, the Grievance Redressal Mechanism (GRM) ensures that any employee who raises a complaint will not face any retaliation.

It is important to note that, Project employees will retain their right to access the public grievance redress mechanism for non-employment-related issues.

Complaints should be reviewed as soon as possible in order to prioritize for resolution. Regardless of general response and resolution timeframes, some complaints may require immediate attention, for example, where it concerns the livelihood of workers.

There are 5 steps that complete the Worker GRM. This process has been detailed in the text below.

Step 1: Identification of grievance will be done through personal communication with the GRM Officer. This could be in person , by phone, letter, grievance boxes or email.

Step 2: Grievance is recorded in the 'Grievance Log'. Once the grievance is received and recorded, based on the subject and issue, the GRM Officer shall identify the department, management or personnel responsible for resolving the grievance.

In the case the complaint is assessed to be out of the scope of the Project's Grievance Redress Mechanism, a grievant should be notified through the desired communication method and an alternative mode of solutions should be suggested.

Step 3: Grievance Investigation. The GRM Officer and related departments should then assess into the facts relating to the grievance. This should be aimed at establishing and analysing the cause of the grievance and identifying suitable mitigation measures. The analysis of the cause will involve assessing various aspects of the grievance such as the past history of the employee, frequency of the complaint occurrence, management practices, recent incidents, etc.

During the cases when needed, for the sake of the investigation, the GRM Officer may also undertake confidential discussions with the concerned parties to develop a more detailed understanding of the issue at hand. In case of Site visit is required to gain first-hand understanding of the nature of the complaint, the visit will be also made to verify the validity and severity of the grievance.

The concern will be referred to the related managerial department who will discuss the concern with the employee and Area and/or Departmental Manager.

The investigation phase should be completed in no more than 5 working days of receiving the grievance.

Step 4: A Resolution and closure is developed based on the understanding that the GRM Officer is developed in consultation with the related departments or management. The suitable resolution for the complaint should be accordingly communicated to the grievant within the 2 working days of the completing the grievance investigation phase.

In case the issue is beyond the scope of the GRM Officer, the grievance should be escalated to the Project Management Unit to endeavour to resolve the grievances through managerial levels within the 7 working days of the escalation.

Step 5: Close the grievance with a sign-off from the GRM Officer once the grievance is resolved and the same has been communicated to the grievant. As the Grievance Log will be updated, the current status of the grievance and understanding of the manner on how the grievance was resolved should also be reported in the Grievance Log. The intention of providing further information on the grievance log is to serve as a reference for any similar grievances that may arise in the future.

In case the complaint was made anonymously, a summary of the grievance and resolution should be posted on notice boards located within the GRM Officer and common areas and should be announced through tool-box or weekly meetings.

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT

The ESMP has been prepared to assess and identify the potential environmental and social impacts and risks arising out of the development of the Project components and auxiliary facilities and recommend mitigation measures for significant adverse environmental and social impacts and describes the monitoring and institutional requirements necessary to implement this Plan.

The primary purpose of this ESMP is to ensure that the environmental requirements and social commitments associated with the Project are carried forward into implementation and operational phases of the Project and are effectively managed. In cases where the Turkish legislation differs from WB Policies, the more stringent one will apply to the implementation of the project. The specific objectives are:

1. Anticipating and avoiding, reducing, mitigating and if these are not achieved compensating any adverse environmental, social and health impacts resulting from the project activities;
2. Prevent or compensate any loss of the affected person;
3. Conducting all project activities in accordance with the applicable national legislation and in compliance with the World Bank's Safeguard Policies;
4. Prevent environmental degradation as a result of either individual subprojects or their cumulative effects;
5. Enhance positive environmental and social outcomes;
6. Ensure that the ESMP is feasible and cost-efficient;
7. To act as an Action Plan in order to ensure that the project impact mitigation measures are properly implemented and monitored; and
8. Ensure that all stakeholders concerns are addressed.

This ESMP has been prepared consistent with the World Bank guidance specified in the OP4.01.

This ESMP was developed based on the findings of the impact assessment studies. Identification of risks, mitigation and monitoring activities are considered for the two main phases of the Project, which are "Construction" and "Operation". In order to achieve environmental and social outcomes consistent with the WB OP given in the Terms of Reference of the Project, potential adverse environmental and social impacts anticipated in each phase of the project components will be identified; requirements for effective and timely interventions will be defined; and means for meeting these requirements will be described in the context of this ESMP.

In order to reflect developments on detailed Project design, this ESMP will be improved and evolved in the future. Hence, this ESMP is a living document that will be continuously reviewed and updated by taking into account of these subjects:

- Monitoring results,
- Test and trial results performed during Project's operation phase,
- Changes on national legislation and international standards, and
- Changes on Project parameters (if any).

The following chapters were prepared to outline the legislative background for management, organizations that will be responsible for the implementation of this ESMP, specifications of the Project, mitigation plans for construction and operation phases of the Project, monitoring plan, public participation, and inspection and reporting.

The purpose of the Mitigation Management and Monitoring Plan presented under this chapter is to apply mitigation measures to reduce the impacts of the Project, describe the roles of the participating parties and key personnel responsible for the implementation of the mitigation measures, and identify procedures to ensure that the mitigation measures are implemented adequately during all phases of the Project.

Roles and Responsibilities

Key roles and responsibilities which are required for the effective implementation of the ESMP are provided below in Table 9-1.The list of plans and procedures which have been developed and implemented in the scope of this ESIA is provided in Table 1-2. An Environmental Expert and an OHS Expert has already been assigned for the Project. The Project Company will ensure continuous effective implementation of the ESMP and other E&S plans and procedures.

Table 9-1. Roles and responsibilities within in the Project

Roles	Responsibilities
Project Company	• The Project Company will ensure allocating qualified resources with clearly defined roles and responsibilities for the effective implementation of ESMS practices at the Project site. • The Project Company is responsible for supervision of contractors for the implementation of ESMP and overall environmental and social risk management for the Project. • The Project Company is responsible for taking appropriate actions to address non-conformities within the ESMS based on audit and monitoring reports.
Environmental Expert and OHS Expert	• They are responsible for the effective implementation of Environmental and Social Management Plans (ESMPs) • for conducting periodic audits, inspections and/or on-site checks to verify the effective implementation of relevant ESMPs also by the contractors.

Roles	Responsibilities
	• For Regular reporting to the management of the Project Company regarding all environmental and social requirements during construction and operation.
GRM Manager/CLO	• Establish and implement the grievance mechanism system, ensuring it aligns with project guidelines and best practices. • Facilitate effective communication channels for stakeholders to express grievances, providing clear information on the mechanism's existence and procedures. • Maintain comprehensive records of grievances, including details of the concerned parties, the nature of the grievances, and steps taken for resolution. • Conduct impartial and thorough investigations into grievances, collaborating with relevant project teams and stakeholders to gather information and assess the validity of concerns. • Develop and recommend appropriate solutions or actions to address grievances, aiming for fair and satisfactory resolutions. • Prepare regular reports on the status of grievances, outlining trends, outcomes, and any recommended improvements to the grievance mechanism. • Provide training to project staff and stakeholders on the grievance mechanism, ensuring awareness and understanding of the process. • Continuously evaluate and refine the grievance mechanism based on feedback and lessons learned, promoting an environment of continuous improvement. • Ensure that the grievance mechanism aligns with legal and regulatory requirements, as well as industry standards and the project's policies. • Engage with various stakeholders, including local communities, government bodies, and project partners, to foster positive relationships and address concerns proactively.
Contractor	• Ensure effective implementation of assigned activities in compliance with ESMP. • Ensure training to the personnel, including the measures within the scope of ESMP, to raise awareness of environmental, occupational and worker health and safety, public health and safety and social issues. • Provide relevant monitoring information regarding their EHS performance

9.1 Environmental and Social Management Plan

Impact mitigation measures and activities are developed for all phases of the Project for both project components and auxiliary facilities including electricity transmission lines and working camps in the scope of this ESMP are in compliance with the national legislation as well as international standards. During the implementation of the mitigation plans, the most stringent among the national legislation and WB standards and the most up-to-date legislation will be complied with. Impact mitigation management plan is presented in Chapter 9.1.1 and Chapter 9.1.2 for construction and operation phases, respectively.

Environmental, Social Management System (ESMS)

The identification of the EHSS aspects, significant risks and impacts of the Project is considered to be the principal stage of the planning of an effective ESMS.

Targets, Objectives and Programs

EHSS objectives and targets will be set for the Project to comply with legal requirements and obligations for continuous improvement of the environmental and social quality targets and objectives of the Project. Targets and objectives will cover issues such as efficient use of raw materials, auxiliary materials/matters, natural resources/energy consumption and reduction, improvement of awareness of employees and reduction of health and safety incidents. Targets and objectives will be specific, measurable and feasible and supported by the programs. Deadlines and responsible party for each program established to achieve desired results will be assigned. Environmental and social targets and programs will be documented and monitored.

Overall Governance of the Project and Responsibilities

The Project-specific organizational structure to be developed will clearly identify the responsibilities for the management of EHSS issues of the Project including Social Expert (responsible for communication), Environmental Expert and Occupational Health and Safety Expert. Core environmental and social responsibilities should be well defined and communicated to the relevant personnel. Additionally, personnel should have adequate knowledge, skills and experience to competently and efficiently take specific measures and actions required under ESMP.

Environmental and Social Emergency Preparedness and Response

An “Emergency Preparedness and Response Plan” will be developed for emergency situations that consist of incidents such as accidents, explosions, fires, gas leakages, hazardous chemical/biological and liquid waste spills, disease outbreaks and similar events that occur unexpectedly due to equipment/infrastructure failures, employee errors, natural disasters (flooding, landslides, earthquakes, storms), sabotage and similar, for the Project in line with national regulations and international standards. Emergency situations are incidents that cause the activities to cease, terminate and also cause serious damage on environment, occupational health and safety and assets.

Emergency Response Team and first aiders (Name, Title, Responsibilities and Key Features);

- Emergency Drills, Internal Trainings
- Maintenance and Control of Emergency Response Equipment (Fire Emergency Equipment, Pollution Prevention Materials, First Aid Cabinet, Safety Data Sheets, Personal Protective Equipment, Warning and Guiding Signs etc.);

- Measures to be taken in case of Emergencies/Natural Disasters (inc. Communication in case of Emergency, Hazardous Materials/Wastes Spills, etc.

Other Management Plans

- Noise Management Plan
- Effluent Management Plan
- Waste Management Plan
- Emergency Response Plan (ERP)
- Code of Conduct
- Spill Response Plan
- Occupational Health and Safety Management Plan
- Camp Management Plan
- Hazardous Materials Management Plan
- Traffic Management Plan
- Subcontractor Management Plan
- Chance Find Procedure

Audit

- External Reporting

All external reporting will be managed by the Project Company within their obligations to the government entities under the national legislation and to the Lenders. The Projects will be monitored by an independent Consultant every 3 months during the construction periods and annually during the operation phase.

- Internal Reporting

Internal reporting with regards to the commitments within the ESMP will be managed jointly by Social, Environmental, Occupational Health and Safety Experts. The Project will share, as appropriate, inspection and audit findings with their suggested measures regularly with the Project Company and employees. To maintain an open communication between the employees and management on occupational health, safety, environmental and social issues the following tools will be used:

- Team Briefings,
- On-site work group meetings,
- Work Specific Instructions.

9.1.1 Environmental and Social Management Plan for the Construction Phase

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
1	**Disclosure**	Insufficient information	Adverse	Included in drilling costs	▪ Before the start of drilling works, the local people and all relevant stakeholders will be informed of the works to be performed and the measures to be taken. ▪ The information on the start and finish dates of drilling and working periods and the permits obtained from the provincial/district municipality will be shown by the project company in a signboard that is easily visible to all personnel at the drilling site.	Contractor Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe
2	**Occupational Health and Safety (OHS)**	Inadequate workers health and safety conditions	Adverse	Included in drilling costs	▪ Project company and the drilling contractor will include staff(s) (at least one environmental and one social expert and one full time OHS expert) who will take part in full-time and effectively control the implementation of the Project and, Project Company will make sure that the measures provided below are taken by the contractor, and enforce necessary actions/sanctions in case lack of these measures on site. ▪ To control the cases (fire, earthquake, etc.) which may occur during the drilling activities under the Project, and which require urgent action, an Emergency Response Plan (ERP) and an Occupational Health and Safety Plan (OHSP) will be applied and shared with all employees. ▪ The Project Company will require all employees and contractors to adhere to local and international health and safety legislation and guidelines. Workers will be provided with all necessary personal protective equipment (PPE) (hard hats, safety harnesses, protective coveralls, glasses, gloves, armor-clad shoes, etc.). ▪ Non-smoking areas will be allocated at the drilling rig. ▪ Appropriate hand and face washing facilities will be provided to the employees, and also shower facilities for dusty works. . ▪ All employees will be informed about working conditions, job definitions, responsibilities, relations with the local community and potential work risks. ▪ The contractor formally agrees that all work will be carried out in a safe and disciplined manner and is designed to minimize risks on neighboring residents and environment. ▪ The contractor will assign full-time personnel with relevant certification and experience in charge of OHS and she/he shall monitor the site implementations. ▪ Emergency teams will be formed, and drills and training programs will be carried out in line with emergency scenarios. ▪ Employees will have a good command of emergency plans, and the grievance will be reported to the authorized teams and resolved, if they require urgent action. ▪ Appropriate signposting of the sites will be provided and then workers will be informed of key rules and regulations to follow. ▪ First aid kit will be kept available at the drilling rig, taking into account that first aid response may be required before the casualty is referred to the nearest healthcare provider. ▪ Both trainings and incidents (fatalities, lost time incidents, any significant events including spills, fire, outbreak of pandemic or communicable diseases, social unrest, etc.) will be recorded. ▪ In the event of any significant incident (e.g. environmental, social, labor or lost-time incidents) the Contractor shall immediately notify Project Company shall inform TSKB and WB within three business days. Then, within 30 days, a report on the root causes of the incident and the corrective actions to be taken will be presented to TSKB and WB. ▪ Areas where excavation work is to be carried out will not be accessible other than the authorized personnel. The loading and unloading activities shall be carried out together with the persons to oversee the personnel to carry out the activity. ▪ Since the works will be performed at areas close to the public, the public access to these areas shall be restricted by any means. If a trench needed to be left open for night, the sufficient illumination of the area shall be ensured by the Contractor and necessary signs shall be placed, and the area shall be enclosed with barriers.	Contractor Project Company	▪ % of scheduled HSE Inspection ▪ % of attendance at HSE meetings ▪ % of closing of Non Compliance Reports (NCRs) ▪ Reporting safe observations ▪ Reporting unsafe observations ▪ Reporting near misses ▪ % of Toolbox attending ▪ % of Risk Assessment compliance ▪ % of Legal Requirements compliance ▪ Results of scheduled audits ▪ HSE training carried out to training matrix ▪ > 90% of all training to matrix ▪ % of attendance at scheduled trainings ▪ Engagement in HSE program by individual managers and supervisors ▪ Engagement in HSE program by contractor's

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ Adequate and appropriate training in confined space hazard control, atmospheric testing, use of required PPE as well as the serviceability and integrity of PPE shall be verified before workers are required to enter a permitting confined space. In addition, adequate and appropriate rescue and/or rescue plans and equipment shall be in place before the worker enters the confined space. In the event of an accident, coordination will be established with the emergency response teams to ensure that the most accurate first aid is given. The Emergency Response Plan will be revised in accordance with the operational period and necessary training will be given to all personnel. ▪ Only personnel holding the height work permit will work at height, and safeguarding measures (guardrails, fall arrest) will be in place. ▪ The areas to be excavated will not be accessible except by authorized personnel. Loading and unloading activities will be carried out together with the persons who will supervise the personnel who will carry out the activity. ▪ The drilling areas will be surrounded and necessary security measures will be taken, no one will be allowed to enter except for the staff. ▪ The WBG General Environment, Health and Safety Guidelines will apply. ▪ Equipment that meets international standards in terms of performance and safety will be used. ▪ All equipment used during the drilling phase will be kept in good working condition. ▪ The contractor will assign a full-time staff responsible for OHS with relevant certification and experience and monitor field practices.		
3	**Employment / Economy**	Child labour, forced labour and unregistered employment Contribution to economy	Adverse	Included in drilling costs	▪ 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 should be given to the local labor where possible and practical. ▪ Efforts will be exercised to allocate employment opportunities to the local parties. ▪ Collaborate with local employment agencies, community organizations, and educational institutions to identify and recruit local talent. ▪ Provide training and skill development programs for local residents to enhance their employability. ▪ Organize job fairs and community outreach events to disseminate information about project-related job opportunities. ▪ Create internship and apprenticeship programs to provide local individuals with hands-on experience and skills development. ▪ Provide financial or technical assistance to local small businesses, fostering entrepreneurship and economic sustainability. ▪ Collaborate with local authorities to invest in infrastructure projects that benefit the local economy, such as roads, utilities, and community facilities. ▪ Establish funds to invest in community projects that have a positive economic impact, such as education, healthcare, or environmental initiatives. ▪ 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 in the workplace will be eliminated. ▪ Necessary measures will be taken by contractor to make sure that workers coming from outside the city will be given 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 Company's responsibility to ensure that the contractor complies with the determined criteria.	Contractor Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe ▪ Percentage of local recruiment
4	**Social Life**	Potential Community Disturbance	Adverse	Included in drilling costs	▪ The Contractor will provide training to the site personnel on environmental and social issues. It is the Project Company's responsibility to ensure that the contractor complies with the determined criteria.	Contractor Project Company	▪ Number of grievances

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ The operations to be carried out during drilling works will be performed not to restrict / hinder the social and economic life of local people. ▪ To avoid any impact on the safety and daily life of communities, safety and information signs will be placed around drilling rig before the work. ▪ The Project Company will ensure that contractors establish the code of conduct and will check that workers will be given training especially on communication with local people of foreign nationality public before starting work, so that local people of foreign nationality will not be adversely affected by external workers.		▪ Percentage of closed grievances within the target timeframe
5	**Labor and Working Conditions**	Improper Working Conditions, Child labor, forced labor and unregistered employment	Adverse	Included in drilling costs	▪ Workers will be allowed to have access to the Grievance Mechanism and will be required to be aware about this Mechanism. ▪ Camp Management Plan will be prepared prior to mobilization and applied. ▪ Establish clean and comfortable cafeteria and rest areas for workers during breaks, ensuring access to sanitary facilities. ▪ Code of conduct will be prepared. Trainings on code of conduct and discrimination will be provided by the project company to both its own employees and contractor employees. At the same time, through the trainings, it will be ensured that workers learn the Grievance Mechanism of the Project and the steps to be followed in exercising their legal rights. Access to the Grievance Mechanism will be easy and effective. The grievance mechanism officer designated for the Project will be announced to all employees during the trainings to be given before starting work. There will be brochures and posters containing the grievance mechanism and the contact information of the authorized person in places such as the cafeteria, canteen and service areas used by the employees. CoC should be signed by all employees. ▪ The project company will provide gender training to both its own staff and contractor staff. The content of these trainings will basically be the reflection of the problems arising from gender inequality in society on working life. Apart from this, employees will learn the definitions, differences, emergence and intervention methods of concepts such as SEA/SH and GBV and Community Health, Safety and Security (which includes sexually transmitted awareness) through interactive activities. ▪ Minimum legal labor standards will be met (child/forced labor, anti-discrimination, working hours, minimum wages) as per International Labor Organization (ILO) regulations. ▪ At the same time, the Operational Policies of the World Bank and the national legislation will be complied with in terms of the working conditions. ▪ 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. ▪ Provide access to healthcare services for workers, including regular health check-ups and medical facilities. ▪ Discrimination based on language, race, gender, political thought, philosophical belief and religion will be avoided in business relations. ▪ Select a camp location that minimizes environmental disruption and respects local land use regulations. ▪ Design the camp to blend with the natural surroundings, using sustainable and low-impact construction materials. ▪ Select a camp location that minimizes environmental disruption and respects local land use regulations. ▪ Regularly inspect and maintain worker accommodation facilities to ensure they meet safety standards. ▪ Promote cultural sensitivity and respect for the local community among the workers. ▪ Encourage community engagement and participation in project-related activities.	Contractor Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe ▪ Results of employee satisfaction surveys

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					▪ Implement security measures to protect workers and the Project Company from potential risks and threats in the area. ▪ An employee satisfaction survey to be conducted by human resources every 6 months will ensure that employees' views on working conditions and the working environment are obtained.		
P6	**Community Health and Safety**	Community health and safety risks	Adverse	Included in drilling costs	▪ To minimize the impact of the traffic activities, the working hours will be adjusted according to the peak hours of transportation. ▪ The drilling rig area will be fenced to avoid physical hazards to the communities associated with the project. ▪ Contractors will take necessary health and safety measures, such as using appropriate warning signs, making the regular maintenance of the machinery, replacement or repair of part which cause noise and performing watering in dry seasons, under the management of the Project Company during site preparation and drilling activities so that the public is informed of the drilling plan and locations in a timely manner and the drilling rig is determined. ▪ Care will be taken to ensure that warning signs are visible at night and in bad weather conditions. ▪ The adequate number of appropriate firefighting equipment will be kept available at drilling rig at all times. ▪ An emergency action plan 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. ▪ Community Health and Safety training will be provided by the project company to both its own employees and contractor employees. ▪ Local people will be informed about possible dangers and precautions to be taken with brochures that will be placed on signs and notice boards to be hung in various areas in the neighborhood. ▪ Detailed information on the use of the Grievance Mechanism and contact information on the grievance mechanism officer will be made available to the public. (via the project website, information brochures left at the headmen offices, posters and hand brochures in places such as schools, health centers, hospitals, mosques, which are the common areas used by the community intensively). ▪ Damages that may occur on the road surfaces due to traffic caused by heavy drilling machinery during drilling works on existing roads will be repaired by the contractor. In case of any damage to infrastructure elements on private lands due to drilling activities, mitigation measures will be taken by the contractor. ▪ , To control emissions, techniques may need to be implemented. For example, chemical processes for H2S removal or filtration and purification systems can be used to reduce air pollutants. It is important to inform and engage the local community about the risks of H2S and air pollutant emissions. This is necessary to address concerns and enhance the community's trust in the project. ▪ Emissions and environmental impacts will be monitored and reported regularly. This helps in evaluating the project's environmental performance. Plans will be developed for emergencies such as H2S leaks or air quality issues. This ensures a rapid response ▪ A grievance redress mechanism through which the local community can raise concerns, report problems or seek clarification on project issues has been established and will be implemented throughout the life of the project; ▪ Organize community meetings and workshops to educate the local population about the closed geothermal system and reinjection technology; ▪ Clearly communicate the benefits of the closed system in minimizing environmental impacts; ▪ Organize community meetings and workshops to educate the local population about the closed geothermal system and reinjection technology;	Contractor Project Company	▪ Number of communicable and non-communicable diseases and injuries experienced. ▪ Number of community health safety & security complaints from local communities as recorded in the grievance register. ▪ Number of reported community health & safety incidents ▪ Number of reported noise incidents

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					▪ Clearly communicate the benefits of the closed system in minimizing environmental impacts; ▪ Organize community meetings and workshops to educate the local population about the closed geothermal system and reinjection technology; ▪ Clearly communicate the benefits of the closed system in minimizing environmental impacts		
7	**Land Use**	Damages to adjacent lands and structures	Adverse	Included in drilling costs	▪ Any unintended damages caused to adjacent land and structures during drilling will be compensated and repaired by Project Company/Contractor. ▪ If grievances are received regarding unauthorized use of privately-owned lands, damage to neighboring lands, etc. through the Grievance Mechanism to be established, assessments / investigations will be performed on a case-by-case basis, and corrective actions will be planned and implemented, where necessary. In addition, visual inspection will be carried out during the monitoring studies to be carried out every 3 months during the construction period. ▪ Materials will be stored in closed and protected areas. ▪ If it is required to provide an additional space for closed and protected areas, the contractor will fulfill temporary rental formalities or obtain relevant permits.	Contractor Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe
8	**Land Acquisition**	Loss of Land	Adverse	Included in drilling costs	▪ In case additional land is required for the geothermal geothermal pipeline or if it passes through the irrigation channel determined as an alternative route (on the right or left side), land owners will be determined. Stakeholder analysis will be carried out. Informal users will be considered as stakeholders. If land acquisition becomes necessary, the first choice will be voluntary acquisition. Compensation will be determined in accordance with the current market value and the full replacement cost. In case of expropriation, the strictest standard will be applied, taking into account the legal gaps between national legislation and World Bank standards. The resettlement action plan to be prepared within the scope of the project will be the guiding document to manage this process, conduct a simple, transparent evaluation process and carry out consultations with stakeholders. ▪ It will be ensured that the compensation offered for the easement right is fair and equitable, taking into account the market value of the affected land for the electricity transmission line. ▪ Transparent and participatory negotiations will be conducted with affected landowners to reach a mutual agreement on compensation terms. ▪ A comprehensive social and environmental impact assessment will be conducted through the resettlement action plan to identify potential risks and impacts on affected land and its owners.In the event of land acquisition, payment will be made in accordance with the full replacement cost, as per the standards set by the World Bank. ▪ All users/shareholders will be informed of the purpose of the land acquisition process. ▪ Any damages caused by involuntary resettlement will be compensated for. ▪ Shareholding users and unregistered users will be provided with fair and transparent compensation. ▪ If grievances are received regarding unauthorized use of privately-owned lands, damage to neighboring lands, etc. through the Grievance Mechanism to be established, assessments / investigations will be performed on a case-by-case basis, and corrective actions will be planned and implemented, where necessary. In addition, visual inspection will be carried out during the monitoring studies to be carried out every 3 months during the construction period. ▪ The Project-specific SEP that includes a grievance mechanism will be implemented, and all grievances related to the land acquisition process will be recorded and followed up.	Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe ▪ Compliance with RAP
9	**Stakeholder Engagement**	Communication issues with the stakeholders	Adverse	Included in drilling costs	▪ An adequate timing will be planned for interaction / communication with communities and for engagement. ▪ Regular consultations will be carried out with the authorities and communities regarding the project management. ▪ Comprehensive information on the stakeholder engagement is provided in SEP of the Project and the SEP will be updated and implemented throughout the Project.	Contractor Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe ▪ Records of stakeholder engagement activities

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
10	**Grievance Redress Mechanism**	Grievance Issues	Adverse	▪ Included in drilling costs	▪ An efficient Grievance Redress Mechanism will be initiated to allow potentially affected individuals to voice their concerns on the Project. ▪ Managing sensitive grievances in a project is crucial for maintaining a positive work environment and ensuring the well-being of team members. There are several measures that can be taken for good management of sensitive grievances in a project: o Emphasize the importance of confidentiality in handling sensitive grievances. o Assure individuals that their concerns will be treated with discretion and that only those directly involved in the resolution process will be informed. o Create an environment where team members feel comfortable expressing their concerns. o Establish regular communication channels, such as team meetings or one-on-one sessions, to encourage open dialogue. o Maintain thorough documentation of the grievance process, including the nature of the grievance, actions taken, and resolutions. o This documentation can serve as a reference for future incidents and may be important for legal or compliance purposes. o Respond promptly to grievances to show that they are taken seriously. o Delayed responses can exacerbate the issue and contribute to a negative perception of the project's commitment to addressing concerns. o Use past grievances as learning opportunities to improve the overall project environment. ▪ In case a sensitive complaint ((Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Gender Based Violence (GBV)) is received by the Contractor they will be responsible for conveying the issue directly to the Project Company GRM focal point. The Project Company is also responsible for forwarding sensitive complaints to the bank immediately. ▪ The Project Company will provide training on SEA/SH and GBV cases and prevention methods to both its own staff and contractor personnel (including the Management Unit).	Contractor Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe
11	**Documentation**	Missing documentation	Adverse	Included in drilling costs	▪ All activities, information meetings, opinions/suggestions, grievances, etc. provided during the drilling period will be documented continuously	Contractor Project Company	N/A
12	**Traffic**	Direct and indirect threats posed by drilling activities against traffic and pedestrians	Adverse	Included in drilling costs	▪ Traffic Management Plan will be prepared prior to drilling and applied. ▪ Actions will be taken to ensure that any vehicles operating during the drilling period obey the set speed limit (30 km/hr). ▪ 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. ▪ 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. ▪ The weight of all vehicles will not exceed the legal limits according to Highway Traffic Regulation. ▪ In case of hazardous chemical or waste storage on site, the transfer of these wastes will be performed out by licensed carriers not to pose a threat to community health.	Contractor Project Company	▪ Number of non-compliances against the mitigation controls identified in Traffic Management Plan ▪ Number of drivers found to be exceeding speed limits or driving unsafely ▪ Number of road traffic accidents involving: ▪ Accidental injuries and deaths, ▪ Spillages (such as cargo or fuel), ▪ Wildlife-vehicle collisions. ▪ Number of traffic-related grievances

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					▪ The routes developed in agreement with the competent authorities will be used for special cargos. The designated routes will be programmed to prevent traffic congestion on the roads, and will be published in advance to prevent possible disturbance. ▪ The arrangements in traffic will be discussed with the Municipality and planned jointly. ▪ To prevent unauthorized access to the drilling rig, the drilling rig will be surrounded by fence/curtain/protection tape, and uncontrolled entrances will be prevented.		
13	**Resource Efficiency**	Improper use of resources (Water, fuel, electricity, raw material)	Adverse	Included in drilling costs	▪ Resource efficiency and management actions will be taken; use of renewable energy and energy efficiency measures, reducing the carbon footprint, financing for green building, responsible supply chain management and green procurement.	Contractor Project Company	▪ Amounts consumed in m³, L, kWh, ton
14	**Air Quality**	Air pollution from Drilling Works	Adverse	Included in drilling costs	▪ Exhaust emissions from drill rigs will be controlled by the contractor by ensuring that emissions are minimized through regular servicing of machinery to meet the relevant emission standards; ▪ Drill rigs used in the project shall comply with recognized performance design standards (WHO and Regulation on the Control of Industrial Air Pollution). ▪ Secure the well location and establish safe and dangerous zones around the exploration areas; ▪ Equipping the workers with proper PPE, especially to those located in dangerous zones; ▪ Drilling and well testing shall include an H2S response plan and early warning alarm; ▪ Dust from outdoor sources will be minimized by employing control measures such as covering the piles and increasing the moisture content. ▪ Dust suppression techniques such as the application of water or non-toxic chemicals will be used to minimize dust from vehicle movements. ▪ Truck loading and unloading operations will be carried out with due care, and materials will be prevented from scattering around. ▪ Modern equipment and vehicles that can meet the applicable emission standards will be selected for drilling works. ▪ All vehicles will have exhaust emission permits and all vehicles will be regularly maintained. ▪ Exhaust systems and emission levels of machinery and vehicles will be checked by the contractor. ▪ Project Grievance Mechanism will be implemented. ▪ In case of any complaints, air quality measurement will be carried out at the nearest sensitive receptors in accordance with international standards, and the results will be recorded. ▪ Speed limits will be set for cars and trucks, and actions will be taken to ensure that such limits are complied with. ▪ During transportation, excavated materials will be covered with nylon canvas. ▪ Any damage caused by inadequate dust suppression measures (i.e. pollution of the surrounding area, transport to a residential area by wind, dust deposits by the wind, etc.) will be compensated by the contractor.	Contractor Project Company	▪ Air Quality incidents ▪ Records of Non-Compliance with air quality standards ▪ Community complaints
15	**Noise**	Noise from Drilling Works	Adverse	Included in drilling costs	▪ Noise Management Plan will be prepared prior to drilling and applied. ▪ Residents living near the project area will be informed during the drilling phase. ▪ Drilling works will be planned in consultation with local communities, and operations with the highest noise generation potential will be scheduled during the time of the day that will cause minimum disturbance. ▪ Use of roads close to the settlements in transportation activities for the project will be avoided or minimized.	Project Company Contractor	▪ Noise and Vibration incidents ▪ Records of Non-Compliance with Project standards ▪ Number of noise-related community grievances

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ Equipment and vehicles used externally will be regularly maintained. ▪ "Low noise" equipment will be used as much as possible during the drilling phase. Where drilling equipment is provided with impermeable acoustic covers or enclosures, covers will be kept closed while equipment is in operation. ▪ When equipment is not working, they will be turned off or reduced to the minimum level. ▪ Vibration levels will be monitored in case of complaints, and measures will be taken to reduce vibration if standards are exceeded. ▪ In case of any complaints, Noise measurement will be carried out in accordance with the international standard, ▪ Provide hearing protective devices, such as silencers and earmuffs, to workers in accordance with relevant legislation.		
16	**Waste Management**	Wastes of Drilling Works	Adverse	Included in drilling costs	▪ Waste Management Plan will be prepared prior to drilling and applied. ▪ Hazardous waste, waste oil, used accumulators and batteries, electrical and electronic waste, recyclable waste, domestic waste, medical waste, and other similar materials will be classified, stored separately at source, and disposed of in compliance with relevant regulations and the WBG EHS Guidelines. ▪ Adequate and appropriate temporary storage areas will be provided for waste management purposes. ▪ The temporary waste storage areas will adhere to national and international standards, including the following: ✓ The storage areas will have covered roofs and sides, and proper drainage to prevent contact between surface water or rainfall and the waste. ✓ The floors of the storage areas will be made of reinforced concrete or impermeable materials like epoxy. ✓ Adequate drainage will be in place to collect any potential leakage. ✓ If volatile wastes are stored, proper ventilation will be provided. ✓ Access to the storage areas will be controlled through gates. ✓ Cautionary signage and boards displaying the name and contact number of authorized personnel will be placed. ✓ Separate storage areas or compartments will be designated for different types of waste. ✓ Secondary containment measures in accordance with relevant legislation and standards will be implemented for related wastes. ✓ Absorbents, spill kits, firefighting equipment, etc., will be readily available nearby to facilitate immediate response in case of emergencies such as spills or fires. ✓ Container types, labeling, classification, etc., within the storage areas will comply with sub-project standards. ▪ Hazardous and non-hazardous wastes will be segregated at the source. ▪ Recyclable and non-recyclable solid waste will be separated and stored separately until collected by the municipality or licensed firms. ▪ Ensure that transportation, recovery, and disposal firms for waste management are licensed. o Implement excavation activities in line with the cut and fill program to minimize excavation waste. ▪ Training to personnel on waste reduction, general waste management, and housekeeping will be provided for personnel. ▪ Conduct drills for personnel to prepare them for emergency situations. ▪ Prohibit disposal or burial of waste on-site under any circumstances.	Project Company Contractor	▪ Total waste generated ▪ Ratio of recovered/reused/ recycled waste to total waste generated

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ Develop and implement a Waste Management Plan in accordance with national regulations and the WBG EHS Guidelines. ▪ Drilling waste will be regularly collected by licensed collectors at the permitted excavation waste storage site of the Municipality. ▪ Waste disposal records will be kept regularly. To keep these records, a Waste Registry Information Form will be prepared, which will contain information on the waste code, amount, and transfer and disposal method as presented in the Waste Management Regulation – ANNEX IV. ▪ Where appropriate, waste can be reused or recycled. ▪ Temporary storage of medical waste will be performed in accordance with Article 14 of the Medical Waste Control Regulation. In addition, medical waste will be transported to processing facilities in accordance with Article 15 of the same regulation.		
17	**Drilling Mud**	Waste management failure, pollution from storage and disposal of mud	Adverse	Included in drilling costs	▪ The 'dry location' method will be used fort he Project which involves the use of specialized equipment to separate chemicals from the mud, and the retained water is permitted to circulate within the drilling system. The remaining mud will be disposed of through a transfer agreement to be arranged with a licensed disposal company (Cement company). In the dry location application, the cuttings that reach the surface in a wet and muddy state are processed in advanced decanters and directed to crescent-shaped waste tanks using screening systems.	Project Company Contractor	▪ Total waste generated ▪ Ratio of recovered/reused/ recycled waste to total waste generated
18	**Domestic Waste**	Waste management failure, pollution from waste	Adverse	Included in drilling costs	▪ Any domestic waste generated will be sorted at source (plastic, glass, paper, etc.), and reusable waste will be recycled. ▪ Unrecyclable waste will be collected in closed sanitary trash bins and will be disposed of by the solid waste collection system of Municipality.	Project Company Contractor	▪ Total waste generated ▪ Ratio of recovered/reused/ recycled waste to total waste generated
19	**Waste Oils**	Waste management failure, pollution from waste	Adverse	Included in drilling costs	▪ If different categories of oils are generated from the works at the drilling rig, these oils will be stored separately. ▪ Containers where waste oils are stored will be kept closed and protected from rainwater. ▪ Waste oils will only be transported by licensed transportation companies, and will only be delivered to licensed recycling or disposal facilities.	Project Company Contractor	▪ Total waste generated ▪ Ratio of recycled to total waste generated
20	**Waste Batteries and Accumulators**	Waste management failure, pollution from waste	Adverse	Included in drilling costs	▪ Waste batteries will be collected separately from other wastes, delivered to authorized organizations and recycled. ▪ Waste batteries and accumulators will be delivered to waste battery and accumulator disposal facilities within the Municipal borders through authorized transportation companies.	Project Company Contractor	▪ Total waste generated ▪ Ratio of recycled total waste generated
21	**End-of-life Tires**	Waste management failure, pollution from waste	Adverse	Included in drilling costs	▪ In cases when tires of the vehicles to be changed during drilling activities; end-of-life tires will be delivered to the companies that distributes and sells tires via the authorized transportation companies.	Project Company Contractor	▪ Total waste generated ▪ Ratio of recycled waste to total waste generated
22	**Effluent Discharges**	Wastewater management failure, pollution from wastewater	Adverse	Included in drilling costs	▪ Wastewater Management Plan will be prepared prior to drilling and applied. ▪ Drilling fluids will be stored in designated tanks or sumps within a restricted area of the project site. The sumps or earth-based ponds will be lined with an impermeable membrane, and concrete ponds will be sealed. ▪ The Geothermal Resources and Natural Mineral Waters Law requires consideration of environmental limits for discharging drilling fluids, including well test waters. If the fluid composition exceeds the environmental limits, reinjection is mandatory. ▪ If drilling fluids need to be discharged into a receiving body, they will undergo testing for specific parameters in accordance with relevant legislation and discharge permits. The discharge must comply with the Turkish Water Pollution Control Regulation and WBG EHS Guidelines. ▪ Before discharging cleaning waters, the final pH level must be monitored.	Project Company Contractor	▪ Minimization and continued improvement in the number of the reported water quality related incidents. ▪ Zero NCRs per year ▪ Zero grievances per year ▪ No significant adverse impact ▪ No infrastructure damage and damage to loads/humans

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ Alternatively, after reuse, the fluids must be transferred to appropriate storage facilities. Based on their chemical, biological, and physical characteristics, they will be disposed of as hazardous or nonhazardous material. Licensed tankers will transport them to suitable wastewater treatment plants, which may include treatment plants in nearby industrial zones or municipalities. Hazardous materials require disposal in specialized hazardous waste treatment plants within reasonable proximity. ▪ During the decommissioning phase, if the sumps or tanks are no longer in use, they should be removed, and the site must be restored to prevent future material release into the soil and water resources. The treatment or disposal of the contents as hazardous or non-hazardous waste depends on their characteristics. Once determined, they will be disposed of or treated at licensed facilities in accordance with national legislation and WBG EHS Guidelines. ▪ Periodic testing of effluent water will be conducted in all cases to monitor any potential contamination of surface or groundwater that could pose risks to community health and safety. ▪ Storage and disposal of domestic wastewater will comply with the Water Pollution Control Regulation and WBG EHS Guidelines. ▪ As a recommended best practice, unused or abandoned wells should be covered with blind flanges to prevent leakage.		
23	**Groundwater Quality**	Groundwater contamination caused by geothermal fluids	Adverse	Included in drilling costs	▪ Preliminary impact analysis and related mitigation measures (i.e. double casing) depending on literature survey about aquifer structure and groundwater use at exploration area as a part of EIA prepared in accordance to EIA Regulation. ▪ Existing Groundwater users in the vicinity of the well(s) (e.g. 1 km) will be identified. In addition, some technical information about existing groundwater wells (e.g. depth, flow, etc.) should be collected. ▪ If important freshwater aquifers overlie geothermal reservoirs, monitoring wells will be installed to monitor ground water composition and temperature. ▪ Proper well casing and well casing material selection for groundwater aquifer section(s).	Project Company Contractor	▪ Literature information on ground water users around drilling rig. ▪ Well casing diagram. ▪ Presence of monitoring wells and monitoring records.
24	**Hazardous Materials**	Pollution from hazardous materials	Adverse	Included in drilling costs	▪ Hazardous Material Management Plan, Spill Response Plan, and EPRP will be prepared prior to drilling and applied. ▪ If hazardous waste is stored in the project area, that waste will be stored in containers that are strong, leak-proof, safe and in accordance with internationally recognized standards. The containers will bear "hazardous waste" label, with the amount, content, properties, storage conditions and storage date of the stored material indicated on the containers. ▪ Containers containing hazardous materials will be placed in sealed vessels to prevent spills and leaks. ▪ Hazardous waste will be transported by licensed waste transportation companies and will be disposed of at licensed facilities. ▪ Toxic paints, solvents or lead-based paints will not be used. ▪ Hazardous waste management will be fulfilled in consultation Project Company in accordance with the Hazardous Waste Control Regulation. ▪ Hazardous chemicals and wastes likely to be generated at the drilling rig will be stored not to pose a threat to community health. ▪ The disposal of hazardous chemicals and wastes that may be generated at the drilling rig will be carried out at licensed facilities under the supervision of authorized companies and experts.	Project Company Contractor	▪ Ratio of hazardous waste generated to total waste (by contamination + by generation)
25	**Cultural Heritage**	Loss of cultural heritage	Adverse	Additional cost is not expected.	▪ Any artifacts found during the drilling works will be indicated and recorded as “chance finds”. A “Chance Find Procedure” has been prepared for the steps to be followed and implemented after the chance finding. ▪ The Cultural and Natural Assets Conservation Boards will be informed about the chance finds and the approval of the Conservation Board, who is responsible for the area where the drilling rig is located, will be required. No demolition/drilling work will be carried out when awaiting the said approval.	Project Company Contractor	▪ Number of chance find records and reports

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ All relevant actions for demolition, postponing or rescheduling of drilling activities regarding the chance finds will be put into effect. ▪ Any correspondence on this subject will be updated in accordance with all decisions taken, and all documents will be submitted as annexed to ESMP.		
26	**Biodiversity**	Habitat Loss Loss or damage of flora species Loss of fauna species Disturbance and displacement of resident fauna due to noise, visual nuisance and vibration Impacts on flora due to dust emission Heavy metal accumulation or loss of vitality on flora elements and poisoning, reproductive disorders or death on fauna Spreading of Alien invasive species	Adverse	Additional cost is not expected.	▪ The clearance of natural vegetation will be limited to the strip of land needed for the occupation of the project and the adjacent working width, ▪ If *Ajuga bombycina* is encountered during construction activities within the project area, it is recommended that the seeds be collected during the months of May and June and subsequently planted in appropriate habitats. ▪ Mobilization area and excavation material temporary storage area will not be located in natural habitats. ▪ Contractor will be keen on environmental protection matters and prohibit unnecessary disturbance, damage and harm to natural habitats, through clear delineation of the boundaries of the work area to avoid encroachment into any critical, natural or modified habitats. ▪ Project activities such as tree cutting, plant cleaning, soil stripping, road construction and ground preparing activities may result in some habitat, amphibians, reptiles, bird and mammal losses. Therefore, it is recommended that all trees and shrubs will be cut and the floor will be cleaned before stripping the surface soil in the construction site to protect and reduce negative impacts on amphibians, reptile and mammal species. ▪ Surface clearing and stripping activities will not be implemented in birds' breeding period between February and early June in order to avoid the damage on bird species. In the parts of the Project site where surface clearing and stripping are already in progress, the construction activities may continue to be undertaken. In some parts of the Project site where breeding burrows do not exist, construction activities will be performed during this season between February and early June. If construction activities, especially surface clearing and stripping, are undertaken within the breeding season, it is important to check the breeding activities and presence of any breeding burrows. ▪ Particular attention should be given to the vulnerable *Testudo graeca* to prevent loss of individuals due to Project activities. This species will be screened before the commencement of the construction activities in the Project site. If this species is identified in the area, they will be carefully relocated/transported to another safe location. During the construction activities, relocation works for species will continue. ▪ Where vegetation clearing is required, thorough pre-clearing checks for all forms of fauna need to be conducted. A proactive approach will be used to prevent the loss of fauna without obstructing construction activities. The following procedures will be applied: ▪ After cleaning the ground and transporting the amphibians, reptiles and mammals encountered on the construction site, surface soils will be striped carefully. While stripping, some amphibians, reptiles and mammals may be seen again in excavated soil. All these animals will be collected and transported to a suitable nearby habitat. ▪ During surface clearing and stripping activities in the construction phase, biodiversity experts shall be present and accompany the construction team. The experts will collect all animals encountered and affected during the construction phase and transfer them to appropriate habitats around the Project site. ▪ If any active burrows are encountered during the construction phase of the Project, marking tape will be placed on the section/area where the burrow was encountered, and necessary signage will be placed. The construction activities on this section/area will be suspended, while construction activities in other sections of the Project site are continued. ▪ Implement measures to ensure safe handling of chemicals and fuels, in accordance with the Hazardous Material Management Plan. ▪ Any contaminated sites that develop as a result of accidental spills will be remediated according to a Spill Response Plan that will be developed. ▪ Waste management measures and facilities that avoid creating opportunities for food scavengers will be developed and implemented.	Project Company Contractor External experts	▪ Zero damage to natural habitats, wetlands and sites considered as protected areas ▪ Zero damage to threatened species ▪ Zero spreading of alien invasive species

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ Strictly prohibit unnecessary destruction of habitats, cutting of trees or vegetation found outside the area absolutely needed for the project. ▪ Prohibit hunting, trapping and intentional killing of wild animals by the project workers and drivers. ▪ Faunal protection policies will be developed and enforced that prohibit all forms of hunting, any killing of animals and keeping of pets. ▪ Awareness programs will be developed for staff and contractors to raise the awareness of the diversity of animals present, risks associated with large wildlife and how to react when confronted by different species of large wildlife, and requirements to actively prevent the loss of any animals including snakes and species commonly considered to be vermin. ▪ Increase the awareness of drivers and equipment operators towards wildlife conservation and encourage them to avoid or minimize animal fatalities. ▪ Biodiversity awareness creating measures will be taken both for the construction workers as well as to the surrounding community. ▪ Training will be delivered to constructions workers prior to the start and during construction works to increase their awareness and responsibilities concerning the surrounding natural values. ▪ Where free-ranging wildlife occurs, vehicle speeds will be reduced through implementation of speed control measures and the regular enforcement. ▪ Post appropriate signs and apply speed limits for the sections passing through important wildlife areas by setting speed limits to safe levels, (around 30km/h) monitoring and enforcing it. ▪ Apply good site practices incorporating appropriate mitigation measures that reduce nuisance noise levels. ▪ Lighting for construction and security purposes will be inward and downward facing to minimise light pollution in remote areas, and to minimize the disturbance to nocturnal wildlife, birds. ▪ Reduce light contamination into natural habitats at night. ▪ All areas that have been cleared of vegetation and/or where the soil surface has been disturbed need rehabilitation of the vegetation to minimise the establishment of alien invasive species, with consideration of the following aspects: ▪ Revegetation of disturbed sites will be implemented within the same spring season, or within the upcoming spring season for disturbances occurring during the dry season. ▪ Only non-invasive species are to be used for rehabilitation. These species will be native species. ▪ The topsoil will be stripped and stored prior to construction and the stripped vegetation will be used to make the surrounding natural. The topsoil will not be used in any other area. Also will not be stored next to existing alien invasive species infestations. ▪ Topsoil will not be imported from elsewhere / if importation is necessary this will be from a reputable supplier with certification that the material does not contain alien invasive species. Local species will be used in landscaping/planting studies. Non-native plant species will not be used. ▪ Invasive species will not be used in replanting/reseeding works to be carried out due to the project. It should be ensured that the species to be used in replanting/reseeding studies are not invasive. ▪ The measures detailed in the Air Quality, Soil Quality, Surface and Groundwater Quality and Wastewater section will be followed in addressing the impacts associated with geothermal fluid leakages.		

9.1.2 Environmental and Social Management Plan for the Operation Phase of the Project

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
1	Occupational Health and Safety (OHS)	Inadequate workers health and safety conditions	Adverse	Included in operation costs	▪ The Project company will include staff(s) (at least one environmental and one social expert and one full-time OHS expert) who will take charge full-time and effectively control the implementation of the Project, and the Project Company will ensure that the following measures are in place at the construction site. if not, to apply necessary actions/sanctions. ▪ Emergency Response Plan (ERP) and Occupational Health and Safety Plan (OHSP) will be implemented and shared with all employees for the control of situations (fire, earthquake, etc.) that may occur during drilling works within the scope of the project and that require emergency intervention. ▪ The Project Company will require all employees to comply with local and international health and safety legislation and guidelines. Workers will be provided with all necessary personal protective equipment (PPE) (hard hats, safety belts, protective overalls, goggles, gloves, armored shoes, etc.). ▪ Non-smoking areas will be allocated in the drilling rig. ▪ Suitable hand and face washing facilities will be provided to the employees, as well as shower facilities for dusty jobs. ▪ All employees will be informed about working conditions, job descriptions, responsibilities, local community relations and potential business risks. ▪ Emergency teams will be formed, drills and training programs will be carried out in line with emergency scenarios. ▪ Employees will be familiar with emergency plans and in cases requiring urgent intervention, the complaint will be reported to the authorized teams and resolved. ▪ Appropriate marking of sites will be ensured and then workers will be briefed on the ground rules and regulations to be followed. ▪ Considering that first aid intervention may be required before the casualty is transferred to the nearest health institution, the first aid kit will be kept ready in the drilling rig. ▪ Both trainings and events (major events including deaths, lost time events, spills, fires, epidemics or communicable disease outbreaks, social unrest, etc.) will be recorded. ▪ In case of any significant event (eg environmental, social, business or lost time events), the Project Company will notify TSKB and the World Bank within three business days. A report on the root causes of the incident and corrective actions to be taken will then be submitted to TSKB and the World Bank within 30 days. ▪ No entry will be made to the areas where excavation work will be carried out, except for authorized personnel. Loading and unloading activities are carried out together with the persons who will supervise the personnel who will carry out the activity. ▪ Since the works will be carried out in areas close to the public, the access of the public to these areas will be restricted in any way. If the trenches must be left open at night, the area will be adequately illuminated and the necessary signs will be placed and the area will be surrounded by barriers. ▪ Adequate and appropriate training in confined space hazard control, atmospheric testing, use of required PPE as well as the availability and integrity of PPE will be verified before workers are required to enter a permitted confined space. In addition, adequate and appropriate rescue and/or rescue plans and equipment shall be in place before the worker enters the confined space. In the event of an accident, the most accurate first aid will be provided by ensuring coordination with the emergency response teams. The Emergency Response Plan will be revised according to the operational period and necessary training will be given to all personnel. ▪ Only personnel with work permit at height will work at height and safety measures (railing, fall prevention) will be taken.	Project Company	▪ % of scheduled HSE Inspection ▪ % of attendance at HSE meetings ▪ % of closing of Non Compliance Reports (NCRs) ▪ Reporting safe observations ▪ Reporting unsafe observations ▪ Reporting near misses ▪ % of Toolbox attending ▪ % of Risk Assessment compliance ▪ % of Legal Requirements compliance ▪ Results of scheduled audits ▪ HSE training carried out to training matrix ▪ > 90% of all training to matrix ▪ % of attendance at scheduled trainings ▪ Engagement in HSE program by individual managers and supervisors ▪ Engagement in HSE program by contractor's

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ The areas to be excavated will not be accessible except by authorized personnel. Loading and unloading activities will be carried out together with the persons who will supervise the personnel who will perform the activity. ▪ Drilling areas will be surrounded and necessary security measures will be taken, no one will be allowed to enter except the personnel. ▪ WBG General Environmental, Health and Safety Guidelines will be applied. ▪ Equipment meeting international standards in terms of performance and safety will be used. ▪ All equipment used in the drilling phase will be kept in good working condition. ▪ Reducing the time required for work in elevated temperature environments and ensuring access to drinking water; ▪ Shielding surfaces where workers come in close contact with hot equipment, including generating equipment, pipes etc.; ▪ Use of personal protective equipment (PPE) as appropriate, including insulated gloves and shoes; ▪ Implementing appropriate safety procedures during the exploratory drilling process.		
3	**Employment / Economy**	Child labour, forced labour and unregistered employment Contribution to economy	Adverse	Included in operation costs	▪ 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 should be given to the local labor where possible and practical. ▪ Efforts will be exercised to allocate employment opportunities to the local parties. ▪ 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 in the workplace will be eliminated. ▪ Necessary measures will be taken by contractor to make sure that workers coming from outside the city will be given 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 Company's responsibility to ensure that the contractor complies with the determined criteria. ▪ If there are any plans to use the pasture land in the future during the operation phase of the project, the project company will inform the local community using this land. The community will be prevented from worrying about their socioeconomic future. Adequate compensation will be given in case of permanent deterioration of livelihood. ▪ In case the pasture land is used, a new pasture land will be allocated in consultation with the local community and local authorities, taking into account factors such as distance and transportation. ▪ A binary cycle (secordary fluid) will be created to prevent the sulfur generated during the operation period from negatively affecting agricultural productivity and the points where geothermal energy is extracted will be covered to prevent leakage into the soil.	Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe
4	**Social Life**	Potential Community Disturbance	Adverse	Included in operation costs	▪ Project Company will provide training to the site personnel on environmental and social issues. ▪ The operations to be carried out during drilling works will be performed not to restrict / hinder the social and economic life of local people. ▪ To avoid any impact on the safety and daily life of communities, safety and information signs will be placed around drilling rig before the work. ▪ The Project Company will ensure that contractors establish the code of conduct and will check that workers will be given training especially on communication with local people of foreign nationality public before starting work, so that local people of foreign nationality will not be adversely affected by external workers.	Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
5	**Labor and Working Conditions**	Improper Working Conditions, Child labor, forced labor and unregistered employment	Adverse	Included in operation costs	▪ Workers will be allowed to have access to the Grievance Mechanism and will be required to be aware about this Mechanism. ▪ Ensure that the grievance mechanism allows for confidential reporting, protecting workers from retaliation for reporting issues. ▪ Code of conduct will be prepared. All workers will be given training on discrimination and codes of conduct. At the same time, through the trainings, it will be ensured that workers learn the Grievance Mechanism of the Project and the steps to be followed in exercising their legal rights. Access to the Grievance Mechanism will be easy and effective. The grievance mechanism officer designated for the Project will be announced to all employees during the trainings to be given before starting work. There will be brochures and posters containing the grievance mechanism and the contact information of the authorized person in places such as the cafeteria, canteen and service areas used by the employees. CoC should be signed by all employees. ▪ The project company will provide gender training to both its own staff and contractor staff. The content of these trainings will basically be the reflection of the problems arising from gender inequality in society on working life. Apart from this, employees will learn the definitions, differences, emergence and intervention methods of concepts such as SEA/SH and GBV through interactive activities. ▪ Minimum legal labor standards will be met (child/forced labor, anti-discrimination, working hours, minimum wages) as per International Labor Organization (ILO) regulations. ▪ At the same time, the Operational Policies of the World Bank given in the national legislation. will be complied with in terms of the working conditions. ▪ 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. ▪ Provide access to healthcare services for workers, including regular health check-ups and medical facilities. ▪ Discrimination based on language, race, gender, political thought, philosophical belief and religion will be avoided in business relations. ▪ An employee satisfaction survey to be conducted by human resources every 6 months will ensure that employees' views on working conditions and the working environment are obtained.	Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe ▪ Results of employee satisfaction surveys
6	**Community Health and Safety**	Community health and safety risks	Adverse	Included in operation costs	▪ To minimize the impact of the traffic activities, the working hours will be adjusted according to the peak hours of transportation. ▪ The drilling rig area will be fenced to avoid physical hazards to the communities associated with the project. ▪ Project Company will take necessary health and safety measures, such as using appropriate warning signs, making the regular maintenance of the machinery, replacement or repair of part which cause noise and performing watering in dry seasons. ▪ Care will be taken to ensure that warning signs are visible at night and in bad weather conditions. ▪ The adequate number of appropriate firefighting equipment will be kept available at drilling rig at all times. ▪ An emergency action plan 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. ▪ Local people will be informed about possible dangers and precautions to be taken with brochures that will be placed on signs and notice boards to be hung in various areas in the neighborhood. ▪ Detailed information on the use of the Grievance Mechanism and contact information on the grievance mechanism officer will be made available to the public. (via the project website, information brochures left at the Mukhtars offices, posters and hand brochures in places such	Project Company	▪ Number of communicable and non-communicable diseases and injuries experienced. ▪ Number of community health safety & security complaints from local communities as recorded in the grievance register. ▪ Number of reported community health & safety incidents ▪ Number of reported noise incidents

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					as schools, health centers, hospitals, mosques, which are the common areas used by the community intensively). ▪ Damages that may occur on the road surfaces due to traffic caused by heavy drilling machinery during drilling works on existing roads will be repaired by the contractor. In case of any damage to infrastructure elements on private lands due to drilling activities, mitigation measures will be taken by the contractor. ▪ Community Health and Safety training will be provided by the project company to both its own employees and contractor employees.		
9	**Stakeholder Engagement**	Communication issues with the stakeholders	Adverse	Included in operation costs costs	▪ An adequate timing will be planned for interaction / communication with communities and for engagement. ▪ Regular consultations will be carried out with the authorities and communities regarding the project management. ▪ Comprehensive information on the stakeholder engagement is provided in SEP of the Project and the SEP will be updated and implemented throughout the Project.	Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe ▪ Records of stakeholder engagement activities
10	**Grievance Mechanism**	Grievance Issues	Adverse	Included in operation costs	▪ An efficient Grievance Mechanism will be initiated to allow potentially affected individuals to voice their concerns on the Project. ▪ Managing sensitive grievances in a project is crucial for maintaining a positive work environment and ensuring the well-being of team members. There are several measures that can be taken for good management of sensitive grievances in a project: ○ Emphasize the importance of confidentiality in handling sensitive grievances. ○ Assure individuals that their concerns will be treated with discretion and that only those directly involved in the resolution process will be informed. ○ Create an environment where team members feel comfortable expressing their concerns. ○ Establish regular communication channels, such as team meetings or one-on-one sessions, to encourage open dialogue. ○ Maintain thorough documentation of the grievance process, including the nature of the grievance, actions taken, and resolutions. ○ This documentation can serve as a reference for future incidents and may be important for legal or compliance purposes. ○ Respond promptly to grievances to show that they are taken seriously. ○ Delayed responses can exacerbate the issue and contribute to a negative perception of the project's commitment to addressing concerns. ○ Use past grievances as learning opportunities to improve the overall project environment. ▪ In case a sensitive complaint ((Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Gender Based Violence (GBV)) is received by the Contractor they will be responsible for conveying the issue directly to the Project Company GRM focal point. The Project Company is also responsible for forwarding sensitive complaints to the bank immediately. ▪ The Project Company will provide training on SEA/SH and GBV cases and prevention methods to both its own staff and contractor personnel (including the Management Unit).	Project Company	▪ Number of grievances ▪ Percentage of closed grievances within the target timeframe
11	**Documentation**	Missing documentation	Adverse	Included in operation costs	▪ All activities, information meetings, opinions/suggestions, grievances, etc. provided during the operation period will be documented continuously.	Project Company	N/A
12	**Traffic**	Direct and indirect threats posed by drilling activities	Adverse	Included in	▪ Traffic Management Plan will be prepared prior to drilling and applied.	Project Company	▪ Number of non-compliances against the mitigation controls identified in Traffic Management Plan

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
		against traffic and pedestrians		operation costs	▪ Actions will be taken to ensure that any vehicles operating during the drilling period obey the set speed limit (30 km/hr). ▪ 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. ▪ 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. ▪ The weight of all vehicles will not exceed the legal limits according to Highway Traffic Regulation. ▪ In case of hazardous chemical or waste storage on site, the transfer of these wastes will be performed out by licensed carriers not to pose a threat to community health. ▪ The routes developed in agreement with the competent authorities will be used for special cargos. The designated routes will be programmed to prevent traffic congestion on the roads, and will be published in advance to prevent possible disturbance. ▪ The arrangements in traffic will be discussed with the Municipality and planned jointly. ▪ To prevent unauthorized access to the drilling rig, the drilling rig will be surrounded by fence/curtain/protection tape, and uncontrolled entrances will be prevented.		▪ Number of drivers found to be exceeding speed limits or driving unsafely ▪ Number of road traffic accidents involving: ▪ Accidental injuries and deaths, ▪ Spillages (such as cargo or fuel), ▪ Wildlife-vehicle collisions. ▪ Number of traffic-related grievances
13	**Resource Efficiency**	Improper use of resources (Water, fuel, electricity, raw material)	Adverse	Included in operation costs	▪ Resource efficiency and management actions will be taken; use of renewable energy and energy efficiency measures, reducing the carbon footprint, financing for green building, responsible supply chain management and green procurement.	Project Company	▪ Amounts consumed in m³, L, kWh, ton
14	**Air Quality**	Air pollution from Operation Works	Adverse	Included in operation costs	▪ Exhaust systems and emission levels of machinery and vehicles will be checked. ▪ Project Grievance Mechanism will be implemented. ▪ In case of any complaints, air quality measurement will be carried out at the nearest sensitive receptors in accordance with international standards, and the results will be recorded. ▪ Ensure cooling towers are sited properly. ▪ Educate workers on the dangers of exposure to H_2S. ▪ Continuous Emission Monitoring: Regularly measure and monitor gas emissions from the geothermal power plant by using Continuous Emission Monitoring Systems (CEMS). ▪ H2S Monitoring Plan: H2S monitoring plan including the installation of H2S monitoring and warning systems wil be developed. Monitoring plan will include contingency actions to be taken in case of unexpected H2S release. Workers will be provided with personal exposure monitoring equipment and also required PPEs. Communication methods and contacts will be defined including the nearby communities and related local organizations. ▪ Management of Wellhead Gas: Efficient practices for managing wellhead gas should be implemented to control the release of gases during the production process. One possible practice is re-injection of non-condensable gases back into the geothermal reservoir to minimize emissions. ▪ Controlling Odor : Use odor control technologies, such as biofilters or activated carbon filters, to reduce the release of unpleasant-smelling gases, like hydrogen sulfide (H2S), which can cause inconvenience to the nearby population. ▪ Regular maintenance and inspection: Routine maintenance and inspections should be conducted on equipment, pipelines, and wellheads to prevent leaks and malfunctions that may result in increased emissions. Community engagement: Engage with local communities and stakeholders to address their concerns about air quality and odor.	Project Company	▪ Air Quality incidents ▪ Records of Non-Compliance with air quality standards ▪ Community complaints

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
15	**Noise**	Noise from Operation Works	Adverse	Included in operation costs	▪ In case of any complaints, Noise measurement will be carried out in accordance with the international standard, ▪ Installing acoustic enclosures around noisy equipment such as cooling towers, powerhouse, and transformers can significantly reduce sound propagation and attenuate noise levels; ▪ Erecting sound barriers between the noise sources and sensitive receptors can act as physical shields, blocking or reducing the direct transmission of noise to residential areas; ▪ Ensuring regular maintenance and proper functioning of equipment can prevent the development of excessive noise due to wear and tear; ▪ Conducting awareness programs for the local community to educate them about the project's noise mitigation efforts and encouraging open communication can foster understanding and cooperation; ▪ In locations where sound insulation is feasible, insulation should be applied, and high sound-dampening barriers can be installed in the switchboard area. Additionally, the operational schedules of pump systems, turbines, ventilation systems, compressors, generators, etc., should be programmed, considering the proximity to sensitive areas like nearby settlements; ▪ Natural elements such as landscapes, trees, bushes, and forests also contribute to sound absorption, creating a masking effect. Alternatively, a combination of trees, shrubs, and acoustic walls can be utilized for optimal noise reduction.	Project Company	▪ Noise and Vibration incidents ▪ Records of Non-Compliance with Project standards ▪ Number of noise-related community grievances
16	**Waste Management**	Wastes of Operation Works	Adverse	Included in operation costs	▪ Any domestic waste generated will be sorted at source (plastic, glass, paper, etc.), and reusable waste will be recycled. ▪ Unrecyclable waste will be collected in closed sanitary trash bins and will be disposed of by the solid waste collection system of Municipality. ▪ During the operational phase of a geothermal plant, the primary hazardous wastes stem from contaminated packages resulting from the use of chemicals and oils during maintenance and repair activities. Additionally, domestic solid wastes are generated from the business buildings on-site. To effectively manage waste and uphold environmental stewardship, prioritized planning should be undertaken to minimize the generation of waste during plant operations. ▪ To maintain site hygiene and cleanliness, it is imperative to temporarily store the wastes in suitable tanks, pools, or dedicated areas, distinct from other materials and equipment. These storage units must be appropriately labeled and diligently maintained to prevent any leakage or soil contamination. ▪ Depending on the waste type, which may include packaging, rubber, lubricating oil, chemicals, scrap metal, or lumber, the site contractor bears the responsibility of ensuring the proper transfer of waste to licensed waste recovery or disposal facilities. This approach ensures limited impact on both the environment and human well-being. By adhering to these practices, geothermal plants can mitigate their waste footprint and foster sustainable operations. ▪ During operation, cooling towers, air scrubber systems, turbines, and steam separators commonly collect sulfur, silica, and carbonate precipitates. The sludge formed at the bottom of cooling towers and emergency holding pools can be categorized as hazardous, depending on its concentration of silica compounds, chlorides, arsenic, mercury, vanadium, nickel, and other heavy metals. It is recommended that these waste products be stored in a sealed-floor area prior to being disposed of at a waste facility that has the appropriate licences. If the sludge does not contain high levels of leachable metals and is of acceptable quality (classified as non-hazardous waste), it may be considered a possible disposal option to reuse it as backfill material. Whenever possible, third parties should recycle recoverable solid wastes, such as sulfur cake (for example, they can be used in the manufacture of agricultural fertilizers). ▪ During the storage, transport and disposal of the wastes, all kinds of measures will be taken against leaks and spills and storage will be made in an area where there are barriers against leakage. ▪ If different categories of oils are generated from the works at the drilling rig, these oils will be stored separately. ▪ Containers where waste oils are stored will be kept closed and protected from rainwater.	Project Company	▪ Total waste generated ▪ Ratio of recovered/reused/ recycled waste to total waste generated

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
					▪ Waste oils will only be transported by licensed transportation companies, and will only be delivered to licensed recycling or disposal facilities. ▪ Waste batteries will be collected separately from other wastes, delivered to authorized organizations and recycled. ▪ Waste batteries and accumulators will be delivered to waste battery and accumulator disposal facilities within the Municipal borders through authorized transportation companies. ▪		
22	**Effluent Discharges**	Wastewater management failure, pollution from wastewater	Adverse	Included in operation costs	▪ Wastewater Management Plan will be prepared prior to operation and applied. ▪ Brine/geothermal fluid ponds should be sited close to the source. ▪ Brine/geothermal fluid re-injection through re-injection wells into underground reservoir. ▪ Chemical composition and parameters of the brine should be routinely monitored. ▪ Before discharging cleaning waters, the final pH level, Chemical Oxygen Requirement (COD), Temperature, Oil and Grease, Total Cyanide, must be monitored. ▪ Before discharging cleaning waters must be monitored with national legislation and WBG EHS Guidelines. ▪ Periodic testing of effluent water will be conducted in all cases to monitor any potential contamination of surface or groundwater that could pose risks to community health and safety. ▪ As a recommended best practice, unused or abandoned wells should be covered with blind flanges to prevent leakage.	Project Company	▪ Minimization and continued improvement in the number of the reported water quality related incidents. ▪ Zero NCRs per year ▪ Zero grievances per year ▪ No significant adverse impact ▪ No infrastructure damage and damage to loads/humans
23	**Groundwater Quality**	Groundwater contamination caused by geothermal fluids	Adverse	Included in operation costs	▪ Preliminary impact analysis and related mitigation measures (i.e. double casing) depending on literature survey about aquifer structure and groundwater use at exploration area as a part of EIA prepared in accordance to EIA Regulation. ▪ If important freshwater aquifers overlie geothermal reservoirs, monitoring wells will be installed to monitor ground water composition and temperature.	Project Company	▪ Literature information on ground water users around drilling rig. ▪ Well casing diagram. ▪ Presence of monitoring wells and monitoring records.
24	**Hazardous Materials**	Pollution from hazardous materials	Adverse	Included in operation costs	▪ Hazardous Material Management Plan, Spill Response Plan, and EPRP will be prepared prior to operation and applied. ▪ If hazardous waste is stored in the project area, that waste will be stored in containers that are strong, leak-proof, safe and in accordance with internationally recognized standards. The containers will bear "hazardous waste" label, with the amount, content, properties, storage conditions and storage date of the stored material indicated on the containers. ▪ The minimum volume for secondary containment shall be 110% of the capacity oft he largest tank system, plus 10% of the total capacity of all other separate tanks and containers within the bund wall with closed valves for controlled draining during rains. ▪ Containers containing hazardous materials will be placed in sealed vessels to prevent spills and leaks. ▪ Hazardous waste will be transported by licensed waste transportation companies and will be disposed of at licensed facilities. ▪ Toxic paints, solvents or lead-based paints will not be used. ▪ The disposal of hazardous chemicals and wastes that may be generated will be carried out at licensed facilities under the supervision of authorized companies and experts.	Project Company	▪ Ratio of hazardous waste generated to total waste (by contamination + by generation)
26	**Biodiversity**	Habitat Alteration Habitat Fragmentation Heavy metal accumulation or loss of vitality on	Adverse	Included in operation costs	▪ Vegetation will need to be rehabilitated in all areas that have been cleared of vegetation and/or where the soil surface has been disturbed. ▪ Revegetation of disturbed sites will be implemented within the same spring season, or within the upcoming spring season for disturbances occurring during the dry season. ▪ Only non-invasive species are to be used for rehabilitation. These species will be native species.	Project Company	▪ Zero damage to natural habitats, wetlands and sites considered as protected areas ▪ Zero damage to threatened species ▪ Zero spreading of alien invasive species

No.	Topic	Definition of Potential Impact	Type of Impact	Cost	Measures to be Taken	Responsibility	Key Performance Indicators
		flora elements and poisoning, reproductive disorders or death on fauna Disturbance and displacement of resident fauna due to noise and light Collision with power lines and electrocution from electric pylons while perching			▪ The geothermal fluid pipelines located on the surface will be positioned above the ground to allow for the passage of animals, and these gaps will be maintained without being obstructed by any material that could impede animal passage. ▪ The measures detailed in the Noise and Vibration section will be followed in addressing the impacts related to noise. ▪ Lighting for security purposes will be inward and downward facing to minimise light pollution in remote areas, and to minimize the disturbance to nocturnal wildlife, birds. ▪ Reduce light contamination into natural habitats at night. ▪ Bird markers and diverters on ETL towers and power lines will be installed. These visual cues can help birds detect the presence of these structures and avoid collisions. ▪ Bird-friendly designs for towers will be implemented to reduce the risk of electrocution. This may involve modifying the tower structures to make them less hazardous for perching or nesting birds and ensuring proper insulation to prevent electrical hazards. ▪ The measures detailed in the Air Quality, Soil Quality, Surface and Groundwater Quality and Wastewater section will be followed in addressing the impacts associated with geothermal fluid leakages.		

9.2 Environmental and Social Monitoring

9.2.1 Monitoring Plan for the Construction Phase

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
1	**Site arrangements and Establishment of management system**	Drilling Rig Construction	Establishment of insufficient environmental and social organization and failure in management Deficiencies in the documentation, training and permit process	- Office - Drilling Rig	- ESMS Documents, Record keeping, and log control system are in place - Regular audits	- At the beginning of the drilling works	- ESMS is in place - Permits are in place - Trainings provided to every worker before start of drilling	- Zero non-compliance	Included in construction costs	Project Company
2	**Occupational Health and Safety**	Land preparation Drilling and test operations Rehabilitation	- Negative impact on health and safety of the workers	- Drilling locations	- Internal site audits - Log and records on OHS - Training records - Internal grievance records	- Weekly	- Number of incidents - Number of non-compliances - Number of trained staff - Number of complaints from workers	- Zero incident - Minimum non-compliance - All personnel trained - Addressing grievances satisfactorily within the specified timeframe (30 days)	Included in construction costs	Contractor Project Company
3	**Employment / Economy**	Pre- construction Land preparation Drilling and test operations Rehabilitation	Non-compliance with project standards	- Drilling locations	- Pre-evaluation records of contractors on E&S and OHS competence and evidences of selection taking into account the economic and feasible considerations following the Beneficiary Agreement Article 11 and	- Prior to contractor selection - Monthly - Weekly	- Pre-evaluation records - Number of non-compliance - Number and % of local businesses contracted	- Selection of most economical and feasible option - Minimum non-compliance - No E&S incident	Included in construction costs	Contractor Project Company

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
					Annex 5. - Employment records by gender and locality/ supply records by locality - Non-compliance records		- Number and % of local workforce	- Increase in local businesses engaged and employment		
4	**Labor and Working Conditions**	Land preparation Drilling and test operations Rehabilitation	Negative impacts associated to the management of workers' fundamental principles and rights.	- Drilling locations	- Internal audits - Accommodation facility audit - Internal grievance records	- Weekly	- Number of non-compliance - Number of complaints from workers	- Zero non-compliance - Addressing grievances satisfactorily within the specified timeframe (30 days)	Included in construction costs	Contractor Project Company
5	**Community Health and Safety**	Land preparation Drilling and test operations Rehabilitation	Negative impact on health and safety of the communities	- Drilling locations - Nearby communities	- Internal site audits - Training records - External grievance records	- Weekly	- Number of incidents - Number of trained staff - Number of complaints from community	- Zero incident - All personnel trained - Addressing grievances satisfactorily within the specified timeframe (30 days)	Included in construction costs	Contractor Project Company
6	**Land Acquisition**	Pre- Construction	Unsuccessful land acquisition implementation	- Drilling locations	- Internal audits	- Weekly	- Land acquisition records/agreements - Number of complaints from land owners/users	- Successful land acquisition process - Successful compensation	Included in construction costs	Project Company
7	**Land Use**	Drilling and test operations Rehabilitation	Negative impact on livelihood	- Nearby communities	- External grievance records	- Weekly	- Records on damage to neighboring lands - Number of complaints	- Zero damage to neighboring lands - Resolving all grievances within the stipulated timeframe	Included in construction costs	Project Company
8	**Stakeholder Engagement and Grievance Mechanism**	Land preparation Drilling and test operations Rehabilitation	Non-informing the stakeholders and non-raising of the complaints / requests of the Project stakeholders / workers	- Nearby communities	- Stakeholder engagement activities and records - Grievance mechanism training records - Internal grievance records - External grievance records	- Continuous - Monthly - Weekly - Weekly	- Number of stakeholder engagement activities - Number of trained staff - Number of complaints	- Sufficient stakeholder engagement activity according to SEP - All personnel trained - Resolving all grievances within the stipulated timeframe	Included in construction costs	Project Company
9	**Resource Efficiency**	Land preparation Drilling and test operations Rehabilitation	Improper use of resources (Water, fuel, electricity, raw material)	- Office - Drilling locations	- Document and resource use log control - Regular audits	- Monthly	- Amounts consumed in m^3, L, kWh, ton	Decrease in use of resources	Included in construction costs	Contractor Project Company
10	**Air Quality**	Drilling and Well test	Potential impact on local air quality	- Drilling location and nearby sensitive areas	- Internal site audits - Environmental air quality measurements (PM10, H2S) - Vehicle exhaust emission	- Daily - Air quality measurements will be performed in case a complaint	- Number of non-compliances - Number of complaints - Regulatory limits	- Zero non- compliance - Zero complaints - Compliance with the limits	Included in construction costs	Contractor Project Company

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
					measurements - External grievance records - Training and drill records - H2S and CO2 emissions monitoring and warning system records	- Exhaust emission measurements will be performed for: - Passenger cars – every 2 years; and - other vehicles – once a year - Weekly - Training drill records will be reviewed weekly - Daily				
11	**Odor**	Drilling and test operations	Disturbance of nearby residents	- Drilling locations and nearby sensitive areas	- Internal site audits - Environmental odor measurements - H2S measurements - External grievance records - H2S emissions monitoring and warning system records - H2S emissions monitoring and warning system maintenance records	- Daily - In case of any complaint with the approval of the Risk Sharing Mechanism (RSM) Unit - In case of any complaint with the approval of the RSM Unit - Weekly - Daily - Weekly	- Number of non-compliances - Number of complaints - Regulatory limits	- Zero non-compliance - Zero complaints - Compliance with the limits	Included in construction costs	Contractor Project Company
12	**Noise**	Land preparation Drilling and test operations Rehabilitation	Potential impact on health of living creatures and disturbance of nearby residents	- Drilling locations and nearby sensitive areas	- Internal site audits - Environmental noise measurement - Records for maintenance of the machinery and vehicles - External grievance records	- Daily - In case of any complaint with the approval of the RSM Unit - Regularly (according to the recommended by the services - Weekly	- Number of non-compliances - Number of complaints - Regulatory limits	- Zero non-compliance - Zero complaints - Compliance with the limits	Included in construction costs	Contractor Project Company
13	**Waste Management**	Land preparation Drilling and test operations Rehabilitation	Potential impact on soil and surface water because of wastes	- Drilling locations and temporary waste storage areas	- Internal site audits - Waste records, log, invoices and receipts - Waste analysis - Soil/groundwater/surface water analysis	- Daily - Daily - In case of any contamination - In case of any contamination, subject to the approval of the RSM Unit	- Volume/amount of wastes - Number of incidents	- Decrease in generation amount - Zero incident	Included in construction costs	Contractor Project Company
14	**Drilling Mud**	Drilling and test operations	Potential impact on soil and surface water because of drilling mud	- Drilling locations	- Internal site audits - Mud analysis results - Waste records, invoices, receipts	- Daily - After completion of the drilling, with the approval of the RSM Unit	- Mud volume - Number of incidents	- No overflow of drilling mud tank/pit - Zero incident	Included in construction costs	Contractor Project Company

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
					- Soil/groundwater/surface water analysis	- Daily - In case of any contamination, subject to the approval of the RSM Unit				
15	**Wastewater Management**	Land preparation Drilling and test operations Rehabilitation	Potential impact on soil surface water and groundwater because of wastewater	- Drilling locations - Septic tanks	- Internal site audits - Waste records, log, invoices and receipts - Wastewater analysis - Soil/groundwater/surface water analysis	- Daily - Daily - In case of any contamination, subject to the approval of the RSM Unit - In case of any spill and contamination, subject to the approval of the RSM Unit	- Volume of wastewater - Number of incidents	- Decrease in generation amount - Zero incident	Included in construction costs	Contractor Project Company
16	**Hazardous Materials**	Land preparation Drilling and test operations Rehabilitation	Potential impact on soil and surface water because of hazardous materials	- Drilling locations - Chemical storage area	- Internal site audits - Accident/incident/near miss log and investigation reports - Assignment records - Spill kit checklists - Training records - Collection pit control records - Contamination analyses for collection pit - Inspection records for vehicles and equipment - Soil/groundwater/surface water analysis	- Daily - Weekly - Monthly - Weekly - Monthly - Daily - In case of any contamination, subject to the approval of the RSM Unit - Daily - In case of any spill and contamination, subject to the approval of the RSM Unit	- Number of incidents	- Zero incident	Included in construction costs	Contractor Project Company
17	**Effluent Discharges**	Drilling and test operations	Potential impact on soil, groundwater and surface water because of test water, recirculation water and geothermal fluid	- Drilling locations	- Internal site audits - Soil/groundwater/surface water analysis	- Daily - In case of any leak into reservoir and contamination, subject to the approval of the RSM Unit	- Test water, geothermal fluid and recirculation water volume - Number of incidents	- No leak in reservoir - No overflow of test water and recirculation pool - Monitoring the wells to be drilled in the drilling location areas	Included in construction costs	Contractor Project Company
18	**Groundwater Quality**	Drilling and test operations	Potential impact on groundwater quality because of drilling and test operation works	- Drilling locations - Groundwater observation wells	- Drilling logs for ground water reservoir controls - Drilling records - Groundwater analysis (Temperature, Salinity, Electrical conductivity, pH, Dissolved oxygen, Hydrogen-sulfur, Alkalinity, Boron, Copper, Zinc, Mercury, Lead,	- Daily - Monthly groundwater analysis in the direction of groundwater flow to identify any leak into reservoir formation and surface or subsurface contamination, subject to the approval of the RSM Unit	- Report regarding measurements and analysis	- No leak in groundwater reservoir	Included in construction costs	Contractor Project Company

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
					Iron, Manganese, Cadmium, Arsenic, Boron, Total suspended solids, Total organic matter, Carbon, Nitrite, Nitrates, Ammonium, Chloride, Sulfate, Trichlorethylene, Tetrachlorethylene, Total Phosphorus / Phosphates, Cyanides, Organohalogen compounds and substances that may form such compounds in the water environment)					
19	**Soil Quality**	Land preparation Rehabilitation	Potential impact on soil quality because of land preparation and rehabilitation works	- Drilling locations	- Internal site audits - Topsoil and excavation handling and storage records - Drainage and surface stabilization design documents	- Daily - Daily - Before works are performed and weekly	- Number of incidents	- Zero incident	Included in construction costs	Contractor Project Company
20	**Cultural Heritage**	Land preparation	Potential impact on tangible and intangible cultural heritage	- Drilling locations	- Internal site audits - Training records	- Daily - Monthly	- Number of non-compliances - Number of trained staff	- Zero non-compliance - All personnel trained	Included in construction costs	Contractor Project Company
21	**Biodiversity**	Land preparation Drilling and test operations Rehabilitation	Hazard to the biodiversity features	- Project area and surroundings	- Internal site audits - Training records	- Daily - Monthly	- Number of incidents - Number of trained staff	- Zero incident - All personnel trained	Included in construction costs	Contractor Project Company

9.2.2 Monitoring Plan for the Operation Phase

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
1	**Establishment of management system**	Operation	Establishment of insufficient environmental and social organization and failure in management Deficiencies in the documentation, training and permit process	- Office - GPP	- ESMS Documents, Record keeping, and log control system are in place - Regular audits	- At the beginning of the drilling works	- ESMS is in place - Permits are in place - Trainings provided to every worker before start of drilling	- Zero non-compliance	Included in operation costs	Project Company
2	**Occupational Health and Safety**	Operation	- Negative impact on health and safety of the workers	- GPP	- Internal site audits - Log and records on OHS - Training records - Internal grievance records	- Weekly	- Number of incidents - Number of non-compliances - Number of trained staff - Number of complaints from workers	- Zero incident - Minimum non-compliance - All personnel trained - Zero complaint	Included in operation costs	Project Company
3	**Employment / Economy**	Operation	Non-compliance with project standards	- GPP	- Pre-evaluation records of contractors on E&S and OHS competence and evidences of selection taking into account the economic and feasible considerations following the Beneficiary Agreement Article 11 and Annex 5. - Employment records by gender and locality/ supply records by locality - Non-compliance records	- Prior to contractor selection - Monthly - Weekly	- Pre-evaluation records - Number of non-compliance - Number and % of local businesses contracted - Number and % of local workforce - Percentage of goods and services procured from local resources. - Number of reported cases of discrimination in the workplace. - Percentage improvement in workplace equality measures Number of actions taken to eliminate discrimination in the workplace. - Feedback from employees on the workplace environment regarding discrimination. Number of collaborative infrastructure projects with local authorities. - Percentage improvement in local infrastructure, such as roads, utilities, and community facilities. Number of workers from outside the city completing the training	- Selection of most economical and feasible option - Minimum non-compliance - No E&S incident - Increase in local businesses engaged and employment	Included in operation costs	Project Company

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
							program on dialogue and communication with local communities. - Assessment of the resolution of social and cultural issues between host communities and external workers			
4	**Labor and Working Conditions**	Operation	Negative impacts associated to the management of workers' fundamental principles and rights.	- GPP	- Internal audits - Accommodation facility audit - Internal grievance records	- Weekly	- Number of non-compliance - Number of complaints from workers - Number of grievances on SH/GBV - Number of grievances on SH/GBV - Results of employee satisfaction surveys - Percentage of workers trained on discrimination and codes of conduct - Number of training sessions conducted on sexual harassment, abuse, gender-based violence, and intervention methods - Number of staff members and contractors who receive gender training - Number of healthcare services provided, including regular check-ups and medical facilities	- Zero non-compliance - Zero complaint	Included in operation costs	Project Company
5	**Community Health and Safety**	Operation	Negative impact on health and safety of the communities	- GPP - Nearby communities	- Internal site audits - Training records - External grievance records	- Weekly	- Number of incidents - Number of trained staff - Number of complaints from community	- Zero incident - All personnel trained - Zero complaint	Included in operation costs	Project Company
6	**Land Acquisition**	Operation	Unsuccessful land acquisition implementation	- GPP	- Internal audits	- Weekly	- Land acquisition records/agreements	- Successful land acquisition process - Successful compensation	Included in operation costs	Project Company
8	**Stakeholder Engagement and Grievance Mechanism**	Operation	Non-informing the stakeholders and non-raising of the complaints / requests of the Project stakeholders / workers	- Nearby communities	- Stakeholder engagement activities and records - Grievance mechanism training records - Internal grievance records	- Continuous - Monthly - Weekly - Weekly	- Number of stakeholder engagement activities - Number of trained staff - Number of	- Sufficient stakeholder engagement activity according to SEP - All personnel	Included in operation costs	Project Company

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
					- External grievance records		complaints	trained - Resolving all grievances within the stipulated timeframe		
9	**Resource Efficiency**	Operation	Improper use of resources (Water, fuel, electricity, raw material)	- Office - GPP	- Document and resource use log control - Regular audits	- Monthly	- Amounts consumed in m³, L, kWh, ton	Decrease in use of resources	Included in operation costs	Project Company
10	**Air Quality**	Operation	Potential impact on local air quality	- GPP and nearby sensitive areas	- Internal site audits - Environmental air quality measurements (PM10, H2S) - Vehicle exhaust emission measurements - External grievance records - Training and drill records - H2S and CO2 emissions monitoring and warning system records	- Daily - Air quality measurements will be performed in case a complaint - Exhaust emission measurements will be performed for: - Passenger cars – every 2 years; and - other vehicles – once a year - Weekly - Training drill records will be reviewed weekly - Daily	- Number of non-compliances - Number of complaints - Regulatory limits	- Zero non-compliance - Zero complaints - Compliance with the limits	Included in operation costs	Project Company
11	**Odor**	Operation	Disturbance of nearby residents	- GPP and nearby sensitive areas	- Internal site audits - Environmental odor measurements - H2S measurements - External grievance records - H2S emissions monitoring and warning system records - H2S emissions monitoring and warning system maintenance records	- Daily - In case of any complaint with the approval of the RSM Unit - In case of any complaint with the approval of the RSM Unit - Weekly - Daily - Weekly	- Number of non-compliances - Number of complaints - Regulatory limits	- Zero non-compliance - Zero complaints - Compliance with the limits	Included in operation costs	Project Company
12	**Noise**	Operation	Potential impact on health of living creatures and disturbance of nearby residents	- GPP and nearby sensitive areas	- Internal site audits - Environmental noise measurement - Records for maintenance of the machinery and vehicles - External grievance records	- Daily - In case of any complaint with the approval of the RSM Unit - Regularly (according to the recommended by the services	- Number of non-compliances - Number of complaints - Regulatory limits	- Zero non-compliance - Zero complaints - Compliance with the limits	Included in operation costs	Project Company

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
						- Weekly				
13	**Waste Management**	Operation	Potential impact on soil and surface water because of wastes	- GPP and temporary waste storage areas	- Internal site audits - Waste records, log, invoices and receipts - Waste analysis - Soil/groundwater/surface water analysis	- Daily - Daily - In case of any contamination - In case of any contamination, subject to the approval of the RSM Unit	- Volume/amount of wastes - Number of incidents	- Decrease in generation amount - Zero incident	Included in operation costs	Project Company
15	**Wastewater Management**	Operation	Potential impact on soil surface water and groundwater because of wastewater	- GPP - Septic tanks	- Internal site audits - Waste records, log, invoices and receipts - Wastewater analysis - Soil/groundwater/surface water analysis	- Daily - Daily - In case of any contamination, subject to the approval of the RSM Unit - In case of any spill and contamination, subject to the approval of the RSM Unit	- Volume of wastewater - Number of incidents	- Decrease in generation amount - Zero incident	Included in operation costs	Project Company
16	**Hazardous Materials**	Operation	Potential impact on soil and surface water because of hazardous materials	- GPP - Chemical storage area	- Internal site audits - Accident/incident/near miss log and investigation reports - Assignment records - Spill kit checklists - Training records - Collection pit control records - Contamination analyses for collection pit - Inspection records for vehicles and equipment - Soil/groundwater/surface water analysis	- Daily - Weekly - Monthly - Weekly - Monthly - Daily - In case of any contamination, subject to the approval of the RSM Unit - Daily - In case of any spill and contamination, subject to the approval of the RSM Unit	- Number of incidents	- Zero incident	Included in operation costs	Project Company
17	**Effluent Discharges**	Operation	Potential impact on soil, groundwater and surface water because of test water, recirculation water and geothermal fluid	- GPP	- Internal site audits - Soil/groundwater/surface water analysis	- Daily - In case of any leak into reservoir and contamination, subject to the approval of the RSM Unit	- Test water, geothermal fluid and recirculation water volume - Number of incidents	- No leak in reservoir - No overflow of test water and recirculation pool - Monitoring the wells to be drilled in the drilling location areas	Included in operation costs	Project Company

No	Topic	Phase	Why	Location	Parameters Monitored	Monitoring / Reporting Time / Frequency	Key Performance Indicators	Target/ Threshold Values	Cost	Responsibility
18	**Groundwater Quality**	Operation	Potential impact on groundwater quality because of drilling and test operation works	- Groundwater observation wells	- Drilling logs for ground water reservoir controls - Drilling records - Groundwater analysis	- Daily - Monthly groundwater analysis in the direction of groundwater flow to identify any leak into reservoir formation and surface or subsurface contamination, subject to the approval of the RSM Unit	- Report regarding measurements and analysis	- No leak in groundwater reservoir	Included in operation costs	Project Company
19	**Soil Quality**	Operation	Potential impact on soil quality because of land preparation and rehabilitation works	- GPP	- Internal site audits - Topsoil and excavation handling and storage records - Drainage and surface stabilization design documents	- Daily - Daily - Before works are performed and weekly	- Number of incidents	- Zero incident	Included in operation costs	Project Company
21	**Biodiversity**	Operation	Hazard to the biodiversity features International agreements	- Project Area and surroundings	- Bird monitoring - Heavy metal accumulation on flora - Population density in plant taxa - Poisoning and reproductive disorders in fauna elements - Internal site audits - Training records	- Seasonal monitoring for a duration of 5 years for Bird monitoring, Heavy metal accumulation on flora, Population density in plant taxa and Poisoning and reproductive disorders in fauna elements - Daily - Monthly	- Number of incidents - Number of trained staff	- Zero incident - All personnel trained	Included in operation costs	Project Company

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Appendix A - Operation License

T.C.
AYDIN VALiLiGi
YATIRIM iZLEME VE KOORDiNASYON BASKANLIGI
DOGAL KAYNAKLAR RUHSAT VE KULTUR VARLIKLARI MUDURLUGU

JEOTERMAL KAYNAKLAR VE DOGAL MiNERALLi SULAR

iSLETME RUHSATI

iii	:	AYDIN
il<;esi	:	KUSADASI
Kaynagm cinsi	:	JEOTERMAL KAYNAK
Ruhsat Numaras1	:	2009/138
Ruhsatm Yi.iri.irli.ige Giri§ Tarihi	:	12.04.2013
Ruhsat Si.iresi Bitim Tarihi	:	12.04.2043
Ruhsat Alam (hektar)	:	4083,78 Ha
Eri§im No	:	
Ruhsat Sahibi	:	HEZ ENERJi iNSAAT ve SANAYi TiCARET A.S.
Vergi veya T.C. Kimlik No	:	FETHiYE V.D.-4620409319
Ruhsatm Ait Oldugu paftalar	:	M18b3,M19a4

1.Poli1!0n Ruhsat koordinatlan: (M18b3)

	1.Nokta	2.Nokta	3.Nokta	4.Nokta	5.Nokta	6.Nokta	7.Nokta	8.Nokta	9.Nokta
(Y)	537 650	539 000	539 000	541 651	544 600	547 000	547 000	546 327	544 349
(X)	4 190 250	4 190 319	4 189 000	4 188 999	4 186 800	4187 000	4 186 551	4 186 469	4 186 586
	10.Nokta	11.Nokta	12.Nokta	13.Nokta	14.Nokta	15.Nokta	16.Nokta	17.Nokta	18.Nokta
(Y)	544100	544 065	544 032	542 700	541645	541866	541 650	542 571	542 962
(X)	4 186 600	4 186 538	4 186 479	4 187 615	4 186 125	4185 926	4185 900	4 183 860	4 182 994
	19.Nokta	20.Nokta	21.Nokta	22.Nokta	23.Nokta	24.Nokta	25.Nokta	26.Nokta	27.Nokta
(Y)	542 350	543 400	548 000	548 000	549 500	549 250	549 249	546 750	544 599
(X)	4 182 070	4180 400	4 183 687	4 179 500	4 179 500	4 178 998	4 178 998	4 174 000	4 173 999
	28.Nokta	29.Nokta	30.Nokta	31.Nokta	32.Nokta	33.Nokta	34.Nokta	35.Nokta	36.Nokta
(Y)	546 800	542 000	539 536	539 449	542 230	541 942	541647	539 220	539 045
(X)	4 175 000	4182 000	4 177 463	4 177 550	4 182 665	4 183 000	4 183 342	4 186 165	4 185 923
	37.Nokta	38.Nokta	39.Nokta	40.Nokta	41.Nokta	42.Nokta	43.Nokta	44.Nokta	45.Nokta
(Y)	538 870	539 426	541618	541548	541 050	541 491	541 400	537 900	—
(X)	4 186 170	4 186 490	4 183 928	4 185 310	4 186 430	4 186 446	4 188 250	4 188 650	—

2.Poli1;on Ruhsat Koordinatlan: (M19a4)

	1.Nokta	2.Nokta	3.Nokta	4.Nokta	5.Nokta	6.Nokta	7.Nokta	8.Nokta	9.Nokta
(Y)	544 349	546 327	545 669	544195	544 032	544 065	544 400	—	—
(X)	4 186 586	4186 469	4 186 389	4186 340	4 186 479	4 186 538	4 186 550	—	—

Bu ruhsat, 17.02.2016 tarih ve 2691 say1lt Olur ile devir sonras1, 18.11.2019 tarih ve 22775 say1h Olur ile 2009/138 (er:3200606) ve 2017/5 (er:3343257) numarah ruhsatlann birle§tirilmesi sonucu di.izenlenmi§tir.

Ruhsat Sahibinin Adresi:
Akarca Mah. 823 Sk. A-Bio Ap.
No:1A K:2 D:7 Fethiye/MUGLA

v-{A'4)
Mustafa Hulusi ARAT
Vali Yard1mcISI
YiKOB Ba kan

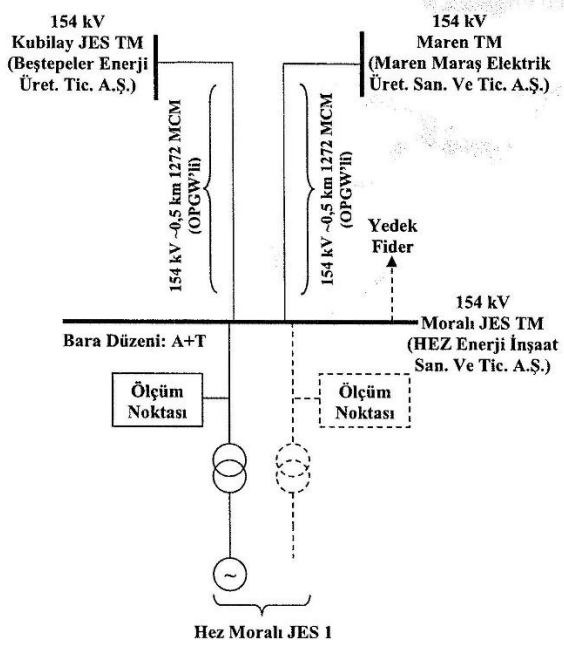
Appendix B - Connection Agreement to The Electricity Distribution System

BAĞLANTI ANLAŞMASI

İKİNCİ BÖLÜM

EK-1a
ÜRETİCİLER İÇİN BAĞLANTI BİLGİLERİ

Tesisin Adresi	:**HEZ Enerji İnşaat Sanayi Ve Ticaret A.Ş./Aydın**
Lisans Tarihi ve No'su	:**31.03.2022 ÖN/10891-3/05146**
Transformatör Merkezi/EİH	:**154 kV Kubilay JES TM-Maren TM EİH'na iki ayrı hat ile girdi-çıktı**
Gerilim Seviyesi	:**154 kV**
Ölçüm Noktası	:Tek hat şemasında belirtildiği gibi
Maksimum Alış Kapasitesi	: ……4…… MW
Maksimum Veriş Kapasitesi[1)]	: **24** MW
Prensip Tek Hat Şeması[2)]	:



[1)] Üretim lisansındaki kurulu güç değerinden az olmamalıdır.
[2)] Prensip Tek Hat Şeması, söz konusu tesisin bara düzeni, TEİAŞ adına bırakılacak yedek fider sayısı, Ölçüm Noktası ve İletim Sistemine Bağlantılarıyla ilgili bilgileri içermelidir.
(*) Kullanıcıya özgü bağlantı koşulları varsa EK-1d'de yer verilecektir.

TÜRKİYE ELEKTRİK İLETİM A.Ş. TARİFE VE MÜŞTERİ HİZMETLERİ DAİRESİ BAŞKANLIĞI TEİAŞ GENEL MÜDÜRLÜĞÜ

9

HEZ ENERJİ İNŞAAT SAN. TİC. A.Ş.
Karacaoğlan Mah. Kemalpaşa Cad. No 307
Işıkkent-Bornova/İZMİR

Appendix C - Exemption Letter Dated 10.07.2013

T.C.
ÇEVRE VE ŞEHİRCİLİK
BAKANLIĞI

T.C.
AYDIN VALİLİĞİ
Çevre ve Şehircilik İl Müdürlüğü

10 Temmuz 2013

Sayı : 98914016-8842-220.01.03 - 7482
Konu : Çed Görüşü

RESİF ÇEVRE MÜHENDİSLİĞİ İNŞ. MAK. TUR.
GIDA TEKST. SAN VE TİC. LTD. ŞTİ
1420 Sok. No:77 Alsancak / İZMİR

İlgi a) 17.07.2008 tarih ve 26939 sayılı Resmi Gazete'de yayımlanarak yürürlüğe giren ÇED Yönetmeliği (Değişik: RG-30.06.2011/27980, RG-05.04.2013-28609)
b) 14.06.2013 tarihli dilekçeniz.

İlgi b) de kayıtlı dilekçenizde İlimiz Söke İlçesi, Argavlı Köyü Mevkii 2009/138 ruhsat nolu sahada 139 ada 1-2-3 parsellerde 50.000 m2 lik alanda **Koz Yer Altı Yer Üstü Kaynakları Elektrik Enerji Mak. İnş. Tur. Tar. San. ve Tic. A.Ş** tarafından gerçekleştirilmesi planlanan jeotermal seracılık faaliyetinin ÇED yönetmeliği kapsamında değerlendirilmesi talep edilmektedir.

Bu kapsamda söz konusu alanda yapılması planlanan faaliyetin; İlgi a) da kayıtlı ÇED Yönetmeliğinin Ek 1 ve Ek 2 listesinde yer almadığından söz konusu faaliyetiniz ÇED Yönetmeliği hükümlerinden muaf olarak değerlendirilmiştir.

7.33 numaralı Genel Hükümde "*Termal kaynak tespiti yapılan alanlar çevresinde, bu kaynakları kullanacak olan tarım torganize sera, ve turizm sektörüne yönelik yatırımlar, Bakanlığın uygun görüşü alınmak şartı ile yapılabilir. Bu tesisler ile ilgili olarak, kurum ve kuruluşlardan alınacak görüşler doğrultusunda yapılacak imar planları, ilgili idarece onaylanmadan uygulamaya geçilemez. Yapılanma koşulları alt ölçekli planlarda belirlenecektir.*" hükmü bulunduğundan söz konusu yatırımın yapılacağı alanda 3194 sayılı İmar Kanunu ve ilgili yönetmelikleri uyarınca imar planının hazırlanması, buna ilave olarak, İmar Kanunu'nun 5. maddesinde karada ve suda, daimi veya muvakkat, resmi ve hususi yeraltı ve yerüstü inşaatı ile bunların ilave, değişiklik ve tamirlerini içine alan sabit ve müteharrik tesisler "yapı" olarak tanımlanmış, 20. maddesinde yapıların imar planı, yönetmelik, ruhsat ve eklerine uygun olarak yapılabileceği, 21. maddesinde bu Kanun kapsamına giren yapılar için yapı ruhsatiyesi alınmasının zorunlu olduğu, 30. maddesinde tamamen ya da kısmen biten bir yapının kullanılabilmesi için yapı kullanma izni alınması gerektiği hüküm altına alınmıştır. Söz konusu parsel üzerinde kurulması planlanan tesis ile ilgili değerlendirmenin ilgili kurum tarafından yukarıda belirtilen plan hükümleri ile 3194 sayılı İmar Kanunu ve ilgili yönetmelikleri kapsamında değerlendirilmesi gerekmektedir.

Ancak, çevre değerlerinin korunması amacıyla 2872 sayılı Çevre Kanunu ve bu kanuna istinaden çıkan yönetmeliklerin ilgili hükümlerine uyulması, mer'i mevzuat çerçevesinde gerekli izinlerin alınması, ileri dönemlerde mevcut duruma ilişkin yapılmak istenen değişikliklere ilişkin bir proje söz konusu olduğunda, Valiliğimize (Çevre ve Şehircilik İl Müdürlüğü) bilgi verilmesi hususunda Bilgilerinizi ve gereğini rica ederim.

Süleyman YARAN
Vali a.
Müdür V

Appendix D - Exemption Letter Dated 05.04.2016

T.C.
<;EVRE ve EHiRCiLiK BAKANLIGI
<;evresel Etki Degerlendirmesi, izin ve Denetim Gene) Mi.idi.irhigi.i
T.C.
AYDIN VALiLiGi
vEVRE ve EHiRCiLiK iL MUDURLUG-0

Karar Tarihi : 05-04-2016
KararNo: 98914016 220-02 E-2016296

CEVRESEL ETKi DEGERLENDiRME BELGESi

25.11.2014 tarih ve 29186 say1h Resmi Gazete'de yay1mlanarak yi.iri.irlii.ige giren <:evresel Etki Degerlendirmesi Yonetmeligi'nin Ek-II listesinde yer alan **'Sondaj Yl>ntemiyle Jeotermal** K.aynak **Arama Faaliyeti'** projesi ile ilgili olarak inceleme-degerlendirme yapllml ve Proje Tamtlm Dosyasmda 9evresel etkilere kar1 alnmas1 ongori.ilen onlemler yeterli gori.ilmi.i ti.ir. Aynca <:ED Raporu haz1rlanmasma gerek bulunmad1g1 tespit edilmi olup, soz konusu projeye <:ED Yonetmeliginin 17. Maddesi geregince Valiligimizce **"vevresel Etki Degerlendirmesi Gerekli Degildir"** Karar1 verilmi tir.

Dr. Necdet TURKER
Vali a.
Vali Yardimcisi

Proje Sahibi : Hez Enerji in aat San. ve Tic. A.S.
Proje Yeri: Aydm ili, Soke ilc:esi, 2009/138 RUHSAT NUMARALI SAHA
Kapasite: 2 Adet Jeotermal Kaynak Arama Sondajr
Koordinatlar belgenin arka yiiziindededir.

Datum	: ED-50	Datum	: V\.{jS-84
TQO	:UTM	TQO	: Cogrm
DOM	: 'U	ifade 9ekli	: Derece.Kesir
ZON	: J5	Eleman Say1s	: E◆em-Boytan
Ol◆ek	: 6Derece		
Eleman S1ras	: Saga -Yukan		
MORALI MAHALLESi 228 ADA 1 PARSEL			
1	546362. 39: 4186565. 51	37. 823 656 52: 27. 5263 2618	
2	546 352. 32: 418 66 78. 54	37. 82467547: 27. 52621900	
3	546349. 36: 4186711. 80	37.82497574:27.52618750	
4	546343. 04: 4186782. 79	37. 82561507: 27. 52612022	
5	546 392. 08: 418 67 96. 99	37. 82574056: 27. 52667835	
6	546400. 06: 4186707. 31	37. 82493261: 27. 52676328	
7	546403. 02: 4186674. 06	37. 82463234: 27. 52679478	
8	546411. 37: 4186580. 37	37. 823787 42: 27. 52688365	
Alm: 1,09ha			
ARGAVLI MAHALLESi 145 ADA 7 PARSEL			
9	544426.17: 4186716. 24	37. 82511099: 27. 50433573	
10	544394. 56: 4186707. 61	37. 82503501: 27. 50397604	
11	544327. 32: 4186841. 41	37. 82624419: 27. 50322022	
12	544404. 37: 4186856. 39	37. 826 37 4 73: 27. 504096 62	
13	544477. 95: 4186666. 89	37. 82466324: 27. 504921 05	
14	544448. 25: 4186661. 02	37. 82461241: 27. 50458323	
Alm: 1,19ha			
Toplan ◆◆•◆ Alm 1:2,28 ha			

05/04/2016 End. Muh. : A. SUBA'v,,;;i-
./04/2016 ube Mud. V. : O.YILDIZ
0)./04/2016 Md.Yrd. V. : E. M. SERT
oS../04/2016 i Muduru : M.T. A

T. C.
ADALET BAKANLIĞI
SÖKE 2. NOTERLİĞİ
Cumhuriyet Meydanı Fevzi Paksoy
İşhanı Kat 2 No: 4 - 5 - SÖKE
07 NİS 2016
№03370

Appendix E - Exemption Letter Dated 03.05.2018

T.C.
ÇEVRE VE ŞEHİRCİLİK
BAKANLIĞI

T.C.
AYDIN VALİLİĞİ
Çevre ve Şehircilik İl Müdürlüğü

Sayı :98914016-220.99-E.3619 03.05.2018
Konu :Hez Enerji 6 adet İlave Jeotermal Kuyu

HEZ ENERJİ İNŞ. SAN. VE TİC. A.Ş.NE
(Akarca Mah.823 Sok. A.BLOK Aprt.NO:1A K:2D.7 Fethiye/MUĞLA)

İlgi : a) Resif Çevre Müh.San.ve Tic.LTD.Şti.'nün 16.04.2018 tarihli ve 164 sayılı yazısı.
b) 05.04.2016 tarih ve 98914016 220-02 E-2016296 Karar No'lu "ÇED Belgesi".
c) Bakanlığımızın 16.08.2017 tarih ve E.10682 sayılı Madencilik Faaliyetleri Uygulama Talimatı yazısı.
ç) Bakanlığımızın 12/10/2015 tarih ve 42193254-110.99-E.12362 sayılı dağıtımlı yazısı.
d) Bakanlığımızın 04.07.2012 tarih ve 8865 sayılı 2012/15 Genelgesi.

İlgi (a) dilekçe ile Hez Enerji İnş. San.Tic A.Ş. tarafından Aydın ili, Germencik-Söke-Kuşadası ilçeleri sınırlarında bulunan J-2009/138 ruhsat numaralı jeotermal sahası içerisinde "Sondaj Yöntemiyle Jeotermal Kaynak Arama Faaliyeti" projesi için Proje Tanıtım Dosyası sunulmuş ve ilgi (b)'de kayıtlı "ÇED Gerekli Değildir" kararı alınmış olup, arama sondaj çalışmaları sonunda yine aynı ruhsatlı saha içinde kalmak kaydıyla söz konusu "proje tanıtım dosyasında" belirtilen bütün yükümlülüklere, ilimiz Germencik ilçesi, Morali Mahallesi'ndeki 228 ada, 228 parselde (kuyuların açılacağı alanın köşe koordinatları; C5=Y:546198.33-X:4186933.19, C6=Y:546497.30-X:4186958.11, C7=Y:546530.54-X:4186493.80, C8=Y:546327.00-X:4186469.00, C9=Y:546227.78-X:4186474.84) 3 adet jeotermal kuyu, Söke ilçesi, Argavlı Mahallesi'ndeki 145 ada, 7 parselde (kuyuların açılacağı alanın köşe koordinatları; C1=Y:544346.29-X:4186989.19, C2=Y:544600.00-X:4186800.00, C3=Y:544512.76-X:4186575.72, C4=Y:544197.27-X:4186594.28) 3 adet jeotermal kuyu olmak üzere toplamda 6 adet ilave jeotermal kuyu için de uyulacağının beyan ve taahhüt etmek koşuluyla Kurumunuzdan ÇED Yönetmeliği kapsamında görüş verilmesi talep edilmektedir.

İlgi (c) Bakanlığımızın yazısında; daha önce ÇED Yönetmeliği kapsamında değerlendirilmiş arama faaliyetlerinde, karar verilen ruhsat sahasında aynı yöntemle yapılacak ilave arama çalışması olması durumunda mevcut karara esas taahhütlere uyulması kaydıyla ÇED Yönetmeliği hükümlerinin uygulanmasına gerek bulunmamakta ancak ruhsat sahası dışında yapılacak aramalar için ÇED Yönetmeliği Ek-2 listesi kapsamında işlem yapılması gerektiği belirtilmektedir.

Kurumumuzda tarafından yapılan tetkikte; Hez Enerji İnş. San.Tic A.Ş. tarafından, Aydın ili, Söke ilçesinde bulunan J-2009/138 ruhsat numaralı jeotermal sahası içerisinde, daha önceden

Not: 5070 sayılı Elektronik İmza Kanunu gereği bu belge elektronik imza ile imzalanmıştır.
Evrak Doğrulama Kodu : FHYTNYYCNMRJNKMCKJRR Evrak Takip Adresi: https://www.turkiye.gov.tr/cevre-ve-sehircilik-bakanligi
Zeybek Mah. İsmet Sezgin Bul. No:20 09020 Efeler/AYDIN Bilgi için:Orhan YILDIZ
Telefon:0 256 219 57 70 Faks: 0 256 219 57 69 Mühendis
e-posta: aydin@csb.gov.tr kep: aydincevrevesehircilik@hs01.kep.tr

1 / 3

T.C.
ÇEVRE VE ŞEHİRCİLİK
BAKANLIĞI

T.C.
AYDIN VALİLİĞİ
Çevre ve Şehircilik İl Müdürlüğü

Sayı :98914016-220.99-E.3619 03.05.2018
Konu :Hez Enerji 6 adet İlave Jeotermal Kuyu

"Sondaj Yöntemiyle Jeotermal Kaynak Arama Faaliyeti" projesi adı altında 2 adet jeotermal kuyu için Valiliğimizce "Çevresel Etki Değerlendirmesi Gerekli Değildir" kararı verildiği tespit edilmiştir.

Yine ilgi (a) dilekçe geçen ve ilimiz Germencik ilçesi, Morali Mahallesi'ndeki 228 ada, 228 parselde (kuyuların açılacağı alanın köşe koordinatları; C5=Y:546198.33-X:4186933.19, C6=Y:546497.30-X:4186958.11, C7=Y:546530.54-X:4186493.80, C8=Y:546327.00-X:4186469.00, C9=Y:546227.78-X:4186474.84) 3 adet jeotermal kuyu, Söke ilçesi, Argavlı Mahallesi'ndeki 145 ada, 7 parselde (kuyuların açılacağı alanın köşe koordinatları; C1=Y:544346.29-X:4186989.19, C2=Y:544600.00-X:4186800.00, C3=Y:544512.76-X:4186575.72, C4=Y:544197.27-X:4186594.28) 3 adet jeotermal kuyu olmak üzere toplamda 6 adet ilave jeotermal kuyu için ilgi (b)'de kayıtlı ÇED Belgesi verilen ruhsat sahası içinde kalması ve ilgi (b) ÇED Belgesi için sunulan Proje Tanıtım Dosyası için tüm hüküm ve taahhütlere uyulmayı taahhüt ve beyan edilmiş olması nedeniyle ÇED Yönetmeliği uyarınca yeniden proje tanıtım dosyası hazırlanmasına gerek olmadığı bilinmelidir. Ancak adı geçen kuyularıyla bağlantılı yapılacak Jeotermal Elektrik Santral projelerin Proje Tanıtım Dosyalarında veya ÇED Raporu Dosyasında, kuyuların etkileri belirtilmelidir.

Bakanlığımızın ilgi (ç) yazısında bahsedildiği üzere, Su Kirliliği Kontrolü Yönetmeliğinin 27. Maddesinin son fıkrasında "(Değişik son fıkra:R.G.- 13/2/2008-26786) Yeraltından çıkarılarak enerji üretme ve ısıtma gibi çeşitli amaçlarla kullanılan jeotermal kaynak sularının debisi 10 L/sn ve üzerinde ise suyun alındığı formasyona reenjeksiyon ile bertaraf edilmesi zorunludur. Reenjeksiyon ile bertaraf etmeyenlere işletme ruhsatı verilemez. Ancak, reenjeksiyonun mümkün olmadığının bilimsel olarak ispatlanması hâlinde; alıcı ortama deşarj edilecek olan suların içerisinde çözülmüş hâlde bulunan mineral ve elementlerin miktarlarının belirlenmesi için yapılacak jeokimyasal analizlerin sonucuna göre Bakanlıkça belirlenecek deşarj standartları esas alınarak izin verilebilir." hükmü yer almaktadır. Bu kapsamda reenjeksiyonun mümkün olmadığının bilimsel olarak ispatlanması hâlinde; kuyu testi çalışmalarının İl Müdürlüğü gözetiminde yapılması, faaliyetin test aşamasında oluşacak atıksuların, soğutma kuleleri inşa edilerek sıcaklığının düşürülmesi ve SKKY ekinde yer alan Tablo 9.5'deki standartları sağlayacak şekilde alıcı ortama deşarj edilmesi, kuyu testi aşamasında, deşarj noktasından sonra tam karışım noktasında, jeokimyasal analizlerde yer alan parametrelerin izlenmesi, atıksuların alıcı ortamdaki mevcut su kalitesini olumsuz etkilemeyecek şekilde ve alıcı ortamdaki suyun sulama suyu olarak kullanıldığı zaman da dikkate alınarak kontrollü olarak verilmesi hususlarına riayet edilmesi gerekmektedir.

Yine kuyu açma, test ve işletme aşamalarındaki kuyu faaliyeti sırasında ortaya çıkan atıksu ve sondaj çamurları yanı sıra sondaj havuzu ve kuyu başlarında sıyrılan bitkisel toprağın ilgi (d)

Not: 5070 sayılı Elektronik İmza Kanunu gereği bu belge elektronik imza ile imzalanmıştır.
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Zeybek Mah. İsmet Sezgin Bul. No:20 09020 Efeler/AYDIN Bilgi için:Orhan YILDIZ
Telefon:0 256 219 57 70 Faks: 0 256 219 57 69 Mühendis
e-posta: aydin@csb.gov.tr kep: aydincevrevesehircilik@hs01.kep.tr

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T.C.
ÇEVRE VE ŞEHİRCİLİK
BAKANLIĞI

T.C.
AYDIN VALİLİĞİ
Çevre ve Şehircilik İl Müdürlüğü

Sayı :98914016-220.99-E.3619 03.05.2018
Konu :Hez Enerji 6 adet İlave Jeotermal Kuyu

Bakanlığımızın Sondaj Çamurlarının ve Krom Madeninin Fiziki İşleme Tabi Tutulması Sonucu Ortaya Çıkan Atıkların Bertarafına İlişkin 2012/15 Genelgesi ile ilgi (ç) Bakanlığımız yazısı kapsamında iş ve işlemlerin yürütülmesi, yine faaliyet sırasında hasıl olacak atıksuların bertarafı konusunda Çevre Kanunu ve bu Kanununa istinaden çıkartılan Su Kirliliği Kontrolü Yönetmeliği başta olmak üzere diğer ilgili Yönetmeliklere uygun hareket edilmesi, jeotermal arama kuyusu açılmadan önce İl Gıda Tarım ve Hayvancılık İl Müdürlüğü başta olmak üzere ilgili diğer kamu kurum ve kuruluşlarından mer'i mevzuat kapsamında gerekli görüş, izin ve onayın alınması gerekmektedir.

Bilgilerinizi ve gereğini rica ederim.

e-imzalıdır
Abdullah ASLAN
Vali a.
Vali Yardımcısı

Ek : İlgi (ç) Reenjeksiyona İlişkin Teknik Rapor Bakanlık yazısı (2 sayfa)

Not: 5070 sayılı Elektronik İmza Kanunu gereği bu belge elektronik imza ile imzalanmıştır.
Evrak Doğrulama Kodu : FHYTNYYCNMRJNKMCKJRR Evrak Takip Adresi: https://www.turkiye.gov.tr/cevre-ve-sehircilik-bakanligi
Zeybek Mah. İsmet Sezgin Bul. No:20 09020 Efeler/AYDIN Bilgi için:Orhan YILDIZ
Telefon:0 256 219 57 70 Faks: 0 256 219 57 69 Mühendis
e-posta: aydin@csb.gov.tr kep: aydincevrevesehircilik@hs01.kep.tr

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Appendix F - Copy of The Worker's Contract

BELİRSİZ SÜRELİ İŞ SÖZLEŞMESİ

1. TARAFLAR

İŞVERENİN

Adı soyadı (unvanı)	Geopet Sondaj Müteahhitlik A.Ş.
Adresi	Hilal Mah. Turan Güneş Blv. No:86/3 Çankaya / ANKARA

PERSONELİN

Adı soyadı	[redacted]
Baba adı	[redacted]
Doğum yeri ve yılı	[redacted]
İkamet adresi	[redacted]
T.C Kimlik No	[redacted]

2. YAPILACAK İŞ : Sondaj İşçisi / Kademe:1

3. ÇALIŞMA YERİ : Şirket merkezi Ankara'dır. İşçi, Türkiye'nin her ilinde açılmış ve açılacak şantiyeler ile yurt dışında alınan işler sebebiyle açılmış ve açılacak her şantiyede çalışmayı kabul ve taahhüt eder. Yurt içi ve yurt dışı şantiyeler arası nakillerde yurt içinde bildirim tarihini takip eden 3 gün içerisinde yeni görev yerinde aynı ücret ve sosyal haklar ile birlikte çalışmayı kabul eder.

4. HİZMET AKDİ TÜRÜ : İşbu sözleşme Belirsiz Süreli olarak akdedilmiştir.

5. DENEME SÜRESİ : Deneme süresi 2 (iki) aydır, bu süre içinde taraflar hizmet akdini ihbarsız ve tazminatsız feshedebilirler.

6. PERSONELİN ÜCRETİ : [redacted]TL /AYLIK / Net' dir. Maaş ayda bir kez kural olarak, takip eden ayın 15'nci gününe kadar ödenir. Arızi olarak finansal problemlerin olması durumunda, ücret ve ekleri takip eden ayın 20'nci gününe kadar ödenir. İşçi bu arızi durumu fesih sebebi yapamaz.

7. ÇALIŞMAYA DAİR ÖZEL ŞARTLAR:

a. Personel, işbu hizmet akdi uyarınca yapacağı işin ifası ile ilgili olarak İşverence çıkartılmış ve çıkartılacak olan yönetmelik, genelge, sirküler hükümlerine ve İşveren ya da İşveren vekilleri tarafından verilecek talimatlara harfiyen uyacağını taahhüt eder.
b. İşçi işverenle iş ilişkisi devam ettiği sürece başka bir işverenle tam veya kısmi süreli ya da çağrı üzerine çalışmayı gerektirecek nitelikte çalışmama, iş sözleşmesi akdetmeme ve görev almamayı kabul ve taahhüt eder.
c. Hiçbir şekilde, serbest zaman, yıllık izin veya farklı izin kullanımlarında başka firmalarda çalışmayacağını ve görev almayacağını peşinen kabul eder. Aksi durumda, iş akdinin işveren tarafından hiçbir ihtar, ihbara gerek kalmaksızın bildirimsiz ve tazminatsız olarak fesih edileceğini kabul beyan ve taahhüt eder.
d. Personel, özgeçmişinde belirttiği bütün hususların gerçek olduğunu beyan ve taahhüt eder.

Personel, **Sondaj İşçisi / Kademe:1** için alınmıştır. Şantiyede arızi durumlarda kendisine verilecek iş olmaması veya acil olarak başka bir işin yapılması sebebiyle personelin görevi geçici olarak

Okudum

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değiştirilip başka bir işte çalıştırılabilir. Geçici bu çalışma için personel şimdiden muvafakat eder, bu durumun çalışma koşullarında esaslı değişiklik olduğunu ileri süremez.

e. Yurtdışında görevlendirilmiş olduğu şube ve/veya şantiyelerde görevlendirme süresi veya görevlendirildiği iş tamamlanmadan iş sözleşmesinin personel tarafından haksız feshedilmesi veya işveren tarafından haklı nedenle fesih edilerek sona erdirilmesi durumlarında, Personel için yapılmış bütün masraflar (vize, uçak bileti, iş elbisesi, ayakkabı … v.b.) Personelden tahsil edilecektir.

f. Personel, şirkette çalışan diğer karşı cinsten bir personel ile duygusal vb. ilişkisi durumunda İŞVEREN her iki personelinde iş akdini hiçbir ihtar, ihbara gerek kalmaksızın bildirimsiz ve tazminatsız olarak fesih edeceğini kabul beyan ve taahhüt eder.

g. 4857 sayılı yasanın 41.ve 63'ncü maddeleri gereği haftalık çalışma süresi 45 saattir. (Yurtdışı çalışmalarında, haftalık çalışma süresi ve çalışma şartları yeni sözleşme ile belirlenir.) İşveren bu haftalık çalışma süresini, günlük 11 saati geçmeyecek şekilde dilediği gibi bölebilir. Günlük ara dinlenme süresi 2 saatdir. (Bir saat yemek ve 30 dakikadan 2 sefer çay ve ihtiyaç molasıdır.) İşveren'in talep etmesi halinde Personel vardiyalı çalışmayı ve fazla mesai yapmayı kabul eder. Personel, gerektiğinde 4857 sayılı Kanunun 7'inci maddesi uyarınca geçici iş ilişkisiyle çalışmayı ve İşveren tarafından gerekli görülmesi durumunda 4857 sayılı İş Kanunu'nun 64. maddesi uyarınca telafi çalışması yapmayı kabul eder. Bu halde, iki aylık süre içinde işçinin haftalık ortalama çalışma süresi, normal haftalık çalışma süresini aşamaz.

h. İşçi, çalışma süresi içerisinde kullanmış olduğu izin sürelerinin serbest zaman izni olarak geçirdiğini kabul eder. Şöyle ki, genel çalışma durumu 20 gün çalışma ve 10 gün serbest zaman izni şeklindedir. Yani taraflar, 20 gün çalışma karşılığında olabilecek fazla çalışma karşılığı için ücret ödemesi yerine 10 gün serbest zaman izni yapılacağı hususunda anlaşmıştır. İşbu sözleşme ile ayrıca serbest zaman izin kullanımı için dilekçeye yazmaya gerek bulunmadığı, sözleşmenin bu maddesi ile olabilecek fazla mesai çalışmaları karşılığının, serbest zaman izni olarak kullandırılacağı taraflarca kabul edilmiştir. Başka bir anlatımla, Yıllık ücretli izin veya yasa da belirtilen izin halleri haricinde yapılacak olan tüm izinler, doğabilecek fazla mesai çalışmaları karşılığı SERBEST ZAMAN İZNİ olarak değerlendirilecektir.

i. Personel, İşveren'in yazılı izni olmadan iş saatleri içinde veya dışında başka bir işyerinde ve işte çalışamaz.

j. Personel, İş Kanununa göre yıllık ücretli izne hak kazanması durumunda, bu iznini İşveren'in iş şartlarına göre belirleyeceği zamanda kullanacağını, bu konudaki takdir yetkisinin tümüyle İşveren'e ait olduğunu beyan ve kabul eder.

k. Personel, ikamet adresi ve telefonları ile ilgili olası değişiklikleri, İşverene en geç 6 gün içinde bildirmekle yükümlü olup, bu bildirimde bulunmadığı takdirde yukarıda beyan edilen ikametgah adresine yapılacak tebligatın geçerli bir tebligat sayılacağını peşinen kabul eder.

l. Personel, İşveren tarafından iş ile ilgili olarak kendisine teslim edilmiş ve kullanımına bırakılmış olan, zimmetinde bulunan tüm cihaz, ekipman, araç gereç ve sair malları usulüne uygun olarak ve özenle kullanacağını, kendi şahsi işleri için kullanmayacağını kabul ve taahhüt eder. İşbu zimmetindeki malzeme ve ekipmanlara zarar vermesi halinde, bu zararın 30 günlük ücretinden az olması halinde bunların bedelini maaşından ¼ oranında kesilmesine

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muvafakat eder. Zararın 30 günlük ücretinden fazla olması halinde, hizmet akdinin feshi durumunda zararın tamamının tüm hakkedişlerden alınacağına şimdiden muvafakat eder.

Personel, İşveren ile arasındaki istihdam ilişkisinin herhangi bir sebep ile sona ermesini müteakip, herhangi bir kopyalama veya çoğaltma yapmadan, istihdamı nedeni ile elinde bulunan bütün belgeleri, kayıtları, yazışmaları, ürün detaylarını, maliyet analizlerini ve sair bütün evrakı İşveren yetkililerine iade edeceğini bila rücu taahhüt eder.

m. Ücretin döviz ile ödeneceğine dair karar alınması durumunda, ödeme tarihindeki efektif satış kuru üzerinden Türk lirasına çevrilerek ödenir. Ücretin içerisinde yıllık 270 saate kadar fazla mesai çalışmaları da dâhildir. İşçi banka hesabına yatırılan ücrete bir hafta içerisinde itiraz etmez ise ihtirazi kayıtsız kabul etmiş sayılır.

n. İşçi işbu sözleşmeyi imzalamakla birlikte, sözleşmenin eki konumunda olan İşyeri Yönetmeliği ve İş Güvenliği Talimatı ve Tutanağı ile çalışma esnasında çıkarılacak iç talimat ve yönergeleri kabul ettiğini beyan ve taahhüt eder.

o. İşçi, 6698 sayılı Kişisel Verilerin Korunması Kanunu çerçevesinde işe alımında veya devamı sürecinde, şirkete iletmiş olduğu veya şirketin usul ve işlemleri çerçevesinde edindiği kişisel veri, biyometrik veri ve sağlık verisi dahil her türlü nitelikli kişisel verilerin veri sorumlusu ve/veya veri işleyen olarak tamamen veya kısmen elde edilmesini, kaydedilmesini, depolanmasını, değiştirilmesi ve güncellenmesini, periyodik olarak kontrol edilmesini, yeniden düzenlenmesi ve sınıflandırılmasını, işledikleri amaç için gerekli olan ya da ilgili kanunda öngörülen süre kadar muhafaza edilmesini, kanuni ya da hizmete bağlı fiili gereklilikler halinde şirketinizin birlikte çalıştığı ya da kanunen yükümlü olduğu kamu kurum ve kuruluşlarıyla paylaşılmasını, bu konularda veri sorumlusu ve/veya veri işleyen şirket yetkilileri tarafından bilgilendirildiğini, açık rızası ile kabul ve taahhüt eder.
İşveren şirket, işçi ile ilgili aldığı veya edindiği bilgileri ne için aldığı ve nerede kullanacağı yönünde işçiyi açık bir şekilde bilgilendirmeyi ve devamı sürecinde bu bilgileri gizlilik içerisinde muhafaza etmeyi 6698 sayılı yasa çerçevesinde işçiye karşı bu yönde yükümlülüklerini yerine getirmeyi kabul ve taahhüt eder.

Toplam 3 (üç) sayfa ve yed, maddeden oluşan işbu Belirsiz Süreli Hizmet Akdi, 05.12.2022 tarihinde taraflarca bir asıl ve bir suret olarak okunarak imzalanmıştır.

İŞVEREN

[redacted]

PERSONEL

[redacted]

Okudum kabul ediyorum
02.12.2022

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Appendix G - Groundwater Utilization Certificate Project Author's Registry Status Certificate

Web: www.jmo.org.tr e-posta: jmo@jmo.org.tr

Tarih :21.06.2016
Sayı :1460/800
Konu :Sicil Durum Belgesi Hk.

DEVLET SU İŞLERİ AYDIN BÖLGE MÜDÜRLÜĞÜ JEOTEKNİK HİZMETLERİ VE YERALTI SUYU ŞUBE MÜDÜRLÜĞÜ
AYDIN

YERALTISUYU KULLANMA BELGESİ PROJE MÜELLİFİ SİCİL DURUM BELGESİ

Oda Sicil No	: 13318
Adı, Soyadı	: NAMIK ERTUĞRUL
T.C Kimlik No	: 21361387258
Bitirdiği Okul	: SELÇUK ÜNİVERSİTESİ
Oda Kayıt Tarihi	: 30.06.2009
Büro Tescil No - Adı	: 2177A SENA JEOLOJİ-NAMIK ERTUĞRUL
Büro Adresi, Telefon	: KURTULUŞ MAHALLESİ 2013. SOKAK NUMARA : 11 09010 MERKEZ /AYDIN 256 2125104

Mal Sahibi	: HEZ ENERJİ İNŞ. SAN. VE TİC. A.Ş.
İli	: AYDIN
İlçesi	: GERMENCİK
Belediyesi	:
Mahallesi	: MORALI
Pafta (İmar/Kadastro)	:
Ada	: 228
Parsel	: 1
Koordinat	: 35S 546400D-4186689K
Kuyu Verimi (lt/sn)	: 19
Statik Seviye (m)	: 4
Dinamik Seviye (m)	: 15
Sondaj Kuyu Derinliği (m)	: 140

Yukarıda kimliği yazılı üyemizin 6235 (7303) sayılı TMMOB Kanunu ve 3458 Sayılı Mühendislik Mimarlık Hakkında Kanun ile 18.10.2006 tarih ve 26323 Sayılı Resmi Gazete'de yayınlanan "TMMOB Jeoloji Mühendisleri Odası Serbest Jeoloji Mühendislik ve Müşavirlik Hizmetleri, Uygulama, Büro Tescil ve Mesleki Denetim Yönetmeliği" hükümleri çerçevesinde Serbest Jeoloji Mühendisliği kapsamında Yeraltısuyu Arama, Kullanma, Islah ve Tadil Belgesi etüt, rapor ve harita ile belge düzenleme hizmeti vermeye yetkili olup iş bu belgenin düzenleniş tarihi itibariyle, TMMOB-Disiplin Yönetmeliği kapsamında mühendislik hizmeti vermesine engel disiplin cezası bulunmamaktadır.

İş bu belge 167 sayılı Yeraltısuları Hakkında Kanun ve ilgili mevzuat gereğince Yeraltısuyu Arama, Kullanma, Islah ve Tadil Belgesi hazırlanmasına esas olarak aşağıda pafta, ada, parsel no ve kordinat bilgileri yazılı taşınmazdaki kuyunun Yeraltısuyu Arama, Kullanma, Islah ve Tadil Belgesi Proje Müellifliği hizmeti için verilmiştir.

VEG3R397

Not: Bu belge söz konusu proje için verilmiştir. Çoğaltılamaz ve başka projeler için kullanılam

belgenin doğruluğunu barkod numarası ile http://belgekontrol.jmo.org.tr adres kontrol edebilirsiniz.

TMMOB JEOLOJİ MÜHENDİSLERİ ODASI, Anayasa'nın 135. Maddesi'nde tanımlanan 66 ve 85 sayılı KHK ve 7303 sayılı Yasa ile değişik