SARIMSAKLI DAM IRRIGATION RENOVATION PROJECT

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

CNR-PLN-TWCEIP-SAR-ESMP-001

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(Final)

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LIST OF ABBREVIATIONS

ABPRS	Address-Based Population Registration System
AFAD	Ministry of Interior Disaster and Emergency Management Presidency
AoI	Area of Influence
C-ESMP	Contractor Environmental and Social Management Plan
CFP	Chance Find Procedure
CHS	Community Health and Safety
CİMER	Presidency Communications Center
ÇINAR	Çınar Engineering Consultancy Inc. / Consultant
C-LMP	Contractor's Labor Management Plan
CoC	Code of Conduct
CORINE	Coordination of Information on the Environment
CSMP	Camp Site Management Plan
CSO	Civil Society Organizations
CTP	Glass Reinforced Plastic
DKMP	General Directorate of Nature Conservation and National Parks
DSİ	State Hydraulic Works
DVIG	Disadvantaged or vulnerable individuals or groups
E&S	Environmental and Social
EAP	Emergency Action Plan
EF	Emission Factors
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EPRP	Emergency Preparedness and Response Plan
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Monitoring Report
ESS	Environmental and Social Standard
GBV	Gender-based violence
GHG	Greenhouse Gas
GRS	Grievance Redressal Service
GSM	Non-Sanitary Establishment
GWW	Groundwater Wells
HPP	Hydroelectric Power Plant
IIP	Independent Inspection Panel
İlbank	İller Bankası A.Ş.
IT	Information Technology
KASKİ	Kayseri Water and Sewerage Administration
KML	Keyhole Markup Language
KPI	Key Performance İndicator
LAP	Land Acquisition Plan
LAPF	Land Acquisition Policy Framework
LM Plan	Labor Management Plan
LMP	Labor Management Procedure

LTV	Long Term Value
M&E	Monitoring and Evaluation
MEDAS	Municipal Water, Wastewater and Waste Statistics Database
MoAF	Ministry of Agriculture and Forestry
MoEUCC	Ministry of Environment, Urbanisation and Climate Change
NA	Not available
NGO	Non-Governmental Organizations
O&M	Operation and Maintenance
OHS	Occupational Health Safety
OHSMP	Occupational Health and Safety Management Plan
OIP	Other interested parties
ORAN	Central Anatolia Development Agency
OSB	Organized Industrial Zone
PAP	Project-affected parties
PE100	Polyethene
PMT	Project Management Team
PPE	Personal Protective Equipment
Project	Sarımsaklı Dam Irrigation Renovation Project
RF	Resettlement Framework
RP	Resettlement Plan
SEA	Sexual Exploitation and Abuse
SEA / SH	Sexual exploitation and abuse/sexual harassment
SEP	Stakeholder Engagement Plan
SGIS	Sarımsaklı Gravity Irrigation System
SH	Sexual Harassment
SPIS	Sarımsaklı Pump Irrigation System
STV	Short Term Value
TMP	Traffic Management Plan
TR	Türkiye
TurkStat	Turkish Statistical Institute
TWCEIP	Türkiye Water Circularity and Efficiency Improvement Project
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
WAP	Worker Accommodation Plan
WB	World Bank
WBG	World Bank Group
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organization
WMP	Waste Management Plan
WWTP	Wastewater Treatment Plant
YAS	Groundwater wells

EXECUTIVE SUMMARY

The Sarımsaklı Dam Irrigation System, commissioned in the late 1960s, currently supplies water to extensive agricultural lands across the Kocasinan and Melikgazi districts of Kayseri Province through a network of aging open canals, canalettes and tertiary distribution channels. Decades of continuous operation have led to structural degradation, seepage losses, evaporation, and reduced hydraulic performance across the system. Combined with the increasing pressure on regional water resources and the need to adapt to climate change , these inefficiencies have significantly constrained agricultural productivity in the Sarımsaklı Plain. In response, DSİ has initiated the Sarımsaklı Dam Irrigation Renovation Project ("the Project"), which aims to modernize the entire scheme by replacing the deteriorated open canal infrastructure with a closed pressurized pipeline system that will serve a total irrigable area of 8,865 hectares.

The project area lies within the Central Kızılırmak Basin, approximately 30 km northeast of Kayseri city center, and consists predominantly of actively cultivated agricultural land where cereals, vegetables, silage corn, sugar beet, sunflower and alfalfa are grown. The Sarımsaklı Gravity-Flow Irrigation Scheme sources water from the Sarımsaklı Dam on the Bünyan Stream, while the pumped irrigation scheme relies on 89 groundwater wells. Under the renovation program, both systems will be integrated into a unified pressurized network designed to minimize water loss, improve distribution efficiency and reinforce long-term water security in the region. Baseline studies show that soil, vegetation and climate conditions are typical of the Central Anatolia steppe ecosystem, and no significant environmental pollution trends have been observed. Although the wider area contains important cultural heritage assets, including the Kültepe (Kanesh-Karum) Archaeological Site and several höyüks, construction activities will remain at a sufficient distance to avoid any direct or indirect impact on these sites.

Environmental and social risks associated with the Project have been assessed as "Moderate" under the World Bank Environmental and Social Framework. Construction-phase impacts such as temporary dust and emissions, noise from machinery, localized soil disturbance during excavation and backfilling, limited vegetation removal, and low-probability risks of accidental fuel or oil spills are expected to be short-term, reversible, and confined to the construction corridor. Social risks are similarly moderate: while the Sub-Project requires approximately 660,000 m² of private land acquisition across 1,167 parcels, with an estimated 3,110 owners and an additional 40,000 m² of pastureland across 14 parcels, the pipeline routes generally follow existing irrigation alignments, thereby minimizing the scale and significance of impacts. No physical displacement is anticipated. Although the exact locations and extent of land acquisition have not yet been determined, land acquisition activities under the Project may result in certain temporary or permanent impacts. A Land Acquisition Plan (LAP) will be prepared to identify and assess these impacts in line with the Türkiye Water Circularity and Efficiency Improvement Project (TWCEIP) Land Acquisition Policy Framework (LAPF) and the requirements of ESS5.

Temporary access restrictions during construction will be managed through continuous engagement with farmers, and the expected workforce, anticipated to reach up to 250 personnel during peak periods, is not expected to induce significant labor influx risks. Community health and safety concerns, primarily linked to construction traffic and roadside activities, are considered manageable with the mitigation measures defined in the Environmental and Social Management Plan (ESMP). Although the wider area contains

notable cultural heritage assets, including the Kültepe (Kaniş-Karum) Archaeological Site, none lie along the construction routes, and no direct impacts are expected.

During the operation phase, environmental and social risks are expected to be low to moderate and comparable in nature and significance to those identified for the construction phase. Potential operational risks are primarily limited to routine operation and maintenance activities of the closed, pressurized irrigation system, such as localized pipeline leakages, valve or meter malfunctions, pressure regulation issues, and short-term disturbances arising from maintenance and repair works. These activities may result in temporary, localized impacts on agricultural lands and access routes; however, they are expected to be short-term, reversible, and confined to the immediate area of intervention. No permanent land take, population displacement, or significant community health and safety risks are anticipated during operation. With regular system monitoring, preventive maintenance, and the implementation of the operational measures defined in the ESMP under the responsibility of DSİ and the relevant Irrigation Union(s), operational-phase risks are considered manageable and consistent with the Project's overall Moderate risk classification under the World Bank Environmental and Social Framework.

The Environmental and Social Screening Form prepared by State Hydraulic Works (DSİ) and reviewed by the World Bank (WB) confirms these findings, noting that the Project has been designed as a closed, pressurized irrigation system drawing water from the existing Sarımsaklı Dam and distributing it to already cultivated agricultural lands. Construction activities will involve limited, linear excavation, with excavated material reused for reinstatement to minimize environmental disturbance. The Screening Form concludes that potential impacts are low to moderate in magnitude, largely short-term and reversible, and geographically confined to the project footprint and its immediate surroundings. No interventions will occur within sensitive ecological areas or designated archaeological sites, supporting the classification of the environmental risk as "Moderate." Land acquisition impacts will be managed in full alignment with the Türkiye Water Circularity and Efficiency Improvement Project (TWCEIP) Land Acquisition Policy Framework (LAPF) through a dedicated Land Acquisition Plan (LAP). Based on these combined considerations, the Project's overall environmental and social risk level is confirmed as "Moderate Risk" under the World Bank Environmental and Social Framework (ESF).

To address these risks, the ESMP proposes a series of mitigation measures aligned with Turkish legislation and the World Bank's environmental and social standards. Construction activities will follow strict dust and noise control procedures, and excavation will be limited to narrow, predefined corridors with rapid soil reinstatement once pipeline installation is complete. Spill prevention measures, preventive maintenance of machinery and proper handling of fuels and lubricants will be applied to protect soil and water quality. Community health and safety will be supported through traffic management, clear routing of construction vehicles and proactive communication with local residents and agricultural stakeholders. Cultural heritage will be protected through adherence to national regulations and the Project's Chance Find Procedure (CFP). During the operation phase, impacts are expected to be minimal and limited to occasional maintenance and repair works, which will involve small-scale excavation and short-term disturbance within agricultural lands.

Monitoring responsibilities will be shared among the DSİ Project Management Team (PMT), the DSİ 12th Regional Directorate, the Contractor for construction phase and the Irrigation Union(s) assigned by DSİ for the operation phase. Monitoring will focus on air quality (particularly dust), soil reinstatement, traffic safety, occupational health and safety, community health and safety, traffic, stakeholder concerns and overall implementation of the ESMP.

Stakeholder engagement will continue throughout construction and operation, with a grievance mechanism available to local communities to ensure transparency and timely resolution of concerns.

Overall, the Sarımsaklı Dam Irrigation Renovation Project will significantly enhance irrigation efficiency, reduce water losses and support climate-resilient agriculture in the Sarımsaklı Plain. By modernizing an aging and inefficient irrigation system into a closed, pressurized and integrated network, the Project will contribute to sustainable agricultural development and support long-term regional water security. With full implementation of the mitigation and monitoring measures outlined in the ESMP, environmental and social risks can be effectively managed in line with national regulations and the World Bank's Environmental and Social Framework.

1 INTRODUCTION

This Environmental and Social Management Plan (ESMP) has been prepared for the purpose of carrying out for Sarımsaklı Dam Irrigation Renovation Project ("Project"), located within the boundaries of Kayseri province, pursuant to the contract signed on 19.09.2025 between the General Directorate of State Hydraulic Works (DSİ) – Department of Studies, Planning and Allocations ("Administration") and Çınar Engineering Consultancy Inc. ("ÇINAR" or "the Consultant"), and the Commencement Protocol signed on 24.09.2025.

1.1 Purpose and Scope

This ESMP has been prepared for the Sarımsaklı Dam Irrigation Rehabilitation Project, which is implemented under Component B of the Türkiye Water Circularity and Efficiency Improvement Project (TWCEIP) financed by the World Bank (WB) and executed by the General Directorate of State Hydraulic Works (DSİ).

The purpose of this ESMP is to ensure that all potential environmental and social (E&S) risks and impacts associated with the construction and operation phases of the Project are properly identified, assessed, mitigated, monitored, and managed in accordance with:

- the World Bank Environmental and Social Framework (ESF) and its Environmental and Social Standards (ESSs),
- the Environmental and Social Management Framework (ESMF) developed for the TWCEIP, and
- the applicable national legislation of Türkiye.

The ESMP establishes the framework for implementing mitigation and monitoring measures that will minimize adverse environmental and social impacts and enhance positive outcomes throughout the Project lifecycle. It defines roles and responsibilities of relevant institutions, provides monitoring indicators, and outlines capacity-building requirements to ensure effective implementation.

The scope of this ESMP covers:

- assessment of baseline environmental and social conditions within the Project's area of influence,
- identification and evaluation of potential E&S risks and impacts during pre-construction, construction, and operation phases,
- development of feasible mitigation and monitoring measures consistent with WB ESSs and national regulations,
- establishment of mechanisms for occupational and community health and safety, waste and pollution control, biodiversity protection, land use and livelihood impacts, cultural heritage management, and stakeholder engagement,
- preparation of implementation and reporting arrangements, including grievance redress and monitoring mechanisms.

This ESMP is a site-specific management document that translates the principles and requirements defined in the TWCEIP ESMF into actionable measures for the Sarımsaklı Project.

1.2 Background

Türkiye's growing population, rapid urbanization, and the effects of climate change are creating increasing pressure on existing water resources. Significant water loss occurs due to evaporation and leakage, particularly in open canal irrigation systems widely used in the agricultural sector. This situation reduces water efficiency and leads to the unsustainable consumption of limited resources. In addition, water quality is deteriorating due to the impact of point and non-point sources of pollution, and the overuse of groundwater increases ecological and social risks.

In this context, there is a need to develop comprehensive programs to increase the circular use of water and ensure efficiency in existing systems. The "Türkiye Water Circularity and Efficiency Improvement Project", TWCEIP, implemented with WB financing, offers an approach that promotes the reuse of wastewater and envisions a transition to modern irrigation infrastructure. The project aims to adapt to the adverse effects of climate change, reduce environmental risks, and strengthen sustainability in agricultural production. In this context, it is anticipated that both water resources will be protected, and rural development and livelihoods will be improved.[1]

1.2.1 Türkiye Water Circularity and Efficiency Improvement Project

TWCEIP is a comprehensive program funded by the WB and implemented by DSİ and İller Bankası A.Ş. (İlbank), which aims to achieve sustainable management of water resources throughout the country. The project aims to contribute to adapting to the negative effects of climate change, increasing water efficiency, and reducing the risk of scarcity through the circular use of water resources.

Component A of the program, implemented under the responsibility of İlbank, focuses on wastewater collection, treatment, and reuse of treated wastewater for irrigation and other beneficial purposes (e.g., green space irrigation, industrial use). In this context, the aim is to improve the quality and resilience of wastewater management services and reduce the pressure of irrigation on freshwater resources.

Component B is being implemented by DSİ and focuses on the rehabilitation and modernization of irrigation infrastructure. This component envisages the conversion of open canal systems to closed pressurized irrigation systems, the installation of smart water meters, the integration of treated wastewater into irrigation networks, and the widespread adoption of modern field irrigation methods (such as drip and sprinkler irrigation).

This holistic approach is an important tool for increasing agricultural production efficiency, supporting rural development, and reducing environmental risks.

[1] General Directorate of State Hydraulic Works (DSİ). (2023). *Project to Improve Water Cycle and Efficiency in Türkiye – Environmental and Social Management Framework* (ESMF). Ankara.

2 LEGAL FRAMEWORK

The ESMP elaborates on the laws and regulations related to environmental, biodiversity and cultural heritage protection, pollution prevention, and both occupational and community health and safety, including traffic and transport.

National and international environmental and social legislation applicable to the Project, along with the identified differences or gaps between these frameworks, are presented in detail in Annex-1.

2.1 Summary of Official Permits, Opinions and Correspondence

The permits obtained, official opinions provided by institutions, and related correspondence for the Project are summarized in Table 2-1. The official letters are presented in Annex-2.

Table 2-1. Summary of Official Permits, Opinions and Correspondence

No	Institution	Date	Document No	Subject/Notes
1.	Kayseri Provincial Directorate of Environment and Urbanization	06.07.2012	220-02	Environmental Impact Assessment (EIA) Is Not Required Decision for Burunören B and C Sand-Gravel Quarries
2.	Kayseri Provincial Directorate of Environment and Urbanization	03.03.2022	202280	EIA Is Not Required Certificate for Akın Sand-Gravel and Borrow Pit
3.	DSİ 12th Regional Directorate (submitted letter)	24.07.2024	4838165	The letter consolidates the official opinions received from relevant authorities, including environmental, biodiversity and cultural heritage institutions. It confirms the presence of natural site areas, sensitive biodiversity zones and registered archaeological sites within or near the project boundaries, and instructs that project designs be adjusted to avoid these areas. The correspondence also emphasizes the need to prevent harm to flora and fauna within the Sarımsaklı Mevkii Sensitive Area and to fully integrate all institutional feedback into the final project layout.
4.	Ministry of Environment, Urbanisation and Climate Change (MoEUCC) to DSİ General Directorate	25.03.2024	9071670	EIA Exemption The official correspondence states that the Sarımsaklı Irrigation Rehabilitation Project is classified outside the scope of the Turkish EIA Regulation, as it involves the modernization and rehabilitation of an existing irrigation network. The Ministry confirms that the project does not require an EIA process and indicates that coordination with the relevant Provincial Directorates should continue in line with administrative procedures.
5.	Ministry of Agriculture and Forestry (MoAF), 7th Regional Directorate (official opinion)	21.03.2024	13670852	The institution reviewed the locations of all settlements and agricultural areas within the Sarımsaklı Irrigation Project footprint and confirmed that most of them do not fall within nationally designated protected areas, legally conserved zones or hunting-prohibited areas. The attached inspection report further clarifies

No	Institution	Date	Document No	Subject/Notes
				that several settlements - Gömeç, Güneşli, Barsama, Sarımsaklı and Salur - are located within the "Sarımsaklı Mevkii Sensitive Area" identified in the Provincial Biodiversity Inventory. The report highlights that this area contains habitats supporting local flora, fauna and wildlife movement. It concludes that irrigation activities can proceed, provided that ecological sensitivities are respected, no harm is caused to vegetation or wildlife, and no interventions take place that could disrupt habitats. With these conditions, the Project is considered acceptable under the institution's mandate. The feedback received from the correspondences was deemed sufficient, and the project layout and borders have been revised accordingly. The Project does not include any sensitive areas or archaeological sites.
6.	General Directorate of DSİ to MoEUCC	14.03.2024	4422550	An EIA Opinion has been requested for the sub-projects (including Sarımsaklı Dam Irrigation Renovation Project) under the scope of TWCEIP.
7.	General Directorate of DSİ to Regional Directorates of DSİ related to the sub-projects	01.04.2024	4505872	The General Directorate confirms that the Sarımsaklı Irrigation Rehabilitation Project, along with other irrigation rehabilitation components under the national program, is considered outside the scope of the Turkish EIA Regulation, since the works involve the modernization of existing irrigation networks. The Ministry's central authority has stated that no EIA process is required for these projects. The letter instructs that, in line with national administrative procedures, the relevant Provincial Directorates of Environment, Urbanization and Climate Change should be formally notified and included in the coordination process.
8.	DSİ 12th Regional Directorate to Kayseri Metropolitan Municipality and Kocasinan Metropolitan Municipality	29.09.2025	6344177	The letter requests that the relevant municipalities identify suitable locations within or near the area shown in the attached KML[2] file for the disposal of surplus excavation material and the temporary storage of stripped topsoil generated during the construction of the Sarımsaklı Irrigation Rehabilitation Project. The correspondence notes that excess spoil will require authorized disposal areas and asks the municipalities to confirm appropriate sites for both excavation waste and topsoil storage in accordance with local regulations.
9.	Kayseri Metropolitan Municipality	03.10.2025	25940	The municipality confirms that surplus excavation material generated during the construction of the Sarımsaklı Irrigation Rehabilitation Project may be disposed of at the designated "Akın Dumping Site," located on parcel 5911/121 in Akın Neighborhood, Kocasinan District. The site is provided as the approved location for both the disposal of excess excavation soil and the temporary storage of stripped topsoil. The official correspondence includes cadastral and satellite

[2] Keyhole Markup Language

No	Institution	Date	Document No	Subject/Notes
				information, as well as a KML file showing the exact boundaries of the disposal area.
10.	Kayseri Provincial Directorate of Environment and Urbanization	13.03.2025	9019582	The Provincial Directorate confirms that a portion of the proposed pipeline route lies within the Engir Lake Natural Site Area and another portion within the Koramaz Valley Proposed Natural Site Area. For the section within Koramaz Valley, an institutional opinion will be issued once the site's legal designation process is completed. For the section falling within the Engir Lake Natural Site Area, approval from the Regional Nature Conservation Commission is required, and no works may be initiated until the necessary documents are submitted and the Commission's formal consent is obtained. The Directorate emphasizes that no intervention should occur in these areas without the relevant permits. The feedback received from the correspondences was deemed sufficient, and the project layout and borders have been revised accordingly. The Project does not include any sensitive areas or archaeological sites.
11.	Kayseri Regional Council for the Protection of Cultural Assets	08.07.2024	5369482	The Regional Council for the Protection of Cultural Heritage confirms that the Sarımsaklı Irrigation Project overlaps with numerous registered cultural heritage assets and legally designated archaeological sites. These include multiple 1st-Degree Archaeological Sites, urban conservation areas, and registered immovable cultural properties, as well as three newly identified areas proposed for registration following field inspections by the Council's experts. For all these locations, the institution states that no physical works, excavation, construction, drilling or any other intervention may take place within the boundaries or protection zones of the registered or proposed sites. Works may only proceed outside these boundaries, and any excavation outside the sites must be immediately stopped and reported if cultural remains are encountered. For segments where project activities cannot be rerouted outside the archaeological site boundaries, the Council requires detailed technical justification reports, including drawings, cross-sections, trench dimensions and construction methodologies for each affected site, to assess whether an exception may be granted. Until such documentation is submitted and formally evaluated, no works are permitted within the archaeological or cultural property areas. Subject to these conditions, the institution indicates no objection to project activities occurring outside the protected areas and their buffer zones
12.	Kayseri Regional Council for the Protection of Cultural Assets	05.04.2024	4982229	The Cultural Heritage Regional Council confirms that several archaeological and cultural heritage sites, including legally registered areas, lie within or near the Sarımsaklı Irrigation Project area. For any project segments falling inside registered site boundaries, works cannot proceed unless

No	Institution	Date	Document No	Subject/Notes
				detailed technical reports—including drawings, excavation dimensions, construction methods, and explanations on how works will be carried out—are submitted for formal evaluation. For areas outside the registered boundaries, experts must conduct on-site inspections under appropriate seasonal and field conditions before issuing a final opinion. Until the Council's formal assessment is completed, no excavation, construction, drilling, trenching, or any physical intervention may be carried out within any of the listed or potentially sensitive areas. The institution emphasizes that each location overlapping with cultural assets must be reviewed separately and that no works may proceed without explicit approval. The feedback received from the correspondences was deemed sufficient, and the project layout and borders have been revised accordingly. The Project does not include any sensitive areas or archaeological sites.
13.	DSİ 12th Regional Directorate to Kayseri Provincial Directorate of Environment, Urbanization and Climate Change	16.04.2024	4528777	The letter informs the relevant provincial authorities that the Sarımsaklı Irrigation Rehabilitation Project is considered outside the scope of the Turkish EIA Regulation, based on the Ministry's earlier assessment. It requests the Provincial Directorate of Environment, Urbanization and Climate Change to carry out the necessary coordination and administrative procedures in line with national requirements. The correspondence also confirms that water from the Sarımsaklı Dam will irrigate 8,865 hectares across multiple settlements within Melikgazi and Kocasinan districts, and that institutional communication regarding the project should continue through the designated provincial channels.
14.	DSİ 12th Regional Directorate to Kayseri Provincial Directorate of Environment, Urbanization and Climate Change and Kayseri Regional Council for the Protection of Cultural Assets	12.03.2024	4429415	The letter informs the relevant environmental and cultural heritage authorities about the planned Sarımsaklı Irrigation Rehabilitation Project and provides the project area and KML data for their assessment. It explains that the existing open-channel irrigation system will be replaced by a closed pressurized pipeline network to supply 8,865 hectares across multiple settlements. The letter requests that the institutions review the project area within their respective mandates—particularly in relation to environmental sensitivities, natural site boundaries, and registered or potential cultural heritage assets—and provide their official opinions to DSİ for incorporation into the final project design.
15.	Kayseri Provincial Directorate of Environment, Urbanization and Climate Change	22.04.2024	9293003	The Provincial Directorate confirms that the Sarımsaklı Irrigation Rehabilitation Project is outside the scope of the Turkish EIA Regulation, as the planned works are limited to the rehabilitation of the existing irrigation network. The institution states that no EIA process is required under this condition and reminds that all relevant environmental legislation, permits and protection measures must still be observed,

No	Institution	Date	Document No	Subject/Notes
				particularly those aimed at safeguarding ecological balance and preventing environmental harm.
16.	Boru Hatları ile Petrol Taşıma A.Ş. [Petroleum Transport via Pipelines Inc.] (BOTAS) Natural Gas Operations and Market Transactions Regional Directorate	25.10.2021	34940	BOTAS confirms that several existing natural gas transmission lines and related facilities pass near or within the broader Sarımsaklı Irrigation Project area. The institution outlines mandatory safety requirements for any construction activities conducted in proximity to these gas pipelines, including coordination with BOTAS field personnel, minimum clearance distances, restrictions on excavation within 30 meters of the pipeline route, and the need for special engineering designs where irrigation pipelines intersect or run parallel to the gas line corridor. The letter states that any works planned within 200 meters of the transmission line require prior consultation, and that no machinery may be operated directly over the gas pipeline. BOTAS emphasizes that all construction must comply with the technical safety standards defined in the national "Pipeline Technical Safety and Environmental Regulations," and warns that any uncoordinated activities leading to damage or disruption of the gas line will be the full responsibility of the contractor and project owner. The project layout has been adjusted according to this correspondence.
17.	DSİ 12th Regional Directorate	11.10.2021	1639688	The letter informs multiple public institutions about the Sarımsaklı Irrigation Project and requests their official opinions to verify whether any existing or planned facilities fall within the irrigation area. The correspondence asks each institution to confirm whether their infrastructure, protected zones or operational assets overlap with the project boundary, and to provide any necessary constraints or requirements. The request was circulated to the following organizations: TCDD (State Railways), BOTAS, General Directorate of Mining and Petroleum Affairs (MAPEG), TPIC (Turkish Petroleum Corporation), Ministry of National Defense Fuel Supply and NATO POL Facilities Management Directorate, İlbank Kayseri Regional Directorate, Karayolları 6th Regional Directorate, Kayseri Metropolitan Municipality, Melikgazi and Kocasinan Municipalities, Kayseri Electricity Distribution Company (KCETAS), Kayseri Gaz (natural gas distribution), PTT, and the Ministry of Agriculture and Forestry 7th Regional Directorate, as well as MTA (General Directorate of Mineral Research & Exploration).
18.	DSİ 12th Regional Directorate	23.03.2021	1090207	The Regional Council for the Protection of Cultural Heritage informs DSİ that the cultural asset boundaries shown in the previously submitted map could not be clearly interpreted and requests that the relevant area be resent in KML format with accurately defined limits. The letter states that the correctly framed KML file must be provided so that the Council can identify

No	Institution	Date	Document No	Subject/Notes
				cultural heritage assets within the irrigation area and issue its official opinion.
19.	Kayseri Regional Council for the Protection of Cultural Assets	23.12.2020	979977	The Cultural Heritage Regional Council reviewed the mapping data submitted by DSİ for the Sarımsaklı AT and TİGH works and stated that the attached files lacked clear legends and could not be interpreted accurately. The institution requested that DSİ resend the relevant spatial data in a comprehensible format, including properly defined legends and the full boundary information of the areas requiring assessment, preferably in KML/KMZ and NCZ formats. The Council noted that only after receiving complete and readable data would it be able to evaluate whether any registered or potential cultural heritage assets fall within the project area.
20.	Türk Telekomünikasyon A.Ş. (Turk Telekom) Access Planning and Investment Directorate	31.03.2021	55988	Turk Telekom confirms that, based on the digital project data shared by DSİ, the company's existing telecommunications infrastructure within the Sarımsaklı AT and TİGH irrigation area has been identified and marked in the attached KMZ file. The institution provides this information for coordination purposes and indicates no further comments beyond notifying the presence of its network assets in the project area.
21.	Kayseri Provincial Directorate of Environment and Urbanization	28.12.2020	27213	The Provincial Directorate states that parts of the Sarımsaklı AT and TİGH project area overlap with designated natural site areas, specifically the Engir Lake Natural Site and the Tavlusun–Germir Natural Site. The institution emphasizes that any works planned within these protected zones require prior permission from the Regional Nature Conservation Commission. It also notes that the project must comply with national environmental legislation, avoid ecological disturbance, and implement all necessary measures for the protection of natural assets. The Directorate attaches spatial data showing the natural site boundaries for coordination purposes.
22.	State Railways Administration General Directorate (TCDD) 4th Regional Directorate (Sivas)	24.03.2022	1227336	TCDD confirms that the Sarımsaklı AT and IGH project area does not contain any railway-owned land, infrastructure or facilities under its mandate. The institution states that it has no objection to the planned works but notes that projects conducted by the General Directorate of Infrastructure Investments should nevertheless be taken into consideration during implementation.
23.	İlbank	01.11.2021	39023	ILBANK confirms that it has no existing or planned facilities, investments, or infrastructure within the Sarımsaklı irrigation project area. In response to DSİ's request, the Bank states that no ILBANK projects overlap with or are affected by the proposed irrigation routes, and therefore it has no objections to the planned works. The institution simply acknowledges the information request and clarifies that it has no operational relevance or constraints concerning the project area.
24.	DSİ 12th Regional Directorate	18.12.2020	817482	DSİ circulated the Sarımsaklı AT and TİGH project maps to a wide range of public institutions

No	Institution	Date	Document No	Subject/Notes
				to confirm whether any existing or planned facilities fall within the irrigation area and to obtain institutional opinions. The letter requests each institution to verify if they have any assets, protected areas, utility lines, or planned projects within the project boundaries and to report these to DSİ. The distribution list includes key infrastructure and utility authorities such as TCDD, BOTAŞ International, MAPEG, Ministry of National Defense Fuel Supply and NATO POL Facilities Management Directorate, İlbank Kayseri Regional Directorate, Kayseri Metropolitan Municipality, State Highways, İlbank, Kayseri Elektrik, Kayseri Environment and Urbanization, Kayseri Cultural Heritage Preservation Board, district municipalities, Kayseri Gas, Ministry of Agriculture and Forestry 7th Region, MTA, and Türk Telekom. The purpose is to ensure that all relevant institutions review the shared project area data (CD containing KMZ/graphs) and provide confirmation regarding overlaps or constraints before finalizing updated irrigation maps.

There is no further correspondence with the institutions. The feedback received from these correspondences was deemed sufficient, and the Project layout and borders have been revised accordingly. The Project does not include any sensitive areas or archaeological sites.

3 PROJECT DESCRIPTION

3.1 Sarımsaklı Dam Irrigation Renovation Project

One of the sub-projects to be implemented by DSİ under Component B of TWCEIP is Sarımsaklı Dam Irrigation Renovation Project located in Kayseri province. This sub-project aims to convert existing open canal irrigation systems to closed pressurized pipe networks, increase water and energy efficiency, and modernize irrigation services.[3]

The Project area is located in the Kızılırmak Basin of the Central Anatolia Region, approximately 30 km east of the Kayseri provincial center. The irrigation area is located between elevations of 1060–1130 meters, where continental climate conditions prevail. Summers are hot and dry, winters are cold with snowfall, while the climate is milder in the low-lying areas.[1]

The main objective of the Project is to ensure that the "Sarımsaklı Gravity and Pumping Irrigation" areas located in the central districts of Kocasinan and Melikgazi in Kayseri province are irrigated with a closed pressure pipe system. Upon completion of the application, the gravity and pumping fields will be combined and operated as a single unit. There is no shortage of water resources. The Project area is located within the boundaries of the central districts of Kocasinan and Melikgazi in Kayseri province and consists of gravity and pumping units. The main source of the Sarımsaklı Gravity Irrigation System is the Sarımsaklı Dam built on the Bünyan Stream, while the source of the Sarımsaklı Pumping Irrigation System is 89 Groundwater Wells (GWW). [4]

The Project covers a gross irrigation area of 8,865 hectares and is designed to enable gravity, sprinkler, and drip irrigation methods. Upon completion, the existing gravity and pump irrigation fields will be operated as a single entity. There are no water supply issues, as the main source is the Sarımsaklı Dam built on the Bünyan Stream.

The following works and operations are planned to be carried out within the scope of the Project:

- Converting open trapezoidal channels into a pressurized pipe network,
- Integration of smart water meters into irrigation units,
- Promoting modern irrigation methods such as drip and sprinkler irrigation.

In this context, the lengths and diameters of the pipelines can be summarized as follows (see Table 3-1), and the types of the pipes will vary among polyethene (PE100), steel and Glass Reinforced Plastic (CTP):

Table 3-1. Lengths and Diameters of the Pipelines

Pipeline	Length		Diameter (mm)
	(m)	(km)	
Right Main Pipeline	18,210	18.2	110-2,200
Left Main Pipeline	33,643.17	33.6	160-2800
Right Replacement Pipes	178,093.17	178.1	1,300-1,700 (for 14.5 km) 110-700 (remaining parts)

[3] DSİ, *Kayseri Sarımsaklı Dam Irrigation Renovation ESF Special Technical Specifications,* 2025.
[4] DSİ, *Sarımsaklı Dam Irrigation Renovation Project – Environmental and Social Screening Form,* May 2025

Pipeline	Length		Diameter (mm)
	(m)	(km)	
Left Replacement Pipes	112,564.07	112.6	110-700
Drain pipes / Drainage pipes	43,141.84	43.1	-

The Contractor may procure pipes from any manufacturer that meets the technical requirements; potential suppliers include facilities in Adana, İzmir, Kayseri and Diyarbakır. Temporary pipe storage areas will be identified within the irrigation project area, primarily on suitable Treasury lands or, where not available, on privately rented parcels. In the event that treasury lands are used for temporary pipe storage areas, any formal or informal land users will be identified in advance, and no physical or economic displacement will take place unless livelihood impacts are duly assessed and appropriate compensation and/or assistance measures are provided in accordance with ESS5 requirements of the WB. All formal and informal right holders and / or users in the relevant areas will be informed in advance about their eligibility and entitlements, including vulnerable groups defined in line with land acquisition. Although the exact locations and extent of land acquisition have not yet been determined, land acquisition activities under the Project may result in certain temporary or permanent impacts. A LAP will be prepared to identify and assess these impacts in line with the TWCEIP LAPF and the requirements of ESS5.

Depending on the spatial needs of the construction schedule, multiple storage areas may be used simultaneously. Transportation of pipes and construction materials will be carried out via existing state roads and local access routes, with final delivery organized according to the sequencing of works. Construction logistics will rely on the regional road network connecting the project area to Kayseri city and neighboring settlements. Materials, equipment and pipes will be transported along state highways and local access roads.

The Sarımsaklı Gravity Irrigation System was commissioned in 1968 to irrigate a net area of 5,000 hectares. Water taken from the source, the Sarımsaklı Dam, is released from the water intake structure into the riverbed and directed to the right and left main channels from the Barsama Regulator located 4.5 km away. This system has a gross irrigation area of 5,910 hectares and a net irrigation area of 5,000 hectares. The right main canal is 15+196 km long and irrigates an area of 3,470 hectares, while the left main canal is 10+681 km long and irrigates an area of 1,530 hectares. The main canal is of the classic type with concrete lining, while the secondary canals are concrete-lined and channel-shaped. Operational responsibility for the facilities was transferred to the Sarımsaklı Ova Irrigation Union in 2013.

The Sarımsaklı Pumping Irrigation System was constructed in 1966 to irrigate a net area of 3,300 hectares. Its source is 89 GWWs. The channels within the area are at a tertiary level and their capacities vary depending on the wells they are connected to. Of these channels, 77+110 km are concrete-lined and 13+200 km are earthen channels. The operation of the pump irrigation system was transferred to the Sarımsaklı Pumped Irrigation Association in 2005. The gross area of the pumped irrigation system is 3,901 ha, and the net area is 3,300 ha. However, due to the region's proximity to the center of Kayseri city, rapid development, and the increase in industrial, residential, and tourism areas, areas where cultivation is not possible have emerged. Therefore, with the approval of the General Directorate of DSİ dated 12.10.2017 and numbered 703377, 1,700 hectares of land used for industrial and residential purposes in the pumping area were removed from the inventory, and the net area of the pumped irrigation was accepted as 1,600 hectares.

Studies conducted within the scope of the Irrigation Renovation Project examined a total area of 11,299 hectares, of which 8,865 hectares were determined to be irrigable. Of the irrigation area, 6,052 hectares will be operated through gravity-fed systems and 2,813 hectares through pumping systems. The total pipeline network length envisaged for the Project is 335 km, and the initial capacity is calculated as 4.118 m³/s.

The construction phase of the Project is expected to last 4 years, with a peak/maximum workforce of 250 people during the construction period. Additionally, the Project's operational life is expected to be approximately 50 years. During this period, the operational workforce is estimated to consist of 40 employees, representing the staff of the irrigation union(s) assigned by DSİ for operating the system.

The Contractor will establish a temporary construction site within or immediately adjacent to the irrigation command area, using rented land or available unused public parcels depending on local conditions. In the event that treasury lands are used for temporary construction site, any formal or informal land users will be identified in advance, and no physical or economic displacement will take place unless livelihood impacts are duly assessed and appropriate compensation and/or assistance measures are provided in accordance with ESS5 requirements of the WB. All formal and informal right holders and / or users in the relevant areas will be informed in advance about their eligibility and entitlements, including vulnerable groups defined in line with land acquisition. Although the exact locations and extent of land acquisition have not yet been determined, land acquisition activities under the Project may result in certain temporary or permanent impacts. A LAP will be prepared to identify and assess these impacts in line with the TWCEIP LAPF and the requirements of ESS5.

In addition to the requirements related to land access and livelihood impacts under ESS5, all temporary construction sites and storage areas will also be subject to the environmental and community health and safety management provisions defined in this ESMP.

Prior to the establishment and use of any temporary construction site, the Contractor will ensure that potential environmental and social risks are identified and managed in line with ESS1, ESS3 and ESS4, including waste and wastewater management, prevention of soil and water contamination, dust and noise control, traffic and access management, and protection of community health and safety.

These measures will be implemented through the Contractor's site-specific management plans/procedures and monitored by DSİ Regional Directorate. The Contractor shall also be responsible for ensuring that all temporary construction sites and material storage areas are managed in accordance with the environmental and social requirements defined in this ESMP.

Essential facilities within the construction site will include the personnel rest and dining areas, site offices, machinery parking, workshops, material storage areas, and general utilities. Due to the proximity of the project to Kayseri city center and surrounding settlements, worker accommodation is not expected to be required, and personnel are anticipated to commute from nearby residential areas. However, if accommodation facilities are deemed necessary by the contractor, a small-scale temporary lodging area may be established within the site, subject to compliance with national regulations and World Bank ESS2 requirements. The exact layout and size of the construction site will be finalized by the contractor prior to mobilization, ensuring minimal land disturbance and efficient integration with existing access routes. Electricity required for construction site including

office operations, lighting and workshop equipment might be supplied from the existing regional electrical distribution network serving the surrounding settlements.

Within the scope of the Project, the materials to be used for the bedding depends on the Contractor selection. The Contractor may prefer to procure the bedding materials such as sand and gravel from the suppliers which have the necessary valid Environmental Permits in line with the national legislation. Or the Contractor may prefer the sand and gravel quarries located in the Kızılırmak riverbed in Burunören area of Sarıoğlan district which belong to DSİ 12th Regional Directorate and operated by private firms. The National Environmental Impact Assessment (EIA) process has been completed for these quarries, including the ABC Sand and Gravel Quarry, and "EIA Not Required" decisions have been made. Similarly, "EIA Not Required" decisions have been issued for crushing, screening, and washing facilities. It is anticipated that concrete requirements will be met through procurement. Additionally, a quarry located within the Akın neighborhood boundaries, which holds a Raw Material Production Permit and completed the EIA process, may be used for material supply purposes by the Contractor, if it prefers.[4] These quarries are available to be used for the Project. However, the decision of using depends on the Construction Contractor. The Contractor may use/procure these quarries or other quarries which have necessary EIA certificates and Environmental Permits (if applicable).

It is planned to diversify the current production pattern, which is mainly based on cereals and sunflowers, with products such as sugar beet, corn, alfalfa, vegetables, and fruits. This transformation aims to increase agricultural productivity, diversify farmers' incomes, and manage water resources in a more controlled manner. The impacts of the works will be largely expected to be short-term, limited, and reversible; therefore, the Project has been classified as "Moderate" risk.

With these characteristics, the Sarımsaklı Dam Irrigation Renovation Project is a sub-project that embodies TWCEIP's goals of climate change adaptation, resource efficiency, and sustainable agriculture at the local level.[3]

3.1.1 Existing Characteristics and Conditions of Sarımsaklı Dam and Its Irrigation System

The Sarımsaklı Dam, located approximately 30 km east of Kayseri province within the Kızılırmak Basin, was constructed on the Bünyan Stream and commissioned in 1968. The dam was primarily designed for irrigation purposes, supplying water to approximately 8,865 hectares of agricultural land through both gravity and pump irrigation systems.

The dam structure is of zoned earth-fill type with a total storage capacity of 34.8 hm³ and an active storage of 33.6 hm³. It plays a vital role in supporting agricultural production in the region, contributing to crop diversification and sustainable water use.

The Sarımsaklı Dam supplies water to both gravity-flow and pump irrigation systems, serving agricultural lands within the districts of Kocasinan and Melikgazi. The irrigation network is supported by a regulator located 4.5 km downstream of the dam, which directs water to the right and left main canals. The system includes secondary and tertiary canals, most of which are concrete-lined or canalette-type structures designed to minimize seepage and distribution losses.

The gravity-flow irrigation scheme consists of two main canals supplying water to approximately 5,000 hectares of net irrigable land. The right main canal has a higher

discharge capacity and a longer distribution reach, while the left canal supports smaller-scale areas with proportionate flow rates.

The pump irrigation system serves approximately 3,300 hectares of land (revised to 1,600 ha due to urban expansion). It operates through 89 groundwater wells (YAS wells) established in 1966, which extract water for distribution through a combination of concrete-lined and earthen canals.

Management of both systems was gradually transferred to local water user organizations to ensure sustainable operation and cost-sharing. The Sarımsaklı Plain Irrigation Union took over the gravity irrigation network in 2013, while the Sarımsaklı Pumped Irrigation Association assumed responsibility for the pump irrigation system in 2005.

Key characteristics of Sarımsaklı Dam and the irrigation systems (gravity and pump) are summarized in Table 3-2.

Table 3-2. Characteristics of Sarımsaklı Dam and Its Irrigation Systems

Parameter		Specification
Sarımsaklı Dam		
Construction Completion Year		1968
Location		30 km east of Kayseri Province
Purpose		Irrigation
Average Annual Water Volume		52 hm³
Dam Type		Zoned earth-fill
Height (from thalweg)		38 m
Height (from foundation)		48 m
Crest Elevation		1,208 m
Thalweg Elevation		1,172 m
Total Embankment Volume		1.5 hm³
Active Storage		33.6 hm³
Total Reservoir Volume		34.8 hm³
Design Spillway Discharge		500 m³/s
Gravity Irrigation Area		5,910 ha (gross) / 5,000 ha (net)
Pump Irrigation Area		3,901 ha (gross) / 3,300 ha (net)*
Main Regulation Distance from Dam		4.5 km
Gravity Irrigation Network		
Irrigation Area	Right Main Canal	3,470 ha
	Left Main Canal	1,530 ha
Length	Right Main Canal	17,570 m
	Left Main Canal	12,780 m
Discharge Capacity	Right Main Canal	4.00 → 0.50 m³/s
	Left Main Canal	1.35 → 0.56 m³/s
Canal Type	Right Main Canal	Concrete-lined
	Left Main Canal	Concrete-lined
	Secondary & Tertiary Canals	Canallete type (partial)
Pump Irrigation Network		
Number of Groundwater Wells (YAS)		89

Parameter	Specification
Operational Since	1966
Irrigation Area (net)*	3,300 ha (currently ~1,600 ha)
Concrete-lined Canals	77 + 110 km
Earthen Canals	13 + 200 km

* The net irrigation area for the pump system was later revised to 1,600 ha due to urbanization and conversion of agricultural land to residential and industrial use.

The existing open canal irrigation infrastructure is now outdated and inefficient, leading to considerable water conveyance losses, energy inefficiency, and unequal water distribution among farmlands. Moreover, socio-economic changes over the last five decades—such as rapid urbanization, shifts in agricultural practices, and migration—have altered water demand and system performance.

In addition, climate change impacts (e.g., reduced rainfall, increased evapotranspiration) have heightened the need for modern, pressurized irrigation systems that can ensure water-use efficiency and sustainability.

Therefore, the rehabilitation and modernization of the existing irrigation network is essential. The proposed pressurized closed-pipe system will minimize transmission losses, improve irrigation efficiency, reduce operational energy costs, and enhance climate resilience. This transition is expected to deliver long-term socio-economic and environmental benefits for the agricultural communities depending on the Sarımsaklı irrigation scheme.

The Project aims to modernize the existing 1960s-era open canal irrigation network into a pressurized closed-pipe system, increasing efficiency and resilience against climate change. The dam currently supplies about 8,865 ha of agricultural land with water from the Bünyan Stream, but parts of the pump-fed area have been lost to urban expansion. The rehabilitation will improve irrigation efficiency, reduce energy use, and enhance the sustainability of local agriculture.

4 ENVIRONMENTAL AND SOCIAL BASELINE

In this chapter, environmental and social existing baseline conditions are summarized for the Project area and its Area of Influence (AoI), which will potentially be affected by the Project's construction and/or operation activities.

The details regarding the environmental and social baseline conditions are given in Annex-3 of this ESMP.

4.1 Environmental Baseline

4.1.1 Geographical Location

The Project area is located in the Kızılırmak Basin of the Central Anatolia Region, approximately 30 km east of the Kayseri provincial center within the boundaries of Kocasinan and Melikgazi districts. The geographical location map of the Project area is shown in Figure 4-1.

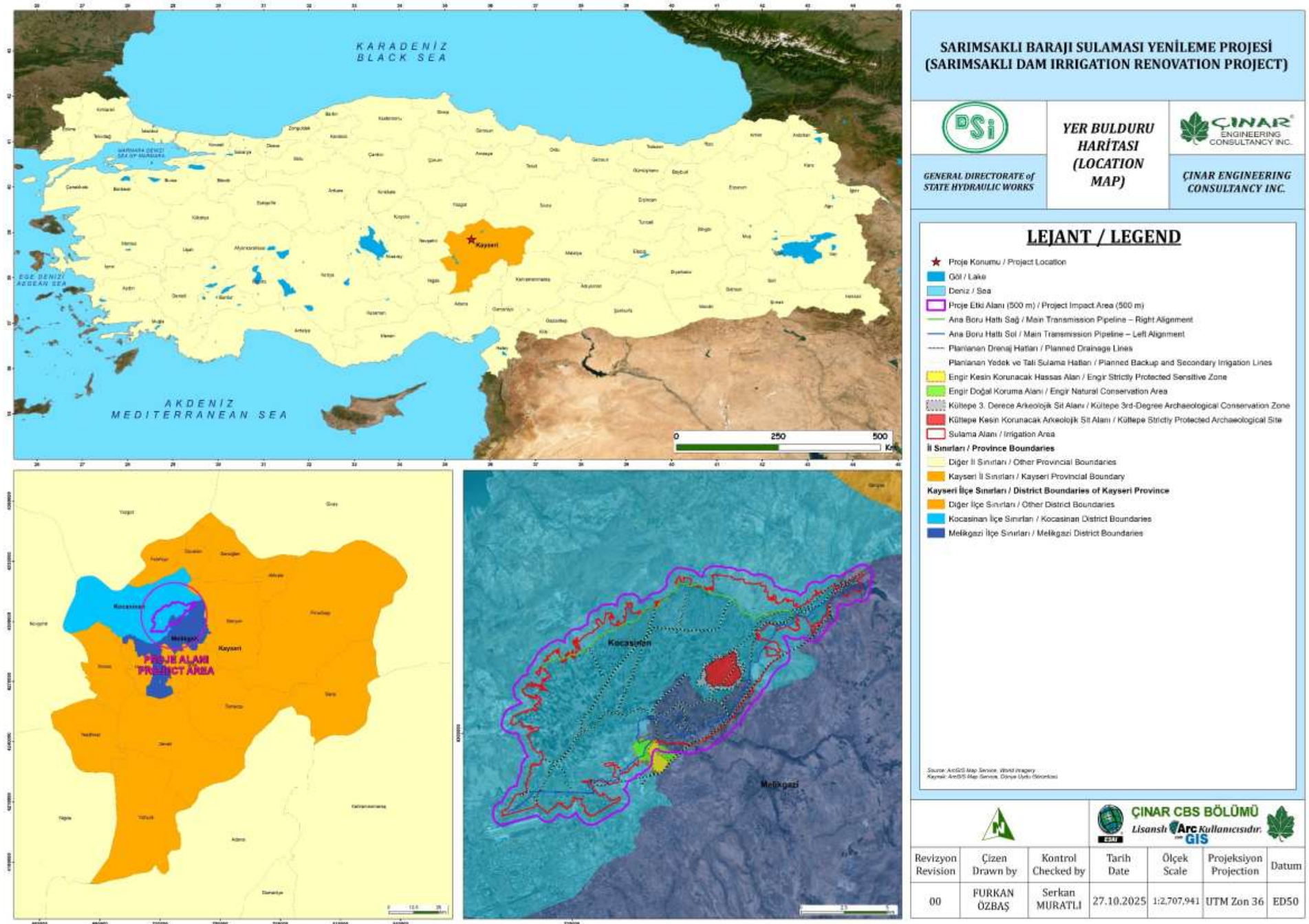

Figure 4-1. Geographical Location of the Project

4.1.2 Geological and Hydrogeological Characteristics

The Project area is located within the Neogene–Quaternary Kayseri basin, in the wider tectonic domain of the Ecemiş Fault Zone. At regional scale, the geology comprises a thick Cenozoic sequence of volcanic and sedimentary units (andesite–basalt lavas, tuffs, ignimbrites, conglomerates, sandstones and marls) overlain by extensive Quaternary alluvial deposits. Within the Project footprint, surface conditions are dominated by Holocene alluvium consisting of unconsolidated gravel, sand, silt and minor clay, which provides generally favorable ground conditions for linear irrigation infrastructure.

No protected geological sites or unique geomorphological features have been identified within the Project area or its immediate surroundings.

The Project lies within the Kayseri graben system developed under an extensional regime and controlled by active fault zones such as the Ecemiş, Erkilet and Erciyes Fault Zones. According to the national seismic hazard map, the design peak ground acceleration for a 475-year return period along the route is approximately 0.210 g. All structures to be constructed under the Project will be designed and built in accordance with the Turkish Building Earthquake Regulation (effective from 01.01.2019) and other applicable national disaster and building codes. Although Kayseri Province has a documented history of damaging earthquakes, the Project does not introduce any additional seismic hazard; rather, it is required to be resilient to the existing regional hazard level.

Other natural hazards such as landslides and flooding are mainly associated with steep volcanic slopes and the Kızılırmak Basin. In the Project area, which is located on gently sloping agricultural land downstream of the existing Sarımsaklı Dam, no active landslide zones or instability-prone areas have been identified. Surface water is already regulated by the Sarımsaklı Dam and dry valleys are connected to the Sarımsaklı Main Outfall, so no Project-related increase in flood risk is anticipated.

Hydrogeologically, the Project is situated on the Sarımsaklı plain, where a 350–400 m thick sedimentary basin filled with fine-grained, volcaniclastic deposits overlies volcanic bedrock. The most productive aquifers are the Quaternary alluvial units and associated alluvial cones and sand–gravel layers, which form a shallow unconfined aquifer with static water levels typically between 2.4 and 30 m below ground level. This system is hydraulically connected to deeper, fractured volcanic aquifers that also constitute an important regional groundwater resource. Groundwater flow in the Sarımsaklı plain is generally towards the southwest.

Given the high permeability of the alluvial aquifer and the regional importance of groundwater, the Project will implement strict pollution prevention measures, including storage of fuels and chemicals in impermeable, bunded areas with secondary containment, and compliance with Law No. 167 on Groundwater and the “Regulation on the Protection of Groundwater against Pollution and Degradation”. With these measures and adherence to national design standards, no significant geological or hydrogeological constraints are expected for the Project.

Detailed stratigraphy, tectonic framework, natural hazard inventory, and hydrogeological unit classification, together with the stratigraphic section, geological map, active fault map, earthquake catalogue and hydrogeology map, are provided in Annex-3.

4.1.3 Meteorological and Climatic Characteristics

The Köppen-Geiger map is globally used in climate studies. According to Köppen-Geiger climate classification, Kayseri province, where the project area is located, is classified as Csa climate type (warm winter, hot summer, and arid climate (Mediterranean climate) according to the Köppen Climate Classification rules. According to this climate type, the mean temperature maximum of 29.0°C is greater than 22°C. [5]

Although according to the Köppen Climate Classification, Kayseri province has a Mediterranean climate, according to the Provincial Environmental Status Report[6] and the Project-Specific Technical Report[7], the region is dominated by a continental Central Anatolian climate with cold and snowy winters and hot and dry summers. However, the climate of the region varies from place to place according to elevation. Accordingly, while the climate is softer in the lands in the pit, it becomes harsher as it moves from the highlands to the mountainous areas. The region has steppe climate characteristics. Summers are hot and dry, winters are cold and snowy. Highland climate prevails in high places.

Seasonal general statistical data in Kayseri province, where the project is located, are illustrated in the following graphics (see Figure 4-2 and Figure 4-3).Moreover, according to General Directorate of Meteorology (MGM) data[8], the average annual precipitation in Kayseri is 390.4 mm.

The annual average temperature in the province is 10.7°C. The highest temperature recorded is 40.7°C and the lowest temperature recorded is -32.5°C. The hottest month is August, and the coldest month is January.

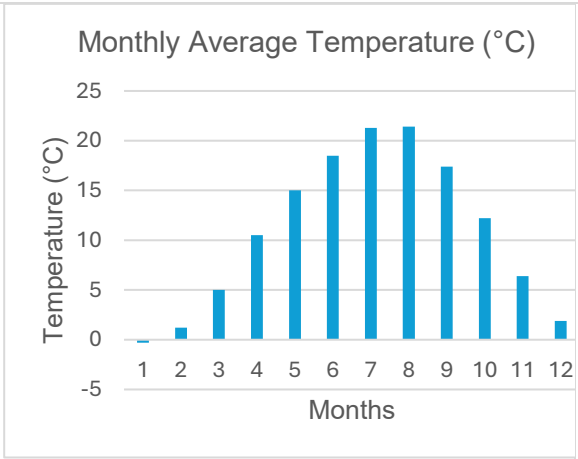

Figure 4-2. Monthly Average Temperature of Kayseri (between 1931-2024)

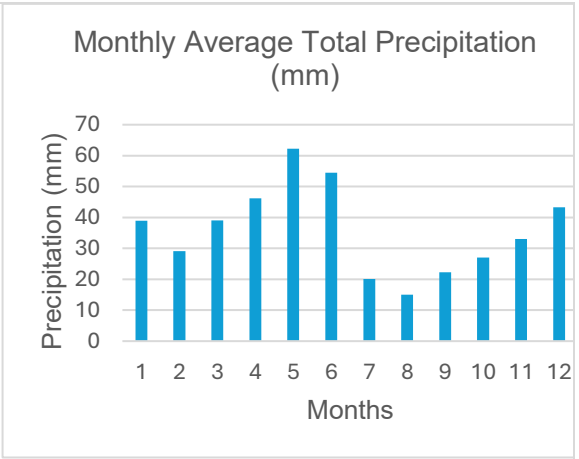

Figure 4-3. Monthly Average Total Precipitation of Kayseri (between 1931-2024)

[5] MoEU, GDoM, Climate of Türkiye According to Köppen Climate Classification, January 2016.Link: https://www.mgm.gov.tr/FILES/iklim/iklim_siniflandirmalari/koppen.pdf

[6] Republic of Türkiye, Governorship of Kayseri, Provincial Directorate of Environment, Urbanization and Climate Change (2024). *Kayseri Province 2023 Environmental Status Report (İl Çevre Durum Raporu 2023)*. Kayseri, Türkiye.

[7] General Directorate of DSİ, 12th Regional Directorate – Kayseri (2018). *Kayseri Sarımsaklı Gravity and Pump Irrigation Project – Technical Report.* Prepared by Borsu Engineering Consulting Construction Ltd., Ankara, Türkiye.

[8] https://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?k=A&m=KAYSERI

4.1.4 Existing Water Resources and Hydrological Characteristics

Kayseri Province lies within the Kızılırmak and Ceyhan River Basins and hosts a diverse water system comprising major rivers, natural lakes and wetlands, extensive reservoirs, and productive alluvial aquifers. According to the Kayseri Provincial Environmental Status Report, the province has a surface-water potential of 3,878 hm³/year and a groundwater potential of 958 hm³/year. The metropolitan districts of Melikgazi and Kocasinan, together with the Sarımsaklı Plain, form the main groundwater-dependent zones. The entire drinking and domestic water supply of Kayseri is sourced from groundwater wells, with no surface-water contribution.

The primary surface-water bodies influencing the region are the Kızılırmak River, the Zamantı River, and the Sarımsaklı Stream, the latter flowing approximately 55 km before joining the Kızılırmak near Boğazköprü. Additional natural lakes and wetlands—such as Sultan Marshes, Hürmetçi Marshes, Tuzla Palas Lake and Engir Lake—constitute significant hydrological features within the Kızılırmak Basin. Numerous DSİ-operated reservoirs, including Ağçaşar, Akköy, Bahçelik, Bayramhacılı, and Yamula, support irrigation, hydropower generation, and groundwater recharge functions across the province.

Groundwater represents the most critical water resource, with static levels ranging 0–320m, dynamic levels 0.5–380 m, and well yields reaching 85 L/s. The Sarımsaklı Plain contains a 350–400 m thick sedimentary basin of permeable alluvial and sand-gravel deposits, forming one of the most productive aquifers. Many municipal supply wells—such as Sarımsaklı, Erkilet, Germiraltı, Kayadibi, Gediris, İncesu and Subaşı wells—are located within or hydraulically connected to these aquifer systems.

Water allocation records indicate 470,246,571 m³/year of groundwater abstraction and 491,709,800 m³/year of surface-water allocation for domestic, agricultural, industrial and livestock sectors. Kayseri hosts 110,089 ha of irrigated land, where groundwater is predominantly used alongside DSİ surface-water systems. Irrigation practices have largely transitioned to sprinkler and drip systems. Industrial water demand is supplied entirely from groundwater, and several hydropower plants—including Yamula Hydroelectric Power Plant (HPP), Bahçelik HPP and Bayramhacılı HPP—operate within the basin, with a combined installed capacity of 363.18 MW and an annual generation of approximately 1,548.85 GWh.

Water quality monitoring confirms nitrate concentrations between 5–29 mg/L in agricultural zones. Irrigation water supplied from the Sarımsaklı Dam was evaluated based on a sample taken from the dam's bottom outlet on 19 October 2017, analyzed by the Water and Soil Laboratory of the Directorate of Survey, Planning and Allocations. The results indicated an electrical conductivity value of EC = 497 µmhos/cm, SAR = 0.44, %Na = 12.55, and Boron = 0.01 mg/L, classifying the water as T2A1 under the national irrigation water classification system. This classification denotes medium-salinity, low-sodium irrigation water suitable for soils with good permeability and for crops with moderate tolerance to salinity. Irrigation scheduling assessments indicate that crop water requirements in the Sarımsaklı irrigation area are typically met with two irrigation applications in July and one application in August, corresponding to the peak seasonal demand period.

Hydrologically, the Project area is located in the Middle Kızılırmak Sub-Basin, downstream of the Sarımsaklı Dam. The Sarımsaklı Stream within the Project footprint is designated as a Sensitive River Water Body (TR15011579) due to nitrate and urban pressures identified under ongoing Kızılırmak River Basin Management Plan studies. The region exhibits a semi-arid Central Anatolian climate with marked seasonal flow variations, snowmelt-driven

spring peaks, and low summer discharge. Surface waters and groundwater are hydraulically interconnected, with the general regional flow direction towards the southwest. All activities will comply with the “Regulation on the Improvement of River and Stream Beds” (2010) and the “Flood and Sediment Control Regulation” (2019).

All detailed tables, full reservoir lists, hydrological maps, well inventories, dam specifications, water-quality datasets, and regulatory references are provided in Annex-3.

4.1.5 Land Use, Topography, Vegetation and Soil Properties

The project area lies within a predominantly steppe-dominated region of Kayseri Province, where the broader provincial land cover consists of 670,584 ha of agricultural land, 691,028 ha of meadow–pasture, 135,817 ha of forest, and 189,144 ha of other land uses.

According to updated land classification studies conducted for the Kayseri Sarımsaklı Irrigation Project, a total of 11,299 ha were surveyed, of which 8,865 ha were identified as irrigable, 1,108 ha as non-irrigable, 37 ha as temporarily non-irrigable, and 1,289 ha as meadow–pasture areas.

The dominant soil groups in the project area include alluvial, colluvial, brown, and reddish-brown soils, characterized by medium- to heavy-textured, deep profiles with high permeability and good water-holding capacity. Approximately 78% of the area consists of soils deeper than 150 cm; Class I–II soils make up about 46%, Class III soils about 43%, and only 0.3% is temporarily non-irrigable. Localized gravelly layers and shallow groundwater zones were observed in approximately 33–34 ha, where groundwater occurred at depths of 90–150 cm and drainage measures are recommended.

Soil salinity remains low (0.1–0.6%), and no contamination has been identified; however, both the Technical Report and the Provincial Environmental Status Report note that improper long-term use of fertilizers and pesticides may pose risks to soil quality, nutrient balance and groundwater.

Land cover within the project footprint is dominated by permanently irrigated land, supported by surrounding patterns of discontinuous urban fabric, industrial/commercial areas, sports and leisure facilities, non-irrigated arable land, pastures, complex cultivation patterns, agricultural mosaics, natural grasslands, sparsely vegetated areas, and inland marshes according to CORINE[9] Land Cover Map.

Land Use Map of the Project indicates that land use types observed within the impact area are irrigated and non-irrigated dry farming, mixed dry farming, pastures, dry vineyards, meadow-pasture units, and settlement areas. Topography, CORINE Land Cover, and land-use characteristics for the Project area are presented in figures, with full datasets and classifications provided in Annex-3.

[9] Coordination of Information on the Environment

4.1.6 Existing Air Quality

In Kayseri province, there are a total of six (6) national air quality monitoring stations under the supervision of MoEUCC. The locations and parameters measured are summarized in Table 4-1, while Figure 4-4 shows the locations of the stations according to the project area.

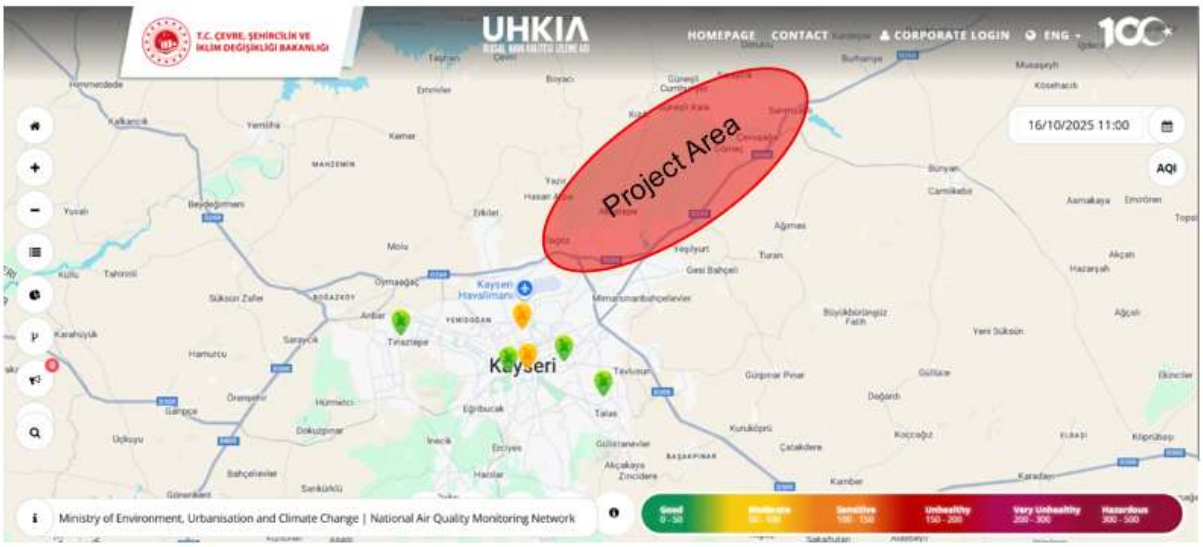

Figure 4-4. Locations of the Air Quality Monitoring Stations and Project Area[6]

Table 4-1. Air Quality Monitoring Stations and Parameters Measured[6]

No	Station Name	Coordinates	Distance to Project (km)	Types	PM_{10}	$PM_{2.5}$	SO_2	NO_2	O_3	CO
1	Hürriyet	38.714757-35.470575	7.2	Heating	✓	–	✓	✓	–	✓
2	Kocasinan	38.744597-35.481918	3.7	Heating	✓	–	✓	✓	–	✓
3	Melikgazi	38.722883-35.518705	6.2	Heating	✓	–	✓	✓	–	–
4	Organized Industrial Zone (OSB)	38.740437-35.375453	10.5	Industry	✓	✓	✓	✓	✓	✓
5	Talas	38.698954-35.553436	8.6	Heating	✓	–	–	✓	✓	–
6	Trafik	38.717305-35.486887	6.8	Traffic	✓	✓	–	✓	✓	✓

Notes:
PM_{10}: Particulate Matter (Dust) for particles smaller than 10 microns
$PM_{2.5}$: Particulate Matter (Dust) for particles smaller than 2.5 microns
SO_2: Sulphur Dioxide (Heating-related)
NO_2: Nitrogen Dioxide (Gas)
O_3: Ozone (Gas)
CO: Carbon Monoxide (Gas)

Accordingly, the closest air quality monitoring stations to the Project area are Kocasinan, Melikgazi and Trafik monitoring stations. The current average data obtained from the National Air Quality Monitoring Network for those stations within 2025 (from 1st January to 16th October 2025) are given in Table 4-2. Accordingly, it is seen that PM_{10} and/or NO_2 concentrations exceeded in Melikgazi and Trafik Monitoring Stations. When the air quality

indexes of these monitoring stations are analyzed, it is observed that they are between Moderate and Good.[10]

Table 4-2. Average Air Quality Values of Selected Monitoring Stations (01.01.2025-16.10.2025)

Parameter	Unit	Kocasinan Monitoring Station	Melikgazi Monitoring Station	Trafik Monitoring Station	Limit Values**
PM_{10}	µg/m³	35.71	**40.55**	**46.58**	40
$PM_{2.5}$*	µg/m³	–	–	–	–
SO_2	µg/m³	–	12.3	–	20
CO	µg/m³	391.05	–	678.13	10 (8-hour max)
NO_2	µg/m³	33.89	–	**69.32**	40
NO_X	µg/m³	48.93	–	122.8	–
NO	µg/m³	15.03	–	54.57	–
O_3	µg/m³	–	–	42.44	–

* No data available for the selected time period.
** Limit values in Table 2.2 of Control of Industrial Air Pollution Regulation Annex-2.

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

4.1.7 Existing Environmental Infrastructure

4.1.7.1 Wastewater Treatment Plants

During the construction phase, domestic wastewater will be produced by the Project personnel. Since there is no existing sewerage system ending at a treatment facility, wastewater generated by those personnel will be collected in a sealed impermeable septic tank. It will then be transported by sewage trucks to the General Directorate of Kayseri Water and Sewerage Administration (KASKİ) Kayseri Advanced Biological Wastewater Treatment Plant (WWTP) operated by Kayseri Metropolitan Municipality, which is located approximately 16 km west of the project area. According to the General Directorate of EIA, Permit, and Inspection's official website, the mentioned WWTP hold valid Wastewater Discharge Permits with a capacity of 20,000 m³/day and more.

In case Kayseri Advanced Biological WWTP is not suitable for wastewater disposal, wastewater generated will be sent to KASKİ's Ebiç-Kızılırmak WWTP located approximately 20 km west of the project area, which holds a valid Wastewater Discharge Permit for domestic wastewater less than 20,000 m³/day.[11]

[10] **Air Quality Index Values of the Stations:**
Good (0-50): The air quality is at a good level.
Moderate (50-100): The air is suitable, but sensitive groups may be moderately affected by air pollution.
[11] The current environmental permit and license status of facilities or enterprises can be inquired from the official website of the General Directorate of EIA Permit and Inspection https://eizin.cevre.gov.tr/Rapor/BelgeArama.aspx

4.1.7.2 Waste Recovery, Recycle and Disposal Sites

During the construction phase of the Project, the Contractor will be responsible for transferring all waste types — including hazardous wastes, waste oils, waste tires, etc. — generated during project activities to licensed waste management facilities authorized by MoEUCC and holding valid Environmental Permits and Licenses within Kayseri Province, especially in Kocasinan and Melikgazi districts.

During the operation phase, wastes generated from maintenance and repair works will similarly be collected and transferred to licensed facilities in the region under the supervision of the DSİ 12th Regional Directorate (Kayseri) or assigned Irrigation Union(s).

In Kayseri province, there is a Solid Waste Sanitary Landfill and Composting Facility, completed on 29 May 2015. Following the issuance of the Class II Sanitary Landfill Facility Approval Certificate, the facility began accepting waste on 30 November 2015.[12]

Moreover, according to the General Directorate of EIA, Permit, and Inspection's official website, there are 113 licensed waste management facilities within Kayseri province, Melikgazi and Kocasinan districts.

All waste types generated under the scope of the Project will be delivered to these licensed facilities. In cases where a suitable facility is not available within the Kocasinan and Melikgazi districts, the relevant wastes will be transferred to licensed facilities located in other districts of Kayseri Province.

Additionally, within the scope of the Project, the Kayseri Metropolitan Municipality and DSİ 12th Regional Directorate have conducted the necessary correspondence for the disposal of excess excavated soil. The Kayseri Metropolitan Municipality's letter No. 309/25940 dated October 3, 2025, designates the Akın Excavated Soil Dumping Site located in Kocasinan District, Akın Neighborhood, plot 5911, parcel 121. The stripped topsoil will be reused in the construction phase, thus there will be no disposal of the topsoil to the dumping site.

4.1.7.3 Quarries

Within the scope of the Project, the Sand and Gravel Quarries located in the Kızılırmak river bed at Burunören locality of Sarıoğlan district might be used. Decisions indicating that "EIA is not required" have been obtained, including for the Bünyan B and C Sand and Gravel Quarries. Moreover, a decision indicating that "EIA is not required" has also been obtained for the crushing, sorting and washing facilities. However, the Contractor may prefer to use any quarries holding necessary environmental permits and EIA decisions in line with the national legislation. At this stage, the Project does not mandate the use of any specific quarry, and it remains uncertain whether these DSİ-owned quarries will be used during construction. Nevertheless, should any of these quarries be utilized under the Project, their use will be managed under the Contractor's ESMP, ensuring compliance with the World Bank Environmental and Social Framework (including supply chain and OHS/community health and safety requirements) and applicable national regulations.

It is planned to procure ready-mixed concrete from licensed suppliers. However, should the Contractor intend to establish an on-site concrete batching plant, it may do so only after

[12] Governorship of Kayseri, Provincial Directorate of Environment, Urbanization and Climate Change (2024). *Kayseri Province 2023 Environmental Status Report*. Kayseri.

obtaining all required permits and approvals from the competent authorities in compliance with national legislation and environmental standards.

In addition, the borrow pit located within the boundaries of Akın locality, for which a Raw Materials Production Permit has been obtained, and an EIA has been conducted, is also available for use.

4.1.8 Biodiversity and Protected Areas

The Sarımsaklı Dam Irrigation Renovation Project is located in Kayseri Province, within an area already modified by intensive agricultural use and irrigation infrastructure. According to the World Bank's Environmental and Social Standard 6 (ESS6), the project footprint is classified as a Modified Habitat, as natural ecological functions have largely been altered.

The nearest major protected area is Sultan Sazlığı National Park, approximately 42.8 km southwest of the project site. Sultan Sazlığı is a Ramsar Site, National Park, and Important Bird and Plant Area, supporting over 300 bird species and extensive wetland habitats. Other nearby sites include Hürmetçi Sazlığı Wetland of National Importance (10.2 km) and Erciyes Mountain Important Plant Area (6.6 km). None of these protected areas are hydrologically or spatially connected to the project.

The Sarımsaklı Dam Irrigation Renovation Project is located within a predominantly modified agricultural landscape; however, a portion of the project footprint overlaps with Engir Lake (Engir Gölü) Natural Site – Strictly Protected Sensitive Area. This designation represents the highest level of legal protection under Turkish conservation legislation and requires strict avoidance of disturbance, pollution, and hydrological alteration. In this regard, necessary correspondence with General Directorate of Nature Conservation and National Parks (DKMP) has been made (see Annex-2) and overlaps with the irrigation route has been moved to outside of the strict protection zone of the Engir Lake Natural Site. The photographs of the Engir Lake Natural Site are provided in Figure 4-5.

Figure 4-5. Photographs of Engir Lake Natural Site

Accordingly, the strict protection zone of the Engir Lake has been preserved. All construction and operation activities will be fully restricted outside of this protected zone. All interventions near the lake will be conducted under direct coordination with the DKMP.

Other protected areas in the wider region - such as Sultan Sazlığı National Park (42.8 km), Hürmetçi Sazlığı Wetland of National Importance (10.2 km), and Erciyes Mountain Important Plant Area (6.6 km) - are hydrologically and ecologically isolated from the Sarımsaklı irrigation system. No direct, indirect, or cumulative impacts are expected on these sites.

With full implementation of the avoidance buffer, sediment and erosion controls, water-quality monitoring near Engir Lake, and biodiversity-sensitive construction and maintenance practices, residual impacts on biodiversity and protected areas are expected to be Negligible.

Given the distance from all designated conservation sites, no direct or indirect impacts are expected on protected areas or biodiversity values. Construction and operation activities will remain outside protected area boundaries, and the project will not affect the ecological or hydrological characteristics of nearby wetlands or habitats.

No Critical Habitats or Natural Habitats of high biodiversity value are present within or adjacent to the project area. Therefore, the project is not anticipated to generate significant residual impacts on biodiversity, and routine environmental monitoring will be sufficient to ensure ongoing compliance with ESS6.

4.2 Social Baseline

The SEP[13] was developed for the "Water Circularity and Efficiency Improvement Project" implemented by the MoAF and financed by the WB.

For the purpose of ESS10, “stakeholder” refers to individuals or groups who:

[13] Türkiye Water Circularity and Efficiency Improvement Project, Stakeholder Engagement Plan, https://cdniys.tarimorman.gov.tr/api/File/GetGaleriFile/425/DosyaGaleri/4350/wceip_stakeholder_engagement_plan_january_2023.pdf

Project-affected parties (PAP) are affected or likely to be affected by the project.

Other interested parties (OIPs) may have an interest in the project.

Disadvantaged or vulnerable individuals or groups (DVIGs) refers to those who may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits.

Within the scope of the Project, the Area of Influence (AoI) has been defined as the 500 m perimeter of the Project irrigation boundary. All settlements intersecting with the irrigation boundary are considered to be within the AoI. The local population and local authorities in these settlements are regarded as PAP. PAP include farmers and livestock breeders who conduct their activities on agricultural lands and grazing areas located within the irrigation boundary.

OIP in the Project primarily include cooperatives, associations, and chambers related to irrigation and agriculture. In addition, local government units, development agencies, media, and civil society organizations (CSO) fall under the OIP category.

DVIG categories for this Project is listed as below;

- Elderlies including living alone;
- Female household heads;
- Illiterates;
- Disabled individuals including home bound-bedridden people;
- Agricultural workers (seasonal and daily waged);
- Non-Turkish speakers.

In line with the identified stakeholder groups, social baseline data collection tools have been implemented as following Table 4-3.

Table 4-3. Stakeholder interviews and participants

Identification of stakeholder	Type of stakeholder	Name of stakeholder	Date	Type of interview	Participant information			
					Number of participant	Position / Assignment	Tenure	Gender
Other interested parties	Development agency	ORAN Development Agency Kayseri Branch Office	21.10.2025	Face to face in-depth interview	4	Unit Head	10 years	Male
						Specialist	12 years	Male
						Intern	1 months	Female
						Specialist	12 years	Female
Other interested parties	Public institution related to agriculture	Kocasinan Chamber of Agriculture	21.10.2025	Face to face in-depth interview	1	President	20 years	Male
Other interested parties	Public institution related to irrigation	Sarımsaklı Pumped Irrigation Association	21.10.2025	Face to face in-depth interview	2	President	4 years	Male
						Agricultural Engineer	8 years	Female
Other interested parties	Local government institution related to rural areas	Kayseri Metropolitan Municipality, Rural Services Department Directorate	21.10.2025	Face to face in-depth interview	2	Director	1 year	Male
						Environmental engineer	12 years	Male
Other interested parties	Public institution related to agriculture	Kayseri Provincial Directorate of Agriculture and Forestry, Rural Development and Organization Branch Office	21.10.2025	Face to face in-depth interview	1	Branch Manager	6 years	Male
Other interested parties	Local government institution	Melikgazi Governorate	21.10.2025	Face to face in-depth interview	1	District governor	1 year	Male
Other interested parties	Public institution related to agriculture	Melikgazi Chamber of Agriculture	21.10.2025	Face to face in-depth interview	1	Secretary General	12 years	Male
Other interested parties	Women's / Farmers' Cooperative	Ağırnas Mimarsinan Kadın Initiative Production and Management Cooperative	22.10.2025	Face to face in-depth interview	1	President	1.5 years	Female
Project-Affected Parties	Farmers	Farmers in the Gölbaşı area of Ağırnas settlement	22.10.2025	Focus group discussion	4	36 aged farmer	NA	Male
						36 aged farmer	NA	Male
						65 aged farmer	NA	Male
						58 aged farmer	NA	Male
Project-Affected Parties	Farmers	Farmers in Buğdaylı Village	22.10.2025	Focus group discussion	9	52 aged farmer /livestock farmer	NA	Male
						41 aged farmer /livestock farmer	NA	Male
						72 aged farmer	NA	Male
						48 aged farmer /livestock farmer	NA	Male
						51 aged farmer +Mukhtar of settlement	NA	Male
						27 aged farmer	NA	Male
						42 aged farmer	NA	Male
						50 aged farmer	NA	Male
						42 aged farmer	NA	Male
Project-Affected Parties	Local representatives	Sarımsaklı settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	2 years	Male
Project-Affected Parties	Local representatives	Bağpınar settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	20 years	Male
Project-Affected Parties	Local representatives	Yeşilyurt settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	2	Aza	2 years	Male
						Aza	2 years	Male
Project-Affected Parties	Local representatives	Akçatepe settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Aza	1.5 years	Male
Project-Affected Parties	Local representatives	Barsama settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Aza	35 years	Male
Project-Affected Parties	Local representatives	Güneşli settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	2 years	Male

Identification of stakeholder	Type of stakeholder	Name of stakeholder	Date	Type of interview	Participant information			
					Number of participant	Position / Assignment	Tenure	Gender
Project-Affected Parties	Local representatives	Salur settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	16 years	Male
Project-Affected Parties	Local representatives	Kızık settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	1.5 years	Male
Project-Affected Parties	Local representatives	Yazır settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	8 years	Male
Project-Affected Parties	Local representatives	Hasanarpa settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	20 years	Male
Project-Affected Parties	Local representatives	Cırgalan settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	2 years	Male
Project-Affected Parties	Local representatives	Boztepe settlement	22.10.2025	Face to face interview, Mukhtar questionnaire	1	Mukhtar	8 years	Male
Project-Affected Parties	Local representatives	Buğdaylı settlement	31.10.2025	Phone call, Mukhtar questionnaire	1	Mukhtar	12 years	Male
Project-Affected Parties	Local representatives	Fevzioğlu settlement	31.10.2025	Phone call, Mukhtar questionnaire	1	Mukhtar	No information	Male
Project-Affected Parties	Local representatives	Gömeç settlement	31.10.2025	Phone call, Mukhtar questionnaire	1	Mukhtar	No information	Male
Project-Affected Parties	Local representatives	Karahöyük settlement	31.10.2025	Phone call, Mukhtar questionnaire	1	Mukhtar	8 years	Male
Project-Affected Parties	Local representatives	Yeşil settlement	31.10.2025	Phone call, Mukhtar questionnaire	1	Mukhtar	No information	Male
Project-Affected Parties	Local representatives	Ağırnas settlement	31.10.2025	Phone call, Mukhtar questionnaire	1	Mukhtar	No information	Male
Project-Affected Parties	Local representative	Akin settlement	-	The interview was rejected by the mukhtar due to ongoing legal proceedings in the village.				
Project-Affected Parties	Local representative	Elagöz settlement	-	The mukhtar declined the meeting request due to time constraints.				

4.2.1 Socio-Economy

The details regarding the social baseline conditions are given in Annex-3 of this ESMP.

Current population information of the AoI is given in Table 4-4.

Table 4-4. Population information, 2024, Turkish Statistical Institute (TurkStat)[14]

Level	Unit	Total
Province Level	Kayseri Province	1,452,458
Subprovince Level, District	Kocasinan District	416,124
Subprovince Level, District	Melikgazi District	589,989
Neigborhood of Kocasinan District	Akçatepe	322
Neigborhood of Kocasinan District	Akın	453
Neigborhood of Kocasinan District	Barsama	322
Neigborhood of Kocasinan District	Boztepe	2,371
Neigborhood of Kocasinan District	Buğdaylı	2,901
Neigborhood of Kocasinan District	Cırgalan	3,689
Neigborhood of Kocasinan District	Elagöz	835
Neigborhood of Kocasinan District	Fevzioğlu	2,390
Neigborhood of Kocasinan District	Gömeç	510
Neigborhood of Kocasinan District	Güneşli	711
Neigborhood of Kocasinan District	Hasanarpa	256
Neigborhood of Kocasinan District	Karahöyük	41
Neigborhood of Kocasinan District	Kızık	449
Neigborhood of Kocasinan District	Salur	189
Neigborhood of Kocasinan District	Yazır	500
Neigborhood of Kocasinan District	Yeşil	4,834
Neigborhood of Melikgazi District	Ağırnas	322
Neigborhood of Melikgazi District	Bağpınar	453
Neigborhood of Melikgazi District	Sarımsaklı	322
Neigborhood of Melikgazi District	Yeşilyurt	2,371

[14] Turkish Statistical Institute (TurkStat), Address-Based Population Registration System (ABPRS), Population of localities, Population of municipalities, villages and quarters, 2024, https://biruni.tuik.gov.tr/medas/?locale=en. Access date: November, 2025.

The average household size in the districts to which the settlements are affiliated is 3.18 for Kocasinan and 3.27 for Melikgazi.

During the consultations, information was gathered regarding the gender distribution of the village populations, and it was reported that in almost all settlements, the numbers of women and men are approximately equal.

Analysis of the responses provided by the local representatives indicates that the populations of most settlements are predominantly composed of middle-aged individuals. Examination of the population change data indicates that a declining trend has been predominant over the past ten years. However, certain settlements have experienced significant population growth in recent years. These notable population increases are associated with the opening of rural settlements to housing projects, with Yeşilyurt and Cırgalan leading in this regard.

The educational status in the settlements was also examined. It was generally found that the education level is at the primary and secondary school levels.

Diabetes and hypertension (or high blood pressure) were mentioned only rarely. Conditions such as disability and being homebound represent a small proportion of the total population in the settlements.

The lowest satisfaction levels on public services were recorded for internet infrastructure and irrigation water supply, while the highest satisfaction levels were reported for electricity service and waste collection service. In most settlements, areas for village coffeehouses, grocery stores, and other shopping services are available.

Many local representatives emphasized the importance of WhatsApp chat groups for communication. This point was also mentioned during stakeholder institution consultations. In particular, when discussing outreach to local media outlets, stakeholder institutions noted that Facebook and WhatsApp chat groups are generally more effective communication tools than the local newspaper.

Interviews conducted with the representatives of the settlements provided information on the main sources of livelihood in each settlement. These interviews revealed that agriculture and livestock predominantly ranked as the top two livelihood sources.

It was generally stated that there is no unemployment problem in the village since everyone is engaged in agriculture and livestock, it was emphasized that young people who have graduated from university but do not wish to work in agriculture and livestock remain unemployed.

Information was collected about individuals who have no source of livelihood and are entirely dependent on government assistance. In many settlements, no individuals were identified who have no means of livelihood and rely solely on state-provided financial support. The proportion of such individuals within the total population of their respective settlements appears to be low.

The main sources of income in the project area are the production of cereals, vegetables, silage corn, sugar beet, seed sunflower, and alfalfa.

Along with agriculture, livestock farming is one of the main sources of livelihood in the area. Both cattle and small ruminant farming are widespread. There are also a considerable number of farms engaged in fattening operations as a commercial activity.

In some settlements within the AoI, beekeeping is practiced as a livelihood activity. However, this activity is mostly carried out as “migratory beekeeping.”

Seasonal and daily labor plays an important role in agricultural activities in the area. Women in the settlements, particularly, work as daily laborers in vegetable gardens.

The number of seasonal agricultural workers varies by settlement, but it has been reported that each settlement hosts approximately 40 to 50 seasonal workers. Seasonal agricultural workers typically arrive in the region between April and May and depart between September and October. They are involved in activities such as weeding, harvesting, and drying.

Seasonal agricultural workers, primarily coming from the Şanlıurfa region, mostly speak Kurdish, which could create a language barrier for announcements and information dissemination.

In many settlements, Afghan and Syrian shepherds are involved in cattle and small ruminant farming. This foreign workforce also works in fattening farms. These shepherds may be at a disadvantage in project announcements and information dissemination due to language barriers.

During the meetings with stakeholders, their perceptions regarding the existing irrigation system were compiled. It was frequently emphasized that the current irrigation channels are very old. These lead to significant water losses through evaporation and seepage.

The predominance of open, unlined earth canals within the current irrigation system leads to substantial water losses and other associated risks, fails to meet farmers’ present-day needs, and increases overall production costs.

Nearly all stakeholders who evaluated the Project positively believe that a closed system will prevent such losses. Reducing losses would not only help conserve existing resources (water and electricity) but also decrease the financial burden associated with resource wastage.

Stakeholders believe that if production costs decrease while crop yields increase, farmers’ incomes will consequently rise. A parallel outcome of increased production is the potential for cultivating secondary crops.

According to stakeholders, the expansion of irrigation opportunities will not only support the cultivation of secondary crops but will also encourage the production of crops that cannot be grown under current irrigation conditions.

In this regard, the production of water-demanding crops - such as sugar beet, horticultural crops, and fruit varieties - is expected to become more widespread. In essence, both the yield of existing crops will increase and the overall cropping pattern will become more diversified.

The diversification of the cropping pattern was viewed by many stakeholders as an advantage for the empowerment of women farmers. Availability of irrigation-enabled fruit and horticultural production would directly draw women into agricultural value chains.

It was learned that women farmers in different localities have already begun to organize through various forms of production - for instance, women in Ağırnas settlement cultivate safflower; women in Bünyan grow gilaburu; women in Kocasinan engage in heirloom seed

cultivation; and women in Karahıdır produce tomatoes and peppers, leading them to establish cooperatives.

While women traditionally have not practiced independent farming in dry-farming systems, the production of irrigated crops enables even female heads of household to participate independently in agricultural activities. Whereas women's labor in dry farming is often regarded as unpaid household labor, their contribution to irrigated agriculture becomes visible and economically recognized.

Several stakeholders even suggested that improvements in irrigation could trigger reverse migration. Some stakeholders also noted that the current farming population largely consists of older individuals and that younger generations tend to distance themselves from agricultural and livestock activities. For this reason, while older parents continue to engage in farming and livestock production, younger family members are more inclined to work in other sectors. The availability of irrigation facilities is expected to increase young people's interest in agricultural and livestock activities. In particular, stakeholders expressed the view that fattening livestock production could become more widespread. They regarded the influx of families who have recently moved to rural areas to engage in livestock fattening - partly driven by the opening of rural lands to development - as evidence of this trend.

When these two dynamics are considered together, it is anticipated that the existing workforce can be retained within the region's agriculture–livestock sector, while the area may also attract new population groups with an interest in livestock production.

A series of questions accompany the concerns expressed by farmers. The key questions raised by stakeholders include the following:

1. *Will farmers be able to continue working in their fields while construction activities are ongoing?*
2. *If crops in cultivated fields are damaged, will compensation be provided?*
3. *Even if there are no standing crops, will expenses incurred by farmers for fertilization or fuel be reimbursed?*
4. *During periods when irrigation is interrupted, will dry-farming be permitted?*
5. *Will farmers be able to use their land while construction is in progress?*
6. *Will support be provided to farmers for the installation of pipelines required to convey water to fields under the closed irrigation system?*
7. *Will financial support (e.g., credit, grants) be provided to farmers for the technical materials needed to integrate their operations into the upgraded system?*

Some recommendations, provided in response to the questions raised by farmers, were also communicated. Farmers proposed the following measures to ensure that the activities would be beneficial to them:

1. *Avoid including the entire area in the construction process simultaneously.*
2. *Inform farmers about the work schedule starting from August, and the information process will be completed no later than September and/or October.*

3. *Cut off water supply in irrigated areas gradually, in stages.*
4. *Open irrigated areas to construction gradually, allowing farmers to continue irrigated farming in some parts and dry-farming in others.*
5. *Utilize areas such as roadside sections without damaging existing canals.*
6. *Access agricultural fields when there are no crops present.*
7. *Continue activities without interrupting irrigation.*
8. *Ensure that structures such as valves, which farmers use to convey water to their fields, are installed at close and convenient distances from one another.*

The representatives of Central Anatolia Development Agency (ORAN) highlighted the need to consider the potential risk of harassment to the local community arising from the presence of external workers in the area. Local settlement authorities requested that worker accommodation facilities be established outside residential areas. Similarly, local authorities expressed concerns that construction vehicle traffic could pose safety risks, particularly for young people riding motorcycles within the villages.

Both local authorities and stakeholder institutions emphasized the need to protect existing infrastructure, including roads, bridges, and similar structures, during construction activities.

Stakeholder consultations revealed that different institutions and community representatives proposed specific tools and approaches for stakeholder engagement. The ORAN Development Agency (Kayseri Branch Office) suggested using social media platforms, particularly Facebook, and emphasized the importance of informing farmers about their rights and the benefits of the Project. Most stakeholders highlighted village-level WhatsApp groups as an effective communication channel. The Melikgazi Chamber of Agriculture recommended making village announcements to reach farmers who do not use digital tools, providing announcements at least two days in advance, and making use of farmers' knowledge and experience. The Kocasinan Chamber of Agriculture proposed holding separate meetings for women farmers. Farmers from Buğdaylı Village emphasized the importance of timely communication starting from August and no later than September and / or October. The Mukhtar of Sarımsaklı also highlighted the importance of engaging with the public and responding to community requests.

4.2.2 Traffic and Transportation

An image from the State Roads Traffic Volume Map of the 6th Regional Directorate of Highways for the Kayseri district[15], where the project area is located, is provided in Figure

[15] General Directorate of State Highways, *2024 State Roads Traffic Volume Map: Annual Average Daily Traffic Values*, retrieved from: https://www.kgm.gov.tr/SiteCollectionDocuments/KGMdocuments/Trafik/trafikhacimharitasi/2024HacimHaritalari/Bolge6.pdf

4-6. Also, a satellite image showing the Project Area and the state roads is provided in Figure 4-7.

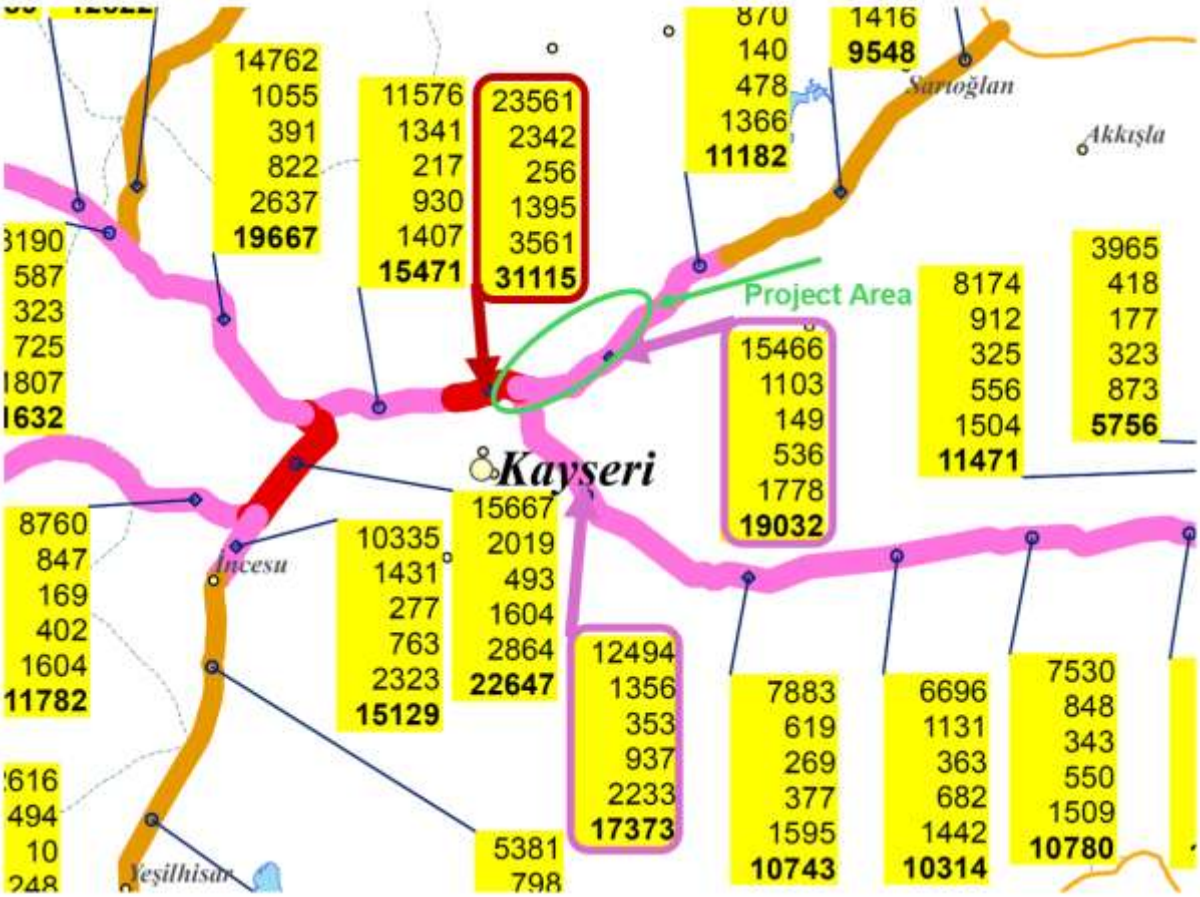

Figure 4-6. Kayseri State Roads Traffic Volume Map

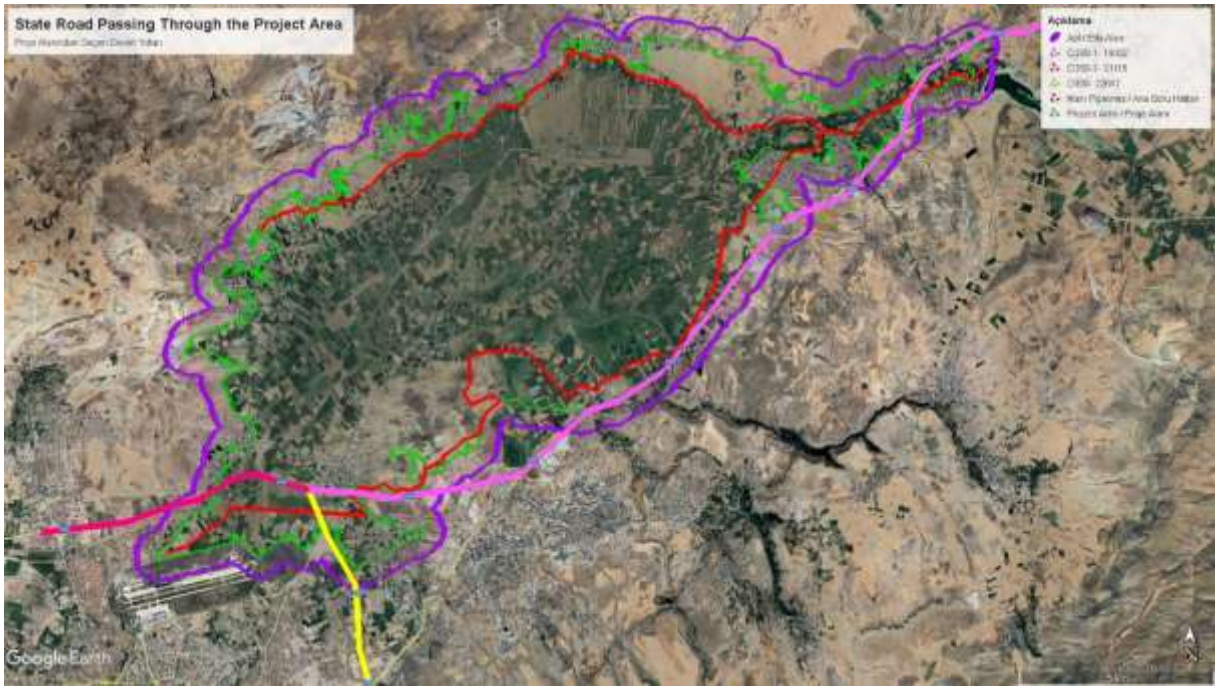

Figure 4-7. Satellite Image of Project Area and State Roads Passing Through Nearby

According to this, the D260 road, which runs in a northeast-southwest direction, appears to pass through the project's area of influence and intersect with the D300 road, which runs in a south-north direction. The State Road Volume Map shows that the annual average daily traffic volume on the eastern section of the D260 road before intersecting with the D300 is 19,302. However, it is observed that the traffic volume increases to 31,115 after intersecting with the D300, which has a traffic volume of 17,373.

4.2.3 Cultural Heritage

As a result of the desk-based research, it has been determined that there are numerous registered archaeological sites within the project area and its immediate surroundings. Although the majority of these sites are not expected to be directly affected by the proposed project activities, a considerable number of them are located in close proximity to project-associated components, such as pipeline routes. There are crucial natural resources (such as water resources, and proximity to agricultural areas) suitable for human settlement around the geographical area where the project is located. On the other hand, there may be tangible cultural heritage assets (chance finds) that have been buried in the geographical area of the Project or its close vicinity and whose existence will be determined by advanced research techniques or that will be unearthed during the construction phase of the project. A total of nine cultural heritage sites/assets are located within the boundaries of the Sarımsaklı Dam Irrigation Renovation Project, while ten sites are located within the Area of Influence (AoI) (see Table 4-5).

Table 4-5. Recognized National Tangible Cultural Heritage Assets

No	Name of Heritage Asset	Province/ District	Neighb.	Location/ Position of the Asset			Approximate Distance to the Project Activities (pipeline, access road, drainage channel, etc.) (m.)	Period
				Within the Project Area	Within the Project AoI	Outside the Project Area and Project AoI		
1	Archaeological Site of Kültepe-Kanesh	Kayseri-Kocasinan	Karahöyük	x			8	Early Bronze Age- Hellenistic Period
2	Barsama Neighbourhood Underground City, Workshop and Wall Remains		Barsama	x			144	Roman- Byzantine Period
3	Gül Hoyuk		Yazır	x			216	Early Bronze Age
4	Akçatepe Tumulus		Akçatepe	x			281	Roman Period
5	Killikdağı Area Tumuli (2)		Buğdaylı	x			581	Roman Period
6	Killikdağı Area Necropolis			x			165	Roman- Byzantine Period
7	Gömeç Bridge		Gömeç		x		221	Medieval
8	Malkayası Area Rock Tombs (Necropolis Area)			x			25	Roman Period
9	Gömeç Station Building			x			60	20th century
10	Tepecik Area Burial Mound Area		Kızık	x			34	Roman Period
11	Kemer Area Tumuli 1-2-3-4				x		265	Roman Period
12	Akçain1				x		631	Roman Period
13	Akçain2					x	730	Roman Period
14	Akçain3					x	920	Roman Period
15	Handeresi Area Rock Carving Site		Çırkalan		x		304	Roman- Byzantine Period
16	Malaltı Area Tumulus				x		430	Roman Period
17	Hasanarpa 1st Degree Archaeological Site		Hasanarpa		x		376	Roman- Byzantine Period
18	Kadıbağları 1st Degree Archaeological Site		Güneşli			x	917	Roman- Byzantine Period
19	Kızık Tumulus				x		377	Roman Period

No	Name of Heritage Asset	Province/ District	Neighb.	Location/ Position of the Asset			Approximate Distance to the Project Activities (pipeline, access road, drainage channel, etc.) (m.)	Period
				Within the Project Area	Within the Project AoI	Outside the Project Area and Project AoI		
20	Gömeç Pöhrekli 1st Degree Archaeological Site		Gömeç		x		509	Roman- Byzantine Period
21	Gesi Rock Cutting Area 1	Kayseri-Melikgazi	Gesi			x	2400	Roman- Byzantine Period
22	Gesi Rock Cutting Area 2					x	2800	Roman- Byzantine Period
23	Bağpınar (Isbıdın) Lower Bridge		Bağpınar			x	1700	Medieval
24	Kayır Inn				x		215	Medieval
25	Bağpınar 1st Degree Archaeological Site					x	1299	Roman- Byzantine Period
26	Adatepe Tumulus				x		450	Roman Period
27	Yeşilyurt Urban Protected Area		Yeşilyurt			x	1959	Medieval

It has been identified that the official authority, the Kayseri Regional Council for the Conservation of Cultural Properties, was previously consulted regarding all cultural heritage assets located within the project boundaries[16]. Based on the official opinion issued by the Regional Council, it was observed that minor revisions had been made to the project boundaries intersecting with the Kültepe-Kanesh Archaeological Site to comply with heritage protection requirements.

Under current baseline conditions, the boundaries of the 1st and 3rd Degree Protection Zones of the Kültepe-Kanesh Archaeological Site, inscribed on the UNESCO World Heritage Tentative List, are situated in proximity (approximately 8 m) to the Project footprint. Consequently, archaeological monitoring is required in the vicinity of the site throughout the construction phase of the Project. Mitigation measures addressing cultural heritage assets, including the Kültepe-Kanesh Archaeological Site, are detailed in Table 6-2.

Consequently, no construction works will be undertaken within the official protection boundary of the archaeological site/s.

The details regarding the tangible and intangible cultural heritage assets in and around the Project area are given within Annex-3.

[16] Kayseri Regional Council for the Conservation of Cultural Properties: Letter dated July 8, 2025, No. E-67141141-165.02.02-5369482.

5 ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS

5.1 Area of Influence (AoI)

Within the scope of the Project, the Area of Influence (AoI) has been defined as the 500 m perimeter of the Project irrigation boundary (see Figure 5-1). A total of 20 neighborhoods has been identified within the AoI, and the list of nearest sensitive receptors is provided in Table 5-1. Accordingly, it can be seen that the most sensitive receptors will be the neighborhoods' residents.

Table 5-1. Nearest Sensitive Receptors

No	District	Neighborhood	Nearest Unit	Distance (m)	Notes
1.	Melikgazi	Sarımsaklı	Left Main Pipeline	8	within existing Sarımsaklı Gravity Irrigation System (SGIS)
2.	Melikgazi	Bağpınar	Left Main Pipeline	9	within existing SGIS
3.	Melikgazi	Yesilyurt	Left Main Pipeline	19	within existing SGIS
4.	Melikgazi	Ağırnas	Left Main Pipeline	99	The Sarımsaklı Dam is located within the boundaries of this neighborhood.
5.	Kocasinan	Akçatepe	Left Replacement Pipes (Sol Y33)	10	within existing SGIS
6.	Kocasinan	Barsama	Left Replacement Pipes (Sol Y-6)	1	within existing SGIS
7.	Kocasinan	Gömeç	Left Main Pipeline	20	within existing SGIS
8.	Kocasinan	Güneşli	Right Replacement Pipes (Sağ Y-16)	10	within existing SGIS
9.	Kocasinan	Karahöyük	Left Replacement Pipes (Sol Y-20)	75	within existing SGIS
10.	Kocasinan	Kızık	Right Main Pipeline	5	within existing SGIS
11.	Kocasinan	Salur	Right Replacement Pipes (Sağ Y9-8)	1	within existing SGIS
12.	Kocasinan	Akın	Right Main Pipeline	1	within existing Sarımsaklı Pump Irrigation System (SPIS)
13.	Kocasinan	Buğdaylı	Right Replacement Pipes (Sağ Y14-25-2)	12	within existing SPIS
14.	Kocasinan	Elagöz	Right Replacement Pipes (Sağ Y14-25)	1	within existing SPIS
15.	Kocasinan	Yazır	Right Replacement Pipes (Sağ Y14-17)	10	within existing SPIS
16.	Kocasinan	Hasanarpa	Right Replacement Pipes (Sağ Y14-21)	12	within existing SPIS
17.	Kocasinan	Cırgalan	Left Main Pipeline	8	Included in the AoI
18.	Kocasinan	Fevzioğlu	Left Replacement Pipes (Sol Y38-1)	12	Included in the AoI
19.	Kocasinan	Yeşil	Left Main Pipeline (End of the Pipeline) to the Airport boundaries	149	The Project Area borders the Kayseri Airport located in the Yeşil neighborhood.
20.	Kocasinan	Boztepe	Left Main Pipeline (End of the Pipeline)	8	Included in the AoI

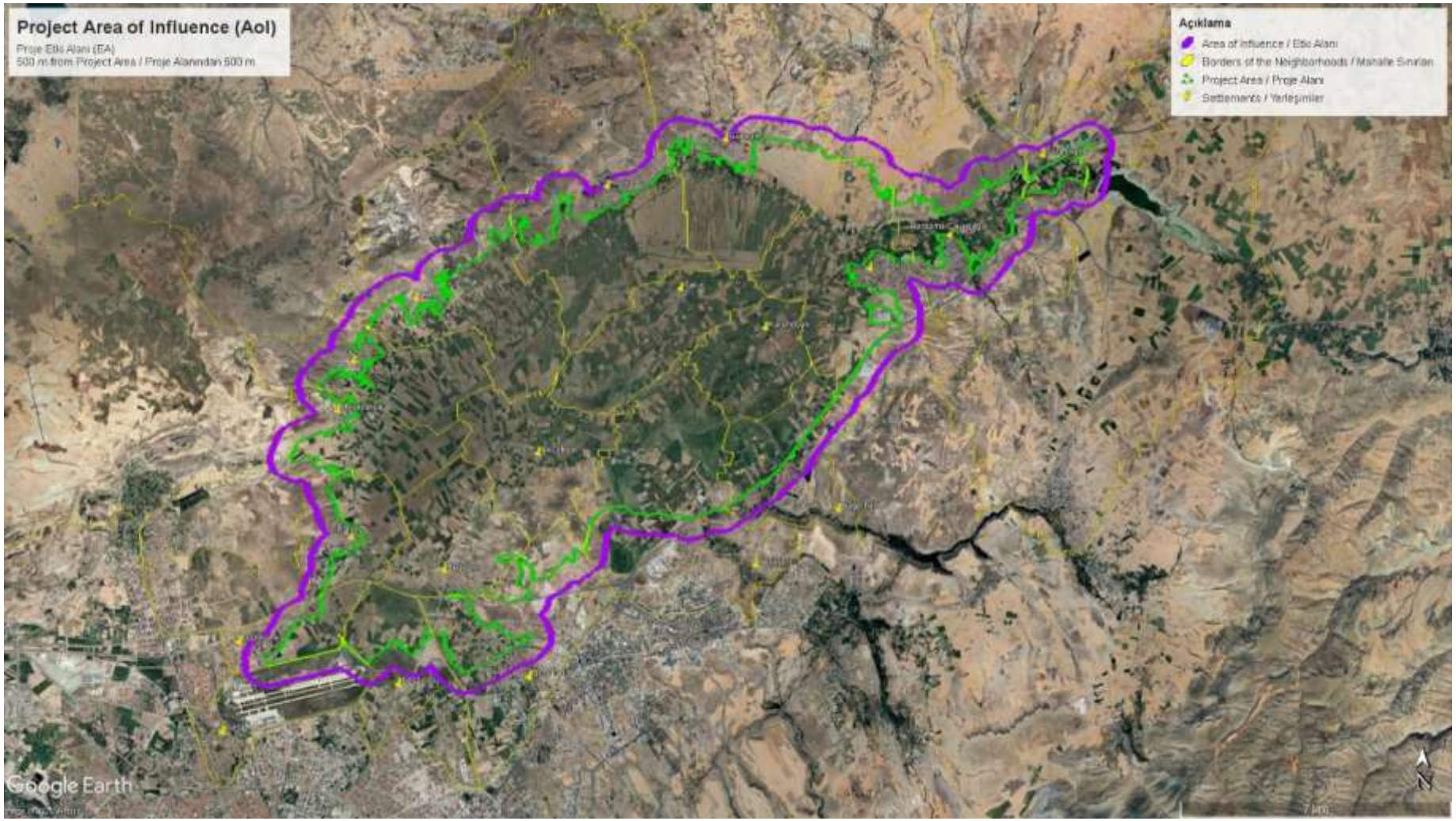

Figure 5-1. Project Area of Influence

5.2 Impact Assessment Methodology

According to the Environmental and Social Screening Form prepared by DSİ experts and approved by the WB, the Project is designed based on a closed irrigation system, and the water for the irrigation project will be supplied from the existing reservoir and directed to the currently cultivated lands. Only limited excavation will be carried out for the pipes to be laid underground within the scope of the Project, and the excavated materials will be reused to restore the project area to its original state. As stated in the Form, the impacts that may arise during the construction phase are expected to be low to moderate, mostly short-term and reversible, and the impact area is expected to be limited to the Project site and its immediate surroundings.

In a similar manner, potential impacts during the operation phase are expected to be low to moderate in magnitude and largely associated with routine operation and periodic maintenance of the closed irrigation system. Operational activities, including inspection, minor repairs and replacement of system components, may involve small-scale, localized interventions and short-term disturbances within agricultural areas. These impacts are anticipated to be temporary, reversible and spatially limited, with no expansion of the project footprint or intervention in sensitive or archaeological areas.

Overall, considering that there will be no intervention in the Sensitive Areas and Archaeological Sites located within the project boundaries, the environmental risk level of the project has been classified as "Moderate."

According to the information provided in the Screening Form, the project plans to expropriate a total of 660,000 m² of private property on approximately 1,167 parcels. It is stated that there are approximately 3,110 owners of these properties and that 40,000 m² of pastureland on 14 parcels will also be acquired. Measures to be taken to mitigate the potential impacts of the Project will be detailed in environmental and social documents prepared specifically for the sub-project. Although the exact locations and extent of land acquisition have not yet been determined, land acquisition activities under the Project may result in certain temporary or permanent impacts. A Land Acquisition Plan (LAP) will be prepared to identify and assess these impacts in line with the Türkiye Water Circularity and Efficiency Improvement Project (TWCEIP) Land Acquisition Policy Framework (LAPF) and the requirements of ESS5. Accordingly, the social risk level of the Project has been assessed as "Moderate."

As a result, following detailed assessments, the environmental and social risk level associated with the Project has been categorized as "Moderate Risk." The significance of these risks within the scope of the Project may be reassessed during the Environmental and Social Assessment process conducted during project preparation. In addition to temporary risks and impacts related to public health and safety, Occupational Health Safety (OHS) risks may be present among construction contractors. The risk of labor influx and sexual exploitation and abuse/sexual harassment (SEA/SH) is expected to be low. The risk of forced labor is expected to be minimal.

Construction-related impacts mainly concern air and noise emissions, non-hazardous waste generation, community health and safety (including risks related to traffic management and gender-based violence (GBV) risks), occupational health and safety risks, labor influx, land acquisition, etc.

At this stage, although there is no clear information yet on the exact locations, detailed designs, and sources of construction materials for the proposed project, it is anticipated that the proposed sub-project and its impacts will not be complex.

The methodology to be used to identify the environmental and social impacts/risks arising from the implementation of the Project has been developed based on the methodologies described in the WB ESF and the TWCEIP ESMF.

The methodology for identifying environmental and social impacts that may arise from the implementation of the Project has been developed based on methodologies found in internationally recognized official publications on environmental impact assessment.[17] Each risk or impact identified within the scope of the Project has been assessed according to the methodology described in this section.

In line with best practices, the significance of impacts is determined by a comprehensive assessment of the sensitivity of the receiving environment/sensitive component and the magnitude of the Project's impact on that component. Impact magnitude is assessed using quantitative methods to the extent possible; when this is not possible, qualitative methods based on professional judgment are used. Environmental and/or social impacts can be positive or negative. The sensitivity/vulnerability of the receiving environment is determined by taking into account existing information (public interest, legal status of the area, design and sustainability issues, acceptability, etc.) and consultations with affected communities.

The overall magnitude of the impacts is assessed based on the following components:

- Geographical scope (broad, local, or limited)
- Reversibility (reversible/irreversible in the long term, reversible in the medium term, or reversible in the short term)
- Duration (long, medium, or short)
- Frequency (continuous/frequently recurring, intermittent, or one-time/rare)
- Severity (low, moderate, significant)

Criteria for impact magnitude factors are provided in Table 5-2.

Table 5-2. Impact Magnitude Assessment Criteria

Magnitude Criteria	**Impact Levels**		
	High	**Medium**	**Low**
Geographic scope	***Wide***	***Local***	***Restricted***
	Beyond the area of influence	Within the area of influence	Within the project area
Reversibility	***Irreversible / Reversible in the Long Term***	***Medium-term reversible***	***Short-term reversible***
	Reversible or irreversible in the long term after the operational phase	Reversible during the operational phase	Reversible during the construction phase or after a one-year construction period

[17] For example: Institute of Environmental Management and Assessment-IEMA, 2011: The State of Environmental Impact Assessment Practice in the UK; Scottish Natural Heritage, 2013: Handbook on Environmental Impact Assessment; Canter, 1993; and Standards Association of Australia, 1999, among other guidance documents.

Magnitude Criteria	Impact Levels		
	High	**Medium**	**Low**
Duration	***Long***	***Medium***	***Short***
	Long term after the operational phase	After transitioning to the operational phase	During the construction phase
Frequency	***Continuous/Frequent***	***Intermittent***	***One-time/Rare***
	Ongoing or occurring regularly; occurring frequently or continuously	Occurring at irregular intervals; or occurring at long intervals	Rare or only once; very low probability of recurrence
Intensity	***Significant***	***Moderate***	***Low***
	Significant potential change/damage; when there are limited or no feasible mitigation measures available	Moderate potential change/damage; and/or costly or ineffective mitigation measures	Minimal potential change/damage; effective and applicable mitigation measures

Calculation of Impact Magnitude: In the table, "High" will be given 3 points, "Medium" 2 points, and "Low" 1 point. Total:

- 5-6 Points: Negligible
- 7-9 Points: Low
- 10-12 Points: Medium
- 13-15 Points: High

General criteria to be considered in determining the sensitivity of the receiving environment and the overall impact magnitude are presented in Table 5-3. Specific assessments for each environmental and/or social component and any methodological differences are provided in the relevant environmental and social assessment and management documents.

Table 5-3. General Criteria for Determining Receptor Sensitivity and Impact Magnitude Levels

Level	Receptor Sensitivity	Overall Impact Magnitude	
		Negative	**Positive**
High	Extremely important (national and international importance scale), high rarity, very limited substitution potential	Loss of quality and integrity of the resource and/or resources; serious damage to fundamental characteristics, features, or elements.	Large-scale or significant improvement in resource quality; comprehensive restoration or improvement; significant improvement in qualitative quality.
Medium	Moderately important (regional importance scale) and moderately rare, with limited substitution potential	Loss of resources, but without adversely affecting integrity; partial loss/damage to fundamental characteristics, qualities, and elements.	Benefit to or addition of fundamental features, qualities, or elements; improvement in quality.
Low	Low importance (local importance scale), not rare	Measurable change in qualities, quality, or sensitivity; minor loss or change in one (perhaps more) fundamental characteristic, quality, or element	A small benefit or addition to one (or possibly more) fundamental characteristic, feature, or element; some beneficial effects on the quality or a reduced risk of adverse effects.
Negligible	No or very low importance and rarity	No loss or very little loss or minimally harmful change in one or more features, qualities, or elements	No or very little benefit or positive contribution to one or more features, qualities, or elements

After determining the sensitivity of the receptor and the overall magnitude of the impact on a specific receptor, the importance of the impact is determined by using a standard matrix-style approach consisting of a 4x4 matrix. General descriptions of the matrix and each significance

level defined in the matrix are provided in Table 5-4. Once the impact significance is determined, the necessary impact mitigation measures are identified to reduce these impacts to more acceptable levels.

Table 5-4. Impact Significance Matrix

		Receptor Sensitivity			
Impact Significance	**Impact Magnitude**	*High*	*Medium*	*Low*	*Negligible*
	High	**High**	**High**	**Moderate**	**Low**
	Medium	**High**	**Moderate**	**Low**	**Negligible**
	Low	**Moderate**	**Low**	**Low**	**Negligible**
	Negligible	**Low**	**Negligible**	**Negligible**	**Negligible**
High		The impacts are considered very significant and are likely to be decisive in decision-making processes. These impacts may be associated with areas or elements that are important at the international, national, or regional level, or with features that are important at the local level and may undergo significant change. Mitigation measures must be implemented to reduce the significance of the impacts to lower levels; these measures must be taken before the project is implemented.			
Moderate		It is unlikely that these impacts will be among the key decision-making factors. However, the cumulative effects of such factors may influence the decision-making process, particularly if they lead to an increase in the total negative impact on a specific recipient. Where possible, the significance of the impact should be reduced to lower levels through mitigation measures; otherwise, acceptance of the associated risks is necessary for the project to proceed.			
Low		Impacts can be considered as factors that are not expected to be critical in the decision-making process and are more local in scale. However, they may be important in terms of making improvements in the subsequent design of the project. Compliance with standards and safety criteria is considered sufficient for project implementation.			
Negligible		There are no impacts, or the impacts are below detectable levels and are acceptable within normal operating procedures.			

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

5.3 Potential Environmental Risk and Impacts

Potential environmental risk and impacts identified for the Project construction and operation phases are presented in this Section, and relevant mitigation measures and monitoring activities are given in the following Chapters.

The construction phase of the Project is expected to last 4 years, with a peak/maximum workforce of 250 people during the construction period. Additionally, the Project's operational life is expected to be approximately 50 years. During this period, the operational workforce is estimated to consist of 40 employees, representing the staff of the irrigation union(s) assigned by DSİ for operating the system.

5.3.1 Water Resources and Use

5.3.1.1 Construction Phase

Bottled drinking water will be provided for workers under the Project. All neighborhoods located near the city center have access to the municipal water supply network. Once the construction site is established, the necessary connections can be made to utilize the municipal water supply. The Contractor will apply for water allocation and obtain the required allocation permit or subscription, completing all official procedures accordingly.

According to TurkStat data for the year 2022, the daily water withdrawal per capita in Kayseri province is 226 L/person-day[18] and the daily water use requirement for a maximum of 250 personnel to be employed during the construction phase is as calculated below.

Total Amount of Water Requirement	=	Number of Personnel x Daily Water Withdrawal per Capita
	=	250 -person x 226 L /person-day
	=	56,500 L/day = 56.5 m³/day

The water needed for the construction work in addition to the drinking and utility water is the water to be used dust suppression. 10 m³/day is envisaged for the water to be used for dust suppression which will be applied by water sprinkler truck.

Including the 10 m³/day water for dust suppression, it is estimated that the daily water use amount for the Project's construction phase will be 66.5 m³/day.

In addition to water usage, Project activities may affect the surface and groundwater quality leading to contamination due to the chemicals and wastes or accidental spills. Loose surface material in excavated areas can be carried by rainfall, depositing sediment loads in stream beds or field drainage channels.

With the mitigation measures included in Chapter 6, the significance of above-mentioned risks and impacts will be considered minor.

5.3.1.2 Operation Phase

During the operation phase, the Project will be operated by approximately 40 personnel, representing the staff of the irrigation union(s) assigned for managing the Sarımsaklı irrigation system.

According to TurkStat data for the year 2022, the daily water withdrawal per capita in Kayseri province is 226 L/person-day[19] and the daily water use requirement for a maximum of 40 personnel to be employed during the operation phase is as calculated below.

[18] Turkish Statistical Institute (TurkStat). Municipal Water, Wastewater and Waste Statistics Database (MEDAS). Available at: https://biruni.tuik.gov.tr/medas/

[19] Turkish Statistical Institute (TurkStat). Municipal Water, Wastewater and Waste Statistics Database (MEDAS). Available at: https://biruni.tuik.gov.tr/medas/

Total Amount of Water Requirement	=	Number of Personnel x Daily Water Withdrawal per Capita
	=	40 -person x 226 L /person-day
	=	9,040 L/day = 9.04 m³/day

Since the Project is a pressurized closed irrigation system, no process water is required for the normal operation of the system. Water use during the operation will therefore be limited to drinking, utility, cleaning and basic facility needs of the irrigation union staff.

Routine maintenance activities (e.g., valve inspections, flushing, chamber cleaning) may require small amounts of water; however, these quantities are considered negligible and do not significantly alter the daily operational water demand.

In the operational phase, potential impacts on water resources primarily relate to:

- localized waterlogging in the event of pipeline leaks or valve malfunctions,
- contamination risks associated with accidental spills during maintenance activities,
- sediment transport or erosion around malfunction points or drainage discharge locations,
- agricultural return flows containing nutrients or agrochemicals, which may indirectly affect surface water quality.

With the mitigation measures outlined in Chapter 6, including proper system monitoring, rapid leak detection, controlled maintenance procedures, and safe handling of chemicals and wastes, and awareness training to the farmers regarding the pesticide control and use, the significance of these impacts is expected to remain minor.

5.3.2 Soil Management

5.3.2.1 Construction Phase

During the construction phase of the Project, soil-related impacts primarily arise from the excavation of trenches for the 385 km pipeline network, the handling of excavated soils, the removal of existing concrete-lined channels in certain sections, and the movement of heavy machinery across agricultural lands. The project area is characterized by deep, medium-to-heavy textured, highly permeable soils classified largely as Class I, II, and III agricultural lands, making them sensitive to disturbance. Improper stripping, temporary storage or reinstatement of topsoil has the potential to temporarily reduce soil fertility, disrupt soil structure, and affect crop productivity across these high-value agricultural zones.

Excavation activities in alluvial and colluvial areas may increase susceptibility to erosion and sediment displacement, particularly during rainfall events, while shallow groundwater zones may experience temporary waterlogging or reduced drainage efficiency when trenches remain open.

Construction also poses risks of soil compaction due to machinery movement, which may impair infiltration rates and root development in cultivated areas. While no existing soil contamination has been recorded, accidental spills of fuel and oil from machinery and field repairs remain possible without proper control measures. In sections where existing open channels will be replaced with buried pipelines, concrete linings will be broken and removed from the corridor; if not managed appropriately, these materials may cause temporary soil disturbance or interfere with nearby drainage lines. Furthermore, unprotected stockpiles of

excavated material may block irrigation ditches or natural surface drainage patterns, contributing to localized sedimentation.

Construction works will generate significant volumes of soil. A total of approximately 81,506 tons (≈54,337 m³) of topsoil will be stripped and stored separately from subsoil to prevent mixing. Temporary storage will occur for about one week at controlled stockpile locations along the corridor, after which 100% of the stripped topsoil will be reinstated to restore soil productivity. Excavation activities are expected to produce 1,267,683 tons (≈845,122 m³) of soil, of which 70% will be reused for backfilling and surface restoration; the remaining 30% will be transported to the Akın Excavation Soil Dumping Site, which operates under the relevant municipal permits. In areas where pipelines will be installed within the alignment of existing open channels, excavation will focus on the removal of concrete casings, which will be transported to licensed waste facilities in accordance with national regulations.

Trench dimensions will vary depending on pipe diameter, which ranges between 700 mm and 2800 mm, and excavation depths will therefore differ along the route. In many areas, the route follows existing farm access roads or canal banks, minimizing the extent of new disturbance. Sand–gravel materials to be used during construction may be sourced, if required, from the permitted quarries (for example Sarıoğlan Burunören Sand–Gravel Quarries (including the B and C Quarry) and the Akın Sand–Gravel Borrow Pit), which hold valid “EIA is Not Required” decisions and extraction/environmental permits. Ready-mix concrete will be supplied by local concrete plants operating under DSİ standards, as no new batching plant is planned for this project.

Soil contamination risks will be minimized through the use of drip pans under stationary machinery, readily available spill kits, and proper secondary containment for hazardous materials and any temporary fuel storage units. Waste oils and contaminated soils will be transported to licensed facilities. In erosion-prone areas, additional sediment barriers such as silt fences or straw bales will be installed to prevent sediment transport during rainfall events.

Overall, the significance of soil-related impacts during the construction phase is assessed as Moderate before mitigation. To reduce these impacts, appropriate topsoil management, controlled excavation practices, erosion-prevention measures in sensitive zones, stabilization of stockpiles, and strict contamination-prevention procedures will be implemented throughout the construction corridor. Detailed mitigation requirements are provided in Table 6-2.

5.3.2.2 Operation Phase

During the operation phase, soil-related risks are expected to remain minimal, as the upgraded closed pressurized irrigation system has been designed to prevent erosion, uncontrolled runoff and water losses typically associated with open-channel schemes. Most soil-related risks during operation are limited to routine maintenance and repair works carried out along pipeline routes and system components.

Maintenance vehicles accessing valve chambers, control units and buried pipeline corridors may cause localized and temporary soil disturbance or minor compaction. These impacts are short-term, small-scale and reversible, as works are performed within narrow and predefined access strips and do not involve large-area excavation.

In addition, diffuse soil impacts may arise from improper pesticide or agro-chemical use by farmers during routine agricultural activities. While DSİ does not intervene directly in on-farm chemical management, this risk will be addressed through awareness-raising activities and user information sessions carried out under the Project’s stakeholder engagement framework.

These activities will focus on preventing excessive chemical use, reducing runoff to irrigation channels and supporting good agricultural practices.

No long-term or large-scale soil degradation is expected during the operation phase, as the irrigation design inherently minimizes soil erosion and waterlogging risks. With regular maintenance of the system and continued user guidance, operation-phase soil impacts are anticipated to remain low and localized. Detailed mitigation requirements for the operation phase are presented in Table 6-3.

5.3.3 Air Quality

5.3.3.1 Construction Phase

During the construction phase of the project, dust emissions from excavation works and exhaust emissions from the construction equipment used for the project are expected to occur. In this section, possible dust emissions and exhaust emissions that may occur during the construction phase are calculated, and the impact of the project activities on the current air pollution level is evaluated.

Excavation works will be conducted on the pipeline route, and dust and exhaust gas emissions will occur from construction machinery/equipment to be used in construction works.

In terms of air quality, the Project is subject to both national legislation and the World Bank Group (WBG) General Environmental, Health, and Safety (EHS) Guidelines. The relevant regulations and international reference documents that define the Project Standards for air quality are listed below:

- Regulation on Industrial Air Pollution Control
- Regulation on the Assessment and Management of Air Quality
- World Health Organization (WHO) Ambient Air Quality Guidelines and WBG General EHS Guidelines

When comparing the limit values in national and international parameters, the lowest limit value is taken as strict value and the Project Standard. Consequently, the air quality parameters and their corresponding limit values applicable to the Project are presented in Table 5-5.

Table 5-5. Project Standards and Limit Values for Air Quality

Parameter	Period	Unit	Strict Value
SO_2	Hourly (It is not exceeded more than 24 times in a year.)	$\mu g/m^3$	350
	24-hour		40
	Long Term Value (LTV)		60
	Annual and winter period (1 October-31 March)		20
NO_2	Hourly (It is not exceeded more than 18 times a year.)	$\mu g/m^3$	200
	Year		10
PM_{10}	24-hour (It is not exceeded more than 35 times a year.)	$\mu g/m^3$	45
	Year		15
$PM_{2.5}$	24-hour	$\mu g/m^3$	15

Parameter	Period	Unit	Strict Value
	1 year		5
Pb	Year	$\mu g/m^3$	0,5
CO	Maximum daily 8-hour average	mg/m^3	10
	24-hour	$\mu g/m^3$	4
Cd	LTV	$\mu g/m^3$	0,02
HCl	Short Term Value (STV)	$\mu g/m^3$	150
	LTV		60
HF	Hour	$\mu g/m^3$	30
	STV		5
H_2S	Hour	$\mu g/m^3$	100
	STV		20
Total Organic Compounds (In terms of carbon)	Hour	$\mu g/m^3$	280
	STV		70
Settled Dust	STV	mg/m^2day	390
	LTV		210

For the excavation works to be carried out within the scope of the Project, the topsoil on the surface will be stripped. Topsoil that will be stripped from the surface during excavation will be collected separately from the excavation material at the channel sides to be used in landscaping works. Following the construction works are completed, the topsoil will be used as surface covering for landscaping works.

Construction activities are expected to last four (4) years. A total of 385 km of pipelines with different diameters (see Table 3-1) will be installed within the scope of the Project. Excavation and backfilling works will be carried out along these lines, and it is planned that 70% of the excavated material and all of the topsoil striped during backfilling will be used in rehabilitation works. Remaining 30% excavated soil will be transported to Akın Excavation Soil Dumping Site with the permission of Kayseri Metropolitan Municipality.

The density of the excavation soil was determined as 1.5 tons/m³. It is foreseen that there will be 10 hours of work per day and 300 days/year. Accordingly, the calculated total topsoil and excavated soil amounts are 81.506,04 tons and 1.267.683,29 tons, respectively. Temporary separate storage of the excavated soil and topsoil will be ensured within the construction site for a week, and the excavated soil and topsoil will be reused at the construction site after the pipeline is laid. Accordingly, dust emissions resulting from the project's construction activities are summarized in Table 5-6. Dust emission from excavation and topsoil stripping works has been calculated as about 1.24 kg/hour in total for the mitigated/controlled situation.

Table 5-6. Dust Emission Calculation Results

Emission Sources	Excavation Emissions (kg/h)		Topsoil Emissions (kg/h)		TOTAL EMISSIONS (kg/h)	
	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled	Controlled
Disassembly	0,7236	0,3618	0,0465	0,0233	0,77009	0,38504
Loading	0,2894	0,1447	0,0186	0,0093	0,30803	0,15402
Unloading	0,2894	0,1447	0,0186	0,0093	0,30803	0,15402
Transportation (total round trip distance)	0,7580	0,3790	0,0580	0,0290	0,81600	0,40800

Emission Sources	Excavation Emissions (kg/h)		Topsoil Emissions (kg/h)		TOTAL EMISSIONS (kg/h)	
	Uncontrolled	Controlled	Uncontrolled	Controlled	Uncontrolled	Controlled
Storage	0,2755	0,1377	0,0024	0,0012	0,27790	0,13890
Total	**2,3359**	**1,1679**	**0,1441**	**0,0721**	**2,48005**	**1,23998**

The land preparation and construction phase is expected to last 4 years. The list of machinery/equipment used for the construction phase is given in Table 5-7.

Scope 1 emissions have been estimated based on fuel consumption data provided by Project Owner.

Table 5-7. Construction Machinery/Equipment to be Used in a Single Working Area

Machinery-Equipment	Number	Diesel Fuel Consumption (L/h)
Excavator	6	20
Loader	9	
Truck	12	
Pick-up Truck	8	
Passenger Vehicle	5	
Minibus (for personnel service)	3	
Water Sprinkler (Water Truck)	2	
Roller	1	
Grader	1	
Bulldozer	1	
Diesel Tanker	1	
Maintenance Vehicle	1	
TOTAL	50	

Within the scope of the planned Project, it is assumed that the quantity of diesel consumed by the construction vehicles used on the site during the land preparation and construction phases will be 20 liters per hour on average, and it is known that an expected operating schedule of 10 hours per day and 300 days per year.

Following the determination of diesel consumption for the construction phase, CO_2e emissions were calculated using the United Kingdom (UK) Government Greenhouse Gas (GHG) Conversion Factors for Company Reporting (DEFRA & DESN, 2025), applying gas-specific factors for CO_2, CH_4 and N_2O.[20]

Total GHG emissions from construction machinery/equipment activities during construction phase for per year are summarized in Table 5-8 in terms of CO_2e. These calculations were made according to total diesel consumption per year.

Table 5-8. Emission Factors (EF) and Annual Emission Quantities from Machinery/Equipment

Emissions	Default Emission Factor (kg CO_2e)	Yearly Diesel Fuel Consumption (L)	Density of Diesel Fuel (kg/L)	Yearly Emission (ton CO_2e/year)
Carbon dioxide	2.62	3,000,000	0.830	7,860

[20] UK Government GHG Conversion Factors for Company Reporting, 2025.

Emissions	Default Emission Factor (kg CO_2e)	Yearly Diesel Fuel Consumption (L)	Density of Diesel Fuel (kg/L)	Yearly Emission (ton CO_2e/year)
Methane	0.00029			0.87
Nitrous oxide	0.033			99
TOTAL				**7,960**

For the Project, the emission calculations were carried out based on a conservative, worst-case scenario assuming that all construction vehicles and machinery would operate simultaneously. In practice, however, such a situation is unlikely, as construction activities will progress along different sections of the irrigation line, and equipment will be distributed across separate work areas and time periods. Therefore, the cumulative emission load will be lower than the calculated values.

Although a large portion of the Sarımsaklı Dam Irrigation Renovation Project area is located within rural and agricultural zones, certain sections of the construction corridor are situated in close proximity to a state highway, where traffic density and background emissions are higher compared to purely agricultural areas. Therefore, temporary increases in dust and exhaust emissions may occur locally, especially near the road corridor and during periods of intensive material transport.

Nevertheless, considering that construction activities will be short-term and progressive along the pipeline route, and that standard mitigation measures such as regular watering of roads, proper vehicle maintenance, and optimized scheduling will be implemented, no significant deterioration in local air quality is anticipated.

5.3.3.2 Operation Phase

During the operation phase of the Project, no regular vehicle activity is foreseen apart from the occasional use of maintenance and repair machinery. Therefore, no significant air quality impacts are expected, other than minor and short-term local emissions that may occur during maintenance and repair works.

Moreover, vehicle use will be limited to occasional maintenance and repair works. Other than short-term and localized exhaust emissions from maintenance vehicles, no notable impact on air quality is anticipated throughout the operation of the irrigation system.

5.3.4 Noise and Vibration

5.3.4.1 Construction Phase

During the construction phase, noise emissions will arise mainly from the operation of vehicles, machinery, and equipment. Details on the types and the total quantities of machinery expected to be utilized in construction activities are provided in Table 5-9. It is anticipated that no more than eight (8) vehicles will be operating simultaneously within the same work area during pipeline construction.

Table 5-9. Total Numbers and Noise Levels of the Vehicles and Machinery

Machinery-Equipment	Number	Expected Noise Level (dBA)[21]
Excavator	6	105
Loader	9	104
Truck	12	102
Pick-up Truck	8	90
Passenger Vehicle	5	85
Minibus (for personnel service)	3	90
Water Sprinkler (Water Truck)	2	95
Roller	1	106
Grader	1	110
Bulldozer	1	112
Diesel Tanker	1	92
Maintenance Vehicle	1	90

The national and international Project standards regarding the noise levels are summarized in Table 5-10. Accordingly, the limit value for the daytime is 55 dBA for the Project since there will not be work at nighttime.

Table 5-10. Project Limit Values for Noise Levels

Noise Level Project Standards		
Environmental Noise Control Regulation (Official Gazette No. 32029 Dated 30.11.2022)		
Type of Operation		Limit Value (dBA)
Infrastructure Works		65- (All sources together)**
Noise Standards - WBG EHS Guidelines: (Environmental Noise Management)		
Type of Operation	Lday * (One Hour LAeq (dBA)) (07:00-22:00)	Lnight * (One Hour LAeq (dBA)) (22:00-07:00)
Limit Value not to be exceeded by the noise from construction site activities at the sensitive receptor (Residential; institutional; educational)	55	45

**Noise impacts should not exceed the levels presented in the Table above, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site*
*** According to the Environmental Noise Control Regulation, the daytime limit value for industrial facilities and transportation resources is determined as 65 dBA, 60 dBA for the evening, and 55 dBA for the night.*

Excavation and pipe-laying activities under the Project will progress regionally, and therefore, all of the above-mentioned vehicles and machinery will not be operating simultaneously within the same work area. Considering the layout of the work zones, the equipment likely to remain continuously within a single active area until completion of works includes: one excavator, one truck, one loader, one pick-up truck, one water truck, one roller, one grader, and one bulldozer. Calculations have been realistically made based on these units. The results of the noise level calculations are summarized in the following Table 5-11.

[21] U.S. Environmental Protection Agency (EPA), *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, NTID 300.1, Washington, D.C., 1971.

Table 5-11. Noise Calculation Results

r (m)	L_{PT} (dB)	Aatm (dBA) (f:500)	DF (dB) (f=500 Hz)	L (dBA) (f:500 Hz)	Aatm (dB) (f:1000 Hz)	DF (dB) (f=1000 Hz)	L (dBA) (f:1000 Hz)	Aatm (dB) (f:2000 Hz)	DF (dB) (f=2000 Hz)	L (dBA) (f:2000 Hz)	Aatm (dB) (f:4000 Hz)	DF (dB) (f=4000 Hz)	L (dBA) (f:4000)	L_T (dBA)
1	107,76	0,00	-3,2	104,56	0,00	0	107,76	0,00	1,2	108,96	0,02	1	108,74	113,83
5	93,78	0,00	-3,2	90,58	0,01	0	93,78	0,02	1,2	94,96	0,10	1	94,68	99,82
10	87,76	0,00	-3,2	84,56	0,01	0	87,75	0,05	1,2	88,91	0,20	1	88,56	93,76
20	81,74	0,01	-3,2	78,53	0,02	0	81,72	0,10	1,2	82,84	0,39	1	82,35	87,66
30	78,22	0,01	-3,2	75,01	0,04	0	78,18	0,15	1,2	79,27	0,59	1	78,63	84,06
40	75,72	0,01	-3,2	72,51	0,05	0	75,67	0,20	1,2	76,72	0,79	1	75,93	81,49
50	73,78	0,02	-3,2	70,57	0,06	0	73,72	0,25	1,2	74,74	0,99	1	73,80	79,48
100	67,76	0,03	-3,2	64,53	0,12	0	67,64	0,49	1,2	68,47	1,97	1	66,79	73,11
150	64,24	0,05	-3,2	60,99	0,19	0	64,05	0,74	1,2	64,70	2,96	1	62,28	69,26
200	61,74	0,06	-3,2	58,48	0,25	0	61,49	0,99	1,2	61,95	3,95	1	58,79	66,47
250	59,80	0,08	-3,2	56,53	0,31	0	59,49	1,23	1,2	59,77	4,93	1	55,87	64,27
300	58,22	0,09	-3,2	54,93	0,37	0	57,85	1,48	1,2	57,94	5,92	1	53,30	62,45
350	56,88	0,11	-3,2	53,57	0,43	0	56,45	1,73	1,2	56,35	6,91	1	50,97	60,88
400	55,72	0,12	-3,2	52,40	0,49	0	55,23	1,97	1,2	54,95	7,89	1	48,83	59,52
500	53,78	0,15	-3,2	50,43	0,62	0	53,17	2,47	1,2	52,52	9,87	1	44,92	57,22
600	52,20	0,19	-3,2	48,81	0,74	0	51,46	2,96	1,2	50,44	11,84	1	41,36	55,32
700	**50,86**	**0,22**	**-2,2**	**48,44**	**0,86**	**1**	**51,00**	**3,45**	**2,2**	**49,61**	**13,81**	**2**	**39,05**	**54,70**
800	49,70	0,25	-3,2	46,25	0,99	0	48,71	3,95	1,2	46,95	15,79	1	34,91	52,28
900	48,68	0,28	-3,2	45,20	1,11	0	47,57	4,44	1,2	45,44	17,76	1	31,92	51,03
1000	47,76	0,31	-3,2	44,25	1,23	0	46,53	4,93	1,2	44,03	19,73	1	29,03	49,90

In the Project, noise levels were evaluated under a realistic assumption that a maximum of eight (8) machines would operate simultaneously within a single work area. Although, in theory, higher noise levels could occur if all machinery were to operate together, such a scenario is not feasible due to the construction schedule and the dispersed, linear nature of the pipeline works.

Given that works at each specific location will be of short duration, and machinery will move progressively along the route, prolonged exposure is not expected. Nevertheless, noise monitoring will be conducted in accordance with the provisions of the Environmental Noise Control Regulation. Where construction activities take place near sensitive receptors, additional measures such as temporary noise barriers or scheduling work during less sensitive hours will be implemented as needed. Regular maintenance of vehicles and equipment will also be ensured to minimize unnecessary noise emissions.

Similarly, vibration during the construction phase of the Project will primarily result from excavation, soil compaction, and the movement of heavy machinery. Given the linear nature of the works and the short duration of construction activities in any single area, vibration impacts are expected to be minor and temporary. The use of well-maintained equipment and proper operation practices will further minimize vibration levels. In areas close to sensitive structures such as residential buildings or community facilities, preventive measures (e.g., reduced equipment speed, avoidance of simultaneous operation of heavy rollers and

excavators, and scheduling works during daytime) will be applied when necessary. Vibration monitoring will be conducted near sensitive receptors if complaints arise.

5.3.4.2 Operation Phase

During the operation phase of the Project, no significant sources of continuous noise or vibration are expected. The system will operate under pressure through underground pipelines without any mechanical pumping or high-energy equipment. The only potential sources of temporary noise or vibration may arise from periodic maintenance and repair works, which could involve light machinery or service vehicles.

These activities will be short-term and infrequent, and are not anticipated to cause any notable impact on surrounding settlements or sensitive receptors. Regular maintenance of equipment and adherence to working hour limitations will ensure that operational noise and vibration remain within acceptable limits as defined by the national and international standards. Consequently, the overall impact of noise and vibration during the operation phase is considered negligible.

5.3.5 Waste Management

This section evaluates the environmental and social risks associated with waste generation during both the construction and operation phases of the Sarımsaklı Dam Irrigation Renovation Project. Waste streams encompass domestic solid waste, packaging waste, recyclable construction materials, hazardous waste, waste oils, waste batteries and accumulators, end-of-life tires, electronic waste, medical waste, and significant quantities of excavation materials generated during pipeline installation and the demolition of existing canal structures.

5.3.5.1 Construction Phase

During the construction phase, domestic solid waste will be generated primarily from the daily activities of up to 250 personnel, consisting mainly of municipal waste, packaging materials and mixed household-type waste. Using the 2022 TurkStat municipal solid waste generation rate for Kayseri Province (0.98 kg/person-day),[22] total domestic waste generation is estimated at 245 kg/day.

Packaging waste will arise from the delivery of construction materials, consumables and food supplies. Plastics, cardboard, nylon and wooden pallets constitute the main components of this stream. If not adequately stored, packaging materials may cause visual pollution or become dispersed by wind, increasing the fire load in temporary storage areas. Recyclable construction materials will also form a small but important waste stream, including scrap metal, reinforcement pieces, cable offcuts, pipe residues and dismantled components. Improper storage or mixing of recyclables can reduce recovery efficiency and expand the volume of disposable waste.

Excavation waste represents the most substantial construction-phase waste stream. Approximately 1,267,683 tons (≈845,122 m³) of excavation soil will be generated. Of this amount, 70% will be reused for backfilling and land restoration, while the remaining 30% will be transported to the Akın Excavation Soil Dumping Site authorized by the Kayseri

[22] Turkish Statistical Institute (TurkStat). Municipal Water, Wastewater and Waste Statistics Database (MEDAS). Available at: https://biruni.tuik.gov.tr/medas/

Metropolitan Municipality. Additionally, 81,506 tons (≈54,337 m³) of topsoil will be stripped, stored separately and reinstated in full to preserve soil productivity. In sections where the new route intersects with existing concrete-lined channels, demolition will generate concrete waste, which will be transferred to licensed waste facilities. No batching plant will operate on-site; all sand-gravel will be sourced from permitted quarries, when needed. Excavation activities may temporarily contribute to dust generation, sedimentation risks, increased haul traffic and localized stockpile impacts, though these effects remain manageable with adequate controls.

Hazardous waste will be produced in limited quantities, typically from paint residues, contaminated containers, oily rags, spill absorbents or chemical packaging. Although volumes are expected to remain low, these materials may pose risks to soil, groundwater and worker health if not handled according to regulatory requirements. Similarly, small volumes of waste oils may occur during emergency repairs, despite the fact that routine maintenance will not be conducted on-site. Waste oils contain high concentrations of hydrocarbons and require sealed, labeled containers placed on impermeable surfaces until their transfer to licensed collectors.

Waste batteries and accumulators may be generated during the use of machinery and vehicles. Due to heavy metal content, these materials must be strictly segregated and delivered to licensed recycling facilities. End-of-life tires resulting from vehicle and machinery operation pose fire and vector-breeding risks if stored improperly. Electronic waste generated from office activities—such as chargers or small Information Technology (IT) components—will remain minimal. Medical waste arising from minor first-aid procedures will occur in very small quantities yet requires fully segregated storage and licensed transport due to its infectious nature.

Although environmental risks remain moderate, improper storage may lead to odor, littering or pest attraction; however, these impacts remain fully manageable with appropriate handling and regular collection. All waste types will be managed in accordance with the relevant national legislation and international standards given in Annex-4, the mitigation measures regarding the waste management are given in Chapter 6.

5.3.5.2 Operation Phase

During the operation period, domestic solid waste will be produced by approximately 40 personnel employed under the irrigation unions. Using the same per capita rate for Kayseri, total daily domestic waste generation is calculated at 39.2 kg/day. Waste quantities remain low and environmental risks minimal, provided that wastes are routinely collected and managed in coordination with municipal systems.

Packaging waste, recyclables, small quantities of Waste Electrical and Electronic Equipment (WEEE), spent batteries, and minor amounts of medical waste may be generated intermittently during routine inspections and administrative activities. Hazardous waste production is expected to remain negligible, with only small quantities arising from periodic maintenance works. As long as proper segregation, labeling and licensed disposal procedures are followed, the environmental risk remains low.

Maintenance works carried out during operation, particularly for repairing buried pipelines, may generate limited amounts of excavation soil. Reusable fractions will be reinstated as backfill, while surplus materials will be delivered to the Akın Excavation Soil Dumping Site. These activities produce minimal environmental impact when managed appropriately and in line with the waste handling procedures established for the construction phase. Thus, the overall impact significance for operation phase regarding waste management is considered as low, and necessary mitigation measures are given in Chapter 6.

5.3.6 Wastewater Management

5.3.6.1 Construction Phase

During the construction phase, the generation of wastewater will be limited to domestic sources such as the use of toilets by site personnel. The main risks are associated with potential soil and surface water contamination due to improper collection, leakage, or uncontrolled discharge of wastewater from mobile toilets or septic tanks. Minor hygiene and odor issues could also occur if wastewater storage units are not regularly emptied or properly maintained.

According to TurkStat data for the year 2022, the daily wastewater discharged per capita in Kayseri province is 157 L/person-day[23] and the daily wastewater for a maximum of 250 personnel to be employed during the construction phase is as calculated below.

Total Amount of Wastewater Generated	=	Number of Personnel x Daily Wastewater Discharged per Capita
	=	250 -person x 157 L /person-day
	=	39,250 L/day = 39.25 m³/day

During the construction phase, generated wastewater will be collected in impermeable septic tanks and transported by licensed vehicles to KASKİ Kayseri Advanced Biological WWTP. In case Kayseri Advanced Biological WWTP is not suitable for wastewater disposal, wastewater generated will be sent to KASKİ's Ebiç-Kızılırmak WWTP located approximately 20 km west of the project area. The use of mobile toilets with their own impermeable wastewater collection reservoirs within the scope of the project is the responsibility of the Contractor, and the wastewater accumulated in these tanks must also be transported to a licensed WWTP using licensed vehicles, with the relevant permits obtained.

Moreover, 10 m³/day is envisaged for the water to be used for dust suppression which will be applied by water sprinkler truck, however, since this water will evaporate, there will be no wastewater generation.

The water requirement during the construction phase of the Project, the amount of wastewater generated, and the disposal method are summarized in Table 5-12.

Table 5-12. Estimated Wastewater Amounts for Construction Phase

Purpose of Use	Supply	Requirement of Water (m³/day)	Amount of Wastewater (m³/day)	Disposal Method
Personnel domestic and drinking water	Municipal water network and market	56.5	39.5	Municipal sewage system or mobile toilet septic tank / impermeable septic tank and transfer to licensed WWTP
Land irrigation for dust prevention	Transported water	10	Evaporation	Not necessary
Total		**66.5**	**39.25**	**WWTP**

[23] Turkish Statistical Institute (TurkStat). Municipal Water, Wastewater and Waste Statistics Database (MEDAS). Available at: https://biruni.tuik.gov.tr/medas/

5.3.6.2 Operation Phase

The operation of the irrigation network Project will be responsibility of an irrigation union, which has not been determined yet. It is estimated that 40 personnel will be working in this union responsible for the irrigation network operation, maintenance and repair.

According to TurkStat data for the year 2022, the daily wastewater discharged per capita in Kayseri province is 157 L/person-day[24] and the daily wastewater for 40 personnel during the operation phase is as calculated below.

Total Amount of Wastewater Generated	=	Number of Personnel x Daily Wastewater Discharged per Capita
	=	40 -person x 157 L /person-day
	=	6,280 L/day = 6.28 m³/day

It is estimated that the Irrigation Union will generally work in offices located in the central district, so the wastewater generated will be disposed of to the urban sewage system. For the maintenance and repair works, an impermeable septic tank might be constructed where necessary. The wastewater generated and collected in the septic tank will be emptied by vacuum trucks and sent to KASKİ Kayseri Advanced Biological WWTP. The irrigation union to be selected for the operation of the Project should make an agreement/protocol with KASKİ regarding the issue.

The natural drainage of the area is the Sarımsaklı Stream and the newly constructed drainage channel are designed to connected to this stream. Surface waters formed after precipitation can be removed from the project area by these streams without damaging the project area.

Moreover, the irrigation system to be installed within the scope of the Project will provide effective irrigation methods (sprinkler, dripping and release systems) to eliminate the over irrigation of the crops.

5.3.7 Impacts on Biodiversity

5.3.7.1 Construction Phase

Baseline Context and Sensitivity:

The Sarımsaklı Dam Irrigation Renovation Project is situated in the central plains of Kayseri Province, within an agricultural landscape that has been extensively modified by long-term irrigation and cultivation. Vegetation cover is dominated by ruderal and pasture species (*Cynodon dactylon*, *Plantago major*, *Avena fatua*), and no natural or semi-natural habitats remain within the project footprint.

The project area partially overlaps with Engir Lake (Engir Gölü) Natural Site – Strictly Protected Sensitive Area, designated under the Turkish Regulation on the Conservation of Natural Sites (2019) as a “Strictly Protected Area” because of its unique hydrological and ecological value. This area represents a legally protected natural habitat under national legislation, requiring full avoidance of disturbance or modification. In this regard, necessary correspondence with

[24] Turkish Statistical Institute (TurkStat). Municipal Water, Wastewater and Waste Statistics Database (MEDAS). Available at: https://biruni.tuik.gov.tr/medas/

DKMP has been made (see Table 2-1 and Annex-2: Official Letters) and overlaps with the irrigation route has been moved outside of the strict protection zone of the Engir Lake Natural Site. Construction and operation activities must ensure strict avoidance of any physical disturbance, pollution, or alteration of the hydrological regime within and around the Engir Lake buffer zone.

In addition to this site, the nearest other ecologically sensitive areas are Hürmetçi Sazlığı Wetland of National Importance (10.2 km) and Sultan Sazlığı National Park (42.8 km), both hydrologically and ecologically isolated from the project area.

Potential Impacts:

Although the project area lies entirely within a Modified Habitat, construction activities can still generate localized, temporary, and indirect effects on biodiversity through the following pathways:

- Vegetation removal and soil disturbance along canal routes, causing short-term habitat loss for small vertebrates and invertebrates.
- Noise, vibration, and light disturbance from machinery, potentially displacing common farmland birds (*Galerida cristata, Motacilla flava, Passer domesticus*) and amphibians (*Pelophylax ridibundus*).
- Dust deposition on surrounding vegetation and croplands, reducing photosynthetic activity.
- Risk of sedimentation or contamination affecting the hydrology and water quality of Engir Lake if construction runoff or waste is not properly managed.
- Water and soil contamination risk from accidental fuel/oil leakage or improper waste management.
- Temporary increase in human activity, which could indirectly disturb fauna or lead to unintentional wildlife harassment if workers are not trained.
- Runoff from stockpile areas, possibly affecting irrigation ditches or small ephemeral streams.

Cumulative and Indirect Effects:

Given that the project involves rehabilitation rather than new construction, cumulative impacts are expected to be low. However, because Engir Lake lies within the project boundary, even minor hydrological changes could cause sensitive ecosystem responses. Continuous coordination with DKMP will be required to ensure compliance with the conservation status of this area. No spatial overlap exists with other infrastructure developments or protected areas that could exacerbate ecological pressure.

Impact Evaluation:

- Spatial Extent: Primarily within construction corridor, including the Engir Lake protected buffer and borrow/storage areas.
- Duration: Short-term (construction phase near the Engir Lake only).
- Intensity: Moderate in areas near Engir Lake, low elsewhere.
- Frequency: Intermittent.
- Sensitivity of Receptors: High within Engir Lake protection zone; low in modified habitats.
- Significance (Pre-Mitigation): Moderate to Major (locally high sensitivity within protected area)

Mitigation Measures (Applying the Mitigation Hierarchy):

Avoidance:

- No work, equipment storage, or vehicle movement shall occur within the strict protection zone of Engir Lake boundaries.
- No work will occur outside the designated right-of-way or previously disturbed land.
- Protected areas and watercourses will be avoided by maintaining buffer zones (≥50 m).

Minimization:

- Limit vegetation clearance strictly to required working width.
- Control noise and dust emissions (use of mufflers, water spraying, speed limits).
- Implement sediment and erosion control measures (silt fences and drainage channels protecting Engir Lake).
- Prohibit nighttime works near settlement areas to reduce light disturbance.

Restoration:

- Rehabilitate all disturbed surfaces after works with native or compatible vegetation.
- Stabilize canal banks using bioengineering methods where feasible.
- Restore any temporarily disturbed sections near Engir Lake using local hydrophytic species and native wetland vegetation under DKMP supervision.

Management and Monitoring:

- Conduct periodic site inspections.
- Maintain a record of any wildlife sightings or incidents.
- Enforce a Code of Conduct prohibiting poaching, tree cutting, and wildlife disturbance.

Residual Impact:

Following full implementation of the above measures, residual impacts are expected to be Minor to Negligible, provided that the Engir Lake protection buffer is fully respected. Vegetation will regenerate naturally, and no long-term loss of ecological function is anticipated within modified habitats. Continuous protection and monitoring of Engir Lake will ensure maintenance of its ecological integrity.

5.3.7.2 Operation Phase

Baseline Context:

The operation phase of the Sarımsaklı irrigation network will not introduce new construction or land conversion except minor maintenance and repair works. The system will continue to function within the existing channels, delivering water for agricultural use. Maintenance and desilting activities will be carried out periodically to ensure flow efficiency.

However, a portion of the project area lies within the boundaries of Engir Lake (Engir Gölü) Natural Site – Strictly Protected Sensitive Area, designated in 2019 under the Turkish Regulation on the Conservation of Natural Sites as a “Strictly Protected Sensitive Area.” This designation requires full avoidance of any activity that may cause pollution, hydrological alteration, or physical disturbance within or around the lake. Therefore, during the operation

phase, strict environmental management will be essential to maintain the integrity of this legally protected area.

Potential Impacts:

Although limited, some potential interactions with biodiversity could occur:

- Maintenance activities (e.g., clearing sediment or vegetation) may cause localized disturbance to amphibians, reptiles, and birds that use canals as microhabitats.
- Vegetation management could temporarily reduce habitat heterogeneity if canal edges are excessively cleared.
- If maintenance works or drainage cleaning occur too close to Engir Lake, there is a risk of sediment runoff or nutrient enrichment that could alter the site's ecological balance.
- Uncontrolled runoff or waste disposal from maintenance operations could degrade nearby soils or drainage ditches.
- Alteration of microhabitat conditions (humidity, shade) if canal margins are completely stripped.

However, since operation will take place within a fully managed agricultural landscape, these impacts are spatially limited and reversible. There is no hydrological connectivity between the irrigation system and Sultan Sazlığı or Hürmetçi Sazlığı, ensuring no risk to their wetland ecosystems.

To avoid negative effects on Engir Lake, all maintenance works shall remain outside the protection zone and will be coordinated with DKMP.

Impact Evaluation:

- Spatial Extent: Highly localized (limited to canal corridors outside the Engir Lake protection zone).
- Duration: Short and periodic.
- Sensitivity of Receptors: Moderate within Engir Lake protected zone; low in modified agricultural areas.
- Significance (Pre-Mitigation): Moderate due to proximity to Engir Lake; Negligible elsewhere.

Mitigation Measures:

- No maintenance or vegetation removal activities shall be conducted within Engir Lake protection boundaries.
- Schedule maintenance outside sensitive breeding and nesting periods (April–July).
- Maintain partial vegetation cover along canal edges to support pollinators, amphibians, and small birds.
- Prefer mechanical clearing over herbicide use to prevent chemical pollution.
- Train maintenance teams on biodiversity-sensitive operations.
- Ensure spill prevention kits and waste collection containers are available at all work sites.

Residual Impact:

After mitigation, operational impacts are expected to remain Low to Negligible, with no effect on species diversity or ecosystem functioning within Engir Lake. Strict buffer management and

continuous monitoring will ensure that the lake's ecological integrity and legal protection status are fully maintained.

Cumulative Impact and Climate Considerations

Cumulatively, the project will not contribute to habitat fragmentation or loss of ecosystem services. On the contrary, improved irrigation efficiency is expected to reduce water losses and mitigate secondary environmental stress on nearby wetlands.

5.3.8 Natural Hazard Potential

5.3.8.1 Construction Phase

The project area is located within a zone of moderate seismic hazard, with a peak ground acceleration (PGA_{475}) value of 0.210 g according to Disaster and Emergency Management Presidency's (AFAD) updated Türkiye Earthquake Hazard Map. While no active fault line directly intersects the project route, several regional fault systems such as the Ecemiş and Erciyes Fault Zones contribute to the area's background seismicity. Historical and instrumental records indicate that earthquakes with magnitudes between 4.5 and 5.5 have occurred within a 100 km radius of the site. Therefore, the primary natural hazard risk during construction is related to ground shaking, which could endanger workers and temporarily stored construction materials or equipment if proper precautions are not taken.

Other natural hazards such as floods, landslides, or avalanches are not anticipated to impact the project area, as the site lies on gently sloping terrain with no recorded instability or flood-prone zones. However, intense rainfall events could temporarily increase surface runoff and localized erosion, particularly at excavation points and stockpiles. Overall, the probability of major natural hazard impacts during construction is considered low, provided that site management, slope stabilization, and emergency preparedness procedures are implemented in line with the national disaster regulations.

5.3.8.2 Operation Phase

During the operation phase, the potential effects of natural hazards are limited to seismic events that may affect the structural integrity of irrigation network components such as valve chambers, control structures, and pipeline joints. Since all facilities will be designed and constructed in accordance with the Turkish Building Earthquake Regulation and the Regulation on Buildings to be Built in Disaster Areas, the likelihood of significant damage is low. Regular inspection and maintenance will ensure that any post-seismic malfunction such as leakage, displacement, or minor cracking can be promptly detected and repaired.

No landslide, flood, or avalanche risks are expected during operation, as the Sarımsaklı Dam and drainage network provide sufficient water regulation capacity, preventing inundation and erosion within the project area. Nonetheless, extreme precipitation or drought conditions could slightly alter soil moisture regimes, which should be managed through periodic monitoring of ground stability and drainage efficiency. Overall, natural hazard risk during operation is assessed as negligible, provided that ongoing monitoring and emergency response measures are maintained under the supervision of DSİ and the assigned irrigation union.

5.4 Potential Social Risks and Impacts

5.4.1 Population and Migration

5.4.1.1 Construction Phase

In the settlements within the AoI, the female and male population is balanced, and the majority of residents fall within the middle-age groups. Although the overall population in the region has generally been in decline, some settlements have begun to show an increasing trend due to zoning and development planning.

Seasonal agricultural workers, who normally contribute significantly to population mobility in the region, are present in the area only during specific agricultural periods. As agricultural activities may be temporarily suspended due to construction activities, seasonal agricultural workers are not expected to come to the area during the construction period, as there will be limited agricultural activities requiring seasonal labor. Therefore, seasonal population movements are expected to decrease throughout the construction period.

Elderly individuals are considered particularly vulnerable to potential environmental impacts during the construction phase. At the same time, these older adults may also face disadvantages in terms of participation in stakeholder engagement activities. A similar situation applies to elderly individuals living alone.

Female heads of household are expected to face disadvantages in participating in information and awareness-raising activities during the construction phase. These disadvantages are anticipated to be more pronounced during the pre-construction and construction phases.

For the households which have reliance on a single source of livelihood - dependent on agricultural and livestock activities within the irrigation area - may create an additional disadvantage in terms of economic losses during the construction phase.

The construction phase of the Project is expected to last 4 years, with a peak/maximum workforce of 250 people during the construction period. No direct impact is expected from labor influx–related population movement on the gender and age distribution or the fundamental population change patterns in the region.

5.4.1.2 Operation Phase

Stakeholders indicated that improved irrigation could revive interest in agriculture and livestock, potentially drawing younger generations back into these activities. As a result, the region may both retain its current agricultural workforce and attract new population groups, particularly those interested in livestock fattening.

Many stakeholders interpreted the potential reduction in production costs, the increase in crop yields, the diversification of the cropping pattern, and the direct participation of women as farmers as factors that would reduce outward migration from the region. Several stakeholders even suggested that improvements in irrigation could trigger reverse migration.

The Project's operational life is expected to be approximately 50 years. Over this 50-year period, population growth driven by reverse migration is anticipated, along with a shift toward a younger age profile.

No significant impacts are expected during the operation phase in line with Disadvantaged or vulnerable individuals or groups (DVIG) as elderlies and female household heads.

The operational workforce is estimated to consist of 40 employees, representing the staff of the irrigation union(s) assigned by DSİ for operating the system. No direct impact is expected from labor influx–related population movement on the gender and age distribution or the fundamental population change patterns in the region.

5.4.2 Education

5.4.2.1 Construction Phase

There are no educational facilities within the irrigation route or pipelines. Therefore, no risks are anticipated for existing education services during the construction phase.

Number of illiterate individuals is quite low, and there are almost no people who are illiterate. Those who are illiterate are reported to be mostly among the elderly population. Illiterate individuals will be considered disadvantaged within the scope of the project's Stakeholder Engagement Plan (SEP) activities. Particular sensitivity may arise regarding the participation of illiterate elderly individuals in stakeholder engagement activities, especially during the pre-construction and construction phases.

5.4.2.2 Operation Phase

No impacts are expected during the operation phase for educational institutions or for disadvantaged/vulnerable groups with low literacy.

5.4.3 Health

5.4.3.1 Construction Phase

There are no healthcare facilities within the irrigation route or pipelines. Therefore, no risks are anticipated for existing healthcare services during the construction phase.

During the Project's construction activities, disabled individuals may be more significantly affected by traffic- and road-use-related impacts. Additionally, persons with disabilities including home bound-bedridden people may experience sensitivity or face challenges in participating in meetings.

5.4.3.2 Operation Phase

No impacts are expected during the operation phase for healthcare institutions.

No particular sensitivity is expected during the operation phase with regard to disabled individuals that may arise during the construction phase.

5.4.4 Infrastructure Services

5.4.4.1 Construction Phase

The evaluation results electricity, utility water, irrigation water, sewerage, waste collection, mobile phone coverage area, internet, and roads are given in Annex-3 of this ESMP. Based on these assessments, the lowest satisfaction levels were recorded for internet infrastructure and irrigation water supply, while the highest satisfaction levels were reported for electricity service and waste collection service.

Both local authorities and stakeholder institutions emphasized the need to protect existing infrastructure, including roads, bridges, and similar structures, during construction activities. The potential damage to existing above-ground facilities was stated as a source of concern.

5.4.4.2 Operation Phase

No impacts are expected on existing infrastructure facilities during the operation phase.

5.4.5 Livelihood Sources

5.4.5.1 Construction Phase

The disadvantages experienced by female agricultural workers as a result of construction activities can be considered in economic terms. During the construction phase, the temporary suspension of agricultural activities may have economic impacts on women employed as daily-wage agricultural laborers. To mitigate income losses during this period, female agricultural workers may either seek employment in other agricultural areas or temporarily stop working.

A similar situation applies to families employed as seasonal agricultural workers. During the construction phase, due to the expected decrease in active agricultural activities in the area, seasonal workers are expected to seek employment elsewhere rather than use the Project area as a work site.

Seasonal agricultural workers may be excluded from information activities such as announcements and meetings held during the agriculture-off-season (April-September), which may limit their effective participation in stakeholder engagement processes. In addition, as seasonal workers are typically accommodated in temporary tents, they may be more vulnerable to construction-related impacts, including noise and dust.

5.4.5.2 Operation Phase

The disadvantages that may arise during the construction phase do not apply to the operation phase. On the contrary, the expansion of irrigation is expected to increase agricultural production and yields, as well as diversify the cropping pattern, which could translate into an economic advantage for these female agricultural workers. Once the operation phase begins, the temporary disadvantage during construction phase is anticipated to become an economic advantage for families engaged in seasonal agricultural work.

The challenges related to environmental impacts arising from inadequate housing conditions during the construction phase are expected to be negligible during the operation phase.

Nearly all stakeholders who evaluated the Project positively believe that a closed system will prevent losses. Stakeholders believe that if production costs decrease while crop yields increase, farmers' incomes will consequently rise. A parallel outcome of increased production is the potential for cultivating secondary crops. The expansion of irrigation opportunities will not only support the cultivation of secondary crops but will also encourage the production of crops that cannot be grown under current irrigation conditions. In this regard, the production of water-demanding crops - such as sugar beet, horticultural crops, and fruit varieties - is expected to become more widespread. In essence, both the yield of existing crops will increase and the overall cropping pattern will also become more diversified.

The diversification of the cropping pattern was viewed by many stakeholders as an advantage for the empowerment of women farmers. Because, dry-farming systems typically rely predominantly on male labor.

The availability of irrigation-enabled fruit and horticultural production would directly draw women into agricultural value chains.

Whereas women's labor in dry farming is often regarded as unpaid household labor, their contribution to irrigated agriculture becomes visible and economically recognized.

5.4.6 Land Acquisition and Livelihoods

5.4.6.1 Construction Phase

The Project requires approximately 660,000 m² of private land acquisition across 1,167 parcels, with an estimated 3,110 owners and an additional 40,000 m² of pastureland across 14 parcels, the pipeline routes generally follow existing irrigation alignments, thereby minimizing the scale and significance of impacts. No physical displacement is anticipated. Temporary access restrictions during construction will be managed through continuous engagement with farmers. Although the exact locations and extent of land acquisition have not yet been determined, land acquisition activities under the Project may result in certain temporary or permanent impacts. These may include temporary access restrictions during construction, loss of small portions of private or public land, temporary disruption of agricultural activities, and limited economic displacement affecting land users and livelihoods. The presence of both formal landowners and informal users may also be encountered depending on site-specific conditions. Where required under national legislation, expropriation procedures may be applied. All land acquisition–related impacts, mitigation measures, eligibility criteria, compensation principles, and livelihood restoration measures will be assessed and defined in detail through a LAP to be prepared in line with the TWCEIP LAPF and the requirements of ESS5.

The Contractor will establish a temporary construction site within or immediately adjacent to the irrigation command area, using rented land or available unused public parcels depending on local conditions. Essential facilities within the construction site will include the personnel rest and dining areas, site offices, machinery parking, workshops, material storage areas, and general utilities

The exact layout and size of the construction site will be finalized by the contractor prior to mobilization, ensuring minimal land disturbance and efficient integration with existing access routes.

5.4.6.2 Operation Phase

There is no anticipated impact during operation phase.

5.4.7 Vulnerable/Disadvantaged Individuals or Groups

All assessments regarding the vulnerable groups presented in Social Baseline have been carried out in sections Population and Migration (Elderlies including living alone and Female household heads), Education (Illiterates), Health (Disabled individuals including home bound-bedridden people), Livelihood (Agricultural workers (seasonal and daily waged), and in Annex-3 of this ESMP. In addition, this section evaluates the Non-Turkish speakers.

5.4.7.1 Construction Phase

Families who have come from the Şanlıurfa and Adıyaman regions as seasonal agricultural workers, predominantly speaking Kurdish. Individuals of mostly Afghan and Syrian origin, residing in the area and working as shepherds in livestock activities. It is known that Syrians speak Arabic. It is presumed that Afghan shepherds use either the Dari or Pashto languages. The use of languages other than Turkish may create disadvantages only within the scope of SEP activities. Beyond this context, no instances of discrimination based on the use of non-Turkish languages or belonging to different cultural backgrounds have been observed in the area. These communication challenges, which may arise during the pre-construction and construction phases, are expected to be less pronounced or negligible during the operation phase.

5.4.7.2 Operation Phase

The communication challenges, which may arise during the pre-construction and construction phases, are expected to be less pronounced or negligible during the operation phase.

5.4.8 Labor Management and Labor Influx

5.4.8.1 Construction Phase

The construction phase of the Project is expected to last 4 years, with a peak/maximum workforce of 250 people during the construction period.

Due to the proximity of the project to Kayseri city center and surrounding settlements, worker accommodation is not expected to be required, and personnel are anticipated to commute from nearby residential areas.

The expected workforce, anticipated to reach up to 250 personnel during peak periods, is not expected to induce significant labor influx risks. During consultations with stakeholder institutions, attention was drawn to potential risks associated with an influx of labor during the construction phase. The ORAN Development Agency advised caution regarding possible incidents of harassment during this period. Local settlement authorities requested that worker accommodation facilities be established outside residential areas. Similarly, local authorities expressed concerns that construction vehicle traffic could pose safety risks, particularly for young people riding motorcycles within the villages.

As part of the consultation held with the Kayseri Metropolitan Municipality, recommendations were made regarding the provision of adequate facilities at construction sites, such as properly equipped changing rooms, and the establishment of areas within the site for external workers to carry out shopping and other daily needs. Both local authorities and stakeholder institutions emphasized the need to protect existing infrastructure, including roads, bridges, and similar structures, during construction activities. The potential damage to existing above-ground facilities was identified as a source of concern.

5.4.8.2 Operation Phase

The Project's operational life is expected to be approximately 50 years. During this period, the operational workforce is estimated to consist of 40 employees, representing the staff of the irrigation union(s) assigned by DSİ for operating the system. No impacts are expected from the labor influx during this period.

5.4.9 Occupational Health and Safety

5.4.9.1 Construction Phase

Construction works will involve excavation, trenching, transportation, and installation of pipelines, operation of heavy machinery, and work at heights. These activities may expose workers to various occupational health and safety risks that could result in physical injuries, illnesses, or accidents if not managed properly.

Potential Risks and Impacts:

Risk: Slips, trips, and falls may occur due to uneven ground surfaces, excavation edges, and poor housekeeping practices.

Impact: Minor to severe injuries such as sprains, fractures, or head trauma; temporary work stoppages.

Risk: Machinery and vehicle accidents may result from improper traffic management, inadequate signaling, or lack of separation between workers and moving equipment.

Impact: Serious injuries or fatalities; property and equipment damage; disruption of work progress.

Risk: Exposure to dust and noise generated by excavation, concrete mixing, and vehicle movement may affect workers' respiratory and auditory health.

Impact: Short- or long-term respiratory problems, hearing loss, fatigue, and reduced work efficiency.

Risk: Manual handling and lifting of heavy materials may cause musculoskeletal disorders or strain injuries.

Impact: Chronic back, shoulder, or joint pain; loss of workdays and reduced productivity.

Risk: Electrical hazards from temporary power supplies, welding machines, and lighting systems may lead to electrical shocks, burns, or fires.

Impact: Severe injury or fatality; damage to electrical infrastructure and increased fire risk.

Risk: Working in confined spaces such as manholes, chambers, and trenches may create oxygen deficiency or exposure to toxic gases.

Impact: Asphyxiation, unconsciousness, or death if ventilation and gas monitoring are inadequate.

Risk: Heat stress and dehydration are likely during summer months, especially during intensive outdoor work.

Impact: Fatigue, heat exhaustion, or heat stroke, potentially resulting in hospitalization or reduced productivity.

Risk: Poor site organization and inadequate housekeeping may increase the frequency of minor accidents or hinder emergency access.

Impact: Accumulated waste and obstructions leading to trip hazards, reduced morale, and inefficiency.

Risk: Inadequate sanitation and hygiene facilities may expose workers to infectious diseases or poor living conditions in worker camps.

Impact: Spread of communicable diseases, absenteeism, and potential community health concerns.

Risk: Psychosocial risks due to long working hours, limited rest, or stressful conditions.

Impact: Mental fatigue, stress, and decreased concentration, increasing the likelihood of accidents.

Overall, the potential impacts on workers' health and safety during construction are considered moderate, as they are predictable, temporary, and reversible if appropriate control measures are implemented.

5.4.9.2 Operation Phase

During the operation phase, occupational risks will mainly arise during inspection, repair, and maintenance of the pressurized irrigation system and pumping facilities.

Potential Risks and Impacts:

Risk: Exposure to high-pressure water systems during maintenance of pipelines, valves, and pumps may cause mechanical injuries.

Impact: Cuts, bruises, or impact injuries from sudden release of pressure; risk of flooding or equipment damage.

Risk: Electrical hazards in pump stations and control rooms may occur due to faulty wiring, lack of grounding, or poor maintenance.

Impact: Electrical shocks, burns, or fatalities; interruption of irrigation services.

Risk: Slip, trip, and fall risks in wet, confined, or poorly lit areas around pumping and control facilities.

Impact: Physical injuries leading to lost working hours or temporary incapacitation.

Risk: Confined space risks during inspection of manholes, valve chambers, or underground structures.

Impact: Oxygen deficiency, gas exposure, or entrapment; possible fatal outcomes.

Risk: Exposure to lubricants, fuels, and cleaning chemicals used during maintenance activities.

Impact: Skin irritation, chemical burns, or long-term respiratory effects from inadequate ventilation.

Risk: Fire and explosion hazards associated with electrical short circuits or improper fuel handling.

Impact: Equipment loss, worker injury, and extended operational downtime.

Risk: Ergonomic risks from repetitive or awkward maintenance activities.

Impact: Chronic strain injuries reduced work performance, or long-term health issues.

Risk: Psychosocial and fatigue-related risks for personnel working in isolated or shift-based environments.

Impact: Stress, reduced alertness, and higher probability of accidents or procedural errors.

The overall significance of these OHS impacts during operation is expected to be low to moderate, provided that workers are adequately trained, maintenance is planned and supervised, and OHS procedures are consistently applied.

5.4.10 Community Health and Safety

5.4.10.1 Construction Phase

Community health and safety risks during the construction phase are mainly associated with the presence of heavy machinery, increased workforce, and temporary site operations across neighborhoods. The most significant potential risk arises from construction traffic and the shared use of access roads between local residents and heavy vehicles such as trucks and excavators. Details and specific mitigation measures for this aspect are provided under the following section on traffic and transportation.

Aside from traffic-related concerns, short-term community impacts may result from noise, dust, and emissions generated by excavation, material transport, and equipment operation, particularly near residential zones and farmland. These activities may cause temporary air quality deterioration and nuisance noise, potentially affecting vulnerable community members such as children, elderly people, or those with respiratory conditions. Those impacts have been assessed under the relevant headings in Section 5.3.

Localized soil and water contamination could occur if fuels, lubricants from machinery and site operations or waste and wastewater are improperly managed. Similarly, those impacts have been assessed under the relevant headings in Section 5.3. Moreover, a Waste Management Plan has been prepared and included in this ESMP as Annex-4.

In addition, the presence of existing natural gas transmission pipelines and associated facilities within or in close proximity to the Project area poses a potential community health and safety risk during construction activities. Excavation, heavy machinery operation, and pipeline

installation works conducted near these assets may increase the risk of pipeline damage, gas leakage, fire or explosion, which could result in serious harm to workers, nearby communities, and surrounding infrastructure if not properly managed and coordinated. Necessary mitigation measures have been included in Table 6-2.

The temporary concentration of workers during construction may increase the risk of communicable and water-related diseases, particularly if hygiene and sanitation facilities are not adequately maintained. Domestic water for construction personnel will be supplied either through subscription to the municipal water network or by licensed water tankers, ensuring that potable water meets national quality standards. Poor hygiene practices, wastewater mismanagement, or the use of contaminated water sources could lead to the spread of gastrointestinal illnesses and other infectious diseases among workers or nearby communities. To prevent such risks, the Contractor will implement strict hygiene protocols, provide clean drinking water and handwashing facilities, and ensure regular inspection and disinfection of water tanks and storage systems. Health awareness sessions will also be conducted to promote preventive behaviors such as proper waste disposal, personal hygiene, and early reporting of symptoms.

From a social perspective, potential gender-based violence (GBV), sexual exploitation and abuse/sexual harassment (SEA/SH), and community tension risks may arise due to the temporary influx of non-local workers. These risks are expected to remain low with the implementation of strict Code of Conduct (CoC) obligations, SEA/SH and GBV training, and an accessible Grievance Mechanism (GM) for community members. Separate and safe sanitation facilities for women and men, adequate lighting, and clear site signage will also contribute to minimizing security-related risks.

During the construction phase, emergency situations may arise from accidents, fires, natural events, or hazardous material spills. To minimize the potential health and safety impacts on both workers and nearby communities, the Contractor will prepare and implement an Emergency Preparedness and Response Plan (EPRP) in coordination with DSİ and local AFAD authorities. The plan will define clear communication channels, responsibilities, and procedures for evacuation, medical assistance, and incident reporting. Emergency contact information will be displayed visibly at all active work sites, and drills will be carried out periodically to ensure staff readiness. Spill control kits, first aid supplies, and fire extinguishers will be kept on-site and regularly inspected. All personnel will receive induction and refresher training on emergency procedures, ensuring rapid and organized response in the event of an incident.

Overall, the magnitude of potential community health and safety impacts during construction is low, localized, and temporary in nature, provided that the Project's management plans and awareness programs are properly implemented.

5.4.10.2 Operation Phase

During the operation phase, the Project is not expected to create significant risks for the surrounding communities. Occasional maintenance and inspection activities may lead to minor increases in vehicle traffic; however, these will be managed in line with this ESMP. The operation of the pressurized closed-pipe irrigation network eliminates risks of open-water accidents, vector breeding, or contamination associated with traditional irrigation canals.

Potential health and safety risks during operation may include minor leakage or rupture in pipelines leading to localized flooding or soil saturation, which could affect nearby farmland or

infrastructure. Regular inspection, pressure control, and emergency response procedures will mitigate such risks effectively.

No significant air, noise, or odor emissions are anticipated during operation. However, maintenance machinery and generators, if used periodically, may temporarily increase local noise and exhaust emissions. In addition, public safety measures such as fencing around valve chambers, warning signs, and restricted access to technical facilities will be maintained to prevent unauthorized entry or accidents.

During the operation phase, risks of waterborne or communicable diseases are considered minimal. Since the irrigation system will operate as a closed pressurized pipeline network, there will be no stagnant water areas where vectors such as mosquitoes could breed. Nonetheless, potential contamination risks could arise if leaks or ruptures occur in the irrigation system, leading to localized standing water. Regular inspection and timely repair of the pipelines will minimize such risks. The irrigation union will maintain coordination with the local public health authorities to ensure early detection and response in case of any outbreak related to irrigation activities.

The potential for community security risks, including harassment or misconduct by staff, remains negligible under the continued enforcement of the CoC and awareness measures.

During operation, emergencies may stem from pipeline failures, mechanical breakdowns, or natural hazards such as earthquakes or extreme weather events. The irrigation union, once established, will develop and maintain a site-specific Emergency Response Plan to manage such incidents. This plan will include protocols for rapid isolation of damaged sections of the network, coordination with DSİ and local emergency services, and communication with affected communities. Regular inspection and maintenance activities will be combined with periodic emergency drills to ensure preparedness. Emergency contact lists, access routes, and response equipment will be reviewed and updated annually. Prompt communication with local authorities and the public will ensure transparency and minimize disruption to community safety and agricultural activities.

Overall, community health, safety, and security risks during operation are assessed as low and manageable under proper maintenance and monitoring by DSİ and the assigned irrigation union.

5.4.11 Traffic and Transportation

5.4.11.1 Construction Phase

The construction phase of the Project will require the intensive use of heavy machinery and transport vehicles, including excavators, loaders, trucks and equipment carriers. These vehicles will operate across a network of asphalt roads, village roads, stabilized roads and agricultural access routes along with the irrigation route. Although the construction routes do not directly pass through the centers of nearby settlements, several pipeline alignments run along the outer boundaries of neighborhoods and in close proximity to scattered rural houses, agricultural facilities and small businesses. As a result, community–construction interface will be significant throughout the construction period.

The shared use of these routes by construction machinery and the local population, farmers accessing their fields, residents travelling between neighborhoods, and occasional regional traffic, may increase the likelihood of traffic accidents. The presence of slow-moving heavy

vehicles, restricted-width field roads, and limited visibility in certain segments can heighten collision risks, particularly during peak agricultural periods when road use intensifies. Temporary short-term road closures or partial lane blockages may occur during excavation activities, pipe-laying works, backfilling operations or material transport, potentially disrupting daily mobility and delaying access to essential services, including health care, especially in emergencies.

Long-term intensive use of asphalt and stabilized roads by construction vehicles may lead to pavement deterioration, rutting, pothole formation, and accelerated wear of road surfaces. On narrow agricultural routes, heavy trucks may damage road shoulders and create soil erosion along road margins. Although these impacts are expected to be localized and largely temporary and short-term, they may still alter accessibility patterns for nearby communities, restrict agricultural logistics, and reduce overall road safety. Considering the dispersed nature of construction sites, the multi-year duration of activities, and the seasonal intensification of rural mobility, proactive traffic and transport management will be essential to minimize community health and safety risks.

Since the heavy vehicle movements will be short-term and temporary in one location, the overall impact significance is determined as high to moderate without proper management activities, and the relevant mitigation measures are given in Table 6-2.

5.4.11.2 Operation Phase

During the operation phase, traffic and transportation-related risks are expected to be significantly lower compared to the construction period; however, certain routine activities may still generate localized impacts. The operation of the irrigation system will require periodic maintenance of pipelines, inspection of valve chambers, monitoring of pressure units, and repair of malfunctioning components. These tasks will involve the movement of light- and medium-sized vehicles, maintenance trucks, and technical teams across the same road network used during construction.

Although maintenance activities will occur intermittently, temporary access restrictions or short periods of slowed traffic may arise near pipeline alignments, especially in narrow agricultural roads and areas close to scattered houses or small agricultural facilities. Occasional increases in vehicle movements may coincide with seasonal agricultural traffic, potentially contributing to short-term congestion. In rare cases, emergency repairs such as the rapid response to a pipeline rupture or leakage may require immediate access by operational vehicles.

Road wear due to operational traffic is expected to be minimal; however, repeated access for maintenance along unpaved agricultural roads may lead to minor surface deterioration or rut formation. These impacts remain low in magnitude, spatially limited, and mostly reversible. With structured maintenance planning, proper signaling, and effective communication with local communities, traffic-related risks during operation can be managed to negligible levels. The relevant mitigation measures are given in Table 6-3.

5.4.12 Cultural Heritage

During the project design and route selection of the irrigation system, registered archaeological and historical sites, and protection areas were taken into consideration, and the irrigation pipeline alignment was revised several times based on the opinions obtained from the relevant cultural heritage conservation boards to ensure that these areas would not be adversely affected. The relevant opinion is provided in Annex-2.

The activities to be conducted during construction phase may cause direct potential impacts on the tangible and intangible cultural heritage receptors, if not properly managed. The key Project activities that may result in impact (direct or indirect) upon tangible and intangible cultural heritage receptors, during construction phase are summarised in Table 5-13.

Table 5-13. Impact Sources and Types on Tangible and Intangible Cultural Heritage Receptors

Description of Activity	Impact Type
• Removal of vegetation and/or trees • Installation of fencing • Traffic movements (vehicles and staff) • Topsoil stripping • Excavation and Filling • Siting of construction sites and other Project/ associated facilities • Piling • Landscaping/ earth-mounding • Waste disposal including excess excavated materials • Structures, installation features (pipes, valves, etc.) • Presence of workforce • Leaks and spills • Establishment of temporary stockpile areas. • Stockpiling of materials, topsoil and subsoil temporarily.	• Physical Impact • Visual Impact • Impact on Conservation-Use Balance

The activities to be conducted during construction phase may cause direct potential impacts on the cultural heritage receptors, if not properly managed. Potential impacts are direct damage or disturbance to cultural heritage resources. In addition to direct impacts, damage due to looting and interference may occur. Sites may suffer inadvertent damage or interference.

This can include:

- Physical damage of construction activities including from topsoil stripping, excavation, filling, etc.
- Physical damage of sites, including from vibration, equipment and heavy vehicles, and from spills and leaks,
- Noise and visual intrusion on people's appreciation of cultural heritage,
- Disruption of access to cultural heritage sites,
- Enhanced access to cultural heritage sites allowing increased opportunity to outside parties for collection of artefacts or damage to resources,
- Loss or change of identity or significance of the intangible cultural heritage,
- Effects of noise and visual intrusion on the ability of communities to appreciate and use their intangible cultural heritage,
- Disruption or diminution of cultural ecosystem services including customary ways of understanding the wider world and for maintaining social relations and group identity.

In addition to direct impacts, damage due to looting and interference may occur. Cultural heritage sites may suffer inadvertent damage or interference. There may be piecemeal illicit removal of portable antiquities from cultural heritage sites within the Project area.

After the construction works currently being carried out or to be carried out in the future on the existing cultural heritage sites and their surroundings, some negative impacts such as deterioration of the silhouette of the archaeological site and restriction of accessibility of visitors to the area(s) may also occur in terms of the visuality and accessibility of the cultural heritage sites. The Project will adopt proactive management of the potential Project impacts, prioritising avoidance where this is possible. In case avoidance is not possible, relevant archaeology and

cultural heritage management/mitigation measures will be taken in accordance with the national legislation, WB ESS8, and other applicable standards.

The Project does not propose to use the cultural heritage, including knowledge, innovations, or practices of local communities for commercial purposes (examples include, but are not limited to, commercialization of traditional medicinal knowledge or other sacred or traditional technique for processing plants, fibres, or metals). Assessment of the impact of the project on intangible cultural heritage has been conducted in the Project area and its vicinity in compliance with international standards and national legislation. Findings of the intangible cultural heritage studies conducted within the project are presented in Section 4.2.6 and Annex-3.

It is possible to encounter new cultural assets during the construction activities to be carried out at the Project area which will require intervention in the soil. Therefore, based on the obtained cultural heritage assessment study results, a project-specific Chance Find Procedure (CFP) has been prepared and presented in Annex-5. Cultural heritage specific preservation recommendations and measures should be systematically managed and implemented in accordance with the CFP.

During the operation phase, maintenance and repair works may require localized ground disturbance, such as small-scale excavations to address pipeline leaks or malfunctions. Although the alignment has already been revised in consultation with the Cultural Heritage Conservation Board to avoid registered archaeological sites, such activities may still pose a very low residual risk of encountering chance finds. These works are limited in scope, occur only within the existing right-of-way, and are not expected to affect the integrity of any known cultural heritage assets. Standard chance find procedures will continue to apply during all maintenance interventions.

The specific mitigation measures required to reduce the potential impacts which were mentioned above are described in Chapter 6.

6 MITIGATION MEASURES

In this section, mitigation measures for each of the potential impact/risk for pre-construction, construction and operation phases have been determined. The definitions of the pre-construction phase, construction phase and operation phase are as follows and the mitigation measures and the relevant monitoring actions in the next Monitoring and Evaluation (M&E) Chapter are determined as per these definitions:

- ***Pre-construction phase:*** This phase covers all preparatory activities before physical work begins. It includes finalizing the irrigation network design, route selection for the pressurized pipeline system, obtaining necessary permits and institutional clearances, conducting field surveys, baseline environmental and social assessments, stakeholder consultations, and preparing management plans (Environmental and Social Management Plan (ESMP), Labor Management Procedure (LMP), Stakeholder Engagement Plan (SEP)). Land access arrangements and contractor mobilization planning are also completed during this stage.
- ***Construction phase:*** This phase involves all on-site works, including on-site mobilization of the Contractor and land preparation activities, required to convert the existing open-channel system into a closed pressurized pipeline network. Typical activities include excavation along the designated corridors, pipe laying, installation of valves, chambers, and control structures, reinstatement of disturbed land, temporary material storage and transport, and the operation of quarries and borrow areas already licensed for use. Construction generates short-term, localized impacts such as dust, noise, traffic increase, and temporary access restrictions, all managed through site-specific mitigation measures.
- ***Operation phase:*** This phase begins once the new irrigation system is commissioned. Water is conveyed from the Sarımsaklı Dam to the agricultural area through the pressurized pipe system, allowing gravity, sprinkler, and drip irrigation over 8,865 hectares. Activities mainly include routine system operation, periodic maintenance and repair works within narrow corridors, monitoring of water use efficiency, and engagement with farmers on good irrigation and agro-chemical practices. Environmental and social impacts during this phase are minimal and mostly related to maintenance movements and potential agricultural runoff, both of which are addressed through ongoing management and awareness activities.

6.1 Pre-Construction Phase Mitigation Measures

The mitigation measures for the pre-construction phase which focuses on the permitting, documentation and planning are presented in Table 6-1.

Table 6-1. Mitigation Measures for Pre-construction Phase

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
PC-ESMS-01	Environmental and Social Management System	Lack of or inadequate presence of environmental and social management system Lack of project-specific E&S management plans/procedures Lack of permitting and approvals	Moderate	ESMP and other sub-management plans and procedures (Waste Management Plan (WMP), Traffic Management Plan (TMP), Occupational Health and Safety Management Plan (OHSMP), Emergency Preparedness and Response Plan (EPRP), Chance Find Procedure (CFP), etc.) will be prepared by the E&S Consultant and/or Contractor and approved by Project Management Team (PMT). All management plans will be informed to all workers immediately after the recruitment and repeated if necessary. The approved ESMP will be added into the bid documents and required to be implemented by the Contractors. An ESMS and GM together with the control and monitoring mechanisms will be established and implemented. Necessary responsible personnel in PMT, Contractor and Regional Directorate of DSİ will be assigned for tracking and monitoring of the ESMP implementation and compliance. The Contractor will employ at least a full-time OHS specialist, an environmental specialist, and a social specialist prior to the commencement of construction works. The Contractor will submit the CVs of specialists for approval. These specialists will be present at the site throughout the construction period. The Contractor will prepare and submit for approval (by PMT) and subsequently implement its Contractor ESMP (C-ESMP) and relevant sub-management plans and procedures. The C-ESMP will be submitted prior to the commencement of construction works and no construction activities will be carried out under the Project until approval of the C-ESMP. The C-ESMP will include at least the following site-specific management plans: • Occupational Health and Safety Management Plan (OHSMP) including Risk Assessment • Emergency Preparedness and Response Plan (EPRP) • Camp Site Management Plan (CSMP) or Worker Accommodation Plan (WAP) (whichever will be applied in the construction period) • Community Health and Safety (CHS) Management Plan	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: Project Management Team (PMT)

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				• Traffic Management Plan (TMP) • Waste Management Plan (WMP) (see Annex-4) • Chance Find Procedure (CFP) (see Annex-5) • Chemicals and Hazardous Materials Management Plan • Water Supply and Wastewater Management Plan • Labor Management Plan (LM Plan) including Code of Conduct (to be prepared in accordance with TWCEIP LMP) • Grievance Mechanism (GM) including pathways for SEA/SH complaints The Contractor will prepare a training program and provide training to all its workers, before they start working on site, on basic environmental, social, health and safety risks associated with the proposed construction works and the worker's responsibility. The training program will be repeated on three-monthly basis. The Contractor's training program will also cover topics related to Code of Conduct (CoC) such as sexual harassment (SH) particularly towards women and children, violence, including sexual and/or gender-based violence (GBV) and respectful attitudes while interacting with the local community. The Contractor will obtain the necessary permits and / or agreements regarding the land usage for the material storage areas and temporary construction site(s) depending on the ownership status of the land. In the event that the Contractor decides to use the DSİ-owned quarries, the Contractor will be responsible for obtaining the required permits and licenses, including the relevant Non-Sanitary Establishment/Gayri Sıhhi Müessese (GSM) license, and for operating the quarries in compliance with national legislation and international standards. Should any of these quarries be utilized under the Project, their use will be managed under the Contractor's ESMP (C-ESMP), ensuring compliance with the WB ESF (including supply chain and OHS/community health and safety requirements) and applicable national regulations. A permission/approval log will be created, and permissions will be tracked through this log. All necessary permissions/approvals (design approvals, land acquisition documentations, water usage permits, official views from the institutions, etc.) will be obtained before construction starts. An "EIA Exemption Letter" and "Environmental Permit Exemption Letter" official letters will be obtained from the relevant authority, where necessary (e.g., If a concrete plant is to be established by the contractor). A contract/agreement or protocol will be signed by the Contractor before the starting of the construction works with the KASKİ and Kayseri Metropolitan Municipality regarding waste and wastewater acceptance. In case Kayseri Advanced Biological WWTP is not suitable for wastewater disposal, Ebiç–Kızılırmak WWTP can be considered as an alternative. An agreement will be signed regarding Akın Excavation Soil Dumping Site for the disposal of excess excavated soil. The project will not be started before the necessary static calculations, ground survey studies, etc. related to the project design are completed.			
PC-ESMS-02	Environmental and Social Management System	Inadequate stakeholder engagement and lack of grievance mechanism establishment. The project's activities may result in adverse impacts that could cause nuisance and disturbance to the local communities. Inadequate Stakeholder Identification and Analysis can lead to conflicts and challenges later, resulting in delays or increased project costs.	Moderate	The Contractor will prepare and submit for approval (by PMT) and subsequently implement its Contractor ESMP (C-ESMP). The C ESMP should be submitted prior to the commencement of construction works and no construction activities will be carried out under the project until approval of the C-ESMP. The C-ESMP will include at least the following site-specific management plans: • OHS management plan including risk assessment and emergency preparedness and response plan • CHS management plan including traffic management plan • Waste management plan • Chance find procedure • Chemicals and hazardous materials management plan • Water supply and wastewater management plan • Labor management plan including Code of Conduct (to be prepared in accordance with TWCEIP LMP)	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				• GM including pathways for SEA/SH complaints. The Project's Stakeholder Engagement Plan (SEP) (see Chapter 9) will be implemented. The ESMP will be disclosed to all stakeholders and relevant public information meetings will be held. Temporary construction sites and material storage areas shall be managed by the Contractor in line with the ESMP to prevent environmental impacts (including waste, dust, noise, soil and water contamination and community health and safety risks), and any land access restrictions or livelihood impacts shall be avoided where possible or otherwise addressed in accordance with ESS5. SEP will be consulted with stakeholders ahead of project start, informing them about project and its potential environmental and social risks and impacts. The public will be notified about the upcoming works through printed and electronic media, as well as notifications posted in public places of the settlements located within the impact area. The scheduling of physical works on the scheme will ensure that irrigation service delivery is not interrupted during the season. The Project will inform farmers about the work schedule starting from August, and no later than September and / or October . Announcements will be provided at least two days in advance of any planned activities The Project will use of most preferred communication tools, including settlement-level WhatsApp groups, to disseminate information. Separate meetings will be organized specifically for women farmers. Village-level announcements will be conducted to reach farmers who do not use social media or WhatsApp, particularly elderly farmers. Stakeholder engagement activities will not be limited to information sharing; farmers' and villagers' local knowledge and experience will also be taken into account. The Project will explain farmers' rights, including land-related rights and entitlements, as part of stakeholder engagement activities. The Project will engage with the public on a continuous basis and address stakeholder requests and concerns. A grievance mechanism will be established and maintained in a transparent manner and will be easily accessible to local residents. In accordance with the SEP, separate grievance mechanisms will be defined for surrounding communities and relevant project stakeholders, as well as a dedicated grievance mechanism for project staff.			
PC-ESMS-03	Environmental and Social Management System	Lack of E&S team for managing environmental and social risks and impacts	**Moderate**	The Contractor will employ at least a full-time OHS specialist, an environmental specialist, and a social specialist prior to the commencement of construction works. The Contractor shall submit the CVs of specialists for approval. These specialists should be present at the site throughout the construction period.	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
PC-ESMS-04	Environmental and Social Management System	Lack of trainings of workers on environmental and social risks	Moderate	The Contractor will prepare a training program and provide training to all his workers, before they start working on site, on basic environmental, social, health and safety risks associated with the proposed construction works and the workers' responsibility. The training program shall be repeated on a monthly basis. The Contractor's monthly training program will also cover topics related to Code of Conduct such as sexual harassment particularly towards women and children, violence, including sexual and/or gender-based violence and respectful attitudes while interacting with the local community.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate
PC-ESMS-05	Labor and working conditions	Child labor, forced labor, discrimination, etc. Lack of OHS precautions, emergency prevention Inadequate accommodation conditions	Moderate	Develop and implement Contractor's Labor Management Plan (C-LMP) based on TWCEIP LMP including working conditions, fair treatment, non-discrimination, equal opportunity, vulnerable/disadvantaged individuals/workers, GBV, SEA/SH, prevention of child labor and forced labor according to TWCEIP's Labour Management Procedure (LMP), incl. Workers' GM. Workers will receive written contracts including job description, working hours, wages, rights and duties, code of conduct, etc. will be arranged according to TWCEIP's LMP.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate
PC-ESMS-06	Land acquisition	Prevention of physical and economic displacement and minimization of income loss for land owners, land users, and seasonal workers.	Moderate	Land requirements for each scheme shall become clear once the relevant designs for the schemes are finalized. For all areas requiring land acquisition, a Land Acquisition Plan (LAP)/Resettlement Plan (RP) (including Land Consolidation Works) shall be prepared in line with the ESS 5 standard of the World Bank and the LAPF prepared for the Project. Mitigation efforts should be made to address the loss of assets and livelihoods (in line with LAPF document) include the restoration of livelihoods to pre-project levels in accordance with ESS5. All users of lands (legal and informal) and their assets will be identified through a full census. In cases where informal users are identified, compensation for affected assets will be provided at replacement cost, in line with the requirements of ESS5. Land consolidation will be performed prior to modernization activities, thereby further decreasing the need for expropriation The Project will ensure that existing agricultural or irrigation activities are not disrupted, with the objective of preventing and/or minimizing loss of income for land owners/users and seasonal workers. In the event that treasury lands are used for temporary construction site or material storage area by the Contractor, any formal or informal land users will be identified in advance, and no physical or economic displacement will take place unless livelihood impacts are duly assessed and appropriate compensation and/or assistance measures are provided in accordance with ESS5 requirements of the WB. All formal and informal right holders and / or users in the relevant areas will be informed in advance about their eligibility and entitlements, including vulnerable groups defined in line with land acquisition.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
PC-OHS-01	Occupational Health and Safety	Inadequate precautions regarding the OHS before starting work including lack of OHS-related trainings, Personal Protective Equipment (PPE) embezzlement, risks assessments, etc.	High	Consultations, assessments and plans regarding OHS and labor management and working conditions will be made by the Contractor and shared with Regional Directorate and PMT to prevent or, if unavoidable, reduce to an acceptable level every potential risk factor prior to the construction activities. OHSMP including Risk Assessment and EPRP will be prepared by Contractor. During the preparation of Risk Assessment Report and EPRP, community health and safety risks and impacts will be included in the assessment and plan. All the staff will participate in training sessions which include grievance mechanism (GM), gender-based violence (GBV), sexual exploitation and abuse (SEA), sexual harassment (SH), code of conduct (CoC) immediately after the recruitment process.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
PC-CHS-01	Community Health and Safety (including security and traffic/transportation)	Traffic risks caused by roads closed without prior notice Discomfort due to increased dust and noise levels Conflicts that may arise between employees and community members due to deficiencies in employee training Unauthorized entry into the work area	High	The construction areas will be enclosed with a fence/curtain, etc. before the construction starts. Warning signs will be hung. A Community Health and Safety Management Plan and Traffic Management Plan (TMP) will be prepared by the Contractor. Security personnel will be assigned for control of the construction site access, where necessary. During the preparation of Risk Assessment Report and Emergency Preparedness and Response Plan to be prepared by the Contractor, community health and safety risks and impacts will be included in the assessment and plan.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
PC-NHP-01	Natural Hazard Potential / Seismicity	Lack of emergency precautions and emergency preparedness and response plan Lack of emergency trainings and drills Deficiencies in the Project design Non-compliance with the regulations	Moderate	Designs of the pipeline network will be made in accordance with the national legislations (Regulation on the Structures to be Built in Natural Disaster Areas). DSİ will ensure that an effective dam safety program is in place and that full-level inspections and assessments have been conducted and documented to the satisfaction of the Bank. For high-hazard cases involving significant or complex remedial work, DSİ will employ independent experts to oversee the process. An Emergency Action Plan will be prepared by Contractor for the construction of the Project. Emergency Action Plans including natural disaster risks (especially flood and inundation risks) will be prepared and work will not start until the measures in these plans are taken.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
PC-BIO-01	Baseline Biodiversity Screening and Habitat Verification	Lack of updated information on flora/fauna within the project footprint Unidentified sensitive or protected species Overlooked buffer requirements near Sultan Sazlığı NP or Hürmetçi Sazlığı Wetland	Moderate	Conduct a pre-construction biodiversity baseline survey along the irrigation network to confirm habitat type (Modified Habitat) and absence of critical species. Map and verify aerial distances to all nearby protected areas (Sultan Sazlığı, Hürmetçi Sazlığı, Erciyes IPA etc.). Define no-go buffer zones (≥ 50 m) around wetlands or natural drainage features. Integrate results into the ESMS and share with PMT before mobilization.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: Project Management Team

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
PC-BIO-02	Protected Areas and Ecological Connectivity Assessment	Potential indirect or cumulative impact on nearby protected areas Disturbance to ecological corridors linking agricultural drainage to wetlands	Moderate	Review satellite imagery and hydrological connectivity between the project area and protected wetlands. Confirm absence of flow diversion or drainage alteration toward Sultan Sazlığı or Hürmetçi Sazlığı. Maintain existing natural vegetation along canal edges as micro-corridors. Communicate results to DKMP Regional Branch prior to construction.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: Project Management Team
PC-BIO-03	Fauna Protection and Awareness	Accidental killing or disturbance of fauna (birds, amphibians, reptiles) during site clearance and equipment mobilization	Moderate	Conduct toolbox training on fauna protection, including species identification and reporting protocol. Prohibit hunting, trapping, or nest removal by workers. If active nests or dens are found, stop work and consult biodiversity specialist. Install temporary signs marking sensitive zones.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: Project Management Team (PMT)
PC-BIO-04	Vegetation Clearance and Topsoil Management	Uncontrolled vegetation removal or topsoil loss before construction Reduced potential for natural regeneration	Moderate	Limit vegetation removal to the minimum necessary working width. Strip and store topsoil separately for later re-use in site rehabilitation. Mark working boundaries clearly before clearance. Avoid machinery entry into adjacent agricultural plots or natural patches.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: Project Management Team (PMT)
PC-BIO-05	Engir Lake Natural Site – Strictly Protected Sensitive Area	Potential disturbance or encroachment within a legally protected zone	High	Clearly mark the boundaries of Engir Lake – Strictly Protected Sensitive Area before any site mobilization. Establish a no-work buffer zone around the boundary of the protected area. Coordinate with DKMP and obtain necessary clearance before any intervention near the lake. Include Engir Lake protection requirements in all construction contracts and environmental management plans.	Low	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: Project Management Team (PMT)

6.2 Construction Phase Mitigation Measures

The mitigation measures for the construction phase are presented in Table 6-2.

Table 6-2. Mitigation Measures for Construction Phase

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
CP-WRU-01	Water Resources and Use	Water use and utility Contamination risk of surface and groundwater resources Surface runoff and sediment deposition	Moderate	Comply with municipal procedures and obtain the required water allocation permit/subscription before connecting to the municipal water supply network. Provide bottled drinking water and ensure safe storage and distribution. Use water-efficient methods for dust suppression and avoid excessive or unnecessary water spraying and water use. Optimize dust suppression frequency based on weather conditions and avoid unnecessary water consumption during low-dust periods. Store fuels, oils, chemicals and construction materials on impermeable, bunded surfaces to prevent infiltration or runoff into water bodies. Implement spill prevention and response measures, including drip trays, designated refueling areas and spill kits at all work sites. Avoid construction activities during heavy rainfall where erosion or sediment transport risks increase. Implement the waste management plan/procedure properly Implement temporary stormwater drainage channels and ensure that runoff is directed away from excavation areas, stockpiles and watercourses. Install temporary sediment control measures (e.g., silt fences, straw bales, sediment traps) in excavation areas prone to runoff. Manage excavated soils properly and prevent loose material from entering irrigation channels, drainage lines, or water courses. Ensure wastewater and greywater generated at the construction site are collected and disposed of in accordance with local regulations. Schedule and coordinate construction works to avoid unnecessary disruption to existing irrigation flows and minimize temporary water access interruptions for farmers.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-SM-01	Soil Management	Loss of soil fertility due to improper topsoil stripping, storage or reinstatement Soil structure degradation and reduced productivity on agricultural lands Erosion and sediment transport risk during rainfall Localized soil compaction from machinery movement Temporary waterlogging in shallow groundwater areas when trenches remain open	Moderate	Strip, stockpile and reinstate topsoil separately from subsoil; prevent mixing through clear labeling and controlled storage. Limit temporary topsoil storage to ~1 week and stabilize stockpiles in designated locations away from drainage lines and irrigation ditches. Reuse excavated soil for backfilling and transport surplus to the licensed Akın Excavation Soil Dumping Site. Install sediment barriers (silt fences, straw bales) in erosion-prone zones and maintain them during rainfall events. Manage concrete debris from removed channel linings and transport to licensed facilities. Use only permitted quarries (Burunören B and C Quarries and Akın Borrow Pit) for sand–gravel; verify existing EIA-not-required permits. Keep trenches open for the minimum feasible duration in shallow groundwater zones; restore drainage continuity during works.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
		Soil contamination risk due to accidental fuel/oil leaks or improper handling of concrete debris		Prevent soil contamination by using drip pans under machinery, placing hazardous materials on impermeable secondary containment, and keeping spill kits on-site. Restrict heavy machinery movement to defined access strips to minimize compaction; avoid unnecessary passes over croplands.			
CP-AQM-01	Air Quality Management	Increase in dust and exhaust emissions near sensitive receptors Decrease in visibility affecting the road safety Increase in the pollutant concentrations in the air leading to air pollution	Moderate	Regular watering of unpaved roads, excavation areas, backfilling zones, and haul routes during dry and windy periods. Covering all trucks transporting loose materials (soil, sand, aggregates) and ensuring loads are not exceeded. Keeping vehicle speeds below 30 km/h on internal construction roads. Temporarily ceasing excavation/loading activities during strong winds when suppression is ineffective. Stabilizing or covering long-term soil stockpiles; avoiding stockpiling near sensitive receptors. Compacting exposed surfaces and completing backfilling as early as possible. Ensuring all construction vehicles and machinery have valid exhaust emission measurements and undergo regular maintenance. Using fuel-efficient and low-emission machinery compliant with national emission standards and good international practice. Enforcing a strict anti-idling policy (e.g., machinery not kept running unnecessarily; max. 3 minutes of idling). Optimizing haul routes to reduce travel distance and fuel use. Transport activities scheduled to avoid local peak traffic hours to reduce cumulative emissions. Using dust suppression (e.g., misting or water spraying) during loading/unloading and material transfer. Keeping aggregate stockpiles covered or dampened; using windbreaks where relevant. Locating construction camps, workshops, and storage areas downwind of settlements when possible. Maintaining all internal roads in stable condition to minimize dust generation. Providing PPE (dust masks) to workers engaged in high-dust activities. Daily inspections for visible dust, exhaust emissions, and effectiveness of dust suppression measures. Recording all air-quality-related activities in relevant logs/registers/forms. Implementing immediate corrective actions if fugitive dust is observed crossing site boundaries. Compliance with the ambient air quality limit values stipulated in Project Standards given in this ESMP. Conducting dust measurements by an authorized laboratory accordingly if any grievance regarding dust generation is received from the nearest receptors.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
CP-NVM-01	Noise and Vibration Management	Increase in noise and vibration levels near sensitive receptors	Moderate	Limit heavy machinery operation to daytime hours (07:00–19:00); night-time construction is prohibited. Use only machinery compliant with Turkish noise emission limits; maintain equipment regularly to minimize noise. Keep machinery and equipment in good working order by manufacturing maintenance procedures. Install acoustic enclosures around generators to reduce noise levels. Install temporary noise-reducing barriers (acoustic screens or soil breams) near sensitive receptors when necessary. Ensure all vehicles and machinery have working mufflers and exhaust silencers. Schedule the noisiest activities (rock breaking, concrete mixing, compaction) away from periods of high community activity. Implement vehicle speed limits (≤30 km/h) on access and farm roads to reduce rolling noise. Train operators on quiet operation techniques, including avoiding unnecessary idling and abrupt bucket drops. Avoid simultaneous operation of high-vibration machinery in the same work zone to prevent cumulative vibration peaks. Comply with applicable OHS legislation on occupational noise exposure and implement all required protective measures, including providing and enforcing the use of appropriate hearing protection for workers. Monitor vibration levels when working near residential buildings or cultural heritage assets (e.g., Kültepe–Kanesh Karum proximity areas). Avoid unnecessary use of alarms, horns and sirens. Schedule/Plan construction activities in consultation with nearby communities so that the noisiest activities are undertaken during periods that will result in the least disturbance. Conducting noise and/or vibration measurements by an authorized laboratory accordingly if any grievance regarding dust generation is received from the nearest receptors. Compliance with the environmental noise level limit values stipulated in Project Standards given in this ESMP.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-WM-01	Waste Management	Domestic solid waste generation from personnel Odor, littering and pest attraction if waste is not properly stored Visual pollution and fire risk from packaging waste Reduced recycling efficiency if materials are not segregated Soil and groundwater contamination risk from hazardous waste and materials Environmental and safety risks from batteries, accumulators, ELTs, WEEE and medical waste	Moderate	Apply the waste hierarchy in all waste management activities Implement the Waste Management Plan (WMP, given in Annex-4) properly. Provide regular training to all personnel on waste management and waste minimization. Collect all waste streams separately according to type and use clearly marked containers. Place dedicated collection bins/containers for each waste category on site. Store hazardous and non-hazardous waste separately in compliance with national regulations and international standards (including WB ESSs). Label all waste containers clearly with waste code, type, quantity, and storage date. Store all waste according to its physical and chemical characteristics to prevent incompatible reactions. Store hazardous waste in durable, closed containers placed on impermeable, bunded surfaces.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				Store waste oils only in impermeable, leak-proof, red-colored containers labeled “waste oil,” equipped with overfill prevention devices. Keep different categories of waste oils separate and prevent mixing. Ensure that waste oils, oily rags, oil filters, and similar maintenance materials are collected properly and never discharged to soil or water bodies. Maximize reuse, recycling, and recovery of generated waste. Send recyclable and recoverable waste to licensed recovery/recycling facilities using licensed vehicles. Segregate spent batteries and accumulators from general waste and deliver them to licensed collection points in accordance with national regulations. Maintain all waste records and tracking documents regularly and accurately. Send hazardous waste to licensed hazardous-waste management facilities and keep all transport receipts; complete required notifications in the MoEUCC system. Ensure that boxes/containers for hazardous and non-hazardous waste are properly positioned on site and used consistently. Conduct construction machinery maintenance only at authorized service centers; send any waste accumulators or end-of-life tires generated on-site to the temporary waste storage area for collection by licensed companies. Manage excavation waste by reusing it as backfilling material as much as possible. Transport surplus excavation waste to the Akın Excavation Soil Dumping Site and keep all transfer records. Strip and store topsoil and subsoil separately to prevent mixing or contamination. Limit stockpile heights to a maximum of 6 m for subsoil and 2 m for topsoil.			
CP-WWM-01	Wastewater Management	Contamination risk of surface and groundwater due to improper collection Leakage or uncontrolled discharge of domestic wastewater Improper handling of waste and hazardous materials	Moderate	Provide sufficient number of mobile toilets or impermeable septic tanks at active work sites and ensure their regular maintenance and cleaning. Prevent wastewater discharge into soil or surface water. Ensure all wastewater is collected in sealed systems. Transport collected wastewater to the nearest licensed WWTP (KASKİ Kayseri Advanced Biological WWTP or Ebiç–Kızılırmak WWTP) via licensed vacuum trucks, in accordance with permits obtained from relevant authorities. Keep record of wastewater collection, transport, and disposal activities, including truck logbooks and disposal receipts. Ensure temporary sanitary facilities are located away from drainage lines, irrigation channels, or surface waters to avoid overflow or leakage. Provide hygiene awareness training to workers on proper use of sanitary facilities. Implement WMP properly to prevent the risks arising from improper waste and hazardous materials.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
CP-NHP-01	Natural Hazard Potential	Potential injury to workers and damage to equipment or materials due to ground shaking during an earthquake Localized surface runoff and erosion after intense rainfall	Moderate	Ensure all construction works comply with the Turkish Building Earthquake Regulation and Regulation on Buildings to be Built in Disaster Areas Implement site-specific emergency preparedness and response procedures for seismic events and extreme weather conditions. Store heavy equipment, fuel, and materials on stable, level ground away from slopes or drainage channels. Conduct pre-construction hazard awareness training for workers, covering earthquake and heavy rainfall response. Monitor weather forecasts and suspend excavation or lifting activities during severe storms or heavy rain. Implement slope protection and temporary drainage measures at excavation and stockpile areas to minimize runoff and erosion. Maintain communication with local AFAD units for emergency coordination during natural events.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-BIO-01	Habitat Disturbance and Vegetation Loss	Removal or disturbance of vegetation during canal excavation and earthworks Soil compaction and topsoil loss Reduced regeneration potential of native vegetation after construction	Moderate	Clearly demarcate work boundaries and restrict construction activities to the designated corridor. Strip and store topsoil separately for later reuse during rehabilitation. Rehabilitate disturbed areas using native grass and shrub species. Stabilize canal banks using bioengineering techniques (e.g., jute mats, seeding) to prevent erosion.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-BIO-02	Noise, Vibration and Dust Impacts on Fauna	Disturbance of birds, amphibians, and small mammals due to construction noise and dust Temporary disruption of breeding and feeding behavior	Moderate	Maintain dust and noise levels below acceptable limits through regular watering, speed restrictions, and equipment maintenance. Avoid night works and heavy activities during the breeding season (April–July). Cover stockpiles and ensure regular dust suppression. Ensure noise level at the nearest receptor does not exceed 70 dB(A).	Negligible	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-BIO-03	Physical Impacts on Wildlife (Fauna)	Accidental injury or mortality of small mammals, reptiles, or amphibians due to vehicle movement Wildlife entering active construction zones	Moderate	Limit vehicle speed to 20-30 km/h within construction areas. Install temporary wildlife fencing to prevent fauna access to work zones. Provide training to all workers on the wildlife protection measures. Immediately report and record any injured or dead fauna to the DSİ Regional Directorate.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-BIO-04	Pollution and Contamination Risks (Fuel, Oil, Waste)	Soil and water contamination due to accidental fuel or oil spills Negative effects on flora and fauna from poor waste management practices	Moderate	Designate impermeable and bunded areas for fuel and chemical storage. Keep spill prevention kits at all refueling and maintenance sites. Implement proper temporary waste storage areas and dispose of waste in compliance with local regulations. Apply erosion and sediment control measures (silt fences, sediment traps) during rainfall events.	Negligible	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-BIO-05	Protection of Sensitive and Protected Areas	Potential disturbance to ecologically sensitive features (e.g., small drainage channels, temporary wetlands) Accidental encroachment on protected area boundaries	Moderate	Include all protected areas (e.g., Engir Lake Natural Site, Sultan Sazlığı National Park, Hürmetçi Sazlığı Wetland, Erciyes IPA) on construction maps and inform site personnel. Maintain a buffer zone from any protected or sensitive areas. Prohibit parking, refueling, or waste storage within buffer zones.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				Maintain regular coordination with the DKMP Regional Directorate.			
CP-BIO-06	Rehabilitation and Revegetation of Disturbed Areas	Exposed surfaces vulnerable to erosion after construction Fragmentation or loss of microhabitats	Moderate	Following construction, reapply topsoil and replant disturbed areas with native vegetation species. Preserve natural vegetation along canal edges where possible. Implement vegetative slope stabilization in erosion-prone areas.	Negligible	Included in Project Cost	Implementing: Contractor Environmental Team Supervising: PMT / DSİ Environmental Unit
CP-BIO-07	Protection of Engir Lake – Strictly Protected Sensitive Area	Risk of sedimentation, pollution, or disturbance in Engir Lake ecosystem	Moderate	No construction, equipment storage, or vehicle movement allowed within the strict protection zone of Engir Lake. Implement silt fences and drainage diversion channels to prevent sediment runoff toward the lake. Ensure supervision during all nearby construction activities.	Low	Included in Project Cost	Contractor, DSİ 12th Regional Directorate, PMT
CP-SOC-01	Disclosure and Stakeholder Engagement	Insufficient disclosure of project information can hinder effective communication and stakeholder engagement, leading to limited transparency and potential mistrust. Insufficient communication and engagement with stakeholders, including local communities, landowners, and relevant organizations, can result in misunderstandings, mistrust, and dissatisfaction. Inadequate consideration of stakeholder concerns, needs, and social dynamics can result in social disruptions, inequities, or negative impacts on the affected communities.	Moderate	Prior to project commencement,, the draft ESMP, RP, SEP and other relevant documents will be publicly disclosed and consulted upon, and information on the GM will be shared with the public Prior to the commencement of construction works, local communities and all relevant stakeholders will be informed about the planned activities and the mitigation measures to be implemented. The information on the start and finish dates of construction and working periods and the permits obtained from the government agencies will be shown by the settlements a signboard. SEP will be implemented, and GM will be operated. All activities, information meetings, opinions/suggestions, grievances, etc. provided during the construction period will be documented continuously Contractor is responsible to: Assign local liaison person to lead communication with and receiving requests / complaints from local population. Identify appropriate communication tools for language use other than Turkish. Consult local communities to identify and proactively manage potential conflicts between an external workforce and local people. Install banners with the name and contact information of contractor in visible locations around/along the work sites to ensure local communities can raise concerns and ask questions to contractor Raise awareness of local communities about any inconveniences they may experience and risks them may face due to presence of an external workforce in proximity to their settlements and works to be undertaken. Raise awareness of workers on overall relationship management with local population, establish the code of conduct in line with international practice and strictly enforce them, including the dismissal of workers and financial penalties of adequate scale.	Low	Included in Project Cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
CP-SOC-02	Vulnerable Groups	Construction zones can pose safety hazards to road users, including the presence of heavy machinery, loose debris, or uneven road surfaces, increasing the risk of accidents or damage to vehicles. Construction activities may result in temporary road closures or disruptions, limiting or restricting access for local communities, businesses, and transportation. Repair/maintenance works that may cause temporary disturbance may threaten public health. During the construction phase of the project, local communities or contractor personnel may face negative impacts related to ethical behavior and codes of conduct, as well as sexual exploitation and abuse/harassment.	Moderate	The use of access roads should be planned in a way that does not pose risks the travel safety of shuttle vehicles in villages with bussed training, and traffic measures (warning signs, speed limits, and information about settlements and schools for the periods when large and dangerous goods will be transported) should be taken. The grievance mechanism should be actively and efficiently operated. The blockages in the access roads shall be at minimum during the construction period and any blockage shall be planned prior to execution. An advance notice shall be given to the local representative (mukhtar and/or aza) including timing and point of blockage and an alternate route which to be used in case of emergency. Schedule works beyond irrigation season to the extent possible to avoid/minimize service disruption. Inform local population about construction and work schedules. Restricted vehicle movement to defined access routes and demarcated working areas to prevent excessive damage to vegetation and soil. Use noise-generating technologies between 08.00a.m-19.00 p.m. The community liaison officer should be introduced to the local community and updated information about the grievance mechanism should continue to be provided. Identify appropriate communication tools for language use other than Turkish. The Grievance Mechanism developed for all personnel working on site will be operational and grievances will be followed up. Procedure will be provided in case of grievance. Implementation of the C-LMP based on the TWCEIP LMP will be ensured.	Low	Included in Project Cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate
CP-SOC-03	Land Use and Resettlement and Land Acquisition	Improperly planned construction activities can result in land disturbance, including excavation, grading, and temporary storage of materials, which may cause damage to the adjacent land and its structures. Construction operations may limit or restrict landowners' access to their properties, potentially impacting their ability to carry out farming or other activities on the land. Construction activities may require the resettlement of communities living in the project area, leading to the displacement of families and disruption of their social structures. Improper rehabilitation measures can leave affected communities without adequate means to rebuild their lives or access comparable livelihood opportunities.	Moderate	Training will be provided to the construction personnel so that they maintain the pre-established construction boundaries. Implement Project Grievance Mechanism. If any complaints related to arable lands are received through the Grievance Mechanism, evaluate the complaint and where necessary plan and implement corrective actions. Contractor will ensure that necessary corrective measures are taken from its own budget, in case of direct or indirect damage caused by project activities to adjacent properties that are state-owned or private property All land acquisition activities including easement rights will be completed prior to the commencement of construction works. LAP/RP will be fully implemented, and all compensation payments will be made before the start of any physical works.. Land Acquisition Plan will be prepared based on TWCEIP 's LAPF. The Contractor will leave appropriate access gaps within the construction corridor, where technically feasible, to ensure farmers' passage to their agricultural lands and to minimize disruption to ongoing agricultural activities. The locations and design of these access gaps will be discussed with local farmers prior to construction, and their feedback will be taken into account during the detailed design and implementation process.	Low	Included in Project Cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate
CP-OHS-01	Inadequate OHS planning, risk assessment, or resource allocation	Neglect of OHS considerations, insufficient controls, or poor design may increase accident likelihood during construction	High	OHS considerations will be integrated into project planning and design. Site-specific risk assessments will be conducted before the commencement of construction activities. Adequate personnel, PPE, and safety tools will be provided. A full-time OHS Specialist, an Occupational Physician, and an Assistant Health Personnel will be assigned. OHS controls will be incorporated into design documents and method statements.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				OHS performance indicators (KPIs) will be established and regularly reported. Accident and near-miss records will be systematically maintained, and root cause analyses will be conducted to prevent recurrence. Implement OHS Plan. Conduct risk Assessment and implement the findings for mitigation measures. Prepare method statements including critical OHS risks. Implement Permit to Work System			
CP-OHS-02	Slips, trips, and falls	Minor to severe injuries; work stoppages	**High**	Maintain even and clean working surfaces. Install guardrails and barriers around excavations and elevated areas. Provide anti-slip footwear and reflective vests. Conduct regular housekeeping inspections.	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-03	Machinery and vehicle accidents	Serious injury or fatalities; equipment damage	**High**	Implement a traffic management plan Separate pedestrian and vehicle pathways. Install signage and use flagmen. Ensure trained operators and regular maintenance.	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-04	Exposure to dust and noise	Respiratory and hearing problems; fatigue	**High**	Apply dust suppression (water spraying). Maintain machinery. Provide PPE (masks, earplugs). Conduct periodic noise/dust monitoring.	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-05	Manual handling and lifting	Musculoskeletal disorders or strain injuries; lost workdays	**High**	Use lifting aids and equipment. Provide manual handling training. Rotate workers; limit repetitive tasks.	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-06	Electrical hazards	Electric shock, burns, fatalities	**High**	Inspect electrical systems regularly. Ensure grounding and insulation. Apply Lockout/Tagout procedures. Train authorized personnel only.	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-07	Confined space works	Oxygen deficiency, toxic gas exposure	**High**	Establish confined space entry permits. Ventilate and monitor gases. Keep rescue team ready. Train personnel.	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-08	Heat stress and dehydration	Fatigue, heat exhaustion	**Moderate**	Provide shaded areas and water. Schedule work in cooler hours. Train workers on symptoms.	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
CP-OHS-09	Poor housekeeping / site organization	Increased minor accidents	High	Maintain daily housekeeping. Keep access routes clear. Supervise waste collection. Conduct weekly inspections.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-10	Sanitation and hygiene	Spread of diseases	Moderate	Provide sufficient toilets and hygiene facilities. Conduct cleaning/disinfection. Maintain safe drinking water supply.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-11	Inadequate worker training and supervision	Accidents due to lack of knowledge and unsafe acts	High	Conduct mandatory OHS induction and periodic refresher training. Supervise new and unskilled workers closely. Implement disciplinary and reward system for safety compliance. Record attendance and evaluation results.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-OHS-12	Lack of emergency preparedness	Increased injury severity during incidents	High	Prepare site-specific Emergency Preparedness and Response Plan. Conduct fire, evacuation, and rescue drills regularly. Provide first-aid kits and trained personnel. Coordinate with local emergency services.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-CHS-01	Community Health and Safety	Health and safety risks to nearby residents due to construction traffic, noise, dust, and machinery operation	Moderate	Coordinate heavy vehicle movements and construction schedules to minimize disturbance; (please refer to Traffic and Transport section). Implement dust suppression, noise control, and emission reduction measures at all active sites. Maintain clear warning signs, fencing, and restricted zones around construction areas. Provide information to local communities about ongoing works, traffic routes, and safety precautions.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-CHS-02	Communicable and water-related diseases	Spread of infectious or waterborne diseases due to poor hygiene, inadequate sanitation, or unsafe water use	Moderate	Maintain clean and separate sanitation facilities for men and women. Inspect and disinfect water storage tanks regularly. Conduct hygiene awareness and health education sessions for workers. Enforce strict hygiene and sanitation protocols at work sites.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-CHS-03	GBV, SEA/SH	Social tension or safety risks arising from misconduct or harassment incidents	Moderate	Enforce the Code of Conduct for all personnel and subcontractors. Deliver SEA/SH and GBV training and awareness to all workers. Establish and publicize a Grievance Mechanism accessible to community members. Provide separate, well-lit sanitation areas and ensure privacy for women. Prohibit any form of harassment or discrimination on site.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-CHS-04	Emergency preparedness and response	Injuries, property damage, or community exposure in case of accidents, fire, or natural events	Moderate	Prepare and implement an Emergency Preparedness and Response Plan (EPRP) in coordination with DSİ and AFAD. Display emergency contact numbers and evacuation routes at all worksites. Conduct emergency drills and refresher training for all workers.	Low	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				Keep fire extinguishers, spill kits, and first aid materials on-site and inspect them regularly. Maintain direct communication with local emergency services. Coordinate all construction activities near natural gas pipelines with BOTAS field personnel in advance. Comply strictly with BOTAS-defined safety distances and buffer zones. Do not carry out excavation works within 30 m of the gas pipeline unless prior approval is obtained and protective measures are in place. Consult BOTAS before conducting any works within 200 m of the gas transmission line corridor. Apply special engineering designs and protective measures at gas pipeline crossings or where pipelines run in parallel. Ensure full compliance with the national Pipeline Technical Safety and Environmental Regulations. Train all relevant personnel on gas pipeline safety requirements and emergency procedures.			
CP-TM-01	Traffic Management	Risks to community members due to heavy vehicle movements, shared use of roads by residents and construction machinery, temporary road closures, reduced access to essential services, and road deterioration from intensive construction traffic.	**High**	Prepare and implement a Traffic Management Plan (TMP) (by the Contractor) covering access routes, transport schedules, signage, detours, and speed limits. Use designated routes and restrict construction vehicles to identified roads wherever feasible. Install warning signs, barriers, cones, and flagmen at active work sites, narrow sections, community-adjacent areas, and road-crossing points. Apply speed limits suitable for rural and agricultural roads (e.g., 20–30 km/h in community-adjacent sections). Coordinate heavy vehicle movements to avoid peak agricultural traffic periods when possible. Provide advance notice to nearby communities regarding temporary road closures, expected delays, or intensified construction activities. Ensure safe pedestrian and vehicle passages near scattered houses, agricultural facilities, and business areas located along pipeline routes. Monitor and promptly repair roads damaged by construction machinery to prevent potholes, rutting, and shoulder failure, if occurred. Ensure that all construction vehicles are well-maintained, equipped with reverse alarms, functioning lights, mirrors, and reflectors. Prohibit unauthorized access to construction zones and ensure proper fencing at dangerous areas. Conduct traffic safety meetings with relevant stakeholder and impacted community members	**Low**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-CHM-01	Cultural Heritage Management	Possible, physical and visual irreversible adverse effect on an registered cultural heritage sites within the Project Area (Table 4-5).	**Moderate**	No construction works will be undertaken within the official protection boundary of the archaeological site. An archaeologist will be included in the contractor team to oversee all mitigation measures and monitoring activities in relation to archaeological sites. In addition, the following measures concerning cultural heritage assets should be undertaken before the commencement of construction activities.	**Negligible**	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				The project proponent will officially notify the Kayseri Regional Council for the Conservation of Cultural Property regarding the revised project details to initiate the legal protection assessment process. All archaeological/cultural heritage sites located within the Project impact area will be identified as archaeologically sensitive areas in the Project construction plans and drawings. No ground-disturbing activities will be planned or implemented within the defined area before the official decision to be issued by the Kayseri Regional Council for the Conservation of Cultural Property. If any ground-disturbing activities are to take place in the vicinity of the defined sensitive area boundaries, daily archaeological monitoring will be implemented. In the event of any chance finds discovered during construction, the necessary salvage excavation and detailed documentation will be carried out in accordance with international best practice and the requirements of the Regional Council. Daily monitoring activities will be conducted near registered archaeological sites.			
CP-CHM-02	Cultural Heritage Management	The cultural heritage sites which are located outside the Project Area, within the AoI (Table 4-5) and its surrounding landscape could be visually impacted by the Project. Hence, any irreversible effect that can be caused by the project's related activities on the cultural heritage sites is not expected.	Low	No construction works will be undertaken within the official protection boundary of the archaeological site/s. In addition, the following measures concerning cultural heritage assets should be undertaken before the commencement of construction activities. All archaeological/ cultural heritage sites located within the project impact area will be identified as archaeologically sensitive areas in the project construction plans and drawings. If temporary access road construction or any construction related needs are required in the upcoming period, the cultural heritage sites must be considered in the planning phase of these possible construction activity.	Negligible	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-CHM-03	Cultural Heritage Management	Impact on the Conservation-Use Balance of Cultural Heritage (such as restricted access to cultural heritage due to project activities)	Low	Implement arrangements that facilitate access to archaeological sites (such as installing directional or warning signs within the construction area). Prevent construction works that may restrict access to archaeological sites, or to reduce them to acceptable levels. Daily monitoring activities should be conducted near registered archaeological sites. An archaeologist will be included in the contractor team to oversee all mitigation measures and monitoring activities in relation to archaeological sites.	Negligible	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
CP-CHM-04	Cultural Heritage Management	Risk of impact on potential unknown artefacts or chance find within and in the close proximity of the Project area	Low	Should unknown archaeological resources be encountered, these must be documented and notified in accordance with Turkish regulations (Law No: 2863) and will add to the country's heritage knowledge and databases. The Chance Find Procedure (given in Annex-5) will be communicated to all employees and implemented. Archaeological monitoring is required during ground-disturbing construction work. A precautionary approach following best practice must be employed to prevent damaging buried cultural heritage assets, chance finds. An archaeologist will be included in the contractor team to oversee all mitigation measures and monitoring activities in relation to archaeological sites.	Negligible	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

6.3 Operation Phase Mitigation Measures

The mitigation measures for the operation phase are presented in Table 6-3.

Table 6-3. Mitigation Measures for Operation Phase

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
OP-WRU-01	Water Resources and Use	Localized waterlogging and soil deterioration in case of pipeline leaks or valve malfunctions Potential contamination of surface or groundwater from accidental spills during maintenance Sediment transport or erosion around malfunction points or drainage discharge location indirect water quality impacts associated with agricultural return flows containing nutrients or agrochemicals	Moderate	Inspect the pressurized closed system regularly to identify leaks, faulty valves, or malfunction risks. Implement rapid leak detection and immediate repair protocols to prevent localized flooding and water wastage. Maintain valves, air-release units, chambers and pipe joints according to manufacturer and DSİ operational standards. Prevent chemical and fuel spills during maintenance by using spill kits, secondary containment and controlled work procedures. Stabilize erosion-prone areas around malfunction points, drainage outlets or discharge locations if needed. Provide awareness training to farmers on pesticide/fertilizer use and promote best irrigation practices to reduce agricultural return-flow pollution. Ensure that operational water use of the Project personnel is limited to drinking, utility and facility needs and apply water-efficiency measures where possible. Restrict maintenance activities requiring water (e.g., flushing) to as-needed cases only. Maintain and clean drainage channels and outlet structures regularly to prevent blockages that could contribute to localized flooding or erosion. Maintain an operational logbook documenting maintenance activities, water usage, leak events and corrective actions. Ensure the Sarımsaklı Dam is made safe in accordance with the related Dam Safety Report. Install warning signs around the Sarımsaklı Dam, including “GÖLETTE YÜZMEK YASAKTIR [SWIMMING IN THE DAM IS PROHIBITED]” and “SULAMA SUYUDUR, KESİNLİKLE İÇİLMEZ [THIS IS IRRIGATION WATER; STRICTLY NOT FOR DRINKING]”. Prepare an Emergency Preparedness Plan (EPP) for the operation phase of the Sarımsaklı Dam (by DSI 12th Regional Directorate of Irrigation Union), covering dam failure, flood risks, water contamination and related hazards.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-SM-01	Soil Management	Localized soil disturbance or compaction from maintenance vehicle access Minor temporary soil exposure during repair works Diffuse soil contamination risk from improper pesticide use by farmers	Moderate	Restrict maintenance vehicle movement to predefined access paths and minimize repeated passes. Limit ground disturbance by keeping repair works within narrow, pre-established corridor limits. Reinstate disturbed soil immediately after maintenance; level and compact lightly to restore surface stability. Provide awareness-raising sessions for farmers on appropriate pesticide and agro-chemical use through stakeholder engagement activities. Promote good agricultural practices to reduce chemical runoff into irrigation channels.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
OP-AQM-01	Air Quality Management	Increase in dust and exhaust emissions near sensitive receptors Decrease in visibility affecting the road safety Increase in the pollutant concentrations in the air leading to air pollution during maintenance and repair works	Low	Watering of unpaved access routes during maintenance periods if vehicle movement is intensive or occurs in dry/windy conditions. Ensuring maintenance vehicles comply with speed limits on service roads. Covering materials transported for repair works (pipes, backfill material, gravel, sand) to prevent dust dispersion. Restoring disturbed ground surfaces immediately after maintenance works (compacting, covering, or stabilizing temporarily exposed soil). Ensuring all maintenance vehicles and equipment have up-to-date emission inspections and proper servicing. Implementing an anti-idling rule during repair activities. Minimizing the number of trips to remote assets by planning maintenance shifts efficiently. Using electric or low-emission service vehicles where feasible (long-term improvement measure). Ensuring access roads used during operation remain well maintained and free of accumulated dust. Preventing soil disturbance during inspections and minor repair works unless necessary. For major repair works (e.g., pipeline replacement), applying construction-phase dust suppression measures identically. Keeping backfill, sand, gravel, or replacement pipe bedding material covered or dampened during maintenance mobilization. Avoiding long-term storage of loose material along irrigation routes. Periodic site inspections (monthly or quarterly, depending on operation plan) to ensure dust and emission risks remain low. Recording any complaints related to dust or exhaust in the GM system and responding with corrective actions. Scheduling maintenance activities causing dust near settlements during daytime hours and informing local communities in advance.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-NVM-01	Noise and Vibration Management	Increase in noise and vibration levels near sensitive receptors during maintenance and repair works	Low	Restrict routine maintenance works that generate noise (e.g., valve testing, flushing, pump inspections) to daylight hours. Ensure all operational vehicles used for patrols and inspections comply with noise emission standards and are maintained regularly. Install noise-absorbing covers or housings on valve chambers, flow-control structures, and any above-ground units producing tonal noise. Implement vegetation screening (shrubs/trees) around permanent structures located near sensitive receptors, when necessary. Avoid unnecessary idling of maintenance vehicles and generators. Ensure periodic inspections of valves, joints, air-release units and chambers to identify abnormal vibration sources in the pressurized system. Apply damping materials or elastomer supports on units that exhibit resonance during operation. Conduct vibration checks during peak irrigation periods to detect surge-related vibration along the pipeline. Prohibit use of high-vibration equipment for routine maintenance near households, farmland structures, or irrigation cooperatives.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
OP-WM-01	Waste Management *(maintenance and repair Works)*	Domestic solid waste generation from personnel Small quantities of packaging waste, recyclables and WEEE generated during maintenance and repair works Spent batteries and limited medical waste posing contamination risk if mismanaged Hazardous waste from periodic maintenance Limited excavation soil from pipeline repair works during maintenance and repair works Potential localized soil disturbance if surplus excavation is not properly disposed of	Low	Apply the waste hierarchy in all waste management activities Implement the Waste Management Plan (WMP, given in Annex-4) properly. Provide regular training to all personnel on waste management and waste minimization. Collect all waste streams separately according to type and use clearly marked containers. Place dedicated collection bins/containers for each waste category on site. Store hazardous and non-hazardous waste separately in compliance with national regulations and international standards (including WB ESSs). Label all waste containers clearly with waste code, type, quantity, and storage date. Store all waste according to its physical and chemical characteristics to prevent incompatible reactions. Store hazardous waste in durable, closed containers placed on impermeable, bunded surfaces. Store waste oils only in impermeable, leak-proof, red-colored containers labeled “waste oil,” equipped with overfill prevention devices. Keep different categories of waste oils separate and prevent mixing. Ensure that waste oils, oily rags, oil filters, and similar maintenance materials are collected properly and never discharged to soil or water bodies. Maximize reuse, recycling, and recovery of generated waste. Send recyclable and recoverable waste to licensed recovery/recycling facilities using licensed vehicles. Segregate spent batteries and accumulators from general waste and deliver them to licensed collection points in accordance with national regulations. Maintain all waste records and tracking documents regularly and accurately. Send hazardous waste to licensed hazardous-waste management facilities and keep all transport receipts; complete required notifications in the MoEUCC system. Ensure that boxes/containers for hazardous and non-hazardous waste are properly positioned on site and used consistently. Conduct construction machinery maintenance only at authorized service centers; send any waste accumulators or end-of-life tires generated on-site to the temporary waste storage area for collection by licensed companies. Manage excavation waste by reusing it as backfilling material as much as possible. Transport surplus excavation waste to the Akın Excavation Soil Dumping Site and keep all transfer records. Strip and store topsoil and subsoil separately to prevent mixing or contamination. Limit stockpile heights to a maximum of 6 m for subsoil and 2 m for topsoil.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-WWM-01	Wastewater Management	Localized contamination of soil or groundwater due to leakage or improper disposal of domestic wastewater generated by operation and maintenance personnel	Low	Ensure all office buildings of the Irrigation Union are connected to the municipal sewage system where available. Construct impermeable septic tanks only where connection to the sewage network is not feasible and ensure regular emptying by licensed vacuum trucks. Sign an agreement/protocol with KASKİ for the collection and disposal of wastewater to the licensed Kayseri Advanced Biological WWTP.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				Prohibit direct discharge of wastewater to soil, surface water, or drainage channels. Implement the WMP properly to prevent risks associated with improper handling of waste and hazardous materials during maintenance works. Maintain disposal records (e.g., vacuum truck receipts, coordination with KASKİ) for transparency and audit purposes. Conduct periodic inspections to ensure integrity of septic tanks and connections to prevent leakage.			Regional Directorate
OP-NHP-01	Natural Hazard Potential	Structural damage to irrigation network components (valve chambers, control structures, pipelines) due to seismic activity Minor erosion or drainage issues following extreme precipitation or drought	Low	Design, construct, and maintain all facilities in accordance with the Turkish Building Earthquake Regulation and the Regulation on Buildings to be Built in Disaster Areas Conduct regular inspection and maintenance of valve chambers, control structures, and pipelines to detect and repair any post-seismic leakage, displacement, or cracking. Maintain up-to-date emergency preparedness and response plans in coordination with DSİ and local AFAD authorities for the operation of the irrigation system. Inspect drainage systems and outfall channels periodically to ensure effective runoff management and prevent localized erosion. Record and report all seismic events or major natural occurrences affecting infrastructure to DSİ. Conduct training for irrigation union staff on emergency procedures and structural safety checks following an earthquake or severe weather event.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-BIO-01	Disturbance to Wildlife During Maintenance Works	Temporary disturbance to birds, amphibians, and reptiles due to maintenance or vegetation clearing along canals Potential destruction of nests or breeding sites if activities coincide with breeding season	Low	Schedule maintenance and vegetation clearing activities outside of breeding season (April–July). Avoid night-time or high-noise maintenance works. Retain partial vegetation along canals to maintain microhabitats for fauna. Conduct toolbox briefings for maintenance crews on biodiversity protection procedures.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-BIO-02	Vegetation Management and Habitat Integrity	Over-clearance of vegetation along canal banks leading to habitat fragmentation Loss of natural regeneration potential	Low	Apply selective vegetation management rather than full clearance. Avoid the use of chemical herbicides; use mechanical cleaning methods only. Encourage growth of native species that stabilize canal banks and provide ecological value.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-BIO-03	Wildlife Entrapment or Mortality	Small fauna (frogs, snakes, birds) falling into canals or being trapped during maintenance Accidental mortality due to lack of escape points	Low	Install escape ramps or ladders in representative sections of canals to allow fauna exit. Conduct regular visual inspections of canal stretches for trapped fauna, especially after rainfall. Report and document all fauna incidents in the Biodiversity Monitoring Logbook.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
OP-BIO-04	Pollution and Runoff Management	Contamination of nearby soils or drainage lines due to maintenance works (fuel leaks, cleaning water, waste materials)	Low	Store and handle fuels and chemicals on impermeable surfaces with secondary containment. Ensure all maintenance wastes are collected and properly disposed of through licensed companies. Prevent washing or discharge of oily/chemical residues into drainage lines.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-BIO-05	Long-Term Habitat Monitoring and DKMP Coordination	Undetected gradual habitat degradation along canal network Lack of coordination with regional conservation authorities (DKMP)	Moderate	Prepare annual biodiversity monitoring reports and submit to DSİ and DKMP, if requested. If any degradation or species mortality is observed, apply adaptive management measures (e.g., replanting, structural modification).	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-BIO-06	Long-term Protection of Engir Lake – Strictly Protected Sensitive Area	Risk of contamination from agricultural runoff or maintenance activities	Moderate	No use of agrochemicals, pesticides, or herbicides within the lake protection boundary. Regularly inspect canal discharges for signs of eutrophication or pollution. Include Engir Lake monitoring results in the Annual Biodiversity Report.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-SOC-01	Grievance Mechanism	Inadequate grievance mechanisms can lead to unresolved community concerns and grievances and escalate social tensions and conflicts within the community.	Moderate	Grievance mechanism will be established for OHS and Community Health and Safety issues in operation period. Updated information about the grievance mechanism will be provided permanently.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-OHS-01	Inadequate OHS management, planning or inspections during operation	Increased likelihood of accidents due to lack of supervision or preventive maintenance	High	The OHS Management System will be effectively implemented throughout the operation phase. OHS performance indicators (KPIs) will be developed and reported on a monthly basis. Records of occupational accidents and near-miss incidents will be regularly maintained. Root cause analyses will be carried out to prevent recurrence of incidents. OHS performance data will be incorporated into annual operational reports. Regular internal OHS audits will be conducted to ensure continuous improvement.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-OHS-02	Exposure to high-pressure systems	Cuts, bruises, or equipment damage	High	Depressurize before maintenance. Train personnel in safe valve operations. Inspect pipes, valves, and pumps regularly.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s)

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
				Install pressure-relief systems.			Supervising: DSİ 12th Regional Directorate
OP-OHS-03	Electrical hazards in pump/control rooms	Electric shock, burns, fatalities	High	Apply lockout/tagout system. Inspect electrical systems regularly. Maintain grounding and insulation. Post warning signs.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-OHS-04	Slip, trip, and fall hazards	Physical injury, loss of workdays	High	Ensure drainage, lighting, and clean floors. Use anti-slip coatings. Provide PPE (non-slip boots).	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-OHS-05	Confined space entry	Asphyxiation, toxic gas exposure	High	Apply confined space permits. Gas monitoring and ventilation. Maintain rescue plan. Train authorized personnel.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-OHS-06	Chemical exposure	Skin or respiratory irritation	High	Maintain MSDS for all substances. Store and label chemicals properly. Provide PPE and spill kits. Conduct annual health monitoring.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-OHS-07	Fire and explosion risks	Injury, equipment loss, downtime	High	Inspect electrical and fuel systems. Provide and maintain fire suppression systems. Conduct regular fire drills.	Low	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
OP-OHS-08	Inadequate training and health surveillance	Higher accident rates, undetected illness	**High**	Conduct pre-employment and annual medical checks. Provide refresher OHS training. Track worker competence and health data confidentially.	**Low**	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-OHS-09	Ergonomic risks	Musculoskeletal disorders	**Moderate**	Rotate tasks, provide ergonomic tools. Design maintenance platforms safely. Train workers on posture and movement.	**Low**	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-OHS-10	Psychosocial stress and fatigue	Mental fatigue, decreased concentration	**Moderate**	Apply fair shift rotation and adequate rest. Monitor workload and morale. Provide counseling or support mechanisms.	**Low**	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-CHS-01	Community health and safety	Risks to community members due to maintenance works, leakage, or pipeline rupture	**Low**	Prepare and implement Community Health and Safety Management Plan (CHSMP). Conduct regular inspection and maintenance of pipelines, valve chambers, and control structures. Repair leaks or damages immediately to prevent localized flooding or contamination as soon as possible. Maintain fencing, warning signs, and restricted access around operational facilities, where necessary. Inform nearby communities before any major maintenance activities that may affect access or safety. Manage operational vehicle movements in accordance with the Traffic and Transport section.	**Negligible**	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-CHS-02	Communicable and water-related diseases	Potential spread of waterborne or vector-related diseases from stagnant water or system leaks	**Low**	Monitor for stagnant water formation and eliminate it immediately. Inspect and maintain closed-pipe network to prevent leaks and ruptures. Coordinate with local health authorities for disease monitoring and response. Provide awareness to irrigation staff on hygiene, vector control, and early disease reporting.	**Negligible**	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate

No.	Issue	Potential Impact	Impact Significance Before Mitigation	Mitigation Measure	Impact Significance After Mitigation	Cost of Mitigation	Responsible Parties
OP-CHS-03	Community security and SEA/SH risks	Misconduct or harassment incidents by operational staff	Low	Prepare and implement Community Health and Safety Management Plan (CHSMP). Enforce the CoC for all operational personnel. Continue SEA/SH and GBV awareness and prevention training. Maintain a confidential and accessible Grievance Mechanism for community members. Ensure gender-sensitive communication and respectful interaction with all stakeholders.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-CHS-04	Emergency preparedness and response	Community exposure or infrastructure damage due to pipeline failure, mechanical breakdown, or natural hazard	Low	Develop and implement a site-specific Emergency Response Plan in coordination with DSİ and AFAD. Conduct periodic emergency drills and refresher training for operation staff. Maintain updated emergency contact lists, access routes, and communication procedures. Ensure availability and regular inspection of emergency response equipment. Report any major incidents promptly to DSİ and local authorities.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
OP-TM-01	Traffic Management	Short-term safety risks arising from maintenance vehicle movements, temporary access restrictions near scattered houses or agricultural facilities, and delayed access in emergency repair situations.	Low	Plan and schedule routine maintenance works to minimize disruption on agricultural and community-adjacent roads. Inform nearby residents before any significant maintenance activity that may temporarily restrict traffic flow or access. Use operational vehicles only on designated access roads; avoid unnecessary passage through sensitive areas and protected boundaries. Install temporary warning signage and cones during maintenance activities taking place near households, business facilities, or narrow field roads. Ensure that all operational vehicles are well-maintained and equipped with functioning signaling, lighting, and identification markings. Maintain an emergency access protocol for rapid but safe vehicle entry to respond to leaks, ruptures, or urgent infrastructure failures. Coordinate with DSİ and local authorities during emergency repairs to ensure road safety and proper community notification.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
CP-CHM-01	Chance Find during maintenance and repair works	Risk of impact on potential unknown artefacts or chance find within and in the close proximity of the Project area during the maintenance and repair works	Low	A precautionary approach following best practice must be employed to prevent damaging buried cultural heritage assets, chance finds. Should unknown archaeological resources be encountered, these must be documented in accordance with Turkish regulations (Law No: 2863) and will add to the country's heritage knowledge and databases. The Chance Find Procedure (given in Annex-5) will be communicated to all employees and implemented.	Negligible	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate

7 MONITORING AND EVALUATION

7.1 Pre-Construction Phase Monitoring & Evaluation (M&E) Plan

Monitoring actions, including monitoring parameters, key performance indicators (KPIs), methods, frequencies, costs and responsibilities for pre-construction phase is presented in Table 7-1.

Table 7-1. Monitoring and Evaluation Plan for Pre-construction Phase

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
MON-PC-ESMS-01	• Preparation and approval of ESMP and sub-management plans (WMP, CPF, Chemicals & Hazardous Materials Plan, Water Supply/Wastewater Plan, Labor Management Plan including Code of Conduct); • Assignment of required E&S personnel; • Establishment of ESMS and GM system; • Inclusion of ESMP in bid documents; • Training program schedule. • Permissions and approvals; • Agreements related to waste, wastewater, and excavation disposal.	• ESMP and all sub-plans prepared and approved prior to construction; • E&S team assigned; • GM established and functional; • All workers informed before mobilization. • All applicable permits and formal agreements obtained; • All plans prepared according to TWCEIP/ESF; • CoC training completed for workers.	• Review of ESMP package and approval letters; • Verification of personnel assignments; • Review of GM records; • Document control checks. • Review of permits, approvals, and agreements including material storage areas and temporary construction sites; • Document checks for all sub-plans; • Verification of training documentation.	Once prior to construction mobilization.	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-ESMS-02	• Stakeholder Engagement and Grievance Mechanism • Impacted Stakeholder Notification Process • Identification of stakeholders	• Number of public consultation meetings: at least 80% of the planned meetings. • At least one meeting per DVIG group in each district. • At least one meeting in each district with the participation of women farmers and women's cooperatives. • 100% of resolved grievance • Number of complaints received. • Number of complaints resolved within 30 days (target 70%).	• SEP implementation / public meetings and consultations records. • Existence of grievance records	Monthly compliance reports	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-ESMS-03	• Assignment of E&S team	• At least an OHS specialist • At least an Environmental specialist • At least a Social specialist	• CVs of specialists for approval	Throughout the construction period	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate
MON-PC-ESMS-04	• Workers' training on E&S risks	• 100% of site workers trained on E&S risks before starting work	• Training records, signed attendance sheets, training reports	Prior to commencement of site work	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate
MON-PC-ESMS-05	• Contractor firms will be responsible for preparing and implementing sub-project specific Labor Management Plans. They will be responsible for contracting and managing the labor force in accordance with the terms and conditions set out in the Labor Management Plans.	• Number of plans and revisions.	• Workers' Grievance mechanism	Prior to commencement of construction works and monitoring monthly, quarterly after approval of documents during construction phase	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate
MON-PC-ESMS-06	• Resettlement and Land Acquisition	• Number of engagement activities. • Number of complaints. • Expropriation process update.	• LAP/RP will be prepared.	Times specified in LAP/RP	Included in Project cost	Implementing: DSİ 12th Regional Directorate Supervising: PMT

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
		• Number of cases continuing and completed. • Number of lands taken with by consent. • Compensation paid. LAP/RP payments. • Records on harms and damages on the assets and compensations/repair				
MON-PC-OHS-01	• Absence of OHS Management System and Health & Safety Plan leading to increased future occupational risks	• Occupational Health and Safety Management should be established. • A comprehensive, site-specific Health and Safety Plan should be prepared prior to the commencement of construction activities.	• Site inspections and OHS audits	Before construction starts	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-OHS-02	• E&S team of the Contractor and related employment records	• Number of experts employed. • Suitability of experts for the task.	• Review and control of employment records	Preparation and approval of documents prior to commencement of construction works and weekly, monthly and quarterly after approval of documents during construction phase	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-CHS-01	• Traffic and community safety precautions; • Installation of warning signs; • Site entrance control measures; • CHSMP and TMP preparation.	• CHSMP and TMP prepared; • Warning signs installed (Target: 100%); • Controlled site access established.	• Site inspections; • Photographic evidence; • Review of CHSMP and TMP documents.	Once prior to site access establishment.	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-NHP-01	• Compliance of pipeline design with seismic and natural-hazard regulations; • Availability of Emergency Action Plan (EAP); hazard-related structural verifications.	• Design documents comply with national regulations; • EAP prepared before construction; • Independent expert involvement for high-hazard cases (if applicable).	• Design review; • Verification of EAP; • Review of engineering and structural assessments.	Once prior to construction.	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-BIO-01	• Presence of sensitive flora and fauna species within the project footprint	• Verified absence of critical or protected species before construction	• Field survey and visual inspection by qualified biodiversity expert • Review of updated DKMP species data and national red list records	Once before construction mobilization	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-BIO-02	• Distance and buffer zones to protected areas (Sultan Sazlığı NP, Hürmetçi Sazlığı Wetland, Erciyes IPA)	• Verified buffer zone distances (≥ 50 m) maintained around any sensitive area	• GIS verification and map review • Site boundary check and marking confirmation	Once before site works begin	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-BIO-03	• Vegetation clearance limits and topsoil management plan	• Work boundaries marked and topsoil stripping properly implemented	• Site inspection and photographic documentation • Verification of topsoil storage area	Continuous during initial site preparation	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-PC-BIO-04	• Biodiversity awareness and training activities for construction personnel	• % of workers trained on biodiversity protection procedures (Target: 100%)	• Review of training records and attendance sheets • Random field interviews with staff	Once prior to construction and for all new staff	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
MON-PC-BIO-05	• GIS confirmation of Engir Lake Natural Site (Strictly Protected Sensitive Area) boundary.	• 100% of no-work buffer correctly demarcated.	• GPS survey and visual marking verification.	Once before mobilization.	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT

7.2 Construction Phase Monitoring and Evaluation Plan

Monitoring actions, including monitoring parameters, key performance indicators (KPIs), methods, frequencies, costs and responsibilities for the construction phase is presented in Table 7-2

Table 7-2. Monitoring and Evaluation Plan for Construction Phase

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
MON-CP-WRU-01	• Daily water consumption for drinking, utility and dust suppression (m³/day) • Validity of water allocation permit/subscription • Availability and condition of spill kits, drip trays and secondary containment • Evidence of soil erosion and sediment movement in excavation areas • Condition and functionality of temporary stormwater drainage channels • Proper installation and maintenance of sediment-control structures (silt fences, straw bales, sediment traps) • Records of spills, leakages or uncontrolled discharges • Dust suppression frequency and water-use optimization	• Daily water use within planned limits (66.5 m³/day) • Number of spill kits available and maintained (100% availability) • Number of erosion/sedimentation cases observed • Number of spill incidents and response time (< 1 hour preferred) • Percentage of sediment-control structures functioning properly • Compliance with water allocation documentation (100%) • Number of grievances related to water resources, use and access interruptions	• Daily visual inspection of construction site, excavation areas, stockpiles and drainage lines • Review of monthly water consumption logs • Inspection of stormwater management systems and sediment barriers • Review of incident logs, spill reports and corrective action forms • Monitoring after heavy rainfall for erosion and sediment transport risks • Observation of dust suppression timing and efficiency	Daily site inspections Monthly review of water-use records After heavy rainfall, additional erosion/drainage inspection Monthly Environmental and Social Monitoring Reports (ESMRs) Immediate monitoring following spill or complaint	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-SM-01	• Topsoil stripping, stockpiling duration and reinstatement quality • Condition and placement of erosion/sediment barriers • Evidence of soil erosion, sediment displacement or blocked drainage • Machinery movement routes and compaction indicators • Records of spills, leakages, and contaminated soil removal • Proper disposal of concrete debris and excavated surplus • Use of permitted quarries and documentation of material sourcing	• Number of topsoil stripping and reinstatement records reviewed (100%) • Number of sites where topsoil storage duration is recorded (maximum 1 week) • Number of sediment-control structures inspected for functionality • Number of uncontrolled spill incidents recorded (Zero uncontrolled spills) • Number of spill kits available and maintained (100% spill kit availability) • Number of records confirming transport of surplus soil to licensed disposal sites (100%) • Number of inspections confirming use of permitted quarries only (100%) • Number of observations related to obstruction of drainage/irrigation channels (Zero long-term obstruction)	• Review of daily topsoil stripping and reinstatement logs • Inspection of stockpile areas and verification of topsoil storage duration • Visual inspection of sediment-control structures (e.g., silt fences, straw bales) • Review of spill incident logs, spill response records and spill kit checklists • Verification of surplus soil transport documents and disposal receipts • Review of quarry compliance documentation and material delivery records • Inspection of irrigation and drainage lines for soil obstruction	Daily site inspections for stockpiles, spill kits, irrigation obstruction checks Weekly soil management review After heavy rainfall: additional erosion/drainage inspections Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-AQM-01	• Dust suppression methods and records • Water spraying records • Related inspection records of the machinery and equipment • Compliance of air quality measurements results (if any)	• Number of vehicles, machinery and equipment and their maintenance records • Exhaust emission inspection results of vehicle • Number of air quality complaints received and resolved in time • Number of trainings on air quality, • Amount water used for dust suppression	• Visual observation at the site for the physical precautions • Review of the documentation (inspection records, dust suppression records, measurement reports, etc.) • Settled dust and PM_{10} measurements by accredited laboratories	Daily inspections for availability of the physical precautions Monthly for other parameters In case of grievance for measurements	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
MON-CP-NVM-01	• Noise levels near worksites and sensitive receptors • Equipment/machinery maintenance and inspection records • Worker PPE use (hearing protection) • Complaints related to noise and vibration • Records of vibration near structures, if applicable • Work-hour compliance	• Number of maintained vehicles/machinery with valid inspection records • Number of noise-related complaints received and resolved in time • Number of workers provided with appropriate hearing protection • Number of PPE compliance checks conducted • Percentage of works conducted within permitted hours (07:00–19:00) • Vibration exceedances recorded (if any)	• Visual observation at site for PPE use, machinery condition, and compliance with work hours • Review of documentation (machinery maintenance records, PPE records, complaint logs) • Noise measurements at selected points if complaints arise or sensitive receptors are nearby • Vibration checks for works conducted near buildings or heritage areas	Daily inspections for physical precautions and work-hour compliance Weekly review of maintenance and PPE records In case of grievance, targeted noise/vibration measurements Monthly summary monitoring for Key Performance Indicators (KPI) Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-WM-01	• Proper implementation of Waste Management Plan (WMP, Annex-4) • Availability and condition of waste collection bins/containers • Segregation of hazardous and non-hazardous waste • Labeling of containers (waste code, type, quantity, storage date) • Storage conditions of waste (impermeable surface, bunded area, closed containers) • Separate storage of different waste types and prevention of mixing • Condition and integrity of hazardous waste and material containers • Quantity of waste generated by type and destination (reuse/recycle/disposal) • Waste transfer records, licenses and receipts from authorized facilities • Training records on waste management and minimization • Condition of temporary waste storage areas and stockpile heights • Topsoil/subsoil segregation and reinstatement practices	• Number of waste bins/containers inspected (Target: 100% compliance with WMP) • Amount of waste segregated by type and recorded (Target: All waste streams properly segregated) • Number of hazardous and non-hazardous waste storage areas inspected (Target: 100% separate storage) • Percentage of containers properly labeled (Target: 100%) • Number of incidents of uncontrolled waste discharge (Target: 0) • Volume or tonnage of recyclable/recoverable waste sent to licensed facilities (Target: ≥ 90% of recyclable waste) • Number of hazardous waste consignments transferred with valid receipts (Target: 100%) • Number of personnel trained in waste management (Target: All relevant staff annually trained) • Height of excavation/topsoil stockpiles measured (Target: ≤ 6 m for subsoil, ≤ 2 m for topsoil) • Number of site audits or inspections completed (Target: As per schedule, 100%)	• Field inspection of waste storage and handling areas • Review of waste tracking records, manifests and transport receipts • Verification of labels, container condition and segregation status • Visual inspection of oil storage and spill-prevention systems • Review of training attendance logs and toolbox talk records • Check compliance with excavation and stockpile management requirements • Review of licensed company contracts and waste transfer documentation	Weekly inspection of waste storage areas; Monthly review of records; After any incident or non-compliance¶ Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-WWM-01	• Wastewater generation and disposal	• Number of mobile toilets and/or septic tanks in active use • Frequency of wastewater collection and transfer operations (number/month) • Number of wastewater disposal receipts/logbooks reviewed • Number of leakage, overflow, or discharge incidents recorded	• Routine inspection of sanitary facilities and septic tanks • Review of wastewater transport receipts and disposal documentation • On-site observation for leaks or improper discharges • Review of WMP compliance and site audit records	Weekly during construction After heavy rainfall, incident or complaint Monthly review of documentation	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
		• Number of non-compliances identified during WMP implementation audits • Number of worker or community complaints related to hygiene or odor		Monthly ESMRs		
MON-CP-NHP-01	• Seismic and meteorological hazard preparedness • Slope and drainage stability	• Number of emergency drills and hazard awareness trainings conducted • Number of site inspections for slope stability and erosion control • Number of incidents or near-miss cases related to natural hazards • Availability rate of emergency response equipment and communication tools on-site	• Review of training and drill records • Routine field inspections of slopes, drainage structures, and storage areas • Documentation review of emergency preparedness equipment inventories • Reporting of hazard-related incidents to DSİ	Weekly site inspections Prior to and after heavy rainfall events Quarterly review of emergency preparedness records After any regional seismic activity Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-BIO-01	• Areas where vegetation is cleared and topsoil is stored	• No exceedance of defined work boundaries • Topsoil properly stored in designated areas • Soil integrity maintained for future rehabilitation	• Daily site inspection and photo documentation • Review of topsoil management and rehabilitation checklist	Weekly inspections and continuous throughout construction Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-BIO-02	• Fauna movement and nesting/breeding areas	• No active nests or fauna detected within work zone • Immediate stop-work and notification in case of species detection • Zero wildlife mortality	• Visual observation and daily fauna checks • Worker reporting and site observation log • Completion of wildlife observation forms	Daily and before each work shift Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-BIO-03	• Noise and dust levels	• Noise level < 70 dB(A) • Dust emissions visually under control • Zero complaints recorded	• Weekly noise measurement with sound meter • Visual inspection for dust and review of complaint log • Verification of dust suppression frequency	Weekly monitoring and daily visual observation during dry periods Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-BIO-04	• Fuel, oil, and chemical leakage/spillage	• Zero spill or leakage events • 100% availability of spill kits on site • Proper hazardous waste storage in secondary containment	• Field inspection and equipment check • Review of waste storage and management areas • Review of incident/spill reports	Daily visual observation and monthly record review Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-BIO-05	• Buffer distance to protected areas (e.g., Sultan Sazlığı NP, Hürmetçi Sazlığı Wetland, Erciyes IPA)	• No encroachment within 50 m buffer zone • DKMP notified and report submitted	• GPS and map verification • Review of site reports submitted to DKMP	Monthly reporting and periodic site verification Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-BIO-06	• Post-construction rehabilitation and vegetation growth	• ≥80% vegetation cover achieved in rehabilitated areas • No erosion observed	• Site inspection and photographic documentation • Estimation of vegetation cover using visual assessment method	At 3rd, 6th, and 12th month after construction Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-SOC-01	• Disclosure of SEP • Implementation of GM	• Websites of MoAF, DSİ, TWCEIP • Local media ads (at least three local newspapers); and • Notifications to be sent to Mukhtars of settlements in the Basins, to be displayed in a public location in communities.	• Important developments and announcements about the project	Throughout construction period	Included in Project cost	Implementing: DSİ 12th Regional Directorate Supervising: PMT

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
		• Number of complaints received. • Number of complaints resolved within 30 days (target 70%). • Suitability of complaint opening and closing forms. • Satisfaction rate (target 70%).				
MON-CP-SOC-02	• Including vulnerable groups	• The elderly and the disabled (or those with additional accessibility needs), migrants, and individuals whose mother language is not Turkish and other disadvantaged/vulnerable groups which may be identified during the Project shall be addressed separately in the consultations. • Project 20 settlements, PAPs including vulnerable groups.	• Meeting records • Grievance records (number and nature), and analysis of • settled grievances • Internal and external audits	Throughout construction period	Included in Project cost	Implementing: Contractor & DSİ 12th Regional Directorate Supervising: PMT
MON-CP-SOC-03	• Documentation of land acquisition related activities	• Land Acquisition Plan will be prepared based on TWCEIP 's LAPF	• Websites of MoAF, DSİ, TWCEIP	Prior to construction	Included in Project cost	Implementing: DSİ 12th Regional Directorate Supervising: PMT
MON-CP-OHS-01	• Implementation of OHS measures and preventive actions • Use and condition of PPE • Housekeeping and site organization • Worker training and toolbox talks • Vehicle and machinery safety • Emergency preparedness and response arrangements • Sanitation and welfare facilities	• Number of incidents, near misses, and non-compliances • % of workers trained and using PPE • Frequency of emergency drills • Dust/noise levels within legal limits • Timely reporting and closure of corrective actions	• Site inspections and OHS audits • Review of accident/incident and near-miss reports • Worker interviews and safety meetings • Review of monitoring data (dust/noise) • Review of training and toolbox talk records	Daily site checks Weekly and monthly monitoring Quarterly audits and reviews Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-CHS-01	• Implementation of CHSMP • Condition of warning signs, fencing, restricted zones • Communication records with local residents on ongoing works	• 100% compliance with the CHSMP • % of required warning signs installed and maintained (target: 100%) • % of fenced / restricted zones properly secured (target: 100%) • Number of community information sessions conducted	• Site inspections and photographic records • Interviews with workers and nearby community representatives • Review of communication & grievance logs	Daily site checks Weekly community-related observations Monthly ESMRs Quarterly audits	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-CHS-02	• Sanitation and hygiene facilities (cleanliness, separation for men/women) • Water storage tank (if any) hygiene and disinfection • Worker hygiene awareness sessions conducted • Compliance with site hygiene protocols	• % of sanitation facilities functioning and clean (target: 100%) • Number of hygiene trainings/toolbox talks delivered • Number of infectious-disease related incidents (target: 0) • Compliance rate with sanitation protocols (target: 100%)	• Regular inspections of sanitation areas • Review of disinfection logs for water storage tanks (if any) • Review of training attendance sheets • Review of medical/incident records	Daily checks Weekly sanitation inspections Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-CHS-03	• Implementation of CoC • Records of GBV / SEA / SH trainings • Accessibility and functionality of Grievance Mechanism • Adequacy of separate and private facilities for women • Enforcement of zero-tolerance policies	• % of workers trained in GBV and SEA/SH (target: 100%) • Number of GBV and SEA/SH grievances (target: 0) • % of CoC acknowledgements signed (target: 100%) • Functionality of grievance channels	• Review of training records • Review of grievance mechanism logs • Review of CoC compliance reports	Monthly monitoring Quarterly audits Immediate review upon any reported incident Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-CHS-04	• Availability and condition of fire extinguishers, spill kits, first-aid kits	• Availability rate of emergency equipment on site (target: 100%)	• Site inspections and equipment checklists	Monthly inspections	Included in Project cost	Implementing: Contractor

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
	• Emergency contact numbers and evacuation route postings • Records of emergency drills • Communication procedures with local emergency services • Storage and inspection of emergency equipment	• Frequency of emergency drills (minimum quarterly) • % of workers trained in EPR (target: 100%) • Response time during drills (continual improvement)	• Review of emergency drill logs • Worker interviews • Review of EPR plan implementation records	Monthly ESMRs Quarterly emergency drills		Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-TM-01	• Implementation of TMP • Condition, visibility, and adequacy of traffic signage, barriers, cones, and flagmen • Compliance with designated routes and speed limits • Condition of community-adjacent roads and agricultural access routes • Community notifications regarding temporary road closures or delays • Vehicle maintenance status (lights, alarms, reflectors, brakes) • Road damage caused by construction traffic and repair records	• Number of traffic-related incidents, near-misses, and complaints (target: 0–low) • % compliance with routes and speed limits (target: 100%) • % of required warning signage and barriers installed and maintained (target: 100%) • Number of road segments repaired following damage by construction vehicles • Response time to community notifications (within required periods) • Number of non-compliances identified during site inspections	• Daily site inspections of active routes • Review of vehicle logs, speed monitoring records, and operator checklists • Review of TMP implementation records and signage/barrier inventories • Review of grievance mechanism entries related to traffic • Photographic documentation of road conditions	Daily checks (active construction points) Weekly monitoring of access routes Monthly ESMRs Immediate inspection following any traffic-related incident or grievance	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT
MON-CP-CHM-01	• Archaeological monitoring by the Contractor's archaeologist or archaeological consultant • Cultural heritage assets • Chance finds (implementation of CFP, Annex-5)	• Compliance with national legislative requirements: Reporting 100% of the number of cultural heritage findings throughout operation • No grievances regarding cultural heritage • Reporting / Notification/ Obtaining Permit of Chance Findings • Compliance with the CFP protocols in case of chance finds	• Archaeologists or cultural heritage monitoring consultants will be employed for daily archaeological monitoring during construction. • The experts will work with equipment operators and have authority to stop work. • They will accompany all ground disturbance activities. • They will instruct operators to stop work in case of a chance find. • The experts will train employees about the Cultural Heritage and Chance Finds • Grievance mechanism will be implemented • Daily Monitoring by an Archaeologist • The experts will implement the CFP	Continuous monitoring for archaeological sites by the archaeologist or the consultant Monthly review of grievances Monthly review of logs, chance find forms, etc. Immediate notification and reporting to regional board in case of chance finds Monthly ESMRs	Included in Project cost	Implementing: Contractor Supervising: DSİ 12th Regional Directorate & PMT

7.3 Operation Phase Monitoring and Evaluation Plan

Monitoring actions, including monitoring parameters, key performance indicators (KPIs), methods, frequencies, costs and responsibilities for the operation phase is presented in Table 7-3.

Table 7-3. Monitoring and Evaluation Plan for Operation Phase

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
MON-OP-WRU-01	• Daily potable and utility water consumption of irrigation union staff • System pressure readings and leak detection indicators • Number and condition of leaks, valve failures or pipeline malfunctions • Maintenance records for valves, chambers, joints, air-release units • Condition of drainage channels and outlet structures • Evidence of localized waterlogging or erosion • Records of accidental spills during maintenance • Calibration records of flow-control and pressure-regulating structures • Farmer feedback and grievance records regarding water quality or return flows • Emergency preparedness actions related to the Dam (signage, dam safety compliance, EPP implementation)	• Daily staff water use within expected limits (9.04 m³/day) • Number of leaks detected and repaired within acceptable timeframes • Number of drainage blockages identified and cleared • Completion rate of scheduled maintenance activities (100%) • Number of erosion/waterlogging cases at malfunction points • Availability of spill response equipment during maintenance (100%) • Number of farmer complaints regarding agricultural return-flow issues • Calibration frequency of flow-control structures (as per Operation & Maintanance (O&M) plan) • Compliance of Pond with Dam Safety Report requirements (100%)	• Routine inspection of pipeline, chambers, valves and control structures • Review of O&M logbooks, leak repair records and maintenance schedules • Field inspection following abnormal pressure readings or farmer complaints • Visual checks of drainage outlets and erosion-prone sites • Periodic verification of spill kit availability • Review of dam safety signage, EPP implementation and emergency readiness • Collection and assessment of farmer feedback	Routine inspections as per DSİ O&M schedule Monthly review of water-use and maintenance records Additional inspections following leak, spill or complaint Annual system performance assessment Seasonal inspection of Dam and related structures	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-SM-01	• Condition of maintenance access paths • Records of soil reinstatement following maintenance/repair works • Visual condition of restored surfaces (leveling, light compaction) • Farmer attendance and documentation of awareness-raising sessions • Farmer grievance records related to soil disturbance or chemical runoff	• Compliance with designated access paths (100%) • Reinstatement completed after each maintenance task (100%) • Number of farmer awareness sessions conducted • Number of farmer participants in awareness activities (increasing trend) • Number of grievances related to soil disturbance/chemical runoff (target: zero)	• Routine inspection of maintenance access paths and work zones • Review of maintenance logs and reinstatement records • Verification of farmer training attendance sheets • Review of grievance logs and follow-up actions	Routine inspections: As per the schedule After each maintenance/repair activity: reinstatement check Monthly: Review of maintenance logs and soil reinstatement records and grievances Annual: Review of overall soil management performance	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-AQM-01	• Dust suppression methods and records • Water spraying records (during maintenance and repair works) • Related inspection records of the machinery and equipment	• Number of vehicles, machinery and equipment and their maintenance records • Exhaust emission inspection results of vehicle	• Visual observation at the site for the physical precautions • Review of the documentation (inspection records, dust suppression records, measurement reports, etc.)	Daily inspections for availability of the physical precautions In case of grievance for measurements	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
	• Compliance of air quality measurements results (if any)	• Number of air quality complaints received and resolved in time • Number of trainings on air quality, • Amount water used for dust suppression	• Settled dust and PM10 measurements by accredited laboratories			
MON-OP-NVM-01	• Noise levels during routine maintenance works • Condition of valves, chambers, pressurized pipe units (vibration sources) • Inspection records of operational vehicles • Worker PPE use during high-noise maintenance activities • Noise/vibration-related complaints from farmers or nearby residents	• Number of operational vehicles with valid exhaust/noise inspection results • Number of noise/vibration-related complaints resolved in time • Number of maintenance activities conducted within permitted hours • Number of workers equipped with hearing protection during maintenance tasks • Vibration abnormalities recorded during system inspections	• Visual observation during maintenance activities for noise and vibration risks • Review of documentation (maintenance records, complaint logs, vehicle inspection records) • Noise measurements performed by accredited laboratories if recurring grievances occur • Vibration inspection of valves, chambers, joints, and air-release units during periodic maintenance	Routine maintenance inspections (according to DSİ schedule) Monthly review of maintenance and complaint records In case of grievance, targeted noise/vibration measurement Annual evaluation of operational noise/vibration risks	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-WM-01	• Proper implementation of Waste Management Plan (WMP, Annex-4) • Availability and condition of waste collection bins/containers • Segregation of hazardous and non-hazardous waste • Labeling of containers (waste code, type, quantity, storage date) • Storage conditions of waste (impermeable surface, bunded area, closed containers) • Separate storage of different waste types and prevention of mixing • Condition and integrity of hazardous waste and material containers • Quantity of waste generated by type and destination (reuse/recycle/disposal) • Waste transfer records, licenses and receipts from authorized facilities • Training records on waste management and minimization • Condition of temporary waste storage areas and stockpile heights • Topsoil/subsoil segregation and reinstatement practices	• Number of waste bins/containers inspected (Target: 100% compliance with WMP) • Amount of waste segregated by type and recorded (Target: All waste streams properly segregated) • Number of hazardous and non-hazardous waste storage areas inspected (Target: 100% separate storage) • Percentage of containers properly labeled (Target: 100%) • Number of incidents of uncontrolled waste discharge (Target: 0) • Volume or tonnage of recyclable/recoverable waste sent to licensed facilities (Target: ≥ 90% of recyclable waste) • Number of hazardous waste consignments transferred with valid receipts (Target: 100%) • Number of personnel trained in waste management (Target: All relevant staff annually trained) • Height of excavation/topsoil stockpiles measured (Target: ≤ 6 m for subsoil, ≤ 2 m for topsoil) • Number of site audits or inspections completed (Target: As per schedule, 100%)	• Field inspection of waste storage and handling areas • Review of waste tracking records, manifests and transport receipts • Verification of labels, container condition and segregation status • Visual inspection of oil storage and spill-prevention systems • Review of training attendance logs and toolbox talk records • Check compliance with excavation and stockpile management requirements • Review of licensed company contracts and waste transfer documentation	Monthly inspection of waste storage areas; Quarterly review of records; After any incident or non-compliance¶	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-WWM-01	• Wastewater generation and disposal	• Number of office and maintenance locations connected to the municipal sewage system	• Routine inspection of office and maintenance facilities	Monthly during operation	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s)

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
		• Number of impermeable septic tanks constructed and in service • Frequency of wastewater collection and transfer operations (number/month) if septic tank of mobile toilet are in use • Number of wastewater disposal receipts/logbooks reviewed if septic tank of mobile toilet are in use • Percentage of septic tanks inspected and found leak-free if septic tank of mobile toilet are in use • Number of non-compliances identified during wastewater management audits	• Review of wastewater collection and disposal receipts/logbooks • Visual inspection for leaks, overflow, or improper discharge • Review of O&M records	After maintenance or repair activities Following any complaint or incident Annual performance review		Supervising: DSİ 12th Regional Directorate
MON-OP-NHP-01	• Seismic activity, structural integrity, and drainage performance	• Number of post-seismic inspections conducted and reports submitted • Percentage of valve chambers, control structures, and pipelines inspected after major rainfall or earthquake • Number of drainage and outfall channels inspected and maintained annually • Number of seismic or weather-related incidents recorded and resolved • Availability rate of emergency response and communication equipment • Percentage of staff trained on earthquake and emergency response procedures	• Review of O&M inspection and maintenance logs • Field verification of structural integrity after seismic or extreme weather events • Review of emergency drill and training records • Coordination with AFAD and DSİ records regarding regional seismic activity • Visual inspection of drainage and outfall efficiency	Routine inspections as per O&M plan After any regional earthquake or severe weather event Semi-annual review of emergency preparedness and training Annual performance assessment of drainage and infrastructure	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-BIO-01	• Presence and activity of fauna species (birds, amphibians, reptiles, small mammals) in and around the irrigation canals	• Stable or increased number of fauna observations compared to baseline • No fauna mortality recorded due to canal entrapment	• Regular fauna monitoring by visual survey • Review of maintenance logs for wildlife encounters • Use of photographic documentation and fauna record forms	Seasonally (spring and autumn)	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-BIO-02	• Vegetation cover and habitat condition along canal edges	• Vegetation maintained at natural density (≥70%) • No evidence of excessive clearing or erosion • Erosion control measures functional	• Field inspection along canals • Photographic comparison with baseline condition • Evaluation of erosion and vegetation regeneration areas	Biannual (twice a year)	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-BIO-03	• Functionality of fauna escape ramps and protective fencing	• ≥90% of fauna ramps and fences functional • No fauna mortality within drainage or canal sections	• On-site inspection during maintenance rounds • Photo records and maintenance checklist • Event recording if fauna found trapped or injured	Quarterly inspections	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-BIO-04	• Pollution risk and chemical use along canal routes	• No unauthorized chemical/herbicide use • Waste and oil spill incidents = 0	• Field inspections of maintenance areas	Continuous during operation	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s)

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
			• Review of waste management and spill records • Immediate response in case of pollution observation			Supervising: DSİ 12th Regional Directorate
MON-OP-SOC-01	• Grievance Mechanism	• Number of complaints received. • Number of complaints resolved within 30 days (target 70%). • Suitability of complaint opening and closing forms. • Satisfaction rate (target 70%).	• Grievance records (number and nature), and analysis of settled grievances • Internal and external audits	Weekly, monthly and quarterly during operation phase	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-OHS-01	• Implementation of OHS Management System and preventive measures • Functionality and maintenance of safety equipment and systems (electrical, mechanical, fire, confined space, PPE) • OHS training, health surveillance and medical checks • Emergency preparedness (EPRP implementation and fire drills) • Sanitation and welfare conditions	• Number of incidents, near misses, and corrective actions completed • % of workers trained and medically examined annually • Frequency of OHS audits and fire/emergency drills • % of maintained safety systems and equipment • % of confined space entries under valid permits • % of compliance with PPE use and housekeeping standards	• Regular site inspections and internal OHS audits • Review of OHS records, incident reports, and training attendance • Worker interviews and toolbox talks • Review of maintenance, medical, and fire safety records • Emergency drill observations	Daily and weekly site checks Monthly OHS monitoring and reporting Quarterly internal audits and reviews Annual training and medical surveillance	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-CHS-01	• Condition of pipelines, valve chambers, and control structures • Repair response time for leaks or damages • Status of fencing, warning signs, and restricted operational zones (if any) • Records of community notifications before major maintenance • Operational (maintenance and repair) vehicle movements along designated routes	• Number of leaks/ruptures detected and repaired (target: immediate action) • % of pipeline inspections completed on schedule (target: 100%) • % of warning signs/fencing maintained (target: 100%) • Number of community complaints (target: 0–low) • Number of community notifications before major works	• Routine field inspections & photographic records • Review of pipeline condition and maintenance logs • Review of community communication records • Review of operational vehicle movement logs • Interviews with irrigation union staff	Monthly site observations Monthly ESMRs Additional inspections after major maintenance activities	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-CHS-02	• Presence of stagnant water in operational structures • Condition and integrity of closed-pipe network • Coordination records with local health authorities • Hygiene and vector-control awareness activities for irrigation staff	• Number of stagnant-water occurrences eliminated (target: no stagnant-water occurrences) • % of pipeline network inspected (target: 100%) • Number of joint disease-monitoring actions with health authorities • Number of awareness sessions held annually • Number of disease-related incidents reported (target: 0)	• On-site inspections of operational structures • Review of maintenance logs for closed-pipe network • Consultation records with health authorities • Review of training and awareness session attendance • Review of incident/disease reports	Monthly inspections Monthly ESMRs Annually coordination with health authorities	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-CHS-03	• Implementation of CoC by operational staff	• % of operational staff who signed and follow CoC (target: 100%)	• Review of CoC compliance checklists	Monthly monitoring	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s)

Issue	Parameters to be monitored	Key Performance Indicators (KPIs) to be monitored	Monitoring Method	Timing/Frequency of Monitoring	Cost of Monitoring	Responsible Parties
	• SEA/SH and GBV prevention training records • Functionality and confidentiality of Grievance Mechanism • Respectful and gender-sensitive communication practices with farmers • Any reported incidents of misconduct or harassment	• % of staff trained on SEA/SH & GBV (target: 100%) • Number of SEA/SH-related grievances (target: 0) • Number of grievances closed in a timely manner (100%)	• Review of grievance mechanism logs • Training records • Community feedback • Review of training attendance records	Quarterly audits Immediate review upon any reported SEA/SH grievance		Supervising: DSİ 12th Regional Directorate
MON-OP-CHS-04	• Status and condition of emergency response equipment • Emergency contact lists, access routes, and communication procedures • Records of emergency drills and refresher trainings • Reporting system for major incidents • Coordination with DSİ and AFAD for emergency readiness	• % of emergency equipment available and functional (target: 100%) • Frequency of emergency drills (target: at least annually) • % of staff trained in EPR (target: 100%) • Incident reporting time (continuous improvement) • Number of major incidents reported to DSİ/local authorities	• Equipment checklists • Review of emergency drill logs • Review of updated emergency contact lists • Review of incident report records	Quarterly inspections Annual emergency drills Immediate reporting after major incidents	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-TM-01	• Vehicle movements during routine maintenance activities • Adequacy of temporary warning signage during maintenance works • Community notifications prior to access restrictions • Vehicle maintenance and safety compliance for operational fleets • Implementation of emergency access protocol during urgent repairs	• Number of operation-related traffic incidents or complaints (target: 0) • % of maintenance activities with appropriate signage and barriers (target: 100%) • Timeliness of community notifications prior to maintenance works • % of operational vehicles with up-to-date maintenance checks (target: 100%) • Emergency response access time (continuous improvement)	• Routine inspections of maintenance routes and work areas • Review of maintenance logs and vehicle inspection records • Review of community communication and notification records • Review of emergency intervention logs	Monthly or quarterly checks depending on maintenance schedule Monthly ESMRs Immediate review following emergency repairs	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate
MON-OP-CHM-01	• Chance finds during major maintenance and repair works	• Reporting / Notification/ Obtaining Permit of Chance Findings • Compliance with the CFP protocols in case of chance finds	• Archaeologists or cultural heritage monitoring consultants will be employed for daily archaeological monitoring during major maintenance and repair works. • The experts will work with equipment operators and have authority to stop work. • They will accompany all ground disturbance activities. • They will instruct operators to stop work in case of a chance find. • The experts will train employees about the Cultural Heritage and Chance Finds • Grievance mechanism will be implemented • Daily Monitoring by an Archaeologist • The experts will implement the CFP	Continuous monitoring for archaeological sites Monthly review of grievances Monthly review of logs, chance find forms, etc. Immediate notification and reporting to regional board in case of chance finds	Included in operation costs	Implementing: Assigned Sarımsaklı Irrigation Union(s) Supervising: DSİ 12th Regional Directorate

8 IMPLEMENTATION ARRANGEMENTS, CAPACITY BUILDING AND TRAINING

8.1 Roles and Responsibilities

Implementation of the ESMP for the Project will follow the institutional structure defined under the TWCEIP. Roles and responsibilities across DSİ, PMT, the Regional Directorate, the Contractor and the E&S Consultant are summarized in below sections.

8.1.1 DSİ Project Management Team (PMT)

As the central coordination body under TWCEIP, the Project Management Team (PMT) holds overall responsibility for ensuring compliance with the Environmental and Social Framework (ESF) and the framework instruments (ESMF, LMP, SEP, Environmental and Social Commitment Plan (ESCP), Resettlement Framework (RF)) of the TWCEIP. Its key duties include:

- Reviewing and approving sub-project–specific ESMPs, LMPs, SEPs and their updates.
- Consolidating monitoring data submitted by Regional Directorates and preparing Quarterly Project Progress Reports for the World Bank.
- Reporting any significant environmental, social, health or safety incident to the World Bank within 48 hours and submitting the incident investigation report, including the root cause analysis and corrective action plan, within 30 business days.
- Initial reporting occupational accident(s) notified by the Regional Directorate to the World Bank within 24 hours of the occurrence of the accident, and detailed follow-up notification within 72 hours. Accident investigation reporting within 10 days of the incident.
- Managing the grievance mechanism at national level and monitoring resolution of grievances.
- Verifying compliance with ESF and ESMP requirements and coordinating with government authorities when needed.
- Ensuring that PMT includes qualified Environmental and Social Specialists who review and validate monitoring data before submission to the World Bank.

8.1.2 DSİ 12th Regional Directorate

The Regional Directorate (DSİ 12th Regional Directorate) is responsible for oversight of ESMP implementation. Its duties include:

- Supervising construction works and ensuring that all mitigation measures defined in the ESMP are applied on site.
- Reviewing and validating weekly and monthly Environmental and Social Monitoring Reports (ESMRs) submitted by the Contractor.
- Conducting regular field inspections and ensuring that required corrective actions are implemented in a timely manner.
- Submitting consolidated Monitoring Compliance Note to the PMT.
- Managing the Project's grievance mechanism at local level and ensuring coordination with PMT for reporting.
- Supporting the preparation and disclosure of project-specific ESF instruments prior to construction.

- Initial reporting/notifying occupational accident(s) notified by the Contractor to the PMT within 24 hours of the occurrence of the accident, and detailed follow-up notification within 72 hours.

8.1.3 Contractor

The Contractor is the primary responsible party for implementing all environmental, social, health and safety requirements and this ESMP on site. Its responsibilities include:

- Preparing a Contractor ESMP (C-ESMP) and site-specific sub-management plans as listed in the mitigation measures section (e.g., Waste Management Plan, OHS Plan, Emergency Preparedness and Response Plan, Community Health and Safety Plan, Traffic Management Plan, etc.) and submitting them to the Regional Directorate for review and PMT for approval.
- Employing at least one Environmental Expert, one Social Expert, and one full-time OHS Expert.
- Employing an archaeologist or procuring specialized archaeological consulting services, as required.
- Implementing all mitigation and monitoring measures defined in the ESMP and sub-management plans.
- Preparing weekly and monthly ESMRs and submitting them to the Regional Directorate.
- Maintaining daily compliance checklists and ESHS records.
- Promptly notifying the Regional Directorate of any environmental, social or OHS incident and maintaining an incident register on site.
- Reporting/Notifying occupational accident(s) within three (3) working days of the occurrence of the accident to Social Security Institution in accordance with the national legislation and within 24 hours to Regional Directorate in accordance with the international standards (see also Section 8.3).
- Ensuring workers receive appropriate induction and refresher trainings on ESMP requirements, OHS, environmental awareness, GM, GBV and SEA/SH prevention.
- Ensuring all subcontractors comply with TWCEIP requirements and project-specific ESMP provisions.
- Ensuring that all temporary construction sites and material storage areas are managed in compliance with the environmental requirements of ESS1, ESS3 and ESS4 and that any land access, land use restrictions or livelihood-related impacts arising from their use are assessed and addressed in accordance with ESS5, including the preparation and implementation of a site-specific Land Acquisition and Livelihood Plan (LALP), where required.

8.1.4 E&S Consultant

- Preparing the ESMP, LAP and required sub-management plans for PMT and Regional Directorate approval.
- Providing technical support during disclosure, consultations and public participation activities.

8.2 Capacity Building and Training

Capacity building under this ESMP will focus directly on improving the Contractor's site workers' capacity to implement the Project–specific mitigation and monitoring measures. Training will be practical, field-oriented and directly linked to the risks identified in this ESMP.

Before the commencement of construction and periodically throughout implementation, the Contractor will provide training to all workers and subcontractors on:

- ESMP requirements relevant to their tasks (soil protection, waste management, traffic safety, CHS, chance finds, etc.)
- Occupational Health and Safety procedures and safe work practices
- Emergency response, spill response and equipment handling
- Waste segregation, hazardous materials handling and storage
- Community Health and Safety, including behavioral rules around settlements and agricultural areas
- Chance Finds Procedure and steps to follow in case of encountering any archaeological remains
- Use of PPE and site rules
- Grievance mechanism and worker obligations under the Code of Conduct including GBV and SEA/SH

Training shall be conducted during induction and whenever new activities, risks or workers are introduced to the site. Furthermore, quarterly refresher trainings will be implemented. Records (attendance forms, materials, photos) will be kept and attached to monthly ESMP monitoring reports.

The Contractor will also conduct toolbox talks at least weekly or at activity-start, focusing on:

- High-risk activities (excavation, machinery movement, traffic)
- Environmental sensitivities (soil disturbance, water crossings, dust, waste)
- Lessons learned from past incidents or non-compliances
- Specific mitigation requirements applicable to current work fronts

Additionally, similar training will be given by the Regional Directorate to the irrigation union staff once it is assigned for the operation phase of the Project and officially taking over the system.

In coordination with the PMT, the Regional Directorate shall give awareness events or trainings to the community members, especially to farmers, on the renovated irrigation system, pesticide usage, effective agricultural applications, etc.

8.3 Reporting

Reporting under this ESMP is designed to ensure regular tracking of environmental, social and OHS performance during construction and operation phases. The reporting obligations below apply only to the Project and to the ESMP itself.

Contractor Reporting

Weekly Environmental and Social Monitoring Report (Weekly ESMR)

- Summary of activities executed that week

- Daily compliance checklists
- Photos demonstrating implementation of mitigation measures
- Chance finds, grievances or minor incidents (if any)
- Issues requiring follow-up

Monthly Environmental and Social Monitoring Report (Monthly ESMR)

- Completed works and progress summary
- Updated monitoring results in line with the ESMP Monitoring and Evaluation Plan (see Section 7).
- Summary of weekly reports and observed trends
- Non-compliances and corrective actions taken
- ESHS incidents and near-misses
- Training records and toolbox talks conducted
- Waste logs, materials storage inspections, spill records
- Grievance mechanism entries (workers or community)

All weekly and monthly reports will be submitted to DSİ 12th Regional Directorate for review and oversight.

DSİ 12th Regional Directorate Reporting

Monthly ESMP Compliance Note

Based on Contractor submissions and site inspections, the Regional Directorate will prepare:

- A short monthly summary of ESMP compliance status
- Outstanding issues and actions required from Contractor
- Verification of monitoring results
- Summary of grievances received locally
- Site photos and inspection notes

This monthly note forms the basis of the monthly monitoring report submitted by DSİ to the PMT.

Incident Reporting (ESMP-Level)

All incidents will be reported as follows:

Contractor → DSİ Regional Directorate (Immediately / Within 24 hours)

- Workplace injuries
- Spills, environmental damage
- Unsafe conditions or community risks
- Chance finds
- Any event that interrupts safe construction

The incident register will be maintained on site and included in monthly reports.

Occupational Accident Reporting

For the Project, the reporting time requirements related to occupational accidents and incidents shall be implemented as follows:

- National reporting obligation: All occupational accidents shall be reported to the Social Security Institution in accordance with national legislation, within a maximum of three (3) working days following the occurrence of the accident.
- Initial notification to the World Bank (early warning): All occupational accidents (fatal, non-fatal with injury, or without injury) and other serious incidents related to Project activities (including death or lost-time injuries of non-workers caused by Project activities, violence or protest actions, epidemic diseases, displacement carried out without following the required procedures, child labor and forced labor, unexpected impacts on cultural heritage and biodiversity resources, environmental pollution incidents, dam failure, etc.) shall be reported to the World Bank within 24 hours of their occurrence.
- Detailed follow-up notification to the World Bank: Occupational accidents resulting in more than three days of lost working time, loss of limb, or fatality, as well as other serious incidents of a similar nature, shall be reported to the World Bank through a detailed follow-up notification within 72 hours of the incident.
- Accident investigation report: An accident/incident investigation shall be completed, and the accident investigation report, together with all relevant supporting annexes, shall be submitted to the World Bank within ten (10) days of the incident.
- OHS specialist assignment: The working periods and deployment of Occupational Health and Safety specialists for the Project shall be determined in line with the applicable criteria, and these requirements shall be explicitly stated in the tender documents and contracts.

Archiving and Documentation

The Contractor and DSİ will maintain:

- All monitoring checklists
- Training records
- Waste transfer documents
- Incident logs
- GM records
- Environmental permits (if applicable)

These documents remain Project archives and must be available during DSİ supervision or external review.

9 STAKEHOLDER ENGAGEMENT

9.1 Brief Summary of Previous Stakeholder Engagement Activities

A Public Consultation Meeting was held on 31 May 2022 at 14:00 at Gömeç Mukhtar's Office to present the Land Acquisition Plan prepared under the Sarımsaklı Dam Irrigation Rehabilitation Project. The meeting was announced to the public in the project villages two days in advance through the relevant Chambers of Agriculture, Irrigation Unions, and mukhtars. During the program, brochures prepared for the meeting were distributed to the attending stakeholders.

The meeting was attended by a total of 47 participants, including officials from the DSİ, the President of Kocasinan Chamber of Agriculture, the President of Sarımsaklı Irrigation Union, village mukhtars, and farmers. The DSİ 12th Regional Office provided general information about the land acquisition process to be carried out in the project villages and explained the land consolidation and expropriation procedures. The President of Kocasinan Chamber of Agriculture stated that water in the dams is insufficient and that problems have been experienced in this regard, and indicated that a modern irrigation system will be implemented to address these issues.

Additionally, the meeting included updates on the current status of villages where the Land Consolidation Project has been implemented or is planned. Following the presentations, a question-and-answer session was conducted, during which DSİ officials provided detailed responses to the farmers' questions[25].

9.2 Stakeholder Identification and Analysis

The Stakeholder Engagement Plan[26] (SEP) was developed for the proposed "Water Circularity and Efficiency Improvement Project" implemented on behalf of the Government of the Republic of Türkiye by the Ministry of Agriculture and Forestry (MoAF) and financed by the World Bank (WB). Environmental and Social Standard (ESS) 10 under WB Environmental and Social Framework (ESF) is prepared to enable Stakeholder Engagement, being an integral part of the Environmental and Social Management Framework (ESMF) of the Project.

For the purpose of ESS10, "stakeholder" refers to individuals or groups who:

Project-affected parties (PAP) are affected or likely to be affected by the project.

Other interested parties (OIPs) may have an interest in the project.

Disadvantaged or vulnerable individuals or groups (DVIGs) refers to those who may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits. Such an individual/group is also more likely to be excluded from/unable to participate fully in the mainstream consultation process and as such may require specific measures and/or assistance to do so. This will take into

[25] Türkiye Water Circularity and Efficiency Improvement Project, Stakeholder Engagement Plan, https://cdniys.tarimorman.gov.tr/api/File/GetGaleriFile/425/DosyaGaleri/4350/wceip_stakeholder_engagement_plan_january_2023.pdf

[26] Türkiye Water Circularity and Efficiency Improvement Project, Stakeholder Engagement Plan, https://cdniys.tarimorman.gov.tr/api/File/GetGaleriFile/425/DosyaGaleri/4350/wceip_stakeholder_engagement_plan_january_2023.pdf

account considerations relating to age, including the elderly and minors, and including in circumstances where they may be separated from their family, the community, or other individuals upon which they depend.

Within the scope of the Project, the Area of Influence has been defined as the 500 m perimeter of the Project irrigation boundary. All settlements intersecting with the irrigation boundary are considered to be within the AoI. The local population and local authorities in these settlements are regarded as PAP. PAP cover farmers, livestock breeders, seasonal and daily-waged agricultural workers, and shepherds who conduct their activities on agricultural lands and grazing areas located within the irrigation boundary.

OIP in the Project primarily include cooperatives, associations, and chambers related to irrigation and agriculture. In addition, local government units, development agencies, media, and civil society organizations (CSO) fall under the OIP category.

DVIG categories for this Project is listed as below;

- Elderlies including living alone;
- Female household heads;
- Illiterates;
- Disabled individuals including home bound-bedridden people;
- Agricultural workers (seasonal and daily waged);
- Non-Turkish speakers.

Details of the DVIG will be explained under relevant section in Annex-3 of this ESMP. Besides, Table 9-1 describes all stakeholders including DVIG.

Table 9-1. Stakeholder Mapping

Types of Stakeholders	Stakeholder Groups	Stakeholder group's interest in the project
PAP	Local people Local authorities (Mukhtars) Farmers and livestock breeders Seasonal and daily-waged agricultural workers Shepherds Irrigation Association Members	Administrative facilitation, Quick access and rapid response to issues. Resolution of issues concerning access to project areas, Ensuring product follow-up, Designating area boundaries in activities for the battle against potential product diseases, Facilitating the monitoring of product incentives and grants Neighborhood population growth during construction Local Farmers would receive the greatest benefit. As a consequence of consolidation, construction of access roads to all farmlands, installing irrigation hydrants at locations closest to the farmlands, preventing loss of water and time, ensuring controlled irrigation, preventing fluctuations in water supply Currently, Irrigation Association are responsible for the supply of water. The necessary arrangements are done by Irrigation Associations for the efficient use of water. With open channel systems, maintenance and repair costs reach high figures each year. In closed systems, maintenance and repair costs are reduced to minimum. With consolidation, the amount of agricultural lands and water-production amounts shall be clarified, bringing forth ease in water management. Irrigation Association Members are persons present within irrigated areas, who are informed about the annual acts and transactions. Irrigation Association Members are the most enthusiastic about irrigation modernization. Agricultural workers will be convenience through the provision of access roads to lands and facilitation in transportation.

Types of Stakeholders	Stakeholder Groups	Stakeholder group's interest in the project
		In time, it will be possible to improve living conditions through Irrigation Associations or Mukhtar's offices. Formal/informal users, non-member farmers and construction workers may also be affected by the project.
OIP	Kayseri Governorate Kocasinan District Governorate Melikgazi District Governorate Kayseri Metropolitan Municipality Kayseri Provincial Directorate of Agriculture and Forestry Kocasinan Chamber of Agriculture Melikgazi Chamber of Agriculture Sarımsaklı Pumped Irrigation Association Ağırnas Mimarsinan Kadın Initiative Production and Management Cooperative ORAN Development Agency Kayseri Branch Office	Increase in the neighborhood population for the duration of construction works. Resolution of issues concerning access to project areas, Ensuring product follow-up, Designating area boundaries in activities for the battle against potential product diseases, Facilitating the monitoring of product incentives and grants. Follow-up on properties and leased lands, Clarification on crop pattern supports, Provision of trainings to increase the yield of products requiring follow-up
DVIG	Elderlies; 20% of total population Elderlies living alone; *60-65 individuals* Female household heads; *75-80 individuals* Illiterates; *18-20 individuals* Disabled individuals, *80-85 individuals* Home bound-bedridden people; *65-70 individuals* Agricultural workers (seasonal and daily waged); *250-270 individuals* Non-Turkish speakers; *Kurdish*, *250-270 individuals* *Arabic; 75-80* *Dari-Pashto; 35-40 individuals*	Female farmers shall be encouraged to participate in consultation meetings. If necessary, special focus group meetings shall be held. Moreover, female farmers shall be provided with additional training as necessary to inform them about how to Access financial instruments/grants. During the design of services and activities targeting individuals who are illiterate (farmers, workers etc.), their needs shall be taken into account in order to ensure they access the same information as those who are literate. Their participation in stakeholder activities shall also be encouraged. Accessible platforms and miscellaneous special trainings shall be provided to those disabled in accordance with their needs. Taking into account the lack of information and experience on the side of older farmers when it comes to accessibility, online tools, services and channels of communication, the necessary support shall be provided for the duration of the Project in order to ensure their participation in the Project and Project activities. Project documents, brochures and announcements shall be made available in Turkish; however, for seasonal agricultural workers and foreign workers and those who do not speak Turkish, the use of different languages shall also be taken into consideration to increase the effectivity of engagement activities and to ensure their participation.

In order to incorporate the opinions of vulnerable groups:

- Meetings shall be held with regional organizations and Non-Governmental Organizations (NGO) who represent the rights of the disabled.
- The elderly and the disabled (or those with additional accessibility needs), migrants, and individuals whose mother language is not Turkish and other disadvantaged/vulnerable groups which may be identified during the Project shall be addressed separately in the consultations.

- Project-related information shall be provided in face-to-face meetings or through another method which suits the disadvantaged/vulnerable groups/individuals duly identified (e.g. Braille alphabet, sign language etc.).
- Consultations shall be held at locations accessible to disadvantaged/vulnerable groups/individuals.

All Project-related written or printed materials to be handed out at Project sites should be accessible to the disadvantaged/vulnerable groups/individuals under the Project. Such materials shall also be prepared with a language that is culturally appropriate and easily understandable (non-technical).

However, before sub-project works commence, consultations will be held in sub-project areas to further identify the vulnerable groups in each area.

In the event that vulnerable groups are identified during the implementation of the project, regular consultations will be held with all project stakeholders including such vulnerable groups to inform them about project's impacts, construction schedule and the compensation they will be eligible for due to a project-related loss of land or livelihood.

9.3 Stakeholder Engagement Program

9.3.1 Principles of SEP

In accordance with the principle of consultation, stakeholders will be informed and consulted during preparation stages of the project.

The Stakeholder Engagement takes into account the following principles for this project: transparent engagement, sensitive inclusive/non-discriminatory consultation, use of multiple outreach channels, user-friendly engagement tools, and inclusive and gender sensitive language.

Transparency

It is important that all the information about the project and its environmental and social risks and impacts are disclosed and shared with the stakeholders in an open manner. In order to achieve this the preparation and dissemination of relevant information and organization of meetings is important. The positive and negative impacts of the project need to be communicated openly with the stakeholders. Information disseminated will be in plain language, accurate and accessible.

Socially Inclusion

The stakeholder participation process will take into account the different and specific needs of various groups and communities. The possible communication barriers with these different groups and communities need to be overcome. The training of the public relation personnel to achieve this end is important. The different needs of the stakeholders will be handled sensitively. These sensitivities may be based on cultural appropriateness, gender, language, ethnicity, remoteness among other factors. There will be no hierarchical structure in the stakeholder engagement; all the different community members, groups and communities will participate in the stakeholder engagement on equal basis.

Different engagement media need to be used in order to overcome possible barriers in participation especially in view of vulnerable groups.

Communication Channels

- Consultation meetings,
- Establishing a local office with a responsible officer,
- Disclosure of documents and an integration of feedback provided by the stakeholders,
- Involvement of village mukhtars in the engagement process,
- The establishment and implementation of grievance mechanism,
- Website,
- Media announcements,
- Disclosure of telephone numbers and e-mail addresses.

User-friendly communication

In order to meet the transparency, sensitivity and inclusivity principles it is important that the engagement tools are accessible, understandable and not complicated. Otherwise, disadvantaged groups, like people lacking formal education experiences or member of a marginalized groups would not be able to participate.

Extent of engagement tools

As well as accessible, diversified and understandable engagement tool also need to be well disseminated. Lack of wider dissemination would let some groups, communities or individuals who are affected by the project out of the process of engagement. Because of these visual and written announcements need to be complemented by face-to-face verbal communication.

Gender sensitive language

Negative attitudes and statements against women reflect itself not only through physical behaviours but also through our “language”. Language has a cultural characteristic and is reproduced by women and men over generations. Therefore, the main focus is to ensure gender sensitive language and target group for gender sensitive communication is women and men community members and stakeholders.

9.3.2 Stakeholder Engagement Methods

To sustain ownership of the project stakeholders’ during project implementation, and to increase positive social impact of the Sub-Project, some stakeholder engagement methods to be used in the implementation phase are explained in the SEP of the main Project. These engagement methods will be used throughout the life cycle of the Project will be ensured. Parallel methods are planned to be used in particular for the Sarımsaklı Dam Irrigation Renovation Project (see Table 9-2).

Table 9-2. Engagement Methods of the Project and Sub-Project

Method	Main Project Level- Türkiye Water Circularity and Efficiency Improvement Project	Sub-Project Level – Sarımsaklı Dam Irrigation Renovation Project
Opening and Closing Meetings	At both the beginning and end of the project life cycle, multi-stakeholder meetings are held to announce and disseminate project activities and results. An opening meeting was held within the scope of TWCEIP. The closing meeting will be held	As a TWCEIP stakeholder, DSİ 12th Regional Directorate attended the main project opening meeting. DSİ will also participate in the project closing meeting. DSİ will provide the

Method	Main Project Level- Türkiye Water Circularity and Efficiency Improvement Project	Sub-Project Level – Sarımsaklı Dam Irrigation Renovation Project
	at the end of TWCEIP. TWCEIP stakeholders participate in these meetings.	necessary information about the sub-project at the meeting.
Public Consultation Meetings	Public consultation meetings are held depending on the sub-project carried out within the scope of TWCEIP.	Public consultations will be conducted when draft ESMP with SEP chapter and LAP/RP are disclosed. In case of a meeting DSİ 12th Regional Directorate representatives, subcontractor company representatives, settlements Mukhtars and PAPs will attend
Disclosure Activities	The current website of the Project is being used to disclose and validation of the E&S documents in both Turkish and English. The hard copies of the TWCEIP documents will be available at DSİ central and local offices. It will be announced that the E&S documents are open to stakeholders for at least 15 days by: • Websites of MoAF, DSİ, TWCEIP and Municipalities; • Local media ads (at least three local newspapers); and • Notifications to be sent to Mukhtars of settlements in the Basins, to be displayed in a public location in communities.	DSİ will inform corporate stakeholders via e-mail, DSİ 12th Regional Directorate employees through a board announcement, and Mukhtars who represent PAPs by phone.
Digital and Visual Communication Tools	Call for E&S documents feedback will be made to stakeholders through above-mentioned channels will have the following content by the MoAF as lead partner of TWCEIP: • Brief information about the project • Brief information about the document • Disclose process and the importance of participation • Information on stakeholder engagement and grievance mechanism • Call for cooperation on participation of all stakeholders, including vulnerable groups • Contact information	The website of MoAF and the website of DSİ 12th Regional Directorate will be used to inform stakeholders about the important developments of the Project. Important developments and announcements about the project will be published on the website.
Grievance Mechanism (GM)	In compliance with the World Bank's ESS10 requirement, a project-specific grievance mechanism will be developed and established. The SEP includes GM procedures to address all types of grievances, environmental, social and resettlement, that relate to the project in Chapter 8.5. The GM will also be adopted to include direct and contracted workers, which is covered in the TWCEIP LMP for the Project. In Chapter 8.5, how to set up and operate the GM is elaborated.	The sub-project will have a grievance mechanism managed by DSİ.
Document Disclosure and Institutional Consultation Process	MoAF and DSİ announced the TWCEIP documents developed specifically for the Project to the public in both Turkish and English. In addition to the documents described, the project website includes a stakeholder engagement section, which includes the stakeholder engagement documents.	

Method	Main Project Level- Türkiye Water Circularity and Efficiency Improvement Project	Sub-Project Level – Sarımsaklı Dam Irrigation Renovation Project
Information and Communication	Visual materials can be used on the MoAF and DSİ web page (https://www.dsi.gov.tr/Sayfa/Detay/1642) if information sharing and consultation activities are needed during the preparation and implementation stages of the project. These materials can be brochures, posters, maps in which the information to be given is explained in a simple language. The materials are shared with stakeholder institutions/organizations and the mukhtars. In addition, information exchange will continue throughout the project with the e-mail and telephone number provided in the contact section of the MoAF website. This contact information, which will also be used in the complaint mechanism, is also added to the contact information of Presidency Communications Center (CİMER) and implementing institutions.	The materials are shared with stakeholder institutions/organizations and the mukhtars. These materials can be brochures, posters, maps in which the information to be given is explained in a simple language. These materials will be presented in places that are easily accessible to stakeholders. Local offices, available in schools, mosques, clinics have been identified as places where posters can be placed. Considering that human circulation is intense in these places, it is thought that the relevant materials will contribute to increasing visibility.
Coordination with Local Communities		Necessary information will be provided by contacting the mukhtar of settlements and PAPs. Mukhtars will be invited to the meetings and will be given priority to follow the developments in the project.t

9.3.3 Consultation Schedule

The implementation program of the SEP is summarized in Table 9-3 and Table 9-4.

Table 9-3. Consultation Schedule

Time and location	Activity	Information to be disclose	Method	Target stakeholder	Responsible Unit
Draft E&S documents - Ankara	Consultation Meeting with institutional stakeholders	• E&S principles/ commitments of the Project • Basic information about the Project	Online or face-to-face	Institutional stakeholders	PMT
Draft E&S documents - Kayseri	Public Consultation Meeting with local stakeholders	• E&S principles/ commitments of the Project • Basic information about the Project • Stakeholder engagement and complaint mechanism	Face-to-face	Local stakeholders including PAPs and mukhtars. Communities of project 20 settlements, PAPs directly affected by land acquisition of the project including vulnerable groups.	DSİ Regional PIU
When significant incident occurs - such as accidental or planned break of a water line and/or electricity line and/or blockage or a road or accidental environmental spill. (such as; accidental release of hazardous materials, such as fuel or chemicals used in construction	Public Consultation Meetings	Important developments regarding the project.	Face-to-face	Local stakeholders including PAPs and mukkhtar. Communities of project 20 settlements, PAPs directly affected by land acquisition of the project including vulnerable groups.	DSİ Regional PIU

Table 9-4. Communication Methods

Time and location	Activity	Information to be disclose	Method	Target stakeholder	Responsible Unit
Preparation (Before SEP approval)	Disclosure Activities	Environmental and Social Standards (ESSs) and call to disclosure process of the draft E&S management plans.	DSİ was informed corporate stakeholders via e-mail, DSİ employees through a board announcement, and Mukhtars who represent PAPs by phone. E&S documents were disclosed to the public at a meeting to be held in the affected settlements. They were announced both electronically on the project website and through the availability of printed materials regarding the project in mukhtars' offices, mosques and other local institutions. The SEP was finalized based on the feedback received from local people and other stakeholders.	Project 20 settlements, PAPs including vulnerable groups.	DSİ Regional PIU
Project lifetime	Digital and visual Communication Tools	Important developments of the Project	Web-site of TWCEIP	All stakeholders of TWCEIP and the sub-project	PMT
Project lifetime	Digital and visual Communication Tools	CHS and GM issues	Information about project stages, meeting dates, GM and CHS will be posted in public places (mukhtars' office, mosque, etc.). E&S Documents of the project will be reachable in the web site of MoAF. Within the scope of CHS measures, necessary signs and markings will be hung to	Project 20 settlements, PAPs including vulnerable groups.	PMT

Time and location	Activity	Information to be disclose	Method	Target stakeholder	Responsible Unit
			public spaces and construction areas for health and safety. Information about GM will be announced through a poster to be hung in public areas at project affected settlements.		
Construction	Warnings	CHS risk and warnings.	Warning signs: Within the scope of CHS measures, necessary signs and markings will be hung.	Project 20 settlements, PAPs including vulnerable groups.	Sub-contractor, DSİ Regional PIU
Construction and Operation	Stakeholder meetings and consultations	Publicise project activities and results and provide necessary information about the sub-project.	Project meeting dates will be announced and posted in public places (mukhtars, mosques, etc.).	Project 20 settlements, PAPs including vulnerable groups. Workers of the sub-project. Other local stakeholders affected by the sub-project.	PMT DSİ Regional PIU
Construction and Operation	Employment call	Local employment opportunities.	Web-site of the DSİ (https://bolge12.dsi.gov.tr/). Job application forms distributed to project affected settlements, Board announcement for DSİ employees.	Project 20 settlements, PAPs including vulnerable groups.	Sub-contractor, DSİ Regional PIU
Project lifetime	Grievance Mechanism (GM)	SEP will be disclosed with other E&S plans. Principles of GM, Contact channels, solutions of the complaints	Online, face-to-face, by phone, through CİMER etc. The sample forms will be used to record and close the received complaints.	Project 20 settlements, PAPs including vulnerable groups. Workers of the sub-project. Other local stakeholders affected by the sub-project.	PMT DSİ Regional PIU

9.4 Resources and Responsibilities for SEP Implementation

9.4.1 Resources

DSİ will be in charge of stakeholder engagement activities. The budget required for implementing the stakeholder engagement plan over project duration will be allocated and used for conducting the above specified activities with different stakeholders and for communication and visibility activities. All the activities will be conducted by use of human resources of the DSİ.

9.4.2 Management Functions and Responsibilities

Contractor: The contractor shall be responsible for partially implementing these SEPs, however, the responsibilities of the contractors shall be disclosed by DSİ. DSİ shall have the SEPs prepared and submitted to WB following the approval of the General Directorate.

DSİ Regional Branch Directorate: The sub-project activities will be prepared by the DSİ Regional Branch Directorate and DSİ Regional PIU and approved by the PMT.

DSİ Regional Project Implementation Unit (PIU): DSİ Regional PIU is responsible for the overall implementation of sub-project activities. 12th Regional Directorate is responsible for the construction of irrigation facilities in Kayseri province as local PIU of the project. 12th Regional Directorate will assume the main responsibility for the coordination, implementation and monitoring and reporting of the implementation of the main project's SEP's implementation.

Meetings with stakeholders shall be organized and held by DSİ Regional PIU. Contractors will also engage with stakeholders during the construction stage of the project: It is expected that contractors will hold regular meetings with surrounding communities to update them on the construction process, discuss community health and safety, and seek feedback and grievances from the community members.

Project Management Team (PMT): The PMT under the General Directorate shall commence the preparation of project-specific SEP. The PMT shall also review these plans and submit them to the World Bank for approval. Project implementation shall only start once SEPs are ready and pre-construction consultation processes under SEPs are finalized.

Table 9-5 presents the roles and responsibilities of each main project's SEP and the SEP of the sub-project.

Table 9-5. Responsibilities of Key Actors/Stakeholders in SEP Implementation

Unit	Responsibilities
Level: Main project – TWCEIP	
PMT	• Incorporating all stakeholder engagement activities into the overall environmental and social management systems • Developing an internal system to communicate progress and results of stakeholder engagement to the senior management and staff members • Coordinating with parties for proper implementation of processes related to grievance mechanism and stakeholder engagement issues • Consultation on specific SEP activities
PMT-Communications and Stakeholder Specialist	• Planning and implementation of the SEP • Leading stakeholder engagement activities with identified stakeholders, governmental bodies

Unit	Responsibilities
	• Organizing/managing Public Participation Meetings and other events related to public disclosure of information • Coordinating interface and reporting to/from World Bank in relation to implementation of SEP • Updating the SEP periodically and upon major Project changes • Information sharing with local community members/ Local community representatives • Prepare and implement subproject level SEPs • Consult and engage poor and vulnerable groups such as women.
PMT- Environmental and Monitoring Specialist	• Monitoring the Project progress • Ensuring the successful delivery of all defined documentation • Consolidated reporting on overall SEP activities and the Project progress • Implementing social and environmental monitoring • Monitoring and reporting to PMT and management whether the social and environmental issues stated in related documents are implemented throughout Project lifetime
PMT-GM Focal Point	• Acting as the focal point for the GM in PMT • Recording and following up grievances related with the Project • Management and coordination on resolution of grievances within the Project • Reviewing grievance records to illustrate significant non-compliance issues or recurring problems regarding the stakeholder engagement and other Project activities and coming up with actions • Coordinating and monitoring GM focal points in PMT and contractor level • Consolidating Project related grievances from all different GM levels • Informing PMT and management about the resolution process • Preparing consolidated GM reports of the Project
Governmental Bodies (Ministry of Agriculture and Forestry, Kayseri Provincial Water and Sewerage Administrations etc.)	• Providing inputs and feedback throughout the stages of the SEP • Participation to the implementation of some activities in the SEP
Local community representatives and local government agencies	• Supporting the Sub-Project during the implementation of the stakeholder engagement activities through their available mechanisms and networks (distribution of communication materials, disclosing events/announcements via their websites, organization of meetings, reaching out to relevant stakeholders, etc.)
Chambers/Representative Institutions of Private Sector	• Providing inputs and feedback during the preparation and implementation phases of the SEP. • Participation to the implementation of some activities in the SEP
Contractors	• Informing PMT of any issues related to their engagement with stakeholders • Informing local communities of any environmental monitoring activity (e.g. noise, vibration, water quality monitoring etc.) • Developing and implementing a grievance mechanism for their workforce including sub-contractors, prior to the start of works in compliance with PMT's GM requirements
Level: Project – Sarımsaklı Dam Irrigation Renovation	
DSİ Regional PIU	• Preparing a sub-project level SEP • Coordination with PMT-Communications and Stakeholder Specialist • Informing SEP related activities to management board of the DSİ. • Outreach to PAPs/stakeholders for site specific project issues • Regional and provincial level outreach • Reporting on implementation of SEP activities to PMT • Executing defined grievance mechanism in the SEP properly and informing PMT about the overall implementation status • Sending all records to Regional Directorate and the Board of Directors
GM focal point	• Receiving and responding to complaints • To ensure that the complaint is resolved by communicating with the relevant departments

Unit	Responsibilities
	• Reporting grievance records and consultation activities to management • Providing data for Monitoring and Evaluation activities

9.5 Grievance Mechanism

9.5.1 Purpose and Principles

A grievance mechanism will be established by DSİ in order to receive, resolve and follow the concerns and complaints of the stakeholders including PAP. The GM will be accessible for the stakeholders and respond to all feedback (including grievances, complaints, requests, opinions, suggestions) at the earliest convenience.

Recording and tracking of complaints (including environmental issues) will be the primary responsibility of DSİ. DSİ will resolve all complaints received by following procedures and follow up on corrective measures taken. DSİ's staff in this regard will have the primary role in resolving complaints as part of their daily activities. Complaints can be received in writing or orally. Personnel who receive the complaint verbally must also state the complaint in writing. The various channels through which complaints can be formally raised are:

- Telephone
- Email
- Face to face
- Grievance/Complaint Record Form

The complaint mechanism established by DSİ includes workers' complaints as well. DSİ's responsibilities towards the Workers' GM:

- Ensuring that the workers' GM fully complies with all employment legislation.
- As a result of the changes made in the employment legislation and the lessons learned from its operation; To Ensure regular review of the Grievance Mechanism in view. of the changes made in the employment legislation and the lessons learned from its operation.
- Ensuring that the GM is communicated to all direct and indirect employees through SEP and communication tools structured for the project.
- Ensuring that the GM is a special topic during the orientation of new employees.
- Giving confidential advice to employees when employees do not want to discuss it with their managers.
- Provide advice and support to Contractor supervisors and management on their roles and responsibilities for the successful implementation and operation of the Grievance Mechanism.
- Log of grievance.

DSİ's responsibilities towards the Public GM:

- DSİ will accept all complaints regarding the project.
- Will forward complaints to PMT.
- Log of grievance.

9.5.2 Levels of GM

9.5.2.1 Public GM

DSİ presently has a four-stage Grievance Mechanism (GM):

1. Irrigation Association / Contractor
2. DSİ Branch Directorates
3. DSİ Regional Directorates
4. General Directorate of DSİ

Accordingly, affected persons or stakeholders will thus be enabled to convey their objections and grievances to any one of mentioned institutions/organizations via e-mail/telephone, written petition, personal application or through direct application to national grievance notification mechanisms such as CİMER (Presidency Communications Center). All grievances received are recorded to Document Registry Branch under DSİ General Directorate Staffing Department. Received grievances are resolved by document registry officers conveying them to the relevant divisions based on their type and contents, and being examined within the specified response time. Written applications or all grievances conveyed through CİMER are recorded by DSİ. In cases where grievances conveyed through telephone must be solved by DSİ, the aggrieved party is directed to convey their objection and/or grievance through GM. Once the grievance is received for the first time, the Grievance Registration Form is filled out.

Document registry officers stationed in all units prepare monthly reports regarding grievances conveyed through both DSİ GM and CİMER.

Grievances received through Irrigation Association usually concerns issues encountered during implementation phase, on the other hand, grievances received through other units may concern all work and transactions conducted by DSİ. Irrigation Association records grievances they receive when necessary and when requested, to share with DSİ.

DSİ will maintain operating its current Grievance Mechanism with minor adjustments to allow for project-level data collection. Any grievance during the implementation of project schemes will be communicated to the closest DSİ unit (Irrigation Association, Project Directorate, DSİ Branch Directorate, Regional Directorate or General Directorate) in person, by electronic mail or other available means. All of the objections will be recorded and objecting parties will be responded to in writing. After objections to plot plans are evaluated, the objecting parties will be informed that the procedures done will be suspended again so that they can be viewed.

9.5.2.2 GM for Workers

Workers will be able to lodge their complaints with DSİ PIU. The Contractor will receive the complaints on site from workers. Complaints will be received as indicated in Figure 9-1. Workers will be provided with "feedback" and an "objection process" regarding complaints. DSİ PIU officer will supervise the Contractor's complaint mechanism. PMT will be informed about the complaints and will carry out monitoring and evaluation.

DSİ Regional PIU will take part in resolving complaints with its Branch Office and supervise the Contractor. The operation of the complaint mechanism will be reported to the PMT with monthly Environmental and Social Monitoring Reports (ESMR).

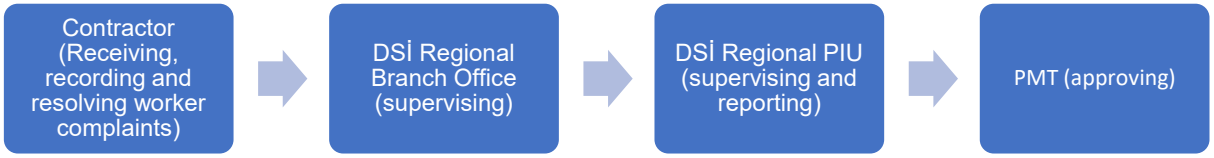

Figure 9-1. Worker GM Flowchart

PMT will require contractors to develop and implement a grievance mechanism for their workforce including sub-contractors, prior to the start of works. Grievance mechanisms will be integrated into the main GM of the DSİ. The workers' grievance mechanism will include:

- a procedure to receive and categorize grievances such as comment/complaint form, suggestion boxes, email, a telephone hotline;
- stipulated timeframes to respond to grievances and to resolve cases;
- a register sheet to record and track the nature and the timely resolution of grievances; and
- a responsible department to receive, record, address and track resolution of grievances.

Women and men can express their opinions, grievances, and recommendations on gender-based violence through grievance tools. The mechanism will provide a high level of accessibility, confidentiality, and responsiveness, as well as assigning and training certain staff to handle such sensitive and serious grievances. The grievance mechanism will be accessible and will be ensured that confidentiality of personal information.

The person responsible for Contractor's GM will do the following respectively:

- Record all incoming complaints, including the following information:
  - Complainant's name (it is not mandatory to give a name),
  - Complaint subject and request,
  - Date,
  - Contact information.
- Notify the complainant within 7 days,
- Communicate with relevant units to resolve the complaint,
- Ensure that the complaint is resolved within 30 days,
- Manage solution-related applications,
- Provide feedback to the complainant regarding the resolution,
- Report weekly, monthly and quarterly.

9.5.2.3 GM in World Bank Level

Communities and individuals who believe they have been adversely affected by the World Bank (WB) or a WB project may submit their complaints to existing grievance mechanisms at the project level or to the World Bank. Complaint about the World Bank or the Project it is forwarded to the World Bank using the Grievance Redressal Service (GRS). GRS ensures that complaints received are investigated.

For the World Bank's GRS use this web link:

https://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service

Project affected communities or individuals can also raise their grievances to the World Bank Independent Inspection Panel (IIP). This panel determines whether the person or communities that made the complaint were harmed because of the breach of one or more of the WB's performance criteria. The panel can directly convey its concerns about the received complaints to the WB. At this stage, WB would have an opportunity to respond to the complaints. For information on how to submit complaints to the World Bank Inspection Panel, please visit https://www.inspectionpanel.org/

In case of grievances regarding Gender Based Violence/SH/SEA

Women and men can express their opinions, grievances and recommendations on gender-based violence through grievance tools. The mechanism will provide a high level of accessibility, confidentiality and responsiveness, as well as assigning and training certain staff to handle such sensitive and serious grievances.

The complaint mechanism will be accessible, and the confidentiality of personal information will be ensured.

- Information activities will be carried out to inform women about the mechanism. Information activities will include the following types of information:
  - Women's rights
  - Self-protection in cases of violence and sexual abuse
  - Emergency phone numbers
  - Contact information of institutions and organizations to which they can apply
  - Complaint mechanism and privacy policy

The confidentiality principle of the grievance mechanism will be repeated in all information materials. The World Bank's "Good Practice Note – Addressing SEA/SH in Investment Project Financing Involving Major Civil Works" document is taken as reference[27].

- The person receiving the complaint will distinguish this complaint from others.
- After the complaint is identified and separated from others, the following steps are followed:
  1. Accepting anonymous grievances and keeping the complainant's information confidential and submitting the complaint anonymously. The steps for sending the complaint are the same.
  2. Determining whether the person complained about is related to the project.
  3. Documenting and closing cases brought through GM if the complaint is moved to litigation.

[27] https://thedocs.worldbank.org/en/doc/632511583165318586029002 2020/original/ESFGPNSEASHinmajorcivilworks.pdf

9.5.3 Assessment and Closing Procedure

The contractor will look into the worker grievance mechanism. The contractor and the DSİ Regional PIU will jointly engage in receiving and managing complaints on site. All complaints will be reported to PMT with the Environmental Social Monitoring Report (ESMR).

The responses to the grievances would be satisfactory for both parties and the actions in Figure 9-2 would be followed and the complainant would be informed about the outcomes of the corrective activities.

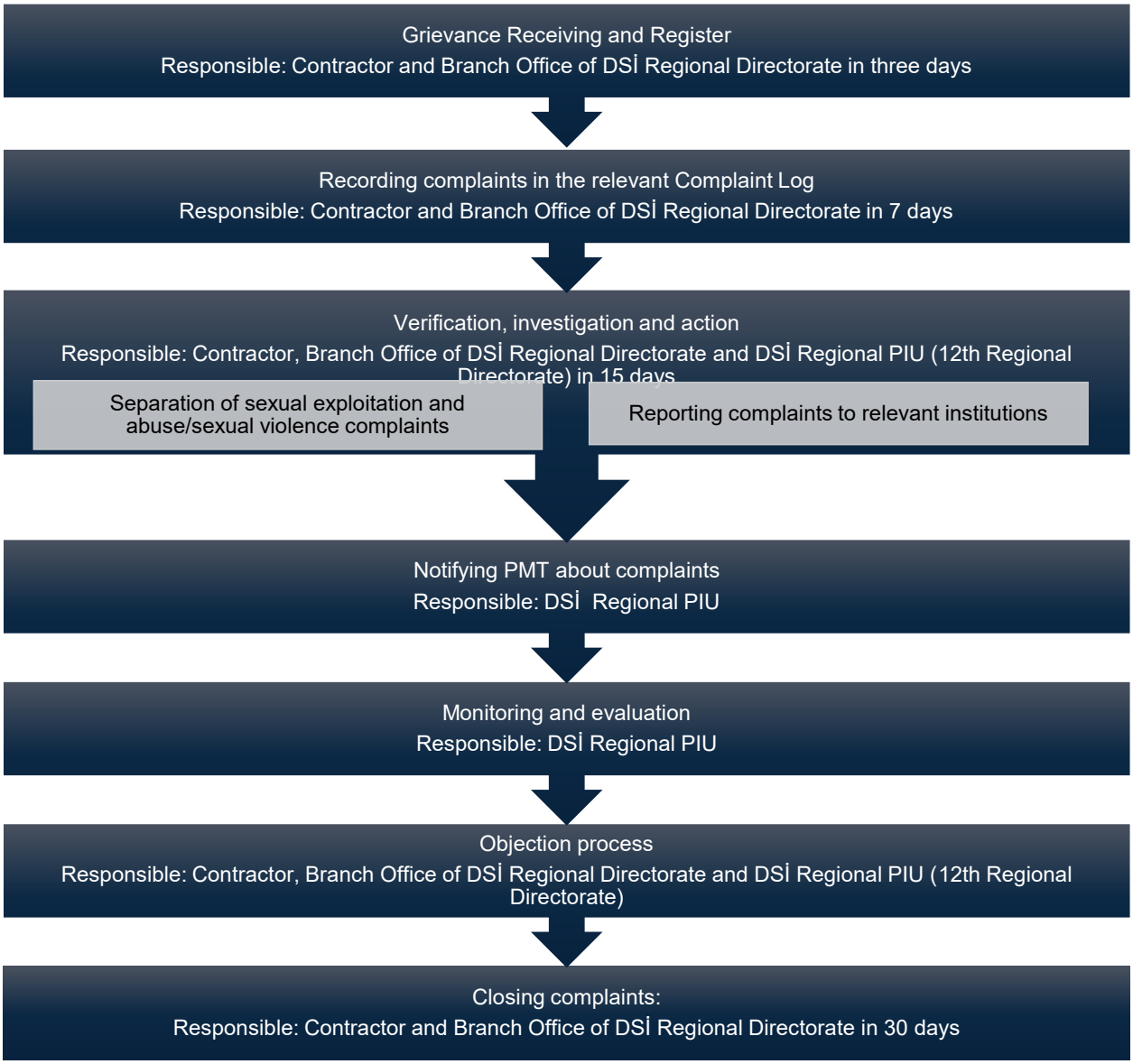

Figure 9-2. Worker GM Flowchart

Complaints received through DSİ will be integrated into the central GM of PMT.

The GM will also enable submission of anonymous feedback. It is indicated to the complainant that lack of name-surname/contact details may lead to delays or problems during the assessment and resolution of the project. The complainant will also be informed that the personal information (including name-surname, contact details) will not be shared by the third parties or disclosed. The information received from the complainant will only be used for assessment and resolution of the feedback/complaint received.

Women, in particular, may be reluctant to use GM for complaints about GBV/SEA/SH Therefore, the possibility to file an anonymous complaint will be open. Grievances of SEA/SH should be differentiated and reported to the appropriate authorities. The handling of SEA/SH claims should pay the utmost attention to maintaining confidentiality and the ethical handling of information in order to protect the survivor, prevent information from being leaked, and limit further harm.

The processes of recording and closing complaints will be carried out in accordance with TWCEIP's SEF. The sample forms will be used to record and close the received complaints.

Grievance Receiving & Register

All incoming grievances will be reflected in a Grievance Log and will be assigned an individual reference number.

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,
- A 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 addressing the issue (DSİ Local PIU and its Branch Office, The Contractor and workers’ representative),
- Dates when the investigation of the grievances initiated and completed,
- Results of the investigation,
- Information on the proposed corrective actions to be delivered to the complainant (in case of non-anonymous) and the date of the delivery,
- Deadlines for required actions by the personnel,
- 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.

Assessment of the Grievance

- All Grievances are reviewed to be classified whether they are genuine and related to Project activities or not. If the issues/disputes raised are not related to Project, guidance is provided to the Complainant to contact relevant party. Eligible complaints are responded according to the procedures outlined here.
- All Grievance received through the direct phone calls e-mails and face-to-face meetings/communications are taken under registration and DSİ local PIU contact the

Complainant within two (2) Business Days following registration in order to explain the Project response process to Grievance.

- DSİ has ten (10) Business Days to investigate and respond to the Complaints. If the case requires a more complex investigation, updated information is provided to the Complainant explaining the actions required to resolve the Grievance, and the likely timeline.
- Responses aligning with the Project social mitigation measures and compensation items are defined beforehand according to the Project standards.

Close Out of the Grievance

Evidence of corrective actions taken following the complaint (scans, photographs or other supporting evidence) is collected and a "complaint close out form is signed by DSİ and the complainant.

9.5.4 Communication Channels for GM

In accordance with the international requirements, a grievance mechanism will be established by DSİ in order to receive, resolve and follow the concerns and complaints of the stakeholders including PAPs. The grievance mechanism will be accessible for the stakeholders and respond to all feedbacks (including grievances, complaints, requests, opinions, and suggestions) at the earliest convenience. The responses to the grievances would be satisfactory for both parties and activities would be followed and the complainant would be informed about the outcomes of the corrective activities.

Any grievances that may occur during the project will be addressed at four levels. The first level of GM will be at the project level. Secondly, DSİ General Directorate will be responsible for overall management and supervision of the Sub-Project including compliance with SEP requirements as well as managing grievances. As the third level, CİMER will constitute the GM of this project. Lastly, communities and individuals who believe they have been adversely affected by the World Bank or a WB project may submit their complaints to existing grievance mechanisms at the project level or to the World Bank.

Table 9-6 presents the contact information for grievance mechanism.

Table 9-6. Grievance Mechanism Contact Information

DSİ General Directorate	Address	Mustafa Kemal, 06510 Çankaya/Ankara
	Phone	0 312 454 54 54
	Web	https://www.dsi.gov.tr/Sayfa/Detay/690
DSİ Kayseri 12th Regional Directorate	Address	Osman Kavuncu Caddesi / Kocasinan Kayseri
	Phone	0 352 336 28 50
	E-mail	dsi12@dsi.gov.tr
	Web	https://bolge12.dsi.gov.tr/Sayfa/Detay/1151
CİMER	Phone	150
	Web	https://www.cimer.gov.tr/

9.6 Public Participation Meeting-02.02.2026

A meeting was organized to inform stakeholders about the Project following the approval of the Project document by the World Bank.

The date and time of the meeting were determined through consultations with the General Directorate of DSİ and the DSİ 12th Regional Directorate. It was decided to hold the meeting on 02 February 2026. Support for venue allocation was sought from the Kocasinan District Governorship. Following official correspondence, the conference hall belonging to the Kocasinan Mufti's Office, located within the boundaries of Kocasinan District of Kayseri Province, was allocated for the stakeholder information meeting to be conducted by ÇINAR Engineering on Monday, 02 February 2026, at 14:00.

After the meeting date, time, and venue were finalized, the information and announcement process was initiated. An announcement text including the meeting details was prepared (see Annex 6.1 – Project Announcement Text). In addition, a brochure was prepared containing key information about the Project, an introduction to the ESMP document, settlements within the AoI, and the grievance mechanism (see Annex 6.2 – Project Brochure).

The announcement text and brochure were first shared with the mukhtars of the settlements within the Project AoI via WhatsApp. The same information was also shared with key stakeholders, including the Head of the Sarımsaklı Pump Irrigation Association, the President of the Kayseri Mukhtars' Association, the President of the Melikgazi Chamber of Agriculture, and the President of the Kocasinan Chamber of Agriculture.

For public announcement purposes, posters were displayed in commonly used public places within the settlements, such as mosques, Qur'an courses, mukhtars' offices, and school buildings (see Annex 6.3 – Meeting Announcement Posters). The same poster was also displayed at the meeting venue.

Following the announcement process, the meeting was held at the specified date, time, and location. A registration desk was set up at the entrance of the meeting hall, and all participants were requested to complete the attendance sheet (see Annex 6.4 – Participant List). Project brochures were distributed to participants in hard copy.

According to the attendance list, a total of 19 participants attended the meeting. Despite the effective implementation of the announcement process, participation remained below expectations. The meeting was attended by a total of 10 participants, including mukhtars, council members, and farmers from the settlements of Akçatepe, Boztepe, Buğdaylı, Hasanarpa, and Yazır located within the Project AoI. The distribution of participants was as follows:

- DSİ General Directorate: 1 participant
- DSİ 12th Regional Directorate: 3 participants
- Irrigation Association: 3 participants
- Mukhtars and farmers: 10 participants
- ÇINAR: 2 participants

Audio and visual recordings were taken throughout the meeting to document the event. Photographs taken during the meeting are provided in Annex 6.5.

The meeting commenced with an opening speech by a representative of the DSİ General Directorate. Following the opening remarks, questions raised by mukhtars and farmers were addressed. After an initial short question-and-answer session, a presentation was delivered by ÇINAR. A second question-and-answer session followed the presentation, and the meeting was concluded after more than one hour.

Key questions raised during the meeting and the responses provided are summarized below:

Akçatepe: Will there be compensation for farmers? If someone cannot cultivate due to construction, will support be provided?

DSİ General Directorate: *This is a social issue. Construction will be carried out in phases across approximately 8,800 hectares. If a farmer faces financial hardship, construction may be postponed or costs may be assessed. It is not possible to provide a definitive answer at this stage.*

Hasanarpa: Will this turn into dry farming?

DSİ General Directorate: *These lands are accustomed to irrigation. Dry farming is not envisaged. Asking people not to cultivate for a year would cause serious hardship, and this is not the case.*

Akçatepe: If construction lasts 3–5 years, what will we do during this period? Will the land remain uncultivated?

DSİ General Directorate: *Construction will be phased. If there is a crop in a specific area, works will be postponed. Construction will not be carried out simultaneously everywhere.*

Boztepe: Will lower villages be unable to cultivate? Will construction always start from upstream?

Irrigation Association, DSİ 12th Regional Directorate: *Construction does not have to start upstream. It can start from the middle or downstream, depending on crop conditions.*

Buğdaylı: When construction starts, will this year be the last cultivation? Will water be cut off?

DSİ General Directorate: *No. The World Bank would not allow such a situation. Income loss for three consecutive years is not acceptable.*

Boztepe: Will this project include Boztepe? Some areas are said to be excluded from the project and opened for development. The airport expropriated our lands and wells—will new wells be drilled?

Irrigation Association: *Some areas fall within the project boundary; some were excluded previously. Authority lies with the operations department. The airport issue is separate. Wells are currently operating, and pumping will continue until the project is completed, after which a gravity-fed system will be used.*

Boztepe: If wells are closed, will new wells be opened?

DSİ 12th Regional Directorate: *This issue is related to airport expropriations. It requires separate evaluation, and no definitive statement can be made at this stage.*

Boztepe: Will water be completely cut off?

DSİ General Directorate: *No. At most, there may be short-term interruptions in limited areas, and if any damage occurs, mitigation measures will be implemented.*

Hasanarpa: If there is a problem, whom should we contact?

DSİ 12th Regional Directorate, DSİ General Directorate: *First the Irrigation Association, then the local branch, then the General Directorate. If unresolved, it can be escalated up to the World Bank. There is a grievance mechanism in place.*

Akçatepe: Can this proceed before land consolidation is completed? How will water reach areas that did not accept consolidation?

DSİ 12th Regional Directorate: *Parcel plans have been prepared; seven have been registered and others are completed. The project was designed assuming consolidation. Consolidation is a separate process and does not prevent the project.*

Who will be responsible for operation and maintenance after construction? The Association has limited income—how will maintenance be funded?

Irrigation Association, DSİ 12th Regional Directorate: *Maintenance will be financed through fees collected from farmers, as practiced elsewhere.*

Boztepe: Will water flow directly from the dam to the pipes? Will algae or animals enter the pipes? Are there filters?

DSİ 12th Regional Directorate: *Yes, it will be a closed system. There are no such issues at Sarımsaklı Dam, and problems are not expected in a closed system.*

Buğdaylı: Will the World Bank interfere with what we plant?

DSİ General Directorate: *No. The World Bank does not regulate crop choices; it only assesses whether there is harm to people.*

Boztepe: When will the project start?

DSİ General Directorate: *The target is to start in July 2026.*

Buğdaylı: Will there be any activities specifically for women farmers?

DSİ General Directorate: *The World Bank places strong emphasis on women farmers and encourages their participation in meetings.*

Akçatepe: Will there be major excavations during maintenance?

DSİ 12th Regional Directorate: *No. Only localized repairs are expected; major excavations are not anticipated.*

Buğdaylı: Once this is completed, will it be considered finished?

ÇINAR, DSİ General Directorate: *No. There will be continuous monitoring before, during, and after construction, with inspections every three to six months.*

Buğdaylı: Will this project really happen? It has been discussed for years.

DSİ General Directorate: *This time, financing is secured and reports are completed. The project is planned to start in 2026.*

As demonstrated by the questions and responses, the main concerns of farmers relate to potential water interruptions during construction, the inability to cultivate their land, possible crop losses, and disruptions to their livelihoods. Farmers expect that irrigation will not be completely interrupted, cultivated areas will not be affected, construction activities will be carried out in phases, and any losses will be compensated. In addition, stakeholders emphasized the importance of keeping wells operational, clarifying land consolidation and project boundaries, clearly defining responsibility for operation and maintenance activities, and knowing whom to contact in case of any issues.

ANNEXES

Annex-1: Legal Framework

Annex-2: Official Letters

Annex-3: Environmental and Social Baseline

Annex-4: Waste Management Plan

Annex-5: Chance Find Procedure

Annex-6: Public Participation Meeting

- Annex-6.1: Project Announcement Text
- Annex-6.2: Project Brochure
- Annex-6.3: Meeting Announcement Posters
- Annex-6.4: Participant List
- Annex-6.5: Photos Taken During the Meeting

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(Will be removed during document disclosure in accordance with the Law on the Protection of Personal Data (KVKK))

Annex-6.5: Photos Taken During the Meeting

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