Electricity Distribution Efficiency Improvement Project (EDEIP)

Environmental and Social Management Plan (ESMP)

for

Extension of 132-kV Tando Adam Grid Station
Augmentation of 132-kV Hala Grid Station
Reconductoring of 132-kV Transmission Line from Hala Road Grid Station to Jamshoro Grid Station

Hyderabad Electric Supply Company (HESCO)
September 2025

Executive Summary

The Hyderabad Electric Supply Company (HESCO) is planning to undertake extension of its existing Tando Adam grid station, augmentation of its existing Hala grid station, and re-conductoring of its existing transmission line from the Hala Road grid station to Jamshoro grid station (these works will be described as the proposed subproject in this document). All components of the proposed subproject are located in the Sindh province.

HESCO is undertaking the proposed subproject under the Electricity Distribution Efficiency Improvement Project (EDEIP), with the financial assistance from the World Bank (WB). EDEIP also includes the Peshawar Electric Supply Company (PESCO) and the Multan Electricity Power Company (MEPCO), in addition to the Power Division of the federal Ministry of Energy.

This **Environmental and Social Management Plan (ESMP)** has been prepared to address the potential environmental and social (E&S) impacts of the proposed subproject, in compliance with the national/provincial regulatory requirements as well as the WB Environmental and Social Framework (ESF).

EDEIP Overview

The EDEIP has four components: Improving Grid Reliability, Modernizing Operations and Management; Building Capacity and Technical Assistance; and Reform Support. The first component covers the investments for the Secondary Transmission and Grid (STG) and Energy Loss Reduction (ELR) programs. The second component includes modernization of the operations and management functions using latest equipment, technology and information systems. The third component includes improving operations and maintenance, capacity building and training, and EDEIP implementation support. The fourth component aims to support implementation of power sector reforms and improve sector governance.

Subproject Overview

As mentioned earlier, the proposed subproject comprises three distinct components; these are briefly described below.

Extension of 132-kilovolt (kV) Tando Adam Grid Station (GS): This includes installation of a new 40 megavolt-amperes (MVA) transformer and its transformer bay within the existing 132-kV Tando Adam GS, to reduce overloading on the two existing 40 MVA transformers. The extension of Tando Adam GS is expected to enhance system reliability for domestic, commercial, and industrial consumers. The key works under this component include: transportation and delivery of new transformer to the GS site; excavation and preparation of foundations for new transformer and other transformer bay components; installing transformer on its foundation; installing conservator tank, radiators, bushings, and cooling fans on the transformer; installation of the transformer bay equipment; installation of control cabinet; cabling; connecting the transformer bay with existing grid network; and finally testing and commissioning.

Augmentation of 132-kV Hala Grid Station: This involves replacement of the existing 13 MVA transformer with a 40 MVA transformer within the existing 132-kV Hala GS, to meet the rising demand on the grid station from Hala city and surrounding areas. The key activities for this component include: disconnecting the existing transformer from the transformer bay, safe removal of the old transformer; transporting the new transformer to the GS site; foundation modifications (if required); installation and connecting the new transformer with

the transformer bay; and finally, testing and commissioning.

Reconductoring of 132-kV Transmission Line from Jamshoro GS to Hala Road GS: This component involves upgrading the existing of 28 kilometer (km) long 132-kV double-circuit transmission line (TL) from Jamshoro GS to Hala Road GS, by replacing the existing lynx conductor with modern High-Temperature Low-Sag (HTLS) conductor. This upgrade will enhance the load carrying capacity of the transmission line thus reducing the chronic overloading and technical losses, improving electricity supply, and also accommodating demand growth in the future. The key activities for this component include: disconnecting the transmission line from the grid stations; removing the existing conductor; transporting the new HTLS conductor to the transmission line right of way (RoW); stringing the HTLS conductor on the existing transmission line towers; transporting the old conductor to the HESCO store; and finally, testing and commissioning.

Institutional and Legislative Framework for Environmental and Social Management

The key regulatory institution for the management of E&S aspects of the proposed subproject is the Sindh Environmental Protection Agency (SEPA) that has been established under the Pakistan Environmental Protection Act 1997. The key provincial legislation to manage the E&S aspects of the proposed subproject is the Sindh Environmental Protection Act, 2014, which is a comprehensive legislation and provides the legislative framework for protection, conservation, rehabilitation and improvement of the environment in the Sindh province. Under this Act, HESCO will seek environmental approvals for the proposed subproject from SEPA.

In addition to the national/provincial legal requirements, the subproject will also comply with the World Bank's Environmental and Social Framework (ESF) as well as the Environmental and Social Standards (ESSs).

Environmental and Social Management Framework (ESMF)

To address the generic environmental and social impacts associated with the EDEIP and to define principles, assessment criteria and procedures to prepare various E&S documents for various EDEIP subprojects, an Environmental and Social Management Framework (ESMF) has been prepared, in accordance with the WB ESF. The present ESMP has been prepared based upon the principles and criteria described in the ESMF.

Baseline Description

All components of the proposed subproject are situated with urban and semiurban settings. The **Tando Adam GS** is located in the Tando Adam Taluka (sub-district) of Sanghar district. The extension works for Tando Adam GS will be carried out within the grid station, which is situated in a periurban area. A staff colony exists within the GS, comprising 10 houses. The GS is surrounded by cultivated area with some small settlements and a village. There is no major water body in the GS vicinity. There are no major existing sources of environmental pollution in the vicinity of the GS. The GS is not located in any ecological sensitive area, in view of the presence of settlements and cultivation in the area. The ambient air and water quality as well as noise levels in the area were found to be within the acceptable limits.

The **Hala GS** is located in Hala Taluka of Matiari district. The augmentation works for Hala GS will be carried out within the grid station, which is situated in a periurban area. A staff colony exists within the GS, comprising 20 houses. The GS is surrounded by cultivated area with some small settlements including a village. There is no major water body in the GS vicinity. There are no major existing sources of environmental pollution in the vicinity of the

GS. The GS is not located in any ecological sensitive area, in view of the presence of settlements and cultivation in the area. The ambient air and water quality as well as noise levels in the area were found to be within the acceptable limits.

The **Hala Road GS to Jamshoro GS transmission line** is located in Hyderabad and Jamshoro districts. The TL passes through congested urban area near the Hala Road GS in the Hyderabad city, and then sparsely populated area with new housing schemes coming up in the area. The terrain is mostly flat with Indus River as the main water body in the area. The TL crosses the Indus River in addition to other canals and drains. The TL does not pass through any ecological sensitive area, in view of the presence of human population in the area. The ambient air and noise levels in the area were found to be within the acceptable limits, however, water was found to be containing bio local contamination in some places along the TL.

E&S Scoping

The E&S scoping was carried out during the preparation of this ESMP. The Scoping considered all E&S impacts and issues and then considered their relevance with the proposed subproject's nature, activities involved and its environmental and social settings. The E&S issues that were considered to be relevant to the proposed subproject were scoped-in and the ones that were not relevant to the proposed subproject were scoped-out. The aspects that are scoped-in include soil erosion and contamination, air quality deterioration, water contamination, noise generation, occupational health and safety risks, community health and safety risks, blocked roads and routes, waste generation, labor influx, sexual exploitation and abuse (SEA) and sexual harassment (SH), and child labor. The key aspects that have been scoped-out include impacts on biological resources, impacts on cultural heritage sites, land acquisition, damage to existing infrastructure such as roads, public utilities and irrigation network. The aspects that have been scoped-in have been further assessed and their mitigation and control measures have been identified in the ESMP. The aspects that have been scoped-out have not been further discussed in this ESMP.

Potential Impacts

The extension and augmentation works for the existing **Tando Adam GS** and **Hala GS** will be carried out within the existing facilities, hence their potential E&S impacts will mostly be confined to the GS boundaries. During the construction phase, these impacts will include: dust and noise generation as well as air quality deterioration caused by the excavation activities and operation of construction machinery and movement of vehicles; waste water releases from the construction sites and workers' camps causing soil and water contamination; soil erosion caused by excavation for foundations; occupational health and safety (OHS) risks for construction workers caused by working near moving machinery/vehicles, lifting and hoisting, working at heights, working in confined spaces, fall and trips, and working at/near energized systems/equipment; safety risks for nearby population (mostly in the staff colonies within the GSs) associated with the vehicle movement, construction activities and electrocution; generation of solid waste including hazardous waste; issues related to labor influx (such as SEA/SH); living conditions within workers' camps; and child labor. During the operation and maintenance (O&M) phase, the potential E&S risks associated with the GS extension and augmentation will include OHS risks particularly working at heights and electrocution, safety risks for the communities particularly the residents of staff colony, soil and water contamination in case of transformer oil leakage, release of effluents (particularly, toile waste) from office/control building and staff colony; and solid waste generation from office, workshop and staff colony.

The **re-conductoring of TL** during the construction phase will mostly cause impacts quite similar to the ones described above for the other two subproject components, except that no excavation-related impacts are expected. In addition, since the TL will pass through the congested areas, there will be additional risks associated with the blocked roads and routes during removing the existing and stringing the new conductor. Furthermore, the construction activities in such areas will pose a greater risk of SEA/SH issues, privacy issues, as well as community health and safety risks. The construction works to cross the river and other water bodies will also pose OHS risks associated with working over water. The TL construction works may also damage crops or structures along the RoW. The E&S risks associated with the O&M phase of the TL include OHS risks particularly working at heights and electrocution, and SEA/SH and safety risks particularly electrocution for communities within the RoW of TL.

Mitigation of Potential Impacts

The risks and impacts described above will be mitigated and controlled mostly with the help of standard mitigation measures. For the construction phase, these measures include water sprinkling to control dust emissions, scheduling construction activities during the daytime to minimize the impact of noise generation, apprising the local communities particularly the staff colony residents about noise generation and safety risks associated with the construction activities, treating the waste effluents released from the site, treating the toilet waste from the workers' camps appropriately (such as through septic tanks), avoiding soil erosion by appropriate techniques such as building dykes and covering the loose soil, disposing non-hazardous waste through the municipality waste handling and disposal system, disposing hazardous waste in accordance with the associated material safety data sheet (MSDS), addressing OHS risks through adopting a stringent OHS management regime that would include employing properly qualified and trained OHS staff at the construction sites, hazard risk assessment and implementing standard operating procedure (SOP) for each construction activity, barricading the construction sites to avoid entry of community members particularly children, awareness raising and training of subproject staff and workers about gender issues particularly SEA/SH, adopting a code of conduct (CoC) covering gender, cultural and SEA/SH issues, to be followed by all site personnel, ensuring proper living conditions within the worker's camps in accordance with the labor laws, ensuring that no child labor is employed at the site and workers' camps, and paying compensation for any crop or any structure damaged by the TL construction works.

During the O&M phase, the HESCO's existing OHS management system will be strictly followed to address the OHS risks. The mitigation and control measures for the remaining O&M-related risks will mostly be the same as described above for the construction phase.

Environmental and Social Management

Institutional setup: HESCO has already established the Project Management Unit (PMU) that includes E&S personnel. HESCO has also employed the Project Implementation and Management Support Consultants (PIMSC) that also have E&S specialists to carry out E&S assessments and prepare the associated documents (such as this ESMP) for HESCO's subprojects under the EDEIP, and also ensure compliance of this ESMP and other E&S documents during the construction phase. The construction contractors to be engaged by HESCO will also be required to employ fulltime E&S specialists at the construction site to ensure compliance with the E&S documents including this ESMP.

Mitigation and Monitoring Plan (MMP): The contractor will be required to implement the

mitigation measures given in this ESMP that has been prepared on the basis of the E&S impact assessment carried out as part of this ESMP. The PIMSC will carry out compliance monitoring with the help of this Plan. The PIMSC will also carry out effects monitoring for the key E&S parameters such as noise and dust emissions, OHS and community health and safety (CHS) incidents, community complaints, and waste management.

Contractor's ESMP (C-ESMP): The construction contractor will be required to prepare and implement a number of site- and subproject-specific plans including camp management plan, waste management plan, traffic management plan, OHS management plan, community health and safety (CHS) management plan, and site restoration plan. These plans will be prepared on the basis of mitigation and control measures provided in the MMP.

Capacity building: The PMU, PIMSC and contractors will be required to conduct regular training and awareness raising for the subproject personnel including construction workers, on key E&S aspects such as waste management, OHS management, camp management, grievance management, traffic management, gender aspects particularly SEA/SH, and implementation of CoC.

Grievance Redress Mechanism (GRM): For all of its subprojects under EDEIP, HESCO has established a three-tier GRM to receive, evaluate, and facilitate the resolution of concerns, complaints, and grievances of the affected communities about the E&S aspects of the subprojects. The GRM will provide a time-bound, early, transparent and fair resolution for affected persons' and other stakeholders' grievances regarding E&S management of the proposed subproject (and HESCO's other subprojects under EDEIP). Under this GRM, a separate mechanism will be established to address labor-related complaints; similarly, a mechanism will also be established to address the complaints related to gender-based violence (GBV).

Stakeholder Consultations

A Stakeholder Engagement Plan (SEP) has been prepared for the entire EDEIP, to provide the context, objectives, principles and procedures for the stakeholder engagement and consultations to be carried out during the EDEIP implementation. The stakeholder consultations for this ESMP were carried out in accordance with the guidelines provided in the SEP. These consultations were carried out in March–April 2025 and comprised 11 community sessions engaging 107 participants including 64 men and 43 women. During these sessions, subproject details and their likely E&S impacts were explained to the participants and their views, comments and concerns obtained about the subproject and its impacts. Separate consultations were carried out with the relevant government departments to seek their views and concerns about the proposed subproject and its E&S impacts.

During these consultations, community participants generally welcomed the subproject, appreciating that it would improve the electricity availability and reliability in the area. Their key concerns particularly related to the TL re-conductoring works were about the safety risks, while their key expectation from the subproject was about the availability of job opportunities during the construction phase. They were assured, during the consultations, that HESCO would take all necessary precautionary measures to ensure safety of the nearby communities, and also that the contractor will be required to offer job opportunities to the local population.

The government departments broadly supported the proposed subproject and assured their full support to HESCO and its contractors during the subproject implementation. The Irrigation Department requested that HESCO/its contractor should coordinate with them regarding the crossing of irrigation canals during the TL re-conductoring works. They were

assured that such coordination will be carried out with them.

Cost of ESMP Implementation

The implementation cost of environmental and social management framework has been estimated to be about PKR 8.75 million.

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List of Acronyms

ABC	Aerial Bundled Cable
AMI	Advanced Meter Infrastructure
AoI	Area of Influence
AP	Affected person
C-ESMP	Contractor's Environmental and Social Management Plan
CHS	Community health and safety
CoC	Code of Conduct
CT	Current transformer
dB	Decibel
DC	Deputy Commissioner
DISCO	Distribution Company
EDEIP	Electricity Distribution Efficiency Improvement Project
E&S	Environmental and social
ECoP	Environmental Code of Practice
EIA	Environmental Impact Assessment
ELR	Energy Loss Reduction
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ESF	Environmental and Social Framework
ESHS	Environmental, Social Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESRC	Environmental and Social Risk Classification
ESS	Environmental and Social Standard
ESU	Environmental and Social Unit
GAP	Gender Action Plan
GBV	Gender Based Violence
GDP	Gross Domestic Product
GoP	Government of Pakistan
GRC	Grievance Redressal Committee
GRM	Grievance Redressal Mechanism

GS	Grid Station
GSO	Grid Station Operation
HESCO	Hyderabad Electric Supply Company
HIV/AIDS	Human immunodeficiency virus/ acquired immunodeficiency syndrome
HR	Human Resource
HTLS	High Tension Low Sag
ILO	International Labor Organization
Km	Kilometer
kV	Kilo-volt
kWh	Kilo Watt Hour
LMP	Labor Management Procedure
M&E	Monitoring and Evaluation
M	Meter
MEPCO	Multan Electric Supply Company
MMP	Mitigation and Monitoring Plan
MSDS	Material Safety Data Sheet
MVA	Mega volt amperes
NEPRA	National Electric Power Regulatory Authority
NEQS	National Environment Quality Standards
NGO	Non-Governmental Organization
NHA	National Highway Authority
O&M	Operation and Maintenance
OCHS	Occupational and Community Health and Safety
OHS	Occupational Health and Safety
PD	Project Director
PESCO	Peshawar Electric Supply Company
PIMSC	Project Implementation and Management Support Consultants
PKR	Pakistani Rupees
PM	Particulate Matter
PMU	Project Management Unit
PPE	Personal protective equipment
PT	Potential transformer

RF	Resettlement Framework
ROW	Right of Way
RP	Resettlement Plan
SEQS	Sindh Environmental Quality Standards
SCADA	Supervisory Control and Data Acquisition
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SEPA	Sindh Environmental Protection Agency
SH	Sexual Harassment
SOE	State Owned Enterprise
STG	Secondary Transmission and Grid
STI	Sexually Transmitted Infections
TL	Transmission Line
TMA	Tehsil Municipal Administration
VAC	Violence Against Children
WB	World Bank
WHO	World Health Organization

1. Introduction

The Hyderabad Electric Supply Company (HESCO) is planning to undertake extension of its existing Tando Adam grid station, augmentation of its existing Hala grid station, and re-conductoring of its existing transmission line from the Hala Road grid station to Jamshoro grid station (these works will be described as the proposed subproject in this document). All components of the proposed subproject are located in the Sindh province.

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This **Environmental and Social Management Plan (ESMP)** has been prepared to address the potential environmental and social (E&S) impacts of the proposed subproject, in compliance with the national/provincial regulatory requirements as well as the WB Environmental and Social Framework (ESF).

1.1. EDEIP Background

Over the past few years Pakistan has struggled to meet its fiscal targets. One of the key fiscal risks is the underperformance of the State-Owned Enterprises (SOEs) dominated by power sector entities. Therefore, improving distribution companies' efficiencies is a prime and core requirement to reduce sector's fiscal burden, lower cost of power supply and attract investments.

Pakistan's electricity sector is in crisis due to high cost of generation, dependent on imported fuels that makes the sector vulnerable to changes in fuel prices and currency exchange rates. Higher cost of electricity supply has exacerbated cost recovery challenges for the distribution companies. This has hampered investments particularly by loss making electricity distribution companies (DISCOs) to strengthen their networks and is resulting in increased outages and interruptions, costing businesses and affecting household welfare. These inefficiencies in the sector are estimated to be costing Pakistan about 6.5 percent of its gross domestic product (GDP), according to a World Bank report[1]. Also, in terms of reliability of electricity supply Pakistan is among the lowest performing countries in the world. It is ranked at 167 out of 190 economies on getting electricity indicator in Ease of Doing Business 2019. Moreover, a significant number of households do not have access to electricity and per capita electricity consumption at 471 kilowatt-hour (kWh) is less than one-fifth of the world average according to the World Development Indicators 2017. While government is adding low-cost generation and plans to shift the generation mix towards renewable sources targeting 20 percent by 2025 and 30 percent by 2030, yet long-term financial viability of the power sector is dependent on DISCOs' efficiency improvement.

1.2. EDEIP Overview

To address some of the problems discussed above, the EDEIP aims to support the targeted DISCOs by providing financial and technical support for investments to modernize their electricity distribution networks and institutional development resulting in improved

[1] https://www.worldbank.org/en/region/sar/publication/in-the-dark-how-much-do-power-sector-distortions-cost-south-asia

operational efficiency in the sector and reliable supply to the consumers. It seeks to help in: (i) physical strengthening of distribution networks; (ii) deployment of modern equipment, technology and information systems; and (iii) provide technical assistance, studies, consultancies and management support. Under the EDEIP, three DISCOs namely HESCO, MEPCO and PESCO have been selected.

1.2.1. EDEIP Objectives

The project development objectives for EDEIP are to improve electricity supply and operational efficiency in targeted areas of selected distribution companies and strengthen the capacity of power sector institutions to implement reforms.

1.2.2. EDEIP Components

The various components of EDEIP are explained below.

Component 1: Improving Grid Reliability

This component finances investments in Secondary Transmission and Grid (STG) and Energy Loss Reduction (ELR) programs of the DISCOs to improve reliability of electricity supply and reduce technical losses. The subprojects financed under this Component can be divided into following categories:

- New Grid Stations. Construction of new 132 kV grid stations and the associated transmission lines;
- Existing Grid Stations. Augmentation, extension, conversion, upgradation and rehabilitation of the existing grid stations and the associated transmission lines;
- Transmission Lines. Construction, rehabilitation and re-conductoring of 132-kV (and below) transmission lines with low loss conductors e.g. high-tension low sag (HTLS); and
- Energy Loss Reduction. Expansion and rehabilitation of 33-kV and 11-kV feeders.

Component 2: Modernizing Operations and Management

This component supports modernization of the DISCOs' operations and management functions using latest equipment, technology and information systems. Major activities include:

- Automation and Information Systems. This entails upgradation deployment of information systems and emergency response planning solutions. This will help improve planning, grid operations and customer services by providing access to and integrating modern information systems
- Revenue Protection Program. It comprises of installation of Aerial Bundled Cables (ABC), Advanced Metering Infrastructure (AMI), Transformer monitoring System, and other measures to pre-empt theft, reduce losses, improve recoveries, and better service delivery based on access to reliable and timely data.

Component 3: Capacity Building and Technical Assistance

This component helps build capacity of the DISCOs with particular focus on:

- Improving operations and maintenance. This covers procurement of tools, equipment, hardware, software, consulting and non-consulting services for improved operations and maintenance practices e.g., for live-line maintenance, upgrade repair workshops, inventory/asset management etc.;

- Training and capacity building. Conduct studies and assessments including preparation/updating of manuals, procedures and systems in particular for human resource management, inventory management, procurement, financial management, customer services and safeguards and assist with their implementation and conduct training programs including workshops, seminars and post graduate degrees in relevant fields;
- Project implementation support. This includes financing of: (a) consulting and other services; (b) individual experts/advisors and any incremental staff positions; (c) equipment and software; (d) financial, operational & technical audits; and (e) operating cost of Project Management Units (PMUs).

Component 4: Reform Support

This component supports the implementation of power sector reforms and seeks to improve sector governance.

1.3. Overview of Proposed Subproject

The proposed subproject comprises three distinct components; these are briefly described below (further details are provided later in the document).

1.3.1. Extension of 132-kilovolt (kV) Tando Adam Grid Station (GS)

This component includes installation of a new 40 megavolt-amperes (MVA) transformer and its transformer bay within the existing 132-kV Tando Adam GS, to reduce overloading on the two existing 40 MVA transformers. The extension of Tando Adam GS is expected to enhance system reliability for domestic, commercial, and industrial consumers. The key works under this component include: transportation and delivery of new transformer to the GS site; excavation and preparation of foundations for new transformer and other transformer bay components; installing transformer on its foundation; installing conservator tank, radiators, bushings, and cooling fans on the transformer; installation of control cabinet; cabling; connecting the transformer bay with existing grid network; and finally testing and commissioning.

1.3.2. Augmentation of Hala Grid Station

This component involves replacement of the existing 13 MVA transformer with a 40 MVA transformer within the existing 132-kV Hala GS, to meet the rising demand on the grid station from Hala city and surrounding areas. The key activities for this component include: disconnecting the existing transformer from the transformer bay, safe removal of the old transformer; transporting the new transformer to the GS site; foundation modifications (if required); installation and connecting the new transformer with the transformer bay; and finally, testing and commissioning.

1.3.3. Reconductoring of 132-kV Transmission Line from Jamshoro GS to Hala Road GS

This component involves upgrading the existing of 28 kilometer (km) long 132-kV double-circuit transmission line (TL) from Jamshoro GS to Hala Road GS, by replacing the existing lynx conductor with modern High-Temperature Low-Sag (HTLS) conductor. This upgrade will enhance the load carrying capacity of the transmission line thus reducing the chronic overloading and technical losses, improving electricity supply, and also accommodating demand growth in the future. The key activities for this component include: disconnecting the transmission line from the grid stations; removing the existing conductor; transporting the

new HTLS conductor to the transmission line right of way (RoW); stringing the HTLS conductor on the existing transmission line towers; transporting the old conductor to the HESCO store; and finally, testing and commissioning.

1.4. Regulatory Overview

The key regulatory institution for the management of E&S aspects of the proposed subproject is the Sindh Environmental Protection Agency (SEPA) that has been established under the Pakistan Environmental Protection Act 1997. The key provincial legislation to manage the E&S aspects of the proposed subproject is the Sindh Environmental Protection Act, 2014, which is a comprehensive legislation and provides the legislative framework for protection, conservation, rehabilitation and improvement of the environment in the Sindh province. Under this Act, HESCO will seek environmental approvals for the proposed subproject from SEPA.

In addition to the national/provincial legal requirements, the subproject will also comply with the World Bank's Environmental and Social Framework (ESF) as well as the Environmental and Social Standards (ESSs).

1.5. E&S Scoping

The E&S scoping was carried out during the preparation of this ESMP. The scoping considered all E&S impacts and issues and then considered their relevance with the proposed subproject's nature, activities involved and its environmental and social settings; see **Table 1.1**.

Table 1.1: E&S Scoping for Proposed Subproject

E&S Aspects	Relevance for Proposed Subproject	Scoping Results
Soil erosion and contamination	Soil erosion is relevant since it may be caused by the excavation activities during the GS extension works. Soil contamination is also relevant since it may be caused by effluent releases from construction sites and workers' camps for all subproject components.	Scoped-in
Air quality deterioration including dust and exhaust emissions	Relevant since it may be caused by excavation for GS extension; vehicle operation during TL works, and operation of construction machinery on all components.	Scoped-in
Noise	Relevant since it may be caused by construction machinery operation and vehicle movement.	Scoped-in
Water contamination	Relevant since it mamy be caused by effluent releases from construction sites and workers' camps for all subproject components	Scoped-in
Damage to crops and builtup structures	Not relevant for GS extension and augmentation components since these works will be carried out inside the existing GSs; very unlikely during TL re-conductoring	Scoped-out

E&S Aspects	Relevance for Proposed Subproject	Scoping Results
	since there are very few cultivated areas along the RoW of TL.	
Occupational health and safety (OHS) risks	Relevant since these risks may be caused by construction and operation of all components	Scoped-in
Community health and safety (CHS) risks	Relevant since these risks may be caused by construction and operation of all components	Scoped-in
Impacts on biological resources (flora and fauna)	Not relevant for all components since subproject area comprises populated and built up area without any original flora and fauna or any sensitive habitats/species of concern. No wildlife protected area exists within or in the vicinity of AoIs of subproject components.	Scoped-out
Blocked roads and routes	Relevant for TL re-conductoring since it can block roads and routes particularly in the populated area	Scoped-in
Waste generation	Relevant since it may be caused by construction activities and camp operation for all components	Scoped-in
Labor influx	Relevant for all components of the proposed subproject since it will engage technical and non-technical personnel including construction workers.	Scoped-in
SEA/SH	Relevant since construction and O&M activities will be carried out near communities.	Scoped-in
Child labor	Relevant since the contractors can potentially engage under age worker.	Scoped-in
Physical cultural heritage	Not relevant since no sites are known to exist that are archeologically, historically, culturally significant within the AoIs of the subprojects are in their immediate vicinity. Chance Find procedures have however been included in the mitigation measures discussed later in the document.	Scoped-out
Land acquisition	No land acquisition is involved since the extension and augmentation components will be carried out in existing GSs and the third component will be carried out on an exisiting TL.	Scoped-out
Damage to existing infrastructure and	Not relevant since the extension and augmentation works will be confined within	Scoped-out

E&S Aspects	Relevance for Proposed Subproject	Scoping Results
public utilities	the existing GSs and the TL works be limited to replacing the existing conductor, without any excavation, foundation works or tower erection.	

The aspects that have been scoped-in have been further assessed and their mitigation and control measures have been described later in this ESMP. The aspects that have been scoped-out have not been further discussed in this ESMP.

1.6. Area of Influence (AoI)

The AoI for the Tando Adam and Hala grid stations will be the entire grid station and a corridor of 500 meters (m) around their boundary walls. The AoI for the Hala Road GS to Jamshoro GS transmission line will be a corridor of 1,000 m wide (500 m either side of the TL centerline). The potential E&S impacts of the above subproject components are likely to be confined to these AoIs. The AoIs of the three components are shown in **Figures 1.1, 1.2,** and **1.3**.

Figure 1.1: Area of Influence of 132-kV Tando Adam Grid Station

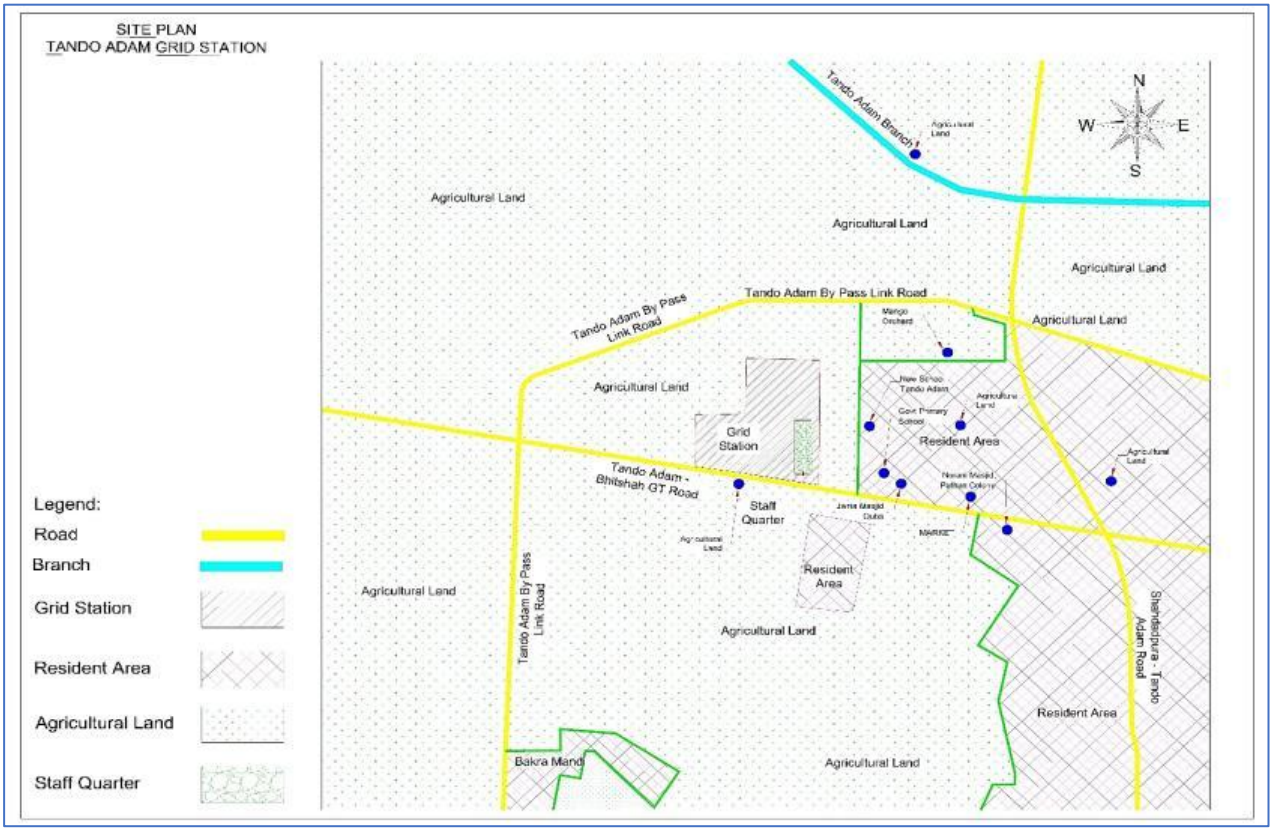


Figure 1.2: Area of Influence of 132-kV Hala Grid Station

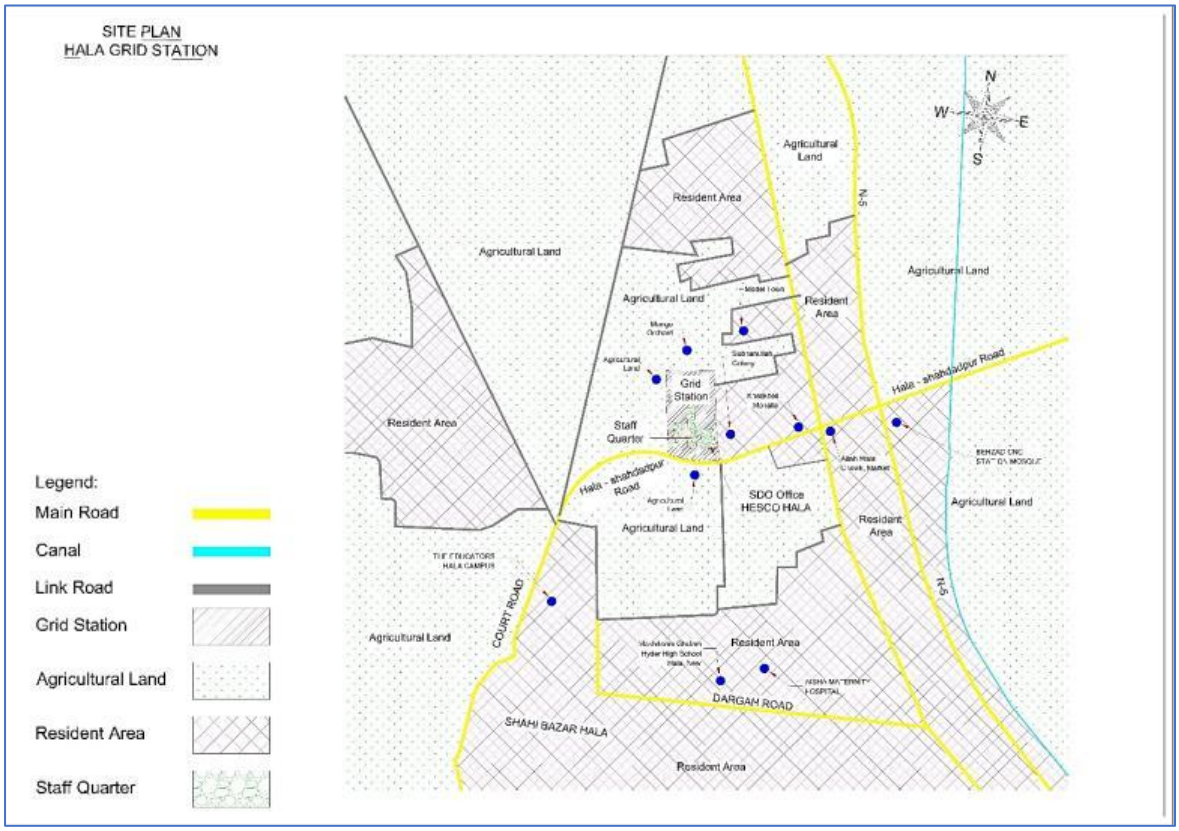
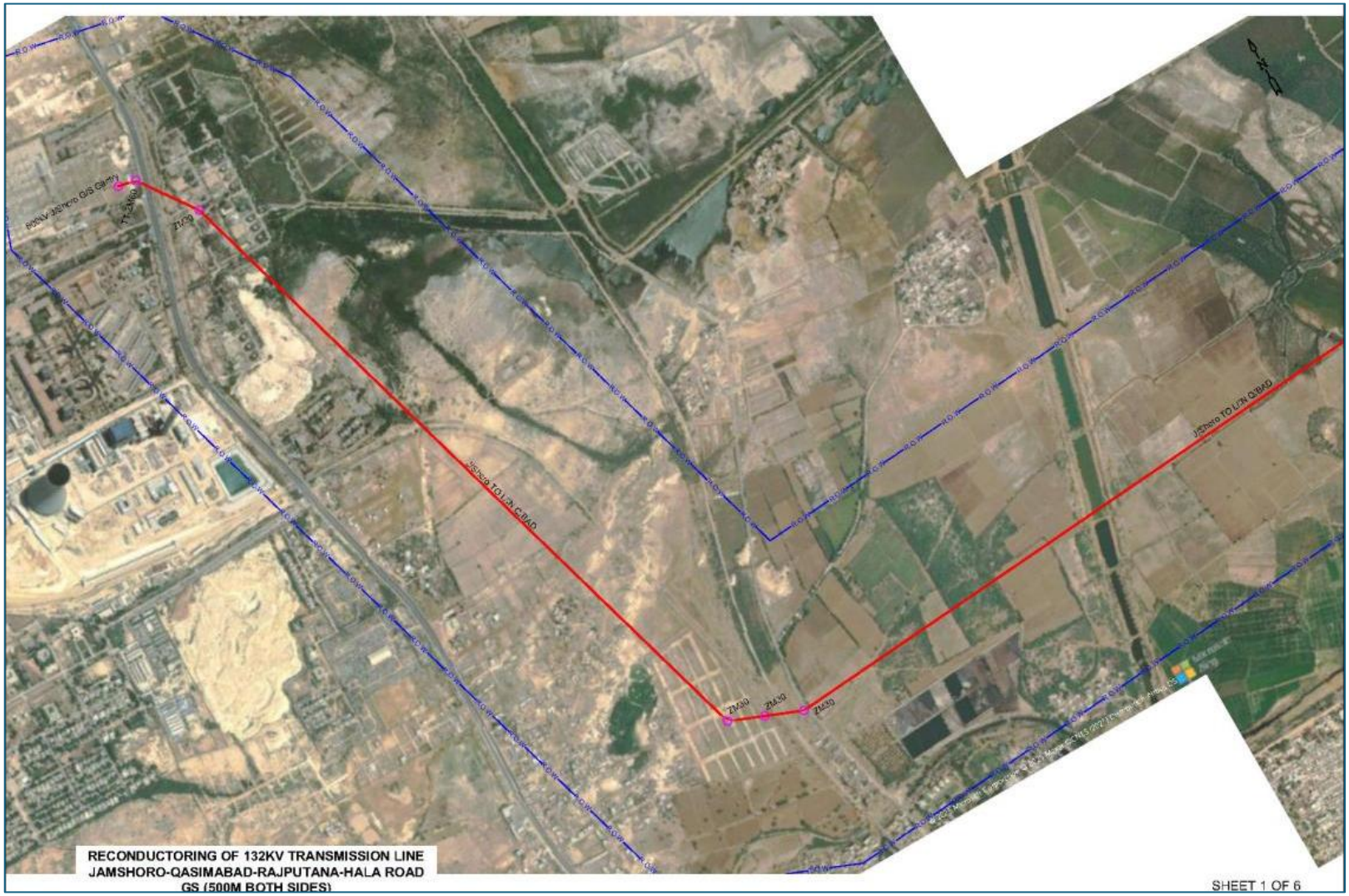
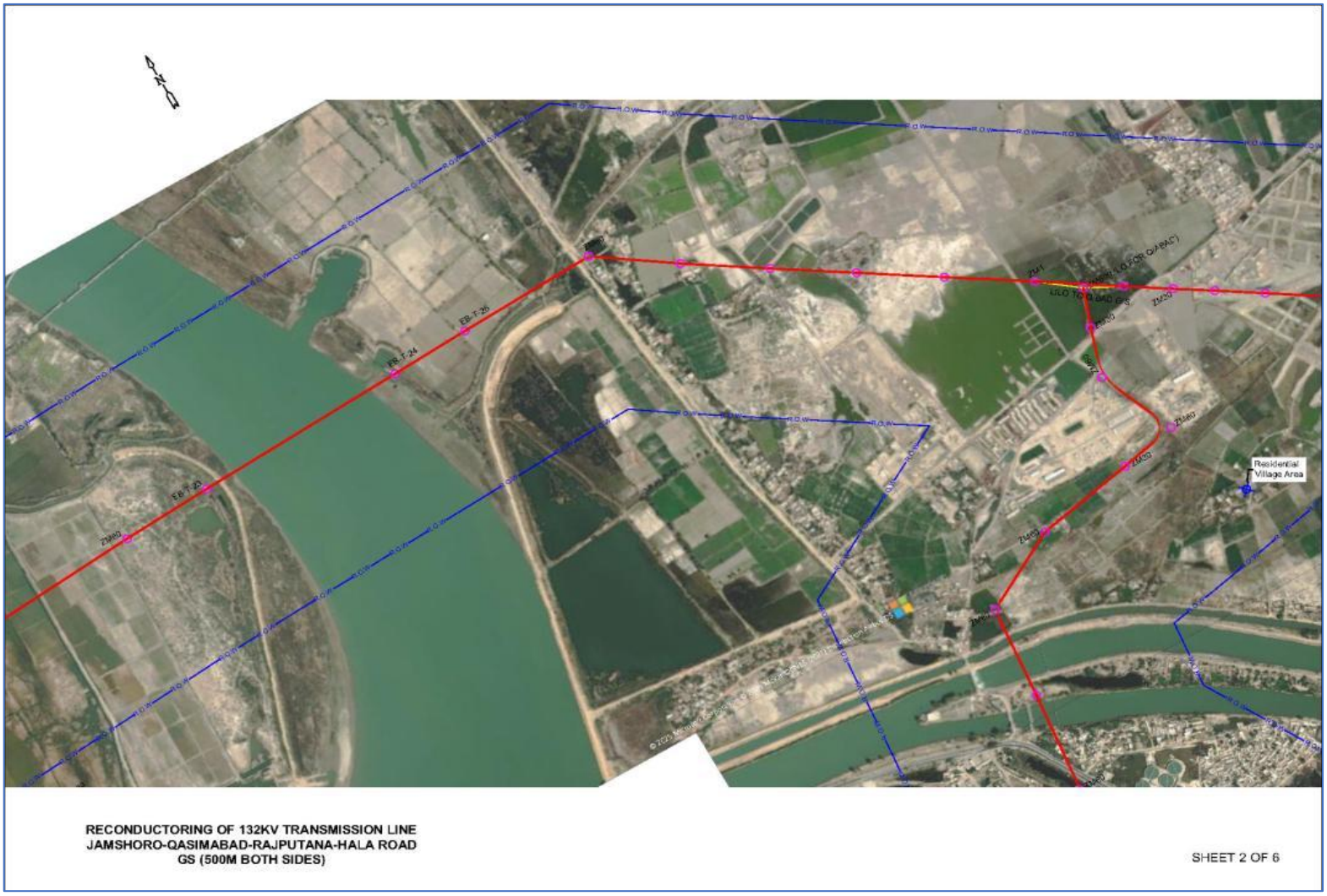
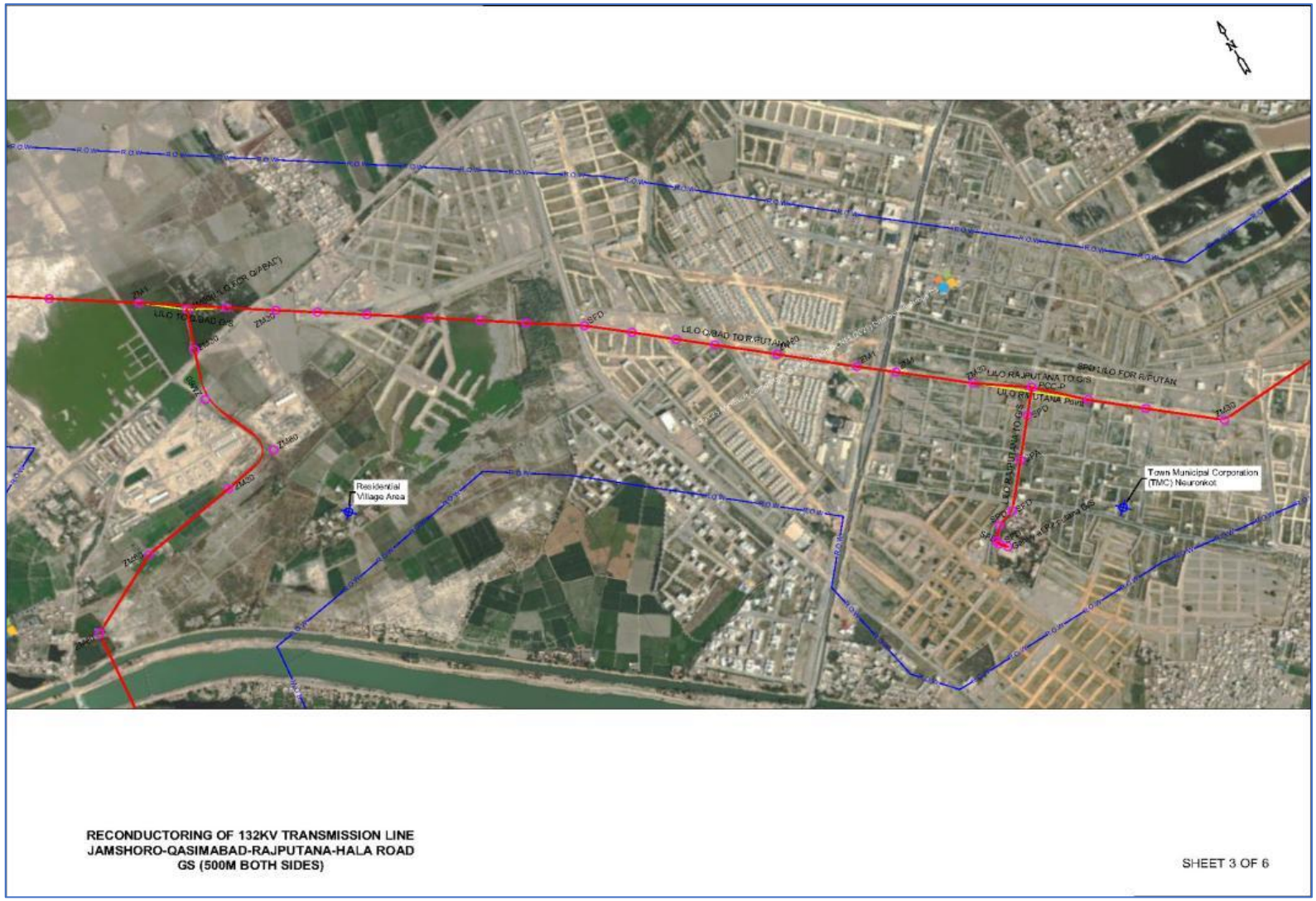
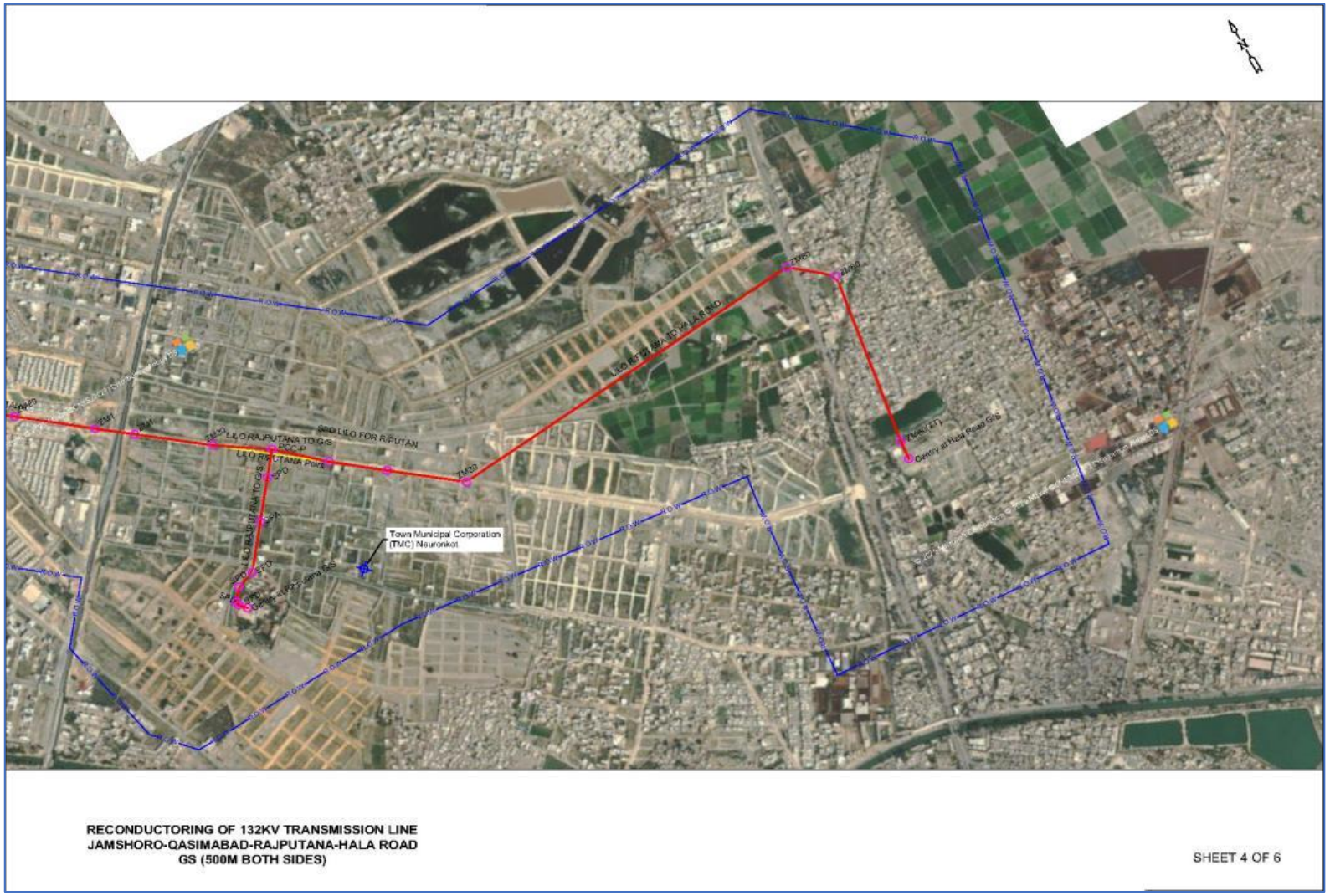


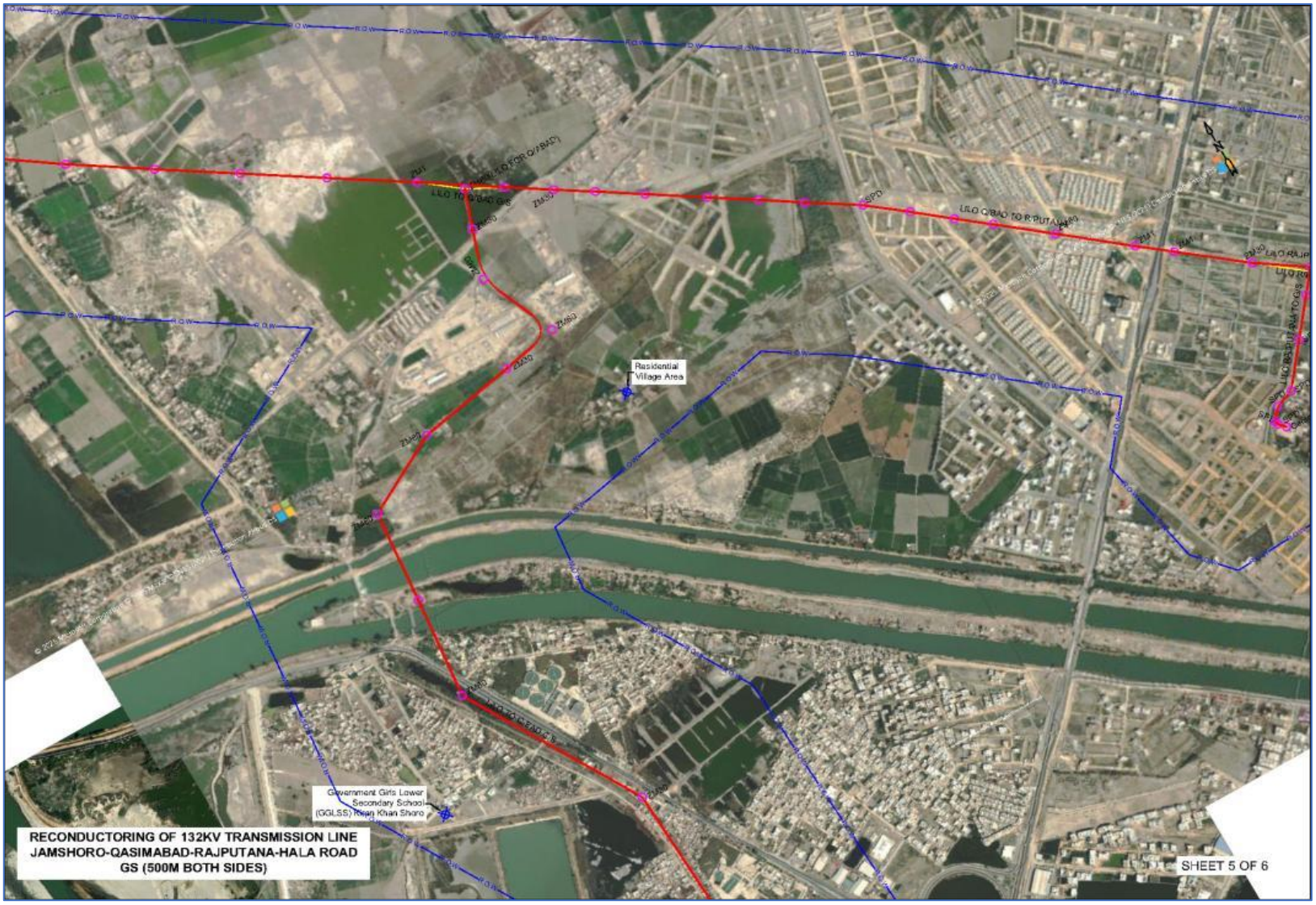
Figure 1.3: Route and Area of Influence of 132-kV Hala Road Grid Station to Jamshoro Grid Station Transmission Line (Sheets 1-6)

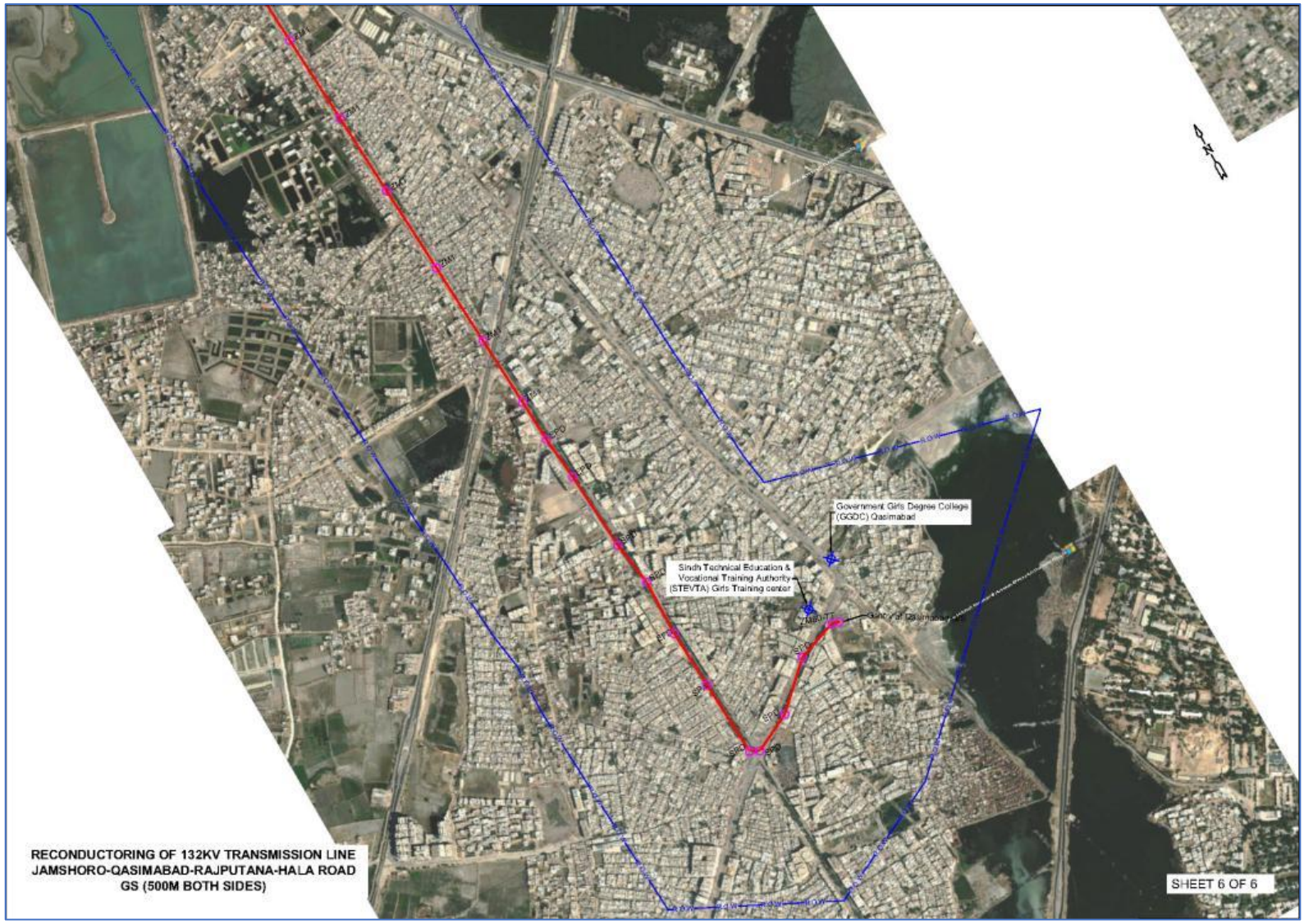



Residential Village Area
RECONDUCTORING OF 132KV TRANSMISSION LINE
JAMSHORO-QASIMABAD-RAJPUTANA-HALA ROAD
GS (500M BOTH SIDES)
SHEET 2 OF 6


Residential Village Area
Town Municipal Corporation (TMC) Neuronkot
RECONDUCTORING OF 132KV TRANSMISSION LINE
JAMSHORO-QASIMABAD-RAJPUTANA-HALA ROAD
GS (500M BOTH SIDES)
SHEET 3 OF 6


Town Municipal Corporation (TMC) Neuronkot
RECONDUCTORING OF 132KV TRANSMISSION LINE
JAMSHORO-QASIMABAD-RAJPUTANA-HALA ROAD
GS (500M BOTH SIDES)
SHEET 4 OF 6


Residential Village Area
Government Girls Lower Secondary School (GGLSS) Khan Khan Sharo
RECONDUCTORING OF 132KV TRANSMISSION LINE
JAMSHORO-QASIMABAD-RAJPUTANA-HALA ROAD
GS (500M BOTH SIDES)
SHEET 5 OF 6


Government Girls Degree College (GGDC) Qasimabad
Sindh Technical Education & Vocational Training Authority (STEVTA) Girls Training center
RECONDUCTORING OF 132KV TRANSMISSION LINE
JAMSHORO-QASIMABAD-RAJPUTANA-HALA ROAD
GS (500M BOTH SIDES)
SHEET 6 OF 6

1.7. Environmental and Social Documents for EDEIP

In compliance with the WB ESF, the following specific environmental and social documents have been prepared for the overall EDEIP:

- **Stakeholder Engagement Plan (SEP)** – to describe various modes of stakeholder engagement including consultations and grievance redress mechanism (GRM).
- **Environmental and Social Management Framework (ESMF)** to provide criteria and procedures for environmental and social assessment of various categories of the subprojects under EDEIP.
- **Resettlement Framework (RF)** – to define principles and procedures for resettlement planning and preparation of resettlement plans for subprojects potentially causing resettlement impacts.
- **Labor Management Procedures (LMP)** to describe assessment of potential labor related risks, overview of labor regulation, staff responsibility, policies and procedures.

The current ESMP has been carried out in accordance with the guidelines provided in the above-listed ESMF. Similarly, the stakeholder consultations for this ESMP have been carried out following the guidelines provided in above-listed SEP. The LMP will be applicable for all the subproject personnel including construction workers.

1.8. Environmental and Social Management Plan

1.8.1. ESMP Objectives

The present ESMP has been prepared for the proposed subproject since it is unlikely to cause widespread and lasting negative environmental and social impacts. The ESMP has been developed to:

- integrate the environmental and social concerns into the design and implementation of the proposed subproject in order to ensure that it is environmentally and socially sustainable;
- consider in an integrated manner, the environmental and social risks, benefits and impacts of the proposed subproject and identify measures to avoid, minimize and manage risks and impacts while enhancing benefits;
- To specify appropriate roles and responsibilities of all implementing agencies/entities and define the necessary monitoring and reporting procedures for managing environmental and social concerns related to the proposed subproject;
- To determine the training, capacity building and technical assistance needed to successfully implement the provisions of this ESMP.
- To comply with the local regulatory and WB policy requirements.

1.8.2. ESMP Study Methodology

The methodology followed in preparing the present ESMP consists of the following steps:

Review of the Subproject Details

At the onset of the study, the subproject details were obtained from HESCO and studied carefully. Meetings were held with the concerned officials as needed. Attempts were made to obtain as much information as available at this stage on the subprojects.

Review of Relevant Legislation, Policies, and Guidelines

In order to determine the policy, legal and institutional environment for the subproject, the applicable policies, guidelines and legislations concerning the subproject's environmental and social aspects were reviewed, as listed below.

- Policies and legislations of Government of Pakistan and Government of Sindh.
- The World Bank ESF, Environmental and Social Standards (ESSs), Guidelines, Policies and Directives.

During the present study, the above legislations, regulations, and framework were studied in depth to determine their relevance and applicability to the proposed subproject, in addition to determining and specifying actions to be taken by the project proponents / implementing agencies to fulfill the associated requirements.

Review of Secondary Literature

Under this task, relevant published and unpublished reports and documents were identified and reviewed. These include among others similar environmental assessment reports particularly of donor-funded projects, project documents, environmental and social management frameworks, environmental monitoring reports, news articles, and research reports. The primary objective of this task was to determine the potentially negative environmental as well as social impacts of projects similar to the proposed subproject and the associated mitigation/management strategies that were proposed to address those impacts. Secondary data was also collected where applicable to obtain baseline conditions of the subproject area and its surroundings.

E&S Scoping and AoI Determination

During this phase, key information on the subprojects was reviewed and interaction between its activities and key environmental resources charted out. A long list of the potential environmental as well as social issues likely to arise as a result of the project was thus developed. Subsequently, the significant potential impacts were short listed, screening out the non-relevant and or insignificant impacts, based upon their nature and severity. Furthermore, the area of influence of the subproject activities was determined. Thus, the sectorial as well as spatial boundaries of the subproject were determined for the purpose of the environmental and social assessment.

Stakeholder Engagement

A Stakeholder Engagement Plan (SEP) has been prepared for the EDEIP to identify various modes of stakeholder engagement including stakeholder consultations and GRM, as mentioned earlier in **Section 1.7**. During the preparation of this ESMP, stakeholder consultations were carried out with communities in and around the AoIs and also with the institutional stakeholders (government departments), in accordance with the guidelines provided in the SEP.

Collection of Baseline Data

During this phase, environmental and social data was collected and compiled, in order to develop a baseline of the subproject area's physical and socio-economic environment.

Impact Assessment

Once the baseline data collection was completed, impact assessment was carried out to identify potentially negative impacts of the proposed activities under the subproject. Subsequently, appropriate mitigation measures were identified to address these potential impacts. To the extent possible, the impact assessment and the associated mitigation measures were subproject- and site-specific.

ESMP Compilation

During this task, the process and outcome of the tasks described above was compiled in the form of the present ESMP. The structure of the ESMP is described in the section below.

1.8.3. ESMP Structure

Executive Summary: This provides a general summary of the ESMP contents and key findings, in a vocabulary that is easily understood by the public at large. It concisely covers all aspects of the document.

Chapter 1: Introduction. This Chapter describes the ESMP purpose, objectives, principles and methodology. This Chapter introduces the subproject proponents and provides other relevant information. The layout of ESMP is also described in it to facilitate its reading.

Chapter 2: Subproject Description. This Chapter provides a simplified description of the proposed subproject. The subproject description includes background and purpose of the subproject and also components of the subproject.

Chapter 3: Environmental and Social Management Requirements. This Chapter describes the relevant national/provincial environmental and social legal requirements as indicated in various legislation, regulations and guidelines relevant to the subproject and this ESMP as well as the World Bank's ESSs applicable to the proposed subproject. The Chapter also states how such requirements will be complied during various phases of the subproject.

Chapter 4: Environmental and Socio-Economic Characteristics. This Chapter covers the dimensions of the study area and review relevant physical, land-use, and socioeconomic conditions. This Chapter has been compiled on the basis of baseline data collection described earlier in **Section 1.8.2**.

Chapter 5: Environmental and Social Impact Assessment. This Chapter defines the impact assessment methodology and describes the potential impacts that were assessed using this methodology. Mitigation measures are also described in this Chapter to address these impacts.

Chapter 6: Stakeholder Consultations. This Chapter summarizes the stakeholder engagement activities carried out during the preparation of this ESMP. The Chapter also describes the similar activities to be carried out during the subproject implementation.

Chapter 7: Environmental and Social Management. This Chapter presents the implementation and monitoring mechanisms for the mitigation measures described in **Chapter 5**. This Chapter also includes institutional arrangements, training requirements, reporting requirements and also the GRM.

2. Subproject Description

This Chapter describes the overall objectives and components of the proposed subproject and the activities that will be carried out during the construction and O&M phases.

2.1. HESCO's Subprojects under EDEIP

HESCO plans to undertake the following components under the EDEIP:

- Extension of 132-kV Tando Adam Grid Station
- Augmentation of 132-kV Hala Grid Station
- Reconductoring of 132-kV transmission line from Hala Road Grid Station to Jamshoro Grid Station (about 28 km long)
- Construction of a new 132-kV grid station at River Bund, Hyderabad
- Construction of a new 132-kV grid station in Rashidabad
- Conversion of 66-kV Khipro Grid Station
- Construction of a new 132-kV transmission line from Kandiari to Khipro (about 35 km long)
- Installation of Advanced Metering Infrastructure (AMI).

The present ESMP has been prepared for the first three components of the above list. These three components of the proposed subproject are described in the following sections.

2.2. Extension of 132-kV Tando Adam Grid Station

The Tando Adam grid station currently operates near full capacity, struggling to meet rising electricity demand driven by rapid urban expansion in surrounding areas. This strain has resulted in inconsistent voltage levels and compromised power reliability for local consumers. To address these challenges, the proposed extension will enhance the station's capacity by installing an additional transformer bay and upgrading associated control systems. These improvements will:

- Increase power distribution capacity to accommodate growing demand
- Improve load management, reducing strain on existing infrastructure
- Enhance service reliability for residential consumers, small businesses, and essential public facilities
- Mitigate overloading risks, ensuring more stable electricity supply

By modernizing this critical node in the power network of the area, the GS extension will support sustainable growth while delivering immediate benefits to the local community through more dependable electricity access.

2.2.1. Proposed Extension Works

Under this component of the proposed subproject, the Tando Adam GS will undergo extension works that comprise the following:

- Construction of a new transformer bay within the existing switchyard
- Installation of a new 40-MVA power transformer

- Installation of associated equipment including high-voltage circuit breakers, isolators and current transformers, and capacitor bank for power factor correction
- Underground cable laying and new control panel installation.

The grid station currently has two power transformers with their associated transformer bays. The grid station has ample space available for adding the third power transformer and its transformer bay under the extension works (see GS layout in **Figure 2.1**).

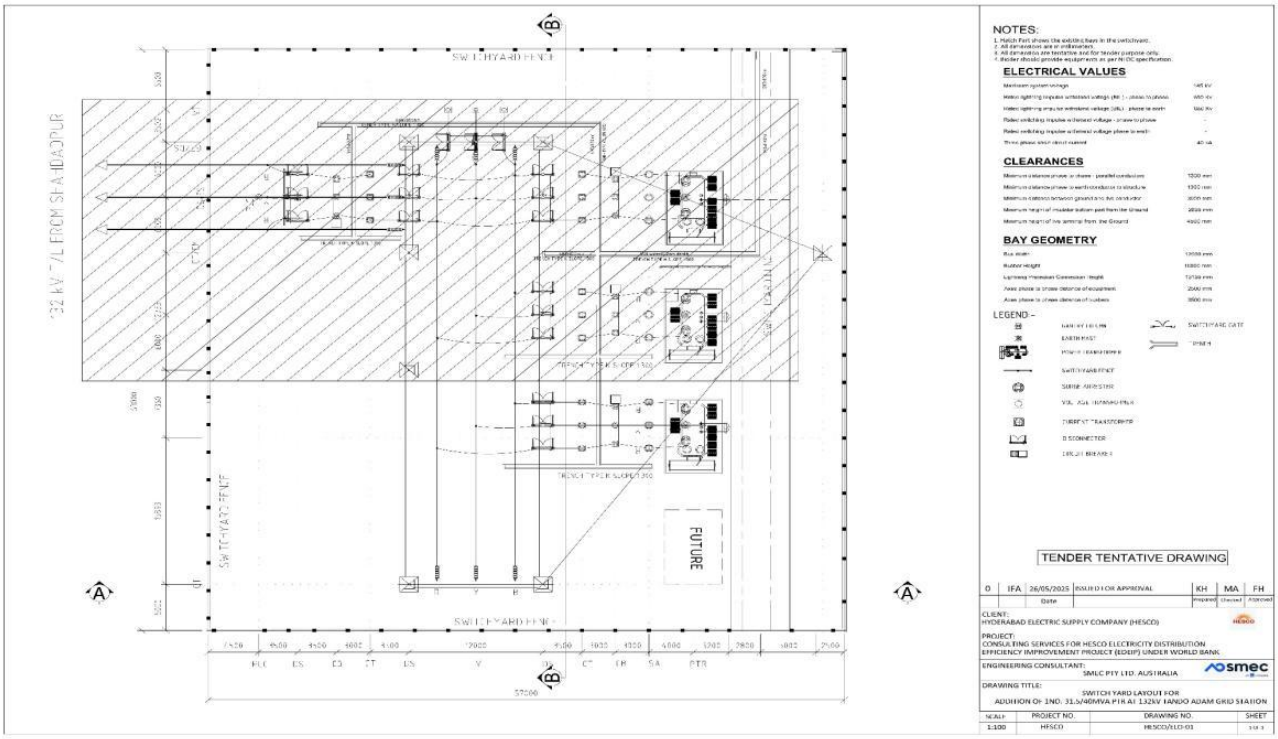


Figure 2.1: Layout of 132-kV Tando Adam Grid Station

2.2.2. Overview of Construction and O&M Activities

The activities to be carried out during the construction and O&M phases of this component are outlined below.

- Contractor mobilization
- Setting up of temporary facilities
- Site preparation and clearance: this will involve removal of any debris, vegetation, or obstructions in the designated extension area; leveling and compacting of ground.
- Excavation for foundations for transformer and associated equipment foundations to specified depth.
- Disposing of excavated material at a location approved by HESCO.
- Construction of reinforced concrete foundations for transformer, and other equipment for the transformer bay.

- Excavation of trenches for power and control cables.
- Laying of control and power cables in the trenches.
- Transporting[2] the 40 MVA transformers to Tando Adam GS; offloading and positioning on the foundation using heavy lifting equipment.
- Assembling bushings, radiators, conservator tank, and other accessories on transformer, filling transformer oil under vacuum.
- Installation of transformer bay equipment for protection and metering
- Connecting bushings to bus bars, surge arresters, current transformer (CT); potential transformer (PT), cable terminations; earthing connections.
- Protection and control system integration including installing and wiring of protection relays, control panels, Supervisory Control and Data Acquisition (SCADA) system connections, and communication lines.
- Testing and commissioning including insulation resistance test, transformer turns ratio test, winding resistance test, and functional tests; energizing transformer.
- Site restoration and demobilization of contractor.
- Routine operation including monitoring transformer load, oil level, and temperature.
- Preventive maintenance including periodic inspection, cleaning, tightening connections, oil testing.
- Emergency maintenance including repairing faults or replacing damaged components.
- Monitoring operational parameters and alarms via SCADA.

2.3. Augmentation of 132-kV Hala Grid Station

The Hala Grid Station currently operates with an overburdened 13 MVA power transformer that struggles to meet peak demand, resulting in inefficient performance and accelerated wear. This capacity constraint affects power reliability for both current users and limits future growth potential. Under the GS augmentation, this power transformer will be replaced with a 40 MVA power transformer thus delivering significant improvements:

- **Enhanced Capacity**: enhance the GS's power handling capability to reliably serve growing demand
- **Improved System Health:** reduce transformer overloading to extend equipment lifespan
- **Stable Electricity Access:** Ensure consistent power supply for residential, commercial, and public service users
- **Future-Readiness:** Support planned rural electrification efforts and economic development in Hala and surrounding areas

[2] According to the information provided by the client, the new transformer for the Tando Adam Grid Station may be imported from abroad, shipped to Karachi, and transported via the M9 Motorway to Hyderabad, followed by onward delivery to Tando Adam through the National Highway (N5). Alternatively, the transformer may be stored at the HESCO regional warehouse in Hyderabad and then transported to the Tando Adam GS when required.

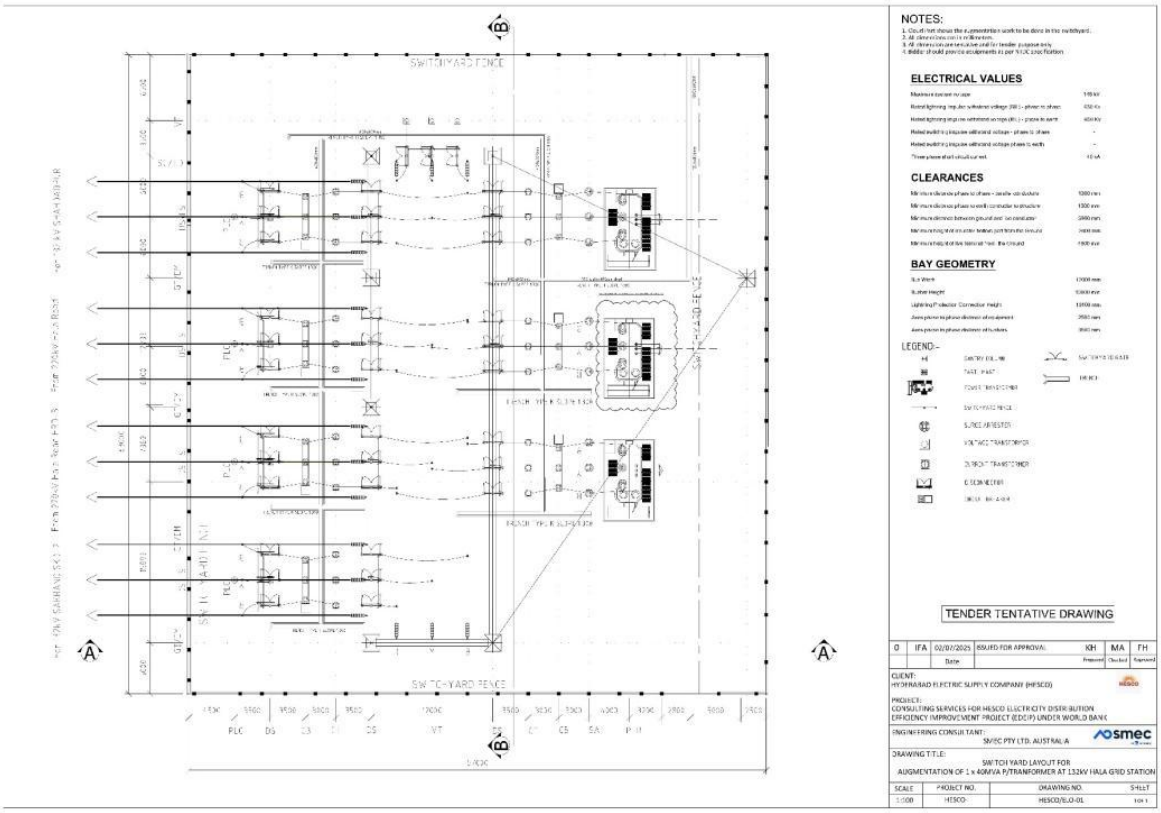
2.3.1. Proposed Augmentation Works

Under this component of the proposed subproject, the Hala GS will undergo augmentation works that comprise the following:

- Replacing the equipment of the existing transformer bay if needed
- Replacing the existing 13-MVA power transformer with a new 40-MVA power transformer
- Replacing (if required) the associated equipment including high-voltage circuit breakers, isolators and current transformers, and capacitor bank for power factor correction;
- Replacing/adding (if required) underground cable laying and new control panel installation (if required).

The grid station currently has three power transformers (T1, T2 and T3) with their associated transformer bays. Under the augmentation works, the second power transformer (T-2) will be replaced with a new power transformer (see GS layout in **Figure 2.2**).

Figure 2.2: Layout of 132-kV Hala Grid Station



2.3.2. Overview of Construction and O&M Activities

The activities to be carried out during the construction and O&M phases of this component are outlined below.

- Contractor mobilization
- Setting up of temporary facilities

- Disconnecting the T2 power transformer and removing it from its foundations in a safe manner (bushings, radiators, conservator tank, and other accessories of the transformer will be removed if needed for safe handling of the transformer).
- Modification of the existing foundation if needed.
- Transporting[3] the 40 MVA transformers to Hala GS; offloading and positioning on the foundation using heavy lifting equipment.
- Assembling bushings, radiators, conservator tank, and other accessories on transformer, filling transformer oil under vacuum.
- Replacing (if needed) of transformer bay equipment for protection and metering
- Connecting bushings to bus bars, surge arresters, CT, PT, cable terminations; earthing connections.
- Protection and control system integration including connecting protection relays, control panels, SCADA system connections, and communication lines.
- Testing and commissioning including insulation resistance test, transformer turns ratio test, winding resistance test, and functional tests; energizing transformer.
- Site restoration and demobilization of contractor.
- Routine operation including monitoring transformer load, oil level, and temperature.
- Preventive maintenance including periodic inspection, cleaning, tightening connections, oil testing.
- Emergency maintenance including repairing faults or replacing damaged components.
- Monitoring operational parameters and alarms via SCADA.

2.4. Re-conductoring of 132-kV Transmission Line from Hala Road GS to Jamshoro GS

The transmission line spans approximately 28 km and is supported by 99 towers. Enroute to the the Jamshoro GS from the Hala Road GS, it also connects the 132-kV Rajputana GS and Qasimabad GS. The existing transmission infrastructure faces significant operational challenges due to aging conductors that are no longer adequate for prevailing electricity demands. The existing TL frequently operates beyond capacity. Other issues include deteriorated conductors contributing to regular voltage fluctuations, unplanned outages affecting key service areas, rapid expansion of residential and commercial users, inability of current infrastructure to support economic growth, particularly in Qasimabad area.

2.4.1. Proposed Re-conductoring Works

To address the above-described issues, the TL will undergo re-conductoring works by replacing the existing lynx conductor with modern HTLS conductor. This upgrade will enhance the load carrying capacity of the transmission line thus reducing the chronic overloading and technical losses, improving electricity supply, and also accommodating demand growth in the future. Since the TL towers are in a sound condition, these will not be

[3] According to the information provided by the client, the new transformer for the Hala Grid Station may be imported from abroad, shipped to Karachi, and transported via the M9 Motorway to Hyderabad, followed by onward delivery to Hala through the National Highway (N5). Alternatively, the transformer may be stored at the HESCO regional warehouse in Hyderabad and then transported to the Hala GS when required.

replaced thus retaining its existing alignment and footprint.

2.4.2. Overview of Construction and O&M Activities

The activities to be carried out during the construction and O&M phases of this component are outlined below.

- Contractor mobilization
- Setting up of temporary facilities
- De-energizing the TL section-by-section, ensuring proper grounding, and issuing work permits in coordination with HESCO control room.
- Detaching old conductors from insulators, lowering them to the ground using tensioner-pullers, and transporting them for storage.
- Checking tower structures, bolts, cross-arms, and insulators; replacing damaged ones; applying anti-corrosion coating where needed.
- For the Indus River span, installing temporary working platforms or using boats/barges; using high-capacity pullers and pilot ropes across the span; ensuring navigation safety.
- Transporting the new HTLS conductor from the HESCO stores to the TL RoW.
- Pulling new conductors using tensioner-pullers; maintaining proper sag and clearance; attaching conductors to insulators. Work to proceed section-by-section to minimize downtime.
- Installing mid-span joints and dead-end clamps as per design specifications; ensuring secure electrical and mechanical connections.
- Conducting electrical resistance tests, visual inspections, and final clearance checks before re-energizing the line.
- Removing temporary access arrangements, disposing of waste material, and restoring ground conditions to pre-work state.
- Contractor demobilization.
- Conducting periodic ground inspections to detect conductor damage, loose fittings, vegetation encroachment, or tower corrosion.
- Tightening bolts, cleaning insulators, applying anti-corrosion coatings, replacing worn-out fittings, and maintaining grounding systems.
- Responding to faults or damage caused by storms, accidents, or equipment failure; isolating faulty sections and carrying out urgent repairs.
- Monitoring line load, voltage levels, and thermal limits from the control center; coordinating with connected GSs to balance loads and prevent overloads.

2.5. Manpower Requirements

While the actual manpower needs will be determined by the construction contractors, some estimates have been carried out based upon similar works for other projects. The tentative manpower requirement for the grid station extension works has thus be estimated to be about 8-10 workers in addition to site supervisors and engineer. Similarly, the tentative manpower

requirement for the grid station augmentation works has been estimated to be about 6-8 workers in addition to site supervisors and engineer. For the TL re-conductoring works, the tentative manpower requirement for the grid station augmentation works has been estimated to be about 12-15 workers in addition to site supervisors and engineer.

2.6. Construction Equipment

A tentative list of the construction equipment needed for the proposed subproject is provided below (the contractor will determine the actual need as per the construction methodology and contractual requirements).

- Excavator,
- Bulldozer
- Dump truck
- Concrete mixer
- Vibrator
- Rebar cutter/bender
- Compactor
- Cable pulling winch
- Testing kits
- Hydraulic tensioner-puller
- Winches
- Scaffolding
- Generators
- Vehicles
- Camp equipment
- Personal protective equipment (PPE).

2.7. Temporary Facilities

The contractor may establish temporary facilities for the construction works under the proposed subproject. For each component under the proposed subproject, these facilities may include site office, workshop and living arrangements for the workers (workers' camp). These facilities will most likely be established within the related grid station. The exact location, size. And other details will be determined based upon the contractual requirements as well as approval from HESCO.

3. Regulatory and Policy Review

This section describes the relevant national and provincial environmental and social legal requirements as well as the WB E&S standards applicable to the project and the proposed subproject.

3.1. Applicable Legislation and Conventions

The national as well as provincial legislations, Acts and Regulations are presented in **Table 3.1** below. Table 3.2 lists the conventions issued by the International Labor Organization (ILO).

Table 3.1: Relevant Legislations and Acts

Sr. No.	Legislation / Acts	Applicability for Proposed Subproject
1.	Sindh Environmental Protection Act, 2014	This Act has a direct bearing on the proposed subproject since it may potentially cause E&S impacts and it needs an approval from the Sindh Environmental Protection Agency.
2.	Sindh Environmental Protection Agency, (Review of EC, IEE and EIA) Regulations, 2021	The provisions of these Regulations are applicable for environmental screening of the subproject.
3.	Sindh Environmental Quality Standards (SEQS), 2016	These standard are applicable to the effluents and emissions released by the proposed subproject.
4.	Guidelines for the Preparation and Review of Environmental Reports, 1997	These guidelines describe the format, practices, and procedures to be employed when carrying out environmental assessment for the proposed subproject.
5.	Pakistan Climate Change Act, 2016	The Act is broadly applicable to the proposed subproject since the subproject areas are prone climate change risks such as flooding and extreme heat.
6.	Sindh Forest Act, 2012	Though the subproject does not involve any tree cutting or deforestation, this Act is still applicable to prohibit the contractor to carry out any tree cutting.
7.	Sindh Wildlife Protection, Preservation, Conservation and Management Act, 2020	Although the subproject is not located in any ecological significant area and the proposed activities are not likely to damage biological resources in any manner, this Act is still relevant to prohibit the construction workers to do any act or activity in violation of this Act.
8.	Sindh Cultural Heritage (Preservation) Act, 1994	No cultural heritage sites are known to exist in the subproject areas, however Chance Find procedures have been included in this ESMP.
9.	Sindh Solid Waste Management Board Act, 2014	This Act is applicable as proposed subproject will generate solid waste which will be managed and disposed of as per the legislative requirements of this

Sr. No.	Legislation / Acts	Applicability for Proposed Subproject
		Act during construction and O&M phases.
10.	The Sindh Hazardous Substances Rules, 2014	This Act is relevant since the project will handle hazardous substances.
11.	Sindh Factories (Amendment) Act, 2021	This Act is applicable for the subproject workers as well as nearby community including men, adults, women, adolescent working in and near the construction area during construction phase.
12.	The Sindh Occupational Safety and Health Act, 2017	This Act is applicable since the construction and O&M activities pose OHS risks.
13.	The Sindh Transparency and Right to Information Act, 2016	This Act is applicable as the proposed subproject is the public sector initiative and will need be transparent for public.
14.	Pakistan Antiquities Act, 1975	No cultural heritage sites are known to exist in the subproject areas, however Chance Find procedures have been included in this ESMP.
15.	Pakistan Penal Code, 1860	The provisions of the Penal Code are applicable to the subproject in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions and effluent disposal.
16.	The Protection against Harassment of Women at the Workplace Act, 2010	This Act is applicable to the subproject in case of the employment of women workers during the construction and O&M phases.
17.	Sindh Prohibition of Child Employment Act, 2017	This Act prohibits any child employment for construction or O&M activities of the proposed subproject.
18.	Labor Laws as part of Constitution of Pakistan, 1973	The labor laws are relevant as they deal with employment of labor for the construction of proposed subproject. Following are the major labor laws which are applicable: • Sindh Workers Compensation Act, 2015; • Sindh Minimum Wage Act, 2015; • Sindh Terms of Employment (Standing Orders) Act, 2015; • Sindh Bonded Labor System (Abolition) Act, 2015; • Sindh Payment of Wages Act, 2015; • Sindh Occupational Safety & Health Act, 2017; and • Sindh Factories Act, 2021.
19.	Sindh Bonded Labor (Abolition) Act, 2015	This Act prohibits use of any bonded labor in the province.

Sr. No.	Legislation / Acts	Applicability for Proposed Subproject
20.	The Canal and Drainage Act, 1873	This Act is applicable as the proposed subproject involves crossing of canals and drains.
21.	National Disaster Management Act, 2010	This Act is applicable to the proposed subproject due to its location. The proposed Project requires special consideration of flood disasters and risk management strategies as per the Act especially during cloud outburst.
22.	Hazardous Substances Rules, 2014	These Rules are applicable to the proposed subproject due to involvement of hazardous waste handling, use and disposal during different construction activities at the construction stage.
23.	The Sindh Minimum Wages Act, 2015	This Act is applicable to the subproject to ensure that the minimum wages and allowances will be given to the labor (skill and unskilled employed for the construction and O&M).
24.	The Sindh Differently Able Persons (Employment, Rehabilitation and Welfare (Amendment) Act, 2017	This Act is applicable as the proposed subproject involves serious occupational health and safety issues during construction phase and may cause serious injury to worker/staff causing permanent disability and differently able.
25.	The Sindh Commission on the Status of Women Act, 2015	This Act is applicable as the proposed subproject may involve female staff/worker as well as local resident women which may be directly or indirectly linked with subproject activities.
26.	Gender Equality as part of Constitution of Pakistan, 1973	The articles of Constitution of subproject are relevant as it may deal with employment of male and female labor having different religion, political affiliation, sect, color, caste, creed and ethnic background for the construction of proposed Project.

Table 3.2: ILO Conventions

	Description	Applicability
1	Forced Labor Convention, 1930 (No. 29)	The convention ensures that all subproject workers are hired voluntarily, with fair contracts with no coercion.
2	Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)	The convention allows workers to form or join unions freely without fear of retaliation.
	Right to Organize and Collective Bargaining Convention, 1949 (No. 98)	The convention supports workers' right to collective bargaining for fair pay and safe conditions.
	Equal Remuneration Convention, 1951 (No. 100)	The convention requires equal pay for men and women doing similar work under the subproject.

	Description	Applicability
	Abolition of Forced Labor Convention, 1957 (No. 105)	The convention prohibits forced labor during any subproject activity, including during high pressure phases.
	Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	The convention ensures fair and non-discriminatory hiring, training, and promotion practices.
	Minimum Age Convention, 1973 (No. 138)	The convention restricts child labor in subproject, especially in hazardous or technical tasks.
	Worst Forms of Child Labor Convention, 1999 (No. 182)	The convention prevents children's involvement in dangerous project work or supply chains.

3.2. World Bank Environmental and Social Standards

The relevant WB E&S Standards and Guidelines are listed in **Table 3.3**.

Table 3.3: WB E&S Standards and Guidelines

World Bank ESS	Relevance
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	This Standard is relevant to the proposed subproject since it may cause environmental and social risks and impacts.
ESS2: Labor and Working Conditions	The ESS2 is applicable as the subproject will involve direct workers; contracted workers engaged in construction work and consultancy services and primary supply workers. Also, the subproject poses OHS risks to the workers.
ESS-3: Resource Efficiency and Pollution Prevention and Management	This standard is relevant since the subproject will potentially cause pollution. The subproject will consume resources such as water, fuel and construction material and their efficient use will be required under this ESS.
ESS4: Community Health and Safety	ESS4 is relevant as the constructions and operations of the subproject activities involve significant community health and safety hazards including SEA/SH risks.
ESS8 Cultural Heritage	No known cultural heritage sites are present in the subproject area. However Chance Find procedures have been included in this ESMP.
ESS10 Stakeholder Engagement and Information Disclosure	The ESS10 is applicable as the subproject involves diverse stakeholders. An SEP has been prepared in accordance with this ESS and stakeholder consultations have been carried out as part of this ESMP.
World Bank Group's Environment, Health and Safety Guidelines	These Guidelines are relevant since the proposed subproject will potentially cause environmental, health and safety risks and impacts.
WB requirements for Disclosure of Documents	HESCO will be required to disclose to the public the E&S documents including this ESMP.

4. Environmental and Socio-Economic Overview

This Chapter provides an overview of the E&S baseline conditions of the proposed subproject areas.

4.1. Baseline Conditions of Tando Adam Grid Station

4.1.1. Brief Profile of Tando Adam Town

Tando Adam is a rapidly expanding urban center ranking as the most populous city in the district with an estimated population of 174,291 residents as of 2023**.** Its demographic composition is mostly diverse. The majority people in this area speak Sindhi language and; Urdu, Punjabi, Balochi, and other regional languages are also widely used.[4]

The city has many historical sites such as ancient mosques, Hindu temples, and proximity to the revered shrine of the Sufi poet Shah Abdul Latif Bhitai (located in Bhit Shah). There are present various educational institutions including degree colleges, the Suleman Roshan Medical College, and various schools.[5]

Economically, Tando Adam stands out as an industrial and agricultural center**.** It hosts Pakistan's largest power loom industry, alongside diverse agro-industries involving sugarcane, wheat, cotton, bananas, mangoes, and numerous juices, paper, ginning, flour, and oil mills.[6]

4.1.2. Grid Station Surroundings

The Tando Adam GS is surrounded by both agricultural and residential areas (see **Figure 1.1**). To the south of the GS, across the road, some banana orchards are located. To the east, Village Paris Banglo is located at a distance of about 400 m, with a population of around 2,000–3,000 people. To the north of GS, banana orchards continue, and the small settlement named Sasti Basti is located at a distance of 500 m. The west of the GS is also bordered by banana orchards. There are no mosques, shrines, or graveyards in close proximity that may be affected by the grid extension works.

4.1.3. Sensitive Receptors

The key sensitive receptors are the residents of the staff colony inside the grid station. Most of the E&S impacts are likely to be confined to the GS boundary, no sensitive receptors are likely to exist outside the GS boundary. However, PIMSC will carry out an assessment of the sensitive receptors outside the GS boundary and determine any additional mitigation measures if needed.

4.1.4. Ambient Conditions

The ambient air quality in Tando Adam GS area is generally within acceptable limits due to the absence of any industrial activities and heavy vehicular traffic. The area is predominantly agricultural, with surrounding banana orchards contributing to greenery and dust suppression. Please see the ambient air quality monitoring results at Tando

[4] Britannica-Sanghar, available at: https://www.britannica.com/topic/Indus-civilization. Retrieved on 04-08-2025

[5] https://khudabadisonara.in/directory/tando-adam-khan/. Retrieved on 04-08-2025

[6] https://en.wikipedia.org/wiki/Sanghar_District. Retrieved on 04-08-2025

Adam GS in **Annex A**. The drinking water quality is also within the acceptable limits of SEQS as shown in **Annex A**. The noise in the area is generally within acceptable limits, with no major sources of noise. The only notable source of noise is small traffic on Bhit Shah Road. Within the GS, noise is limited to operational equipment, which is not significantly disruptive to nearby residents. Overall, the ambient noise levels are low and seem within acceptable limits. Please see the ambient noise monitoring results at Tando Adam GS in **Annex A**.

4.2. Baseline Conditions of Hala Grid Station

4.2.1. Brief Profile of Hala Town

Hala is the principal city of District Matiari with an estimated population of 71,094 as of 2023, while Hala Taluka—comprising the city and surrounding areas such as Hala Old, Bhit Shah, and Bhanote has grown to a population of approximately 286,155.[7] Situated along the strategic National Highway (N-5) about 62 km from Hyderabad, Hala is an important transport hub. The city is renowned for its rich cultural heritage—particularly its traditional pottery (Kaashi), lacquered woodwork (Jandi), textile crafts such as Sussi and Khaddar, and vibrant cloth printing serving as a regional center for arts and crafts.

Hala also holds significant spiritual importance; it hosts the mausoleum of Sufi saint Makhdum Nuh and lies in proximity to the revered shrine of Sufi poet Shah Abdul Latif Bhitai at Bhitshah, attracting pilgrims and cultural events. Agriculturally, the Taluka remains heavily dependent on irrigated crop cultivation with crops such as wheat, cotton, rice, and bananas.

4.2.2. Grid Station Surroundings

The immediate surroundings of the Hala GS include a mix of agricultural, residential, and semi-rural land areas (see **Figure 1.2**). To the south of the GS, across the road, a stretch of mango orchards is located with an irrigation channel for the orchard and adjacent agricultural lands. To the east, approximately 300 m from the GS, a small village of Khas Kheli is located, having an estimated population of 2,000–2,500 people. Agricultural lands also surround the Hala GS from the west and north.

4.2.3. Sensitive Receptors

The key sensitive receptors are the residents of the staff colony inside the grid station. Most of the E&S impacts are likely to be confined to the GS boundary, no sensitive receptors are likely to exist outside the GS boundary. However, PIMSC will carry out an assessment of the sensitive receptors outside the GS boundary and determine any additional mitigation measures if needed.

4.2.4. Ambient Conditions

The Hala GS area is not exposed to any major sources of air and noise pollution. Only minor vehicular movement takes place along Shahdadpur Road, and no industrial activity is located in the vicinity. No visible air pollution sources were observed. Drinking water quality of the area is also good. Please see the laboratory results for ambient air, water and noise in the area of Hala GS respectively in **Annex A**.

[7] Sindh (Pakistan): Province, Major Cities, Municipalites [sic] & Towns - Population Statistics, Maps, Charts, Weather and Web , Information". *www.citypopulation.de*. Retrieved on 05-08-2025

4.3. Baseline Conditions of Hala Road GS to Jamshoro GS Transmission Line Route

4.3.1. Brief Profile of Hyderabad City

Hyderabad, located in Sindh province along the east bank of the Indus River, is the second-largest city in Sindh and a major urban and commercial hub. The city, including its Qasimabad Tehsil, features a semi-arid climate characterized by hot summers, mild winters, and low annual rainfall, making it vulnerable to climate-related stress such as droughts and occasional flood events from the Indus River and urban drainage congestion. The environmental setting includes urban green belts, seasonal nullahs, and man-made drains such as Wadu Wah, which serve as both drainage and ecological corridors. Rapid urbanization and land use change have led to increased pressure on municipal services and the environment.

Hyderabad is a densely populated and culturally diverse city with a mix of Sindhi, Urdu-speaking, and other ethnic communities. Qasimabad Tehsil has experienced significant population growth due to the development of residential schemes and housing societies. The area is served by educational institutions, healthcare centers, markets, and other urban infrastructure.

4.3.2. Transmission Line Route

The TL initially crosses Jamshoro Road and passes through a semi-agricultural zone before reaching the Indus River. The river crossing occurs approximately one kilometer west of Kotri Barrage. Beyond the Indus River, the TL traverses agricultural lands within its right-of-way until it enters the peri-urban area of Qasimabad. From this point, the TL runs parallel to the Wadu Wah Drain and crosses the Hyderabad Bypass to enter Qasimabad city. Within the city limits, the TL continues along the greenbelt located between the dual carriageways of Wadu Wah Road. In this segment, some tall trees are situated along the transmission line corridor and may require pruning to facilitate reconductoring activities.

At the end of Wadu Wah Road, the TL follows Nasim Nagar Road, a densely trafficked area characterized by active commercial establishments. After crossing Nasim Nagar Road, the line enters the Qasimabad GS. From Qasimabad GS, it proceeds primarily along urban greenbelts and reaches the Rajputana GS. Before entering Rajputana GS, the Transmission line passes through greenbelts of a private housing society. Finally, from Rajputana GS, the TL continues through urban green areas within Hyderabad city and terminates at the Hala Road GS (see **Figure 1.3** for the TL route).

4.3.3. Sensitive Receptors

Several hospitals are present along the TL route. The PIMSC will carry out an assessment of these and other sensitive receptors along the TL route and determine any additional mitigation measures if needed.

4.3.4. Ambient Conditions

The ambient air quality along most of the TL route is generally within the SEQS limits however the water in some locality is not fit for drinking purpose; see **Annex A** for the air quality and water quality monitoring results. The noise levels along Wadu Wah Road and Nasim Nagar Road are high due to heavy vehicular traffic, and commercial activities. These areas experience noise exceeding permissible limits, especially during peak hours.

The noise levels in agricultural and semi-urban zones near Jamshoro are relatively lower. Prudent scheduling of reconductoring works is necessary to avoid aggravating noise exposure. As shown in the **Annex A**, the ambient air and noise quality in the area is within the SEQS limits.

5. Environmental and Social Impact Assessment

This Chapter assesses the potentially adverse environmental and social impacts of the proposed subproject. Also provided in the Chapter are the recommended mitigation measures to minimize if not eliminate the potentially adverse impacts.

5.1. Impact Assessment Methodology

The significance of potential impacts was assessed using the risk assessment methodology that considers impact magnitude and sensitivity of receptors, described below.

5.1.1. Impact Magnitude

The potential impacts of the subprojects have been categorized as major, moderate, minor or nominal based on consideration of the parameters such as i) duration of the effect; ii) spatial extent of the impact; iii) reversibility; iv) likelihood; and v) legal standards and established professional criteria.

The magnitude of each potential impact of the subprojects has been identified according to the categories outlined in **Table 5.1**.

Table 5.1: Parameters for Determining Magnitude

Parameter	Major	Moderate	Minor	Minimal
Duration of potential impact	Long term (beyond the project life)	Medium Term Lifespan of the project (within the project life span)	Limited to construction period	Temporary with no detectable potential impact
Spatial extent of the potential impact	Widespread far beyond project boundaries	Beyond next project components, site boundaries or local area	Within project boundary	Specific location within project component or site boundaries with no detectable potential impact
Reversibility of potential impacts	Potential impact is effectively permanent, requiring considerable intervention to return to baseline	Environmental or social parameter needs a year or so with some responses to come back to baseline	Baseline returns naturally or with limited response within a few months	Baseline remains constant
Legal standards and established professional criteria	Breaches national standards and or international guidelines/obligations	Complies with limits given in national standards but violates international lender guidelines in one or more parameters	Meets minimum national standard limits or international guidelines	Not applicable

Parameter	Major	Moderate	Minor	Minimal
Likelihood of potential impacts occurring	Occurs under typical operating or construction conditions (Certain)	Happens under worst case (negative consequences) or best case (positive impact) working conditions (Likely)	Occurs under abnormal, exceptional or emergency conditions (occasional)	Unlikely to happen

5.1.2. Sensitivity of Receptor

The sensitivity of a receptor has been determined based on a review of the population (including proximity/numbers/vulnerability) and the presence of features on the site or the surrounding area. For each potential impact of the subprojects, sensitivity of the related receptor was determined using the criteria outlined in **Table 5.2**.

Table 5.2: Criteria for Determining Sensitivity

Sensitivity Determination	Definition
Very Severe	Vulnerable receptor with little or no ability to absorb proposed changes or minimal opportunities for mitigation.
Severe	Vulnerable receptor with little or no ability to absorb proposed changes or limited opportunities for mitigation.
Mild	Vulnerable receptor with some ability to absorb proposed changes or moderate opportunities for mitigation
Low	Vulnerable receptor with good ability to absorb proposed changes or/and excellent opportunities for mitigation

5.1.3. Assigning Significance

Following the assessment of impact magnitude and determining the quality and sensitivity of the receiving environment or potential receptor, the significance of each potential impact was established using the impact significance matrix shown in **Table 5.3**.

Table 5.3: Criteria for Determining Impact Significance

Magnitude of Impact	Sensitivity of Receptors			
	Very Severe	Severe	Mild	Low
Major	Critical	High	Medium	Negligible
Moderate	High	High	Medium	Negligible
Minor	Medium	Medium	Minor	Negligible
Minimal	Negligible	Negligible	Negligible	Negligible

5.2. Potential Impacts of Proposed Subproject

The proposed subproject's potential E&S impacts and their significance have been assessed using the methodology described in the above section. These impacts and their significance along with the mitigation measures are presented in **Table 5.4**.

Table 5.4: Summary of Potential Impacts, their Significance and Mitigation Measures

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
Construction Phase Impacts						
Soil Erosion and Degradation	Excavation and construction activities, running of vehicles on unpaved roads	Mild	Moderate	Medium	• Construction camp will be located in a stable and flat area, requiring minimal de-vegetation and leveling. The contractor(s) will obtain approval from the Project Implementation and Management Support Consultants (PIMSC) for this purpose. • Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (eg, stone pitching). • Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir will be minimized. • After the completion of the construction works, the work sites, the transmission line routes campsites will be completely restored. No debris, surplus construction material or any garbage will be left behind. • Photographic record will be maintained for pre-project, during-construction and post-construction condition of the sites (grid station, transmission line, camps). • Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water	Minor

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
					contamination. • The domestic sewage from the construction camps will be connected to the city sewerage system. If such system is not available, appropriate treatment and disposal system, such as septic tanks and soaking pits, will be constructed having adequate capacity. The contractor(s) will submit to the PMISC the plans for the camp layout and waste disposal system, and obtain approval. • Waste oils will be collected in drums and sold to the recycling contractors. • The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste. ■ Domestic solid waste from the construction camp will be disposed in a manner that does not cause soil contamination. The waste disposal plan submitted by the contractor(s) will also address the solid waste.	
Air quality deterioration	Operation of construction machinery and vehicles	Mild	Moderate	Medium	■ Construction camps will be established at least 500 m from communities (except when such camps are established inside the grid stations, in which case a safe distance will be maintained between the residential colony and the construction Camps and other contractor's facilities). The contractor(s) will obtain	Minor

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
					PMISC's approval for this purpose, as mentioned earlier. ■ Construction machinery, generators and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions. ■ Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate. The waste water from kitchen and washing area of the construction camp may be used for water spraying. ■ Project vehicles will avoid passing through the communities and cultivation fields as far as possible. If unavoidable, speed will be reduced to 15 km per hour to avoid excessive dust emissions. ■ While working within the communities for transmission line works, coordination with the communities will be maintained to minimize any detrimental impacts on the crops and settlements. ■ Ambient air quality analysis will be carried out at the grid station sites during the construction phase. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.	
Surface Water and Groundwater	Release of contaminated water/effluents	Severe	Major	High	■ The contractor(s) will submit to the PMISC the plans for the camp layout and waste disposal system, and obtain approval.	Minor

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
Contamination	from construction sites and camps				■ Construction debris or any other solid wastes or untreated waste effluents will not be disposed-off in water bodies.	
Blocked Access	Transmission line works, off-road movement of vehicles	Mild	Moderate	Medium	■ Efforts will be made to avoid any impacts on the local roads, routs, and accesses. ■ In case of the blockage of the existing routes, alternate routes will be identified in consultation with the affected communities. ■ The contractor will prepare and implement a traffic management plan to minimize impacts on the local routes. ■ Community liaison will be maintained throughout the construction phase. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.	Negligible
Noise and Vibration	Operation of construction machinery and vehicles	Mild	Moderate	Medium	■ It will be ensured that the noise levels measured at the communities near the project sites are kept within the acceptable limits (70 dB(A) for industrial zones day and night; 45 dB(A) night and 55 dB(A) daytime for residential areas). ■ Noise levels will be measured at the key locations such as at the Staff Colony in grid stations and sensitive receptors. If the noise levels are found to be more than the prescribed limits, appropriate measures will be undertaken by the construction team such as rescheduling the	Minor

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
					works, using quieter equipment and/or erecting barriers to protect the communities from excessive noise. ■ Vehicular traffic through the communities will be avoided as far as possible. Project routes will be authorized by the PIMSC. ■ Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities. ■ Vehicles will have exhaust silencers to minimize noise generation. ■ Nighttime traffic will be avoided near the communities, as far as possible. ■ Movement of all project vehicles and personnel will be restricted to within work areas, to avoid noise disturbance. ■ Working hours for construction activities will be limited to between 8 am and 6 pm (between 6 am and 8 pm during the summers). ■ Liaison with the community will be maintained. Grievance redressal mechanism will be put in place to address the community complaints. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.	
OHS Hazards	Risks associated with construction	Severe	Major	High	■ The contractor will prepare and implement occupational and community health and safety (OCHS) plan, in accordance with the WB ESF,	Medium

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
	works, construction machinery, working at heights and confined spaces, electrocution risk.				World Bank Group's Environment, Health and Safety Guidelines as well as World Health Organization (WHO) Guidelines, ILO Code of Practice and any internationally recognized OHS standard such as ISO 45001 or US OSHA 29 CFR 1926 or any standard specifically mentioned in the bidding documents. The Plans will include organization hierarchy/change of command for OHS management, applicable safety standards and protocols, requirements of job hazard analysis, training requirements, documentation and reporting mechanism. ■ All construction works will be executed in accordance with the OCHS management plan and appropriate safety standards. Adequate monitoring and equipment will be available as needed. ■ Contractor will be required to depute adequate number of OHS supervisors and inspectors at the site on fulltime basis. ■ The construction sites will have protective fencing to avoid any unauthorized entry. ■ The project drivers will be trained for defensive driving skills. ■ Vehicular speeds near/within communities will be kept low to minimize safety hazards. ■ Firefighting equipment will be made available at the camps and at worksites. ■ The camp staff will be provided OCHS	

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
					training. ■ All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel. ■ Liaison with the community will be maintained. In particular, the nearby communities will be informed before commencing the testing commissioning of the system. Awareness raising program will be implemented to educate the communities regarding the hazards associated with the transmission lines, feeders and other electrical systems/equipment. Warning signs will be used at the appropriate locations. ■ Contractor will provide and maintain adequate hygienic kitchens which are sheltered and separated from the living quarters. Kitchens will include raised and washable surfaces suitable for food preparation. ■ Contractor will maintain hygienic and comfortable living conditions in accordance with the relevant labor laws and ILO conventions. ■ Contractor will ensure the provision of first aid facility at construction site and camps through hiring medics and establishing a dispensary at the campsite. ■ Reasonable number of first aid kits will be made available on construction sites and within	

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
					contractor camps. ■ Site personnel will be provided appropriate type of personal protective equipment (PPE). Contractor will ensure consistent use of PPE by all site personnel. ■ Adequate and reliable supply of safe drinking water will be made available at readily accessible and suitable places including at all camps.	
Community health and safety issues	Risks associated with construction works, construction machinery, electrocution risk, vehicular traffic hazards, improper waste disposal, exhaust emissions.	Severe	Major	High	■ OCHS Management Plan will be strictly implemented ■ The construction area will be barricaded to prevent unauthorized access ■ Warning signs will be placed where appropriate ■ The construction camps will have septic tanks and soaking pits of adequate size, if appropriate/required. ■ The construction camps will have appropriate solid waste disposal mechanism ■ The construction camps and site offices will have first-aid kits. ■ The construction crew will be provided awareness for the transmissible diseases (such as human immunodeficiency virus - HIV/ acquired immunodeficiency syndrome - AIDS, hepatitis B and C). ■ Guidelines for SEA/SH, gender-based	Medium

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
					violence (GBV) and violence against children (VAC) will be implemented ■ Liaison with the community will be maintained. In particular, the nearby communities will be informed before commencing the construction works and testing commissioning of the system. Awareness raising program will be implemented to educate the communities regarding the hazards associated with the transmission lines, feeders and other electrical systems/equipment. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.	
Influx of Labor	Risks associated with influx of labor from other parts of the country	Severe	Major	High	■ Code of conduct (CoC) for workers and employees will be enforced for the protection of local communities, gender-based violence, other social issues, flora and fauna and a ban on tree cutting and hunting. Any violation of the CoC would lead to strict punishment including termination of employment; ■ Awareness among workers will be created on proper sanitation and hygiene practices to endorse proper health; ■ Good housekeeping practices will be maintained at project site(s); ■ Adequate personal hygiene facilities will be provided in good condition with adequate supply of clean water; ■ Arrangements will be made to treat the	Minor

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
					affected workers on time to control the movement of vectors diseases; ■ Workers and surrounding communities will be sensitized on awareness and prevention of HIV/AIDS and STI through training, awareness campaigns and workshops; ■ Free HIV/AIDS and STI screening and provided for site workers ■ Counseling sessions will be held to made the workers aware of the risks of HIV/AIDs and STI; ■ Any employees, who continues misconduct or lack of care, carry out duties amateurishly or inattentively, fail to conform to provisions of the contract, or persist in any conduct which is harmful to safety, health, or the protection of the environment, will be terminated; ■ The use of drugs and alcohol will not be allowed at the work/construction site; ■ Carrying weapons into the workplace premises will be prohibited; ■ Appropriate site security arrangements will be made at all construction sites and temporary facilities; appropriate fencing, security check points, gates and security guards will be provided at the construction sites to ensure the security of equipment, machinery and materials, as well as to secure the safety of site staff; ■ The contractor will create awareness of construction crew to sensitize them about	

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
					security situation in the subproject area; ■ The Contractor will ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft; ■ To avoid conflicts with local people on employment matters, it is recommended to the contractor to employ the locals in skilled, semi-skilled, and unskilled work. This will reduce pressure on resources such as residential and health facilities; ■ The contractor will proactively manage the potential impacts from labor influx and potential cultural conflicts between local communities and workers, which include following: ■ The Contractor's regular training program will cover topics related to respectful attitude while interacting with the local communities; ■ Inclusion of COC obligations and the applicable legislation will be ensured in the contracts of all employees and workers with the provision of sanctions and penalties in case of violations; ■ World Bank Guidelines on Influx of labor8 will be used for further guidance.	
Gender Issues	Presence of	Severe	Major	High	■ The routes/places used by the women of the	Minor

[8] http://pubdocs.worldbank.org/en/863471511809509053/ESS2-FactSheet-WB-ESF.pdf

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
	migrant labor				surrounding areas will be avoided as far as possible. If unavoidable, alternate routes to be identified for the communities, if required, especially along routes frequented by women folk, such as route to the local well or water source. ■ Construction crew will avoid in entering villages and settlements. ■ Communities will be informed and consulted before commencing works inside or near the communities. ■ Strict code of conduct will be maintained by the construction crew. Local norms will be respected. ■ WB guidelines on GBV and Influx of Labor will be implemented. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.	
Child labor	Employment of below age workers	Severe	Moderate	Medium	■ The provisions of the Child Labor Act will still be made part of the construction contracts ■ It will be ensured that no child labor is employed at any of the work site or camp site.	Negligible
Damage to crops	TL re-conductoring works	Mild	Moderate	Medium	■ Appropriate/adequate compensation will be paid to the grower/landowner in case of any crop loss caused by construction activities.	Minor
Operation Phase Impacts						
Soil and water	Maintenance activities,	Mild	Moderate	Medium	■ The grid stations will have appropriate solid	Minor

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
Contamination	disposal of transformer oils and other wastes				waste collection and disposal arrangements. ■ The grid stations will have appropriate sewage handling system. The grid stations' sewage collection system will be connected to the Municipality operated sewerage system, if available. Otherwise, grid stations will have their own septic tanks and soakage pits. ■ Waste oils and chemicals will be disposed in accordance with their respective Material Safety Data Sheet (MSDS). MSDS will be made available at the grid stations and maintenance workshops. ■ Non-toxic recyclable waste (such as cardboard) will be given away for recycling. ■ Toxic waste will be stored separately, and provided to the Municipality for safe and appropriate disposal. ■ Grid stations will have channels and drainage pits to collect any leaked oil from the transformers in the grid stations. This oil will be sent back to the workshop for recycling. ■ Any soil contaminated by the oil/chemical spillage will be removed and disposed-off appropriately in accordance with the MSDS of the spilled oil/chemical.	
OHS hazards	O&M activities on live equipment, working at	Severe	Major	High	■ HESCO will implement the Safety Code prepared by the National Electric Power Regulatory Authority (NEPRA) and its own	Medium

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
	heights				OHS Management System. ■ O&M staff will be provided essential protective gears and equipment. ■ O&M staff will be provided regular safety training. Refresher courses will be arranged on regular basis. ■ Firefighting equipment will be made available at the grid stations. ■ The Emergency Response Plan (ERP), prepared by HESCO, will be made available at each grid station. Its salient points will be displayed at prominent places within each grid station. The O&M staff will be given training on the ERP. The E&S team will review the ERP and with respect to the environmental and social considerations, and recommend changes if needed. The ERP will include procedure to inform the nearby communities in case of fire in the grid stations. ■ The communities near the grid stations and transmission lines will be educated on the risk of electrocution, and how to avoid accidents. ■ Appropriate signage on safety precautions will be installed at the key locations. ■ The trees under the transmission lines will be regularly trimmed in order to maintain 8 m clearance.	
Public Health	Electrocution risk; EMF	Severe	Major	High	■ Separation of live parts and pubic	Medium

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
Concerns	radiation; health concerns for nearby population				property/other structures/trees will be maintained ■ Community liaison will be maintained to raise the public awareness about electrocution risks ■ Solid waste and waste effluents from the grid stations will be treated/ managed appropriately.	
Loss of agriculture	Maintenance of transmission lines	Mild	Moderate	Medium	■ Damage to the crops will be avoided during the transmission line patrolling. ■ Any damage during repair the repair and maintenance activities will be compensated. ■ Liaison with the nearby communities will be maintained in this regard. ■ The grievance redressal mechanism will be maintained on continuous basis.	Negligible
Noise generation	From grid station operation and maintenance.	Mild	Moderate	Medium	■ Appropriate equipment selection will forestall any concerns associated with noise. ■ Noise measurements will be carried out at the outer fence of the grid stations, in order to ensure that the noise levels are within acceptable limits. If found beyond these limits at any stage, appropriate measures will be taken, such replacing the noisy equipment, and/or erecting noise barrier along the grid station outer periphery. ■ Liaison with the nearby communities will be maintained in this regard. ■ The grievance redressal mechanism will be maintained on continuous basis.	Negligible

Impacts	Likely Causes for Proposed Project	Impact Sensitivity	Impact Magnitude	Impact Significance before Mitigation	Mitigation Measures	Significance of Residual Impact
Gender Mainstreaming	Gender mainstreaming needs to be carried out in HESCO	Mild	Moderate	Medium	■ Gender mainstreaming will be encouraged in HESCO. Employment opportunities will be created for women. Women friendly work environment will be established within HESCO facilities (e.g., separate toilets, system to address sexual harassment).	Minor

6. Stakeholder Consultations

This section describes the stakeholder consultations carried out during the ESMF preparation. It also provides the consultations framework for future projects.

6.1. SEP

As described in **Section 1.7**, an SEP has been prepared to describe objectives, process and outcome of the stakeholder engagement already carried out during the project preparation and to be carried out during the project implementation – in accordance with the WB ESS 10. The key aspects of the SEP are summarized below.

ESS10 requires that borrowers engage with stakeholders throughout the project life cycle, commencing such engagement as early as possible in the project development process and in a timeframe that enables meaningful consultations with stakeholders on project design. The nature, scope and frequency of stakeholder engagement have to be proportionate to the nature and scale of the project and its potential risks and impacts.

The overall objective of the SEP is to define a program for stakeholder engagement, including public information disclosure and consultation, throughout the entire project cycle. The SEP outlines the ways in which the project team will communicate with stakeholders and includes a mechanism by which people can raise concerns, provide feedback, or make complaints about the project and any activities related to the project. The involvement of the local population is essential to the success of the project in order to ensure smooth collaboration between project staff and local communities and to minimize and mitigate environmental and social risks related to the proposed activities.

The stakeholder engagement and consultation activities for the proposed subproject have been carried out in accordance with the guidelines provided in the SEP. These activities are described in the following sections.

6.2. Purpose and Objective of Consultations

The objective of stakeholder consultations carried out for the proposed subproject have been to provide to the stakeholder timely and accessible information on the subproject's scope, potential E&S impacts, and proposed mitigation measures, while obtaining their views, concerns and recommendations.

This process helps build trust, strengthen community ownership, and ensure that the ESMP reflects the needs and priorities of affected communities and other stakeholders.

6.3. Methodology

Stakeholder consultations and information disclosure for the proposed subproject have been conducted in accordance with the SEP and WB ESS10-as well as the national/provincial regulatory requirements. The process involved:

- Identification and mapping of key stakeholders, including affected communities and government departments.
- Preparation of consultation materials

- Organization of focus group discussions, key informant interviews, and community meetings at accessible locations and convenient times
- Provision of subproject information to the stakeholders and obtaining their feedback
- Systematic documentation of stakeholder feedback, concerns, and suggestions.

6.4. Stakeholder Identification and Analysis

The SEP prepared for the EDEIP defines three groups of stakeholders: i) affected parties, ii) interested parties; and iii) vulnerable groups. The affected parties for the proposed subproject include individuals, groups or other entities within the subproject's AoI, who are impacted or likely to be impacted directly or indirectly, positively or adversely, by the proposed subproject activities. The interested parties are the individuals / groups who may have an interest in the subproject. They include individuals or groups whose interests may be affected by the subproject and who have the potential to influence the subproject's outcomes in any way. Vulnerable groups include people who may be disproportionately impacted by the subproject or further disadvantaged as compared with any other groups due to their vulnerable status and that may require special engagement efforts to ensure their equal representation in the consultation and decision-making process associated with the subproject. This group may include elderly citizens, disabled citizens, women, ethnic and religious minorities, and poor.

Table 6.1 identifies various categories of stakeholders for the proposed subproject. Consultations have been carried out with these categories of the stakeholders of the proposed subproject.

Table 6.1: Stakeholder Categories for Proposed Subproject

Subproject Component	Affected Parties	Interested Parties	Vulnerable Groups
Extension of Tando Adam GS	Nearby communities, GS staff and their families living inside the GS.	• Tehsil Municipal Administration (TMA), Hyderabad • Regional directorate of Sindh EPA in Hyderabad. • National Highway Authority (NHA), Hyderabad for transporting new transformer to GS site from Hyderabad or Karachi via M9 and N5	Children, women, elderly and poor households residing within the AoI of the GS
Augmentation of Hala GS	Nearby communities, GS staff and their families living inside the GS.	• TMA, Hyderabad • Regional directorate of Sindh EPA in Hyderabad. • NHA, Hyderabad-for transporting new transformer to GS site	Children, women, elderly and poor households residing within the AoI of GS

Subproject Component	Affected Parties	Interested Parties	Vulnerable Groups
		from Hyderabad or Karachi via M9 and N5	
Reconductoring of TL	Communities, farmers, industrial and commercial entities, road users along TL route	• TMA, Hyderabad • Regional directorate of Sindh EPA in Hyderabad. • NHA, Hyderabad-the TL moves over the national highways • Irrigation department, Hyderabad-TL crosses the Indus River and Canals • Fisheries department Hyderabad • Agriculture department, Hyderabad • Forest Department, Hyderabad	Children, women, elderly and poor households residing within the AoI of the TL.

6.5. Consultation Process

A series of meetings were carried out with the identified stakeholders by the environment and social team during March and April 2025. The stakeholder consulted during these meetings included local communities, business communities and government departments.

A total of 11 community consultations including focused group discussions and key informant interviews were conducted. About 124 people including 72 males and 34 females participated in these consultations. **Table 6.2** provides a summary of these consultations.

Table 6.2: Summary of Consultations

Sr. No	Date	Venue	Number of Participants	
			Male	Female
1.	07/04/2025	Tando Adam – Arbab Ali Chandio Village	13	09
2.	08/04/2025	Hala, Shahdad Pur Chowk and GS colony	08	10
3.	23/03/2025	Al Fateh Byepass, Superhighway, Hyderabad	05	0
4.	23/03/2025	Soomra Goth, Wadhu Wah Road, Hyderabad	08	05
5.	25/03/2025	Jumeirah Residency Office, Hala Qasimabad/	03	0
6.	25/03/2025	Hala Qasimabad/ Saima Downtown	04	0

Sr. No	Date	Venue	Number of Participants	
			Male	Female
7.	25/03/2025	Palm Builders (Hala Road-Qasimabad- Jamshoro TL)	03	0
8.	26/03/2025	Subhanullah Colony, (Hala Road- Qasimabad- Jamshoro TL)	08	06
9.	27/03/2025	Village Sawan Shoro, (Qasimabad-Jamshoro	09	04
10.	27/03/2025	Shah Latif (Rajputana Gird Station, Hala Road-Qasimabad- Jamshoro TL)	04	0
11.	28/03/2025	Wadhu Wah, (Qasimabad- Jamshoro TL)	07	0
		Total	72	34

6.6. Views of Community Stakeholders (Affected Parties)

No major social or environmental issues were pointed out by the communities during the consultation process. Local people showed their eagerness for the implementation of the subproject so that they could receive better and un-interrupted electricity supply. They hoped for some employment opportunities for locals particularly during the construction phase.

Most participants identified the primary benefit of the subproject as the provision of reliable and stable electricity. They also expressed confidence that, once implemented, the subproject would improve their living conditions and also create significant economic opportunities for the local population.

The summary of consultations carried out for this ESMP is provided in **Table 6.3** whereas the consultations details and photographs can be seen in **Annex B.**

Table 6.3: Views of Primary Stakeholders (Affected Parties)

Sr. No.	Venue	Views / Concerns Raised	HESCO's Responses
1.	Tando Adam – Arbab Ali Chandio Village	Participants appreciated the GS extension; no major concerns as works will be carried out within GS; women highlighted hardships because of load shedding; business losses from spoilage during outages	HESCO assured that the subproject will improve supply, reduce outages and loadshedding.
2.	Hala, Shahdad Pur Chowk & GS Colony	Participants complained about severe load shedding, affecting households, artisans, and farmers; appliance and machinery are damaged; reliance on diesel generators	HESCO assured that the subproject will improve supply, reduce outages and loadshedding.
3.	Al Fateh Bypass, Super Highway, Hyderabad	Participants welcomed the subproject; they emphasized the need of early completion of the	HESCO assured that strict safety measures will be implemented during the

Sr. No.	Venue	Views / Concerns Raised	HESCO's Responses
		subproject; they stressed upon safety of people/property	subproject construction and O&M; awareness campaigns will be carried out among the communities; warning signs will be placed. HESCO will maintain liaison with the communities.
4.	Soomra Goth, Wadhu Wah Road, Hyderabad	Participants urged early implementation of the subproject; complained about frequent breakdowns, low voltage, appliance damage, and income loss	HESCO assured early start of the subproject; load shedding and voltage fluctuation will be significantly reduced after subproject completion
5.	Jumeirah Residency Office, N-5 Highway	Participants appreciated subproject and pledged their support	No concerns raised
6.	Saima Downtown, N-5 Highway	Participants appreciated subproject and pledged their support and cooperation	No concerns raised
7.	Palm Builders, N-5 Highway	Participants appreciated subproject and pledged their support	No concerns raised
8.	Subhanullah Colony, N-5 Highway	Participants supported subproject; They were concerned about any tower relocation for the TL	HESCO explained that no tower would be relocated and assured of safety clearance, hazard markings and fencing where necessary.
9.	Village Sawan Shoro, UC 147, Qasimabad	Participants supported the subproject; they requested employment opportunities	HESCO assured that contractor will prioritize hiring local labor where required
10.	Shah Latif Rajputana GS	Participants appreciated subproject and pledged their support and cooperation	No concerns raised
11.	Wadhu Wah Road, Hyderabad	Participant welcomed subproject; they urged safety during subproject implementation; they were concerned about livelihood impacts from outages	HESCO assured that the subproject will improve supply, reduce outages and loadshedding. HESCO also assured that strict safety measures will be implemented during the subproject construction and O&M;

6.7. Consultations with Institutional Stakeholders (Interested Parties)

As mentioned earlier, the relevant government departments were consulted during the

preparation of this ESMP. During these consultations, the subproject's interventions were shared with concerned officials of the departments and their views and concerns were obtained. See details in **Table 6.4**.

Table 6.4: Views of Institutional Stakeholders (Interested Parties)

Sr. No.	Officer Consulted	Views / Concerns Raised	HESCO Response
1.	Chief Circle Officer, Irrigation Circle Office, Hyderabad	He pointed out that TL crosses Phulali Canal & River Sindh; he requested coordination during the TL construction works	HESCO assured that coordination will be carried out with Irrigation Department during construction.
2.	Chairman, TMA Qasimabad, Hyderabad	He appreciated the subproject; he expected improved electricity supply; he offered cooperation	HESCO assured improved power supply after implementation of the subproject.
3.	Director General, Livestock, Hyderabad	He expected no negative impacts on livestock; he supported the subproject	HESCO assured diligence during construction and O&M
4.	Director, Fisheries Department, Hyderabad	He expected no impacts on fish and; he stressed uninterrupted electricity supply; he supported the subproject	HESCO welcomed feedback; assured diligence during construction and O&M
5.	Director Agriculture, Hyderabad Division	Supported the subproject	No concerns raised
6.	Superintendent, Social Forestry, Hyderabad	He expected n impacts on forest; he pledged cooperation and support for the subproject.	No concerns raised
7.	Regional In-charge, SEPA, Hyderabad	He asked about the subproject status; he assured full cooperation and support	HESCO explained the subproject details.
8.	Assistant Director (Maintenance), National Highway Authority (NHA), Hyderabad	He requested subproject details and offered cooperation	HESCO explained the subproject details.

6.8. Issues and Concerns Raised by Women (Vulnerable Group)

Most of the female participants were initially unaware of the subproject objectives, but responded positively after the HESCO team's explanation during the consultation meetings. They expressed hope that reliable electricity would enhance girls' education and promote gender equality. Women actively participated in the discussions, shared concerns, as outlined in **Table 6.5**.

Table 6.5: Views of Women of the Area (Vulnerable Group)

Concern Raised by Women	Response / Mitigation Measures
The participants complained about frequent voltage fluctuations damage home appliances, making household work difficult.	HESCO explained that voltage issues are due to a weak distribution network. The subprojects will ensure stable electricity, reducing appliance damage.
The participants complained about limited participation of women in subproject consultations and decision-making.	HESCO is committed to ensure women's inclusion through dedicated women-focused consultation sessions.
The participants shared concerns about safety, security, and privacy due to the presence of outside workers.	HESCO assured that contractor will be required to: (i) locate worker camps away from residential areas, (ii) implement a worker code of conduct respecting local norms; privacy of the women, ensure safety of the population particularly women and children.
The participants request for equal employment opportunities for women.	Contractor will prioritize hiring unskilled and semi-skilled workers from local communities, giving preference to female applicants where possible.
The participants complained about poor road infrastructure, fuel shortages, lack of girls' schools, and limited job opportunities.	HESCO assured that the subproject will provide job opportunities and will bring about overall improvement in the area.
The participants complained about lack of potable water; women must fetch drinking water from outside their homes.	HESCO assured that the subproject will bring about overall improvement in the area.
The participants complained about limited medical facilities in the project area.	HESCO assured that the subproject will bring about overall improvement in the area.

6.9. Future Consultations

Stakeholder engagement and consultations are on-going activities and will continue to be carried during the project construction and O&M phases, in accordance with the SEP. An indicative framework is presented in **Table 6.6** listing these consultations; it will be finalized before commencing the construction activities/site mobilization.

Table 6.6: Consultation Framework

Description	Target Stakeholders	Timing	Responsibility
• Stakeholder consultations as part of the preparation of each subproject-specific E&S ESMP, ESIAs and RPs	• Affected communities • Secondary stakeholders	During preparation of each ESMP/RP	PIMSC/HESCO
• Public awareness sessions to share the ESMPs, ESIAs, and RPs with the	• Communities within subproject area,	During the preparation of	PIMSC/HESCO

Description	Target Stakeholders	Timing	Responsibility
communities and other stakeholders. • Location: various places in project area	general public; and line departments/ agencies.	ESMP; to be continued thereafter	
• Consultations with the communities during each ESMP and RP implementation • Location: various places in project area	• Communities at/around subproject area	During implementation of subproject activities.	PIMSC/HESCO
• Establishment of Grievance Redress Mechanism (GRM) • Location: various places in project area	• Communities at/around subproject area	Before commencement of subproject activities.	PIMSC/HESCO
• Grievance redress • Location: various places in project area	• PMU staff; consultants; relevant line departments; and communities.	Subproject implementation Stage	PIMSC/HESCO
• Informal consultations and discussions. • Location: various places in project area	• Communities at/around subproject area	Subproject implementation Stage	PIMSC/HESCO; Contractor
• Consultations with the communities during internal monitoring • Location: various places in project area	• Communities at/around subproject area	Construction Stage	PIMSC/HESCO
• Consultations with the Communities during the Independent Monitoring (if required) • Location: various places in project area	• Communities at/around subproject area	Construction Stage	Independent monitors
• Consultation workshops to review ESMF/ESMPs/RPs implementation, any outstanding issues and grievances, views and concerns of communities; and actions needed to address them. • Location: site offices in project area.	• Communities at/around subproject area; relevant line department; relevant NGOs	Six-monthly during implementation phase	PIMSC/HESCO

6.10. Disclosure Requirements

The present ESMP and its Urdu/Sindhi translation of its executive summary will be disclosed at the HESCO website. These will be made available at the HESCO office, contractor's site office and worksites.

7. Environmental and Social Management

This Chapter describes the mechanism for implementing the mitigation measures discussed in **Chapter 5**. The Chapter includes the institutional arrangements, monitoring requirements, documentation and reporting requirements and also a training plan.

7.1. Institutional Arrangements

HESCO will be responsible for the overall management, supervision, and execution of the project through the Project Management Unit (PMU). A full-time Project Director (PD) has been appointed to head the PMU.

The overall responsibility of E&S performance, including ESMP implementation, will rest with the PMU. HESCO has an existing Environmental and Social Unit (ESU), which needs to be fully staffed for the E&S management of the proposed subproject.

Details of environmental and social staff associated with various consultants and contractors that may be engaged under the project are summarized below.

- **Environmental and Social Staff in PMU:** The ESU of PMU needs to include the following staff:
  - A Manager, Environmental and Social
  - two Assistant Managers (one environment, and one social)
  - An OHS specialist
  - A gender specialist
- **PIMSC**: The PIMSC will be responsible for (i) carrying out detailed engineering designs of the subprojects under EDEIP; (ii) construction supervision of these subprojects; (iii) preparation of E&S documents for EDEIP subprojects including this ESMP; (iv) implementation supervision of this ESMP (and other E&S documents/plans). The consultants will have adequate environmental, social, health and safety specialists to carry out the above tasks.
- **Contractors:** Construction contractors will also have adequate environmental, health and safety specialists to implement this ESMP.
- **Monitoring and Evaluation Consultants (M&E Consultants):** The PMU may also engage an independent organization to carry out third-party E&S monitoring during EDEIP implementation.

The roles and responsibilities of PMU's E&S staff and consultants for E&S management of the Project are given in **Table 7.1**.

Table 7.1: Roles and Responsibilities for E&S Management

Organizations	Responsibilities
PMU	• Ensure that all project activities are well-managed and coordinated. • Procurement of works and goods. • Payment of compensation to the project affected households

Organizations	Responsibilities
	• Overall E&S management of the subprojects under EDEIP (including the proposed subproject)
E&S Staff within PMU	• Reviewing consultants' deliverables related to E&S assessment, reviewing bid documents for inclusion of ESMP measures, supervising construction activities, producing periodic monitoring reports, • Supervising PIMSC for the implementation of ESMP including mitigation measures • Carry out direct monitoring of key aspects such as OCHS and GRM • Closely coordinate with other concerned agencies including EPA, local governments, and communities to support the implementation of ESMP.
PIMSC	• Prepare detailed engineering designs for subprojects • Supervise civil works, ensuring compliance with all design parameters including quality requirements • Prepare ESIA, ESMP, and other E&S documents • Ensuring inclusion of ESMP in bidding documents • Supervise ESMP implementation during construction • Prepare monthly E&S reports and submit to PMU • Support the E&S staff of PMU in carrying out their responsibilities • Providing training on ESMP principles and requirements to contractors, field staff, and others as needed to ensure effective implementation of ESMP • PIMSC will have dedicated environmental and social staff.
Contractor	• Prepare Contractor-ESMP (C-ESMP) with site-specific mitigation measures. • implementation of mitigation and monitoring measures proposed in the ESMP • Each contractor will depute adequate number of Environmental, Health, and Safety personnel fulltime at the site, who will be responsible for implementing the contractors' environmental, health and safety responsibilities, and liaising with government agencies.
M&E Consultant	• Independent monitoring of the implementation of ESMPs and RPs • External Monitoring and evaluation.

7.2. Inclusion of ESMP in contract documents

HESCO will include the following Environmental, Social, Health and Safety (ESHS) conditions in the bidding documents to ensure all the mitigation measures proposed in the ESMPs are effectively implemented:

- Past performance of the Contractor on ESHS aspects including sexual exploitation and abuse and gender-based violence;
- ESHS Staff with the Contractor;
- Mitigation measures to address construction impacts (as given in ESIA/ESMP);
- Payments for implementation of ESHS measures;
- Preparation of C-ESMP before site mobilization and its implementation during construction to manage the ESHS risks;
- Code of Conduct of Contractor's personnel.

7.3. Environmental and Social Management During Construction

7.3.1. Environmental Code of Practices (ECoP)

The ECoPs provide guidelines for E&S matters to be followed by the contractors for sustainable management of all E&S issues. These ECoPs have been prepared based on the experiences in the construction of projects, including World Bank-funded projects in Pakistan and also in conformity with the World Bank Group's (WBG's) Environment, Health and Safety Guidelines and also Good International Industry Practice. The ECoPs are presented in **Annex C** and will be included in the bidding documents to ensure their implementation.

The list of ECPs prepared for the subproject is given below.

- ECP 1: Waste Management
- ECP 2: Fuels and Hazardous Goods Management
- ECP 3: Water Resources Management
- ECP 4: Soil Quality Management
- ECP 5: Erosion and Sediment Control
- ECP 6: Air Quality Management
- ECP 7: Noise and Vibration Management
- ECP 8: Road Transport and Road Traffic Management
- ECP 9: Labor Influx Management and Construction Camp Management
- ECP 10: Cultural and Religious Issues
- ECP 11: Workers Health and Safety

7.3.2. Construction Stage Mitigation and Monitoring Plan

The mitigation and monitoring plan (MMP) for the construction stage impacts have been prepared on the basis of the impact assessment covered under **Chapter 5.** The MMP is presented in **Table 7.2**. This plan is subproject-specific, and to the extent possible, site-specific, however, contractors will be required to carry out further detailing of the key aspects, to prepare site-specific management plans as part of C-ESMP before commencing the construction activities.

7.3.3. Contractor's ESMP (C-ESMP)

The contractor will be required to prepare, obtain approval from PIMSC and then implement the C-ESMP during the construction phase. The C-ESMP will be prepared on the basis of construction stage MMP and ECoPs, and will consist of sub plans on the key E&S aspects including camp management, traffic management, OHS management, CHS management, pollution management, air quality and noise management, water resource management, spills and leakages, waste management, hazardous substance management and others. The C-ESMP will be site- and subproject-specific and will be prepared on the basis of the prevailing conditions at the construction sites and their surroundings, contractor's plans and construction methodology.

Table 7.2: Mitigation and Monitoring Plan for Construction and O&M Phases

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
Construction Phase Impact				
Soil Erosion and Degradation	Excavation and construction activities, running of vehicles on unpaved roads or tracks	• Construction camp will be located in a stable and flat area, requiring minimal de-vegetation and leveling. The contractor(s) will obtain approval from the PIMSC for this purpose. • Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (eg, stone pitching). • Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir will be minimized. • After the completion of the construction works, the transmission line routes, campsites and other construction sites will be completely restored. No debris, surplus construction material or any garbage will be left behind. • Photographic record will be maintained for pre-project, during-construction and post-construction condition of the sites (grid station, transmission line/feeder routes, camps and access roads). • Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination. • The domestic sewage from the construction camps will be connected to the city sewerage system. If such system is not available, appropriate treatment and disposal system, such as septic tanks and soaking	Contractor	PIMSC, PMU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		pits, will be constructed having adequate capacity. The contractor(s) will submit to the PIMSC the plans for the camp layout and waste disposal system, and obtain approval. • Waste oils will be collected in drums and sold to the recycling contractors. • The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste. ■ Domestic solid waste from the construction camp will be disposed in a manner that does not cause soil contamination. The waste disposal plan submitted by the contractor(s) will also address the solid waste.		
Air quality deterioration	Operation of construction machinery and vehicles	■ Construction camps will be established at least 500 m from communities (except when such camps are established inside the grid stations, in which case a safe distance will be maintained between the residential colony and the construction Camps and other contractor's facilities)). The contractor(s) will obtain PIMSC approval for this purpose, as mentioned earlier. ■ Construction machinery, generators and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions. ■ Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate. The waste water from kitchen and washing area of the	Contractor	PIMSC, PMU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		construction camp may be used for water spraying. ■ Stockpiled soil and sand will be slightly wetted before loading, particularly in windy conditions. Such stockpiles will be covered when necessary. ■ Vehicles transporting soil, sand and other construction materials will be covered with tarpaulin ■ Stack height of generators will be at least 3 meters above the ground. ■ Project vehicles will avoid passing through the communities and cultivation fields as far as possible. If unavoidable, speed will be reduced to 15 km per hour to avoid excessive dust emissions. ■ While working within the communities for works such as transmission line re-conductoring, coordination with the communities will be maintained to minimize any detrimental impacts on the crops and settlements. ■ Ambient air quality analysis will be carried out at the grid station sites and along the TL route during the construction phase. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.		
Surface Water and Groundwater Contamination	Release of contaminated water/effluents from construction sites and camps	■ The contractor(s) will submit to the PMISC the plans for the camp layout and waste disposal system, and obtain approval. ■ Construction debris or any other solid wastes or untreated waste effluents will not be disposed-off in water bodies.	Contractor	PIMSC, PMU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
Blocked Access	Construction activities particularly transmission line works, off-road movement of vehicles	■ Efforts will be made to avoid any impacts on the local roads, routs, and accesses. ■ In case of the blockage of the existing routes, alternate routes will be identified in consultation with the affected communities. ■ The contractor will prepare and implement a traffic management plan to minimize impacts on the local routes. ■ Community liaison will be maintained throughout the construction phase ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.	Contractor	PIMSC, PMU
Noise and Vibration	Operation of construction machinery and vehicles	■ It will be ensured that the noise levels measured at the communities near the project sites are kept within the acceptable limits (70 dB(A) for industrial zones day and night; 45 dB(A) night and 55 dB(A) daytime for residential areas). ■ Noise levels will be measured at the key locations such as at the Staff Colony in grid stations and sensitive receptors. If the noise levels are found to be more than the prescribed limits, appropriate measures will be undertaken by the construction team such as rescheduling the works, using quieter equipment and/or erecting barriers to protect the communities from excessive noise. ■ Vehicular traffic through the communities will be avoided as far as possible. Project routes will be authorized by the PIMSC. ■ Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities.	Contractor	PIMSC, PMU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ Vehicles will have exhaust silencers to minimize noise generation. ■ Nighttime traffic will be avoided near the communities, as far as possible. ■ Movement of all project vehicles and personnel will be restricted to within work areas, to avoid noise disturbance. ■ Working hours for construction activities within the communities will be limited to between 8 am and 6 pm (between 6 am and 8 pm during the summers). ■ Liaison with the community will be maintained. Grievance redressal mechanism will be put in place to address the community complaints. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.		
OHS Hazards	Risks associated with construction works, construction machinery, working at heights and confined spaces, electrocution risk, works over/near water.	■ The contractor will prepare and implement occupational and community health and safety (OCHS) plan, in accordance with the WB ESF, World Bank Group's Environment, Health and Safety Guidelines as well as World Health Organization (WHO) Guidelines, ILO Code of Practice and any internationally recognized OHS standard such as ISO 45001 or US OSHA 29 CFR 1926 or any standard specifically mentioned in the bidding documents. The Plans will include applicable safety standards and protocols, requirements of job hazard analysis, training requirements, documentation and reporting mechanism. ■ All construction works will be executed in	Contractor	PIMSC, PMU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		accordance with the OCHS management plan and appropriate safety standards. Adequate monitoring and equipment will be available as needed. ■ Risk assessment will be carried out for the overall construction activities and then for each activity/task particularly high-risk activities such as working at heights, working over/near water (while crossing the Indus River), works at/near energized systems, hoisting and lifting, and others. ■ Contractor will be required to depute adequate number of OHS supervisors and inspectors at the site on fulltime basis. ■ The construction sites will have protective fencing to avoid any unauthorized entry. ■ The project drivers will be trained for defensive driving skills. ■ Vehicular speeds near/within communities will be kept low to minimize safety hazards. ■ Firefighting equipment will be made available at the camps. ■ The camp staff will be provided OCHS training. ■ The Contractor will submit to the Engineer of PIMSC for approval an emergency evacuation plan and practice the procedure annually. ■ All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel. ■ Fire extinguishers will be provided throughout camps and work sites. Fire extinguishers will be		

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		inspected monthly and maintained as necessary. ■ An adequate and reliable supply of safe drinking water will be made available at readily accessible and suitable places including at all camps. ■ The Contractor will take samples from each supply of drinking water and arrange for analysis of these samples at EPA certified laboratory prior to its use by the Contractor's staff. The results of these tests for each supply must be submitted to the Engineer of PIMSC and must demonstrate that each water supply meets national and World Health Organization (WHO) standards for drinking water. ■ The Contractor will provide and maintain adequate hygienic kitchens which are sheltered and separated from the living quarters. Kitchens will include raised and washable surfaces suitable for food preparation. ■ The Contractor will provide and maintain adequate hygienic dining areas for staff. Work places and camps will be provided with both natural& artificial light. Artificial lighting will be powered by generator in the event of power cuts. ■ Public sensitization training will be provided to workers to avoid social conflicts between residents and the construction contractor, Occurrence of any such impacts can be avoided by community sensitive project planning and implementation and through effective involvement of local administration. ■ Contractor must ensure the provision of first aid		

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		facility at construction site and camps through hiring medics and establishing a dispensary at the campsite. ■ Reasonable number of first aid kits will be available on construction sites and within contractor camps. ■ Site personnel will be provided appropriate type of personal protective equipment (PPE). Contractor will ensure consistent use of PPE.		
Public health and safety issues	Risks associated with construction works, construction machinery, electrocution risk, vehicular traffic hazards, improper waste disposal, exhaust emissions.	■ OCHS Management Plan will be strictly implemented ■ The construction area will be barricaded to prevent unauthorized access ■ Warning signs will be placed where appropriate ■ The construction camps will have septic tanks and soaking pits of adequate size if appropriate/required. ■ The construction camps will have appropriate solid waste disposal mechanism ■ The construction camps and site offices will have first-aid kits. ■ The construction crew will be provided awareness for the transmissible diseases (such as HIV/AIDS, hepatitis B and C). ■ Guidelines for SEA/SH, gender-based violence (GBV) and violence against children (VAC) will be implemented ■ Liaison with the community will be maintained. In particular, the nearby communities will be informed before commencing the testing	Contractor	PIMSC, PMU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		commissioning of the system. Protective fencing will be used where appropriate/possible. Awareness raising program will be implemented to educate the communities regarding the hazards associated with the transmission lines, feeders and other electrical systems/equipment. Warning signs will be used at the appropriate locations. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.		
Influx of Labor	Risks associated with influx of labor from other parts of the country, including SEA/SH risks	■ Limit the sitting of any temporary facilities within the boundaries of the worksites as far as possible; ■ Code of conduct (CoC) for workers and employees will be enforced for the protection of local communities, gender-based violence, other social issues, flora and fauna and a ban on tree cutting and hunting. Any violation of the CoC would lead to strict punishment including termination of employment; ■ Awareness among workers will be created on proper sanitation and hygiene practices, SEA/SH issues, privacy of women, and cultural appropriateness; ■ GRM will have a separate mechanism (GRC) to handle SEA/SH cases; ■ A GBV service provider will be identified in the subproject area; ■ Accountability and response framework will be prepared and implemented for SEA/SH cases; ■ Safe spaces will be established/arranged for women in all temporary and permanent facilities;	Contractor	PIMSC, PMU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ SEA/SH awareness will be considered during the recruitment of staff; ■ Good housekeeping practices will be maintained at project site(s); ■ Adequate personal hygiene facilities will be provided in good condition with adequate supply of clean water; ■ Arrangements will be made to treat the affected workers on time to control the movement of vectors diseases; ■ Workers and surrounding communities will be sensitized on awareness and prevention of HIV/AIDS and STI through training, awareness campaigns and workshops; ■ Free HIV/AIDS and STI screening and provided for site workers ■ Counseling sessions will be held to made the workers aware of the risks of HIV/AIDs and STI; ■ Any employees, who continues misconduct or lack of care, carry out duties amateurishly or inattentively, fail to conform to provisions of the contract, or persist in any conduct which is harmful to safety, health, or the protection of the environment, will be terminated; ■ The use of drugs and alcohol will not be allowed at the work/construction site; ■ Carrying weapons into the workplace premises will be prohibited; ■ Appropriate site security arrangements will be made at all construction sites and temporary		

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		facilities; appropriate fencing, security check points, gates and security guards will be provided at the construction sites to ensure the security of equipment, machinery and materials, as well as to secure the safety of site staff; ■ The contractor will create awareness of construction crew to sensitize them about security situation in the subproject area; ■ The Contractor will ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft; ■ To avoid conflicts with local people on employment matters, it is recommended to the contractor to employ the locals in skilled, semi-skilled, and unskilled work. This will reduce pressure on resources such as residential and health facilities; ■ The contractor will proactively manage the potential impacts from labor influx and potential cultural conflicts between local communities and workers, which include following: ■ The Contractor's regular training program will cover topics related to respectful attitude while interacting with the local communities; ■ Inclusion of CoC obligations and the applicable legislation will be ensured in the contracts of all employees and workers with the provision of		

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		sanctions and penalties in case of violations; ■ World Bank Guidelines on Influx of labor9 will be used for further guidance.		
Gender Issues including SEA/SH risks	Presence of migrant labor	■ Awareness among workers will be created on proper sanitation and hygiene practices, SEA/SH issues, privacy of women, and cultural appropriateness; ■ GRM will have a separate mechanism (GRC) to handle SEA/SH cases; ■ A GBV service provider will be identified in the subproject area; ■ Accountability and response framework will be prepared and implemented for SEA/SH cases; ■ Safe spaces will be established/arranged for women in all temporary and permanent facilities; ■ SEA/SH awareness will be considered during the recruitment of staff; ■ The routes/places used by the women will be avoided as far as possible. If unavoidable, alternate routes to be identified for the communities, if required, especially along routes frequented by women folk, such as route to the local well or water source. ■ Construction crew will avoid entering villages and settlements. ■ Communities will be informed and consulted before commencing works inside or near the communities.	Contractor	PIMSC, PMU

[9] http://pubdocs.worldbank.org/en/863471511809509053/ESS2-FactSheet-WB-ESF.pdf

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ Strict code of conduct will be maintained by the construction crew. Local norms will be respected. ■ WB guidelines on GBV and Influx of Labor will be implemented.		
Child labor	Employment of below age workers	■ the provisions of the Child Labor Act will still be made part of the construction contracts ■ It will be ensured that no child labor is employed at any of the work site or camp site.	Contractor	PIMSC, PMU
Damage to crops	TL re-conductoring works in cultivated fields	• Damage to the crops will be avoided during the transmission line re-conductoring works. • Any damage caused by the construction activities or project vehicle/machinery movement will be compensated. • Liaison with the nearby communities will be maintained in this regard. ■ The grievance redressal mechanism will be maintained on continuous basis.		
Impacts on Sites of Historical, Cultural, Archeological or Religious Significance	Construction activities	■ In case of discovery of any sites or artifacts of historical, cultural, archeological or religious significance, the work will be stopped at that site. ■ The provincial and federal archeological departments will be notified immediately, and their advice will be sought before resumption of the construction activities at such sites. ■ The existing graveyards will not be damaged. The construction work close to the graveyards will be carried out after informing/consulting the relevant communities. ■ Chance-find procedures which will be used during	Contractor; PIMSC; PMU	PIMSC, PMU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		this Project are as follows: • Stop the construction activities in the area of the chance find; • Delineate the discovered site or area; • Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard will be present until the responsible local authorities and relevant Department of Archaeology take over; • Notify the supervisory Engineer who in turn will notify the responsible local authorities and relevant Department of Archaeology immediately (within 24 hours or less); • Responsible local authorities and relevant Department of Archaeology would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists (within 72 hours). The significance and importance of the findings will be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historical, scientific or research, social and economic values; • Decisions on how to handle the finding will be taken by the local authorities and the relevant Department of Archaeology. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration, and salvage;		

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		• Implementation for the authority decision concerning the management of the finding will be communicated in writing by the relevant Department of Archaeology; and • Construction work could resume only after permission is given from the local authorities and relevant Department of Archaeology concerning the safeguard of the heritage.		
O&M Phase Impacts				
Soil and water Contamination	Maintenance activities, disposal of transformer oils and other wastes	• The grid stations will have appropriate solid waste collection and disposal arrangements. • The grid stations will have appropriate sewage handling system. The grid stations' sewage collection system will be connected to the Municipality operated sewerage system, if available. Otherwise, grid stations will have their own septic tanks and soakage pits. • Waste oils and chemicals will be disposed in accordance with their respective Material Safety Data Sheet (MSDS). MSDS will be made available at the grid stations and maintenance workshops. • Non-toxic recyclable waste (such as cardboard) will be given away for recycling. • Toxic waste will be stored separately, , and provided to the Municipality for safe and appropriate disposal. • Grid stations will have channels and drainage pits to collect any leaked oil from the transformers in the grid stations. This oil will be sent back to the workshop for recycling.	Grid Station Operation (GSO)	ESU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		• Any soil contaminated by the oil/chemical spillage will be removed and disposed-off appropriately in accordance with the MSDS of the spilled oil/chemical.		
OHS hazards	O&M activities on live equipment, working at heights	• HESCO will implement the Safety Code prepared by NEPRA and its own OHS Management System. • O&M staff will be provided essential protective gears and equipment. • O&M staff will be provided regular safety training. Refresher courses will be arranged on regular basis. • Firefighting equipment will be made available at the grid stations. • The Emergency Response Plan (ERP), prepared by HESCO, will be made available at each grid station. Its salient points will be displayed at prominent places within each grid station. The O&M staff will be given training on the ERP. The E&S team will review the ERP and with respect to the environmental and social considerations, and recommend changes if needed. The ERP will include procedure to inform the nearby communities in case of fire in the grid stations. • The communities near the grid stations and transmission lines will be educated on the risk of electrocution, and how to avoid accidents. • Appropriate signage on safety precautions will be installed at the key locations. • The trees under the transmission lines will be regularly trimmed in order to maintain 8 m	GSO	ESU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		clearance.		
Public Health Concerns	Electrocution risk; EMF radiation; health concerns for nearby population	• Separation of live parts and public property/other structures/trees will be maintained • Community liaison will be maintained to raise the public awareness about electrocution risks • Solid waste and waste effluents from the grid stations will be treated/ managed appropriately.	GSO	ESU
Loss of agriculture	Maintenance of transmission lines	• Damage to the crops will be avoided during the transmission line patrolling. • Any damage during repair the repair and maintenance activities will be compensated. • Liaison with the nearby communities will be maintained in this regard. • The grievance redressal mechanism will be maintained on continuous basis.	GSO	ESU
Noise generation	From grid station operation and maintenance.	• Appropriate equipment selection will forestall any concerns associated with noise. • Noise measurements will be carried out at the outer fence of the grid stations, in order to ensure that the noise levels are within acceptable limits. If found beyond these limits at any stage, appropriate measures will be taken, such replacing the noisy equipment, and/or erecting noise barrier along the grid station outer periphery. • Liaison with the nearby communities will be maintained in this regard. • The grievance redressal mechanism will be maintained on continuous basis.	GSO	ESU
Gender Mainstreaming	Gender mainstreaming needs to be carried out in	• Gender mainstreaming will be encouraged in HESCO. Employment opportunities will be created for women. Women friendly work	Human Resource (HR) Department	ESU

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
	DISCOs	environment will be established within HESCO facilities (e.g., separate toilets, system to address sexual harassment).		

7.4. E&S Monitoring

7.4.1. Compliance Monitoring

Environmental and Social staff of the Contractor is responsible for implementing the ESMP, while the environmental and social specialists of the PIMSC and PMU will be responsible for the overall monitoring of the EMSPs throughout the subproject implementation.

Compliance monitoring comprises of on-site inspection of the construction activities to verify that measures identified in this ESMP and that are included in the clauses for contractors are being implemented. The E&S Checklists prepared on the basis of MMP given in **Table 7.2** will be used for this purpose.

7.4.2. Effects Monitoring

A tentative monitoring plan to be implemented during the construction stage of the subproject to ensure effectiveness of the mitigation measures is given in **Table 7.3,** along with the monitoring indicators and frequency. The PIMSC will finalize/revise it before the commencement of construction works.

Table 7.3: Effects Monitoring Plan During Construction

Parameter	Means of Monitoring	Location	Frequency	Responsibility	
				Implementation	Supervision
Erosion	Visual inspection of erosion prevention measures and the occurrence of erosion	All sites	Monthly	Contractor	PIMSC, PMU
Wastewater discharges worksites, batching plants, and campsites	Spot measurement for pH Visual inspection to ensure clear water leaving the site	All sites	Weekly	Contractor	PIMSC, PMU
	Sampling and analysis of wastewater discharges for the parameters given in SEQS	All sites (including worksites, batching, camp discharges)	Quarterly	Contractor	PIMSC, PMU
Air Quality (dust)	Visual inspection	All sites	Daily	Contractor	PIMSC, PMU
Ambient Air Quality	Air quality monitoring for 24 hours for the parameters specified in SEQS	At all sites	Quarterly	Contractor	PIMSC, PMU

Parameter	Means of Monitoring	Location	Frequency	Responsibility	
				Implementation	Supervision
Noise and vibration	24-hour noise monitoring (at/near construction sites, campsites, offices, colony, communities, quarry area, transportation routes)	At all sites, particularly near sensitive receptors	Monthly	Contractor	PIMSC, PMU
Emissions from plant and equipment	Visual Inspection	All vehicles / equipment	Monthly	Contractor	PIMSC, PMU
Waste Management	Visual inspection on spoil disposal	At disposal sites	Monthly	Contractor	PIMSC, PMU
	Visual inspection for availability of dust bins at worksites and camp	At camp and work sites	Monthly	Contractor	PIMSC, PMU
	Visual inspection for collection and treatment of organic waste	At campsite	Monthly	Contractor	PIMSC, PMU
	Visual inspection for collection and treatment of recyclable and hazardous waste by the waste management contractor	At camp and work sites	Monthly	Contractor	PIMSC, PMU
Spills from hydrocarbon and chemical storage	Visual inspection to check whether fuels are stored in contained facilities Availability of spill kits at the site Visual Inspection for leaks and spills	At fuel storage sites	Monthly	Contractor	PIMSC, PMU
Traffic Safety	Visual inspection for placement of traffic signs and traffic control	Near the construction sites	Monthly	Contractor	PIMSC, PMU,

Parameter	Means of Monitoring	Location	Frequency	Responsibility	
				Implementation	Supervision
	personnel				
Local Roads	Visual inspection to ensure local roads are not damaged	local roads	Monthly	Contractor	PIMSC, PMU,
Cultural/religious and Sites	Visual observation for cultural sites	Along the local roads	Monthly	Contractor	PIMSC, PMU,
Drinking water and sanitation	Water quality analysis for drinking water parameters specified in SEQS	At the work sites and campsite	Quarterly	Contractor	PIMSC, PMU,
Safety of workers	Usage of Personal Protective equipment; accident / incident record.	All worksites	On a regular basis	Contractor	PIMSC, PMU,
Labor engagement and GBV risks	Interaction with labors and review of GRM	All work sites	Monthly	Contractor	PIMSC, PMU
Reinstatement of Work Sites	Visual Inspection	All worksites	After completion of all works	Contractor	PIMSC, PMU,

7.5. Gender Action Plan Outline

An outline of the Gender Action Plan (GAP) for the subproject is given in **Table 7.4**; it will be finalized before the mobilization of the contractor**.**

Table 7.4: Gender Action Plan of the Project

#	Activities	Targets	Responsibility
1	Conduct public awareness campaigns on subproject benefits and potential impacts particularly on women and children	• Project brochure in Urdu/Sindhi to be disseminated in villages/communities of the subproject area of influence and within one month of the start of the subproject and orientation to women in face-to-face meetings.	PMU; PIMSC

#	Activities	Targets	Responsibility
2	Socially and gender-inclusive consultations	• Broad-based socially and gender-inclusive participatory consultation workshop(s) for relevant stakeholders on GAP objectives, one for male and one for female. • At least 25% of participants of stakeholder consultation activities should be women. • Representation of women in consultation, participation and decision-making forums to voice their opinions, needs and preferences at a location and time that increases the possibility of women's participation, 20% of participants are women's representatives.	PMU, Project Director (PD), Social and Gender Staff of PMU; PIMSC
3	Enhance the capacity of HESCO and PMU to include a gender perspective into EDEIP subprojects	• Evidence that equal employment opportunity policy and practices are implemented, at least 10% of female staff in PMU with equal salaries by following GoP fixed minimum quota for women employment; • Evidence of the type of incentives designed to recruit women, increase their capacity, and provide career development; • Social and Gender Specialist and female staff deployed in PMU and PIMSC to assist in GAP implementation and monitoring; • PMU and HESCO staff trained in job-related skills of which 10% are women; • Gender awareness and social inclusion training provided to 100% PMU and 50% management staff of HESCO for clarity in gender mainstreaming and social inclusion concepts, orientation on GAP targets, roles, and responsibilities, better planning, communication, coordination, implementation, documentation, monitoring and evaluation;	PMU, Project Director, Social and Gender Staff of PMU; PIMSC
4	Include gender-disaggregated data in monitoring and evaluation and EDEIP progress reports.	• Developed a set of quantitative and qualitative sub-indicators of key indicators, and develop a system to consistently collect, retrieve and analyze the gender-disaggregated data of level of participation, immediate results of activities, benefits, and outcomes, of the EDEIP on women, men, boys, and girls (disaggregated by gender, income, marginalized and vulnerable groups)	PMU, Project Director, Social and Gender Staff of PMU (PIMSC for monitoring)

7.6. Capacity Building and Training

The proposed training plan is given in **Table 7.5**. At the construction sites, PIMSC will take the lead in implementing the capacity building plan, though the contractors will also be responsible

for conducting training for their own staff and workers. The various aspects that are covered under the capacity building will include general environmental and social awareness, key environmental and social sensitivities of the area, key environmental and social impacts of the project, ESMP requirements, OHS aspects, and waste disposal.

Table 7.5: Environmental and Social Training Plan

Contents	Participants	Trainer	Schedule
Environmental and social impacts of the subproject and ESMP requirements of the Contractor; World Bank Group Environmental Health and Safety Guidelines. The contents for the second and subsequent training programs will cover topics related to the issues associated with on-going construction activities.	All the technical Staff of PMU, ESU, and relevant technical staff of HESCO who are involved in the management of environmental and social issues associated with routine operation and maintenance of the airport. Site Engineers of the Engineer.	ESHS staff of the PIMSC; and an external training agency who has a thorough knowledge of the WB ESSs and guidelines	During the initial stages of the subproject implementation. The training will be repeated every six months.
Environmental and Social issues associated with the ongoing construction works; Workers' health and safety	Site Engineers of the Contractor, PMU, and the PIMSC; E&S staff of contractor	E&S staff of the PIMSC	On a monthly basis
Code of Conduct Occupational Health and Safety	Construction crew	Contractors ESHS Staff	Prior to the start of the construction activities and during the construction activities (To be repeated as needed.)

7.7. Grievance Redress Mechanism

7.7.1. Project GRM

HESCO has established an EDEIP-specific grievance redress mechanism (GRM) to receive, evaluate, and facilitate the resolution of affected parties' concerns, complaints, and grievances about the environmental and social performance of the EDEIP. This GRM will be applicable to the proposed subproject as well.

A three-tier GRM has been designed to provide a time-bound, early, transparent and fair resolution of the grievances raised by affected persons (APs) and other stakeholder regarding E&S management of the EDEIP subprojects. All complaints received verbally or in writing will

be properly documented and recorded in the Complaint Management Register(s). The GRM will be linked with the HESCO's existing complaint handling system. The GRM for the EDEIP is outlined below and consists of three levels with time-bound schedules for addressing grievances.

First Tier of GRM: The PMU's project site office will be the first tier of GRM, which will offer the fastest and most accessible mechanism for resolution of grievances at the local level. A local level Grievance Redress Committee (GRC) will be formed for this purpose headed by the Project Director (PD) with the membership of ESU, contractors' representatives, consultants' representatives, representatives of other relevant departments, and two members from communities if applicable. At this tier, the designated E&S staff of PMU site office will make attempt to resolve the complaints within two to 10 working days, depending on the nature of grievance. The PD (or his/her representative) will convene the meetings of local GRC and conduct proceedings informally to reach an amicable settlement between the parties within 10 days of receiving a complaint (verbally or in writing) from an affected person or their representative. The report of the GRM meetings will be recorded in writing, and copies will be provided to the parties involved. Grievances will be documented with personal details (name, address, date of complaint, nature of the complaint, etc.) will be included unless anonymity is requested. A tracking number will be assigned to each complaint/grievance. Should the grievance remain unresolved or the AP not satisfied with the decision, the grievance can be lodged with the Program level grievance redress committee, led by the head of PMU.

Second Tier of GRM: The E&S staff in PMU will refer to the unresolved issues or grievances (with written documentation) to the second tier of GRM, the PMU-level Grievance Redress Committee (GRC). The PMU GRC will be established by HESCO and will consist of the following persons: (i) a HESCO's representative from senior management; (ii) the head of PMU will act as secretary of the GRC; (iii) Project Director of respective subproject; (iv) representative of Deputy Commissioned (DC) office (if applicable); (v) representative of PIMSC; (vi) Chief Resident Engineer of the Consultants (on-call); (vii) representative of relevant government offices (on-call); (viii) two to three representative of respective project-affected people (on-call). A hearing can be called with the GRC, if necessary, where the AP(s) can present details of his/her/their concern/grievance. The GRC will meet as necessary when there are grievances to be addressed. The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 25 working days, depending on the nature of the grievance. If complainant is still unsatisfied with the decision, the existence of the GRC will not impede the complainant's access to the government's administrative or judicial remedies.

Third Tier of GRM: In the event that a grievance cannot be resolved directly by the second tier GRC or if complainant is dissatisfied with the decision of GRC, the affected people can seek alternative redress through the Chief Executive Officer (CEO) or Board of Directors of HESCO, district administration, the Secretary Energy and Power Department or higher-level administrative authorities, the Pakistan Citizen Portal or the court of law, as appropriate.

HESCO will establish a separate GRC to handle SEA/SH cases. Appropriate handing of such cases will be carried out to ensure complete privacy of the complainants, details of the complaint/grievance, and the corrective actions proposed, and corrective actions taken.

Monitoring and reporting: The monitoring reports of ESMP implementation will include the

following aspects pertaining to progress on grievances: (i) number of cases registered, level of jurisdiction (first, second, third tiers), number of hearings held, decisions made, status of pending cases; and (ii) lists of cases in process and already decided upon, may be prepared with details such as name with copy of National Identity Card, complaint number, date of application, date of hearing, decisions, remarks, actions taken to resolve issue(s), and status of grievance (i.e., open, pending, closed).

7.7.2. GRM for Construction Workers

The GRM described above addresses the grievances/complaints lodged by the project affected persons and other local stakeholders. But according to the lessons learned in various project contexts, there is also a need to establish a separate GRM to deal exclusively with those complaints that involve workers employed by the contractors for construction activities. Such grievances may involve wage rates and unpaid overtime works; irregular and partial payments; lack / inadequacy of living accommodations; lack of clean drinking water and sanitation facilities; lack of medical care in emergencies; and lack of protection against gender-based violence (GBV) by labor suppliers, supervisors.

The dealing with labor grievances / complaints will have members who are directly and indirectly associated with the construction works. The GRC will include a PMU official who is in charge at the worksite as the convener, resident engineer of the PIMSC, a worker's representative, and the contractor's representative. The convener will designate an official to receive the complaints and ensure the complainant does not lose his job and is not intimidated into withdrawing the complaint before the formal hearing.

To ensure impartiality and transparency, hearings on complaints will be held in a non-threatening environment and will remain open to all other workers on the site. The GRC will record the (i) details of the complaints; (ii) reasons that led to acceptance or rejection of the individual cases, as well as the number of accepted and rejected cases; and (iii) decisions agreed with the complainants. PMU will keep records of all resolved and unresolved complaints and grievances and make them available for review as and when asked for by the World Bank and other interested entities/persons.

7.8. Reporting

HESCO and its contractors will prepare periodic reports on the status of ESMP implementation and will be submitted to World Bank for their review and feedback. Details of these reports and their content are given in **Table 7.6**.

Table 7.6: ESMP Monitoring and Compliance Reports

#	Title of the Report	Contents of the Report	Frequency of Report Preparation	Report to be prepared by
1	ESHS Monitoring Report	The compliance status of the subproject with environmental and social mitigation and monitoring measures. Besides, the report also covers: • environmental incidents; • health and safety incidents, • health and safety supervision:	Monthly	Contractor

#	Title of the Report	Contents of the Report	Frequency of Report Preparation	Report to be prepared by
		• Usage of PPE by workers • worker accommodations • Training conducted and workers participated • Workers' grievances • Community grievances • Chance-find (if any)		
2	ESMP Monitoring Report	The compliance status of overall subproject with ESMP requirements; non-compliances; Effects Monitoring Report; training provided; GRM data; summary of ESHS monthly reports; corrective actions determined; corrective actions taken; availability of E&S personnel at site.	Quarterly	PIMSC
3	Incident Reports	Incident investigation reports for all major incidents covering details of the incident, root cause analysis, and actions taken to address the future recurrence of this event	Initial investigation report within 24 hours Detailed Investigation Report within ten days	Contractor; PIMSC

7.9. ESMP Implementation Cost

The total cost of the ESMP implementation is estimated to be about **PKR 8.75 million** (see **Table 7.7**).

Table 7.7: Cost Estimates for ESMP Implementation

Sr. No.	Description of Item	Unit	Item Total (PKR)
A	**Contractors Budget**		
1.	Contractors' preparation of C-ESMP including OHS Plans		Included in construction cost
2	Contractors ESHS Staff		Included in construction cost
3.	Waste Management (procurement and operation of composters, bailers, and waste management contractors)		Included in construction cost
4	Dust Management (procurement and operation of sprinklers)		Included in construction cost
5	Site/OHS facilities for workers (PPE)		Included in construction cost
6	Training of Workers on Code of Conduct (incl. GBV/SH/AIDs)		Included in construction cost

7	Health facilities at the camp including a fully equipped ambulance, doctor and nurses		Included in construction cost
8	Wastewater treatment facilities (incl. mobile toilets at worksites)		Included in construction cost
9	Compensation for crop damage		Included in construction cost
10	Spot monitoring for dust and hazardous gases in tunnels		Included in construction cost
11	Environmental Monitoring during construction by a third party (wastewater quality, air quality, and noise)	LS	5,000,000
B.	**Consultants' Budget**		
1	ESHS Staff for the PIMSC	LS	Included in project management cost
C.	**HESCO's Budget**		
2	Capacity building of PMU E&S staff	LS	2,000,000
	Subtotal		**7,000,000**
D.	**Contingency**		
	Contingency (25% of A+B+C)		1,750,000
	Total (PKR)		**8,750,000**

Annex A: Ambient Monitoring Results

Ambient Air Quality Results for Component 1

Ambient Air Quality Monitoring

Job Reference Number	BV-PAK-LHR-40-25-0189(2)
Date of Intervention	01-06-2025
Coordinates	Tando Adam 25°47'05.5"N 68°39'07.4"E

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	SEQS
Nitrogen Dioxide (NO_2)	µg/m³	24Hours	1.00	34.8	80.0
Nitrogen oxide (NO)	µg/m³	24Hours	1.00	15.2	40.0
NO_X	µg/m³	24Hours	1.00	50	120.0
Sulphur Dioxide (SO_2)	µg/m³	24 Hours	1.00	02.01	120.0
Carbon Monoxide (CO)	mg/m³	8 Hours	0.01	0.08	05.0
Ozone (O_3)	µg/m³	1 Hour	-	0.00	130.0
Particulate Matter (PM_{10})	µg/m³	24 Hours	1.00	94.5	150.0
Particular Matter ($PM_{2.5}$)	µg/m³	24 Hours	1.00	58.4	75.0
Total Suspended Particles (TSP)	µg/m³	24 Hours	1.00	152.9	500.0

Abbreviations:
LDL= Lowest Detection Limit
SEQS= Sindh Environmental Quality Standards
*(8 Hours standard for CO)
**(01 hour standard for O_3)
µg/m³= Micrograms per Cubic Meter

Water Quality Results for Component 1

Water Testing Report

Job Ref. No:	BV-PAK-LHR-40-25-0189(2)			Sample Date:	01-06-2025
Sampling Method:	APHA 1060-B & C			Location	**Tando Adam.** 25°47'05.5"N 68°39'07.4"E
Sample Identification	Drinking Water(Bore Water)				
Parameters	**Analysis Method**	**Unit**	**LDL**	**Result**	**SEQs**
pH	APHA-4500H+ B	-	-	7.57	6.5-8.5
Odor	In-house	-	-	Non-Objectionable	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	< 1.0	≤15 TCU
Taste	In-house	-	-	Non-Objectionable	Non-Objectionable
Total Hardness	EDTA Titration	mg/l	5.0	160	<500
Total Dissolved Solid	APHA-2540 C	mg/l	5.0	578	< 1000
Turbidity	APHA-2130 B	NTU	0.1	< 0.1	<5 NTU
Chloride	APHA-4500Cl- B	mg/l	0.5	62.55	< 250
Chlorine, Residual	APHA-3111 B	mg/l	0.1	BDL	1.5
Fluoride (F)	APHA-4500F- C	mg/l	0.1	BDL	≤ 1.5
Nitrate	APHA-3111B NO	mg/l	0.1	BDL	≤0.50
Nitrite	APHA-3111B NO3	mg/l	0.1	< 0.1	≤3 (P)
Alkalinity	APHA-2320 B	mg/l	5.0	59.3	NGVS
Aluminum (Al)	APHA-3111Al B	mg/l	0.05	BDL	≤ 0.2
Antimony (Sb)	APHA-3111Sb B	mg/l	0.05	BDL	≤ 0.005 (P)
Arsenic (As)	APHA-3111As B	mg/l	0.05	BDL	≤ 0.05 (P)
Barium (Ba)	APHA-3111Ba B	mg/l	0.05	BDL	0.7
Boron (B)	APHA-4500-B (C)	mg/l	0.05	BDL	0.3
Cadmium (Cd)	APHA-3111Cd B	mg/l	0.01	<0.01	0.01
Chromium (Cr)	APHA-3111Cr B	mg/l	0.05	<0.05	≤ 0.05 (P)
Copper (Cu)	APHA-3111Cu B	mg/l	0.05	<0.05	2
Cyanide (CN)	APHA-4500CN E	mg/l	0.05	<0.05	≤ 0.05
Lead (Pb)	APHA-3111Pb B	mg/l	0.05	<0.05	≤ 0.05
Manganese (Mn)	APHA-3111Mn B	mg/l	0.05	<0.05	≤ 0.5
Mercury (Hg)	APHA-3112Hg B	mg/l	0.001	<0.001	≤ 0.001
Nickel (Ni)	APHA-3111Ni B	mg/l	0.02	<0.02	≤ 0.02
Selenium (Se)	APHA-3111Se B	mg/l	0.01	<0.01	0.01 (P)
Zinc (Zn)	APHA-3111Zn B	mg/l	0.05	BDL	5.0
Phenols	APHA-3111B	mg/l	0.002	<0.002	≤ 0.002
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA:9222 B	CFU/100ml		0.00	0/100ml
Faecal Coliforms (Ecoli)	APHA:9222 D	CFU/100ml		0.00	0/100ml

Ambient Noise Quality Results for Component 1

Noise Level Monitoring Report

Job Reference Number	BV-PAK-LHR-40-25-0189(2)
Date of Intervention	01-06-2025
Sampling Coordinates	Tando Adam 25°47'05.5"N 68°39'07.4"E

	Time	Method/Technique	Unit	Results LAavg
1.	10:00	Noise Meter	dB	47
2.	11:00	Noise Meter	dB	49
3.	12:00	Noise Meter	dB	47
4.	13:00	Noise Meter	dB	44
5.	14:00	Noise Meter	dB	52
6.	15:00	Noise Meter	dB	51
7.	16:00	Noise Meter	dB	49
8.	17:00	Noise Meter	dB	48
9.	18:00	Noise Meter	dB	48
10.	19:00	Noise Meter	dB	47
11.	20:00	Noise Meter	dB	44
12.	21:00	Noise Meter	dB	43
13.	22:00	Noise Meter	dB	45
14.	23:00	Noise Meter	dB	48
15.	00:00	Noise Meter	dB	41
16.	01:00	Noise Meter	dB	45
17.	02:00	Noise Meter	dB	45
18.	03:00	Noise Meter	dB	44
19.	04:00	Noise Meter	dB	45
20.	05:00	Noise Meter	dB	42
21.	06:00	Noise Meter	dB	41
22.	07:00	Noise Meter	dB	48
23.	08:00	Noise Meter	dB	45
24.	09:00	Noise Meter	dB	46
		Average (DAY)	**dB**	**48**
		SEQs	**dB**	**55**
		Average (NIGHT)	**dB**	**42**

Ambient Air Quality Results for Component 2

Ambient Air Quality Monitoring

Job Reference Number	BV-PAK-LHR-40-25-0189
Date of Intervention	31-05-2025
Coordinates	Hala 25°49'24.9"N 68°25'19.6"E

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	SEQS
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	24Hours	1.00	51.2	80.0
Nitrogen oxide (NO)	$\mu g/m^3$	24Hours	1.00	19.10	40.0
NO_X	$\mu g/m^3$	24Hours	1.00	70.3	120.0
Sulphur Dioxide (SO_2)	$\mu g/m^3$	24 Hours	1.00	08.28	120.0
Carbon Monoxide (CO)	mg/m^3	8 Hours	0.01	1.02	05.0
Ozone (O_3)	$\mu g/m^3$	1 Hour	-	0.00	130.0
Particulate Matter (PM_{10})	$\mu g/m^3$	24 Hours	1.00	88.2	150.0
Particular Matter ($PM_{2.5}$)	$\mu g/m^3$	24 Hours	1.00	27.9	75.0
Total Suspended Particles (TSP)	$\mu g/m^3$	24 Hours	1.00	116.1	500.0

Abbreviations:
LDL= Lowest Detection Limit
SEQS= Sindh Environmental Quality Standards
*(8 Hours standard for CO)
**(01 hour standard for O_3)
$\mu g/m^3$= Micrograms per Cubic Meter

Water Quality Results for Component 2

Water Testing Report

Job Ref. No:	BV-PAK-LHR-40-25-0189(1)			Sample Date:	31-05-2025
Sampling Method:	APHA 1060-B & C			Location	**Hala** 25°49'24.9"N 68°25'19.6"E
Sample Identification	Drinking Water(Bore Water)				
Parameters	**Analysis Method**	**Unit**	**LDL**	**Result**	**SEQs**
pH	APHA-4500H+ B	-	-	7.45	6.5-8.5
Odor	In-house	-	-	Non-Objectionable	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	< 1.0	≤15 TCU
Taste	In-house	-	-	Non-Objectionable	Non-Objectionable
Total Hardness	EDTA Titration	mg/l	5.0	158	<500
Total Dissolved Solid	APHA-2540 C	mg/l	5.0	497	< 1000
Turbidity	APHA-2130 B	NTU	0.1	< 0.1	<5 NTU
Chloride	APHA-4500Cl- B	mg/l	0.5	51.25	< 250
Chlorine, Residual	APHA-3111 B	mg/l	0.1	BDL	1.5
Fluoride (F)	APHA-4500F- C	mg/l	0.1	0.25	≤ 1.5
Nitrate	APHA-3111B NO	mg/l	0.1	0.3	≤0.50
Nitrite	APHA-3111B NO3	mg/l	0.1	< 0.1	≤3 (P)
Alkalinity	APHA-2320 B	mg/l	5.0	34	NGVS
Aluminum (Al)	APHA-3111Al B	mg/l	0.05	BDL	≤ 0.2
Antimony (Sb)	APHA-3111Sb B	mg/l	0.05	BDL	≤ 0.005 (P)
Arsenic (As)	APHA-3111As B	mg/l	0.05	BDL	≤ 0.05 (P)
Barium (Ba)	APHA-3111Ba B	mg/l	0.05	BDL	0.7
Boron (B)	APHA-4500-B (C)	mg/l	0.05	BDL	0.3
Cadmium (Cd)	APHA-3111Cd B	mg/l	0.01	<0.01	0.01
Chromium (Cr)	APHA-3111Cr B	mg/l	0.05	<0.05	≤ 0.05 (P)
Copper (Cu)	APHA-3111Cu B	mg/l	0.05	<0.05	2
Cyanide (CN)	APHA-4500CN- E	mg/l	0.05	<0.05	≤ 0.05
Lead (Pb)	APHA-3111Pb B	mg/l	0.05	<0.05	≤ 0.05
Manganese (Mn)	APHA-3111Mn B	mg/l	0.05	<0.05	≤ 0.5
Mercury (Hg)	APHA-3112Hg B	mg/l	0.001	<0.001	≤ 0.001
Nickel (Ni)	APHA-3111Ni B	mg/l	0.02	<0.02	≤ 0.02
Selenium (Se)	APHA-3111Se B	mg/l	0.01	<0.01	0.01 (P)
Zinc (Zn)	APHA-3111Zn B	mg/l	0.05	BDL	5.0
Phenols	APHA-3111B	mg/l	0.002	<0.002	≤ 0.002
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA:9222 B	CFU/100ml		00.00	0/100ml
Faecal Coliforms (Ecoli)	APHA:9222 D	CFU/100ml		00.00	0/100ml

Ambient Noise Quality Results for Component 2

Noise Level Monitoring Report

Job Reference Number	BV-PAK-LHR-40-25-0189
Date of Intervention	31-05-2025
Sampling Coordinates	Hala 25°49'24.9"N 68°25'19.6"E

	Time	Method/Technique	Unit	Results LAavg
1.	10:00	Noise Meter	dB	48
2.	11:00	Noise Meter	dB	52
3.	12:00	Noise Meter	dB	54
4.	13:00	Noise Meter	dB	57
5.	14:00	Noise Meter	dB	51
6.	15:00	Noise Meter	dB	50
7.	16:00	Noise Meter	dB	51
8.	17:00	Noise Meter	dB	49
9.	18:00	Noise Meter	dB	48
10.	19:00	Noise Meter	dB	50
11.	20:00	Noise Meter	dB	49
12.	21:00	Noise Meter	dB	46
13.	22:00	Noise Meter	dB	43
14.	23:00	Noise Meter	dB	45
15.	00:00	Noise Meter	dB	47
16.	01:00	Noise Meter	dB	42
17.	02:00	Noise Meter	dB	42
18.	03:00	Noise Meter	dB	44
19.	04:00	Noise Meter	dB	49
20.	05:00	Noise Meter	dB	48
21.	06:00	Noise Meter	dB	42
22.	07:00	Noise Meter	dB	46
23.	08:00	Noise Meter	dB	51
24.	09:00	Noise Meter	dB	52
		Average (DAY)	**dB**	**49**
		SEQs	**dB**	**55**
		Average (NIGHT)	**dB**	**41**
		SEQs	**dB**	**45**

Ambient Air Quality Results for Component 3

Ambient Air Quality Monitoring

Job Reference Number	BV-PAK-LHR-40-25-0189(3)
Date of Intervention	02-06-2025
Coordinates	Hala Road 25°25'26.2"N 68°22'57.1"

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	SEQS
Nitrogen Dioxide (NO_2)	µg/m³	24Hours	1.00	29.2	80.0
Nitrogen oxide (NO)	µg/m³	24Hours	1.00	19.5	40.0
NO_X	µg/m³	24Hours	1.00	48.7	120.0
Sulphur Dioxide (SO_2)	µg/m³	24 Hours	1.00	4.81	120.0
Carbon Monoxide (CO)	mg/m³	8 Hours	0.01	1.28	05.0
Ozone (O_3)	µg/m³	1 Hour	-	0.00	130.0
Particulate Matter (PM_{10})	µg/m³	24 Hours	1.00	108.3	150.0
Particular Matter ($PM_{2.5}$)	µg/m³	24 Hours	1.00	59.6	75.0
Total Suspended Particles (TSP)	µg/m³	24 Hours	1.00	167.9	500.0

Abbreviations:
LDL= Lowest Detection Limit
SEQS= Sindh Environmental Quality Standards
*(8 Hours standard for CO)
**(01 hour standard for O_3)

Ambient Air Quality Monitoring

Job Reference Number	BV-PAK-LHR-40-25-0189(6)	
Date of Intervention	05-06-2025	
Coordinates	Jamshoro 25°28'35.6"N 68°16'14.3"E	

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	SEQS
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	24Hours	1.00	34.8	80.0
Nitrogen oxide (NO)	$\mu g/m^3$	24Hours	1.00	15.2	40.0
NO_X	$\mu g/m^3$	24Hours	1.00	50	120.0
Sulphur Dioxide (SO_2)	$\mu g/m^3$	24 Hours	1.00	02.01	120.0
Carbon Monoxide (CO)	mg/m^3	8 Hours	0.01	0.08	05.0
Ozone (O_3)	$\mu g/m^3$	1 Hour	-	0.00	130.0
Particulate Matter (PM_{10})	$\mu g/m^3$	24 Hours	1.00	94.5	150.0
Particular Matter ($PM_{2.5}$)	$\mu g/m^3$	24 Hours	1.00	58.4	75.0
Total Suspended Particles (TSP)	$\mu g/m^3$	24 Hours	1.00	152.9	500.0

Abbreviations:
LDL= Lowest Detection Limit
SEQS= Sindh Environmental Quality Standards
*(8 Hours standard for CO)
**(01 hour standard for O_3)

Ambient Air Quality Monitoring

Job Reference Number	BV-PAK-LHR-40-25-0189(5)	
Date of Intervention	04-06-2025	
Coordinates	Qasimabad 25°24'12.1"N 68°20'37.8"E	

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	SEQS
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	24Hours	1.00	57.89	80.0
Nitrogen oxide (NO)	$\mu g/m^3$	24Hours	1.00	39.4	40.0
NO_X	$\mu g/m^3$	24Hours	1.00	97.29	120.0
Sulphur Dioxide (SO_2)	$\mu g/m^3$	24 Hours	1.00	05.28	120.0
Carbon Monoxide (CO)	mg/m^3	8 Hours	0.01	2.03	05.0
Ozone (O_3)	$\mu g/m^3$	1 Hour	-	0.00	130.0
Particulate Matter (PM_{10})	$\mu g/m^3$	24 Hours	1.00	139.8	150.0
Particular Matter ($PM_{2.5}$)	$\mu g/m^3$	24 Hours	1.00	69.1	75.0
Total Suspended Particles (TSP)	$\mu g/m^3$	24 Hours	1.00	208.9	500.0

Abbreviations:
LDL= Lowest Detection Limit
SEQS= Sindh Environmental Quality Standards
*(8 Hours standard for CO)
**(01 hour standard for O_3)
$\mu g/m^3$= Micrograms per Cubic Meter

Water Quality Results for Component 3

Water Testing Report

Job Ref. No:	BV-PAK-LHR-40-25-0189(5)			Sample Date:	03-06-2025
Sampling Method:	APHA 1060-B & C			Location:	**Qasimabad** 25°24'12.1"N 68°20'37.8"E
Sample Identification	Drinking Water(Community Line Water)				
Parameters	**Analysis Method**	**Unit**	**LDL**	**Result**	**SEQs**
pH	APHA-4500H+ B	-	-	7.45	6.5-8.5
Odor	In-house	-	-	Objectionable	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	Objectionable	≤15 TCU
Taste	In-house	-	-	Objectionable	Non-Objectionable
Total Hardness	EDTA Titration	mg/l	5.0	38.24	<500
Total Dissolved Solid	APHA-2540 C	mg/l	5.0	889	< 1000
Turbidity	APHA-2130 B	NTU	0.1	9.32	<5 NTU
Chloride	APHA-4500Cl- B	mg/l	0.5	46.32	< 250
Chlorine, Residual	APHA-3111 B	mg/l	0.1	BDL	1.5
Fluoride (F)	APHA-4500F- C	mg/l	0.1	0.52	≤ 1.5
Nitrate	APHA-3111B NO	mg/l	0.1	8.86	≤0.50
Nitrite	APHA-3111B NO3	mg/l	0.1	< 0.1	≤3 (P)
Alkalinity	APHA-2320 B	mg/l	5.0	37	NGVS
Aluminum (Al)	APHA-3111Al B	mg/l	0.05	BDL	≤ 0.2
Antimony (Sb)	APHA-3111Sb B	mg/l	0.05	BDL	≤ 0.005 (P)
Arsenic (As)	APHA-3111As B	mg/l	0.05	BDL	≤ 0.05 (P)
Barium (Ba)	APHA-3111Ba B	mg/l	0.05	BDL	0.7
Boron (B)	APHA-4500-B (C)	mg/l	0.05	0.010	0.3
Cadmium (Cd)	APHA-3111Cd B	mg/l	0.01	<0.01	0.01
Chromium (Cr)	APHA-3111Cr B	mg/l	0.05	<0.05	≤ 0.05 (P)
Copper (Cu)	APHA-3111Cu B	mg/l	0.05	0.021	2
Cyanide (CN)	APHA-4500CN- E	mg/l	0.05	<0.05	≤ 0.05
Lead (Pb)	APHA-3111Pb B	mg/l	0.05	<0.05	≤ 0.05
Manganese (Mn)	APHA-3111Mn B	mg/l	0.05	0.027	≤ 0.5
Mercury (Hg)	APHA-3112Hg B	mg/l	0.001	<0.001	≤ 0.001
Nickel (Ni)	APHA-3111Ni B	mg/l	0.02	0.016	≤ 0.02
Selenium (Se)	APHA-3111Se B	mg/l	0.01	<0.01	0.01 (P)
Zinc (Zn)	APHA-3111Zn B	mg/l	0.05	0.641	5.0
Phenols	APHA-3111B	mg/l	0.002	<0.002	≤ 0.002
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA:9222 B	CFU/100ml		86.2	0/100ml
Faecal Coliforms (Ecoli)	APHA:9222 D	CFU/100ml		79.8	0/100ml

Water Testing Report

Job Ref. No:	BV-PAK-LHR-40-25-0189(6)	Sample Date:	03-06-2025
Sampling Method:	APHA 1060-B & C	Location:	Jamshoro . 25°28'35.6"N 68°16'14.3"E
Sample Identification	Drinking Water(Community Line Water)		

Parameters	Analysis Method	Unit	LDL	Result	SEQs
pH	APHA-4500H+ B	-	-	7.41	6.5-8.5
Odor	In-house	-	-	Objectionable	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	Objectionable	≤15 TCU
Taste	In-house	-	-	Objectionable	Non-Objectionable
Total Hardness	EDTA Titration	mg/l	5.0	64	<500
Total Dissolved Solid	APHA-2540 C	mg/l	5.0	1870	< 1000
Turbidity	APHA-2130 B	NTU	0.1	9.99	<5 NTU
Chloride	APHA-4500Cl- B	mg/l	0.5	166.33	< 250
Chlorine, Residual	APHA-3111 B	mg/l	0.1	BDL	1.5
Fluoride (F)	APHA-4500F- C	mg/l	0.1	0.39	≤ 1.5
Nitrate	APHA-3111B NO	mg/l	0.1	11.29	≤0.50
Nitrite	APHA-3111B NO3	mg/l	0.1	1.44	≤3 (P)
Alkalinity	APHA-2320 B	mg/l	5.0	232	NGVS
Aluminum (Al)	APHA-3111Al B	mg/l	0.05	BDL	≤ 0.2
Antimony (Sb)	APHA-3111Sb B	mg/l	0.05	BDL	≤ 0.005 (P)
Arsenic (As)	APHA-3111As B	mg/l	0.05	BDL	≤ 0.05 (P)
Barium (Ba)	APHA-3111Ba B	mg/l	0.05	BDL	0.7
Boron (B)	APHA-4500-B (C)	mg/l	0.05	0.0172	0.3
Cadmium (Cd)	APHA-3111Cd B	mg/l	0.01	<0.01	0.01
Chromium (Cr)	APHA-3111Cr B	mg/l	0.05	<0.05	≤ 0.05 (P)
Copper (Cu)	APHA-3111Cu B	mg/l	0.05	0.0113	2
Cyanide (CN)	APHA-4500CN- E	mg/l	0.05	<0.05	≤ 0.05
Lead (Pb)	APHA-3111Pb B	mg/l	0.05	<0.05	≤ 0.05
Manganese (Mn)	APHA-3111Mn B	mg/l	0.05	<0.05	≤ 0.5
Mercury (Hg)	APHA-3112Hg B	mg/l	0.001	<0.001	≤ 0.001
Nickel (Ni)	APHA-3111Ni B	mg/l	0.02	<0.02	≤ 0.02
Selenium (Se)	APHA-3111Se B	mg/l	0.01	<0.01	0.01 (P)
Zinc (Zn)	APHA-3111Zn B	mg/l	0.05	0.25	5.0
Phenols	APHA-3111B	mg/l	0.002	<0.002	≤ 0.002

MICROBIOLOGICAL ANALYSIS

Total Coliforms	APHA:9222 B	CFU/100ml	97.5	0/100ml
Faecal Coliforms (Ecoli)	APHA:9222 D	CFU/100ml	92.1	0/100ml

Water Testing Report

Job Ref. No:	BV-PAK-LHR-40-25-0189(4)			Sample Date:	03-06-2025
Sampling Method:	APHA 1060-B & C			Location	**Rajputana** 25°25'53.1"N 68°21'40.5"E"
Sample Identification	Drinking Water (Bore Water)				
Parameters	**Analysis Method**	**Unit**	**LDL**	**Result**	**SEQs**
pH	APHA-4500H+ B	-	-	7.76	6.5-8.5
Odor	In-house	-	-	Non-Objectionable	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	< 1.0	≤15 TCU
Taste	In-house	-	-	Non-Objectionable	Non-Objectionable
Total Hardness	EDTA Titration	mg/l	5.0	64	<500
Total Dissolved Solid	APHA-2540 C	mg/l	5.0	485	< 1000
Turbidity	APHA-2130 B	NTU	0.1	< 0.1	<5 NTU
Chloride	APHA-4500Cl- B	mg/l	0.5	27.59	< 250
Chlorine, Residual	APHA-3111 B	mg/l	0.1	BDL	1.5
Fluoride (F)	APHA-4500F- C	mg/l	0.1	BDL	≤ 1.5
Nitrate	APHA-3111B NO	mg/l	0.1	BDL	≤0.50
Nitrite	APHA-3111B NO3	mg/l	0.1	< 0.1	≤3 (P)
Alkalinity	APHA-2320 B	mg/l	5.0	37	NGVS
Aluminum (Al)	APHA-3111Al B	mg/l	0.05	BDL	≤ 0.2
Antimony (Sb)	APHA-3111Sb B	mg/l	0.05	BDL	≤ 0.005 (P)
Arsenic (As)	APHA-3111As B	mg/l	0.05	BDL	≤ 0.05 (P)
Barium (Ba)	APHA-3111Ba B	mg/l	0.05	BDL	0.7
Boron (B)	APHA-4500-B (C)	mg/l	0.05	BDL	0.3
Cadmium (Cd)	APHA-3111Cd B	mg/l	0.01	<0.01	0.01
Chromium (Cr)	APHA-3111Cr B	mg/l	0.05	<0.05	≤ 0.05 (P)
Copper (Cu)	APHA-3111Cu B	mg/l	0.05	<0.05	2
Cyanide (CN)	APHA-4500CN E	mg/l	0.05	<0.05	≤ 0.05
Lead (Pb)	APHA-3111Pb B	mg/l	0.05	<0.05	≤ 0.05
Manganese (Mn)	APHA-3111Mn B	mg/l	0.05	<0.05	≤ 0.5
Mercury (Hg)	APHA-3112Hg B	mg/l	0.001	<0.001	≤ 0.001
Nickel (Ni)	APHA-3111Ni B	mg/l	0.02	<0.02	≤ 0.02
Selenium (Se)	APHA-3111Se B	mg/l	0.01	<0.01	0.01 (P)
Zinc (Zn)	APHA-3111Zn B	mg/l	0.05	BDL	5.0
Phenols	APHA-3111B	mg/l	0.002	<0.002	≤ 0.002
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA:9222 B	CFU/100ml		0.00	0/100ml
Faecal Coliforms (Ecoli)	APHA:9222 D	CFU/100ml		0.00	0/100ml

Ambient Noise Quality Results for Component 3

Noise Level Monitoring Report

Job Reference Number	BV-PAK-LHR-40-25-0189(6)
Date of Intervention	05-06-2025
Sampling Coordinates	Jamshoro 25°28'35.6"N 68°16'14.3"E

	Time	Method/Technique	Unit	Results LAavg
1.	11.30	Noise Meter	dB	48
2.	12:30	Noise Meter	dB	47
3.	13:30	Noise Meter	dB	48
4.	14:30	Noise Meter	dB	49
5.	15:30	Noise Meter	dB	50
6.	16:30	Noise Meter	dB	48
7.	17:30	Noise Meter	dB	48
8.	18:30	Noise Meter	dB	44
9.	19:30	Noise Meter	dB	43
10.	20:30	Noise Meter	dB	45
11.	21:30	Noise Meter	dB	46
12.	22:30	Noise Meter	dB	41
13.	23:30	Noise Meter	dB	40
14.	00:30	Noise Meter	dB	39
15.	01:30	Noise Meter	dB	38
16.	02:30	Noise Meter	dB	39
17.	03:30	Noise Meter	dB	40
18.	04:30	Noise Meter	dB	39
19.	05:30	Noise Meter	dB	40
20.	06:30	Noise Meter	dB	38
21.	07:30	Noise Meter	dB	40
22.	08:30	Noise Meter	dB	42
23.	09:30	Noise Meter	dB	45
24.	10:30	Noise Meter	dB	46
		Average (DAY)	**dB**	**46.25**
		SEQs	**dB**	**55**
		Average (NIGHT)	**dB**	**40.66**

Noise Level Monitoring Report

Job Reference Number	BV-PAK-LHR-40-25-0189(5)
Date of Intervention	04-06-2025
Sampling Coordinates	Qasimabad 25°24'12.1"N 68°20'37.8"E

	Time	Method/Technique	Unit	Results LAavg
1.	11:30	Noise Meter	dB	48
2.	12:30	Noise Meter	dB	47
3.	13:30	Noise Meter	dB	49
4.	14:30	Noise Meter	dB	45
5.	15:30	Noise Meter	dB	48
6.	16:30	Noise Meter	dB	47
7.	17:30	Noise Meter	dB	46
8.	18:30	Noise Meter	dB	44
9.	19:30	Noise Meter	dB	42
10.	20:30	Noise Meter	dB	42
11.	21:30	Noise Meter	dB	44
12.	22:30	Noise Meter	dB	43
13.	23:30	Noise Meter	dB	40
14.	00:30	Noise Meter	dB	42
15.	01:30	Noise Meter	dB	40
16.	02:30	Noise Meter	dB	41
17.	03:30	Noise Meter	dB	39
18.	04:30	Noise Meter	dB	41
19.	05:30	Noise Meter	dB	40
20.	06:30	Noise Meter	dB	42
21.	07:30	Noise Meter	dB	42
22.	08:30	Noise Meter	dB	41
23.	09:30	Noise Meter	dB	45
24.	10:30	Noise Meter	dB	47
		Average (DAY)	**dB**	**42.41**
		SEQs	**dB**	**55**
		Average (NIGHT)	**dB**	**41.83**

Noise Level Monitoring Report

Job Reference Number	BV-PAK-LHR-40-25-0189(4)
Date of Intervention	03-06-2025
Sampling Coordinates	Rajputana 25°25'53.1"N 68°21'40.5"E

	Time	Method/Technique	Unit	Results LAavg
1.	11:00	Noise Meter	dB	45
2.	12:00	Noise Meter	dB	47
3.	13:00	Noise Meter	dB	49
4.	14:00	Noise Meter	dB	44
5.	15:00	Noise Meter	dB	48
6.	16:00	Noise Meter	dB	47
7.	17:00	Noise Meter	dB	48
8.	18:00	Noise Meter	dB	49
9.	19:00	Noise Meter	dB	46
10.	20:00	Noise Meter	dB	45
11.	21:00	Noise Meter	dB	46
12.	22:00	Noise Meter	dB	49
13.	23:00	Noise Meter	dB	47
14.	00:00	Noise Meter	dB	46
15.	01:00	Noise Meter	dB	45
16.	02:00	Noise Meter	dB	44
17.	03:00	Noise Meter	dB	47
18.	04:00	Noise Meter	dB	48
19.	05:00	Noise Meter	dB	44
20.	06:00	Noise Meter	dB	46
21.	07:00	Noise Meter	dB	47
22.	08:00	Noise Meter	dB	46
23.	09:00	Noise Meter	dB	48
24.	10:00	Noise Meter	dB	46
		Average (DAY)	**dB**	**47**
		SEQs	**dB**	**55**
		Average (NIGHT)	**dB**	**42**

Annex B: Stakeholder Consultations and Photographs

COMMUNITY CONSULTATIONS

Male Participants

Sr. No.	Participant	Date	Venue
1	Mohammad Sawan	25-03-2025	Village Achar Mallah
2	Ali Mohammad		
3	Nazir Ahmed		
4	Ahmed Ali		
5	Mohammad Bachal		
6	Asghar Ali Mallah		
7	Abdul Kareem		
8	Haji Mallah		
9	Abdul Ghafoor		
10	Ghulam Hyder		
11	Mohammad Sajjan		
12	Engr Sadam Hussain		Jumeirah Residency
13	Noor Hussain		
14	Ali Qazi		
15	Ahmed Khan	26-03-2025	Village Sawan Shoro
16	Muhammad Hussain		
17	Rab Dino		
18	Ahmed Ali		
19	Ghulam Hyder		
20	Alisher		
21	Juman Shoro		
22	Ashraf Ali		
23	Mushtaque		

Sr. No.	Participant	Date	Venue
24	Abid Ali		
25	Wahid Bux	08-04-2025	Hala City, Shahdadpur chowk, Ibrahim Shah
26	Wali Muhammad		
27	Umeed Ali		
28	Qayoom Shah		
29	Muhammad Umar		
30	Nabi Bux		
31	Hussain Bux		
32	Ahmed Khan		
33	Abdul Hameed		
34	Niaz Chandio		
35	Habib		
36	Khadim Hussain		Village Haji Arbab Chandio, Kandoo Road, Tando Adam
37	Imam Bux		
38	Abdul Hakim		
39	Abdul Sameer		
40	Yousif Mari		
41	Pandhi		
42	Abdul Ghafoor		
43	Lashkari		
44	Mor Chandio		
45	Niaz Chandio		
46	Imam Bux		Village Iso Dahri, Bhit Shah, Hala
47	Abdul Hameed		
48	Sadam Hussain		
49	Abdul Latif		

Sr. No.	Participant	Date	Venue
50	Lal Bux		
51	Haseeb Rehman		
52	Aijaz Ali		
53	Mehtab Ali		
54	Teer Hath Bheel		
55	Peer Bux		

Village Achar Mallah

Housing Societies and Communities

Village Sawan Shoro

Hala City, Shahdadpur chowk, Ibrahim Shah

Village Haji Arbab Chandio, Kandoo Road, Tando Adam

Village Iso Dahri, Bhit Shah, Hala

COMMUNITY CONSULTATIONS

Female Participants

Sr. No.	Participant	Date	Venue
1	Abida Ali Bux	08-04-2025	Village Haji Arbab Chandio, Kandoo Road, Tando Adam
2	Hina Rafique		
3	Saira Rasheed		
4	Naila Inayat		
5	Shazia Mayar		
6	Zarbano Hameed		
7	Zeba Razaq		
8	Ameera Sain bux		
9	Nazia Sadaqat		
10	Wazeera Gul Hassan		
11	Ameera Nawaz		
12	Gulshad Hameed		
13	Zareena Imam Bux		
14	Kiran Tanveer		
15	Zeenat		Hala WAPDA Colony
16	Razia		
17	Shahzadi		
18	Aqsa		
19	Arbela		
20	Najima		
21	Faiza		
22	Pashmin		
23	Anees		
24	Javeria		

Sr. No.	Participant	Date	Venue
25	Sana		
26	Khatija		
27	Anam		
28	Ishirat		
29	Allah Rakhi		Village Iso Dahri, Bhit Shah, Hala
30	Zenat		
31	Ameera		
32	Hazoori		
33	Bachal Khaton		
34	Shabana		
35	Imamzadi		
36	Noorzadi		
37	Fatima		
38	Nupari		
39	Shabana		
40	Shehnaz		
41	Meerzadi		
42	Hajari		
43	Allam Khanot		

Village Haji Arbab Chandio, Tando Adam

Hala WAPDA Colony

Village Iso Dahri, Bhit Shah, Hala

GOVERNMENT OFFICES CONSULTED

Sr. No.	Participant	Designation	Date	Venue
1	Saleem Ud Din	In-charge	27-03-2025	Grid Station, Tando Adam
2	Muhammad Rafique			Grid Station, Hala
3	Mir Muhammad Ali Talpur	Chief Circle Officer	09-04-2025	Chief Circle Office, Irrigation Hyderabad
4	Muhammad Rafique	Chairman		TMA Chairman, Qasimabad, Hyderabad
5	Musharraf Ali Malkaani	Technical Officer	16-04-2025	DG Livestock, Hyderabad
6	Ghulam Rasool	Director		Director Fisheries, HQ Hyderabad
7	Altaf Hussain Channar	Director		Director Agriculture, Hyderabad
8	Shahzad Agaani	Superintendent		Forest Department, Hyderabad
9	Imran Ali Abbasi	Regional In-charge		Environmental Protection Agency (EPA) Sindh, Hyderabad
10	Asghar Langar	Assistant Director (Maintenance)		National Highway Authority (NHA), Hyderabad

In-charge, HESCO Grid Stations Tando Adam

In-charge, HESCO Grid Stations Hala

Chief Circle Officer Irrigation Department Irrigation Circle Office, Hyderabad

Chairman, TMA, Qasimabad, Hyderabad

Technical Officer, DG Livestock, Hyderabad

Director Fisheries, HQ, Hyderabad

Director Agriculture, Hyderabad Division, Hyderabad

Superintendent, Forest Department, Hyderabad

Regional In-charge (EPA),

Environmental Protection Agency (EPA) Sindh, Hyderabad

Assistant Director (Maintenance) National Highway Authority (NHA), Hyderabad

Annex C: Environmental Code of Practice

The objective of the Environmental Code of Practices (ECPs) is to address all potential and general construction-related impacts during the implementation of the Project. The ECPs will provide guidelines for best-operating practices and environmental management guidelines to be followed by the contractors for sustainable management of all environmental issues. These ECPs will be annexed to the general conditions of all the contracts, including subcontracts, carried out under the Project.

The list of ECPs prepared for the Project is given below.

- ECP 1: Waste Management
- ECP 2: Fuels and Hazardous Goods Management
- ECP 3: Water Resources Management
- ECP 4: Soil Quality Management
- ECP 5: Erosion and Sediment Control
- ECP 6: Air Quality Management
- ECP 7: Noise and Vibration Management
- ECP 8: Road Transport and Road Traffic Management
- ECP 9: Labor Influx Management and Construction Camp Management
- ECP 10: Cultural and Religious Issues
- ECP 11: Workers Health and Safety

ECP 1: Waste Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	The Contractor will • Develop a waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to PIMSC for approval. • Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of the disposal site, so as to cause less environmental impact. • Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. • Segregate and reuse or recycle all the wastes,

Project Activity/ Impact Source	**Environmental Impacts**	**Mitigation Measures/ Management Guidelines**
		wherever practical. • Prohibit burning of solid waste • Collect and transport non-hazardous wastes to all the approved disposal sites. Vehicles transporting solid waste will be covered with tarps or nets to prevent spilling waste along the route • Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process. • Provide refuse containers at each worksite. • Request suppliers to minimize packaging where practicable. • Place a high emphasis on good housekeeping practices. • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal.
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	The Contractor will • Collect chemical wastes in 200-liter drums (or similar sealed containers), appropriately labeled for safe transport to an approved chemical waste depot. • Store, transport and handle all chemicals avoiding potential environmental pollution. • Store all hazardous wastes appropriately in bunded areas away from watercourses. • Make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction. • Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. • Construct concrete or other impermeable flooring to prevent seepage in case of spills

ECP 2: Fuels and Hazardous Goods Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuels and hazardous goods.	Materials used in construction have the potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals	The Contractor will • Prepare spill control procedures and submit the plan for PIMSC approval. • Train the relevant construction personnel in the handling of fuels and spill control procedures.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.	• Store dangerous goods in bunded areas on a top of a sealed plastic sheet away from watercourses; and also under rainwater shed (to prevent contact with rainwater). • Refueling will occur only within bunded areas. • Make available MSDS for chemicals and dangerous goods on-site. • Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site approved by EPA or sold to EPA registered vendors. • Provide absorbent and containment material (e.g., absorbent matting) where hazardous materials are used and stored and personnel trained in the correct use. • Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use. • Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur. • Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area will preferably slope or drain to a safe collection area in the event of a spill. • Put containers and drums in permanent storage areas on an impermeable floor that slopes to a safe collection area in the event of a spill or leak. • Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution. • Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials. • Return the gas cylinders to the supplier. However, if they are not empty prior to their return, they must be labeled with the name of the material they contained or contain, information on the supplier, cylinder serial number, pressure, their last hydrostatic test date, and any additional identification marking that may be considered necessary.

ECP 3: Water Resources Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous Material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage	The Contractor will • Follow the management guidelines proposed in ECPs 1 and 2. • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, storm water systems or underground water tables
Discharge from construction sites	Wastewaters from construction sites and work camps. The construction works will modify groundcover and topography changing the surface water drainage patterns of the area including infiltration and storage of storm water.	The Contractor will • Minimize the amount of exposed soil at any one time (only clear vegetation immediately before construction is about to begin) • Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials • Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site • Divert runoff from undisturbed areas around the construction site • Stockpile materials away from drainage lines • Prevent all solid entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting and transport to an approved waste disposal site or recycling depot • Collect, transport and discharge the septic tank waste from the construction camps in the nearby municipal wastewater treatment plants • Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This will be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil Erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and	The Contractor will • Ensure that sealed roads used by construction vehicles are swept regularly to remove sediment. • Water the material stockpiles, access roads and

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	contaminant loading of surface water bodies.	bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds)

ECP 4: Soil Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	The Contractor will • Strictly manage the wastes management plans proposed in ECP1 and storage of materials in ECP2 • Construct appropriate spill contaminant facilities for all fuel storage areas • Establish and maintain a hazardous materials register detailing the location and quantities of hazardous substances including the storage, use of disposals • Train personnel and implement safe work practices for minimizing the risk of spillage • Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site • Remediate the contaminated land using the most appropriate available method to achieve required commercial/industrial guideline validation results
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor will • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds

ECP 5: Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities and material stockpiles	The impact of soil erosion is (i) Increased runoff and sedimentation causing a greater flood hazard to the downstream, (ii) destruction of aquatic environment in nearby lakes, streams, and reservoirs caused by	The Contractor will • Locate stockpiles away from drainage lines • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds • Remove debris from drainage paths and sediment control structures • Cover the loose sediments and water them if required • Divert natural runoff around construction areas

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	erosion and/or deposition of sediment damaging the spawning grounds of fish, and (iii) destruction of vegetation by burying or gullying.	prior to any site disturbance • Install protective measures on-site prior to construction, for example, sediment traps • Observe the performance of drainage structures and erosion controls during rain and modify as required.

ECP 6: Air Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	The Contractor will • Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition. • Operate the vehicles in a fuel-efficient manner • Cover haul vehicles carrying dusty materials moving outside the construction site • Impose speed limits on all vehicle movement at the worksite to reduce dust emissions • Control the movement of construction traffic • Water construction materials prior to loading and transport • Service all vehicles regularly to minimize emissions • Limit the idling time of vehicles not more than 2 minutes
Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	The Contractor will • Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions. Proof of maintenance register will be required by the equipment suppliers and contractors/subcontractors • Focus special attention on containing the emissions from generators • Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites Service all equipment regularly to minimize emissions • Provide filtering systems, duct collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard.	• Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds). Stored materials such as gravel and sand will be covered and confined to avoid their being wind-drifted • Minimize the extent and period of exposure of the bare surfaces • Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during periods of high wind and if visible dust is blowing off-site • Store the cement in silos and minimize the emissions from silos by equipping them with filters. • Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations • Crushing of rocky and aggregate materials will be wet-crushed, or performed with particle emission control systems

ECP 7: Noise and Vibration Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	The Contractor will • Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures • Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc. • Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor will • Appropriately site all noise generating activities to avoid noise pollution to local residents • Use the quietest available plant and equipment • Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines) • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors will present proof of maintenance register of their equipment. • Install acoustic enclosures around generators to reduce noise levels. • Fit high efficiency mufflers to appropriate construction

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		equipment • Avoid the unnecessary use of alarms, horns and sirens
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor will • Notify adjacent landholders prior any typical noise events outside of daylight hours (6 pm to 7 am) if the construction works are being carried out near residential areas • Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions • Employ best available work practices on-site to minimize occupational noise levels • Install temporary noise control barriers where appropriate • Notify affected people if major noisy activities will be undertaken, e.g. pile driving • Plan activities on site and deliveries to and from site to minimize impact • Monitor and analyze noise and vibration results and adjust construction practices as required. • Avoid undertaking the noisiest activities, where possible, when working at night (6pm to 7 am) near the residential areas

ECP 8: Road Transport and Road Traffic Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.	The Contractor will • Prepare and submit a traffic management plan to the PIMSC for their approval before commencement of construction. • Include in the traffic management plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges temporary diversions, necessary barricades, warning signs / lights, and road signs. • Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Pakistan Traffic Regulations. • Install and maintain a display board at each important road intersection on the roads to be used during construction, which will clearly show the following information in local language: o Location: chainage and village name o Duration of construction period o Period of proposed detour / alternative route o Suggested detour route map o Name and contact address/telephone number of the concerned personnel

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		○ Name and contact address / telephone number of the Contractor ○ Inconvenience is sincerely regretted.
	Accidents and spillage of fuels and chemicals	• Restrict truck deliveries, where practicable, to day time working hours (7 am to 6 pm). • Restrict the transport of oversize loads. • Operate road traffics/transport vehicles, if possible, to non-peak periods to minimize traffic disruptions. • Enforce on-site speed limit

ECP 9: Labor Influx Management and Construction Camp Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camps	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	The Contractor will • Prepare a management plan for construction of workers camp in accordance with IFC Guidance on Workers Accommodation and submit the plan for supervision consultant's approval. • Locate the construction camps within the designed sites or at areas which are acceptable from environmental, cultural or social point of view; and approved by the supervision consultant. • Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities. • Submit to the supervision consultant for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps. • Local authorities responsible for health, religious and security will be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters.
Construction Camp Facilities	Lack of proper infrastructure facilities , such as housing, water supply and sanitation facilities will increase pressure on the local services and generate	Contractor will provide the following facilities in the campsites • Adequate accommodation, transportation, and basic services including water, sanitation, and medical care for the workers working on that project Safe and reliable water supply, which will meet NEQS. Drinking water to be chlorinated at source, and ensure presence of residual

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	substandard living standards and health hazards.	chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time (WHO guideline). • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by location. The minimum number of toilet facilities required is one toilet for every ten persons. • Treatment facilities for sewerage of toilet and domestic wastes. • Storm water drainage facilities. • Paved internal roads. • Provide child crèches for women working construction site. The crèche will have facilities for dormitory, kitchen, indoor and outdoor play area. Schools will be attached to these crèches so that children are not deprived of education whose mothers are construction workers. • Provide in-house community/common entertainment facilities. Dependence of local entertainment outlets by the construction camps to be discouraged/prohibited to the extent possible.
Workers Accommodation	All workers in the camp will have adequate accommodation facilities	The Contractor will provide the following: • The labor will be provided with accommodation on twin sharing basis made of insulated material and locally available building material, etc.; • The migrant workers with families will be provided with individual accommodation comprising bedroom, sanitary and cooking facilities; • The units will be supported by common latrines and bathing facilities duly segregated for male and female labor; • Adequate number of toilets will be provided in the accommodation facilities. A minimum of 1 unit to 15 males and 1 unit for 10 females will be provided; • The contractor will provide a kitchen facility for the construction workers and the food will be of appropriate nutritional value and will consider religious/cultural backgrounds; • All doors and windows will be lockable and mobile partitions/curtains will be provided for privacy; • Facilities for the storage of personal belongings for workers will be provided within the campsite only; • Dustbins will be provided for collection of garbage and will be removed on a daily basis; • It is also required to provide first aid box in adequate numbers; and • Ventilation will be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	The Contractor will • Ensure proper collection and disposal of solid wastes within the construction camps • Insist waste separation by source; organic wastes in one pot and inorganic wastes in another pot at household level. • Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed. • Dispose organic wastes in a designated safe place on daily basis. At the end of the day cover the organic wastes with a thin layer of sand so that flies, mosquitoes, dogs, cats, rats, are not attracted. One may dig a large hole to put organic wastes in it; take care to protect groundwater from contamination by leachate formed due to decomposition of wastes. Cover the bed of the pit with impervious layer of materials (clayey or thin concrete) to protect groundwater from contamination. • Locate the garbage pit/waste disposal site min 500 m away from the residence so that peoples are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places. Encompass the waste dumping place by fencing and tree plantation to prevent children to enter and play with. • Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approval waste disposal sites.
Fuel supplies for cooking purposes	Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna	The Contractor will • Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or other biomass. • Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking. • Conduct awareness campaigns to educate workers on preserving the protecting the biodiversity and wildlife of the project area, and relevant government regulations and punishments on wildlife protection.
Health and Hygiene	There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted	The Contractor will • Provide adequate health care facilities within construction sites. • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse. • Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals. • Initial health screening of the laborers coming from

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	infections and HIV/AIDS.	outside areas • Inspect all camp facilities regularly to ensure o Daily sweeping of rooms and houses will be undertaken; o Regular cleaning of sanitary facilities will be undertaken; o The kitchen and canteen premises will be established under good hygiene conditions; o Daily meal times will be fixed for the labor; o Smoking and alcohol consumption will be prohibited in the workplace; o Water logging will be prevented at areas near the accommodation facilities and adequate drainage is to be provided; and o Checklists pertaining to the daily housekeeping schedule will be maintained and displayed at houses, toilets and kitchen. • Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work • Provide HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on regular basis • Complement educational interventions with easy access to condoms at campsites as well as voluntary counseling and testing • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellant sprays during monsoon. • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camps containing messages on best hygienic practices
Safety	Inadequate safety facilities to the construction camps may create security problems and fire hazards	The Contractor will • Provide appropriate security personnel (police / home guard or private security guards) and enclosures to prevent unauthorized entry into the camp area. • Maintain register to keep a track on a headcount of persons present in the camp at any given time. • Encourage use of flameproof material for the construction of labor housing / site office. Also, ensure that these houses/rooms are of sound construction and capable of withstanding wind storms/cyclones. • Provide appropriate type of firefighting equipment suitable for the construction camps • Display emergency contact numbers clearly and prominently at strategic places in camps. • Communicate the roles and responsibilities of laborers in

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		case of emergency in the monthly meetings with contractors.
Site Restoration	Restoration of the construction camps to original condition requires demolition of construction camps.	The Contractor will • Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work. • Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed • Give prior notice to the laborers before demolishing their camps/units • Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site. • Handover the construction camps with all built facilities as it is if agreement between both parties (contactor and land-owner) has been made so. • Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner. • Not make false promises to the laborers for future employment in O&M of the project.

ECP 10: Socio-cultural and Religious Issues

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities near residential areas	Disturbance from construction activities (dust, noise, traffic, conflicts with contractor's workforce etc.)	The Contractor will • Establish a system for receiving complaints from the community and address them (the community can also make complaints to the GRM established under the project) • Will ensure all the construction workers follows the following code of conduct: • All workers are strictly forbidden to establish any kind of relationship with local women bring any un-related women to the project site. • All workers will avoid sexual harassment and child abuse. • All workers must not leave the camps or work sites unless a written authorization is issued by the respective supervisor • The contractors will advise and prohibit the local population and its authorities or representatives not to enter the project operation areas (campsites, colonies, etc.) in order to minimize the potential risk of incidents related to the operations.
Construction activities near religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances.	The Contractor will • Communicate to the public through community consultation and newspaper announcements regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction. • Do not block access to cultural and religious sites, wherever possible

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Restrict all construction activities within the footprints of the construction sites. • Stop construction works that produce noise (particularly during prayer time) will there be any mosque/religious/educational institutions close to the construction sites and users make objections. • Take special care and use appropriate equipment when working next to a cultural/religious institution. • Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given by the PIMSC/PMU. • Provide separate prayer facilities to the construction workers. • Show appropriate behavior with all construction workers especially women and elderly people • Allow the workers to participate in praying during construction time • Resolve cultural issues in consultation with local leaders and supervision consultants • Establish a mechanism that allows local people to raise grievances arising from the construction process. • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters

ECP 11: Worker Health and Safety

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals,	The Contractor will • Implement suitable safety standards for all workers and site visitors which will not be less than those laid down on the international standards (e.g. International Labor Office guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with the national standards of the Government of Pakistan (• Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas, • Provide personal protection equipment (PPE) for

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	construction material, solid waste, waste water, vector transmitted diseases etc.), (ii) risk factors resulting from human behavior (e.g. STD, HIV etc.) and (iii) road accidents from construction traffic.	workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones. • Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job • Appoint an environment, health and safety manager to look after the health and safety of the workers • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters
	Child and pregnant labor	The Contractor will • not hire children of less than 16 years of age and pregnant women or women who delivered a child within 8 preceding weeks, in accordance with the national Labor Laws
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	• Provide health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations will be easily accessible throughout the place of work • Document and report occupational accidents, diseases, and incidents. • Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice. • Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures. • Provide awareness to the construction drivers to strictly follow the driving rules Provide adequate lighting in the construction area and along the roads
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	The Contractor will provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in ECP 15 • Adequate ventilation facilities • Safe and reliable water supply. • Hygienic sanitary facilities and sewerage system. The toilets and domestic wastewater will be collected through a common sewerage. • Treatment facilities for sewerage of toilet and domestic wastes • Storm water drainage facilities. • Recreational and social facilities • Safe storage facilities for petroleum and other chemicals in accordance with ECP 2

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Solid waste collection and disposal system in accordance with ECP1. • Arrangement for trainings • Paved internal roads. • Security fence at least 2 m height. • Sickbay and first aid facilities
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	The contractor will provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities will be at least 6 m away from storm drain system and surface waters. These portable toilets will be cleaned once a day and all the sewerage will be pumped from the collection tank once a day and will be brought to the common septic tank for further treatment. Contractor will provide bottled drinking water facilities to the construction workers at all the construction sites.
Other ECPs	Potential risks on health and hygiene of construction workers and general public	The Contractor will follow the following ECPs to reduce health risks to the construction workers and nearby community ECP 2: Fuels and Hazardous Goods Management ECP 4: Drainage Management ECP 10: Air Quality Management ECP 11: Noise and Vibration Management ECP 14: Road Transport and Road Traffic Management
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	The Contractor will • Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of sexually transmitted infections (STI) HIV/AIDS. • Train all construction workers in general health and safety matters, and on the specific hazards of their work . Training will consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. • Commence the malaria, HIV/AIDS and STI education campaign before the start of the construction phase and complement it with by a strong condom marketing, increased access to condoms in the area as well as to voluntary counseling and testing. • Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on ongoing and regular basis. This will be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.