



ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

220KV DOUBLE CIRCUIT, TWIN BUNDLE LILO
TRANSMISSION LINE TO KE
DHABEJI GRID STATION
FROM NTDC”

FINAL REPORT

MAY 2022



**EMC Pakistan
Private Limited**

Environmental Impact Assessment
**“220kV Double Circuit, Twin Bundle LILO
Transmission Line to KE Dhabeji Grid Station
from NTDC”**

Final Report

May 2022

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EXECUTIVE SUMMARY

Environmental Impact Assessment is a tool for environmental conservation and has been identified as a key component in implementation of any new project. The relevant rules which support this statement are: Section 17 of Sindh Environmental Protection Act 2014 and other regulatory documents such as Sindh Environmental Protection Agency (Environmental Assessment) Regulations 2021. These regulations require that every new development project has to be preceded by an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) depending upon the magnitude of the severity of impacts anticipated at the time of construction and operations of the project.

In compliance of above laws, this report has been prepared; which presents the findings of the Environmental Impact Assessment (EIA) study carried out by EMC Pakistan Pvt. Limited for the proposed "220kV Double Circuit, Twin Bundle LILO Transmission Line to KE Dhabeji Grid Station from NTDC Project". The project has been studied and analyzed in detail.

The proposed power supply project aims to construct new 220kV Double Circuit Transmission Line from NTDC System to Dhabeji Grid Station of KE. The transmission line comprises of overhead and underground portions with approx. 2.65km is overhead from NTDC transmission line till 2PLDP and approx.400meters is underground from 2PLDP till 220kV Dhabeji Grid Station.

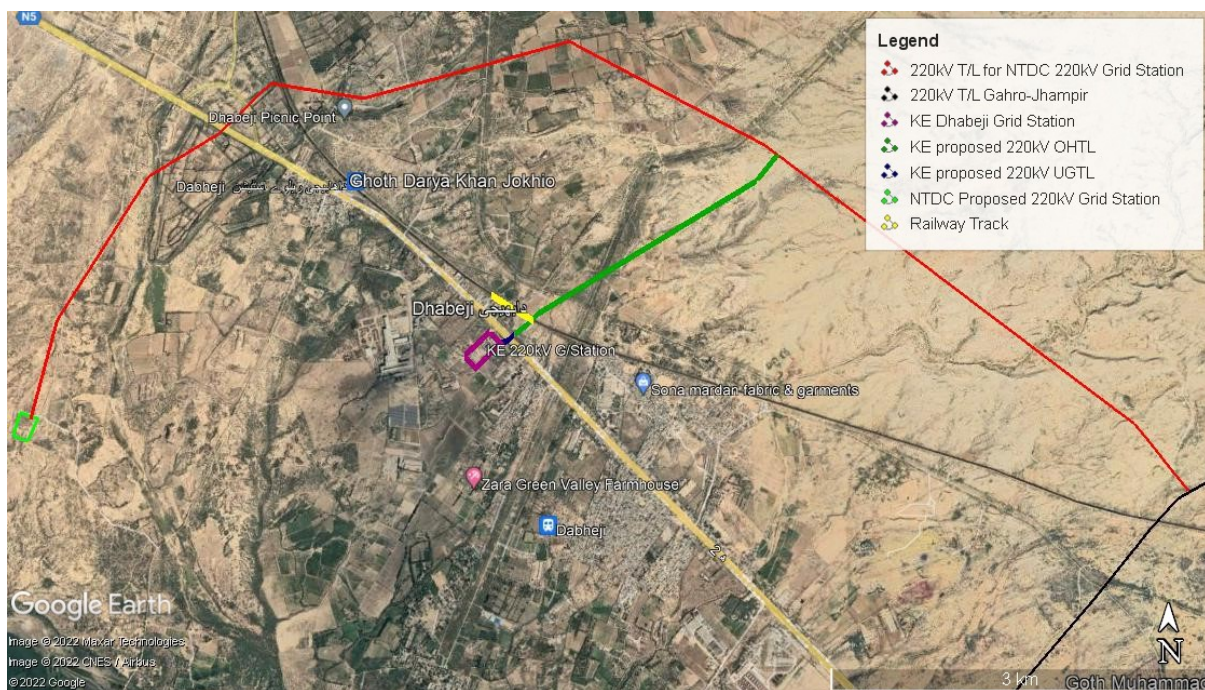


Fig Ex-1: Location of proposed transmission line project

Objectives of the Project

The proposed power supply project aims to import Power from NTDC system to KE system through new 220kV transmission line. The project is being developed considering the ongoing industrial development, and to meet the increasing loads demand (forecasted) across Karachi (the Metropolis), Dhabeji and Gharo in Sindh, and Uthal, Vinder and Bela in Balochistan.

The proposed Transmission line will serve as an incoming new source of power to the KE grid station and power will then be transmitted to the KE network.

Categorization of the Project

The Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 categorizes the projects on the basis of their nature and scope. The project "220kV D/C, TWIN BUNDLE LILO T/ Line to KE DHABEJI Grid Station from NTDC Project" falls in Schedule III requiring an EIA to be submitted to relevant Environmental Protection Agency and is given as:

- ✓ A. Energy
- ✓ 4. Transmission Lines above 132 kV and Distribution projects.

Collection of Data

To further study the project features, primary and secondary data is collected. Primary data is obtained through field data collection which includes observational surveys, monitoring and analysis of various environmental parameters, consultations and meetings for data collection from the neighboring communities etc. And, secondary data is collected from various sources such as internet, studies previously conducted in the project area and its neighborhood, in-house sources, Government Departments and NGO's etc. Furthermore, applicable international guidelines, conventions and environmental assessment procedures prepared by the EPA have been consulted frequently while preparing this document.

Baseline

The physical, ecological and socio-economic environmental conditions of the microenvironment and macro environment of the project area have been studied in detail. Previous published and unpublished literature and other information were collected in order to gain a complete understanding of existing environmental and socioeconomic conditions in the area including the topography, geology, soils, water resources, ambient air, climate, flora and fauna, habitats within the proposed site and its surroundings, socio-economic conditions, infrastructure and land use; and any heritage aspects such as sites of cultural, archaeological or historical significance.

Physical Environment

The Ambient air quality was conducted in the micro environment by EMC Pakistan Pvt. Limited. Based on the result of the survey, the average values of air pollutants monitored were within the SEQS standards for Ambient Air Quality.

The project area noise levels are within the SEQS standards for commercial areas as the project RoW cannot be blanketly categorized as residential or industrial or commercial. However, noise levels exceed 65dBA near N-5, particularly when there are passing vehicles. Predominant source of noise in the project area are light & heavy traffic with sound of strong wind blowing in the background due to open terrain area.

Ecological Environment

Surveys were conducted along the project area to check the current ecological status of the project site and their immediate surroundings. Floral species found in the project area include *Prosopis Juliflora*, *Euphorbia caducifolia*, *Calotropis procera*, *Capparis decidua*, *Salvadora oleoides*, *Prosopis cineraria*, and *Acacia nilotica*.

Socio Economic Environment

The socio-economic situations prevailing in the microenvironment of the project area, based on primary and secondary information were studied. The primary data was gathered through extensive field surveys, while various relevant sources were used for secondary data. The proposed TL route is mostly unpopulated. Only some residential structures exist outside the RoW within farmlands. Vehicular traffic is frequent on N5/KTDC and the TL route also crosses railway track (mainline 1). Feedback from stakeholders was rather general, instead on specific project activities.

Impacts and Mitigation Measures

Potential environmental impacts that would result due to various activities performed in project area for the transmission line during different phases such as design, construction, operation and maintenance, have been identified, and mitigation measures have been suggested to reduce those impacts. The potential impacts expected to arise during construction phase are transitory, localized and last during the construction phase. Some of the significant impacts of construction activities are i) disturbance to sensitive receptors and existing infrastructure, ii) obstruction to movement of people/traffic, iii) deterioration of air & water quality due to temporary construction camps in area, vii) construction waste handling and disposal, viii) deterioration of local air quality due to dust and vehicular emissions, ix) noise and vibration near the construction activity site, x) occupational health and safety and xi) community health & safety. The potential impacts in operation phase will be minor in nature and may arise mostly during maintenance of the proposed transmission line project e.g., concerns due to electromagnetic fields, impacts to the migratory birds and electrocution hazards. Therefore, the mitigation measures for these impacts are being provided in the Environmental Management Plan. The consequent Environmental Monitoring Plan has been provided in table Ex.1.

Conclusions and Recommendations

On the basis of the findings of the EIA Study, it is possible to conclude that:

- Construction and Operation of Transmission line will, on full adoption of the mitigation measures, have no broad-scale or significant adverse impacts on the physical as well as socio-economic composition of the microenvironment and macro-environment of the project area;
- The likely impact of construction and operation of the Transmission line will be appropriately mitigated through use of proven technologies, careful planning and stringent monitoring;
- The project will aid in meeting the forecasted demand for energy in KE-operated areas;
- The proposed project after commissioning will become an integral part of the microenvironment and a benign component within its macro environment.

Mitigation will be assured by a robust program of environmental monitoring conducted to ensure that all advised measures are implemented as intended, and to determine whether the environment is being protected as envisaged. This will include observations on and off site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be informed to the proponent for due implementation, and the resultant remedies being reported to the EPA Sindh.

The study recommends and confirms that the proponent shall adopt all environmental management processes in full, as prescribed by the national and international laws and guidelines and given in the EIA document.

The study therefore recommends that the EIA report should be approved with the provision that the suggested mitigation measures will be fully adopted by the project proponent and the Environmental Management Plan will be followed in letter and spirit.

Environmental Monitoring Plan

Table Ex-1: Environmental Monitoring Plan for construction and operation of transmission line

Environmental Aspect	Monitoring Parameters	Monitoring Location	Monitoring Frequency	Responsibility
Construction Phase				
Air Quality	Priority parameters (as per SEQS)	Near Construction sites/camps	Monthly/ reported quarterly basis	CC
Excavation, storage of soil and waste, generation of waste	Check any obstruction in existing drains due to construction, check lifting of waste material, check waste management plan	At construction site	Monthly / reported quarterly basis	CC
Fuel, Oil & Chemical handling, storage and disposal	Check contamination on the ground, check waste disposal	Vehicles/ machinery in working areas	Monthly / reported quarterly basis	CC
Construction Waste Disposal	Domestic waste, Hazardous waste – Chemical waste, electro waste, Paper and Polythene material waste and Wood	Collection, handling, storage areas and disposal	Measured on daily basis and reported quarterly	CC
Exhaust Emissions	Parameters as per SEQS	Construction vehicles	Measured monthly/ reported quarterly basis	CC
Drinking water	Priority parameters	Water coolers	Monthly / reported quarterly basis	CC
Noise and Vibration	Noise Intensity (dB)	Near Construction site	Monthly / reported quarterly basis	CC
ROW Clearance	Check tree cutting, compensatory plantation, inventory of cleared trees / plants	At construction alignment	Monthly / reported quarterly basis	CC
Safety Precautions for the Workers	Accidents, PPE, Annoyance, Fire Hazards, Safety Protocols, Spill on Land and Spill on Water	All construction areas	Continuous / reported quarterly basis	CC
Traffic Movement near construction site	Traffic flow, timing of activities, near misses and injuries records and reporting	At crossroads and along transmission line Right of Way	Continuous / reported quarterly basis	CC

Table Ex-1: Environmental Monitoring Plan for construction and operation of transmission line

Environmental Aspect	Monitoring Parameters	Monitoring Location	Monitoring Frequency	Responsibility
Social Impacts	Review of complaint register Local Consultations	Near Construction site	Monthly / reported quarterly basis	CC
	Surface topography, Proper backfilling and carpeting	All excavated areas	Continuous / reported quarterly basis	CC
Operational and Maintenance Phase				
Human Exposure to Electromagnetic Fields (EMF)	EMF value	Transmission line Corridor	Annually & record is maintained	KE

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Abbreviations and Acronyms

AC	Alternating Current
ACD	Anti-Climbing Device
ASCE	American Society of Civil Engineers
CC	Construction Contractor
CNG	Compressed natural gas
CO	Carbon monoxide
CO ₂	Carbon dioxide
CSR	Corporate Social Responsibility
dB	Decibel (Unit of Sound level)
DC	Direct Current
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
EMMP	Environmental Management and Monitoring Plan
EPA	Environmental Protection Agency
GRM	Grievance Redress Mechanism
GS	Grid station
HSE	Health Safety and Environment
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEC	International Electro-technical Commission
IMC	Independent Monitoring Consultant
ISO	International Organization for Standardization
KE	K-Electric
kV	Kilo Volt
kW	Kilowatt
LILO	Looping in/Looping out
MGD	Million gallons per day
NO ₂	Nitrogen dioxide
NO	Nitric oxide
NOC	No Objection Certificate
NTDC	National Transmission & Dispatch Company
OPGW	Optical Ground Wire
OHTL	Overhead transmission line
O ₃	Ozone
PLDP	Power Line Drop Point
PM	Particulate Matter
PPE	Personal Protective Equipment
ROW	Right of Way
SCADA	Supervisory control and data acquisition
SEPA	Sindh Environmental Protection Agency
SEQS	Sindh Environmental Quality Standards

SO ₂	Sulfur Dioxide
SO _x	Sulfur Oxides
SPM	Suspended Particulate Matter
TL	Transmission Line
UGTL	Underground transmission line

Chapter 1 INTRODUCTION

K-Electric Limited plans to construct and operate a 220kV Double-circuit, Twin bundle LILO Transmission Line to Dhabeji Grid Station from National Grid (NTDC), in town of Dhabeji, District Thatta, Sindh. The project is being developed considering the ongoing industrial development and to meet the forecasted increase in commercial, residential and agricultural loads across Karachi, Dhabeji and Gharo in Sindh, and Uthal, Vinder and Bela in Balochistan.

EMC Pakistan Pvt. Limited has been engaged by K-Electric to conduct the Environmental Impact Assessment of the proposed project to comply with the provisions of Sindh Environmental Protection Act, 2014 and the Sindh EPA Environmental Assessment Regulations, 2021.

1.1 Project Developer Introduction

Through a network spanning across 6,500 square kilometers, KE supplies power to all residential, commercial, industrial and agricultural areas, serving over 2.5 million customers across Karachi, Dhabeji and Gharo in Sindh, and Uthal, Vinder and Bela in Balochistan. KE is the only vertically-integrated power utility in Pakistan, which means the organization manages all three key areas – Generation, Transmission and Distribution – of producing and delivering energy to consumers.

Since 2009, KE has invested over 2.1 billion USD in Generation and Transmission & Distribution network, which has resulted in increase in generation capacity by approximately 29% and transmission & distribution capacity by 60%, while reducing the transmission and distribution losses by 15.5% points¹.

1.1.1 Vision

To restore and maintain pride in KE, Karachi and Pakistan.

1.1.2 Mission

Brightening lives by building the capacity to deliver uninterrupted, safe and affordable power to Karachiites.

1.1.3 Corporate Health, Safety, Environment and Quality

The company aims to maintain a high international standard to ensure quality, safety and reliability in its operations. Training courses are conducted on a regular basis and staff is also provided training and networking opportunities within its power plants in Karachi. The Company's commitment to Environmental Sustainability is indicated by the Environmental Health & Safety Awards it has received over the years².

1.1.4 Corporate Social Responsibility (CSR)

KE believes in contributing to the health of the communities in which it operates, and maintains a wide range of CSR activities in order to help build a better society for all. KE facilitates communities in energy conservation, environmental protection, health, education, skill development, poverty reduction and other activities for socio-economic development. Some of CSR initiatives include³;

- Social Investment Programme: KE's Social Investment Programme (SIP) benefits 4.9 million people annually by supporting 16 philanthropic institutions and NGOs in the areas of health and education.

¹ Retrieved from <https://www.ke.com.pk/our-company/who-we-are/>

² Retrieved from <https://www.ke.com.pk/>

³ Retrieved from <https://www.ke.com.pk/sustainability/esg-sustainability-management/social-impact/>

- System Enhancement Programme: KE provides capacity enhancement to ensure fault-free power supply to all strategic hospitals and other vital organs of the city.
- Community Development:
 - Project Ujala: Project Ujala is being carried out in communities across Karachi through the installation of Aerial Bundled Cables and low-cost meters which ensure reliable electricity supply and consistent voltage.
 - Theft-Free Community Creation: KE initiated illegal hook connection conversions to legal connections through subsidised electricity connections and long-term retention of converted consumers.
- Employee Volunteering: Volunteer initiatives such as blood donation camps are organised regularly at various KE locations.
- KE-TCF School: The TCF school constructed in 2014 within the KE's employees residential colony has become one of the flagship TCF campuses in Karachi.
- Knowledge Sharing Platform: Since the inception of the Youth Engagement Platform, numerous sessions have been conducted in terms of technical visits and lectures, aimed to impart real-life technical knowledge of the course matter being studied at technical universities.
 - KE – NED Lab: KE in order to further strengthen the knowledge sharing platform for future engineers has established a first of kind, state of the art Electrical Engineering Lab at NED University, which enables electrical engineering students to gain first-hand practical access to complex electrical equipment, while enhancing R&D activities.
- Technical Lectures: Experts in their fields conduct technical lectures and guest speaker sessions where students from engineering universities are encouraged to approach KE with ideas and research topics for which KE provides support, essentially aiming to benefit both the industry and the academia. Strategic partnerships have been created under this umbrella with leading institutions like NED, SZABIST, PAF-KIET, SSUET, among others.

1.2 Project Overview

The proposed project involves construction and operation of 220kV double-circuit, twin bundle transmission line from NTDC infrastructure to Dhabeji grid station. Self-support Lattice Towers and Tubular Pole will be used. 10 Lattice Towers and 01 Tubular Pole will be used to support the transmission line. However, the total no. of towers will be determined at time of approval of P & P after ROW acquired.

1.3 Project Location

Project is located in the town of Dhabeji, in Mirpur Sakro sub-division, District Thatta, Sindh, as shown in Figure 1.1. Coordinates of towers are given in table below;

Table 1-1: Location coordinates of TL towers

S. No	Tower type	Coordinates	Elevation (m)
1	JKD	24°48'52.70"N 67°32'11.28"E	72.14
2	JKD	24°48'45.93"N 67°32'5.35"E	65.50
3	T	24°48'42.26"N 67°31'58.72"E	66.77

Table 1-1: Location coordinates of TL towers

S. No	Tower type	Coordinates	Elevation (m)
4	T	24°48'37.44"N 67°31'50.04"E	64.87
5	T	24°48'32.72"N 67°31'41.52"E	72.99
6	T	24°48'27.43"N 67°31'31.97"E	47.69
7	T	24°48'21.79"N 67°31'21.79"E	42.96
8	T	24°48'16.23"N 67°31'11.77"E	38.24
9	A	24°48'10.47"N 67°31'1.37"E	38.17
10	JKD	24°48'6.75"N 67°30'56.97"E	36.09
11	2PLDP	24°48'4.70"N 67°30'54.07"E	36.02



Figure 1-1: Location map of the project

1.4 Categorization of the Project

Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 notified under section 37 of SEP Act, 2014 categorizes projects in three separate schedules which requires either a Checklist (Schedule-I) or an IEE (Schedule-II) or an EIA (Schedule-III) and according to this, the proposed project falls in **Schedule III: A (4)** requiring an EIA.

- ✓ Transmission Lines above 132 kV and Distribution projects.

1.5 Project Rationale

Federal government has approved to supply the additional electricity to KE. The additional electricity will be supplied from newly commissioned Nuclear Power Plants and Coal-fired Power Plants in Port Qasim. To supply additional electricity to KE network, transmission infrastructure has to be enhanced⁴⁵⁶. The proposed project has been conceived to tap the additional electricity supply to KE.

The proposed power supply project aims to import Power from NTDC system to KE system through new 220kV T/Line. The project is being developed and will be implemented by keeping in view the ongoing industrial development, and to meet the increasing loads demand (forecasted) across Karachi (the Metropolis), Dhabeji and Gharo in Sindh, and Uthal, Vinder and Bela in Baluchistan.

1.6 Objectives of EIA

As stated by the United Nations Environment Programme's Division of Technology, Industry and Economics, an EIA is a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, finding ways and means to reduce the adverse impacts, shape projects to suit the local environment, and presenting options to decision-makers.

An EIA can bring about both environmental and economic benefits, such as the reduction in costs and time taken for implementation and design of a project and lesser intervention of legalities and regulations. A properly conducted EIA lessens conflicts by promoting community participation, informs decision-makers, and helps lay the base for environmentally sound projects.

The main purpose of this EIA Study is to provide and analyze information on the nature and severity of environmental aspects and propose mitigation measures in case of negative impacts arising from the construction and operation of the project and related activities that would take place concurrently or subsequently. The EIA study will, in fact, respond to the provision of Sindh Environmental Protection Act 2014, and Guidelines for the Preparation and Review of Environmental Reports. The Study will:

- Identify all major and minor impacts, negative as well as positive, on the environment (physical and ecological) during its different stages viz. pre-construction, construction and operation of Project;
- Identify Socioeconomic aspects, and
- Devise Environmental Management & Monitoring Plan (EMMP) for sustainable operation of the Project.

⁴ Retrieved from <https://nation.com.pk/20-Jun-2020/ccoe-endorses-are-policy-2019-supply-of-additional-power-to-k-electric>

⁵ Retrieved from <https://tribune.com.pk/story/2246349/2-ccoe-okays-additional-350mw-k-electric/>

⁶ Retrieved from iea-coal.org/pakistan-karachi-to-receive-additional-1400-mw-electricity-by-2023-asad-umar/

1.7 Methodology Adopted for EIA

This environmental impact assessment was conducted in the following manner:

1.7.1 Scoping

A scoping exercise was undertaken to identify the potential issues that are to be considered in the environmental impact assessment. The scoping exercise included the following tasks:

- **Data Compilation:** A generic description of the proposed activities relevant to this environmental assessment was compiled with the help of the Project proponent.
- **Review of Published literature:** All available published and unpublished information pertaining to the micro and macro environment of the study area was obtained and reviewed. It included the earlier studies conducted in the study area, environmental and social baselines and impact assessment studies conducted by different consultants in past. Secondary data was very helpful in understanding the issues that were identified by other consultants.
- **Review of applicable Legislation:** Information on relevant legislation, regulations, guidelines, and standards was reviewed and compiled.
- **Identification of potential impacts:** The information collected in the above procedures was reviewed and potential environmental impacts were identified.
- **Initial site visit:** An initial site visit was conducted to get an overview of site conditions and the surrounding areas.
- **Stakeholder consultation:** A stakeholder consultation was undertaken to document the concerns of the local community and other stakeholders, and to identify issues that may require additional assessment in order to address these concerns.

1.7.2 Review of Legislation and Guidelines

National legislation, international agreements and environmental guidelines were reviewed to set environmental standards that The KE will be required to follow during construction & operation phase of the project. Sindh Environmental Protection Act 2014, SEPA Environmental Assessment regulations 2021 and Guidelines for the Preparation and Review of Environmental Reports and IFC EHS Guidelines for Electric Power Transmission & Distribution were the basic guiding documents used during the study.

1.7.3 Baseline Data Collection

Baseline Data was collected from different sources including electronic and print media, studies previously conducted by EMC Pakistan Pvt. Limited and archives of the experts, consultations with institutions, Non-government Organizations (NGOs) and field surveys conducted for this study by the team of EMC Pakistan Pvt. Limited etc.

Primary Data Collection

The team comprising of environment specialists, ecologist and sociologist collected area-specific primary data during site visits of the proposed project. A description of baseline data (physical, biological and socioeconomic conditions) of the proposed project is provided in this report.

Secondary Data Collection

Previous published and unpublished literature and other information were collected in order to gain a complete understanding of existing environmental conditions in the area including the following:

- **Physical environment:** Topography, geology, soil, water resources, ambient air, noise and climate;
- **Biological environment:** Flora and fauna within the proposed site and its surroundings;
- **Socio-economic environment:** Settlements, socio-economic conditions, infrastructure and land use; and
- **Heritage aspects:** Sites of cultural, archaeological or historical significance.

1.7.4 Identification of Aspects

Identification of environmental aspects and their significance is fundamentally important for the determination of severity of incidence of impacts at different stages of the project. This step is aimed at obtaining an inventory of the aspects. The aspects identified during this step cover all activities like construction, installation and operation, in order to determine those which have or can have a significant impact on the environment.

1.7.5 Impact Assessment & EMMP

Environmental experts at EMC Pakistan Pvt. Limited analyzed and assessed the anticipated impacts that are likely to arise due to the identified aspects. Potential impacts were evaluated using the environmental, ecological, socioeconomic, and project information collected. The impact assessment covers the following aspects:

- Potential change in environmental parameters likely to be affected by Project-related activities;
- Prediction of potential impacts;
- Evaluation of the likelihood and significance of potential impacts;
- Defining of mitigation measures to reduce impacts to as low as reasonably practicable;
- Prediction of any residual impacts, including all long-term and short-term, direct and indirect, and beneficial and adverse impacts; and
- Monitoring of residual impacts.

An environmental management & monitoring plan (EMMP) was developed to oversee the environmental performance of the project, adoption of proposed mitigation measures, to monitor impacts of all activities and performance of mitigation measures and to identify the residual impact, and also the positive/negative changes in the physical, ecological, and socioeconomic environment.

1.7.6 Documentation & Review

This is the final step of the EIA study. The data generated during and for the study was compiled and examined by experts. Sections of this report were prepared as the study progressed, by consultation with experts. The report was finally reviewed by Team Leader, who analyzed the information, assessed the potential environmental impacts in the light of national and international guidelines, and examined the alternatives in the light of observations on the field as well as meetings with the stakeholders.

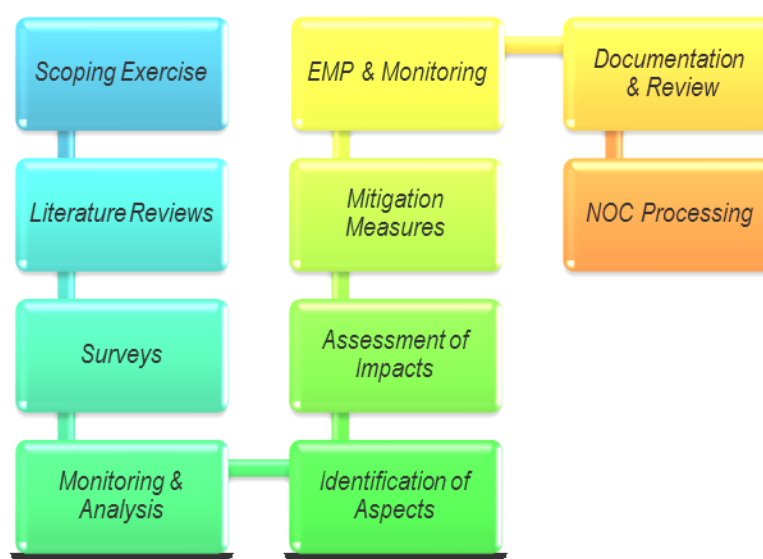


Figure 1-2: EIA Methodology

1.8 Structure of the Report

This document is structured as follows:

- **Chapter 1:** Presents the background, objectives, scope and methodology adopted for the study;
- **Chapter 2:** Provides an overall description of the project;
- **Chapter 3:** Describes the legislative and policy framework governing the project;
- **Chapter 4:** Provides environmental (Physical & Biological) and social baseline conditions of the macro and microenvironment of the project area;
- **Chapter 5:** Summarizes the main concerns raised by stakeholders during consultations;
- **Chapter 6:** Provides analysis of different alternatives;
- **Chapter 7:** Screening of environmental impacts of the project and appropriate mitigation measures;
- **Chapter 8:** Provides environmental management and monitoring plan (EMMP); and
- **Chapter 9:** Provides conclusions and recommendations.

The main text of the report is supported by a series of Annexure which provides supplementary information including respective sections of prominent provincial and national laws and guidelines.

1.9 EIA Study Team

EMC Pakistan Pvt. Limited formed the following team for conducting the Environmental Impact Assessment (EIA) of the proposed 220 kV double-circuit Transmission line.

Table 1-2: List of EIA Study Team		
S. No.	Name of Experts	Position in EIA Team
1.	Mr. Syed Nadeem Arif	Director/Team Lead
2.	Mr. Ahmed Zohair Siddiqui	Deputy Team Lead
3.	Mr. S.M. Zaman	Soil Scientist
4.	Mr. Sohaib Tariq	Environmental Engineer
5.	Mr. Tanveer Ahmed	Senior Sociologist
6.	Ms. Samita Nadeem	Senior Environmental Engineer
7.	Mr. Wajai Kumar	Sociologist
8.	Mr. Syed M. Omer Arif	Environmental Engineer
9.	Mr. Ather Adil	Field Sampling Officer

Chapter 2 PROJECT DESCRIPTION

2.1 Introduction

This chapter of EIA presents a brief overview of the project including objectives, location, scope, need and schedule of the project. This chapter gives a clear picture of the project, its context and operations.

2.2 Overview of the Project

The proposed power supply project aims to construct new 220kV Double Circuit Transmission Line from NTDC System to Dhabeji Grid Station of KE. The transmission line comprises of overhead and underground portions with approx. 2.65km is overhead from NTDC transmission line till 2PLDP and approx.400meters is underground from 2PLDP till 220kV Dhabeji Grid Station.

2.3 Objectives of the Project

The proposed power supply project aims to import Power from NTDC system to KE system through new 220kV TL. The project is being developed and will be implemented by keeping in view the ongoing industrial development, and to meet the increasing loads demand (forecasted) across Karachi (the Metropolis), Dhabeji and Gharo in Sindh, and Uthal, Vinder and Bela in Balochistan.

2.4 Scope and need of the Project

The scope of the project is the construction and operation of 220kV Double Circuit, Twin Bundle Transmission line from NTDC system to KE Dhabeji Grid Station. Power will be imported from NTDC 220kV TL which is the westwards extension of existing Gharo – Jhimpir 220kV Transmission.

Karachi and adjoining areas have a wide network of power transmission but the standards and conditions of the power transmission system are inadequate to meet rapidly growing demand of electrical power. This situation limits the sub-national development and economic growth. To cope with the constraints, the proposed project has been planned to expand the network. This program will enhance the customer service and improve power supply reliability to Karachi and adjoining areas.

Nowadays power systems are complicated networks. They have several generating stations and load centers that are interconnected through power transmission lines. Generation facilities should have the capacity to produce required power to meet the customer demand. Bulk power generated must be transported through best transmission systems over a long distance without overheating or jeopardizing system stability.

2.5 Project Location

Project is located in the town of Dhabeji, in Mirpur Sakro sub-division, District Thatta, Sindh, as shown in Figure 1.1. Coordinates of towers are given in table below.

Table 2-1: Location coordinates of TL towers

S. No	Tower type	Coordinates	Elevation (m)
1	JKD	24°48'52.70"N 67°32'11.28"E	72.14

Table 2-1: Location coordinates of TL towers			
S. No	Tower type	Coordinates	Elevation (m)
2	JKD	24°48'45.93"N 67°32'5.35"E	65.50
3	T	24°48'42.26"N 67°31'58.72"E	66.77
4	T	24°48'37.44"N 67°31'50.04"E	64.87
5	T	24°48'32.72"N 67°31'41.52"E	72.99
6	T	24°48'27.43"N 67°31'31.97"E	47.69
7	T	24°48'21.79"N 67°31'21.79"E	42.96
8	T	24°48'16.23"N 67°31'11.77"E	38.24
9	A	24°48'10.47"N 67°31'1.37"E	38.17
10	JKD	24°48'6.75"N 67°30'56.97"E	36.09
11	2PLDP	24°48'4.70"N 67°30'54.07"E	36.02

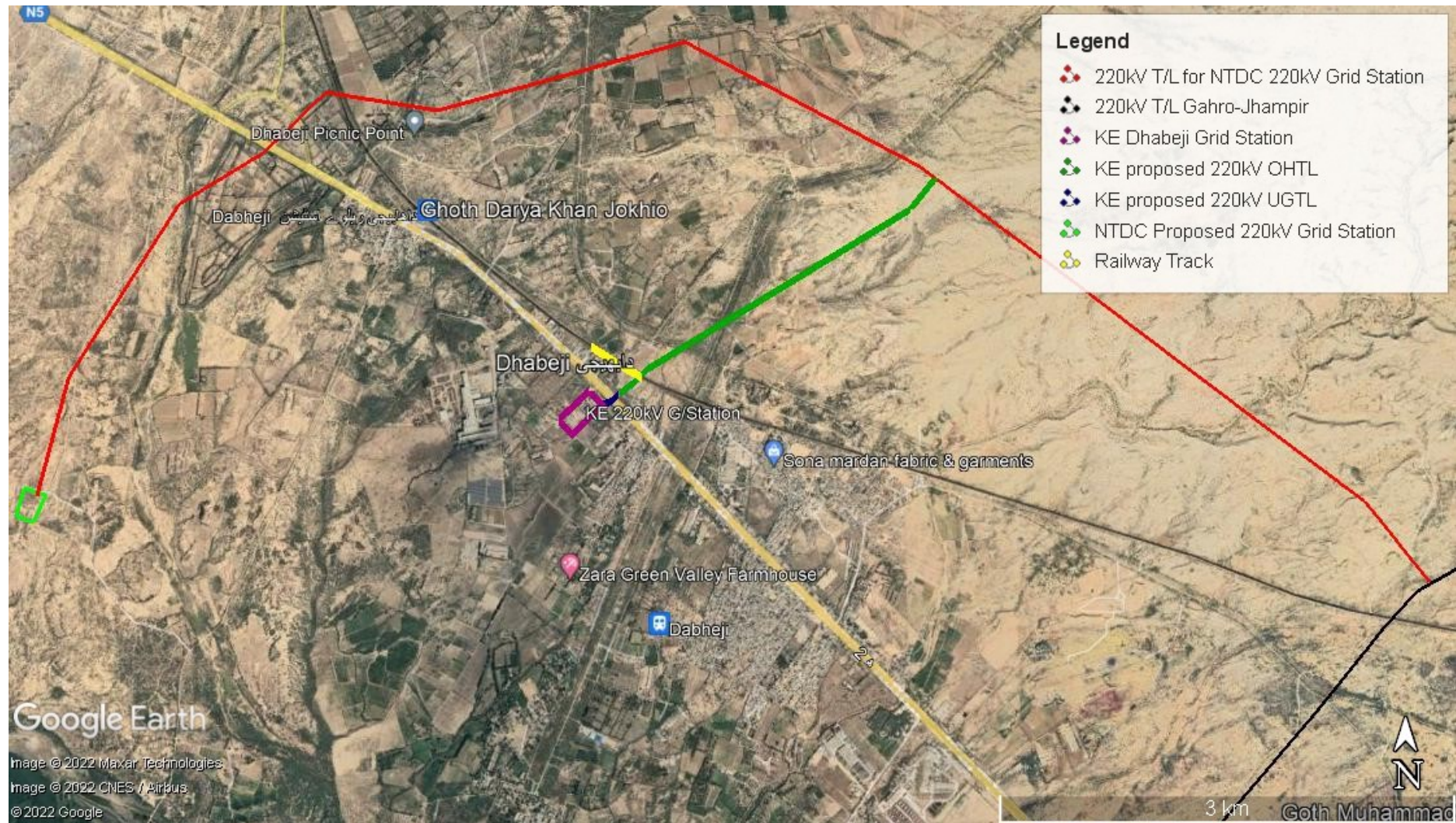


Figure 2-1: Location map of the KE 220kV Transmission Line

2.6 Technical Details of Project

2.6.1 Technical Specifications for OHTL and UGTL

1. OHTL:

Towers / Poles:

1. Types (T, A, JKD and 2PLDP)

2. Specific Data T-Type:

- Wind span =380
- Weight span = 500

2.1 Specific Data A-Type:

- Wind span =380
- Weight span = 600

2.2 Specific Data JKD-Type:

- Wind span =380
- Weight span = 600

2.3 Specific Data 2PLDP Pole Type:

- Wind span =125
- Weight span = 125

Conductor Specific Data:

1. AAAC Greely

2. Aluminum Alloy

3. 37 No of strands

4. UTS 13835kg approx.

Insulators Specific data:

1. Disc insulators.

2. Ball and socket coupling

3. Failure load 160kN

OPGW Specific Data:

1. 24 fibres OPGW

2. Thixotropic jelly with in buffer tube.

3. UTS 7000kg approx

Surge Arrestors:

1. Polymer housed

2. Highest system voltage 245kV

3. Rated frequency 50Hz

4. Lightning impulse voltage withstand 1050kV

2. UGTL:

Cable:

1. 1600mm² cross section

2. Annealed copper wire

FOC:

1. 48 No of fibers.

2.6.2 *Detail of Towers*

Self-support Lattice Towers and Tubular Pole will be used.

Numbers:

- 10 Nos = Lattice Towers
- 01 No = Tubular Pole.

However, the total no. of towers will be determined at time of approval of P & P after ROW acquired.

2.6.3 *Anti-climbing and bird protection Devices*

Anti-climbing:

Each tower shall be fitted with an anti-climbing device to prevent unauthorized persons from climbing the tower.

Bird Protection Device:

All suspension towers and tension towers having jumper insulator strings shall be provided with bird protection devices on each cross arm over insulator strings. The bird protection devices shall be spike type of galvanized and fitted with bolts and nuts.

2.6.4 Other Details

Grounding Wire: Optical Fiber Ground Wire (OPGW) with sufficient no. of Fibers and accessories including Joint Boxes.

Insulators: Porcelain Disc type insulators will be used. Power Line Drop Point (PLDP): PLDP will be of tubular type with platform for equipment.

Interconnection: Interconnection will be done from NTDC newly proposed 220kV Ghara-DSEZ – Jhampir Transmission Line.

2.6.5 Methodology of Construction and Installation of Transmission Line

Civil works for OHTL:

- i. Site mobilization of Civil team with equipment and machinery under supervision of site engineers.
- ii. Steel and stubs shifting at site.
- iii. Excavation for spread foundations, drilling for piles.
- iv. Lean.
- v. Fixing of steel.
- vi. Fixing of stubs.
- vii. Concrete / pad / pedestal / chimney for spread foundations and concrete for piles and pile caps for pile foundations.
- viii. Curing.
- ix. Installation of grounding.
- x. Testing of grounding.
- xi. Layer by layer backfilling with approved material.
- xii. Testing of grounding.

Civil works for UGTL:

- i. Site mobilization of Civil team with equipment and machinery under supervision of site engineers.
- ii. Excavation for trench
- iii. Horizontal directional drilling for Highway crossing.
- iv. Layer by layer backfilling with approved material.
- v. Installation of Route Markers.

Erection works for OHTL:

- i. Site mobilization of Erection team with equipment and machinery under supervision of site engineers.
- ii. Tower / Pole material will be shifted at site.
- iii. Material will be stored at site as per approved manners.
- iv. Part by part Erection of pole with crane.
- vi. Assembly of Towers parts i.e leg extension body extension, leg, super structure, cross arms and peaks on ground.
- vii. Erection of tower parts with gin pole.
- viii. Erection of Towers and Poles shall be done in such a manner that no abrasion with ground or any other existing feature will be held.
- ix. After Erection Nuts & Bolts Tightening as per manufacturer recommended torque values with calibrated torque wrenches.
- x. Application of paint.
- xi. Testing of grounding.

Stringing works for OHTL:

- i. Site mobilization of stringing team with proper equipment and machinery under supervision of site engineer.
- ii. Shifting of conductor, Insulators, OPGW and all allied hardware.
- iii. Assembly of insulators with hardware and hanging on cross arms.
- iv. Selection of slack or tension method for pulling as per site conditions. In any case abrasion of conductor with ground shall not be happened.
- v. Travelers will be installed in such a manner, that the vertical position of conductor / OPGW in sheave to be at same elevation as when clamped in the final position.
- vi. Pulling shall be done as per selected slack or tension method.
- vii. After pulling sagging and dead ending will be done.
- viii. Clipping In and installation of Spacer Dampers.
- ix. Testing of grounding.

Installation of UGTL:

- i. First layer sand bedding after excavation.
- ii. Installation of rollers.

- iii. Cable laying.
- iv. Second layer of sand bedding.
- v. Placement of warning tiles.
- vi. First layer of approved backfill material.
- vii. Placement of warning tape.
- viii. Warning tape shall be fixed.

Testing & commissioning for OHTL and UGTL:

- i. Men present at both sides of line shall guard the line against entry of unauthorized person.
- ii. Tests shall be conducted as per approved method statements in detailed design stage.

2.7 ROW requirements / guidelines of KE

The way leaves consents and Right of Way approvals including temporary and special rights of way from private owners, Government and other civic agencies that may be required in accordance with the applicable requirements for the execution of the work before the work is commenced.

2.8 KE Standards for Vertical and Horizontal Clearances from Objects

Voltage level 220kV	
1. Building part	
Vertical	Horizontal
6.10m	7.62m
2. Across open Country inaccessible of traffic vehicles	
Vertical	
7.01m	
3. Roads and highways	
Vertical	
7.92m	
4. Railway Track outside of railway station	
Vertical	
8.84m	
Note: Trees shall be removed in the line corridor. The above-mentioned clearance values are subject Line only.	

2.9 Timeline of Project Completion

Project completion duration is 16 months.

2.10 Work force and camps required for construction phase of & TL

Workforce of 150-200 person will be utilized during the construction of transmission line. 05 camps will be established for the project activities and workforce.

2.11 Required resources during construction & Operation phases of TL

Water and electricity would be required during the construction and operation phases of the proposed project.

Table 2-2: Resource requirement & sources (Construction & Operation Phase)		
Construction phase:		
Resource	Consumption	Source
Electricity	13 - 7 kW (approx.)	Gasoline Generators
Water	500-1000 gallons/day	Tanker service filtration plant.
Operational phase		
Electricity	N/A	N/A
Water	100-150 gallons/day	Tanker service or Connection from water supply authority

2.12 Storage area for material and equipment during construction and operation phase of and Transmission Line

On-site Storage of materials during construction and operation phases

1. A temporary storage area (s) develop by contractor for materials/equipment storage required for construction.
2. For operations there will be no on-site material storage.

2.13 Land Acquisition, ROW requirements, NOCs from authorities & Utility agencies of and Transmission Line

Right of way approvals, including temporary and special rights of way, from private owners, Government and other civic agencies that may be required for the execution of the work will be acquired after the approval from respective provincial EPAs. The NOCs/leases/approvals are not available at this early stage of project and will be taken in due course as and when required.

Chapter 3 LEGISLATION & ADMINISTRATIVE FRAMEWORK

3.1 Introduction

Before initiation of any project, the mandatory legislations enacted by government and other regulatory agencies need to be studied. Governments from time to time have enacted many environmental rules, regulations, laws and guidelines specifying different requirements for diverse kind of projects. Therefore, it would be necessary to study those environmental laws pertaining to the project before its execution so that protection of environment can be ensured.

In this section, same methodology would be followed by studying those rules, regulations and laws that are relevant to the environmental and social aspects of the project "220kV D/C, Twin Bundle LILO Transmission Line to KE Dhabeji Grid Station from NTDC". The assessment has been carried out to comply with both local and international laws and guidelines. The main among these are:

- National Environmental Laws & Legislations;
- Provincial Environmental Laws & Legislations;
- National & International Environmental and Social Guidelines; and
- Institutional Setup for Environmental Management.

This project will comprehensively practice the applicable requirements of policy documents, legislative framework and recommendations described in national and international guidelines of the project and will follow the institutions existing in the country that may influence the environmental management of the proposed project. These laws and guidelines have been incorporated in the mitigation measures and Environmental Management & Monitoring Plan (EMMP), which have been formulated for better environmental, ecological and social management.

3.2 National Environmental Laws & Legislations

In Pakistan, the awareness about necessity of having environmental protection laws and regulations developed since late 1970s. First step in this direction was the promulgation of the Pakistan Environmental Protection Ordinance, 1983. The organization entrusted with enforcement of environmental laws was then established viz. Pakistan Environmental Protection Agency in 1984. These efforts were continued and plan for protection of environment was developed called the Pakistan National Conservation Strategy.

Similarly, provincial governments also created Provincial Environmental Protection Agencies to look after the environmental issues in their regions. Then, in 1993, the National Environmental Quality Standards (NEQS) were made.

The powers of Environmental Protection Agencies were considerably enhanced by enacting the Pakistan Environmental Protection Act, 1997. And, the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations (IEE-EIA Regulations), 2000 explained the details about the preparation, submission, and review of Initial Environmental Examinations (IEEs) and Environmental Impact Assessments (EIAs). Moreover, there are numerous other national laws that contain the provisions for protection of environment.

Previously, the issue of 'environmental pollution and ecology' was placed in Concurrent list in the Constitution which allowed both Federal and Provincial Governments to enact laws on it. But, Eighteenth Amendment to the Constitution of Pakistan, 2010, transferred this subject to the Provincial governments. Due to this, the functions related to the national environmental management were transferred to the provinces. The international obligations in the context of environment will be management by the Ministry of Climate Change, Government of Pakistan.

Significant national environmental laws and legislations that have relevance to the project are as discussed under:

3.2.1 The Pakistan Environmental Policy, 2005⁷

The Pakistan Environmental Policy provides an overarching framework for addressing the environmental issues facing Pakistan, particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. It also gives direction for addressing the cross sectoral issues as well as the underlying causes of environmental degradation and meeting international obligations.

The National Environmental Policy, while recognizing the goals and objectives of the National Conservation Strategy, National Environmental Action Plan and other existing environment related national policies, strategies and action plans, provide broad guidelines to the Federal Government, Provincial Governments, Federally Administrated, Territories and Local Governments for addressing environmental concerns and ensuring effective management for their environmental resources.

The National Environmental Policy aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life for the citizens through sustainable development and the same is agreed by the proposed project.

3.2.2 Pakistan Penal Code, 1860⁸

Section XIV of PPC deals with the offences affecting the public health, safety, convenience, decency and morals. Person may be guilty of public nuisance if his act or omission causes common injury, danger or annoyance to the public or results in spread of infection of diseases dangerous to life. The section also deals with environmental pollution.

Provisions under this Act relating to environment are no longer being enforced after promulgation of the Pakistan Environmental Protection Act, 1997 and then by Sindh Environmental Protection Act, 2014. However, pollution offences can still be tried under the Pakistan Penal Code, 1860.

3.2.3 Land Acquisition Act, 1894⁹

This Act provides law for the acquisition of land needed for public purposes and for companies; and for determining the amount of compensation to be made on account of such acquisitions. The law provides details of various peculiarities involved in acquisition of land such as preliminary investigation, objection to acquisition, declaration of intended acquisition, enquiry into measurements, value & claims, taking possession, reference to court and procedure thereon, apportionment of compensation, payment, temporary occupation of land, acquisition of land for companies, disputes resolutions, penalties and exemptions etc. This Act has 55 sections addressing different areas. Such as section 4(2) mentions that it shall be lawful for any official authorized by the Collector to enter upon and survey, to dig or to do all other Acts necessary to ascertain that whether the land is adapted for such purpose.

3.2.4 The Telegraph Act, 1885

The Telegraph Act (TA) was conceived in the British era for telegraphic poles and then was passed to post-independence Pakistan with a broader application covering also electric poles and towers. The original provision of this law was that the land occupied by telegraph poles was not to be compensated (only crops destroyed during the erection of the pole were compensated). This was based on the logic that a pole, covering only a negligible land area, does not cause substantial impacts to land users.

In case of impacts caused by the poles and towers for public facilities and transmission lines, land acquisition is not regulated by the LAA but instead by the Telegraph Act, 1885 (amended in 1975).

The Act (section 11) confers powers to the NTDC to enter private lands and (section 10) construct/maintain electricity towers and transmission lines without the need to acquire the land affected and paying compensation for it. However sub-section 10 (d), provides that the NTDC is required to avoid causing unnecessary damages to the affected land and associated assets. Finally Sub Section 10 (d) and Section 16 provides that if any such damage occurs (i.e., damages

⁷ The Pakistan Environmental Policy, 2005, Govt. of Pakistan, Ministry of Environment

⁸ Pakistan Penal Code (XLV of 1860) 6th October 1860

⁹ The Land Acquisition Act 1894 (Act of 1894) <http://punjabelaws.gov.pk/laws/12.html>

to crops, irrigation facilities, and land quality or land income) the project proponent has to provide just compensation for the damages caused.

The Telegraph Act also requires the proponents to: (i) properly inform the affected people through written notices and onsite public meetings; (ii) compensate at market rates all the lands occupied by towers in urban areas, or replace the broad-based conventional towers by narrow-based tubular poles to minimize impact on land; (iii) avoid land impacts in rural areas through the use of towers with sufficient vertical clearance to allow the continuation of unrestricted farming and animal grazing; and, (iv) if the construction of such towers is impossible, compensate the land occupied by tower bases also in rural areas. In addition, the proponent will compensate by default all the crops, trees and other assets expected to be affected by the Transmission Line construction phases including (i) construction of tower bases; (ii) tower erection; and (iii) stringing of power cables.

This Act makes provision of installing towers without acquiring any land. However, provision is there for temporary acquisition of land during the construction period. During the proposed Transmission Line project, it will be ensured that land under the transmission lines is accessible and can be used productively. In the absence of such situation, the land will be acquired and compensation paid either under LAA (1894), or under the willing buyer-willing seller at market prices with consensus on price.

3.2.5 Antiquities Act, 1975¹⁰

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The Act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments; etc. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain such articles of archaeological significance.

No archeological and cultural site as protected under Antiquities Act 1975 is present near the proposed route alignment.

3.2.6 The Forest Act, 1927¹¹

The Forest Act deals with the matters related with protection and conservation of natural vegetation/habitats. The Act contains procedures for constituting and managing various types of forests, such as reserved forests, village forests and protected forests. The Act empowers the provincial forest departments to declare any forest area as reserved or protected. It also defines the duties of forest related public servants, prohibits cutting of trees and prescribes penalties for violation of any provision of the Act.

The Project site does not encompass any reserve/protected forest area.

3.2.7 National Climate Policy, 2012

The National Climate Change Policy provides a framework for addressing the issues that Pakistan faces or will face in future due to the changing climate. In view of Pakistan's high vulnerability to the adverse impacts of climate change, in particular extreme events, adaptation effort is the focus of the policy document. The vulnerabilities of various sectors to climate change have been highlighted and appropriate adaptation measures spelled out. These cover policy measures to address issues in various sectors such as water, agriculture, forestry, coastal areas, biodiversity and other vulnerable ecosystems. Notwithstanding the fact that Pakistan's contribution to global greenhouse gas (GHG) emissions is very small, its role as a responsible member of the global community in combating climate change has been highlighted by giving due importance to mitigation efforts in sectors such as energy, forestry, agriculture and livestock.

3.2.8 Pakistan Climate Change Act, 2017

Pakistan is a party to UNFCCC, 1992 and Kyoto Protocol to the UNFCCC, 1997. It also initiated the process for ratifying the Paris Agreement, 2015 which recognizes that Climate Change represents an urgent and potentially irreversible threat to human societies and the planet and thus is a global challenge. The Act calls for establishment of independent

¹⁰ Act VII of 1976(Gazette of Pakistan, Extraordinary, Part 1, 14th January, 1976

¹¹ The Forest Act, 1927(XVI of 1927) <http://punjab.laws.gov.com/laws/40.html>

Pakistan Climate Change Authority under the guidance of high-powered Pakistan Climate Change Council to provide a framework for mitigating and adapting to the effects of the changing climate on various sectors of the economy and developing response strategies to climate change. The Act also establishes Pakistan Climate Change Fund. Money from Fund will also be utilized for financial assistance to suitable adaptation and mitigation projects.

3.2.9 The Electricity Act, 1910¹² & the Electricity (Amendment) Ordinance, 1979¹³

The electricity Act, 1910 relates to the supply and use of electrical energy. Supply of energy licenses and its revocation under various conditions is given in part II of the Act. This Act obligates licensee to pay compensation for any damages caused during the constructions and maintenance of any power distribution facilities. Part III of the Act discusses the supply, transmission and use of energy by non licensees. This law prohibits the generation, transmission, supply or use of energy, in any way that may injure any railway, tramway, canal or waterway or any dock, wharf or pier vested in or controlled by a local authority.

The electricity Act, 1910 is amended through the electricity (Amendment) Ordinance, 1979. Penalty of three years imprisonment or five thousand fines or with both is prescribed for dishonest abstraction or consumption of energy.

3.2.10 Electricity Rules, 1937¹⁴

These rules regulate the generation, transmission, supply and use of energy in Pakistan. The Act prescribes the conditions and procedures of issuance of licenses. General precautions for the safety of the public are mentioned. Construction, insulation and earthing of apparatus are prescribed to be done to prevent danger. Additional rules for electric tractions are also given.

3.2.11 The Electricity Control Ordinance, 1965¹⁵

This ordinance provides powers to control the production, distribution, use and consumption of electrical energy during an emergency throughout Pakistan. When the National Assembly is not in session and the President is satisfied that circumstances exist which render immediate legislation necessary, the president can promulgate the ordinance. The ordinance prescribes a penalty of six month or with fine, or with both, in case of non-compliance of the ordinance.

3.3 Provincial and Local Environmental Laws and Legislations

3.3.1 Sindh Environmental Protection Act, 2014¹⁶

This Act has been enacted to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development. It equally lays emphasis for the preservation of the natural resources of Sindh and to adopt ways and means for restoring the balance in its eco-system by avoiding all types of environmental hazards.

Environmental Protection Council (EPC)

It has been formed consisting of Chief Minister as Chairman with Minister in charge of Environment Protection Department, Addl. Chief Secretary, Planning & Development Department, Government of Sindh and Secretaries of Environment, Finance, Public Health Engineering, Irrigation, Health, Agriculture, Local Government, Industries, Livestock & Fisheries Forest & Wildlife, Energy, Education Departments Government of Sindh and Divisional Commissioners of Sindh. Non-official members are also included (i.e. representatives of Chamber of Commerce & Industry and from medical or legal professions etc.) along with DG EPA & two Members of Provincial Assembly also form part of EPC.

¹² The Electricity Act, 1910, (IX of 1910)

¹³ The Electricity (Amendment) Ordinance, 1979, (LXII OF 1979)

¹⁴ Electricity Rules, 1937

¹⁵ The Electricity Control Ordinance, 1965, Ordinance No. XXVIII of 1965

¹⁶ Sindh Environmental Protection Act, 2014, Sindh Act No. VIII of 2014 dated 20th March, 2014

The functions and powers of EPC include coordination & supervision of provisions of Act, approving provincial environmental & sustainable development policies & SEQS, provide guidance for protection & conservation, consider annual Sindh Environmental Report, deal with interprovincial and federal provincial issues, provide guidance for bio safety and assist Federal Government in implementation of various provisions of UN Convention on laws on Seas (UNCLOS).

Sindh Environmental Protection Agency (SEPA)

SEPA would be headed by Director General (DG) with the aim to exercise the powers and perform the functions assigned to it under the provisions of this Act and the rules and regulations made there under. The Agency shall have technical and legal staff and may form advisory committees.

The Agency shall administer and implement the provisions of this Act and rules and regulations. It shall also prepare environmental policies, take measures for implementation of environmental policies, prepare Sindh Environment Report and prepare or revise Sindh Environmental Quality Standards. SEPA shall also establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution and to estimate the costs of cleaning up pollution and rehabilitating the environment and sustainable development. SEPA would also take measures for protection of environment such as to promote research; issues licenses for dealing with hazardous substances, certify laboratories, identify need for or initiate legislation, specify safeguards etc. SEPA would also encourage public awareness and education regarding environmental issues.

SEPA would have powers to enter or inspect under a search warrant issued by Environmental Protection Tribunal or a Court search at any time, any land or building etc. where there are reasonable grounds to believe that an offence under this Act has been or is being or likely to be committed. SEPA may also take samples, arrange for testing or confiscate any article in discharge of their duties.

This act has also provided for Sindh Sustainable Fund derived from various sources such as voluntary contributions or fees generated etc. This fund is utilized for protection, conservation or improvement of environment.

Salient Features

Section-11: No person shall discharge or emit or allow the discharge or emission of any effluent waste, pollutant, noise or adverse environmental effects in an amount, concentration or level which is in excess to that specified in Sindh Environmental Quality Standards.

Section-12 & 13: No person shall import hazardous waste into Sindh province and handle hazardous substances except under licenses etc.

Section 14: No person shall undertake any action which adversely affects environment or which lead to pollute or impairment of or damage to biodiversity, ecosystem, aesthetics or any damage to environment etc.

Section 15: This section deals with regulation of motor vehicles banning emission of air or noise pollutants being emitted from them in excess of allowable standards.

Section 17: This section states that no proponent of a project shall commence construction or operation unless he has filed with the Agency an initial environmental examination or environmental impact assessment and has obtained from Agency approval in respect thereof. SEPA shall review the IEE & EIA and accord approval subject to such terms and conditions as it may prescribe or require. The agency shall communicate within four (04) months its approval or otherwise from the date EIA is filed failing which the EIA shall deemed to have been approved.

Section 21: Where agency is satisfied that the discharge or emission has occurred in violation of any provision of this act or rules etc. then it may, after giving an opportunity to person responsible, by order direct such person to take such measures within specified period. The agency under this section has been empowered to immediately stop, prevent or minimize emission, disposal etc. for remedying adverse environmental effects.

Section 22: The person who fails to comply with section 11, 17, 18 and 21 shall be punishable with a fine which may extend to five million rupees, to the damage caused to environment and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues. And, where a person convicted under sub-sections 1 & 2 had been previously convicted for any contravention of this Act, the Environmental Protection Tribunal (EPT) may, in addition to punishment, award imprisonment for a term that may extend up to three years, or order confiscation or closure of facility etc.

Section 23: Where any violation of this Act has been committed by any of employee of any corporate body, then, that employee shall be considered to be guilty of environmental pollution.

Section 25: This section allows for establishment of Environmental Protection Tribunals.

The Act has been attached as Annex-I.

3.3.2 Sindh EPA Environmental Assessment Regulations, 2021

The Regulation classifies projects on the basis of expected degree of adverse environmental impacts and lists them in three separate schedules. Schedule I lists projects that may not have significant environmental impacts and therefore require an Environmental Checklist. Schedule II lists projects of considerable environmental impacts requiring preparation of an IEE report. Schedule III lists projects of potentially adverse environmental impacts requiring preparation of an EIA report. The regulation also requires that all projects located in environmentally sensitive areas require preparation of an EIA.

The proposed project falls in Schedule II under following categories, requiring an EIA study;

- ✓ A. Energy
- ✓ Transmission Lines above 132 kVA and distribution projects.

The regulations have been attached as Annex-II.

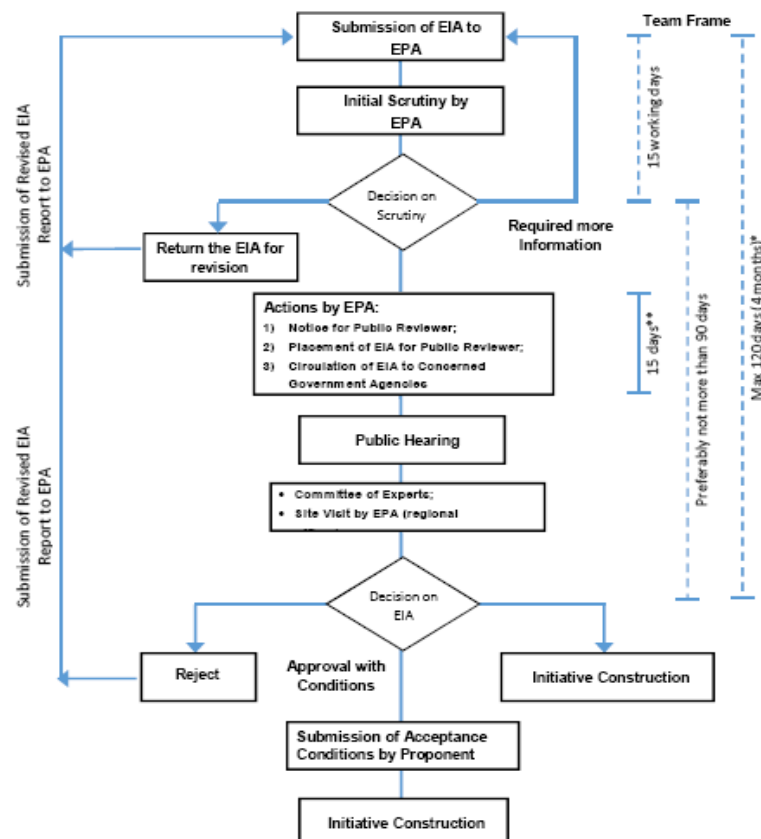


Figure 3-1: Procedure for EIA Review and Approval process

3.3.3 Sindh Environmental Quality Standards

On June 28, 2016, the Sindh Environmental Industrial Waste Water, Effluent, Domestic, Sewerage, Industrial Air Emission and Ambient Air, Noise for Vehicles, Air Emissions for Vehicles and Drinking Water Quality Standards, 2015 have been notified by Sindh EPA. The KE shall follow the SEQS in letter and spirit during project execution.

SEQS have been attached as Annex-III.

3.3.4 Hazardous Substances Rules, 2014¹⁷

These Rules were notified to stream line procedures for issuance of licenses to industries/ businesses that generate hazardous waste, safety precautions for workers; and devices them methods for the removal of hazardous wastes in an environmentally friendly manner. The rules also specify procedures to be adopted for import, transport and disposal of hazardous waste; and identify two hundred and forty-three hazardous substances and synthetic chemicals.

3.3.5 The Sindh Wildlife Protection, Preservation, Conservation and Management Act, 2020

This Act provides for the preservation, protection, and conservation of wildlife by the formation and management of protected areas and prohibition of hunting of wildlife species declared protected under the ordinance. The Act also specifies four broad classifications of the protected areas: National Parks, Wildlife Sanctuaries, Game reserves and Private Game Reserve. Activities such as hunting and breaking of land for mining are prohibited in the protected areas, as are removing vegetation or polluting water flowing through the park. Wildlife sanctuaries are areas that have been set aside as undisturbed breeding grounds and cultivation and grazing is prohibited in the demarcated areas. Nobody is allowed to reside in a wildlife sanctuary and entrance for the general public is by special dispensation. Game reserves are designated as areas where hunting or shooting is not allowed except under special permits.

The project TL route is not neighboring any Wildlife Sanctuary or Game Reserve.

3.3.6 The Sindh Cultural Heritage (Preservation) Act, 1994

The Sindh Cultural Heritage (Preservation) Act, 1994 is the provincial law for the protection of cultural heritage. Its objectives are similar to those of the Antiquity Act, 1975. No antiquity protected under these two laws is identified in the vicinity of the proposed project area.

3.3.7 The Sindh Occupational Safety and Health Act, 2017

The Sindh Occupational Safety and Health Bill 2017 has been approved by the Provincial Assembly of Sindh (Ref. Sindh Bill No. 27 of 2017) and enacted as the Sindh Occupational Safety and health Act, 2017. The Act makes provision for Occupational Safety and Health conditions at all workplaces for the protection of persons at work places against risk of injury arising out of the activities at work places and the promotion of safe, healthy and decent working environment adapted to the physical, physiological and psychological needs of all persons at work. The Sindh Occupational Safety and Health Rules, 2019 have also been framed under the act.

3.4 Environmental and Social Guidelines

The environmental as well as social guidelines related to the proposed project are as discussed under:

3.4.1 Environmental Protection Agency's (EPA's) Guidelines on Environmental & Social Aspects

The Federal EPA has prepared a set of guidelines for conducting environmental and social assessments as discussed under:

¹⁷ Hazardous Substances Rules, 2014

- **Policy & Procedures for the Filing, Review and Approval of Environmental Assessments, 2014¹⁸**

The Policy & Procedures for the Filing, Review and Approval of Environmental Assessments 1997, prepared by PEPA under Pakistan Environmental Protection Act 1999 and Policy & Procedures for the Filing, Review and Approval of Environmental Assessments 2014, prepared by the SEPA under the powers conferred upon it by the Sindh Environmental Protection Act 2014, provide the necessary details on the preparation, submission, and review of the Initial Environmental Examination (IEE) and the Environmental Impact Assessment (EIA).

This EIA Study has followed the procedures defined in the Sindh Environmental Protection Act 2014, Review guidelines, and the EIA will be submitted to the SEPA as in their jurisdiction the project will be implemented.

- **Guidelines for the Preparation and Review of Environmental Reports, 1997**

The guidelines on the preparation and review of environmental reports target project proponents and specify:

- The nature of the information to be included in environmental reports;
- The minimum qualifications of the EIA conductors appointed;
- The need to incorporate suitable mitigation measures at every stage of project implementation; and
- The need to specify monitoring procedures.

The terms of reference for the reports are to be prepared by the project proponents themselves. The report must contain baseline data on the study area, detailed assessment thereof, and mitigation measures.

- **Guidelines for Public Consultation**

These guidelines provide assistance throughout the environmental assessment of the project by involving the public which can lead to better and more acceptable decision-making. Timely, well planned and appropriately implemented public involvement, undertaken in a positive manner and supported by a real desire to use the information gained to improve the proposal, will lead to better outcomes, and lay the basis for ongoing positive relationships between the stakeholders. Specifically, public involvement is a valuable source of information on key impacts, potential mitigation measures and the identification and selection of alternatives.

3.4.2 World Bank Guidelines on Environmental & Social Aspects¹⁹

The principal World Bank publications that contain environmental guidelines are listed below:

- Environmental Assessment Operational Policy 4.01. Washington, DC, USA. World Bank 1999;
- Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross Sectoral Issues. World Bank Technical Paper Number 139, Environment Department, the World Bank, 1991;
- Environmental Assessment Sourcebook, Volume III: Guidelines for Environmental Assessment of Energy and Industry Projects. World Bank Technical Paper No. 154, Environment Department, the World Bank, 1991; and
- Pollution Prevention and Abatement Handbook: Towards Cleaner Production, Environment Department, the World Bank, United Nations Industrial Development Organization and the United Nations Environment Program, 1998.

The first two publications listed here provide general guidelines for the conduct of an IEE/EIA, and address the IEE/EIA practitioners themselves as well as project designers. While the Source book in particular has been designed for the Bank projects, and is especially relevant for the impact assessment of large-scale infrastructure projects, it contains a wealth of information which is useful to environmentalists and project proponents.

The Source book identifies a number of areas of concern, which should be addressed during impact assessment. It sets out guidelines for the determination of impacts, provides a checklist of tools to identify possible biodiversity issues and suggests possible mitigation measures. Possible development project impacts on wild lands, wetlands, forests etc. are

¹⁸ Policy and Procedure for the Filing, Review and Approval of Environmental Assessments, Government of Pakistan, November 1997

¹⁹ World Bank Guidelines on Environmental & Social Aspects

also identified and mitigation measures suggested. The Sourcebook also highlights concerns in social impact assessment, and emphasizes the need to incorporate socio-economic issues in EIA exercises.

3.4.3 IFC Environmental and Social Performance Standards and their Applicability to the Project

International Finance Corporation (IFC), a member of World Bank Group which focuses on private-sector development, has defined 8 Performance Standards for its prospective clients to reduce the environmental and social risks that may arise from development projects.

Performance standards and their relevance to the proposed 220kV Dhabeji transmission line project have been discussed here as;

1. Performance Standard 1: Risk Management

PS-1 calls for the identification of potential environmental and social impacts which may arise during various phases of the project. For the Mitigation measures are to be provided for the potential impacts to reduce environmental and social risks to the communities, workers and other stakeholders. For effective implementation of mitigation measures, a robust monitoring plan is also required to be in place for all the phases of the project to ensure effective implementation of mitigation plan. PS-1 also stipulates effective Stakeholder engagement, with focus on primary stakeholders/affected community, so that their concerns and grievances are noted and adequately incorporated during project execution. PS-1 also asks for appropriate information disclosure and dissemination of the environmental and social information pertaining to the project to the affected communities and other stakeholders.

Applicability to the project

The environmental and social risk management for the proposed project is being undertaken through an EIA, which is required as per Sindh Environmental Protection Act 2014 and Sindh EPA Environmental Assessment Regulations 2021, the applicable environmental law is Sindh province. During EIA study, consultations were carried out with the primary stakeholders although population is sparse in the project area. EIA has identified potential impacts and has proposed proportionate mitigation measures. An Environmental Management and Monitoring Plan has also been developed to ensure effective implantation of mitigation measures during project cycle. Grievance redress mechanism (GRM) has also been provided to address community complains during project execution. The EIA report once submitted and reviewed by Sindh EPA, will be uploaded on its official website.

2. Performance Standard 2: Labor and Working Conditions

The PS-2 calls for adequate working conditions and environment for the labor and employees associated with the project development that has to be provided by the prospective clients. Forced labor and child labor is not allowed. The PS-2 also convers indirect and contractual workers. Local labor working and labor compensation laws should be followed. Workers have to be provided safety and healthy conditions in the occupational settings. Labor grievance should be addressed through GRM. Employment decisions should be non-discriminatory.

Applicability to the project

Labor laws of Pakistan and the Occupational Safety and Health Act 2017 of Sindh will be adhered by KE. Labor living and working conditions will be as per local requirements. Forced labor and child labor will not be allowed for the project activities. KE is an equal-opportunity employer and therefore non-discriminatory employment decisions are taken.

3. Performance Standard 3: Resource Efficiency and Pollution Prevention

The PS-3 recognizes the increase in air, water, noise pollution due to increase in economic activities. Environmental pollution can have adverse impacts on health, living and livelihoods of the human populace. PS-3 asks for the measures for pollution prevention and mitigation. This should be coupled with resource conservation and resource efficiency for

the prudent use of finite resources. In the context of climate change, efforts should be put in forth to reduce the GHG-emissions from the development projects.

Applicability to the project

The proposed transmission line project has been designed as per the established international technical standards for overhead and underground electrical transmission. It is therefore assumed that the project will aim for optimal utilization of resources. Electric power transmission has over the years got more efficient, reaching over 90% of transmission efficiencies. The environmental pollution arising from project activities is expected to be limited to the project construction phase only as the project operations does not involve effluent or emissions into the environment. Mitigation measures proposed would ensure lower GHG emissions from project activities and that too are concern mainly for the construction phase.

4. Performance Standard 4: Community, Health, Safety and Security

The PS-4 calls for the identification of health, safety and security issues for the affected communities, arising from project activities. These issues are then needed to be addressed properly to minimize the negative implications of project works on the communities. Influx of workers may raise the concern of communicable diseases, such as COVID-19, social conflicts, safety of community members from incidents and legitimate security concerns of trespassing or physical harm from workers. Such concerns should be taken care of before and during project execution.

Applicability to the project

Project route is sparsely populated, so the concerns for community health, safety and security will be minimal. It is expected that most of the unskilled and semi-skilled labor will be sourced locally, so the issues arising from intervention of workers foreign to the area can be minimized. Health screening of workers at hiring may also be carried out to reduce chances of spread of diseases. Administrative controls will be in place to minimize unauthorized community interaction of project workers.

5. Performance Standard 5: Land Acquisition and Involuntary Resettlement

The PS-5 highlights unavoidable consequences of land acquisition and resettlement for project development. It asks for avoidance of involuntary resettlement when possible and alternative project execution sites/routes may be considered. Where unavoidable, impacts of land acquisition and involuntary resettlement should be minimized and managed by providing adequate compensation and alternative liveable place for the displaced population. Forced eviction is not allowed. Also, displaced populace should also be provided with the livelihoods and their living at the resettlement sites should have a security of tenure. The displaced community should be adequately informed during the resettlement process. In case the livelihoods are displaced instead of physical displacement, clients should prepare livelihood restoration plans to compensate affected communities.

Applicability to the project

The proposed transmission line project does not involve physical displacement of populace or habitable structures. For the overhead and underground transmission line, way leave consent will be obtained and ROW will be acquired from relevant authorities. Land acquisition will be carried out in accordance with the applicable bylaws.

6. Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

The PS-6 stresses on the importance of biodiversity conservation and maintain the benefits of the natural ecosystems. It seeks to strike the balance between need for development and need for the sustainable management of natural ecosystems and resources. PS-6 defines various habitats where development projects may be sited, however projects should be avoided in 'Critical Habitats' and in locally 'Protected Areas' and areas of International Importance, unless no alternative exists or allowed under local law or the biodiversity of the area will not be impacted as the project execution involves stringent environmental and ecological controls.

Applicability to the project

The project area has an arid and hot environment. The vegetation cover is mostly Xerophytes and other than common bird species, wildlife of concern is rare because of human intervention in the area, mainly by water supply projects and limited agriculture. Therefore, the area does not have a critical ecology. No gazetted protected area or a wildlife refuge lies along the project route as well as any area of international importance does not exist.

7. Performance Standard 7: Indigenous Peoples

PS-7 recognizes that Indigenous Peoples may be more vulnerable and can easily be exploited as they have distinct cultural norms and way of living than the mainstream societies. Indigenous peoples may reap economic benefits from development project by participating in project activities but their involvement should be consensual. Moreover, indigenous people should be shielded from adverse impacts of projects, as their ability to cope with the negative impacts may be impaired. Impacts on their land and livelihoods should also be avoided/mitigated. Their cultural heritage should also be protected.

Applicability to the project

No known or officially declared indigenous people exist in or along the project route.

8. Performance Standard 8: Cultural Heritage

The PS-8 recognizes importance of cultural heritage for current and future generations and asks for its protection from negative implications of project activities and seeks its preservation. If a cultural heritage site is being used or maintained or modified as part of the project, benefits arising from it should be equitable for society and the developer. If the project activities are to be carried out at the cultural sites, any structural removals or alterations should be in accordance with the applicable laws and only if there are no alternatives. Internationally recognized cultural heritage sites should also be protected from project activities.

Applicability to the project

Transmission line route does not have any known or gazetted cultural heritage site. Thatta city has several cultural sites, which is several kilometres away from project area.

3.4.4 IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP)²⁰. These industry sector EHS guidelines are designed to be used together with the General or multiple industry-sector guidelines as may be necessary. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project such as host country context, assimilative capacity of the environment etc. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

Industry-Specific Impacts and Management

This includes construction site waste generation, soil erosion and sediment, control from materials sourcing areas and site preparation activities, fugitive dust and other emissions (e.g. from vehicle traffic, land clearing activities, and materials stockpiles), noise from heavy equipment and truck traffic, potential for hazardous materials and oil spills associated with heavy equipment operation and fueling activities.

Performance Indicators and Monitoring

²⁰ www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines

Where dust or potentially contaminated water runoff exists, site operations should comply with guidelines described. Monitoring should be conducted by trained individuals and monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. Occupational health and safety performance should be evaluated against internationally published exposure guidelines. Projects should try to reduce the number of accidents among project workers.

Chapter 4 ENVIRONMENTAL & SOCIAL BASELINE OF THE PROJECT AREA

4.1 General

4.1.1 The Aim of Baseline Study

The baseline study relates to the physical, biological and socio-economic environment of the project area prior to the beginning of construction and operational activities. This categorization would aid in understanding the prevalent macro and micro environment conditions of this project and would enable assessment of possible environmental impacts that may arise as a result of the activities associated with the project. It would also assist the design team in defining the mitigation measures that would be required to minimize if not eliminate the negative impacts which are pointed out in this study.

4.1.2 Methodology

Information for this section was collected from different sources including electronic and print media, studies previously conducted in proposed project area by EMC and archives of the experts, consultations with institutions, Non-government Organizations (NGOs) and field surveys conducted for this study by the team of EMC, etc.

4.1.3 Study Area

The project is located in Dhabeji, in Mirpur Sakro sub-division in District Thatta, Sindh. The macro environment and the route of the Transmission Line is shown in the Figure 4.1.

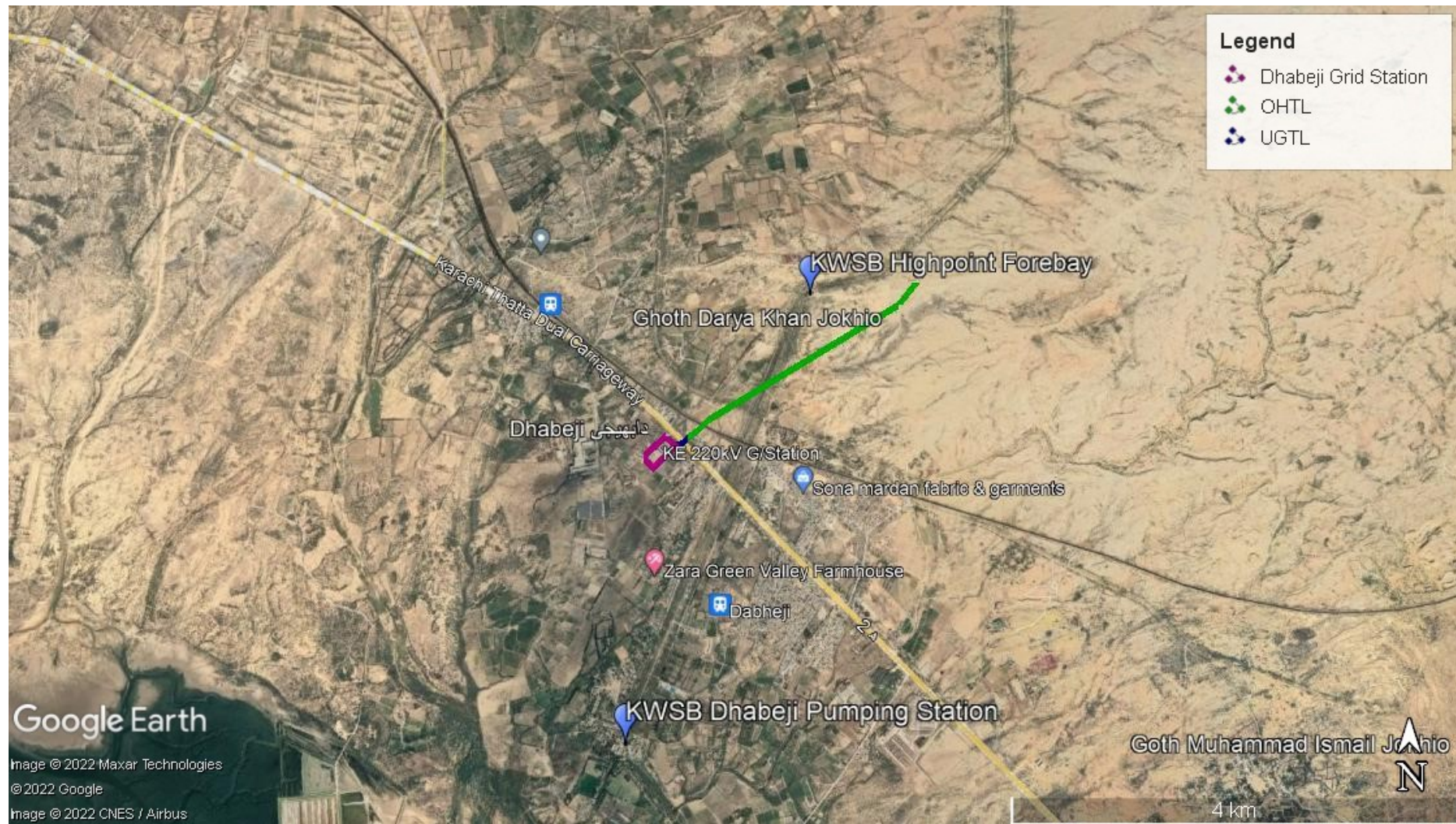


Figure 4-1: Micro and macro environment of proposed project

Pictorial views of project area



KE Dhabeji Grid Station at N5/Karachi-Thatta Dual Carriageway



Powerline drop point (PLDP) site of the proposed 220kV transmission line



Farmlands along transmission line route



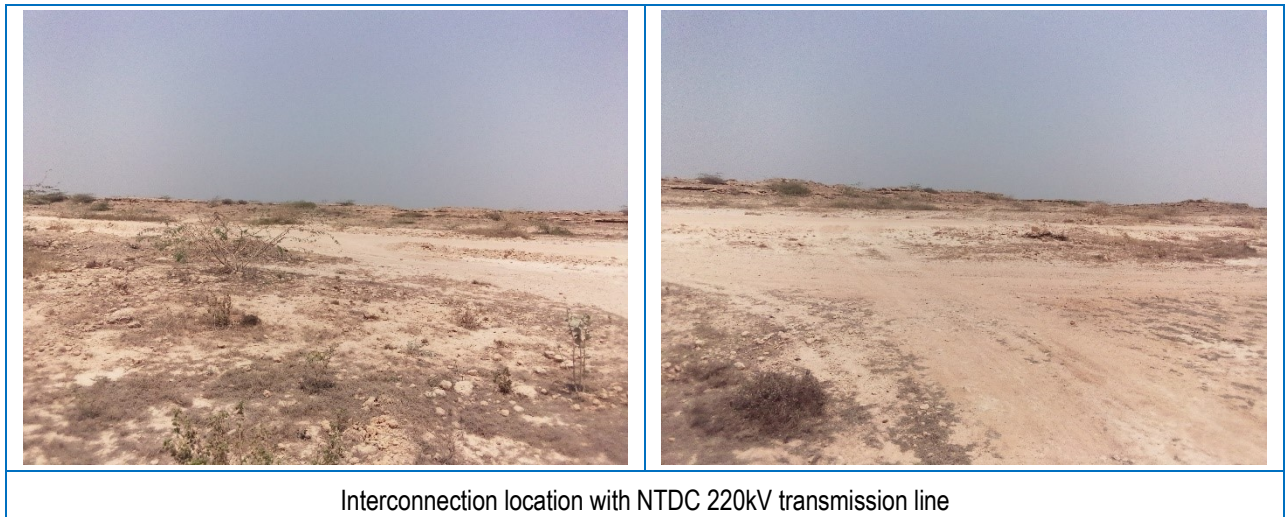
Railway track crosses the overhead transmission line



KWSB water supply pipeline crossing transmission line route



Habitable structures with farmlands along transmission line route



4.2 Physical Environment

4.2.1 Meteorology and Climate

The representative Meteorology and Climate data for District Thatta has been described, mainly from Thatta city. The climate of the Thatta broadly classified as arid, moderate, humid and hot. The mild winter is restricted to the November-February period. The summer extends from May to September, which overlaps the short spells of the main rainy season during July- August. The weather tends to be very humid during June, July and September and is pleasant during March April. There exist several meteorological stations in Sindh; data recorded at some of these stations is provided in the table below;

Table 4-1: Meteorological Parameters for Thatta, Sindh

Month	Temperature °C		Rainfall (mm)	Relative Humidity %
	Maximum	Minimum		
January	25.78	8.73	0.96	50.38
February	28.59	11.60	3.60	48.81
March	34.02	16.80	2.30	48.36
April	38.40	21.80	2.49	48.67
May	39.85	25.47	0.69	53.10
June	38.02	27.46	10.76	60.70
July	35.11	27.04	70.49	69.61
August	33.61	26.06	89.88	72.55
September	34.36	24.87	34.43	68.78
October	35.80	21.70	3.72	58.15
November	31.87	15.86	1.67	53.88
December	26.68	10.10	1.11	52.46
Annual Average	33.48	19.76	221.64	57.56

Source: Pakistan Meteorological Department (PMD)

Temperature

Atmospheric temperature is generally moderate through the year in Thatta due to the presence of sea. The mean yearly temperature reached maximum 40°C and minimum around 8°C. The above table indicate that the mean monthly maximum temperature in Thatta ranged between 25°C and 39°C, while the mean monthly minimum temperature ranged between 8°C and 27.6°C. The Temperatures start falling from October each year to January and dry and hot weather prevails from April to September as mentioned in Table.

Precipitation

The southwest monsoon brings in humid air from the sea, but the precipitation is generally very low with nearly 80% of the 70 to 83 mm rain falling from July to August according to the table. Rainfall, when it does come, it is often torrential causing problems of drainage and erosion of the light and sparsely vegetated land of Jhimpir.

The winters are short and mild from late November to early February with the prevailing wind coming from the North East with very little rainfall. The most important characteristics of the prevailing meteorological conditions are the generally high dust conditions as a result of the aridity of the surrounding area; dust storms occur especially before the onset of monsoon. The higher winds during the southwest monsoon tend to carry air-borne dust inland during the summer months, while in winter they tend to be light to moderate in intensity and carry air borne particulate matter seaward.

In General, Monsoon in the arid area of Kohistan is characterized by low and high variable rainfall both in time and space. The rainfall has a specific trend and pattern that is below medium rainfall, which may come once in three years, whereas drought once in 8- 10 years. Annual rainfall increases from less than 100 mm in the north to 350 mm in the southeast. During some years the persistent wind with high velocity the monsoon winds do not reach the region and no rain occurs during such periods. The desertified area is subject to heavy soil erosion. The rainy season is spread over the June-September period, with maximum rainfall occurring in September, and average rate of evapotranspiration 218.2mm.

Humidity

Humidity depends on temperature and the pressure. The same amount of water vapor results in higher humidity in cool air than warm air. A related parameter is the dew point. The amount of water vapor needed to achieve saturation increases as the temperature increases. As the temperature of a parcel of air decreases it will eventually reach the saturation point without adding or losing water mass.

In Jhimpir region, July, August and September are the most humid months whereas May and June are the least humid months. Average monthly relative humidity (RH) values at whole Thatta District are provided in table.

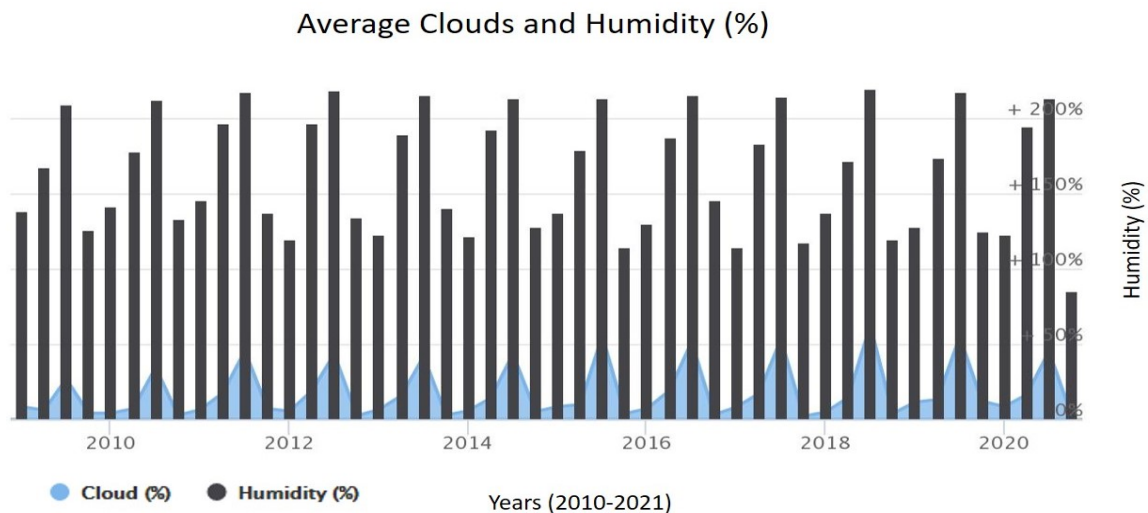


Figure 4-2: Average humidity of Thatta, District Sindh since 2009 to 2020²¹

Wind Speed and Direction

The wind direction in Thatta region is generally west-northwesterly during the summer monsoon and east-northeasterly during the short winter monsoon season. The wind speed at ground level varies between 0 and 2 m/s during the calm months to 4 and 8m/s during the pre-monsoon season.

Pakistan Meteorological Department has conducted a detailed Wind Power Potential Survey of Coastal Areas of Pakistan including district Thatta. The list of stations located along Sindh is shown in the Figure 4.3.



Figure 4-3: Wind Mapping Stations installed by Pakistan Meteorological Department (PMD)²²

²¹ Source: worldweatheronline

²² Source: PMD: <http://www.pmd.org.pk>

The monthly average wind speeds are different in the region compare to the other region of Thatta District and adjoining areas are shown below;

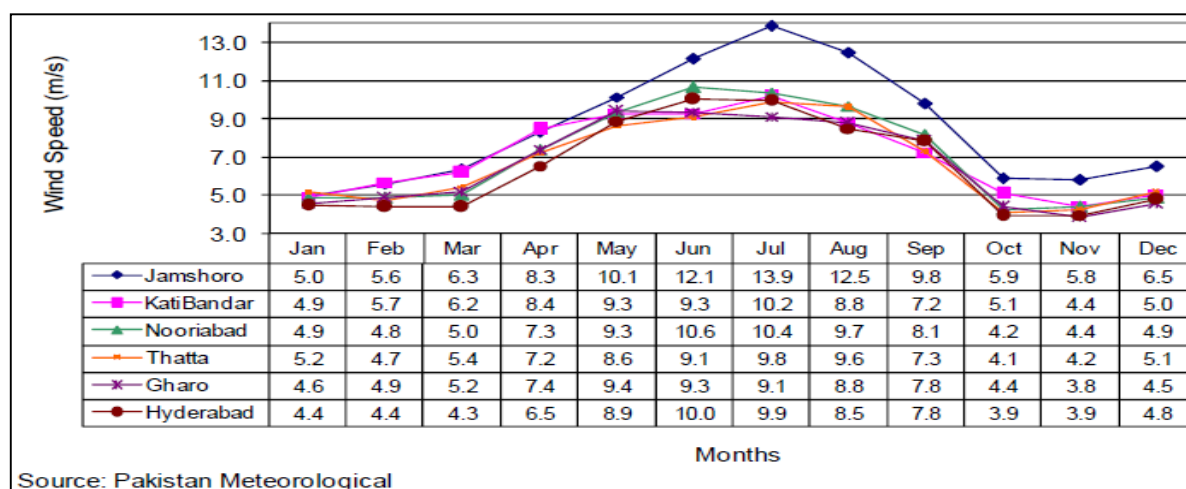


Figure 4-4: Monthly Average Wind Speed at 50m in Sindh districts²³

Cloud Cover

In Thatta, the average percentage of the sky covered by clouds experiences extreme seasonal variation over the course of the year. The clearer part of the year in Thatta begins around September 8 and lasts for 9.1 months, ending around June 12. The clearest month of the year in Thatta is October, during which on average the sky is clear, mostly clear, or partly cloudy 92% of the time. The cloudier part of the year begins around June 12 and lasts for 2.9 months, ending around September 8. The cloudiest month of the year in Thatta is July, during which on average the sky is overcast or mostly cloudy 52% of the time.

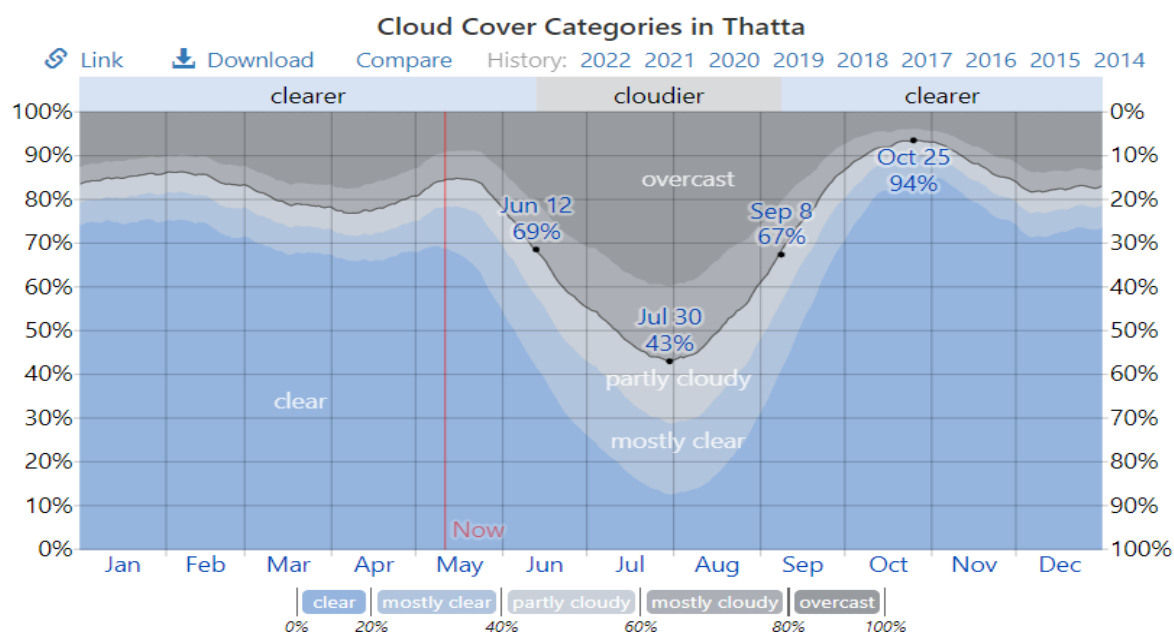


Figure 4-5: The percentage of time spent in each cloud cover band, categorized by the percentage of the sky covered by clouds

²³ Source: PMD: <http://www.pmd.org.pk>

4.2.2 Ambient Air Quality & Noise

Inefficient transportation system and indiscriminate burning of garbage are the dominant sources of air pollution in cities. Operation of defective vehicles, use of low-quality fuel, and increase in the number of vehicles beyond the capacity of roads leading to frequent traffic jams are the main reasons for deterioration of ambient air quality. Emissions from stationary sources e.g., residential & commercial areas associated with fuel combustion for domestic use and power generation are also significant.

The environmental impact from vehicular exhaust emission is often neglected in Pakistan due to the lack of awareness in our society, which is the major factor contributing to vehicle emission that includes NO₂ (Nitrogen dioxide), Carbon dioxide (CO₂), Carbon monoxide (CO) and other pollutants. The implementation of CNG vehicles in Karachi and other cities may be counted as a significant achievement by any standards. It is perhaps the first instance, after Brazil and India, of alternative transport fuels being implemented on such a large scale in a low-income country. However due to ad hoc attitude and lack of long-term policies, demand of natural gas including CNG outstripped supply, leading to curtailment of CNG supply in urban centers.

Project area in general represent the mixture of sparsely populated areas, commercial area, highway and less-frequented internal and access roads. Air monitoring setup was installed at the monitoring locations to collect ambient air quality data. Pollutants being monitored included NO_x, SO₂, CO, CO₂, O₃, SPM, PM_{2.5} and PM₁₀.

Air quality monitoring was conducted in the macroenvironment. The criteria of site selection for air quality monitoring in the macroenvironment was based on representativeness of the location i.e., locations selected for monitoring are representative of the various type of activities (Industrial operations, traffic congestion etc.) in the macroenvironment.

The results of monitoring of the water quality are shown in Table 4.8.

Parameter	Unit	Monitoring Duration	Average Obtained Concentration	NEQS	LDL-Limits	Methodology
Carbon Monoxide (CO)	mg/m ³	08 Hours	1.1	5.0	0.01	Non Dispersive Intra Red (NDIR)
Nitrogen oxide (NO)	µg/m ³	08 Hours	28.2	40.0	1.00	Chemiluminescence
Nitrogen Dioxide (NO ₂)	µg/m ³	08 Hours	30.2	80.0	1.00	
Sulphur Dioxide (SO ₂)	µg/m ³	08 Hours	21.4	120.0	1.00	Ultraviolet Fluorescence Method
Ozone (O ₃)	µg/m ³	01 Hour	16.8	130.0	0 ppm	Non Dispersive UV Absorption Method
Particulate Matter (PM ₁₀)	µg/m ³	08 Hours	119.3	150.0	1.00	β Ray Absorption Method
Particulate Matter (PM _{2.5})	µg/m ³	08 Hours	38.3	35.0	1.0	
Total Suspended Particles (TSP)	µg/m ³	08 Hours	321.2	500.0	1.0	
Lead	µg/m ³	08 Hours	ND	1.5	-	ASS Method

Based on the result of the survey, the average values of NO₂, NO, CO, SPM, PM₁₀, PM_{2.5} and SO₂ monitored are within the SEQS standards. It could be attributed to openness of the arid area and sporadic spread of the population and variable frequency of vehicular traffic.

The noise level data generated from the monitoring suggest that the noise levels in the project area are generally within the SEQs standards for commercial areas as the project area cannot be blanketly categorized as either residential or industrial or commercial. However, noise levels exceed 65dBA near N-5, particularly when there is are passing vehicles. Predominant source of noise in the project area are light & heavy traffic with sound of strong wind blowing in the background due to open terrain and proximity of coastal area.

Table 4-3: Noise Levels – Project Area

S.NO.	LOCATION/SOURCE	Noise Level Readings			
		Minimum	Maximum	Average	Limits
1	Near KE Dhabeji Grid Station	60.3	63.4	61.8	SEQS-Limits : 65dB(A)
2	Outside the residential structure in farmhouse along the Transmission Line route	57.8	59.4	58.6	
3	Near Road Side N-05	66.5	67.2	66.8	

Ambient air and Noise Monitoring – photographs



4.2.3 Hydrogeological Resources

No perennial river and natural or artificial wetland exist in and along transmission line route. The overhead TL does cross KWSB (partially buried) water supply pipelines which delivers water at high pressure from Dhabeji Pumping Station to Forebay highpoint and then to Karachi by gravity. Groundwater abstraction is common in project area, through diesel and solar powered tubewells. District Thatta however is rich in surface water resources with River Indus the largest surface water body in the district, followed by Keenjhar, Hadero and Haleji lakes. Keenjhar Lake is the source of water for Karachi city. Gharo creek lies over 5km southwards from Dhabeji grid station. The neighbouring Gharo town has several water channels and canals originating from Keenjhar lake.

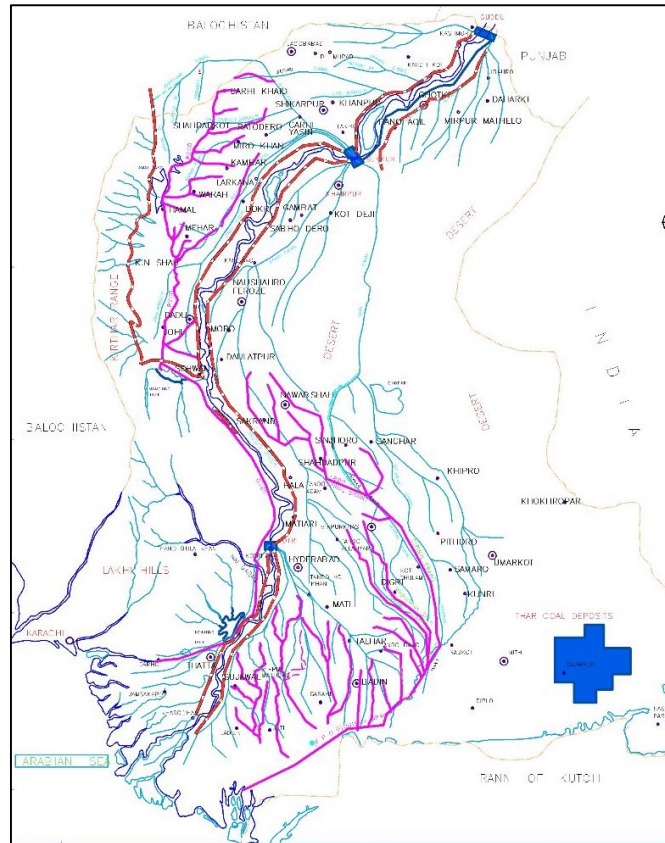


Figure 4-6: The Canal and Drainage System of Sindh²⁴

The southern Sindh province of Pakistan adjoins the Arabian Sea coast where drinking water quality is deteriorating due to the dumping of industrial and urban waste and use of agrochemicals and yet has limited freshwater resources. The groundwater quality is badly affected by salinity, arsenic, fluoride and microbial pollution, which further deteriorates in low-lying, deltaic and floodplains of Sindh. In these areas, people mostly depend on the groundwater for drinking and irrigation purpose because of low precipitation and reduced flow of Indus River. In the coastal areas, seawater intrusion further degrades the quality of groundwater. The contamination in groundwater in most of the areas of the Thatta district is due to seawater intrusion, as seawater contains many trace metals.

Water Quality

Water sample was taken from the water channel of the existing KWSB supply system and it was testing for the water quality parameters. Results are shown in table below;

Table 4-4: Water quality results				
S.NO.	PARAMETERS TO BE ANALYZED	UNITS	RESULTS	TEST METHOD
1	pH value	-	8.2	USEPA 150.1
2	Chemical Oxygen Demand(COD)	mg/L	25	Hach 8000
3	Total Suspended Solids(TSS)	mg/L	07	Hach 8006
4	Total Dissolved Solids(TDS)	mg/L	450	Hach 8160
5	Oil & Grease	mg/L	0.11	APHA 5520-D

²⁴ Source: Sindh Irrigation and Drainage Authority

6	Fluoride(as F ⁻)	mg/L	0.31	USEPA 340.1
7	Chloride(as Cl ⁻)	mg/L	160	Hach 8206
8	Total Hardness(as CaCO ₃)	mg/L	230	Hach 8213
9	Turbidity	NTU	0.21	Turbidity meter
MICROBIOLOGICAL ANALYSIS REPORT				
10	Total Coliform	cfu	>115	APHA-SM9221B
11	Fecal Coliform	cfu	63	APHA-SM9221F
12	Escherichia Coli(E-Coli)	cfu	35	APHA-SM9221F

4.2.4 Topography

Topographic map of the project area and surroundings is provided in the figure below;

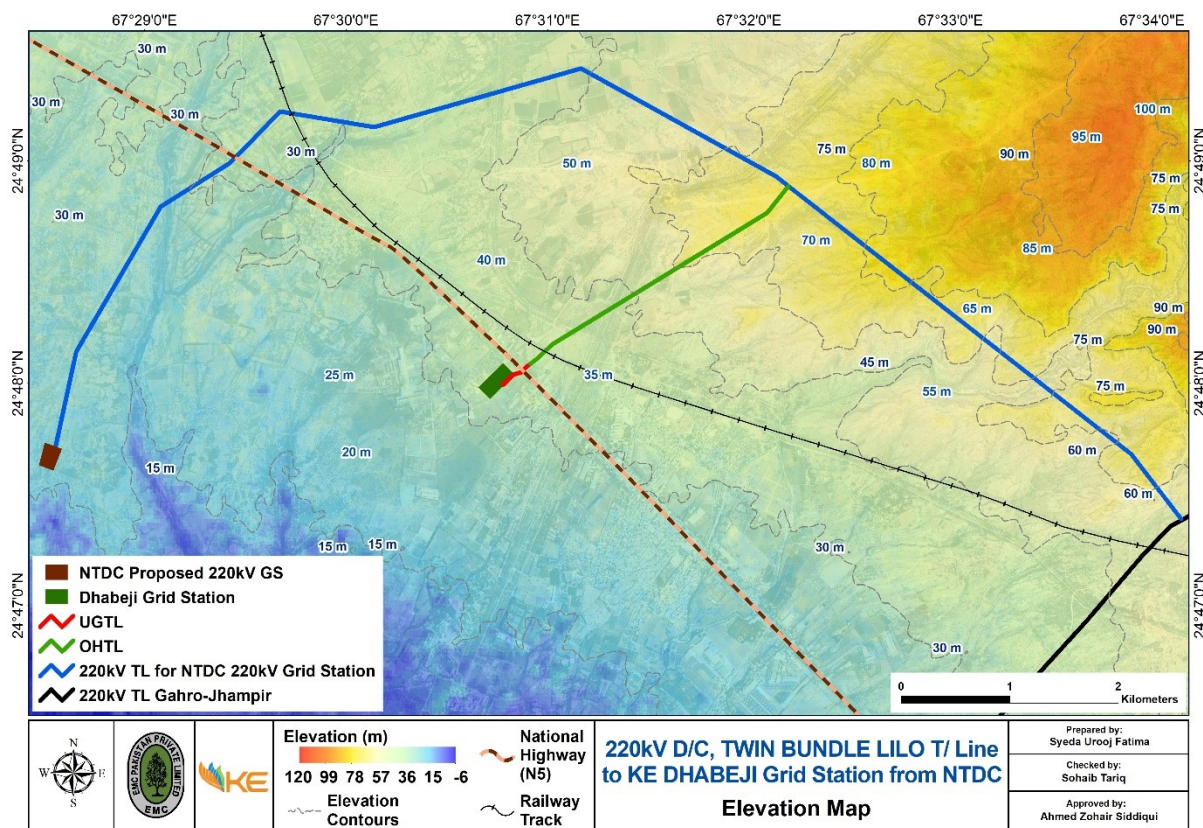


Figure 4-7: Elevation map of the macroenvironment

Ground elevation is approx. 75 m near the interconnection point and it gradually decreases towards southwest, reach to about 25m near Dhabeji grid station. Therefore, in the event of precipitation, flow of water is likely towards south and southwest of project route, eventually draining into creeks.

4.2.5 Geology, Geomorphology and Soil

Geologically, Thatta is formed of volcanic and sedimentary rocks of quaternary and tertiary and has the same composition as that of the Indus plain and the eastern desert zone of Pakistan containing the deserts of Cholistan, Nara and Thar. The soils are silt, clayey wet and saline. The natural vegetation found in the district can be divided into two categories-mangroves in the coastal or delta zone, and tropical thorns in the rest of the district. In terms of use, the lands in the district can be divided into five major categories; lands not available or fit for agriculture, those under arable

agriculture, forests, rough grazing lands and areas under human settlements. River Indus bisecting the district (from Sujawal) from north to southwest, Kohistan or hill zone in the north and North West, areas put under year-round cultivation along river Indus through canals and tube wells, and coastal belt and delta area, are four broader topographical divisions of Thatta. Keenjhar Lake is another important physical feature and surface water resource of the district. District Thatta possesses a diversity of environmental features and resources since it carries all the environmental features of the province. The district has desert, hills/gravel rocks, rangelands, water bodies, delta, tidal flats, creeks, lakes, mangrove and riverine forests and irrigated agricultural lands.

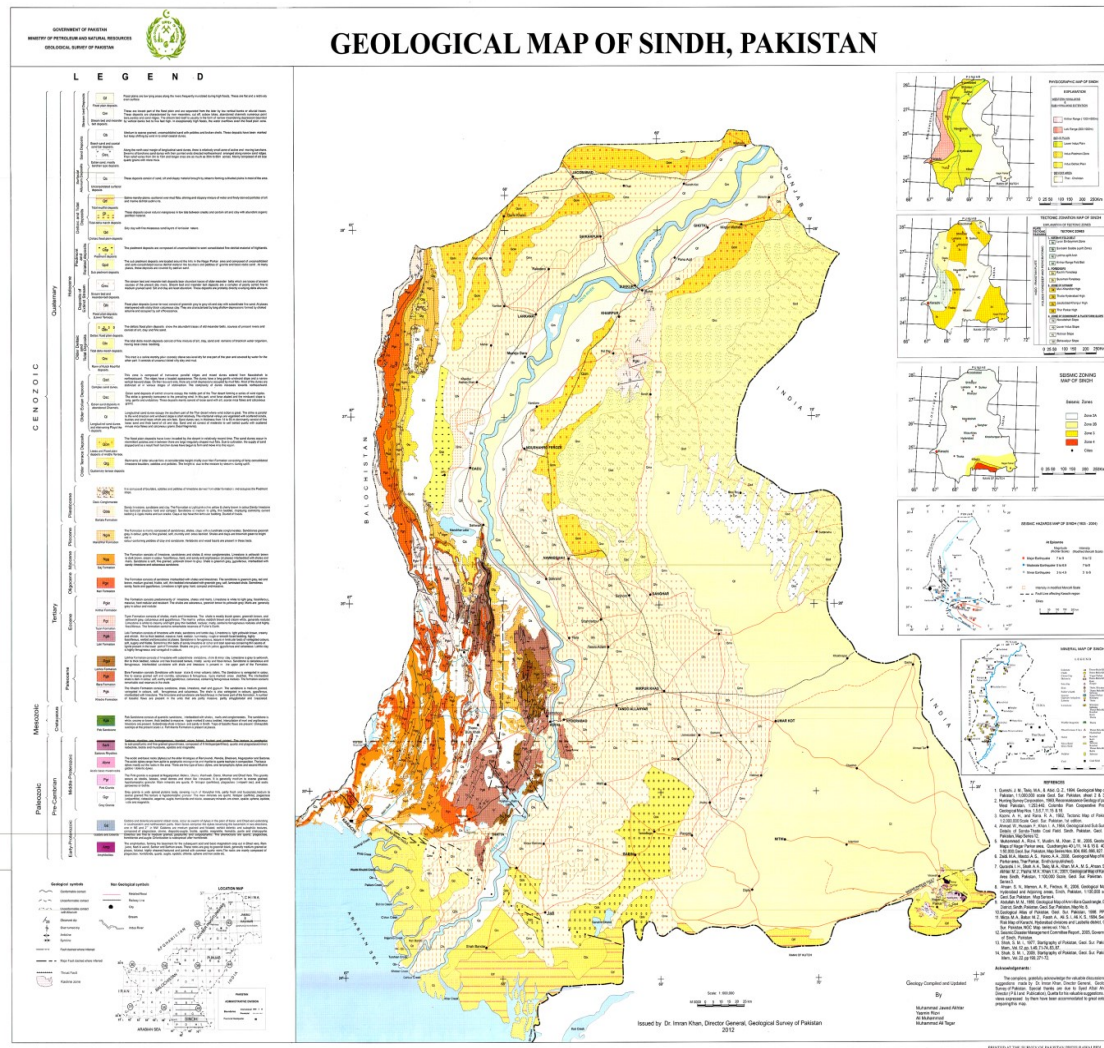


Figure 4-8: Geological map of Sindh

Soil: The project area has mainly loamy and clayey soil as found in the coastal areas of Sindh. The soil of project may also be classified as mainly loamy saline and part gravelly. At certain parts of the project area, the soil is strongly calcareous (moderately alkaline) and some part is strongly saline. Soil composition includes deposition of pebbles, loosely packed cobbles, stones, and fine to coarse sand.

4.2.6 Seismicity

Seismic activity in the region is the result of the triple junction as well as the Karachi Arc, located in southeastern Pakistan, as a large fold and thrust belt that shows Neogene thin-skinned eastward movement (Sarwar and DeJong, 1979; Schelling, 1999). Seismic activity in and around the region shows that the Karachi Arc has been active since long in prompting the eastward movement of the delta. It is possible that the movement is related to the rebound that takes

place after mass shift. Sarwar has suggested that the eastward creep of Karachi Arc is directly related to active subsidence of the Hyderabad graben that underlies it and also defines the northern and southern limits of the Karachi Arc.²⁵ It may be added that subsidence such as that on Southern coast of Sindh, occurs naturally as a result of plate tectonic activity above active faults, and in places where fluid is expelled from underlying sediments and is common at river deltas that may have receded. Earthquakes arise and result from the release of the force along the growth fault plane. As a result, many different growth faults are created as sediment loads shift basinward and landward.

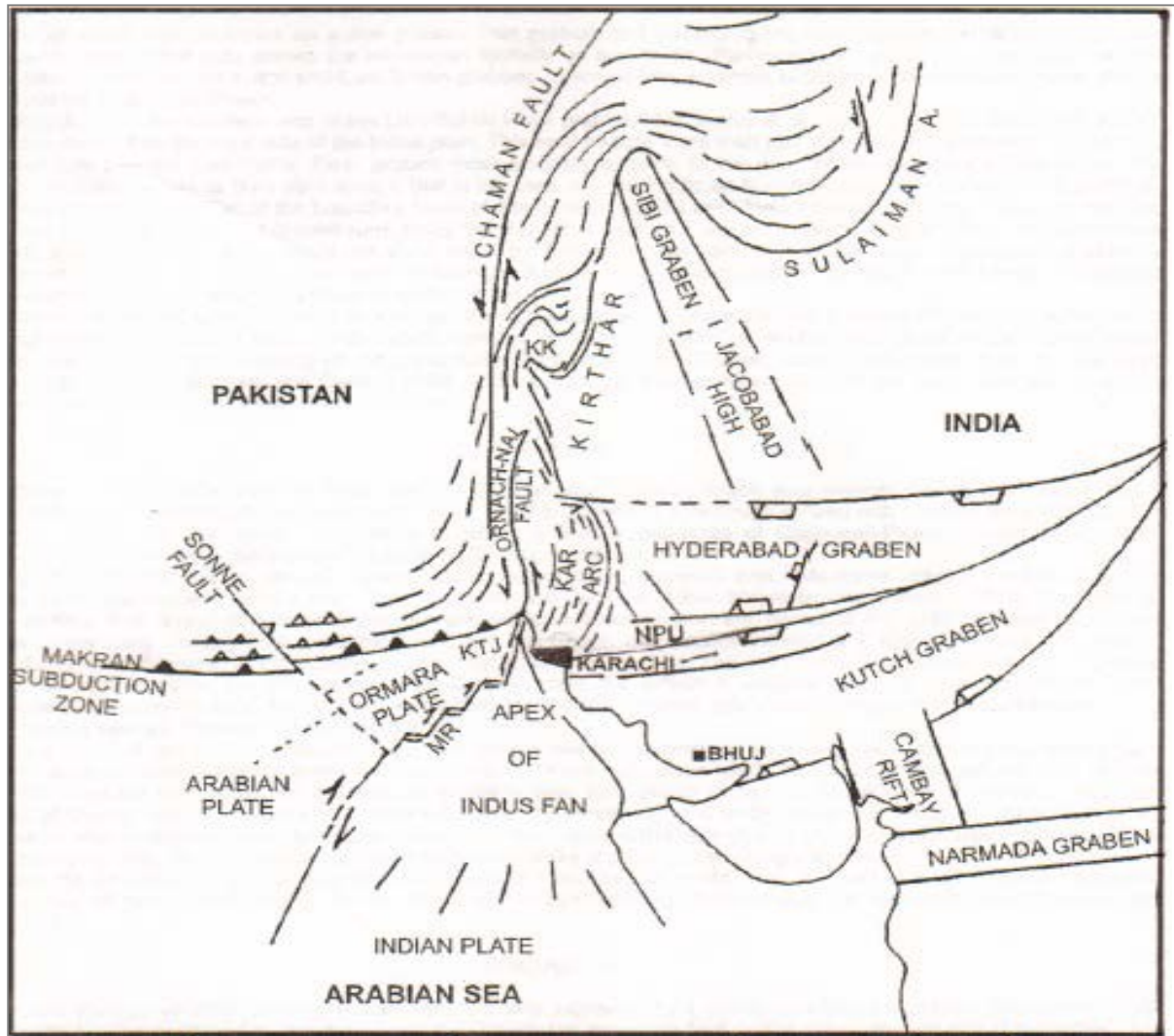


Figure 4-9: Schematic plate tectonic sketch map showing the Karachi Arc and its regional tectonic framework

According to a map created by the Pakistan Meteorological Department, the country is divided into 4 zones based on expected ground acceleration. The areas surrounding Quetta, those along the Makran coast and parts of the NWFP, and also along the Afghan border fall in Zone 4. The rest of the NWFP lies in Zone 3, with the exception of southern parts of this province, which lie in Zone 2. The remaining parts of the Pakistani coastline also lie in Zone 3. The remaining parts of the country lie in Zone 2. According to this classification, the Project site would be placed in Zone 2A.

²⁵ (Sarwar, G., 2004. Earthquakes and the Neo-Tectonic Framework of the Kutch-Hyderabad-Karachi Triple Junction Area, Indo-Pakistan. Pakistan Journal of Hydrocarbon Research, 14, 35-40).

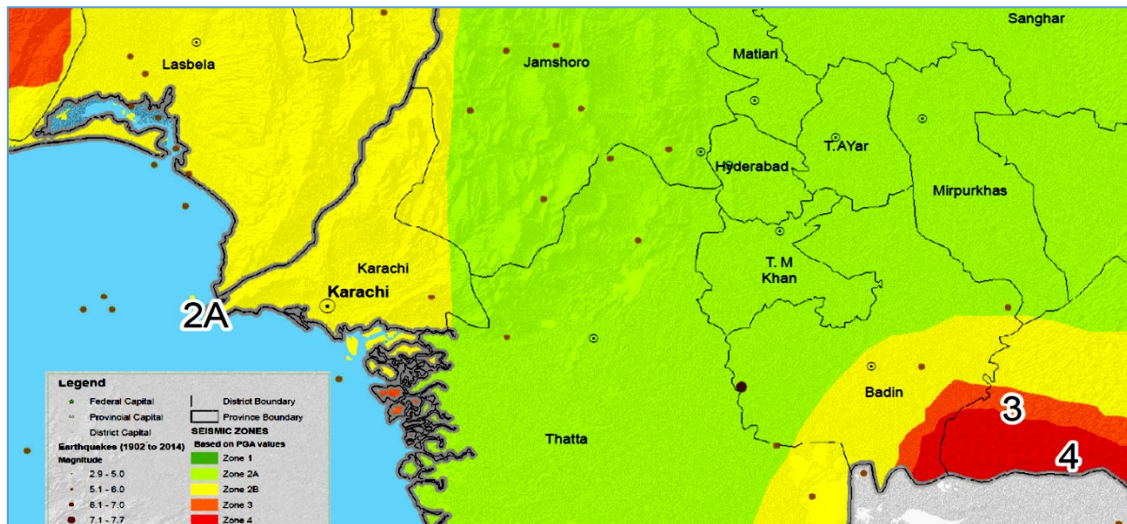


Figure 4-10: Seismic Zones Karachi and Thatta²⁶

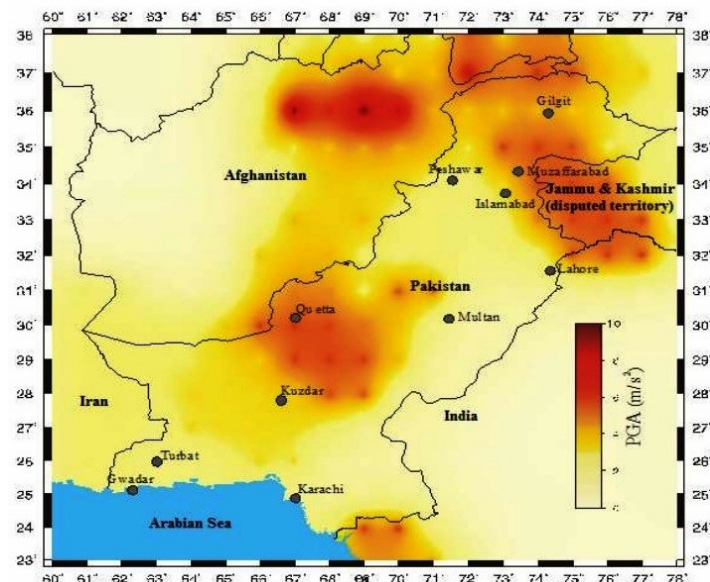


Figure 4-11: Seismic Hazard for Pakistan in terms of Peak Ground Acceleration (PGA)²⁷.

4.3 Description of Biological Environment

Due to arid climate, the land use of the microenvironment is mostly barren with patches of small-scale agricultural activity. The vegetation mostly comprises of various species of grass, bushes, shrubs and few species of cactus and other thorny plant.

4.3.1 Flora

Dominant species in the project area is *Prosopis juliflora*. Very few species of trees are present in and around the project area, that include *Conocarpus erectus* etc. these trees are in very small number and widely spaced. The native flora of the typical habitat as in project area is given in below list, however, only a few species such as *Capparis aphylla*, *Euphorbia caducifolia*, *Calotropis procera*, *Prosopis juliflora* and *Salvadora oleoides* can be found in the project area. Farmlands had cultivations of Pappaya, Oats/cereals and vegetables.

²⁶ Map data source(s): PMD, GSP, Pakistan Engineering Council – Prepared by Al hasan Systems Private Limited

²⁷ PMD Seismic Monitoring and Early Tsunami Warning Centre - <http://seismic.pmd.gov.pk/seismicnew/map2.html>

Table 4.5: List of Floral species

S. No	Botanical Name	Local Name
Trees and Shrubs		
1.	<i>Capparis aphylla</i>	Kirir
2.	<i>Salvadora oleoides</i>	Khabar
3.	<i>Acacia Senegal</i>	Kunbhat
4.	<i>Prosopis cineraria</i>	Kandi
5.	<i>Prosopis juliflora</i>	Mesquit, devi
6.	<i>Tecoma undulata</i>	Lohiro
7.	<i>Euphorbia caudicifolia</i>	Thuar
8.	<i>Tamarix aphylla</i>	Lai
9.	<i>Ziziphus nummularia</i>	Ber
10.	<i>Acacia nilotica</i>	Babur
Grass		
1.	<i>Aristida adscenciones</i>	Lumb
2.	<i>Aristida funiculata</i>	Lumb
3.	<i>Cenchrus biflorus</i>	Bhurt
4.	<i>Cenchrus ciliaris</i>	Dhaman
5.	<i>Chrysopogon aucheri</i>	Putar
6.	<i>Cymbopogon jawarncusa</i>	Poi
7.	<i>Desmostachya bipinnata</i>	Dubh
8.	<i>Dicanthium annulatum</i>	
9.	<i>Lasiurus indicus</i>	Sain
10.	<i>Lasiurus hirsutus</i>	
11.	<i>Leersia spp.</i>	

Pictorial views of vegetation in Project area and surroundings





4.3.2 Fauna

The project area is mostly vacant, barren and sparsely inhabited with little vegetation comprising mostly bushes. Due to human disturbance and shrinking habitat, only nominal fauna could be recorded on the site. However, the habitat of common wild animals, who could be found if there had been no disturbance in this area, comprises: Jackal, Porcupine, Fox and Wild Hare. Birds of the eco-zone likely include Grey Partridge, Common Quail, Spotted Owllet, Indian Nightjar, Woodpecker, Passerines, etc. Reptiles of the area could include Monitor Lizard, Spiny-tailed Lizard, Krait, Vipers and Rat Snake.

Threats

At present, there are no serious threats to the animal species, most of which have already moved to the distant surrounding lands due to disturbance. Only the species adapted to the presence of humans occur in the area. These include Rodents, Squirrels, and Birds usually associated with human habitations in the vicinity of water points or garbage areas where food is available. Lizards may be surviving well in the rocky or wasteland area even with sparse vegetation.

4.4 Description of Socio-Economic Environment

The social baseline chapter provides a comprehensive review of the socio-economic conditions of the project area. This socio-economic profile is based on a literature review and several primary data gathering activities including site visits, sample socio-economic survey of stakeholders in the area and consultations with primary and secondary stakeholders. This social baseline provides an overview of the socio-economic conditions of the people who reside and work in the project vicinity. It also includes an assessment of public utilities and social services (education and health facilities) in the area with respect to the proposed construction and operation of the 220kV TL Project.

International best practice for EIA studies demands an alignment of the proposed project components with the applicable Sustainable Development Goals (SDGs) adopted by all UN Member States in 2015. The SDGs provide broad universal targets for reducing poverty, environmental degradation, injustice and important pillars of social upheaval that must be achieved by 2030. In March 2017, the global indicator framework was developed and agreed upon by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs) to monitor progress towards achievement of these indicators. Moreover, all member states, including Pakistan have developed national indicators linked to the global targets that provide the basis for a national effort of monitoring progress towards fulfillment of the indicators. The proposed power expansion project directly contributes to Goal 7 of the SDGs that is focused on ensuring everyone has access to affordable, reliable, and modern energy services by the year 2030. Moreover, one of the key milestones for Goal 7 relates to expansion and improvement of energy infrastructure.

The proposed project route falls in town of Dhabeji, Mirpur Sakro sub-division, District Thatta. This social baseline, therefore, covers the respective macro and micro environments in both provinces. The discussion on macro-environment encompasses District Thatta, Sindh. The micro-environment covers the immediate environs of the route of the transmission line. The total length of the proposed TL is less than 3km.

4.4.1 Macro Environment – District Thatta

Demography

District Thatta is situated at a distance of 98 Kilometers in the east of Karachi Division on the National Highway. The district is surrounded on the north and northwest by Jamshoro district, on the east by Hyderabad, Tando Muhammad Khan, Sujawal districts and the Indus River while the Indian Ocean is situated on the south of the district.

Based on the national census conducted in 2017, there are a total of 979,817 people in district Thatta whereas the average annual growth of 2.61% between the last two censuses (1998, 2017). The gender ratio in District Thatta is 109, with the proportion of males (52%) slightly higher than the proportion of females (48%). District Thatta is rural by its characteristics like majority of the other districts in Sindh. Nearly 82% of the population resides in the rural area while 18% resides in the urban areas. The following table shows the demographic details of Thatta based on the findings of the 2017 census.

Table 4-6: Population Census Summary for Thatta (2017)

Administrative Units		Households	Population 2017				Pop. 1998	Sex Ratio 2017	1998-2017 Ave Annual Growth Rate
			Male	Female	Trans-gender	Total			
Thatta		184,868	510,279	469,504	34	979,817	599,492	108	2.61
	Rural	152,881	418,992	384,754	13	803,759	508,214	109	2.44
	Urban	31,987	91,287	84,750	21	176,058	91,278	107	3.51

Administrative Context

The project falls under the jurisdiction of district Thatta. District Thatta has four sub-divisions, locally called (Taluka): Ghorabari, Ketu Bunder, Mirpur Sakro and Thatta. It is spread over an area of 7,705 sq.km and according to the 2017 national census, the total population of District Thatta was just under 1 million. Previously, Sujawal was part of district Thatta before being granted the status of a district on 12th October 2013 through official notification by the Government of Sindh. The new district comprises of five talukas; Sujawal, Kharochan, Mirpur Bathoro, Jati and Shah Bander. It is located at about 20 km west of Thatta.

Table 4-7: Population of District Thatta and Sub-Divisions (1998, 2017)

District/Talukas	Status	Population (Census-1998)	Population (Census-2017)
Thatta	District	599,492	979,817
Ghorabari	Taluka	105,482	174,088
Ketu Bunder	Taluka	41,410	58,832

Mirpursakro	Taluka	198,852	340,834
Thatta	Taluka	253,748	406,063

Ethnicity and Religion

District Thatta represents the traditional Sindhi culture. Sindhi is the major language of the district, although Urdu is also spoken and understood. Besides, Seraiki and Balochi are also spoken in the city area. Islam is the major religion of this district representing 96.2% of the population followed by Hinduism (2.89%) and Christianity (0.18%). Caste system is very strong in this region. Majority of the population of Thatta district belongs to indigenous Sindhi clans. Jokhio, Palijo, Sheerazi, Soomro, Sammo, Syed, Memon, Khoja and Mirbahar are the main tribes of Thatta district.

This district has a rich heritage of ancient Sindhi and Arabian culture. Both can be seen in the architect and culture of this district. Thatta's Jamia Masjid known as Shah Jehan Masjid is a masterpiece. It was built on the orders of the Mughal Emperor, Shah Jehan, who gifted it to the people of Thatta. Its construction started in 1644 and was completed in 1647. Makli hills, also known as Makli graveyard, are one of the largest necropolises in the world, with a diameter of approximately 8 kilometers. These hills are supposed to be the burial place of some 125,000 sufi saints. The graveyard is located on the outskirts of Thatta city.

Livelihood

Agriculture and fisheries are the two major sources of employment for the people of district Thatta. In addition to that, there is a substantial number of landless people who own and manage livestock or are engaged in the non-farm sectors. According to a study conducted by Asian Development Bank, 79% of the population of district Thatta is poor. The incidence of poverty is negatively correlated with land ownership. Landowners are usually non-poor.

There are about 30 industrial units established in the district. Apart from the sugar mills, all the larger industrial units are located in Dhabeji and Gharo mouzas adjacent to Karachi. Most of the labour force working in these units is non-local and generally belongs to Karachi. The industrial units of the district include sugar mills (5), textile mills (9), paper mills (2), flour mill (3) salt works, ice factory (2), etc. In addition, crushed stones from the Makli Hills and Kohistan are supplied to the Pakistan Steel Mill and the Thatta Cement Factory. There are also large coal deposits in Thatta Taluka. Recent addition to the industrial units is the car manufacturing plant near Budho Talpur, belonging to the Deewan Group, adjacent to the Deewan Sugar Mills.

Education Profile

According to Sindh Education Profile 2016-17 published by Reform Support Unit, Sindh Education & Literacy Department, the average enrolment rate in public schools for school going aged females in the province is 39% and 61% for males. The total number of males enrolled at secondary level of education is 505,561 while the total number of females is 350,281. The enrolment of males decreased to 224,280 and number of females to 123,409 at the higher secondary level.

The total number of students enrolled in public schools of Thatta district is 77,303 according to Sindh Education Profile 2016-17. At the secondary level the total number of students enrolled is 12,356 out of which only 3,995 are females. The teacher to student ratio in the primary level is 1 teacher for 31 which is somehow good, for middle 1 teacher for 16 students and for secondary and higher secondary are 1 teacher for 18/19 students which is showing that the education personnel in the district are adequate to serve the students of entire district but students drop-out ratio is high due to

poverty. This suggests that most of the students drop out from the education after completion of secondary education. The level wise enrolment rate is given in the table below.

Table 4-8: School Education Data (Institutions, Enrolment and Teaching Staff) by Gender (2016-2017)											
S. No	LEVEL	INSTITUTIONS				ENROLMENT			TEACHING STAFF		
		T	M	F	MIXED	T	M	F	T	M	F
1	Primary	1,195	236	133	826	58,215	36,485	21,730	1,865	1,488	377
2	Middle	42	7	11	24	2,930	1,882	1,048	182	24	58
3	Secondary	38	12	10	16	12,356	8,361	3,995	684	451	233
4	Higher secondary	7	3	1	3	3,802	2,716	1,086	197	157	40
	GRAND TOTAL	1,282	258	155	869	77,303	49,444	27,859	2,928	2,120	708

Source: RSU-Sindh Education Management Information System (SEMIS)

Health Profile

According to Health Profile of Sindh 2016, there are 648 hospitals in the province with a total capacity of 30,126 beds. Additionally, there are 800 BHUs and 133 RHCs in the province with a total capacity of 3318 beds. The doctor to population ratio in the province is 1 doctor for 3159 people. There are only 8 hospitals in the entire district of Thatta with a total capacity of 300 beds. Additionally, there are 22 BHUs and 6 RHCs in the district with a total capacity of 124 beds. (Health Profile of Sindh 2016) The doctor to population ratio in the district is 1 doctor for 5859 people, showing that the health personnel in the district are inadequate to serve the population of entire district. According to PESA report for district Thatta 2014, 44% (Male 44%: Female 43%) of the children aged 12-23 months have received full immunization.

Table 4-9: Number of Health Facilities in District Thatta 2017							
District	Hospitals	Dispensaries	Basic Health Units	R.H. Centers	T.B Clinics	M.C.H.C.	Total
Thatta	8	91	22	6	8	6	141

Source: Health Profile of Sindh-2017 (BOS Sindh)

4.4.2 Micro Environment

Main Source of Livelihood/Income

The people in the nearby villages are also employed in the surrounding industries of Dhabeji. Average monthly income of household is Rs. 12,000 to 15,000. The major source of income is labor work in industry while few people depend on agriculture.

Education Facility

Field team observed that there are no education facilities in the surroundings of project area. The children go to schools available in Dhabeji to acquire education and some children get religious education by the Imam of the local Masjid in the settlement.

Health Facility

There are no health facilities in the project area. People of these areas suffer significant problems when someone gets sick so the people go to Gharo /Makli hospital in Thatta for treatment of minor to major disease. Major health problems of the area reported by people are fever, cough and flu as common diseases. People prefer to go private hospitals/clinics to get getting better treatment instead of government facilities. There is no proper public transportation for are people in the project area, so in emergency, people use private transportation include car and rickshaw to reach health facilities. The people of project area have low income so they are hardly able to manage the private transportation expenses.

Utilities

The main source of drinking water in most of the nearby villages is underground water drawn through motor, powered by diesel and solar and hand pumps. Water supply system through pipelines was not available in settlements nearby project area. The settlements do not have proper sewerage system for the disposal of domestic wastewater. The toilets systems in these villages are pit-hole latrine type. There are no proper mechanism of solid waste disposal and people throw waste in the open lands or access roads. Electricity is not available in the nearby settlements of the project area and people usually rely on solar panels. There is no gas connection in the settlements so people use wood for cooking purpose.

Transportation

There is no public transportation available in the area the most commonly used transportation mode is motorbike. Traffic on N5/KTDC including light and heavy traffic.

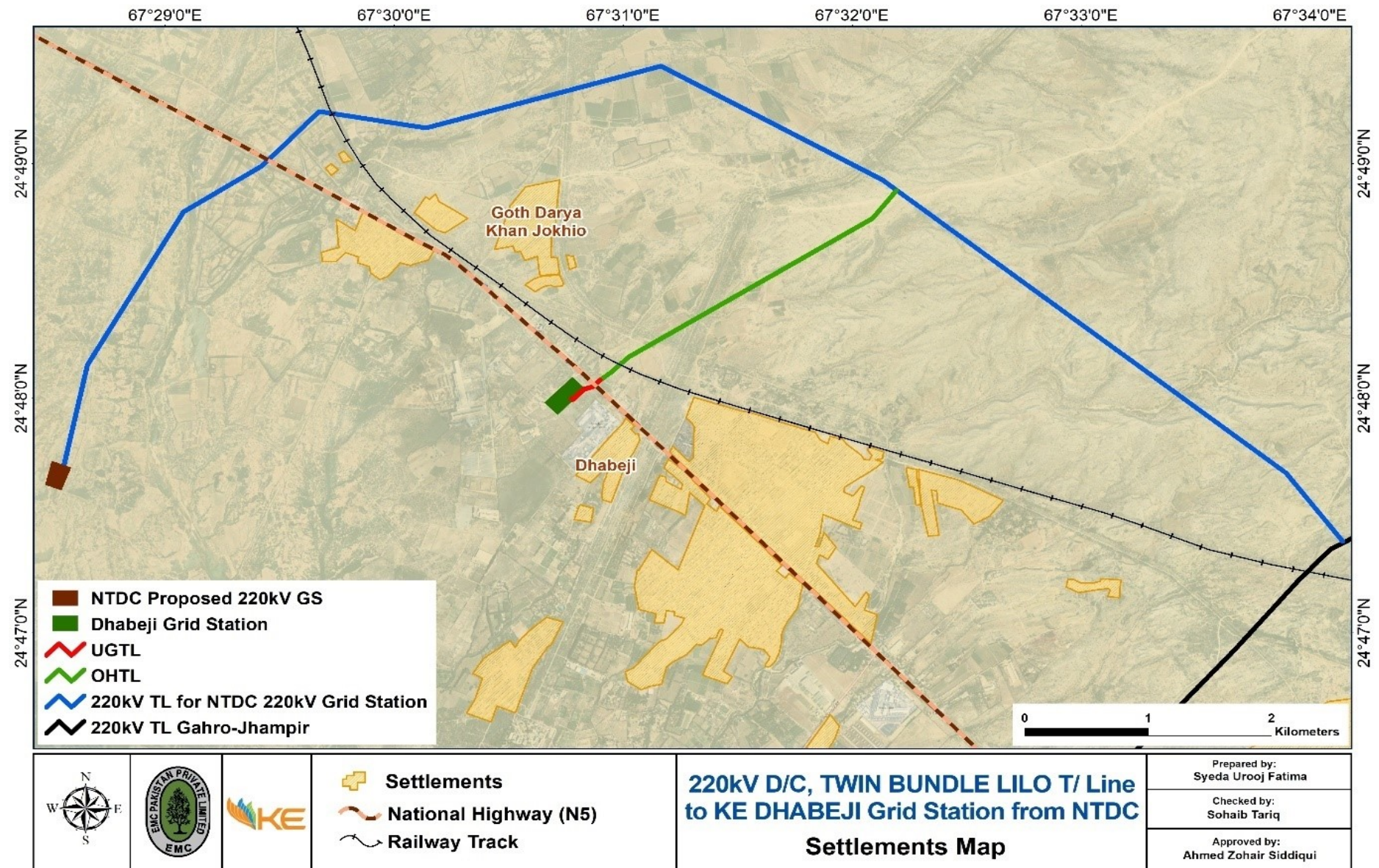


Figure 4-12: Settlements map of project area and surroundings

Chapter 5 STAKEHOLDER CONSULTATION

5.1 Background and Overview

5.1.1 Context for Stakeholder Engagement

The objective of involving the public in general and project affected persons in the decision-making process is to identify and assess potential positive and negative impacts of the project and identify win-win solutions for the adverse impacts. Stakeholder engagement is an essential tool for establishing and promoting productive dialogue between the project proponent (s), stakeholders, and project affected persons / groups. Both the success and sustainability of a development project is dependent on the active involvement and participation of stakeholders during the entire project cycle from planning to implementation.

The perceptions, knowledge and attitudes of the stakeholders play a critical role in the project design, construction and operations phase. Therefore, an effective stakeholder engagement process ensures an enabling environment that encourages the articulation of various socioeconomic aspects particularly those related to residential and commercial interests in the project area. Stakeholder engagement is an iterative process that provides opportunity for companies to strengthen their relationship with those residing and/or working in the project area and develop a mechanism for continuous quality improvement. A five-step approach to Stakeholder Engagement for a typical project is illustrated in the figure below.

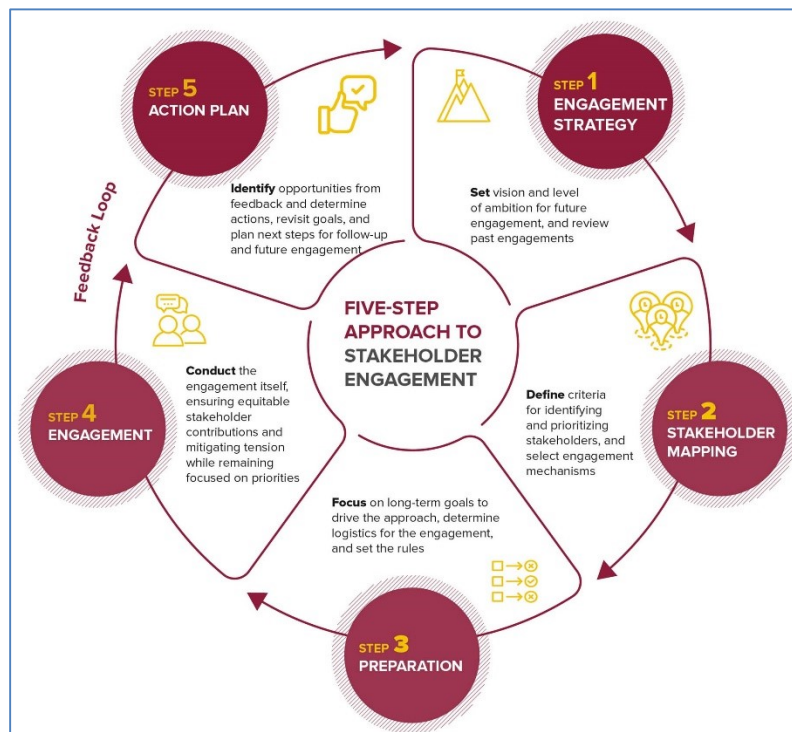


Figure 5-1: Steps for Stakeholder Engagement

5.1.2 Stakeholder Consultation in EIA Study

The participation of stakeholders is now universally recognized as an integral part of the Environmental Impact Assessment. Local communities, government level stakeholders, national and international NGOs and the civil society representatives may be able to contribute to, and benefit from, the dialogue directed at identifying and

resolving key project-related issues. Stakeholder consultation presents an opportunity for mutual information-sharing and dialogue between the project proponent and stakeholders. An effective public consultation process provides concrete suggestions that can help improve project design, resolve conflicts at an early stage, identify management solutions to mitigate potentially adverse consequences and enhance positive impacts.

Providing the public with adequate reliable information of the planned project is of significant importance in creating public trust and acceptance. Moreover, experience reveals that unexpected project impacts on the local community generally give rise to significant issues and concerns. Such problems can be avoided if people are properly informed and consulted about the project and given the opportunity to raise their concerns.

This chapter provides an overview of the public consultation process adopted for the 220kV Transmission Line Project and presents the findings of the stakeholder consultations. The key aspects, including consultation objectives, consultation approach, stakeholders and their concerns are detailed outlined in the following sections.

5.2 Consultation Approach

5.2.1 Objectives and Aims of Stakeholder Engagement

The engagement aims and objectives for this project are in line with the Guidelines for Public Consultation under the Federal and Provincial Environmental legislation. Moreover, the consultation process and procedures applied are in sync with the basic requirements of stakeholder engagement in guidance documents of the World Bank (Environmental and Social Management Framework, 2017) and the Asian Development Bank (Safeguards Policy Statement, 2009). The objectives are articulated here:

1. Provide project-related information to stakeholders (including project context, background, objectives, beneficiaries, implementation mechanism, time-frame, potential benefits and risks of project etc.).
2. Engage major stakeholder groups (residents, commercial/industrial units, Government Departments, academia and subject specialists) and solicit feedback through adequate consultation tools, depending on the particular socio-economic context of stakeholder groups.
3. Enable opportunity for stakeholders to discuss and debate the probable positive and negative impacts of the project and suggest mitigation measures that are agreeable to all stakeholders and the regulatory authorities.

5.2.2 Identification of Primary and Secondary Stakeholders

Stakeholders are individuals, groups, or institutions that may be affected by and can significantly influence the project activities, and are thus, integral to the achievement of the objectives of a project. Stakeholders can be divided into two broad categories; primary and secondary (Table 5.1).

Primary stakeholders are those who have a direct interest in the project due their proximity to the project site, more often this category includes residents, commercial entities and institutions falling in the project area. Secondary stakeholders include the relevant government agencies and public interest groups which may indirectly influence or be influenced by the project. The concerns and input from both primary and secondary stakeholders are important to identify the issues arising from the construction and/or operation phase of the project and propose mitigation measures that minimize the negative project impacts and enhance the positive ones.

Table 5-1: Primary Major Primary & Secondary Stakeholders for the Proposed Project

Nearby Villages (Within 3km)	• Ibraheem Jokhio Goth • Dhabeji • Farhan Malik Farm House
Commercial	• Jhulay Laal Rice Godown • Dastgeer Steel works shop • Fruits and Kiryan store
Government Agencies & Other Service Providers	• Sindh Environmental Protection Agency (SEPA) • Social Welfare Department Govt. of Sindh • Sindh Forest Department • Wildlife Department, Govt. of Sindh • Sindh Economic Zones Management Company • Sindh University Jamshoro – Thatta campus
NGOs/Interest groups	• WWF Pakistan • IUCN Pakistan • SRSO • NRSP

5.3 Consultation Methodology and Tools

5.3.1 Stakeholder Consultation

The consultation exercise with primary stakeholders was carried out in two stages. In the first stage, site visits were carried out to identify all stakeholders that either reside or work in the project vicinity and conduct an initial identification of potential positive and negative impacts.

The social survey team used a pre-designed semi-structured template to engage the representatives and ‘gate-keepers’ of the villages and goths. The village representatives were briefed about background and scope of the Project. Concerns and suggestions of the respondents were noted down by the team and pictures of the session were taken with the consent of the villagers. If the villagers had any queries regarding the project, the team responded to their queries during the session. Those stakeholders, who were not available at the first attempt, were re-visited on the same day or followed-up for their comments during the next few days. During each meeting, the project team introduced the project to the stakeholders, recorded their concerns and informed them regarding contact details for providing any further input/feedback through email or in writing.

Moreover, the team inquired about the current situation of the area such as the status of utilities, security and law and order situation in the project area from the residents near the project site. Several open-ended questions were also included in the questionnaire to ensure that the respondents could openly share their opinions and suggestions relevant to the study. The following table shows the settlements and commercial units that were consulted in May, 2022.

Table 5-2: Consultation with Primary Stakeholders			
S. No	Stakeholders	Location	Stakeholder's Type
1	Mr. Zahid Hussain Mugheri	Farhan Malik Farm House Near Ibrahim Jokhio Goth	Village Representative
2	Mr. Yousif and Santosh	Near Ibraheem Jokhio Goth	Farmers
3	Mrs. Murad Ali Jokhio (Late)	Goth Ibraheem Jokhio	Village Representatives
4	Mr. Ghulam Nabi, Mr. Mashooq Ali, Mr. Asif, Mr. Bala Khan Kalmati Baloch	Dhabeji	Village Representatives and commercial interests
5	Mr. Ahsanullah	Dhabeji	Commercial interests

5.4 Stakeholders' Response and Feedback

The comments, concerns and suggestions received from stakeholders during the consultation meetings have been collated in this section. The comments solicited from stakeholders were helpful in the screening of the potential environmental & social aspects of the project.

5.4.1 Stakeholder Concerns and Suggestions

The discussion with village representatives during the consultation sessions have been summarized in the following paragraphs along with brief village profiles providing the relevant socio-economic context.

The discussion with stakeholders during the consultation sessions have been summarized. They were general concerns, rather than specific feedback on proposed project.

1. They were concerned that their lands may be affected. As it is their primary source of income, they suggested that project activities should be carried out in manner to have minimal impact on livelihood. They hoped that in case any land is acquired for project, applicable laws for compensation will be adhered.
2. The public and private health related institutes expected authorities the rehabilitation of roads of the area should be carried out in proper way and timely because hospitals cannot allow emergency patients to have discomfort due to unpaved roads.
3. The stakeholders were of the view that the project will bring positive socioeconomic changes in the area. The project will bring numerous changes for people of all age groups, but most importantly it will secure the economic future of the surrounding communities.
4. The residents and the commercial stakeholders are expecting reduction in load-shedding after the completion of the project
5. The commercial stakeholders said that project activities should create less disturbance in the area as people run their businesses in the area.
6. They advised the prospective project staff and workers to respect local cultural norms and environment.

Stakeholders Consultation Pictures



Consultation with Resident and General Manager of Farhan Malik Farm House



Consultation with Farmers Near Ibrahim Jokhio Goth



Consultation with Resident at Ibrahim Jokhio Goth



Consultation with Shop Owner



Consultation with Villagers and Commercials

5.5 Grievance Redress Mechanism

5.5.1 Guidelines

The Environmental and Social Safeguards Policies and Guidelines of Multi-lateral and Bi-lateral development agencies coupled with growing global awareness of community rights and issues has called for putting in place a grievance mechanism at the very outset of a project. The purpose of a grievance mechanism is to provide the necessary space and opportunity for stakeholders to lodge project-related complaints and seek resolution of the same. According to the World Bank's Environmental and Social Framework (2018), a project-specific grievance mechanism must:

- build upon existing informal or formal grievance mechanisms in the project area and/or within practice with particular industries;
- must be designed to address the range of project-related potential risks and impacts;
- must be designed and accessible to all stakeholders in a timely and transparent manner;
- must establish a robust institutional mechanism with clear roles and responsibilities of those departments/individuals responsible for grievance recording, redress and communication with project-affected stakeholders and
- must be culturally appropriate and seek to establish a record-keeping system for proper documentation of all grievances and meetings/efforts for resolution

5.5.2 Project-Specific Grievance Mechanism

In order to receive and facilitate the resolution of affected peoples' concerns, complaints, and grievances about the project's environmental and/or social impacts, a project-specific Grievance Redress Mechanism (GRM) will be established the project. The mechanism will be used for addressing any complaints that arise during the implementation of the project. In addition, the GRM will include a proactive component whereby at the commencement of construction of each sub-section (prior to mobilization), the relevant stakeholders will be formally advised of project implementation details. All necessary project information will be communicated effectively to the community and their immediate concerns can be addressed. This proactive approach with communities will be pursued throughout the project execution.

Chapter 6 SCREENING OF ALTERNATIVES

6.1 Introduction

The screening of alternatives is a part of the EIA process to select the best among all possible project options. The alternatives of a project are defined as the options that can help to meet the objectives of a project by different means including an alternative project site, technology or material, design or inputs. The key criteria when identifying alternatives is that they should be economically feasible and practically reasonable.

Alternatives to the proposed project components include:

1. The "no project" option
2. Transmission Line Alternatives

1. The "no project" option

K Electric is responsible to supply electricity to Karachi and few parts of district Lasbela, Balochistan and District Thatta Sindh. However, due to growing population, expanding towns and increasing demands have put tremendous pressure on the K Electric's generation and distribution infrastructure. To cope with this situation, K Electric has proposed this project to tap in the electricity from NTDC and add it to its distribution network. This project will not only help reduce the load shedding, it will also generate job opportunities, both during construction and operation phases, and provide energy to the industries such as in SEZ and thus augment the economic growth of the country.

By opting the No Project alternative, all the aforementioned benefits cannot be achieved. Therefore, No Project alternative is not a suitable option.

2. Transmission technologies alternative

Overhead versus Underground Transmission line

The decision between overhead versus underground transmission lines was also considered. Certainly, electric power can be transmitted by underground power cables which assist the transmission of power crosswise over populated urban zones, territories where area is occupied or arranging assent is troublesome, waterways and other natural obstacles, land with extraordinary natural or environmental heritage, regions of significant or prestigious infrastructural advancement and area whose worth must be kept up for future urban development and rural improvement.

a) Underground Transmission

- Less subject to harm from extreme climate conditions (mostly lightning, wind and heavy showering);
- Remarkably decreases the intensity of electromagnetic fields (EMF) in the surrounding area. All electric currents produce EMF, yet the protecting shield provided by the earth encompassing underground cables limits their extent and power;
- Underground cable requires a narrower encompassing strip to introduce; though an overhead line require a surrounding strip of around 20–200 meters wide to be kept for all time clear for safety, support and repair;
- Site restoration for underground construction is a much larger effort than it is for overhead construction because soil is disturbed along the entire route;

- High-voltage underground transmission lines require small substations called transition substations wherever the underground cables connect to overhead transmission;
- Underground high-voltage transmission lines generally need to be replaced after approximately 40 years;
- Underground cables pose no risk to low flying airplane or to natural life, and are essentially more secure as they pose no shock hazard (except the digging and excavation);
- Their maintenance and repair is very arduous and time consuming;
- Underground lines are silent except in the immediate area near the transition substations, which are lighted throughout the night for security purposes;
- They are less likely to cause death or injury due to accidental contact with the lines/cables;
- The transmission through underground is more expensive than overhead electrical cables, and the life cycle expense of an underground power cable is two to four times more than an overhead electrical cable.

b) Overhead Transmission

- Installation of overhead lines may prevent from removal of small trees and bushes along the transmission ROW;
- Overhead lines are at great risk against lightning strikes which can cause interruption and serious accident;
- Overhead lines use bare conductors and can be damaged;
- Aesthetically unattractive as they distract the scene of the landscape;
- It doesn't require high cost in construction, repair & maintenance;
- Overhead high voltage lines can emit hiss or hum noises;
- When people come into accidental contact with overhead lines, the implications are extremely severe;
- Overhead lines have a life expectancy of more than 80 years;
- Its cost is lesser than Underground Transmission line.

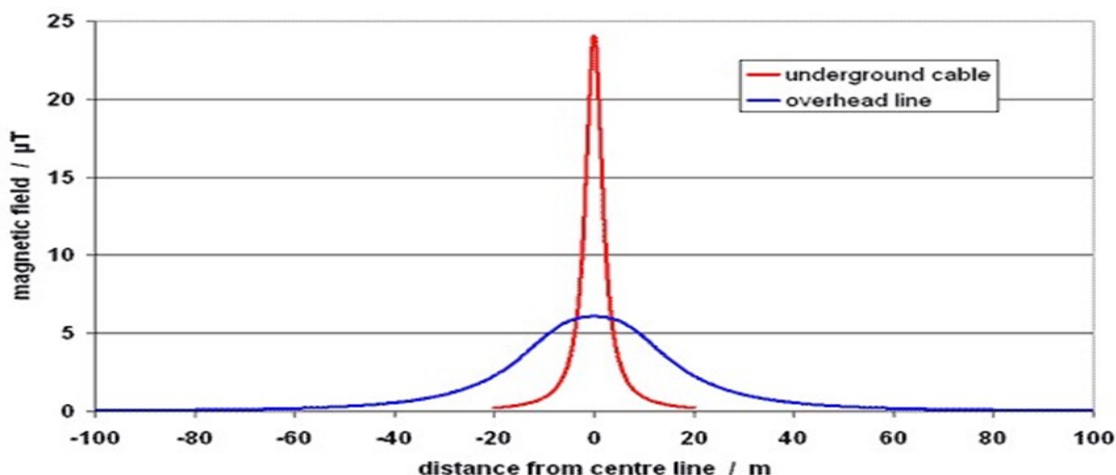


Figure 6-1: EMF effect comparisons between Underground and over headline

Source: <http://www.emfs.info/sources/underground>

In underground cable EMF concentration increases in the center line because of the buried in the earth but in the contemporary overhead transmission line EMF affect disperses with low concentration to 60 m from the center.

In the finalized design, the project mainly uses overhead TL, while uses underground TL across the section of N5/KTDC highway.

Chapter 7 POTENTIAL ENVIRONMENTAL IMPACTS & PROPOSED MITIGATION MEASURES

7.1 Introduction

This chapter documents the findings of assessment of potential environmental and socio-economic impacts and proposes their mitigation measures. It includes identification, analysis, prediction, significance and characteristics of the impacts and mitigation measures to prevent unacceptable adverse effects through the implementation of appropriate project modifications.

This chapter plays a vital role in environmental impact assessment and identifies all significant impacts during the designing, construction and operation phases of the project. Environmental and social aspects identified during the stakeholder consultations and by the screening process are assessed for their severity and mitigation measures have been proposed on the basis of assessment. Additionally, residual impacts are identified using professional judgment that may persist after adoption of mitigation measures. The proponent will adopt these mitigation measures to reduce, minimize and compensate for the negative impacts as far as possible.

7.2 Screening Methodology

Potential Project impacts have been identified in this section related to the project design, construction and operation phases. Impact predictions are based on the consultants' previous experiences on similar projects; professional judgment; data collected in the field; discussions with local communities, relevant government officials and relevant technical specialists. Predicted impacts relate to all aspects of the proposed transmission line project. mitigation measures are mainly related to community and occupational health and safety, others with good construction practices.

7.3 Design Phase: Impacts and their Mitigation Measures

Design phase impacts are primarily related to i) land acquisition, resettlement and approvals; ii) sensitive receptors (settlements, schools, hospitals, protected areas) and existing infrastructure (roads, railways); and iii) physical cultural resources. Mitigations are mainly related to careful selection of the right of way for transmission line so as to avoid or minimize impacts.

7.3.1 Land Acquisition and Approvals

The ROW for the TL for tower base placement and trenching will be obtained from relevant authorities during the design phase. NOCs from relevant institutions will be taken before the construction of TL. No resettlement is envisaged from project activities. Way leave consent will be obtained as required.

7.3.2 Physical Cultural Resources by affecting any archaeological site

There are no protected cultural and heritage sites located near the proposed TL route.

7.3.3 Sensitive Receptors and Existing Infrastructure

The construction of TL is unlikely to adversely impact sensitive receptors and existing infrastructure in project area as most of the TL route is sparsely populated and the TL will require minimal area for trenching and tower placement at specific locations.

Mitigation Measures

- Prior notices shall be given to the land owners before the starting tower placement activities in their land;
- GRM shall be followed in letter and spirit;
- Impacts on public utilities should be minimized by incorporating environment friendly construction methods in the engineering design; and
- Works around public utilities should be carried out in consultation with relevant authorities. NHA should be consulted before commencement of trenching activity under N5/KTDC in front of Dhabeji GS.

7.3.4 Movement of People/Traffic

Overhead TL will understandably provide passageways for people, vehicles and livestock. For the underground part of the TL, trenching/thrust boring will be deployed to avoid any disruption to traffic at N5/KTDC highway.

Mitigation Measures

- Transmission towers should not be placed on or block any established pathway for human and animal movement.
- Tower erection activities should be scheduled to minimize the impact to the movement of people and traffic.

7.3.5 Temporary Construction Camps

There may be a requirement to establish a small construction camp. If not undertaken carefully, activities involved in establishing and running campsite can result in deterioration of air & water quality, and social impacts including disease transmission, particularly in the context of COVID-19.

Mitigation Measures

- Camps are to be located away from settlements to minimize nuisance;
- Sanitation facilities in the camps should be provided and its wastewater should adequately be disposed offsite through septic tank and soak pit or connected to the local sewerage system;

7.3.6 Establishing responsibility on construction contractor regarding disposal of spoil/excavated earth

Construction Contractor/Waste Contractor shall be made responsible through contract documents for proper disposal of the spoil / excavated earth and not to dump these spoils/ earth near open plots / open spaces / open storm water drains / in front of settlements or on cultivated lands or left unattended along the construction site. It should be disposed in designated landfill site.

A proper site rehabilitation plan shall be made by the contractor include the spoil / excavated earth disposal arrangements

7.3.7 Establishing responsibility on construction contractor to abide SEQs

Contractors shall also be made responsible through contract documents to follow Sindh Environmental Quality Standards (SEQs) and applicable standards during all the construction activities and ensure compliance of the same through periodic environmental monitoring reports.

7.3.8 Health and Safety of Workers and Public

Contractors shall be made responsible through contract documents to follow Standard Practices and Standard Operating Procedures (SOPs) to ensure health & safety of workers at the site and public during construction and operations.

7.3.9 Living and Livelihood of the Neighbouring Community

The proposed transmission line route avoids the community areas and settlements. Settlements in the outside the TL route in the area mostly belong the Sindhi people, with Jokhio as dominated casts. Dominant source of livelihood is small scale farming and trading. Secondary sources of livelihood include livestock rearing and labor in nearby industrial units. The proposed transmission line is unlikely to cause any loss of livelihoods to the area populace.

7.4 Construction Phase: Impacts and Mitigation Measures

Construction phase impacts include erosion of soil; impacts on surface and groundwater; solid waste management; air quality issues - primarily related to dust generation; noise; vegetation removal; aesthetic impacts; and occupational and community health risks. Mitigation measures include good construction and housekeeping practices, and compensatory plantation for any loss of trees in the ROW.

7.4.1 Erosion of soil

Project activities may cause erosion of soil. Such activities may be identified as trenching, transportation of materials and equipment, preparation of tower base for overhead TL, landscaping and removal of natural vegetation etc. Usually, the exposed soil after excavation is vulnerable to erosions and runoff by moderate to heavy rains. But, the impact of all these activities would be less significant and temporary lasting only for construction period.

Mitigation Measures

- The most suitable strategy to avoid adverse environmental impact of soil erosion is to limit area from where the removal of vegetation is being done to construction sites only. The other areas should be disturbed least.
- Construction activities should be so scheduled to avoid runoff due to rain;
- The removed soil must be contained in an enclosure to reduce the chances of runoff during the seasons of precipitation;
- Stock piles of fine material should be wetted or covered with tarpaulin especially during windy weather conditions;
- Site workers should wear dust masks especially during the dry and windy weather conditions;
- Debris should be collected during construction and disposed of in low lying areas near the site;
- Cut and fill should be balanced to the extent practical at each site in order to minimize the need for fill and for spoil disposal. Cut material should be used to level the site area where required or be disposed at designated spoil disposal sites;
- Excess spoil should only be directed to designated disposal areas and temporary quarries; no disposal in waterways is allowed.

7.4.2 Impacts on Surface and ground water sources

The project activities do not involve deep excavation or substantial use of surface and groundwater from project area. No major surface water body is present in vicinity of TL ROW. Generally, the type and significance of the impact is dependent on the characteristics of the water resource, the design of the structures and their method of construction.

Mitigation Measures

- All excavated soil should be completely removed;
- Debris and vegetation clogging culverts should be regularly cleared;
- Soil runoff from the site leading to off-site contamination (particularly during rainy season) should not be allowed; and
- Spillage of oil and grease from the vehicles should be avoided.

7.4.3 Fuel, Oil & Chemical handling, storage and disposal

Inappropriate handling, storage and disposal of fuels, oils and chemicals at construction sites may lead to contamination of soil.

Mitigation Measures

- Chemicals and oils should be stored in secure designated areas with temporary impermeable bunds at distance of at least 100 m from any water course;
- Refueling, oil changing and maintenance of machinery, equipment and vehicles should only be carried out at designated areas within the construction site;
- Oil contaminated materials should be disposed at designated waste disposal facilities.

7.4.4 Water Consumption and Conservation

Water is used in numerous construction activities such as concreting, curing, plastering, domestic etc. Water required for such activities is likely to be met from external sources such as water tankers supplying water to the construction site.

Mitigation Measure

- Regular monitoring of water consumption, conservation and quality;
- Use of leak proof water storage tanks;

7.4.5 Solid Waste Management

Typical solid waste generated during construction include waste concrete, steel scrap, wooden scaffolding, empty cement bags, excavated soil, wood remains etc. Solid waste generated during land clearance and Earth-fill material could be in significant quantities. This waste has the potential to cause negative impact on the surroundings if not properly managed and disposed of. It may block nearby natural drainage channels that can ultimately cause localized flooding during monsoon season. Random storage of this waste may be injurious to the workers at the site as well. Windblown debris is a nuisance to the nearby settlements. Poor waste management practices would result in short term and long-term negative impacts on the aesthetics of the surrounding.

Mitigation Measures

- A Comprehensive Waste Management Plan for Construction phase should be developed;

- Construction sites should be equipped with temporary refuse bins, and construction wastes should be collected on a daily basis and contained in a temporary designated waste storage area on each site;
- Any hazardous waste should be separated and stored in areas clearly designated and labeled, and disposal in environmentally friendly manner.
- All type of wastes should be routinely collected from the designated area and disposed at designated waste disposal site(s); and
- Upon completion of activities at a construction site all solid wastes should be completely removed and the site should be re-contoured or prepared for natural re-vegetation.

7.4.6 Dust Emissions

Construction activities that may lead to dust generation include excavation; transportation and tipping of cut materials; handling and storage of aggregates in concrete plants; concrete batching; site leveling and clearing of vegetation; and associated activities. The quantity of dust that may generate on a particular day of construction phase will depend on the magnitude and nature of activity and the atmospheric conditions prevailing on that day.

Mitigation Measures

- Dust emissions from soil piles and aggregate storage stockpiles should be reduced by keeping the material wet by sprinkling water at appropriate frequency;
- Vehicular movement should be restricted to a specific time for dumping of supplies and construction materials; and
- Workers should wear dust masks and safety goggles, especially during dry and windy weather conditions to avoid health risk.

7.4.7 Exhaust Emissions

Major sources of exhaust emissions are standby diesel generators, material transport vehicles and emissions from construction machinery/earth moving equipment. Major exhaust emissions of concern are CO, SO_x, NO_x and Particulates. These emissions are injurious to human health in high concentration and can also cause vegetation damage by clogging the photosynthesis process in plants.

Mitigation Measures

- All vehicles, generators and other equipment used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants;
- Emissions from the machinery and vehicles will be monitored on regular basis to ensure compliance of SEQS;
- Excessive engine idling will be discouraged and machinery causing excessive pollution (i.e., visible smoke/soot) will be banned from sites;
- Standby generators for power supply will be kept away from pathways and will be placed at locations where probabilities of human intervention are limited.

7.4.8 Noise and Vibration

During the construction phase noise will be generated from the operation of heavy machinery and haulage of construction materials to and around construction sites and construction activities including concrete mixing, excavation,

backup power generators for supply of electricity; use of pressure horn etc. These construction activities are expected to produce noise levels in the range of 80 – 95 dB and may cause discomfort to local residents and fauna.

Mitigation Measures

- Machinery operation and high noise activities should be carefully planned and scheduled;
- To the extent practical, batching plants and construction areas should not be located within 500 meters of a settlement;
- Where that is not possible, high noise activities should cease between 22:00 and 06:00 hrs²⁸ at any construction site within 500 meters of a settlement, or if noise complaints are received from settlement residents.
- Vehicles and machinery will be equipped with silencers. Contractors will be required to fit noise shields on high noise construction machinery;
- Site labor working in high noise area such as where noise level exceeds 80 dB (A), will wear earplugs;
- Occupational health, safety and environmental procedures and Environmental management plan for proposed project would be followed.

7.4.9 Impacts on Ecology (Flora and Fauna)

The overhead TL will require the least footprint and only site clearance is required at tower bases. Underground portion of the TL which is approx.400m would not involve the removal of terrestrial flora. The project area has already been disturbed by human activities. Therefore, the impact on ecology of area from construction activities is minimal.

Mitigation Measures

- Trees are not expected to be removed; however, compensatory plantation shall be provided at a ratio of 1:3 for immature tree and at a ratio of 1:5 for mature tree
- Selection of plants for landscaping should consider the habitat suitability, trees of national interest, flowering trees and shrubs; and
- By using the best practice for vegetation clearing and disposal practices; will minimize the environmental risk associated with clearing and disturbance of vegetation communities.

7.4.10 Occupational Health and Safety

Civil works poses an inherent risk of injury to workers from accidents and hazardous working environments. There may be either minor or major accidents due to different activities in construction phase.

Mitigation Measures

- Preventive and protective measures including modification, substitution, or elimination of hazardous conditions, with particular attention to live power lines, working at height, EMF, high noise levels, and exposure to chemicals will be made;
- Measures for the management and appropriate disposal of hazardous wastes will be undertaken to ensure protection of the workforce and the prevention and control of releases and accidents;
- Appropriate fire extinguishers and fire response plans will be available at the site;

²⁸ Night time hours given in SEQS for Noise.

- Appropriately stocked first-aid equipment and stations at both work sites and temporary construction camps, including appropriately trained first aid staff on site and adequate transport facilities for moving injured persons to the nearest hospital will be available;
- Training for workers and appropriate incentives to use and comply with health and safety procedures and PPE will be provided;
- Procedures for documenting and reporting occupational accidents, diseases, and incidents;
- Emergency prevention, preparedness, and response arrangements will be in place;
- There will be strict safety requirements for personnel assigned to construction work;

7.4.11 Heat Stress to Construction Workers

There will be a likely impact of sunlight causing heat stress to construction workers during summer season as the temperatures may well cross 40°C. Moreover, the project corridor has no significant tree cover.

Mitigation Measures

- Move to a cool place e.g., cool shady area;
- Provide plenty of drinking water;
- Break the working in shifts

7.4.12 Impacts on Traffic

Traffic flow in the locality of project slightly increases during construction activities. The transportation of trucks for raw materials and mobilization and demobilization of the earth works equipment are required during construction phase of proposed project. This activity has potential to directly impact the traffic flow along the right of way of proposed transmission line. However, as most of the project area is not frequented by heavy and light traffic, adverse impact of general traffic conditions in area would be minimal.

Mitigation Measures

- Traffic management plan will be developed and implemented during the construction phase;
- Construction activities will be scheduled to reduce the chances of traffic congestion;
- Adequate and appropriate road signs will be erected to warn road users along the ROW of transmission line;
- Raw materials for construction work will be adequately covered within the trucks to prevent any escaping into the air and along the roadway;
- Vehicles will be maintained regularly to reduce the exhaust emissions; and
- Any complain launched by community member will be responded and appropriate action will be taken to avoid it in future.

7.4.13 Community Health & Safety

The construction of transmission line may pose a modest risk to local communities from emergency events such as entry of local people in dangerous working environment i.e., close to transmission line infrastructure.

Mitigation Measures

- Emergency response plan should be prepared and implemented during entire phase of construction;
- In order to minimize traffic congestion (if applicable), deliveries of materials and equipment should avoid peak traffic hours;
- Erection of towers and poles for the overhead TLs should be barricaded and crane movement should be assessed prior to the operation near the community areas;
- Diversions, hazard points and works at construction sites will have appropriate warning signs; this is particularly important at night to avoid accidents.

7.5 Operational and Maintenance Phase: Impacts and Mitigation Measures

The most focusable area in the impact assessment process of proposed project is operational and maintenance activities of Transmission line as impacts generated during this phase may have long term and continuous affects. Potential operational issues include impact on migratory birds (the project route is at considerable distance from Indus Flyway), EMF effects, occupational and community health and safety risks, risks from fires, earthquakes. Mitigation measures have been provided to minimize the impacts to acceptable levels.

7.5.1 Impact on migratory birds

The birds during migration fly at elevations between 800 and 2000 m, whereas maximum height of the towers of the transmission line is less than 40 m. As such, the transmission line routes will not cause any obstruction for the flight of migratory birds. Similarly, the transmission line will not intercept Indus Flyway (Central Asian-Indian Flyway) causing any disruption to flight of migratory birds.

Figure 7.1 shows the Indus Flyway or Central Asian-Indian Flyway (green). This famous route from Siberia to various destinations in Pakistan over Karakorum, Hindu Kush, and Suleiman Ranges along Indus River down to the delta is known as International Migratory Bird Route Number 4. It is also called as the Green Route or more commonly Indus Flyway, one of the important migratory routes in the Central Asian - Indian Flyway. The birds start on this route in November. February is the peak time and by March they start flying back home. These periods may vary depending upon weather conditions in Siberia and/or Pakistan. As per an estimate based on regular counts at different Pakistani wetlands, between 700,000 and 1,200,000 birds arrive in Pakistan through Indus Flyway every year. Figure 7.2 shows the Migratory route, breeding range and wintering range of Ferruginous Duck *Aythya nyroca* in Pakistan. This study suggests that the project site is not on the corridor of migratory birds.

Therefore, no adverse impact on migratory birds is expected.

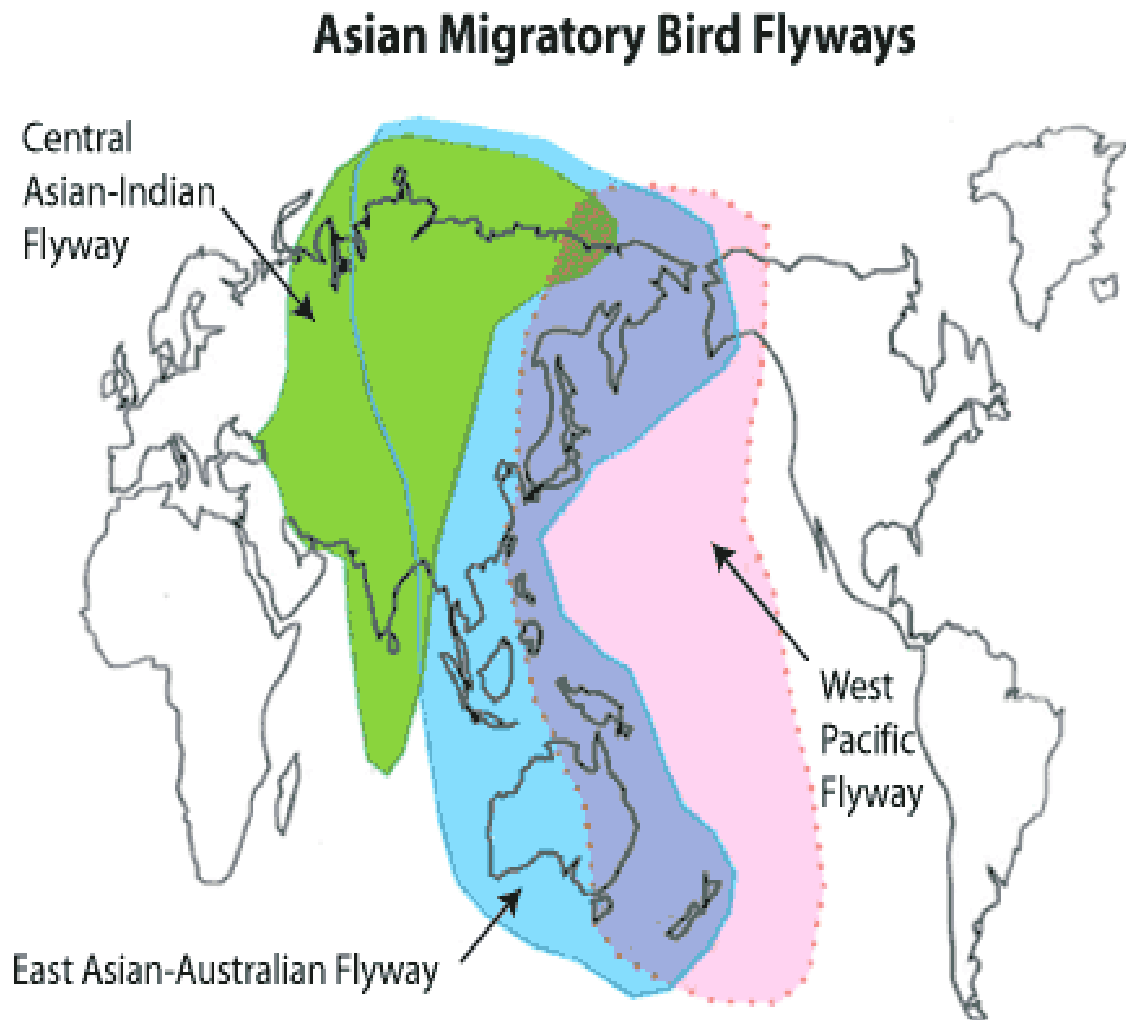
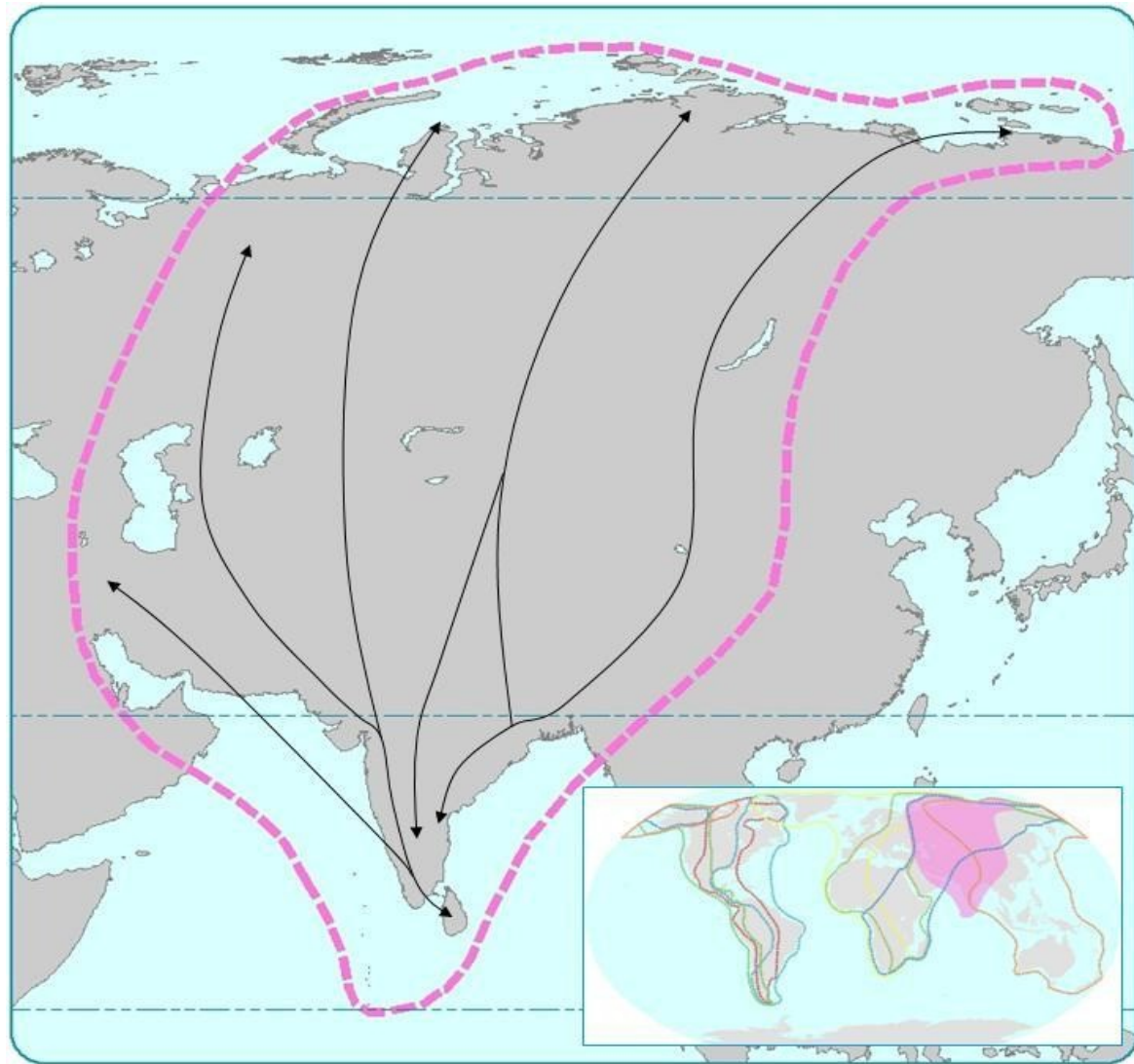


Figure 7-1: Various flyways of birds from Siberia to south²⁹

²⁹ By U.S. Fish and Wildlife Service - U.S. Fish and Wildlife Service/Alaska, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=36889825>



Flyways

 Pacific Americas	 East Atlantic	 Eurasia/South Asia
 Central Americas	 Black Sea/Mediterranean	 East Asia/Australasia
 Atlantic Americas	 Asia/East Africa	

Figure 7-2: Eurasian/South Asia Migratory bird flyway (Source: Birdlife International)

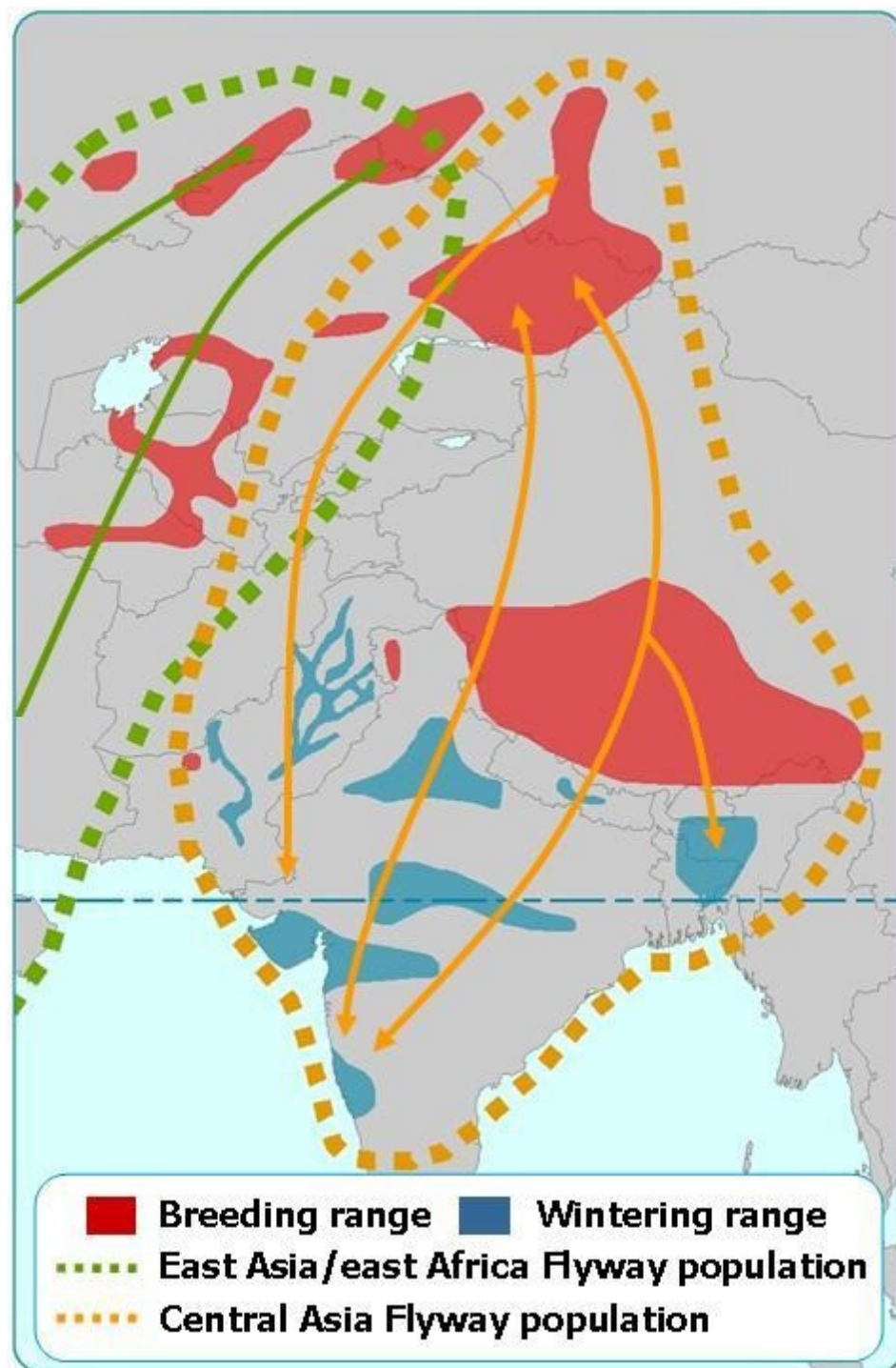


Figure 7-3: Migratory route, breeding range and wintering range of Ferruginous Duck *Aythya nyroca* in Pakistan (Source: Birdlife International)

Two declared wildlife sanctuaries for wintering birds, Marho Kotri Wildlife Sanctuary and Keti Bandar South Wildlife Sanctuary lie at a substantial distance of 19km and 73km respectively from the proposed TL route. Therefore, no impact on migratory birds is envisaged from the proposed project.

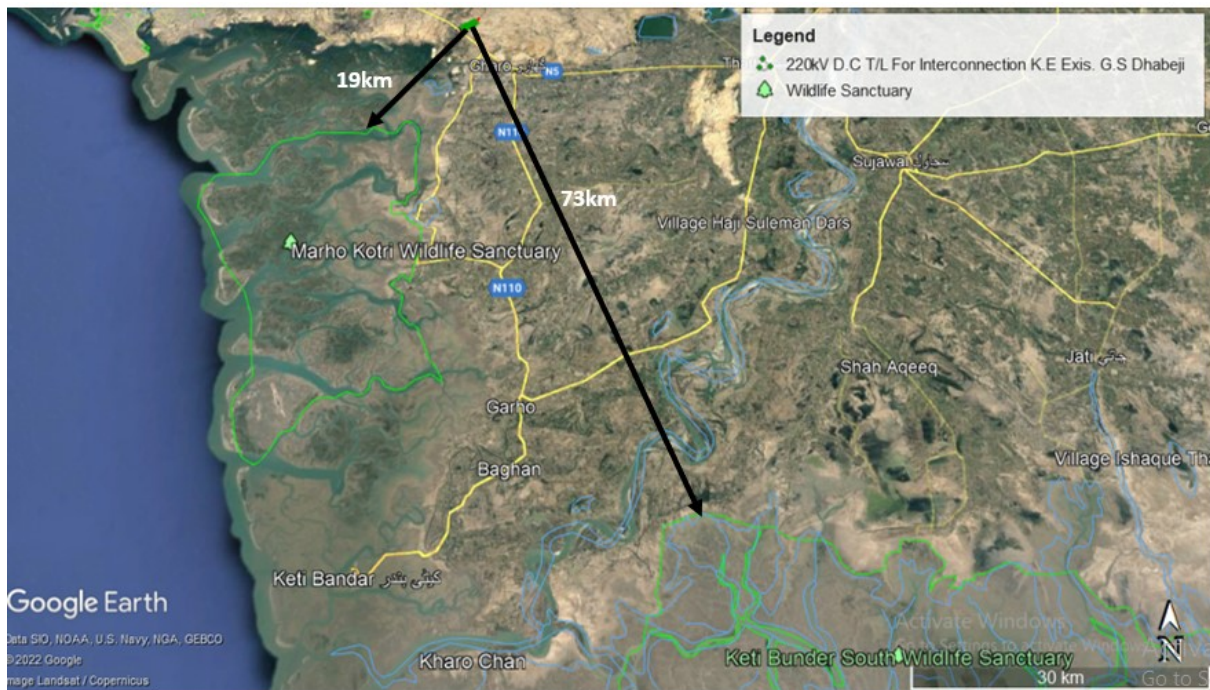


Figure 7-4: Distance of wildlife sanctuaries from project alignment

Mitigation Measures

- All suspension poles shall have detachable bird protection devices, over each suspension insulator string.
 - All suspension towers and tension towers having jumper insulator strings shall be provided with bird-repellent devices on each cross arm over insulator strings. The bird-repellent devices shall be spike type galvanized and fitted with bolts and nuts.

7.5.2 Health Impacts

a. Human Exposure to Electromagnetic Fields (EMF)

During the operation phase the Transmission Line will be energized and which may generate electromagnetic fields (EMFs).

Experimental studies have not found that magnetic fields are the cause of any disease. Many reputable health authorities such as the World Health Organization (WHO) and Health Canada have conducted thorough reviews of all the different types of studies and research on EMF and health. These health authorities have examined the scientific weight-of-evidence and have determined that when all of the epidemiological and experimental studies are considered together, the consensus is that there is no cause-effect relationship between exposure to magnetic fields and human health. The WHO concludes:

From the current scientific literature there is no convincing evidence that exposure to radiation field shortens the life span of humans or induces or promotes cancer (WHO, 2006).

Mitigation Measures

Following mitigation measures have additionally been adopted:

- Operation phase EMF monitoring will be undertaken. Average and peak exposure levels should remain below the ICNIRP recommendation for general public exposure; and
- EMF monitoring will be conducted as per pre-defined procedures of KE. Further, complaints register will be maintained.

Both Ac and Dc technologies produce magnetic fields and both decrease with distance as you move away from the line or cable. See graphs below:

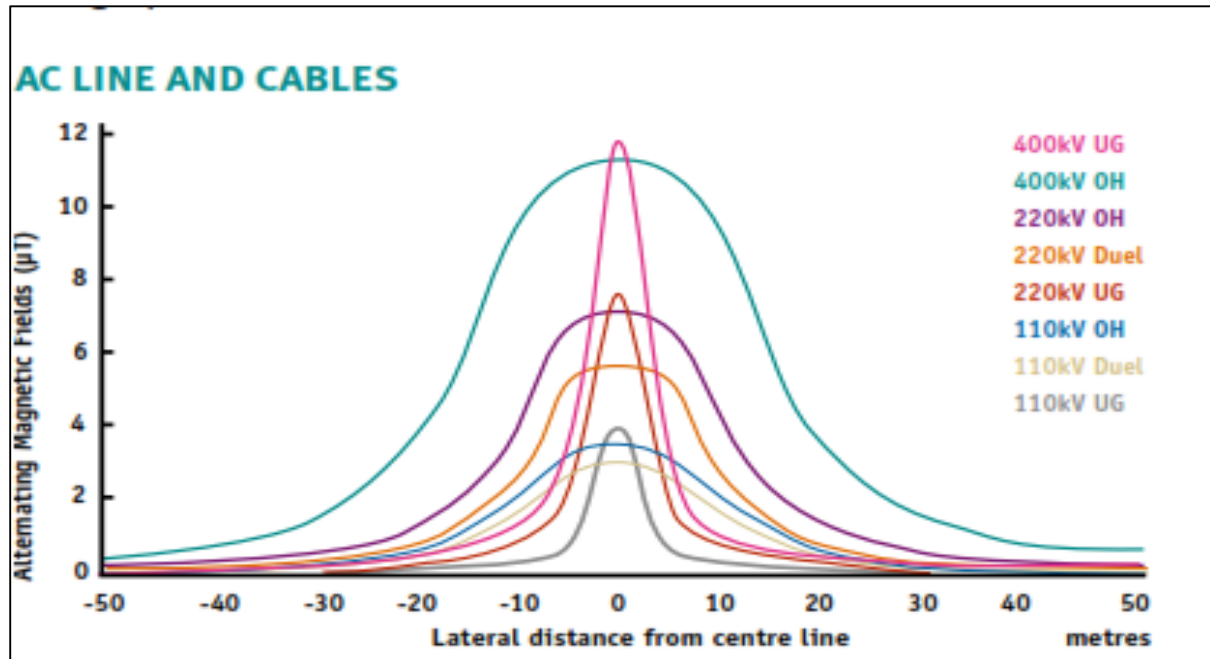


Figure 7-5: Overhead Transmission line: Maximum magnetic field

Source: EMF-You-Booklet_2014

The maximum EMF given in the graph is approximately 12 microtesla (μT), which is well below the ICNIRP guideline of 100 μT . Overall, no significant adverse EMF impacts are predicted during Project operation.

7.5.3 Wind, Fire and Earthquake Hazards

Wind, fire and earthquakes pose risks to the project operation and the likelihood of occurrence consider medium with significance of impact is major.

Mitigation Measures

- Transmission towers have been designed as per relevant national building codes which include earthquake resistance and loading requirements related to wind conditions.
- Transmission support structures such as tower foundations have also been designed to withstand different combinations of loading conditions including extreme winds that generally exceed earthquake loads.
- To mitigate fire hazards:
 - The fire hazards risk will be minimized through the use of tall towers and wide ROW.
 - System protection features designed to safeguard the public and line protection systems will consist of Transmission Line relays and circuit breakers that are designed to rapidly detect faults and cut-off power to avoid shocks and fire hazards.

- Regular maintenance of the protection system including conductors and circuit breakers will be undertaken.

7.5.4 Electromagnetic Interference

The corona of overhead Transmission Line conductors and high frequency currents of overhead Transmission Line can create radio noise which may interfere with broadcast signals or electronic equipment.

Mitigation Measures

- Standard design guidelines have been adopted to limit the conductor surface gradients so as to minimize electronic interference.

7.5.5 Electrocutation Hazard

High voltage transmission lines may pose electrocution hazard for unauthorized person(s) attempting to climb the tower(s).

Mitigation Measures

- Reduction in the Resistance to Ground of the grounding system
- Proper placement of ground conductors
- The addition of resistive surface layer
- Use of insulating protective equipment inside safety boots or standard class safety shoes to provide protection against electrocution, during wet season.
- Keep extra safety margin from live part during wet season.
- A grounding (earthing) system must be designed. The total ground potential rise, and the gradients in potential during a fault (called touch and step potentials) must be calculated to protect passers-by during short-circuit.
- Each tower shall be fitted with an anti-climbing device to prevent unauthorized persons from climbing the tower. The anti-climbing device shall be the ACD spiked type barbed wire or other approved type, and shall be fixed at a height not less than 3 meters above ground.

7.5.6 Positive Socioeconomic Impact

Project operation will result in some positive socio-economic impacts including:

- Generating short to medium-term employment for local people;
- Indirect employment opportunities by making provision of electricity available for the operations of industrial units in Dhabaji SEZ;
- Improving the technical skills of local people.

Chapter 8 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

8.1 Introduction

8.1.1 General

This section discusses the implementation and management of mitigation measures that are required for proposed project that includes progressive report and techniques to assure that all necessary environmental protection measures are carried out in the future as planned and to reduce residual impact to acceptable levels and achieve the expected outcomes of the project. The Environmental Management and Monitoring Plan (EMMP) is based on the type, extent and duration of the identified environmental impacts. The EMMP has been prepared following the regulatory requirements and guidelines.

Environmental management and monitoring are mandatory activities to be undertaken by the project administration over the entire project cycle showing its commitment towards meeting environmental regulations/standards as well as maintaining health and safety standards.

The environmental management and monitoring programs are implemented from the very early stages of planning and execution phases of the project. In fact, the authorization of the project is the point of initiation of environmental management plan. The monitoring data, observations recorded and test results / analyses are vital and formulate legal documents to be kept in safe custody and may be provided to competent authority as and when required in accordance to Sindh Environmental Protection Act 2014.

EMMP is a dynamic and a live document that is under constant review having periodic revisions and may be updated as required. Any amendments in the procedures, information, are notified to the concerned personnel after the approval from the competent authority for subsequent implementation. It also highlights the responsible personnel to work for the implementation of this EMMP.

The Proponent will be responsible for implementing the EMMP and ensuring that all personnel management are informed about the EMMP and the requirement to implement the procedures it contains. The EMMP is intended as a quick reference for Project personnel and regulators to monitor compliance.

8.1.2 Objectives of EMMP

The EMMP will serve as a principal execution module of the project that would not only mitigate adverse environmental impacts during the designing, construction, operational and maintenance phase of the project but also ensures that environmental standards and good housekeeping is maintained. Continuous environmental monitoring is exercised to ensure that preventive measures are in place and are effective; to sustain environmental integrity. Some of the key objectives of the EMP are to:

- Outline mitigation measures recommended in the EIA and define the responsibility and implementation of these measures;
- To outline functions and responsibilities of personnel;
- To state and implement standards and guidelines which are required under environmental legislations particular in context to the project,
- Facilitates the implementation of the mitigation measures by providing the technical details of each project impact, and proposing implementation schedule of the proposed mitigation measures;

- Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented; and
- Identify training requirements at various levels and provide a plan for the implementation of training sessions

It is important that the recommendations and mitigation measures are carried out according to the spirit of the environmental assessment process and in line with the guidelines. The EMMP are presented in Table 8.1 and Table 8.2. Screening of potential environmental and social impacts has played a vital role in reconfirming typical mitigation measures and in identifying any different approaches based on the feasibility and detailed design assumptions and any alternatives available at this stage.

8.1.3 *Legislation and Guidelines*

Legislation and guidelines pertaining to this project have been discussed at length in chapter 3 of this EIA study. It shall ensure that the project activities during designing, construction and operation phases of the project would follow the relevant environmental legislations and guidelines. The staff of the proponent and contractor should also be aware of these laws.

8.2 *Environmental Management Plan (EMP)*

The impacts and their mitigation measures have been classified into those relevant to the designing, construction, operational and maintenance phase. The matrix provides details of the mitigation measures recommended for each of the identified impacts, time span of the implementation of mitigation measures, and the responsibility of the institution. The institutional responsibility has been specified for the purpose of the implementation and the supervision. The matrix is supplemented with a monitoring plan.

The monitoring plan is designed based on the project cycle. During the designing period, the monitoring activities will focus on (i) checking the contractor's bidding documents, particularly to ensure that all necessary environmental requirements have been included and (ii) checking that the contract documents' references to environmental mitigation measures requirements have been incorporated as part of contractor's assignment and making sure that any advance works are carried out in good time. Where detailed design is required (e.g., for power distribution lines and avoidance of other resources) the inclusion and checking of designs must be carried out. During the construction period, the monitoring activities will focus on ensuring that environmental mitigation measures are implemented, and to guide any remedial action to address unexpected impacts. Monitoring activities during project operation will focus on recording environmental performance and proposing remedial actions to address unexpected impacts.

8.3 *Structure of EMP*

The environmental management plan is divided into the following core components:

- Organizational Structure and Roles and responsibilities;
- Implementation of Environmental Management Plan
- Mitigation matrix for each project phase;
- Monitoring plan for the project;
- Worker's Health and Safety Plan
- Waste management plan
- Equipment Maintenance

- Emergency Response Plan
- Site Restoration
- Change Management Plan

8.4 Institutional Framework for Implementation of EMMP

This Framework illustrates the roles & responsibilities required for the implementation of EMMP. Environmental management during construction of proposed project would be performed by CC in supervision of KE. In O&M phase, the implementation of EMMP would be the responsibility of KE and KE will ensure that all activities during each phase will be in compliance with the EMMP and SEQS.

The K-Electric (KE)

KE would perform the following roles and responsibilities:

- Will be responsible for the successful execution of the project;
- Ensure that the project complies with regulatory requirements;
- Ensure that EMMP is followed and staff is properly trained;
- Keep in place emergency and rescue plans for safety of staff and general public;
- Improve the coordination and exchange of information between management, employees and contractors etc.;
- Ensure the health and safety of employees;

Construction Contractor

Some roles and responsibilities of Contractors are as under:

- Ensure that the project activities are undertaken in an environment friendly manner and EMMP is implemented;
- Evaluate compliance with SEQS, national and international guidelines for environmental protection;
- Implement Grievance Redress Mechanism (GRM).

8.5 Mitigation Matrix

Mitigation Management Matrix have been provided in this Environmental Management Plan (table 8.1). The Mitigation Management Matrix will be used as a management and monitoring tool for implementation of the mitigation measures. The matrix lists down the following.

- The mitigation measures recommended in the EIA;
- The person/organization directly responsible for adhering to or executing the required mitigation measures;
- The parameters which will be monitored to ensure compliance with the mitigation measures; and
- The timing at which the mitigation or monitoring has to be carried out.

It is highlighted that although responsibilities for executing and monitoring mitigation measures have been delegated to different persons/organizations, KE holds the primary and overall responsibility for ensuring full implementation of the EMP.

8.6 Environmental Monitoring Plan

The EIA predicts the impacts of the proposed project on the basis of information available at the time of conducting the assessment and the natural processes that link various environmental parameters. Based on this prediction, mitigation measures are proposed such that the predicted residual effects do not exceed acceptable levels. However, there is always an element of uncertainty in such predictions due to an insufficient grasp of the processes, limitations in prediction techniques, or inadequate data on the environment/social aspects. Consequently, it is possible that even if the mitigation measures are implemented fully, the negative impacts of the project might exceed acceptable limits.

In order to address the above concerns, environmental health and safety monitoring will be undertaken during the project activities, with the overall objective of proper management of environmental and social risks and uncertainties. Broadly, monitoring will be undertaken with the following objectives:

- To verify that the impacts of the proposed project are within acceptable limits, thus establishing credibility (public assurance).
- To immediately warn the project proponents (and the regulatory agencies, if required) of unanticipated adverse impact or sudden changes in impact trends so that corrective actions can be undertaken, which may include modifications in the proposed activities, or the inclusion of modified or additional mitigation measures.
- To provide information to plan and control the timing, location, and level of certain project activities so that the effects are minimized.

The following environmental parameters will be monitored at locations identified during the construction and operation phase:

- Air quality and noise level
- Emissions from generators, vehicle exhaust etc.
- Waste management

A detailed environmental monitoring program/plan is provided in this section to assist the proponent in evaluating and monitoring the project performance against the EIA requirements.

To achieve the objectives of monitoring, Environmental Audits will be conducted to enable site management to assess the day-to-day environmental management of construction and operation activities at the site. The activities which will be monitored include all aspects of construction and operations that result in emissions, effluent or wastes or any other aspect of environmental concern.

8.6.1 Compliance Monitoring

The compliance monitoring of the project activities is principally a tool to ensure that the environmental control measures identified in the EIA are strictly adhered to during the project activities. Compliance monitoring will be the responsibility of all organizations involved in the field activities, i.e., K Electric and the contractors.

The compliance monitoring will be conducted at agreed intervals;

- Systematically observe the activities undertaken by the contractors (and subcontractors) or any other person associated with the project.
- Verify that the activities are undertaken in compliance with the EIA and EMP.

- Document and communicate the observations to the concerned person(s) of the contractors and K Electric, so that any corrective measures, if required, can be taken in a timely manner.
- Maintain a record of all incidents of environmental and social significance, related actions and corrective measures taken.
- Maintain contact with the stakeholders, solicit their views and concerns, and discuss them during the regular meetings.
- Prepare periodic reports of the environmental, health and safety performance of project.

The monitoring plan discussed in Table 8.2(a) and (b) will be used as a monitoring tool for compliance monitoring. Inspection will be done using checklists prepared by the respective contractors, on the basis of Table 8.2(a) and (b), during the construction phase.

8.7 Environmental Training

An environmental training program will be prepared to address the need of contractor's site staff and build their capacity to effectively implement project-specific EMMP. HSE officer (Contractor) will coordinate with contractors to organize training for their staff and to help them establish system /infrastructure for future sustainability. In addition to the training arranged and imparted by the HSE officer (Contractor) for complete project team, the contractor will also plan small training sessions for workers involved in specific jobs. Cost of trainings and mitigation measures will be deemed included in contract cost. Environmental Training Plan is provided in Table 8.3.

8.8 Emergency Response Plan

Emergency procedures will be prepared to include all events which have the tendency to create an emergency situation at the project locations. It is advisable that emergency procedures are prepared in conjunction with the emergency services such as fire brigade.

The procedures will be readily available to all personnel involved, regularly practiced and checked periodically that they are up to date. Workers likely to be affected will be provided with the knowledge of the actions required to minimize the adverse effects.

The emergency procedures will consider:

- occupational health and safety;
- electrocution hazards

8.8.1 Contingency Planning –Incidents and Emergencies

A. Fire Contingency Plan

Fire is an ever-present hazard. All personnel and subcontractors are not trained professional fire-fighters. Therefore, if there is any doubt that a fire cannot be quickly contained and extinguished, personnel will notify the Site supervisor and vacate the area. The site supervisor will immediately notify the local Fire Department.

The following procedures will be followed to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.
- "No Smoking" signs will be posted at visible areas where flammable materials are present.

- Fire extinguishers will be placed in areas where a fire hazard may exist.
- Before workers begin operations in an area, the area supervisor will give instruction on exit procedures and assembly points. Exit routes will be displayed through signage in work areas and exit points will be clearly marked.
- Anyone who sees a fire will notify the supervisor who will then contact the Site Superintendent and the HSE Officer. The HSE Officer will activate the emergency alarm and contact the local Fire Department.
- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.
- Work crews will comprise of pairs of workers who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble for a head count.
- When a small fire has been extinguished by a worker, the site superintendent and the Health and Safety Officer will be notified.

i. Responsibilities of Fire Safety Officer (Contractor)

- ii. The Fire Safety Officer will supervise and perform firefighting activities.
- iii. Responsible for maintenance and documentation of fire extinguishers.
- iv. Develop and regularly review fire emergency plans.

If any person smells a burning odor or hear any one shouting "Fire, Fire" or sees the fire/smoke, he/she will immediately inform the call fire safety officer (contractor) or call Police and local government/municipal agency only if told by fire officer.

If there is fire, rush towards the nearest fire extinguisher and try to extinguish the fire.

B. Evacuation Procedures

In the event of on-site evacuation of personnel is necessary, the following actions will be taken:

- The emergency signal will be activated (one single long blast on the air horn).
- No further entry of visitors or contractors will be permitted.
- Shut off all onsite equipment if safe to do so.

C. Evacuation Responsibility

The decision will be made by the Emergency Rescue team which includes Fire Safety Officer (contractor) & **Site In-charge** and will be communicated to the **Project Manager**. Emergency rescue team will inform the **Project Manager** and decide if partial or full evacuation is required. Also liaise to mitigate the situation and return the area to normal as soon as possible.

The emergency response team members involved are as follows:

i. Actions by Site Incharge (Contractor)

- Manager Administration and the Security officer in co-ordination with specific area in-charge will arrange for evacuation.
- If the fire goes beyond the control of management, the local Fire brigade to be summoned in consultation with Manager Administration.
- He will conduct root cause analysis and log the same on the prescribed incident report form.
- Security in charge will inform Manager Administration as soon as fire is confirmed by him personally.

- Call Fire Department immediately.

ii. Senior Management/Administration

- Should reach the place of fire as soon as the news is confirmed.
- Media/press Handling
- A debriefing session at the end of the disaster.

8.8.2 Fire Detection & Warning

A suitable means of raising the alarm, such as a stand mounted manual hand crank bell. in the event of a fire or other emergency at the project site, will be established. The alarm system will be appropriate to ensure all personnel can be notified immediately of any emergency situation and evacuation, or other actions required.

8.8.3 Fire Fighting Equipment

The following firefighting equipment will be maintained in good order during construction and maintenance works:

- Fire Extinguishers of adequate size and type
- Sand buckets
- Rescue gear (includes stretchers, turnout gear, fire rescue gloves, emergency light, fire boots, fire hoods, etc.)
- Equipment will be maintained and tested to ensure serviceability in the event of a fire.

Portable Fire extinguishers will be used where required during project activities throughout the project corridor.

- ABC (Dry Chemical): Red or Orange in color. All-purpose dry chemical may be used on any type of fire
- CO₂: Red in color, Big Black horn on hose. Good for Oil, Grease & Electrical fires.
- Water: Completely red with no color band. Suitable for paper, textiles, wood, most plastics & rubber.

8.9 Waste Management Plan

The waste management plan will be prepared and implemented by the construction contractor for the proposed Transmission Line in order to ensure timely collection, handling and disposal of the waste generated during the construction phase. Waste management would:

- reduce risk exposure to a minimum,
- protect employees,
- bring the organization into compliance with EPA's requirements

Table 8-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
Designing Phase			
Land acquisition and resettlement	Resettlement is not envisaged for the project	RoW will be obtained from authorities prior to construction of overhead and underground portions of TL.	KE
Birds	Chance of Collision of Birds with the conductor string	- All suspension poles shall have detachable bird protection devices, over each suspension insulator string. - All angle poles having jumper insulator strings will also be furnished with bird protection devices.	CC
Temporary Construction Camps	Deterioration of air & water quality, and social impacts	- Camps are to be located away from residents/commercial activities to minimize nuisance; - Sanitation facilities in the camps, if provided, should be mobile & collect its wastewater or connected to the local sewerage system; - Water conservation practices shall be adopted.	CC
Contract clauses	Contractor may not perform the work in environmentally friendly manner	- Construction Contractor / Waste Contractor shall be made responsible through contract documents for proper disposal of the spoil / excavated earth and not to dump these spoils/ earth near open plots / open spaces / open storm water drains / in front of residents or leave unattended along the construction site. It should be disposed in designated landfill site. - A proper site rehabilitation plan shall be made by the contractor which includes the spoil / excavated earth disposal arrangements - Contractors shall also be made responsible through contract documents to follow Sindh Environmental Quality Standards (SEQS) and applicable standards during all the construction operations and ensure compliance of the same through periodic environmental monitoring reports. - Contractors shall be made responsible through contract documents to follow Standard Practices and Standard Operating Procedures (SOPs) to ensure health & safety of workers at the site and public during all construction operations. - As the work is usually completed by contractors and sub-contractors, K-Electric should monitor their works to ensure proper task completion.	KE
Construction Phase			
Excavation, storage of soil and waste, generation of waste	Soil Erosion	- Construction activities should be scheduled to avoid runoff due to rain; - The dredged soil must be contained in an enclosure to reduce the chances of runoff during the seasons of precipitation; - Stock piles of fine material should be wetted or covered with tarpaulin especially during windy weather conditions; - Cut and fill should be balanced to the extent practical at each site in order to minimize the need for fill and for spoil disposal. Cut material should be used to level the site area or be disposed at designated spoil disposal sites;	CC

Table 8-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		Excess spoil should only be directed to designated disposal areas and temporary quarries; no disposal in waterways is allowed.	
Water Resources	Impact on Surface and ground water sources	- All excavated soil left after backfilling should be completely removed; - Debris and vegetation clogging culverts and drains should be regularly cleared; and - Soil runoff from the site leading to off-site contamination (particularly during rainy season) should not be allowed. - Spillage of oil and grease from the vehicles should be avoided.	CC
Fuel, Oil & Chemical handling, storage and disposal	Soil contamination	- Chemicals and oils should be stored in secure designated areas with temporary impermeable bunds; - Refueling, oil changing and engine maintenance of machinery, equipment and vehicles should be avoided at construction site; - Oil contaminated materials should be disposed at designated waste disposal facilities.	CC
Construction Waste Disposal	This waste has the potential to cause negative impact on the surroundings if not properly managed and disposed of.	- A Comprehensive Waste Management Plan for Construction phase should be developed and implemented; - Construction sites should be equipped with temporary refuse bins, and construction wastes should be collected on a daily basis and contained in a temporary designated waste storage area on each site; - Designated waste storage areas should not be within 50 m of water ways; - Any hazardous waste should be separated and stored in areas clearly designated and labeled, and disposal through EPA certified waste contractor in environmentally friendly manner. - Non-hazardous waste should be routinely collected from the designated area(s) and disposed in an environmentally friendly manner or recycled or reused;	CC
Dust Emissions	Deterioration of local Air Quality	- Dust emissions from soil piles and aggregate storage stockpiles should be reduced by keeping the material wet by sprinkling water at appropriate frequency and erecting windshield walls on three sides of the piles; - Vehicular movement should be restricted to a specific time for dumping of supplies and construction materials; and - Workers should wear dust masks and safety goggles, especially during dry and windy weather conditions to avoid health risk.	CC
Exhaust Emissions	Deterioration of local Air Quality	- All vehicles, generators and other equipment used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants; - Emissions from the machinery and vehicles will be monitored on regular basis to ensure compliance of SEQS;	CC

Table 8-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		- Excessive engine idling will be discouraged and machinery causing excessive pollution (i.e. visible clouds of smoke) will be banned from sites; - Standby generators for power supply will be kept away from pathways and will be placed at locations where probabilities of human intervention are limited; and - The stack height of the generators used will be at least 3 m above the ground.	
Noise and Vibration	Construction activities are expected to produce noise levels in the range of 80 – 95 dB and may cause discomfort to local residents	- Machinery operation and high noise activities should be carefully planned and scheduled; - To the extent practical batching plants and construction areas should not be located within 500 meters of a settlement; - Where that is not possible, high noise activities should cease between 20:00 hrs. to 06:00 hrs. at any construction site within 500 meters of a settlement, or if noise complaints are received from settlement residents. - Vehicles and machinery will be equipped with silencers. Contractors will be required to fit noise shields on high noise construction machinery; - Site labor working in high noise area such as where noise level exceeds 80 dB (A), will wear earplugs; - The stationary sources of noise such as concrete mixers, batching plant, power generators and pumps will be selected and segregated from work areas and residents; and - Occupational health, safety and environmental procedures and Environmental management plan for proposed project would be followed.	CC
ROW Clearance	Impacts on Ecology (Flora and Fauna), cutting of trees	- Compensatory plantation shall be provided at a ratio of 1:3 for immature trees and at 1:5 for mature trees; - Selection of plants for landscaping should consider the habitat suitability, trees of national interest, flowering trees and shrubs; and - By using the best practice for vegetation clearing and disposal practices; will minimize the environmental risk associated with clearing and disturbance of vegetation.	CC
Safety Precautions for the Workers	The construction and civil works pose an inherent risk of injury to workers from accidents and hazardous working environment.	- Preventive and protective measures including modification, substitution, or elimination of hazardous conditions, with particular attention to live power lines, working at height, working above water, high noise levels, and exposure to chemicals will be made; - Measures for the management and appropriate disposal of hazardous wastes will be undertaken to ensure protection of the workforce and the prevention and control of releases and accidents; - Appropriate fire extinguishers and fire response plans will be available at the site;	CC

Table 8-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		• Appropriately stocked first-aid equipment and stations at both work sites and temporary construction camps, including appropriately trained first aid staff on site and adequate transport facilities for moving injured persons to the nearest hospital will be available; • Training for workers and appropriate incentives to use and comply with health and safety procedures and PPE will be provided; • Procedures for documenting and reporting occupational accidents, diseases, and incidents; • Emergency prevention, preparedness, and response arrangements will be in place; • There will be strict safety requirements for personnel assigned to construction work; • Workers will not be interacted with the local populace. • To maintain safe conditions for the general public, construction camps will be fenced and gated; and To protect workers from heat stress • Move to a cool place e.g., cool shady area; • Provide plenty of drinking water; • Break the working in shifts	
Traffic Movement near construction site	Traffic flow in the locality of project will slightly increase during construction activities of the project, which directly impact the traffic flow along the right of way of transmission line. This increase in traffic may congest the flow of traffic and may cause some accidental injuries and deteriorate the air quality of ambient air.	• Traffic management plan will be developed and implemented during the construction phase; • Construction activities will be scheduled to reduce the chances of traffic jams; • Adequate and appropriate road signs will be erected to warn road users along the ROW of transmission lines; • The movement of equipment (trucks) during the construction of the proposed project will be limited to daytime; • Raw materials for construction work will be adequately covered within the trucks to prevent any escaping into the air and along the roadway; • Vehicles will be maintained regularly to reduce the exhaust emissions; and • Any complaint launched by community member will be responded and appropriate action will be taken to avoid it in future.	CC
Social Impacts	Community health & safety issues	• Emergency response plan should be prepared and implemented during entire phase of construction; • Procedures for interaction with local and regional emergency and health authorities should be made; • In order to minimize traffic congestion (if applicable), deliveries of materials and equipment should avoid peak traffic hours;	CC

Table 8-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		- Erection of towers and poles for the overhead TLs should be barricaded and crane movement should be assessed prior to the operation near the communities; - Proper lighting at night near trenches will be ensured; and - Diversions, danger points and works at culverts, bridges and construction sites will have appropriate warning signs; this is particularly important at night to avoid accidents. - Complaints register will be maintained.	
Impact on Flora and Fauna	Vegetation removal is minimal.	Implement the best practice for vegetation clearing and disposal practices to minimize the environmental risk associated with clearing and disturbance of vegetation communities.	CC
Operational and Maintenance Phase			
Wind, fire and earthquakes	Electricity arcing, poles and towers dislodgment	- Transmission towers have been designed as per relevant national building codes which include earthquake resistance and loading requirements related to wind conditions. - Transmission support structures such as tower foundations have also been designed to withstand different combinations of loading conditions including extreme winds that generally exceed earthquake loads - System protection features designed to safeguard the public and line protection systems will consist of Transmission Line relays and circuit breakers that are designed to rapidly detect faults and cut-off power to avoid shocks and fire hazards. - Electricity arcing from power lines can be a fire hazard. To mitigate against fire hazards: - The fire hazards risk will be minimized through the use of tall towers and wide ROW. - System protection features designed to safeguard the public and line protection systems will consist of Transmission Line relays and circuit breakers that are designed to rapidly detect faults and cut-off power to avoid shocks and fire hazards. - Regular maintenance of the protection system including conductors and circuit breakers will be undertaken.	KE
Electromagnetic Interference	The corona of overhead TL conductors and high frequency currents of overhead Transmission Line can create radio noise which may interfere with broadcast signals or electronic equipment.	Standard design guidelines have been adopted to limit the conductor surface gradients so as to minimize electronic interference.	KE
Electrocution hazard	High voltage transmission lines may pose electrocution hazard for unauthorized person(s) attempting to climb the tower(s).	- Each tower shall be fitted with an anti-climbing device to prevent unauthorized persons from climbing the tower. The anti-climbing device shall be the ACD spiked type barbed wire or other approved type, and shall be fixed at a height not less than 3 meters above ground. - Reduction in the Resistance to Ground of the grounding system - Proper placement of ground conductors	KE

Table 8-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
Gaseous Emissions	Air pollution	- All vehicles, power generators and other equipment used during the maintenance work will be properly tuned and maintained in good working conditions in order to minimize emission of pollutants; and - Emissions from the O&M vehicles will be monitored to ensure compliance with SEQS.	KE
Solid Waste	The maintenance activities may generate some hazardous and non-hazardous waste such as wires and wild vegetation etc.	- A Waste Management Plan for operation phase should be developed; - Ensure that all solid waste generated during operational or maintenance work is collected and segregated and non-hazardous waste should be disposed of in an approved disposal site or recycled or reused. - Any hazardous waste should be separated and stored in areas clearly designated and labeled, and disposal in environmentally friendly manner through EPA certified waste contractor.	KE
Notes KE = K-Electric; CC = Construction Contractor; SEQS = Sindh Environmental Quality Standards; PM = Particulate Matter, TL = Transmission Line			

Table 8-2: Environmental Monitoring Plan for construction and operation of transmission line

Environmental Aspect	Monitoring Parameters	Monitoring Location	Monitoring Frequency	Responsibility
Construction Phase				
Air Quality	Priority parameters (as per SEQS)	Near Construction sites/camps	Monthly/ reported quarterly basis	CC
Excavation, storage of soil and waste, generation of waste	Check any obstruction in existing drains due to construction, check lifting of waste material, check waste management plan	At construction site	Monthly / reported quarterly basis	CC
Fuel, Oil & Chemical handling, storage and disposal	Check contamination on the ground, check waste disposal	Vehicles/ machinery in working areas	Monthly / reported quarterly basis	CC
Construction Waste Disposal	Domestic waste, Hazardous waste – Chemical waste, electro waste, Paper and Polythene material waste and Wood	Collection, handling, storage areas and disposal	Measured on daily basis and reported quarterly	CC
Exhaust Emissions	Parameters as per SEQS	Construction vehicles	Measured monthly/ reported quarterly basis	CC
Noise and Vibration	Noise Intensity (dB)	Near Construction site	Monthly / reported quarterly basis	CC
Drinking water	Priority parameters	Water coolers	Monthly / reported quarterly basis	CC
ROW Clearance	Check tree cutting, compensatory plantation, inventory of cleared trees / plants	At construction alignment	Monthly / reported quarterly basis	CC
Safety Precautions for the Workers	Accidents, PPE, Annoyance, Fire Hazards, Safety Protocols, Spill on Land and Spill on Water	All construction areas	Continuous / reported quarterly basis	CC
Traffic Movement near construction site	Traffic flow, timing of activities, near misses and injuries records and reporting	At crossroads and along transmission line Right of Way	Continuous / reported quarterly basis	CC
Social Impacts	Review of complaint register Local Consultations	Near Construction site	Monthly / reported quarterly basis	CC

Table 8-2: Environmental Monitoring Plan for construction and operation of transmission line

Environmental Aspect	Monitoring Parameters	Monitoring Location	Monitoring Frequency	Responsibility
	Surface topography, Proper backfilling and carpeting	All excavated areas	Continuous / reported quarterly basis	CC
Operational and Maintenance Phase				
Human Exposure to Electromagnetic Fields (EMF)	EMF value	Transmission line Corridor	Annually & record is maintained	KE

Table 8-3: Environmental Training Plan

Staff	Responsibilities	Areas	Schedule
Project staff	Contractor/HSE Officer	EMP	Prior to start of Project activities
Drivers	Contractor/HSE Officer	- Road safety - Road restrictions - Defensive driving	Before and during construction activities

Table 8-4: Estimated EMP Implementation Cost

Activity	Cost (PKR)	Remarks
Training Program	300,000	Refer table 8-3
	Environmental Monitoring	
Ambient Air	$(40,000 \times 2 \times 16) = 1,280,000$	Cost @ 2 locations per month @Rs.40,000 per monitoring
Waste management	500,000	Estimated cost during construction
Exhaust Emissions	$(1500 \times 3 \times 16) = 216,000$	Cost @ 3 locations per feeder for 3 parameters @Rs.1500 per parameter, for 16 months
Noise and vibration	$(1000 \times 16 \times 5) = 80,000$	Cost @ 5 locations @Rs.1000 per location per month, for 16 months
Drinking water	$(10,000 \times 16) = 160,000$	Cost for 16-months monitoring at 1 sample @Rs.10,000 for all primary parameters
Row Clearance	300,000	Initial estimates
Safety for Workers	700,000	Initial estimates

Traffic Movement	100,000	Initial estimates
Social Impacts	500,000	Initial estimates
Mitigation Measures (Project execution)	1,000,000	Initial estimates
Reporting	500,000	Initial estimates
Sub total	5,636,000	-
Contingency (5%)	281,800	-
Grand total	5,917,800	For project execution (16-months)

8.10 Monitoring Forms

Environmental reviews will decide for necessary items to be monitored which are based on regular reports including measured data submitted by the project proponent. When necessary, the project proponent should refer to the following monitoring form for submitting reports.

Table 8-5: (a): Sample Forms for Ambient Air Quality Monitoring Record

PM₁₀ (Respirable Particulate Matter)						
Location	S.No.	Date	Time (Hrs:Min)	Result (µg/m³)	SEQS (µg/m³)	Remarks
	1				150	
	2				150	
	3				150	
	4				150	
	5				150	
	6				150	
	7				150	
	8				150	

Table 8.5 (b): Sample Forms for Ambient Air Quality Monitoring Record

CO, SO_x, NO_x							
Location	S.No.	Parameter	Date	Time (Hrs:Min)	Result (µg/m³)	SEQS (µg/m³)	Remarks
	1	CO			 (mg/m ³)	5 (mg/m ³)	
	2	SO _x				120	
	3	NO _x				40	

Table 8-6: Sample Form for Noise Quality Monitoring Record

Location	S.No.	Date	Time (Hrs:Min)	Analysis	Result dB(A)Scale	SEQS	Remarks
	1					55 / 45*	
	2					55 / 45	
	3					55 / 45	
	4					55 / 45	
	5					55 / 45	
	6					55 / 45	
	7					55 / 45	
	8					55 / 45	

***Limits are for Commercial Area, Day Time / Night Time**

(Domestic/non-hazardous solid wastes)

Location: _____ Date: _____ Source: _____ (domestic/ non-hazardous)

Table 8-7: Sample Form for Solid Waste Monitoring Board

Total Quantity (kg)	Components	Weight (as discarded)	% by weight (as discarded)	Recyclables	Non-recyclables	Organic waste
	Food/kitchen waste					
	Plastics					
	Metals					
	Paper					
	Textile/Rugs					
	Cardboard					
	Glass					
	Rubber					
	Others					
Total						

Generation Rate:

Total waste generated = _____ kg/capita/day

No. of persons in units

Summary:

- Total Waste Generated (as collected) = _____ kg
- Recyclable waste quantity = _____ kg
- Non-Recyclable waste quantity = _____ kg
- Organic waste quantity = _____ kg
- %age of Recyclables = _____ %
- %age of Non-recyclables = _____ %
- %age of Organic waste = _____ %
- Total waste sent for recycling = _____ kg
- Total waste sent for landfill = _____ kg

Comments:

Location: _____ Date: _____ Source: _____ (Hazardous)

<i>Total Quantity (kg) Recyclables</i>	<i>Hazardous waste Components</i>	<i>Weight (as discarded)</i>	<i>% by weight (as discarded)</i>	<i>Characteristics (corrosive, toxic, explosive, etc.)</i>	<i>Non-recyclables (requiring disposal)</i>
Total					

No. of persons in units

- Total Waste Generated (as collected) = _____ kg
- Recyclable waste quantity = _____ kg
- Non-Recyclable waste quantity = _____ kg
- %age of Recyclables = _____ %
- %age of Non-recyclables = _____ %
- Total waste sent for recycling = _____ kg
- Total waste sent for disposal = _____ kg

(Health & Safety)

Monitoring Items	Monitoring Results

(Electromagnetic Fields)

Monitoring Items	Monitoring Results

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Chapter 9 CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

This Environmental Impact Assessment study was carried out to identify the environmental and socioeconomic impacts of the proposed “220kV Double Circuit, Twin Bundle LILO Transmission Line to KE Dhabeji Grid Station from NTDC” project.

During the study, environmental and socioeconomic baseline information was collected from variety of sources including visit of project area, previous environmental reports and studies conducted in the area, published literature and field surveys. All this information was used to compose the profile of the physical, biological and socioeconomic environment of the area which is likely to be affected by the proposed project activities. Information for the project description was provided by the project’s proponent.

On the basis of the established baseline and the proposed activities described as under project description, the potential environmental impacts were identified on the project area’s physical, biological and socioeconomic environments. In summary the potential impacts during the construction phase of the proposed project include the generation of dust and gaseous emissions, noise, construction waste, health and safety and socioeconomic effects. Similarly, the key environmental and social issues during the operation phase included those arising from electromagnetic fields and electrocution hazards.

The EIA process finds that the impacts of the project activities at the design, construction and operation stages have been adequately addressed and mitigation measures have been duly proposed wherever needed. Adoption of mitigation measures will ensure the reduction of any possible impacts on the micro and macroenvironment as well as socio-economic conditions, to acceptable levels. The development of this project will be made compatible with the requirements of the Sindh Environmental Protection Act 2014, Sindh Environmental Protection Agency (Environmental Assessment) Regulations 2021, Sindh Environmental Quality Standards (SEQS), as well as other regulatory requirements of the Government of Sindh. The issues of environment, health and safety have been duly incorporated in the design, construction and operations phases of the project. In addition, IFC’s Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution have been reviewed for the proposed project and will be utilized as a standard for Good International Industries Practice (GIIP).

On the basis of the findings of the EIA Study, it is possible to conclude that:

- Construction and Operation of Transmission line will, on adoption of the mitigation measures, have no broad scale significant adverse impacts on the physical as well as socio-economic composition of the microenvironment and macroenvironment of the project area;
- The likely impact of construction and operation of transmission line will be appropriately mitigated through proven technologies, careful planning and stringent monitoring practices;
- The project will assist in meeting the forecasted demand for energy;
- Employment opportunities will be generated for short to medium term;
- The proposed project, after commissioning will become an integral part of the microenvironment.

Mitigation will be assured by a robust plan of environmental monitoring conducted to ensure that all advised measures are provided as intended, and to determine whether the environment is protected as envisaged. This will include observations on and off site, document checks, and interviews with workers and beneficiaries, and any requirements for

remedial action will be informed to the proponent for due implementation, and the resultant remedies being reported to the Sindh EPA.

9.2 Recommendations

The study recommends and confirms that the proponent shall adopt all environmental management processes in full, as prescribed by the national and international laws and guidelines and given in the EIA document. Following essentials recommendations which are also the part of EMP as mitigation measures will be followed by KE in letter and spirit:

- Communities and commercial entities in the project area shall be intimated prior to commencing project activities;
- No trees are expected to be removed; however, compensatory plantation shall be provided at a ratio of 1:3 for immature trees and at 1:5 for mature trees;
- A Comprehensive Waste Management Plan for construction and operation phases should be developed;
- Wastes should be routinely collected from the designated area and disposed in an environmentally friendly manner;
- Protective measures against high noise intensity, soil erosion, traffic problem, land pollution and water contamination will be taken care of;
- Emergency response plan should be prepared and implemented during construction and operation phases;
- Preventive and protective measures including modification, substitution, or elimination of hazardous conditions, with particular attention to live power lines, working at height, EMF, high noise levels, and exposure to chemicals will be made; and
- The Project will thus respond to all aspects of sustainability: Economic, social and environmental and will thus be a sustainably viable project.

The study therefore recommends that the EIA report should be approved with the provision that the suggested mitigation measures will be adopted and the Environmental Management Plan will be followed in letter and spirit.

ANNEXURES

Annex I

Sindh Environmental Protection Act 2014

**PROVINCIAL ASSEMBLY OF SINDH
NOTIFICATION
KARACHI, THE 20TH MARCH, 2014.**

NO.PAS/Legis-B-06/2014-The Sindh Environmental Protection Bill, 2014 having been passed by the Provincial Assembly of Sindh on 24th February, 2014 and assented to by the Governor of Sindh on 19th March, 2014 is hereby published as an Act of the Legislature of Sindh.

THE SINDH ENVIRONMENTAL PROTECTION ACT, 2014.

SINDH ACT NO.VIII OF 2014.

**AN
ACT**

to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development.

WHEREAS it is expedient to provide for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development, and for matters connected therewith and incidental thereto;

Preamble.

PART- I

It is hereby enacted as follows:-

1. (1) This Act may be called the Sindh Environmental Protection Act, 2014. **Short title and commencement.**
- (2) It extends to the whole of the Province of Sindh.
- (3) It shall come into force at once.

2. In this Act, unless there is anything repugnant in the subject or context- **Definitions.**

- (i) "adverse environmental effect" means impairment of, or damage to, the environment and includes—
- (a) impairment of, or damage to, human health and safety or to biodiversity or property;
- (b) pollution; and
- (c) any adverse environmental effect as may be specified in the rules or regulations made under this Act;
- (ii) "Agency" means the Sindh Environmental Protection Agency established under section 5 of this Act;
- (iii) "agricultural waste" means waste from farm and agricultural activities including poultry, cattle farming, animal husbandry residues from the use of fertilizers, pesticides and other farm chemicals and agricultural runoff;

- (iv) "air pollutant" means any substance that causes pollution of air and includes soot, smoke, dust particles, odor, light, electro-magnetic, radiation, heat, fumes, combustion exhaust, exhaust gases, noxious gases, hazardous substances and radioactive substances;
- (v) "biodiversity" or "biological diversity" means the variability among living organisms from all sources, including inter-alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems;
- (vi) "biosafety" means the mechanism developing through policy and procedure to ensure human health and the environmentally safe application of biotechnology;
- (vii) "Council" means the Sindh Environmental Protection Council established under section 3 of this Act;
- (viii) "discharge" means spilling, leaking, pumping, depositing, seeping, releasing, flowing-out, pouring, emitting, emptying or dumping into the land, water or atmosphere;
- (ix) "ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit;
- (x) "effluent" means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour;
- (xi) "emission standards" means the permissible standards established by the Agency for emission of air pollutants and noise and for discharge of effluent and waste;
- (xii) "environment" means-
 - (a) air, water, land and natural resources;
 - (b) all layers of the atmosphere;
 - (c) all organic and inorganic matters and living organisms;
 - (d) ecosystems and ecological relationships;
 - (e) buildings, structures, roads, facilities and works;
 - (f) all social and economic conditions affecting community life; and
 - (g) the inter-relationship between any of the factors in sub-clause (a) to (f) made under this Act;
- (xiii) "environmental aspect" means an organization's activities or services that can interact with the environment;

- (xiv) "environment audit" means a systemic scrutiny of environmental performance of an organization, factory, company or manufacturing and production unit regarding to its operations;
- (xv) "environmental impact assessment" means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigation and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed;
- (xvi) "Environmental Management Plan" means a site specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with the environmental legislation;
- (xvii) "Environmental Protection Order" means an order passed under Section 21 made under this Act.
- (xviii) "Environmental Protection Tribunal" means the Environmental Protection Tribunal constituted under section 25 of this Act ;
- (xxix) "Environmental Review" means a quantitative and qualitative assessment of documents submitted by proponent, comments from public and Government agencies or organizations;
- (xx) "factory" means any premises in which industrial activity is being undertaken;
- (xxi) "genetically modified organism" means any organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology and which does not occur naturally through mating and or recombination and includes both living and non-living modified organisms;
- (xxii) "Government" means the Government of Sindh;
- (xxiii) "Government Agency" includes:-
 - (a) A department, attached department or any other office of Government; and
 - (b) A development authority, local authority, company body corporate established or control by Government;

- (xxiv) "Court" means the Court of the Judicial Magistrate First Class;
- (xxv) "hazardous substance" means-
- (a) a substance or mixture of substances, other than a pesticide as defined in the Agricultural Pesticides Ordinance, 1971 (II of 1971), which, by reason of its chemical activity or toxic, explosive, flammable, corrosive, radioactive or other characteristics, causes, or is likely to cause, directly or in combination with other matters an adverse environmental effect; and
 - (b) any substance which may be prescribed as a hazardous substance;
- (xxvi) "hazardous waste" means waste which is or which contains a hazardous substance or which may be prescribed as hazardous waste, hospital waste, nuclear waste, obsolete pesticides and persistent organic pollutants;
- (xxvii) "hospital waste" means waste medical supplies and materials of all kinds, and waste blood, tissue, organs and other parts of the human and animal bodies, from hospitals, clinics, laboratories and veterinary facilities;
- (xxviii) "industrial activity" means any operation or process for manufacturing, making, formulating, synthesising, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal, or for mining, for oil and gas exploration and development, or for pumping water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purposes;
- (xxix) "industrial waste" means waste resulting from an industrial activity;
- (xxx) "initial environmental examination" means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an adverse environmental effect for requiring preparation of an environmental impact assessment;
- (xxxi) "local authority" means any agency set up or designated by Government, by notification in the official Gazette, to be a local authority for the purposes of this Act;

- (xxxii) "local council" means a local council constituted or established under a law relating to local government;
- (xxxiii) "motor vehicle" means any mechanically propelled vehicle adapted for use upon land whether its power of propulsion is transmitted thereto from an external or internal source, and includes a chassis to which a body has not been attached, and a trailer, but does not include a vehicle running upon fixed rails;
- (xxxiv) "municipal waste" includes sewage, refuse, garbage, waste from abattoirs, sludge and human excreta and the like;
- (xxxv) "noise" means the intensity, duration and character of sounds from all sources, and includes vibration;
- (xxvi) "non degradable plastic products" means a plastic product which are made from the non-biodegradable substances;
- (xxxvii) "nuclear waste" means waste from any nuclear reactor or nuclear plant or other nuclear energy system, whether or not such waste is radioactive;
- (xxxviii) "Oxo-biodegradable Plastic Products" means a plastic product made of a polymer by adding a pro-degrading additive containing a transition metal salt, except cobalt, which cause the plastic to degrade and bio-grade from oxidative and cell mediated phenomena either simultaneously or successfully;
- (xxxix) "person" means any natural person or legal entity and includes an individual, firm, association, partnership, society, group, company, corporation, co-operative society, Government Agency, non-governmental organization, community-based organization, village organization, local council or local authority and, in the case of a vessel, the master or other person having for the time being the charge or control of the vessel;
- (xl) "pollution" means the contamination of air, land or water by the discharge or emission of effluent or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or substances alters unfavorably the chemical, physical, biological, radiational, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious, disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to biodiversity;

- (xli) "prescribed" means prescribed by rules made under this Act;
- (xlii) "project" means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes-
 - (a) construction or use of buildings or other works;
 - (b) construction or use of roads or other transport systems;
 - (c) construction or operation of factories or other installations;
 - (d) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like;
 - (e) any change of land use or water use; and
 - (f) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations;
- (xliii) "proponent" means the person who proposes or intends to undertake a project;
- (xliv) "regulations" means regulations made under this Act;
- (xlv) "rules" means rules made under this Act;
- (xlvi) "sewage" means liquid or semi-solid wastes and sludge from sanitary conveniences, kitchens, laundries, washing and similar activities and from any sewerage system or sewage disposal works;
- (xlvii) "Schedule Plastic Products" means all types of flexible plastic packaging and disposable plastic products made of Polythene, Polypropylene, Polystyrene and Poly-ethylene Terephthalate (PET), used for food and non-food items, like shopping bags, garbage bags, snacks packs, water and milk packaging, shrink wraps, bubble pellet wraps, films, liners, woven or non-woven bags, mulch films;
- (xlviii) "Sindh Environmental Quality Standards" means standards established by the Agency under clause (e) of sub-section(1) of section 6 and approved by the Council under clause (c) of sub-section(1) of section 4 made under this Act;

- (xlix) "standards" means qualitative and quantitative standards for discharge of effluent and wastes and for emission of air pollutants and noise either for general applicability or for a particular area, or from a particular production process, or for a particular product, and includes the Sindh Environmental Quality Standards, emission standards and other standards established under this Act and the rules and regulations;
- (l) "strategic environmental assessment" mean an analysis of a proposed policy, legislation, plan or programme to determine whether the principles of sustainable development have been integrated therein and to identify its likely environmental effects and such components as require an initial environmental examination or environmental impact assessment;
- (li) "sustainable development" means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs;
- (lii) "trans-boundary environmental impacts" means environmental impact arising from beyond the boundaries or limits of Sindh province and causing any adverse environmental impact or pollution in the air, land, water and coastal water of Sindh province;
- (liii) "waste" means any substance or object which has been, is being or is intended to be, discarded or disposed-of, and includes liquid waste, solid waste, waste gases, suspended waste, industrial waste, agricultural waste, nuclear waste, municipal waste, hospital waste, used polyethylene bags and residues from the incineration of all types of waste.
- (liv) "waters (coastal waters, internal waters, territorial waters and historical waters)" means such limits of the waters adjacent to the land territory as may be specified in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976).

PART-II

THE SINDH ENVIRONMENTAL PROTECTION COUNCIL.

3. (1) The Government of Sindh shall, by notification in the official Gazette, establish a Council to be known as the Sindh Environmental Protection Council consisting of-

**Establishment of
the Sindh
Environmental
Protection Council.**

- (i) Chief Minister or such other person as the Chief Minister may nominate in this behalf. **Chairperson**
- (ii) Minister-in-charge of the Environment Protection Department. **Vice Chairperson**
- (iii) Additional Chief Secretary, Planning and Development Department, Government of Sindh. **Ex-officio Member**
- (iv) Secretaries of the Environment, Finance, Public Health Engineering, Irrigation, Health, Agriculture, Local Government, Industries, Live Stock and Fisheries, Forest and Wildlife, Energy, Education, Departments of Government of Sindh and the divisional commissioners of Sindh. **Ex-officio Members**
- (v) Such other persons not exceeding twenty- five as Government may appoint from representatives of the Chambers of Commerce and Industry and industrial associations, representatives of the Chambers of Agriculture, the medical and legal professions, trade unions, non-governmental organizations concerned with the environment and sustainable development, and scientists, technical experts and educationists. **Non-official Members**
- (vi) Director General, Sindh Environment Protection Agency **Member / Secretary**
- (vii) **Two Members of the Provincial Assembly of Sindh amongst the eleven Members of the Standing Committee on Environment nominated by the Speaker** **Members**

2) The Members of the Council, other than ex-officio members, shall be appointed in accordance with the prescribed procedure.

(3) A non-official member, unless he sooner resigns or is removed, shall hold office for a term of three years and shall be eligible for re-appointment but shall not hold office for more than two terms.

(4) The Council shall frame its own Rules of Procedure.

(5) The Council shall hold meetings, as and when necessary, but not less than two meetings, shall be held in a year.

(6) The Council may constitute committees of its members and entrust them with such functions as it may deem fit, and the recommendations of the committees shall be submitted to the Council for approval.

(7) The Council, or any of its committees, may invite any technical expert or representative of any Government Agency or non-governmental organization or other person possessing specialized knowledge of any subject for assistance in performance of its functions.

4. (1) The Council shall-

Functions and Powers of the Council.

(a) co-ordinate and supervise the enforcement of the provisions of this Act and other laws relating to the environment in the Province;

(b) approve comprehensive provincial environmental and sustainable development policies and ensure their implementation within the framework of a conservation strategy and sustainable development plan as may be approved by Government from time to time;

(c) approve the Sindh Environmental Quality Standards;

(d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources.

(e) coordinate integration of the principles and concerns of sustainable development into socio-economic and development policies, plans and programmes at the provincial, district and local levels;

(f) consider the annual Sindh Environment report and give appropriate directions thereon and cause it to be laid before the Provincial Assembly;

- (g) deal with inter-provincial and federal-provincial issues, and liaise and coordinate with other Provinces through appropriate inter-provincial forums regarding formulation and implementation of standards and policies relating to environmental matters with an inter-provincial impact;
- (h) provide guidelines for biosafety and for the use of genetically modified organisms; and
- (i) assist the Federal Government or Federal Agency in implementation and or administration of various provision of United Nation Convention on Laws on Seas, 1980 (UNCLOS) in coastal waters of the province;

(2) The Council may, either itself or on the request of any person or organization, direct the Agency or any Government Agency to prepare, submit, promote or implement projects for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, and the sustainable development of resources or to undertake research in any specified aspect of environment.

PART-III

THE SINDH ENVIRONMENTAL PROTECTION AGENCY

5. (1) Government shall, by notification in the Official Gazette, establish the Sindh Environmental Protection Agency, to exercise the powers and perform the functions assigned to it under the provisions of this Act and the rules and regulations made thereunder.

Establishment of the Sindh Environmental Protection Agency.

(2) The Agency shall be headed by a Director General who shall be appointed by Government on such terms and conditions as it may determine.

(3) The Agency shall have such administrative, technical and legal staff as Government may specify, to be appointed in accordance with such procedure as may be prescribed.

(4) The powers and functions of the Agency shall be exercised and performed by the Director General.

(5) The Director General may, by general or special order, delegate any of these powers and functions to staff appointed under sub-section (3).

(6) For assisting the Agency in the discharge of its functions Government shall establish Advisory Committees for various sectors and appoint as members thereof eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

6. (1) The Agency shall–

Functions of the Agency.

- (a) administer and implement the provisions of this Act and the rules and regulations;
- (b) prepare, in co-ordination with the appropriate Government Agency or local council and, in consultation with the concerned Advisory Committees where established, environmental policies for the approval of the Council;
- (c) take all necessary measures for the implementation of the environmental policies approved by the Council;
- (d) prepare and publish an annual Sindh Environment Report on the state of the environment in the province;
- (e) prepare or revise and establish the Sindh Environmental Quality Standards with approval of the Council:

Provided that before seeking approval of the Council, the Agency shall publish the proposed Sindh Environmental Quality Standards for public opinion in accordance with the prescribed procedure;

- (f) ensure enforcement of the Sindh Environmental Quality Standards;

(g) where the quality of ambient air, water, land or noise so requires, the Agency may, by notification in the Official Gazette establish different standards for discharge or emission from different sources and for different areas and conditions as may be necessary:

Provided that where these standards are less stringent than the Sindh Environmental Quality Standards; prior approval of the Council shall be obtained;

- (h) establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors;
- (i) take measures to promote research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and sustainable development;
- (j) issue licences, approval for the consignment, handling, transport, treatment, disposal of, storage, handling or otherwise dealing with hazardous substances;

- (k) certify laboratories as approved laboratories for conducting tests and analysis and one or more research institutes as environmental research institutes for conducting research and investigation for the purposes of this Act;
- (l) identify the needs for and initiate legislation in various sectors of the environment;
- (m) provide assistance to relevant Federal and Provincial Government Agencies in the management of environment accidents and natural and environmental disasters, including conduct of inquiry thereto;
- (n) render advice and assistance in environmental matters including such information and data available with it as may be required for carrying out the purposes of this Act:

Provided that the disclosure of such information shall be subject to the restrictions specified in Part XI (Access to Information);

- (o) assist Government Agencies, local councils, local authorities and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the Sindh Environmental Quality Standards;
- (p) provide information and guidance to the public on environmental matters;
- (q) recommend environmental courses, topics, literature and books for incorporation in the curricula and syllabi of educational institutions;
- (r) promote public education and awareness of environmental issues through mass media and other means including seminars and workshops;
- (s) establish and maintain mechanisms, including its own website, to disseminate information, subject to the provisions of this Act, regarding policies, plans and decisions of the Government, the Council and the Agency, relating to the environment;
- (t) specify safeguards for the prevention of accidents and disasters which may cause pollution, collaborate with the concerned persons in the preparation of contingency plans for control of such accidents and disasters, and co-ordinate implementation of such plans;

- (u) review and approve mitigation plans and give guidance and directions, where necessary, relating to clean up operations ordered under this Act;
 - (v) encourage the formation and working of non-governmental organizations, community organizations and village organizations to prevent and control pollution and promote sustainable development;
 - (w) take or cause to be taken all necessary measures for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development; and
 - (x) perform any function that the Council may assign to it.
- (2) The Agency may -
- (a) undertake inquiries or investigation into environmental issues, either of its own accord or upon complaint from any person or organization;
 - (b) request any person to furnish any information or data relevant to its functions;
 - (c) initiate, with the approval of Government, requests for foreign assistance in support of the purposes of this Act and enter into arrangements with foreign agencies or organizations for the exchange of material or information and participate in international seminars or meetings;
 - (d) recommend to Government and the Council the adoption of financial and fiscal programmes, schemes or measures for achieving environmental objectives and goals and the purposes of this Act, including -
 - (i) taxes, duties, cesses and other levies; and
 - (ii) incentives, prizes, awards, rewards, subsidies, tax exemptions, rebates and depreciation allowances;
 - (e) establish and maintain laboratories to help in the performance of its functions under this Act and to conduct research in various aspects of the environment and provide or arrange necessary assistance for the establishment of similar laboratories in the private sector;
 - (f) arrange, in accordance with such procedure as may be prescribed, financial assistance for projects designed to facilitate in discharge of its functions; and
 - (g) acquire assistance of concerned authorities of district administration and other relevant agencies, departments and police assistance for enforcement of this Act.

7. Subject to the provisions of this Act, the Agency may-

Powers of the Agency.

(a) lease, purchase, acquire, own, hold, improve, use or otherwise deal in and with any property both moveable and immovable;

(b) sell, convey, mortgage, pledge, exchange or otherwise dispose of its property and assets;

(c) fix and realize fees, rates and charges for rendering any service or providing any facility, information or data under this Act or its rules and regulations;

(d) enter into contracts, execute instruments, incur liabilities and do all acts or things necessary for proper management and conduct of its business;

(e) appoint, with the approval of Government and in accordance with such procedures as may be prescribed, such advisers, experts and consultants as it considers necessary for the efficient performance of its functions on such terms and conditions as it may deem fit;

(f) summon and enforce the attendance of any person and require him to supply any information or document needed for the conduct of any enquiry or investigation into any environmental issue;

(g) Director General may authorize any officer or official to enter and inspect or under a search warrant issued by Environmental Protection Tribunal or a Court, search at any time, any land, building, premises, vehicle or vessel or other place where or in which there are reasonable grounds to believe that an offence under this Act has been, or is being, or likely to be committed;

(h) take samples of any materials, products, articles or substances or of the effluent, wastes or air pollutants being discharged or emitted or of air, water or land in the vicinity of the discharge or emission;

(i) arrange for the testing and analysis of samples at a certified laboratory;

(j) confiscate any article used in the commission of the offence where the offender is not known or cannot be found within a reasonable time:

Provided that the powers under clauses (f), (g), (h) (i), and (j) shall be exercised in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898) or the rules and regulations and under the direction of the Environmental Protection Tribunal or a Court; and

- (k) establish the Sindh Environmental Co-ordination Committee comprising the Director-General as its Chairman and such other persons as Government shall appoint as its members to exercise such powers and perform such functions as shall be delegated or assigned to it by Government for carrying out the purposes of this Act and for ensuring coordination among Government Agencies in implementation of environmental policies.

PART-IV

SINDH SUSTAINABLE DEVELOPMENT FUND

8. (1) There shall be established a Sindh Sustainable Development Fund.

**Establishment of
the Sindh
Sustainable
Development Fund.**

(2) The Sindh Sustainable Development Fund shall be derived from the following sources, namely—

- (a) allocations and grants made or loans advanced by the Government of Sindh or by the Federal Government;
- (b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, national or international agencies, and non-governmental organizations; and
- (c) voluntary contributions from private, corporate, multinational organizations and other persons.
- (d) Any fees generated under the provision of this act including the fines imposed against contraventions including penalties.

(3) The Sindh Sustainable Development Fund shall be utilized, in accordance with such procedures as may be prescribed for -

- (a) providing financial assistance to projects designed for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, the sustainable development of resources and for research in any specified aspect of the environment; and
- (b) any other purposes which, in the opinion of the Board, will help achieve environment objectives and the purposes of this Act.

9. (1) The Sindh Sustainable Development Fund shall be managed by a Board known as the Provincial Sustainable Development Fund Board consisting of—

- (i) Additional Chief Secretary, **Chairperson**
Planning and Development
Department, Government of
Sindh,
- (ii) Such officers of Government, **Ex-officio Members**
not exceeding five (05), as
Government may appoint
including Secretaries of the
Environment, Finance,
Industries and Local
Government Departments,
Government of Sindh.
- (iii) Such non-official persons, not **Non-official Members**
exceeding five (05), as
Government may appoint,
including representatives of
the Chambers of Commerce
and Industry, non-
governmental organizations
and major donors.
- (iv) Director General, Sindh **Secretary/ Member**
Environmental Protection
Agency.

(2) The members of the Board, other than ex-officio members, shall be appointed in accordance with the prescribed procedure.

(3) A non-official member of the Board, unless he sooner resigns or is removed, shall hold office for a term of three years and shall be eligible for re-nomination, but shall not hold office for more than two terms.

(4) The Board shall frame its own rules of procedure with the approval of Government.

(5) In accordance with such procedures and such criteria as may be prescribed, the Board shall have the power to —

- (a) sanction financial assistance for eligible projects;
- (b) invest moneys held in the Sindh Sustainable Development Fund in such profit-bearing Government bonds, saving schemes and securities as it may deem suitable; and
- (c) take such measures and exercise such powers as may be necessary for utilization of the Sindh Sustainable Development Fund for the purposes specified in sub-section (3) of section 8.

(6) The Board shall constitute committees of its members to undertake regular monitoring of projects financed from the Sindh Sustainable Development Fund and to submit progress reports to the Board which shall publish an Annual Report incorporating its annual audited accounts and performance evaluation based on the progress reports.

10. (1) The Agency shall maintain proper accounts of the Sindh Sustainable Development Fund and other relevant records and prepare annual statement of accounts in such form as may be prescribed. **Accounts.**

(2) The accounts of the Sindh Sustainable Development Fund shall be audited annually by the Auditor General of Pakistan.

PART-V PROHIBITIONS AND ENFORCEMENT

11. (1) Subject to the provisions of this Act and the rules and regulations, no person shall discharge or emit or allow the discharge or emission of any effluent, waste, pollutant, noise or any other matter that may cause or likely to cause pollution or adverse environmental effects, as defined in section 2 of this Act, in an amount, concentration or level which is in excess to that specified in Sindh Environmental Quality Standards; or, where applicable, the standards established under Section 6(1)(g)(i); or direction issued under Section 17, 19, 20 and 21 of this Act; or any other direction issued, in general or particular, by the Agency. **Prohibition of certain discharges or emissions and compliance with standards.**

(2) All persons, in industrial or commercial or other operations, shall ensure compliance with the Environmental Quality Standards for ambient air, drinking water, noise or any other Standards established under section 6(1)(g)(i); shall maintain monitoring records for such compliances; shall make available these records to the authorized person for inspection; and shall report or communicate the record to the Agency as required under any directions issued, notified or required under any rules and regulations.

(3) Monitoring and analysis under sub-section (1) and (2), shall be acceptable only when carried out by the Environmental Laboratory certified by the Agency as prescribed in the rules.

12. No person shall import hazardous waste into Sindh province or its coastal, internal, territorial or historical waters, except acquiring prior approval of the Agency. **Prohibition of import of hazardous waste.**

13. Subject to the provisions of this Act, no person shall import, generate, collect, consign, transport, treat, dispose of, store, handle or otherwise use or deal with any hazardous substance except-

Handling of hazardous substances.

- (a) under a licence issued by the Agency; or
- (b) in accordance with the provisions of any other law, rule, regulation or notification for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement or other instrument to which Government is a party.

14. (1) Subject to the provisions of this Act and the rules and regulations, no person shall cause any act, deed or any activity, including-

Prohibition of action adversely affecting Environment.

- (a) recycling or reuse of hospital waste and infectious waste;
- (b) disposal of solid and hazardous wastes at unauthorized places as prescribed;
- (c) dumping of wastes or hazardous substances into coastal waters and inland water bodies;
- (d) release of emissions or discharges from industrial or commercial operations as prescribed;
- (e) recycling or reuse or recovery of hazardous wastes or industrial by-products in an unauthorized or non-prescribed manner or procedure; and
- (f) any activity which may cause adverse environmental affect due to trans boundary projects of Province of Sindh.

which lead to pollution or impairment of or damage to biodiversity, ecosystem, aesthetics or any damage to environment and natural resources as defined in section 2 (xxxvi) of this Act.

(2) No person shall generate, handle, transport, dispose of or handle the hospital waste and infections waste except in accordance with the Hospital Waste Management Rules and in such manner as may be prescribed.

(3) No person shall import, manufacture, stockpile, trade, supply, distribute or sell any scheduled plastic product which is non-degradable. The scheduled plastic products must be oxo-biodegradable and the pro-degradant used must be approved by the Agency or any other department or agency and in such manner as prescribed.

15. (1) Subject to the provisions of this Act, no person shall operate or manufacture a motor vehicle or class of vehicles from which air pollutants or noise are being emitted in an amount,

Regulation of motor vehicles.

concentration or level which is in excess of the Sindh Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6.

(2) For ensuring compliance with the standards mentioned in sub-section (1), the Agency may direct that any motor vehicle or class of vehicles shall install such pollution control devices or other equipment or use such fuels or undergo such maintenance or testing as prescribed.

(3) For ensuring compliance with the standards mentioned in sub-section (1), the Agency may direct that any manufacturer of motor vehicle or class of vehicles shall use such manufacturing standard or design or pollution control devices or other equipment or undergo such testing as may be prescribed.

(4) Where a direction has been issued by the Agency under sub-section (2) and (3) in respect of any motor vehicles or class of motor vehicles, no person shall operate or manufacture any such vehicle till such direction has been complied with.

16. (1) The monitoring, testing and analysis carried out in compliance or for the enforcement of any provisions of this Act.

**Certified
Environmental
Laboratory.**

(2) The laboratory or organization having any facility for environmental monitoring, testing and analysis and intend to perform under sub-section (1) shall register with the Agency in accordance with the Environmental Laboratory Certification Rules as prescribed.

PART-VI ENVIRONMENTAL EXAMINATIONS AND ASSESSMENTS

17. (1) No proponent of a project shall commence construction or operation unless he has filed with the Agency an initial environmental examination or environmental impact assessment, and has obtained from the Agency approval in respect thereof.

**Initial
environmental
examination and
environmental
impact assessment.**

(2) The Agency shall –

(a) review the initial environmental examination and accord its approval, subject to such terms and conditions as it may prescribe, or require submission of an environmental impact assessment by the proponent; or

(b) review the environmental impact assessment and accord its approval subject to such terms and conditions as it may deem fit to impose or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated or decline approval of the environmental impact assessment as being contrary to environmental objectives.

(3) Every review of an environment impact assessment shall be carried out with public participation and, subject to the provisions of this Act, after full disclosure of the particulars of the project.

(4) The Agency shall communicate its approval or otherwise within a period of two months from the date that the initial environmental examination is filed, and within a period of four months from the date that the environmental impact assessment is filed complete in all respects in accordance with the regulations, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations:

(5) The provisions of sub-sections (1), (2), (3) and (4) shall apply to such categories of projects and in such manner as prescribed:

(6) The Agency shall maintain separate registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open for inspection to the public during office hours.

18. (1) All provincial government agencies, departments, authorities, local councils and local authorities responsible for formulating policies, legislation, plans and programmes to be implemented in Sindh province which may cause any environmental impact in the jurisdiction of the province shall, before submitting the same to the competent authority for approval, forward to the Sindh Environmental Protection Agency a strategic environment assessment containing —

**Strategic
environmental
assessment.**

(a) description of the objectives and features of the proposed policy, legislation, plan or programme that are in consonance with the principles of sustainable development;

(b) assessment of the adverse environmental effects, if any, likely to be caused during implementation of the policy, legislation, plan or programme alongwith proposed preventive, mitigation and compensatory measures;

(c) analysis of possible alternatives; and

(d) identification of those components of the policy, legislation, plan or programme, if any, in respect of which specific environmental impact assessment need to be carried out in due course.

- (2) The Agency shall, in consultation with the concerned Government Agencies and Advisory Committees where established, review the strategic environment assessment, within sixty (60) days of its filing, and prepare a report containing its comments and recommendations in respect thereof which shall be forwarded to the initiating Government Agency, authority, local council or local authority and duly considered by it and the competent authority before approval or otherwise of the proposed policy, legislation, plan or programme.
- (3) The provisions of sub-sections (1), and (2) shall apply to such categories of policies, plans and programmes and in such manner as may be prescribed.

19. (1) The Agency shall carry out or arrange environmental monitoring of all projects in respect of which it has approved an initial environmental examination or environmental impact assessment to determine whether the actual environmental impact exceeds the level predicted in the assessment and whether the conditions of the approval are being complied with.

**Environmental
monitoring.**

(2) For purposes of sub-section (1), the Agency may require the person in charge of a project to furnish such information as it may specify pertaining to the environmental impact of the project, including quantitative and qualitative analysis of -

- (a) discharge of effluents, wastes, emissions of air pollutants, noise and any other matter or action that may be found offensive under section 14 from the project on daily, weekly, monthly or annual basis;
- (b) ambient quality of the air, water, noise and soil before, during and after construction and during operation of the project.

(3) On review of the data collected by it and information provided, the Agency may issue such directions to the person in charge as it may consider necessary to ensure compliance with the conditions of the approval.

20. (1) The Agency shall from time to time require the person in charge of a project to furnish, within such period as may be specified, an environmental audit or environmental review report or environmental management plan containing a comprehensive appraisal of the environmental aspects of the project.

**Environmental
Audit and Review.**

- (2) The report of a project prepared under sub-section (1) shall include -
 - (a) analysis of the predicted qualitative and quantitative impact of the project as compared to the actual impact;

- (b) evaluation of the efficacy of the preventive, mitigation and compensatory measures taken with respect to the project; and
- (c) recommendations for further minimizing or mitigating the adverse environmental impact of the project.

(3) Based on its review of the environmental audit report, the Agency may, after giving the person in charge of the project an opportunity of being heard, direct that specified mitigation and compensatory measures be adopted within a specified time period and may also, where necessary, modify the approval granted by it under section 17.

PART-VII

ENVIRONMENTAL PROTECTION ORDER

21. (1) Where the Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of any provision of this Act, the rules or regulations or of the conditions of a licence, or is likely to cause, or is causing or has caused an adverse environmental effect, the Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order direct such person to take such measures as the Agency may consider necessary within such period as may be specified in the order.

**Environmental
Protection Order.**

(2) In particular and without prejudice to the generality of the foregoing power, such measures may include —

- (a) immediate stoppage, preventing, lessening or controlling the discharge, emission, disposal, handling, act or omission, or to minimize or remedy the adverse environmental effect;
- (b) installation, replacement or alteration of any equipment or thing to eliminate, control or abate on a permanent or temporary basis, such discharge, emission, disposal, handling, act or omission;
- (c) action to remove or otherwise dispose of the effluent, waste, air pollutant, noise, or hazardous substances;
- (d) action to restore the environment to the condition existing prior to such discharge, disposal, handling, act or omission, or as close to such condition as may be reasonable in the circumstances, to the satisfaction of the Agency; and
- (e) impose a penalty as prescribed.

(3) Notwithstanding the provisions of sub-section (1), in an emergency situation where, for reasons to be recorded, the Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or the handling of hazardous substances, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of the provisions of this Act and that circumstances of the case warrant immediate action in the public interest, it may pass an ad-interim order of the nature described in sub-sections (1) and (2) by providing reasonable opportunity of hearing.

PART-VIII

OFFENCES AND PENALTIES

22. (1) Whoever contravenes or fails to comply with the provisions of sections 11, 17, 18 and 21 or any order issued there under shall be punishable with a fine which may extend to five million rupees, to the damage caused to environment and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues:

Penalties.

Provided that if the contravention of the provisions of section 11 also constitutes a contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2).

(2) Whoever contravenes or fails to comply with the provisions of sections 13, 14, 15 and 16 or any rule or regulation or conditions of any license, any order or direction, issued by the Agency, shall be punished with a fine, and in case of continuing contravention or failure with an additional fine which may extend to ten thousand rupees for every day during which such contravention continues.

(3) Where an accused has been convicted of an offence under sub-sections (1) and (2), the Environmental Protection Tribunal and Court shall, as the case may be, in passing sentence, take into account the extent and duration of the contravention or failure constituting the offence and the attendant circumstances.

(4) Where an accused has been convicted of an offence under sub-sections (1) or (2), the Environmental Protection Tribunal or Court, as the case may be, shall endorse a copy of the order of conviction to the concerned trade or industrial association, if any, or the concerned Provincial Chamber of Commerce and Industry or the Federation of Pakistan Chambers of Commerce and Industry.

(5) Where a person convicted under sub-sections (1) and (2) had been previously convicted for any contravention of this Act and its rules or regulations, the Environmental Protection Tribunal, as the case may be, may, in addition to the punishment awarded thereunder-

- (a) sentence him to imprisonment for a term that may extend up to three years;
- (b) order the closure of the factory;
- (c) order confiscation of the facility, machinery and equipment, vehicle or substance, record, document or other object used or involved in contravention of the provisions of this Act;
- (d) order such person to restore the environment at his own cost, to conditions existing prior to the contravention or as close to such conditions as may be reasonable in the circumstances to the satisfaction of the Agency; and
- (e) order that compensation be paid to any person or persons for any loss, or damage to their health or property suffered by such contravention.

(6) The Director General or an officer generally or specially authorised by him in this behalf may, on the application of the accused, compound an offence under this Act with the permission of the Environmental Protection Tribunal or Court in accordance with such procedure as prescribed.

(7) Where the Director General is of the opinion that a person had contravened any provision of this Act, he may, subject to the rules, by notice in writing to that person require him to pay to the Agency a penalty in the amount set out in the notice for each day the contravention continues.

23. Where any contravention of this Act has been committed by a body corporate, and it is proved that such offence has been committed with the consent or connivance of, or is attributed to any negligence on the part of, any director, partner, manager, secretary or other officer of the body corporate, such director, partner, manager, secretary or other officer of the body corporate, shall be deemed guilty of such contravention along with the body corporate and shall be punished accordingly:

Offences by body corporate.

Provided that in the case of a company as defined under the Companies Ordinance, 1984 (XLVII of 1984), only the Chief Executive as defined in the said Ordinance shall be liable under this section.

Explanation.— For the purposes of this Section, “body corporate” includes a firm, association of persons and a society registered under the Societies Registration Act, 1860 (XXI of 1860), or under the Co-operative Societies Act, 1925 (VII of 1925).

24. Where any contravention of this Act has been committed by any Government Agency, local authority or local council, and it is proved that such contravention has been committed with the

Offences by Government Agencies, local authorities or local

consent or connivance of, or is attributable to any negligence on the part of, the Head or any other officer of Government Agency, local authority or local council, such Head or other officer shall also be deemed guilty of such contravention along with the Government Agency, local authority or local council and shall be liable to be proceeded against and punished accordingly. **councils.**

PART-IX

ENVIRONMENTAL PROTECTION TRIBUNALS AND COURTS

25. (1) Government may, by Notification in the Official Gazette, establish as many Environmental Protection Tribunals as it considers necessary and, where it establishes more than one Environmental Protection Tribunal, it shall specify territorial limits within which, or the class of cases in respect of which, each one of them shall exercise jurisdiction under this Act. **Environmental Protection Tribunals.**

(2) An Environmental Protection Tribunal shall consist of a Chairperson who is, or has been, or is qualified for appointment as a Judge of the High Court to be appointed after consultation with the Chief Justice of the High Court and two members to be appointed by Government, of which at least one shall be a technical member nominated from amongst the officers of the Agency with suitable professional qualifications and experience in the environmental field.

(3) For every sitting of the Environmental Protection Tribunal, the presence of the Chairperson and not less than one Member shall be necessary.

(4) A decision of an Environmental Protection Tribunal shall be expressed in terms of the opinion of the majority of its members, including the Chairperson, or if the case has been decided by the Chairperson and only one of the members and there is a difference of opinion between them, the decision of the Environmental Protection Tribunal shall be expressed in terms of the opinion of the Chairperson.

(5) An Environmental Protection Tribunal shall not, merely by reason of a change in its composition, or the absence of any member from any sitting, be bound to recall and rehear any witness who has given evidence, and may act on the evidence already recorded by, or produced, before it.

(6) An Environmental Protection Tribunal may hold its sittings at such places within its territorial jurisdiction as the Chairperson may decide.

(7) No act or proceeding of an Environmental Protection Tribunal shall be invalid by reason only of the existence of a vacancy in, or defect in the constitution, of, the Environmental Protection Tribunal.

(8) The terms and conditions of service of the Chairperson and members of the Environmental Protection Tribunal shall be such as may be prescribed.

26. (1) An Environmental Protection Tribunal shall exercise such powers and perform such functions as are, or may be, conferred upon or assigned to it by or under this Act or the rules and regulations.

Jurisdiction and powers of Environmental Protection Tribunals.

(2) All contraventions punishable under sub-section (1) of section 22 shall exclusively be triable by an Environmental Protection Tribunal.

(3) An Environmental Protection Tribunal shall not take cognizance of any offence triable under sub-section (2) except on a complaint in writing by—

- (a) the Agency or any Government Agency or Local Council; and
- (b) any aggrieved person, who has given notice of not less than thirty days to the Agency, of the alleged contravention and of his intention to make a complaint to the Environment Protection Tribunal.

(4) In exercise of its criminal jurisdiction, the Environmental Protection Tribunal shall have the same powers as are vested under the Code of Criminal Procedure, 1898 (Act V of 1898).

(5) In exercise of the appellate jurisdiction under section 27 the Environmental Protection Tribunal shall have the same powers and shall follow the same procedure as an appellate court in the Code of Civil Procedure, 1908 (Act V of 1908).

(6) In all matters with respect to which no procedure has been provided for in this Act, the Environmental Protection Tribunal shall follow the procedure laid down in the Code of Civil Procedure, 1908 (Act V of 1908).

(7) An Environmental Protection Tribunal may, on application filed by any officer duly authorised in this behalf by the Director General, issue bailable warrant for the arrest of any person against whom reasonable suspicion exists, of his having been involved in contravention punishable under sub-section (1) of section 22:

Provided that such warrant shall be applied for, issued and executed in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898):

Provided further that if the person arrested executes a bond with sufficient sureties in accordance with the endorsement on the warrant he shall be released from custody, failing which he shall be taken or sent without delay to the officer in-charge of the nearest jurisdiction police station.

(8) All proceedings before the Environmental Protection Tribunal shall be deemed to be judicial proceedings within the meaning of sections 193 and 228 of the Pakistan Penal Code (Act XLV of 1860), and the Environmental Protection Tribunal shall be deemed to be a court for the purpose of sections 480 and 482 of the Code of Criminal Procedure, 1898 (Act V of 1898).

(9) No court other than an Environmental Protection Tribunal shall have or exercise any jurisdiction with respect to any matter to which the jurisdiction of an Environmental Protection Tribunal extends under this Act and the rules and regulations.

(10) Where the Environmental Protection Tribunal is satisfied that a complaint made to it under sub-section (3) is false and vexatious to the knowledge of the complainant, it may, by an order, direct the complainant to pay to the person complained against such compensatory costs which may extend to one hundred thousand rupees.

27. (1) Any person aggrieved by any order or direction of the Agency under any provision of this Act or the rules or regulations may prefer an appeal with the Environmental Protection Tribunal within thirty days of the date of communication of the impugned order or direction to such person.

Appeals to the Environmental Protection Tribunal.

(2) An appeal to the Environmental Protection Tribunal shall be in such form, contain such particulars and be accompanied by such fees as prescribed.

28. (1) Any person aggrieved by any final order or by any sentence of the Environmental Protection Tribunal passed under this Act may, within thirty days of communication of such order or sentence, prefer an appeal to the High Court.

Appeals from orders of the Environmental Protection Tribunal.

(2) An appeal under sub-section (1) shall lie before the High Court of Sindh.

29. (1) Notwithstanding anything contained in the Code of Criminal Procedure, 1898 (Act V of 1898), or any other law for the time being in force, but subject to the provisions of this Act, all contraventions punishable under sub-section (2) of section 22 shall exclusively be triable by the Court of Judicial Magistrate of First Class having of First Class having jurisdiction.

Jurisdiction of Judicial Magistrate.

(2) A Judicial Magistrate shall be competent to impose any punishment specified in sub-sections (2) and (4) of section 22.

(3) A Judicial Magistrate shall not take cognizance of an offence triable under sub-section (1) except on a complaint in writing by—

- (a) the Agency; and
- (b) any aggrieved person.

30. Any person aggrieved by any final order or sentence passed by a Judicial Magistrate under section 28 may, within thirty days from the date of the communication of such order or sentence, appeal to the Court of the District and Sessions Judge defined as Green Court under this Act, whose decision thereon shall be final.

Appeals from orders of the Judicial Magistrate.

PART-X PUBLIC PARTICIPATION

31.(1) The Agency shall cause relevant details of any proposed project regarding which an Environmental Impact Assessment has been received to be published, alongwith an invitation to the public to furnish their comments thereon within a specified period.

Public participation.

(2) In accordance with such procedure as may be prescribed, the Agency shall hold public hearings to receive additional comments and hear oral submissions.

(3) All comments received under sub-sections (1) and (2) shall be duly considered by the Agency while reviewing the environmental impact assessment or strategic impact assessment, and decision or action taken thereon shall be communicated to the persons who have furnished the said comments.

PART-XI GENERAL

32. The Agency may, by notification in the official Gazette, make and amend the schedule.

Power to make and amend schedule.

33. No suit, prosecution or other legal proceedings shall lie against Government, the Council, the Agency, the Director General of the Agency, members, officers, employees, experts, advisors, committees or consultants of the Agency or Environmental Protection Tribunal or Court or any other person for anything which is done or intended to be done in good faith under this Act or rules or regulations.

Indemnity

34. Any dues recoverable by the Agency under this Act and rules or regulations shall be recoverable as arrears of land revenue.

Dues recoverable as arrears of land revenue.

35. The provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force.

Act to override other laws.

36. The Sindh Environment Protection Agency may, by notification in the Official Gazette, make rules for carrying out the

Power to make rules.

purposes not in consistence of this Act with the approval of Government.

37. (1) For carrying out the purposes of this Act, the Agency may, by Notification in the Official Gazette and with the approval of Government, make regulations not inconsistent with the provisions of this Act or the rules. **Power to make regulations.**

(2) In particular and without prejudice to the generality of the foregoing power, such regulations may provide for —

(a) submission of periodical reports, data or information by any Government Agency, local authority or local council in respect of environmental matters;

(b) preparation of emergency contingency plans for coping with environmental hazards and pollution caused by accidents, natural disasters and calamities;

(c) appointment of officers, advisors, experts, consultants and employees **as per prescribed rules**;

(d) levy of fees, rates and charges in respect of services rendered, actions taken and schemes implemented;

(e) monitoring and measurement of discharges and emissions;

(f) categorization of projects to which, and the manner in which sections 17, 18 and 20 applies;

(g) laying down of guidelines for preparation of initial environmental examination, environmental impact assessment and strategic environmental assessment, and development of procedures of their filing, reviews and approval.

(h) laying down standard operating procedures for environmental sampling, examination of water, waste water, gaseous emissions, solid waste and noise;

(i) providing procedures for handling hazardous substances; and

(j) installation of devices in, use of fuels by, and maintenance and testing of motor vehicles for control of air and noise pollution.

**BY ORDER OF THE SPEAKER
PROVINCIAL ASSEMBLY OF SINDH**

**G.M.UMAR FAROOQ
SECRETARY
PROVINCIAL ASSEMBLY OF SINDH**

Annex II

SEPA (Environmental Assessment)
Regulations 2021



**GOVERNMENT OF SINDH
SINDH ENVIRONMENTAL PROTECTION AGENCY**

Karachi dated the 03rd September, 2021

NOTIFICATION

NO.EPA/TECH/739/2021:- In exercise of the powers conferred by section 37 of the Sindh Environmental Protection Act, 2014, the Sindh Environmental Protection Agency, with the approval of Government, is pleased to make the following regulations, namely:-

1. Short title and commencement

- (1) These regulations may be called the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021.
- (2) They shall come into force at once.

2. Definitions. -

- (1) In these regulations, unless there is anything repugnant in the subject or context
 - (a) “Act” means the Sindh Environmental Protection Act, 2014 (VIII of 2014);
 - (b) “Agency” means the Sindh Environmental Protection Agency as defined under section 2(ii);
 - (c) “Director General” means the Director General of the Agency;
 - (d) Environmental Checklist means rapid environmental assessment or environmental screening through a prescribed checklist in respect of projects having least/minimal impacts on the environment.
 - (e) "Firm" means the Environmental Consulting Firm registered by the Agency.
 - (f) “Environmentally sensitive area” means a location, large or small, that has significant environmental values that contribute to maintaining biological diversity and integrity, have intrinsic or attributed scientific, historical or cultural heritage value, or are important in providing amenity, harmony or sense of community, ecosystem as declared by Agency.
 - (g) “Protected area” means any area which safeguards the earths precious bio-diversity, protected areas of natural beauty and conservation of cultural significance as declared by relevant authority;
 - (h) “Schedule” means the Schedules provided in these regulations;

- (i) “Urban area” means an area within the limits of a town, municipality or city as determined by the Agency on the basis of population and environmental issues
 - (2) All other words and expressions used but not defined in these regulations shall have the same meaning as are assigned to them in the Act.
- 3. Projects requiring Environmental Checklist (EC)**

A proponent of a project falling in any category listed in Schedule-I shall file environmental checklist with the Agency and the provisions of section 17 shall apply to such projects.
- 4. Projects requiring an Initial Environmental Examination (IEE)**

A proponent of a project falling in any category listed in Schedule-II shall file an IEE with the Agency, and the provisions of section 17 shall apply to such projects.
- 5. Projects requiring an Environmental Impact Assessment (EIA)**

A proponent of a project falling in any category listed in Schedule-III shall file an EIA with the Agency, and the provisions of section 17 shall apply to such projects.
- 6. Projects not requiring an Environmental Assessment**
 - (1) A project not falling in any category listed in Schedules-I, II and III shall not be required to file an EC, IEE or EIA
 - (2) Notwithstanding anything contained in sub-regulation (1), the Agency may direct the proponent of a project, whether or not listed in Schedule I or II or III, to file an EC or IEE or EIA, for reasons to be recorded in such direction:

Provided that no such direction shall be issued without the recommendations in writing of the Advisory Committee constituted under regulations 21.
- 7. Preparation of environmental assessment report**
 - (1) The Agency may issue guidelines for preparation of an EC or IEE or EIA reports including guidelines of general applicability, and sectoral guidelines indicating specific assessment requirements for planning, construction and operation of projects relating to particular sector.
 - (2) The Agency may issue guidelines for preparation scope of an Environmental Management Plan(EMP) or Environmental Audit(EA).
 - (3) Where guidelines have been issued under sub-regulation (1) & (2), an EC, IEE or EIA or EMP or EA shall be prepared, to the extent practicable, in accordance therewith and the proponent shall justify any departure therefrom.
- 8. Review Fees**

The proponent shall pay, at the time of submission of an EC, IEE or EIA or EMP or BTS tower a non-refundable review fee to the Agency as prescribe in Schedule-IV.

9. Filing of report

- (1) Two hard copies and two electronic copies for an EC or IEE or EIA report shall be filed with the Agency by the proponent. The Agency may require the proponent to submit additional copies, as and when required during the review process.
- (2) Every EC, IEE and EIA shall be accompanied by -
 - (a) an application, in the form prescribed in Schedule-V;
 - (b) Copy of receipt showing payment of review fee as prescribed in Schedule-IV

10. Preliminary Scrutiny

- (1) Any report filed by the proponent or applicant shall be returned, if found incomplete in terms of Regulation 9.
- (2) Notwithstanding anything contained in sub-regulation (1) of regulation 12, the Agency may require the proponent to submit an additional information at any stage during the review process.

11. Public participation

- (1) In the case in an EIA, the Agency shall issue a public notice to be published in widely circulated English or Urdu or Sindhi national newspaper and in a local newspaper of general circulation in the area affected by the project, mentioning the type of project, its exact location, the name and address of the proponent and the date, time and place of public hearing for inviting comments from primary stakeholders.
- (2) The date fixed under sub-regulation (1) shall not be earlier than ten days from the date of publication of the notice.
- (3) The Agency shall also ensure the circulation of the EIA, where necessary, to the concerned Government Agencies and solicit their comments thereon.
- (4) All comments received by the Agency from the public or any Government Agency shall be duly considered before issuance of decision.
- (5) The Agency may issue guidelines indicating the basic techniques and measures to be adopted to ensure effective public consultation, involvement and participation in EIA assessment.

12. Review process

- (1) Notwithstanding anything contained in sub section (4) of Section 17, the Agency shall make every effort to conclude its review process of the EA, EMP or environmental checklist within fifteen days, of the IEE within thirty days, and of the EIA within sixty days after receiving of complete case.
- (2) In reviewing an EIA, the Agency shall consult such Committee of Experts be constituted for the purpose by the Director General, and may also solicit views of concerned Advisory Committee, if any, constituted by the Agency.

- (3) The Director General may, where considers it necessary, constitute a committee to inspect the site of the project and submit its report on such matters as may be specified.
- (4) In reviewing the IEE, the Director General may constitute a committee of the officers from within the Agency, on case to case basis, in view of the jurisdiction and location of the project for the purpose to extend final recommendation about the approval or rejection of the IEE.
- (5) The review of the IEE or EIA by the Agency shall be based on quantitative and qualitative assessment of the documents and data furnished by the proponent, comments from the public and Government Agencies received under regulation 12, and views of the committees mentioned in sub-regulations (2) and (3) above.
- (6) EMP, EA, EC shall be reviewed as per guidelines issued by SEPA

13. Decision

- (1) The documentary evidence in the form of videos (soft copies) of public hearing shall be submitted by the proponent within three days after conclusion of public hearing to the Agency.
- (2) On completion of the review process, the decision of the Agency shall be communicated to the proponent in the form prescribed in Schedule-VI or in case of an IEE or EMP or environmental checklist or environmental audit in the form prescribed in Schedule-VII in case of an EIA.

14. Conditions of approval

- (1) Every approval of an EC or IEE or EIA or EMP or EA shall, in addition to such conditions as may be imposed by the Agency, be subject to the condition that the project shall be designed, constructed or operated and mitigatory and other measures adopted, strictly in accordance with the EC or IEE or EIA or EMP or EA, unless any variations thereto have been specified in the approval by the Agency.
- (2) Where the Agency accords its approval subject to certain conditions, the proponent shall submit an undertaking to the Agency, before commencing operation of the project, in the form prescribed in Schedule-VIII that the conditions of approval, and the requirements in the IEE or EIA relating to design and construction, adoption of mitigation and other measures have been duly complied with.

15. Validity period of Approval

- (1) The approval accorded by the Agency under section 17 read with sub-regulation (2) of regulation 15 shall be valid, for commencement of construction, for a period of three years from the date of issue.
- (2) If construction is commenced during the initial three years validity period, the

validity of the approval shall stand extended for a further period of three year.

- (3) The proponent may apply to the Agency for extension in the validity periods mentioned in sub-regulations (1), (2), which may be granted by the Agency in its discretion for such period not exceeding three years at a time, if the conditions of the approval do not require significant change:

Provided that the Agency may require the proponent to submit a fresh IEE or EIA, if in its opinion changes in location, design, construction and operation of the project so warrant.

16. Entry and inspection

- (1) For the purpose of verification of any matter relating to the review or to the conditions of approval of an EC or IEE or EIA or EMP or EA list prior to, before or during and after commencement of construction or operation of a project, duly authorized staff of the Agency shall be entitled to enter and inspect the project site, factory building and plant and equipment installed therein.
- (2) The proponent shall ensure full cooperation of the project staff at site to facilitate the inspection, and shall provide such information as may be required by the Agency for this purpose and pursuant thereto.

17. Cancellation of approval

- (1) Notwithstanding anything contained in these regulations, if, at any time, on the basis of information or report received or inspection carried out, the Agency is of the opinion that the conditions of an approval have not been complied with, or that the information supplied by a proponent in the approved EC or IEE or EIA or EMP or EA list is incorrect, it shall issue notice to the proponent for show cause within two weeks of receipt thereof as to why the approval should not be cancelled.
- (2) In case no reply is received or if the reply is considered unsatisfactory, the Agency may, after giving the proponent an opportunity of being heard -
 - (i) require the proponent to take such measures and to comply with such conditions within such period as it may specify, failing which the approval shall stand cancelled; or
 - (ii) cancel the approval.
- (3) On cancellation of the approval, the proponent shall cease construction or operation of the project forthwith.
- (4) Any action taken under this regulation shall be without prejudice to any other action that may be taken against the proponent under the Act or rules or regulations or any other law for the time being in force.

18. Registers of EC or IEE and EIA projects

Separate Registers to be maintained by the Agency for EC or IEE and EIA projects shall be in the form prescribed in Schedule-IX.

19. Environmentally sensitive areas

- (1) The Agency may designate an area to be an environmentally sensitive area,
- (2) Notwithstanding anything contained in regulations 3 and 5, the proponent of a project situated in an environmentally sensitive area shall be required to file an EIA with the Agency.

20. Environmental assessment guidelines

- (1) The Agency may from time to time issue guidelines to assist proponents and other persons involved in the preparation of environmental assessment.
- (2) Where guidelines have been issued under sub-regulation (1), the projects shall be planned and prepared, to the extent practicable, in accordance therewith and any departure therefrom justified in the IEE/EIA pertaining to the project.

21. Environmental Assessment Advisory Committee. -

The agency may constitute one or more Committees for the purpose of rendering advice on implementation and enforcement of Section 17, which may include experts of relevant field, civil society, academia, environmental experts, representative of Administrative Department, legal expert and experts from natural resources.

22. Repeal and Savings.

- (1) The Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2014, shall, on commencement of these regulations, stand repealed.
- (2) All orders made, notification issued, actions taken under the repealed Regulations shall remain in force until amended, altered or repealed by the provisions of these regulations.

**DIRECTOR GENERAL
SINDH ENVIRONMENTAL PROTECTION
AGENCY**

SCHEDULE-I

(See Regulation 3)

List of projects requiring Environmental Screening (through check list)

- a. Subject to the compliance with concerned zoning laws:
 - i. Construction of residential and commercial buildings having total covered area from 60,000 sq.feet to 100,000 sq.feet
 - ii. Housing Schemes covering an area from 05 acres to 15 acres.
 - iii. Ware Houses for Non-Hazardous substances having total area from 1000 sq.yards to 5,000 sq.yards
 - iv. Warehouse for Fertilizers
 - v. Marriage Halls/Banquet/Restaurants/Baking facilities having total area more than 500 sq.yards
 - vi. Motor vehicle workshops/Service Stations having total area of more than 500 sq.yards.
- b. Construction/Reconstruction/Rehabilitation of roads in urban area from 500 meters to 01 kilometres and in rural area from 500 meters to 05 kilometres.
- c. Construction of Flyover, underpasses and bridges of length from 100 meters to 500 meters
- d. On-farm dams and fish farms
- e. Pulses mills
- f. Flour Mills
- g. Lining of existing minor canals and /or water courses.
- h. Canal cleaning
- i. Forest harvesting operations
- j. Rain harvesting projects
- k. Health care units of less than 50 beds
- l. BTS Tower
- m. Lime Kilns
- n. Ice factories and cold storage.
- o. Cotton oil mill
- p. Construction of LPG, CNG, LNG filling station and petrol pumps
- q. Carpet manufacturing units
- r. Rain harvesting projects
- s. Industrial Effluent Treatment Plant
- t. Sanitary Landfill site up to 500 tons/day

Schedule-II
(See Regulation 4)

List of projects requiring an Initial Environmental Examination

A. Agriculture, Livestock and Fisheries

1. Poultry, livestock and fish farms
2. Warehousing for pesticides and pharmaceuticals
3. Projects involving packaging, formulation, cold storage and warehouse of agricultural, livestock and fish products.
4. Construction & Operation of Slaughter houses

B. Energy

1. Hydroelectric power generation up to 25 MW
2. Thermal power generation up to 100 MW
3. Coal fired power plants with capacity up to 50 MW
4. Transmission lines up to 132 KV, and grid stations
5. Waste-to-energy generation projects including bio-mass up to 25 MW
6. Construction of Coal Handling and storage facilities
7. Handling, Transportation & Storage of Biofuel Facility
8. Handling and storage of edible grains and seeds
9. All Renewable energy Projects (excluding Protected/Sensitive area under any law)

C. Oil and Gas projects:

1. Oil and gas 2D/3D Seismic survey and drilling activities (on and off shore)
2. Oil and gas extraction projects including exploration and production located outside the environmentally sensitive/protected areas
3. Oil & Gas transmission gathering, storage, separation & transportation system
4. Construction of CNG, LPG Petroleum and LNG bulk storage facility
5. Oil blending and recycling units

D. Manufacturing and processing

1. Ceramics and glass units
2. Food processing units
3. Pharmaceutical units.
4. Rice mills, ghee/oil mills, Cotton ginning
5. Man-made fibers and resin projects

6. Tanning and leather finishing projects
7. Manufacturing of apparel, textile garments units, including weaving, spinning, dyeing, bleaching and printing
8. Woodwork units manufacturing products
9. Steel re-rolling mills
10. Waste recycling plants
11. Battery manufacturing plant
12. Brick Kilns
13. Marble processing units
14. Stone Crushing units

E. Mining and mineral processing

1. Commercial extraction of sand, gravel, limestone, clay, Sulphur and other minerals not included in Schedule I.
2. Crushing, grinding and separation processes
3. Metal Smelting plant production capacity up to 20 tons/day

F. Transport

1. Construction of flyovers, underpasses and bridges having length more than 500 meters to 1000 meters in urban areas and more than 5km in rural areas
2. Bus terminals/ railway station/ metro stops and construction & operation of transport related terminals
3. Rehabilitation or rebuilding or reconstruction of existing roads more than one kilometers in urban areas and more than 5 km from rural areas

G. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of less than 25 million cubic meters of surface area less than 4 square kilometers
2. Irrigation systems and drainage system with the area of less than 15,000 hectors
3. Flood protection bunds

H. Water supply and filtration

Water supply schemes and filtration plants

I. Waste disposal and wastewater treatment

1. Solid and Non-hazardous waste with annual capacity up to 10,000 tonnes (excluding municipal landfill sites and commercial facilities) including Garbage Transfer station/composting plant

2. Wastewater treatment for sewerage treatment facility less than 100 mgd
3. Hospital waste disposal facilities including incineration units owned by Hospitals for own use excluding commercial facility.

J. Urban development

1. Housing schemes more than 15 acres to 50 acres
2. Residential, Commercial multistory High rise construction projects having covered area more than 100,000 sq.feet to 500,000 sq.feet.
3. Laboratories
4. Hospitals, health care unit of more than 50 beds
5. Construction of Educational and Academic institutions.

K. Other projects

Any other project for which filing of an IEE is required by the Agency under sub-regulation (2) of Regulation 6.

SCHEDULE III

(See Regulation 5)

List of projects requiring an EIA

A. Energy

1. Hydroelectric power generation more than 50 MW
2. Thermal power generation more than 100 MW
3. Coal power projects more than 50 MW
4. Transmission lines above 132 KVA and distribution projects.
5. Nuclear power plants
6. Wind, Solar or renewable energy projects if falls under any environmental sensitive and protected area.

B. Oil and Gas projects

1. Oil Petroleum refineries.
2. LPG and LNG Terminals Projects
3. Coal Handling Terminals Projects

C. Manufacturing and processing

1. Cement plants
2. Chemical manufacturing industries
3. Fertilizer plants
4. Steel Mills
5. Sugar Mills and Distilleries
6. Establishment of Industrial estates & Export processing zones
7. Petrochemicals complex
8. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, printing and publishing, paints and dyes.

D. Mining and mineral processing

1. Mining and processing of coal, gold, copper, sulphur and precious stones
2. Mining and processing of major non-ferrous metals, iron and steel rolling
3. Metal Smelting plant production capacity more than 20 tons/day

E. Transport

1. Airports
2. Construction of highway, motor ways, major roads (Intercity roads) more than one km and above

3. Ports and harbor development
4. Mass transit projects
5. Railway works
6. Construction of Flyover, underpass and bridges having total length more than one km.

F. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of 25 million cubic meters and above having surface area of 4 square kilometers and above
2. Irrigation and drainage projects serving more than 15,000 hectares and above

G. Water supply and filtration

Public water supply schemes and **filtration** plants.

H. Waste Disposal and treatment

1. Facilities for handling, storage or disposal of hazardous or toxic wastes or radioactive waste (including landfill sites, incineration units, etc.)
2. Solid waste municipal landfill sites.
3. Combine Effluent Treatment Plant
4. Domestic wastewater treatment plant more than 100mgd

I. Urban development and tourism

1. Housing schemes above 50 acres
2. Residential, Commercial High rise buildings subject to compliance of building bylaws of relevant organizations more than 500,000 sq.feet
3. All Projects located in High Density Zones notified by Government and relevant land controlling organization, irrespective of their size.
4. Commercialization of major corridors/roads in urban centers
5. Large Scale public facilities
6. Large-scale tourism development projects

J. Environmentally Sensitive Areas

All projects situated in environmentally sensitive areas being identified by the Agency.

K. Other projects

1. Any other project for which filing of an EIA is required by the Agency under sub-regulation (2) of Regulation 5.
2. Any other project likely to cause an adverse environmental effect.

Schedule-IV
(See Regulation 8)

Project Cost (in million)	Review Fee
Up to 20	Rs.50,000
Above 20 up to 100	Rs. 100,000
Above 100 up to 200	Rs. 200,000
Above 200 up to 500	Rs. 400,000
Above 500	Rs. 600,000
Review fee for Environmental Checklist or EMP shall be Rs. 40,000/=	
Review fee for BTS Tower shall be 20,000/=	

*

Note:

The fee shall be payable into the “Sindh Sustainable Development Fund” account
Details are as under:

A/C Title: Sindh Sustainable Development Fund

Account Number: 03084572626100

Bank: Sindh Bank

Branch Code: 0308-Korangi Industrial Area

SCHEDULE V
[See Regulation 9(2)(a)]
Application Form

1.	Name and address of Proponent		Phone: Email:	
2.	CNIC No. of proponent			
3.	Brief description of project			
4.	Location of project			
5.	Cost of the Project			
6.	Objectives of project			
7.	IEE/EIA attached?	IEE/EIA: Yes/No		
8.	Have alternative sites/options been considered/ reported in IEE/EIA?	Yes/No		
9.	Title document of the project			
10.	Existing land use		Land requirement	
11.	Is basic site data available, or has it been measured?	(only tick yes if the data is reported in the IEE/EIA)	Available	Measured
			Yes/No	Yes/No
		Meterology (including rainfall)	Yes/No	Yes/No
		Ambient air quality	Yes/No	Yes/No
12.	Have estimates of the following been reported, especially Quantitative Analysis?	Water balance	Estimated	Reported
		Solid waste disposal	Yes/No	Yes/No
		Liquid waste	Yes/No	Yes/No
13.	Source of power		Power requirement	
14.	Labour force (number)	Construction: Operation:		
15.	Environmental Consulting Firm			

Verification. I do solemnly affirm and declare that the information given above and contained in the attached EC/IEE/EIA is true and correct to the best of my knowledge and belief.

Date

Signature, name _____
of proponent (with official
stamp/seal)

SCHEDULE VI
[See Regulation 13(2)]

Decision on IEE/Environmental Check List

1. Name and address of proponent _____
 2. Description of project _____
 3. Location of project _____
 4. Date of filing of IEE _____
 5. After careful review of the IEE, the Agency has decided –
 - (a) to accord its approval, subject to the following conditions:

 - or (b) that the proponent should submit an EIA of the project, for the following reasons –

- Dated _____

Tracking no. ____

Director-General
Sindh Environmental Protection Agency
(with official stamp/seal)

SCHEDULE VII

[See Regulation 13(2)]

Decision on EIA

1. Name and address of proponent _____
 2. Description of project _____

 3. Location of project _____
 4. Date of filing of EIA _____
 5. After careful review of the EIA, and all comments thereon, the Federation Agency has decided –
 - (a) to accord its approval, subject to the following conditions:

 - or (b) that the proponent should submit an EIA with the following modifications-

 - or (c) to reject the project, being contrary to environmental objectives, for the following reasons:

- Dated _____

- Tracking no.____

Director-General
Sindh Environmental Protection Agency
(with official stamp/seal)

SCHEDULE VIII
[See Regulation 14(2)]

Undertaking

I, (full name and address) as proponent for (name, description and location of project) do hereby solemnly affirm and declare that the conditions of approval and the requirements in the IEE or EIA relating to design and construction, adoption of mitigation and other measures and other relevant matters have been duly complied with in the design and construction of the project.

Signature, name and

designation of proponent
(with official stamp/seal)

Witnesses(full names and addresses)

SCHEDULE IX
(See Regulation 18)
Form of Registers for EC, IEE and EIA projects

<u>S. No.</u>	<u>Description</u>	<u>Relevant Provisions</u>
1	2	3
1.	Tracking number	
2.	Category type (as per Schedules I or II)	
3.	Name of proponent	
4.	Name and designation of contact person	
5.	Name of consultant	
6.	Description of project	
7.	Location of project	
8.	Date of submission of IEE/EIA	
9.	Date of public hearing / technical presentation	
10.	Date of committee of experts for schedule-II projects	
11.	Approval granted (Yes/No)	
12.	Date of approval granted or refused	

Annex III

Sindh Environmental Quality Standards



The Sindh Government Gazette

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PART-I

GOVERNMENT OF SINDH
SINDH ENVIRONMENT PROTECTION
AGENCY

NOTIFICATION

NO.EPA/TECH/739/2014:- In exercise of the powers conferred under clause (g) of sub-section (1) of section 6 of the Sindh Environmental Protection Act, 2014, the Sindh Environmental Protection Agency, with the approval of the Sindh Environmental Protection Council, is pleased to establish the following standards:-

1. (1) These Standards may be called the Sindh Environmental Industrial Waste Water, Effluent, Domestic, Sewerage, Industrial Air Emission and Ambient Airs, Noise for Vehicles, Air Emissions for Vehicles and Drinking Water Quality Standards, 2015.

(2) These Standards shall come into force at once.

2. In these Standards, unless there is anything repugnant in the subject or context --

(a) "Government" means the Government of Sindh;

(b) "Standards" means the Sindh Environmental Quality Standards.

**SINDH ENVIRONMENTAL QUALITY STANDARDS FOR MUNICIPAL AND
LIQUID INDUSTRIAL EFFLUENTS (mg/l, UNLESS OTHERWISE DEFINED)**

S. No.	Parameter	Standards		
		Into Inland Waters 3	Into Sewage Treatment ⁽⁵⁾ 4	Into Sea ⁽¹⁾ 5
1.	Temperature 40 ⁰ C or Temperature Increase *	≤3 ⁰ C	≤3 ⁰ C	≤3 ⁰ C
2.	pH value (H ⁺)	6-9	6-9	6-9
3.	Biochemical Oxygen Demand (BOD) ₅ at 20 ⁰ C ⁽¹⁾	80	250	80**
4.	Chemical Oxygen Demand(COD) ⁽¹⁾ ..	150	400	400
5.	Total Suspended Solids (TSS)	200	400	200
6.	Total Dissolved Solids (TDS)	3500	3500	3500
7.	Oil and Grease	10	10	10
8.	Phenolic compounds (as phenol)	0.1	0.3	0.3
9.	Chloride (as Cl ⁻)	1000	1000	SC***
10.	Fluoride (as F ⁻)	10	10	10
11.	Cyanide (as CN ⁻) total	1.0	1.0	1.0
12.	An-ionic detergents (as MBAS) ⁽²⁾	20	20	20
13.	Sulphate (SO ₄ ²⁻)	600	1000	SC***
14.	Sulphide (S ²⁻)	1.0	1.0	1.0
15.	Ammonia (NH ₃)	40	40	40
16.	Pesticides ⁽³⁾	0.15	0.15	0.15
17.	Cadmium ⁽⁴⁾ ..	0.1	0.1	0.1
18.	Chromium (trivalent and hexavalent) ⁽⁴⁾ ..	1.0	1.0	1.0
19.	Copper ⁽⁴⁾ ..	1.0	1.0	1.0
20.	Lead ⁽⁴⁾ ..	0.5	0.5	0.5
21.	Mercury ⁽⁴⁾	0.01	0.01	0.01
22.	Selenium ⁽⁴⁾	0.5	0.5	0.5
23.	Nickel ⁽⁴⁾ ..	1.0	1.0	1.0
24.	Silver ⁽⁴⁾	1.0	1.0	1.0
25.	Total toxic metals	2.0	2.0	2.0
26.	Zinc	5.0	5.0	5.0
27.	Arsenic ⁽⁴⁾	1.0	1.0	1.0
28.	Barium ⁽⁴⁾	1.5	1.5	1.5
29.	Iron	8.0	8.0	8.0
30.	Manganese	1.5	1.5	1.5
31.	Boron ⁽⁴⁾	6.0	6.0	6.0
32.	Chlorine	1.0	1.0	1.0

Explanations:

1. Assuming minimum dilution 1:10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Sindh Environmental Protection Agency. By 1:10 dilution means, for example that for each one cubic meter of treated effluent, the recipient water body should have 10 cubic meter of water for dilution of this effluent.
 2. Methylene Blue Active Substances; assuming surfactant as biodegradable.
 3. Pesticides include herbicides, fungicides, and insecticides.
 4. Subject to total toxic metals discharge should not exceed level given at S. N. 25.
 5. Applicable only when and where sewage treatment is operational and BOD₅=80mg/l is achieved by the sewage treatment system.
 6. Provided discharge is not at shore and not within 10 miles of mangrove or other important estuaries.
- *. The effluent should not result in temperature increase of more than 3⁰C at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 meters from the point of discharge.
- ** The value for industry is 200 mg/l
- *** Discharge concentration at or below sea concentration (SC).

Note: 1. Dilution of liquid effluents to bring them to the STANDARDS limiting values is not permissible through fresh water mixing with the effluent before discharging into the environment.

2. The concentration of pollutants in water being used will be subtracted from the effluent for calculating the STANDARDS limits".

**"SINDH ENVIRONMENTAL QUALITY STANDARDS FOR
INDUSTRIAL GASEOUS EMISSION (mg/Nm³, UNLESS
OTHERWISE DEFINED)."**

S. No.	Parameter	Source of Emission	Standards
1	2	3	4
1.	Smoke	Smoke opacity not to exceed	40% or 2 Ringleman Scale or equivalent smoke number
2.	Particulate matter	(a) Boilers and Furnaces	
	(1)	(i) Oil fired	300
		(ii) Coal fired	500
		(iii) Cement Kilns	300

		(b) Grinding, crushing, Clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas.	500
3.	Hydrogen Chloride	Any	400
4.	Chlorine	Any	150
5.	Hydrogen Fluoride	Any	150
6.	Hydrogen Sulphide	Any	10
7.	Sulphur Oxides ^{(2) (3)}	Sulfuric acid/ Sulphonic acid plants	
		Other Plants except power Plants operating on oil and coal	1700
8.	Carbon Monoxide	Any	800
9.	Lead	Any	50
10.	Mercury	Any	10
11.	Cadmium	Any	20
12.	Arsenic	Any	20
13.	Copper	Any	50
14.	Antimony	Any	20
15.	Zinc	Any	200
16.	Oxides of Nitrogen	Nitric acid Manufacturing unit.	3000
	(3)	Other plants except power plants operating on oil or coal:	
		Gas fired	400
		Oil fired	600
		Coal fired	1200

Explanations:-

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1 percent Sulphur content in fuel oil. Higher content of Sulphur will ease standards to be pro-rated.
3. In respect of emissions of Sulphur dioxide and Nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to Standards specified above, comply with the following standards:-

A. Sulphur Dioxide

Sulphur Dioxide Background levels Micro-gram per cubic meter ($\mu\text{g}/\text{m}^3$) Standards.

Background Air Quality (SO ₂ Basis)	Annual Average	Max. 24-hours Interval	Criterion I Max. SO ₂ Emission (Tons per Day Per Plant)	Criterion II Max. ground level increment to ambient (One year Average)
Unpolluted	<50	<200	500	50
Moderately Polluted*				
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	>100	>400	100	10

* For intermediate values between 50 and 100 $\mu\text{g}/\text{m}^3$ linear interpolations should be used.

** No projects with Sulphur dioxide emissions will be recommended.

B. Nitrogen Oxide

Ambient air concentrations of Nitrogen oxides, expressed as NO_x should not be exceed the following:-

Annual Arithmetic Mean $100\mu\text{g}/\text{m}^3$
(0.05 ppm)

Emission level for stationary source discharge before missing with the atmosphere should be maintained as follows:-

For fuel fired steam generators as Nanogram (10^0 -gram) per joule of heat input:

Liquid fossil fuel	..	..	..	130
Solid fossil fuel..	..	..	..	300
Lignite fossil fuel	..	..	..	260

Note:-

Dilution of gaseous emissions to bring them to the STANDARDS limiting value is not permissible through excess air mixing blowing before emitting into the environment.

Sindh Environmental Quality Standards for Motor
Vehicle Exhaust and Noise

(i) For in-use Vehicles				
S. No.	Parameter	Standards (maximum permissible limit)	Measuring Method	Applicability
1	2	3	4	5
1.	Smoke	40% or on the Ringleman Scale during engine acceleration mode	To be compared with Ringleman Chart at a distance of 6 meters or more.	Immediate effect
2	Carbon Monoxide	6 %	Under idling conditions: Non- dispersive infrared detection through gas analyzer.	
3.	Noise	85 db (A)	Sound-meter at 7.5 meter from the source.	

For new Vehicles

EMISSION STANDARDS FOR DIESEL VEHICLES

(a) For passenger Cars and Light Commercial Vehicles (g/Km)

Type of Vehicle	Category/Class	Tiers	CO	HC+ NOx	PM	Measuring Method	Applicability
1	2	3	4	5	6	7	8
Passenger Cars.	M I: with reference mass (RW).	Pak-II, IDI	1.0	0.7	0.08		All imported and local manufactured
	up to 2500 kg. Cars with RW over 2500 kg. to meet NI Category standards	Pak-II DI	1.0	0.9	0.10	NEDC (ECE 15+ EUDCL)	Diesel vehicles with effect from 01-07-2012
Light Commercial Vehicles	NI-I (RW<1250 Kg)	Pak-II IDI	1.0	0.70	0.08		
		Pak-II DI	1.0	0.90	0.10		
	NI-II(1250kg< RW < 1700 Kg)	Pak-II IDI	1.25	1.0	0.12		
		Pak-II DI	1.25	1.3	0.14		
	NI-III(RW< 1700 Kg)	Pak-II IDI	1.50	1.2	0.17		
		Pak-II DI	1.50	1.6	0.20		

Parameter Standards (maximum permissible limit) Measuring method

Noise	85 db (A)	Sound-meter at 7.5 meters from the source
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(b) For Heavy Duty Diesel Engines and Large Goods Vehicles (g/Kwh)

Type of Vehicle	Category/ Class	Tiers	CO	HC	NOx	PM	Measuring Method	Applicability
1	2	3	4	5	6	7	8	9
Heavy Duty Diesel Engines	Turks and Buses	Pak-II	4.0	1.1	7.0	0.15	ECE-R-49	All Imported and local manufactured diesel vehicles with the effect 1-7-2012
Large goods Vehicles	N2(2000 and up	Pak-II	4.0	7.0	1.10	0.15	EDC	

Parameter Standards (maximum permissible limit) Measuring method

Noise	85 db (A)	Sound-meter at 7.5 meters from the Source
-------	-----------	---

Emission Standards for Petrol Vehicles (g/km)

Type of Vehicle	Category/ Class	Tier	Co	HC+ NOx	Measuring Method	Applicability
1	2	3	4	5	6	7
Passenger Cars.	M 1: with reference mass (RW). upto 2500 kg. Cars with RW over 2500 kg. to meet N1 Category standards	Pak-II	2.20	0.5	NEDC (ECE 15 + EUDCL)	All imported and new models * locally manufactured petrol vehicles with effect from 1 st July, 2009**

Light Commercial Vehicles	NI-I (RW<1250 kg) NI-II (1250kg> kg RW< 1700 Kg)	Pak-II	2.20	0.5	
		Pak-II	4.0	0.65	
		Pak-II	5.0	0.08	
	NI-III(RW> 1700 kg)				
Motor Rickshaws & Motor Cycles	2,4 strokes < 150 cc	Pak-II	5.5	1.5	ECER 40
	2,4 strokes > 150cc	Pak-II	5.5	1.3	

Parameter Standards (maximum permissible limit) Measuring method

Noise source 85 db (A) Sound-meter at 7.5 meters from the

Explanations:

- DI: Direct Injection.
 IDI: Indirect Injection.
 EUDCL: Extra Urban Driving Cycle.
 NEDC: New European Driving Cycle.
 ECE: Urban Driving Cycle.
 M: Vehicles designed and constructed for the carriage of passenger and comprising no more than eight seats in addition to the driver's seat.
 N: Motor vehicles with at least four wheels designed and constructed for the carriage of goods.
 * New model means both model and engine type change.
 ** The existing models of petrol driven vehicles locally manufactured will immediately switch over to Pak-II emission standards but no late than 30th June, 2012.

SINDH ENVIRONMENTAL QUALITY STANDARDS FOR AMBIENT AIR

Pollutants	Time-weight average	Concentration in Ambient Air	Method of measurement
Sulphur Dioxide(SO ₂)	Annual Average*	80 µg/m ³	Ultraviolet Fluorescence method
Oxides of Nitrogen as (NO)	24 hours**	120 µg/m ³	Gas Phase Chemiluminescence
Oxides of Nitrogen as (NO ₂)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
O ₃	24 hours**	40 µg/m ³	Gas Phase Chemiluminescence
Suspended Particulate Matters(SPM)	Annual Average*	80 µg/m ³	Non dispersive UV absorption method
Respirable Particulate Matter PM10	1 hour	130 µg/m ³	High Volume
Respirable Particulate Matter PM2.5	Annual Average*	360 µg/m ³	Sampling (Average flow rate not less than 1 l in 3/minutes)
Lead Pb	24 hours**	500 µg/m ³	B Ray absorption method
Carbon Monoxide(CO)	Annual Average*	120 µg/m ³	B Ray absorption method
	24 hours**	150 µg/m ³	B Ray absorption method
	Annual Average*	40 µg/m ³ ***	B Ray absorption method
	24 hours**	75 µg/m ³	B Ray absorption method
	Annual Average*	1 µg/m ³	ASS Method after sampling using EPM 2000 or equivalent filter paper
	24 hours**	1.5 µg/m ³	ASS Method after sampling using EPM 2000 or equivalent filter paper
	8 hours**	5 mg/m ³	Non Dispersive Infra Red(NDIR) method
	1 hours**	10 mg/m ³	Non Dispersive Infra Red(NDIR) method

*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week, 24 hourly and at uniform interval.

** 24 hourly/8 hourly values should be met 98% in a year, 2% of the time. It may exceed but not on two consecutive days.

*** Annual Average limit of $40\mu\text{g}/\text{m}^3$ or background annual average concentration plus allowable allowance of $9\mu\text{g}/\text{m}^3$, whichever is lower.

Sindh Standards for Drinking Water Quality

Properties / Parameters	Standard Values for Sindh	WHO Standards	Remarks
Bacterial			
All water intended for drinking (e.Coli or Thermo tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E.coli or thermo tolerant coliform and total coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period	Most Asian countries also follow WHO standards
Physical			
Colour	≤ 15 TCU	≤ 15 TCU	
Taste	Non objectionable/Acceptable	Non objectionable/Acceptable	
Odour	Non	Non	

	objectionable/Acceptable	objectionable/Acceptable
Turbidity	< 5 NTU	< 5 NTU
Total hardness as CaCO ₃	< 500 mg/l	---
TDS	< 1000	< 1000
pH	6.5 – 8.5	6.5 – 8.5
Chemical		
<i>Essential Inorganic</i>	<i>mg/Litre</i>	<i>mg/Litre</i>
Aluminium (Al) mg/l	≤ 0.2	0.2

Properties / Performance	Standard Values for Pakistan	Who Standards	Remarks
Antimony (Sb)	≤ 0.005 (P)	0.02	
Arsenic (As)	≤ 0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl)	< 250	250	
Chromium (Cr)	≤ 0.05	0.05	
Copper (Cu)	2	2	
<i>Toxic Inorganic</i>	<i>mg/Liter</i>	<i>mg/Litre</i>	
Cyanide (CN)	≤ 0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤ 1.5	1.5	
Lead (Pb)	≤ 0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤ 0.5	0.5	
Mercury (Hg)	≤ 0.001	0.001	
Nickel (Ni)	≤ 0.02	0.02	

Properties / Performance	Standard Values for Pakistan	Who Standards	Remarks
Nitrate (NO ₃)	≤ 0.50	50	
Nitrite (NO ₂)	≤ 3 (P)	3	
Selenium (SE)	0.01 (P)	0.01	
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	---	
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries

Properties / Performance	Standard Values for Pakistan	Who Standards	Remarks
Organic			
Pesticides mg/L		PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted.***	Annex II
Phenolic compounds (as Phenols) mg/L		≤ 0.002	
Polynuclear aromatic hydrocarbons (as PAH g/L)		0.01 (By GC/MS method)	
Radioactive			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

*** PSQCA: Pakistan Standards Quality Control Authority

Proviso:

The existing drinking water treatment infrastructure is not adequate to comply with WHO guidelines. The Arsenic concentrations in some parts of Sindh have been found high then Revised WHO guidelines. It will take some time to control arsenic through treatment process. Lead concentration in the proposed standards is higher than WHO Guidelines. As the piping system for supply of drinking water in urban centers are generally old and will take significant resources and time to get them replaced. In the recent past, Lead was completely phased out from petroleum

products to cut down Lead entering into environment. These steps will enable to achieve WHO guidelines for Arsenic, Lead, Cadmium and Zinc. However, for bottled water, WHO limits for Arsenic, Lead, Cadmium and Zinc will be applicable and PSQCA Standards for all the remaining parameters.

Sindh Environmental Quality Standards for Noise

S. No.	Category of Area / Zone	Effective from 1 st Jan, 2015		Effective from 1 st January, 2015	
		Limit in dB(A) Leq *			
		Day Time	Night Time	Day Time	Night Time
1.	Residential Area (A)	65	50	55	45
2.	Commercial Area (B)	70	60	65	55
3.	Industrial Area (C)	80	75	75	65
4.	Silence Zone (D)	55	45	50	45

- Note: 1. Day time hours: 6:00 a.m to 10:00 p.m
 2. Night time hours: 10:00 p.m to 6:00 a.m
 3. Silence zone; Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts
 4. Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.
 * dB(A) Leq; Time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

3. Repeal and Savings.

- (1) The provisions of the Statutory Notification dated 10th August, 2000 and 18th October, 2010, issued by the Ministry of Environment, Government of Pakistan, to the extent of the Province of Sindh are hereby repealed.
- (2) All actions taken, proceedings initiated shall be deemed to have been taken and initiated validly under the the provisions of these Rules.

DIRECTOR GENERAL
SINDH ENVIRONMENTAL PROTECTION
AGENCY

Annex IV

Environmental Monitoring Reports

Ambient Air Quality Test Report

Project Name:	EIA- KE- 220kV D/C, TWIN BUNDLE LILO T/ Line to KE DHABEJI Grid Station from NTDC	Test Report No:	QTS/KE-DBG/22/3042
		Sample Duration:	08hr's
Sample Description:	Ambient Air Quality Test	Location:	Project Site

PARAMETERS									
Date	Time	CO (mg/m ³)	NO (µg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SPM (µg/m ³)	Lead (µg/m ³)
27.04.2022	10:00	1.1	26.7	29.7	17.9	103	35	303	ND
27.04.2022	10:30	1.3	28.3	30.2	18.2	105	38	307	ND
27.04.2022	11:00	1.2	28.8	30.8	18.8	109	41	311	ND
27.04.2022	11:30	1.4	29.0	31.2	19.0	111	48	313	ND
27.04.2022	12:00	1.1	29.7	31.3	19.8	114	51	314	ND
27.04.2022	12:30	1.2	30.1	31.8	20.2	117	54	316	ND
27.04.2022	13:00	1.0	28.3	32.0	20.6	121	50	317	ND
27.04.2022	13:30	1.1	27.7	32.3	21.3	123	57	321	ND
27.04.2022	14:00	1.0	30.1	32.8	21.7	125	61	322	ND
27.04.2022	14:30	1.1	29.4	33.0	22.0	126	63	326	ND
27.04.2022	15:00	1.0	28.9	33.3	22.4	128	66	328	ND
27.04.2022	15:30	1.2	26.2	32.6	22.9	131	73	329	ND
27.04.2022	16:00	1.3	25.8	32.1	23.0	133	78	331	ND
27.04.2022	16:30	1.4	27.0	21.9	23.2	128	81	333	ND
27.04.2022	17:00	1.3	28.3	31.4	24.6	125	72	337	ND
27.04.2022	17:30	1.2	27.2	31.0	24.9	119	62	330	ND
27.04.2022	18:00	1.1	29.8	31.1	23.3	114	63	326	ND
MIN		1.0	25.8	21.9	17.9	103	35	303	ND
MAX		1.4	30.1	33.3	24.9	133	81	337	ND
AVG		1.1	28.2	30.7	21.4	119.3	58.3	321.2	ND
SEQS		5	40	80	120	150	75	500	1.5
LDL-Limits		Oppm	Oppm	Oppm	Oppm	10µg/m ³	2.5µg/m ³	1 µg/m ³	-



Ambient Air Quality Test Report

Project Name:	EIA- KE- 220kV D/C, TWIN BUNDLE LILO T/ Line to KE DHABEJI Grid Station from NTDC	Test Report No:	QTS/KE-DBG/22/3042
		Sample Duration:	08hr's
Sample Description:	Ambient Air Quality Test	Location:	Project Site

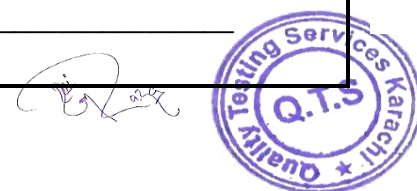
Parameter	Unit	Monitoring Duration	Average Obtained Concentration	NEQS	LDL-Limits	Methodology
Carbon Monoxide (CO)	mg/m ³	08 Hours	1.1	5.0	0.01	Non Dispersive Intra Red (NDIR)
Nitrogen oxide (NO)	µg/m ³	08 Hours	28.2	40.0	1.00	Chemiluminescence
Nitrogen Dioxide (NO ₂)	µg/m ³	08 Hours	30.2	80.0	1.00	
Sulphur Dioxide (SO ₂)	µg/m ³	08 Hours	21.4	120.0	1.00	Ultraviolet Fluorescence Method
Ozone (O ₃)	µg/m ³	01 Hour	16.8	130.0	0 ppm	Non Dispersive UV Absorption Method
Particulate Matter (PM ₁₀)	µg/m ³	08 Hours	119.3	150.0	1.00	β Ray Absorption Method
Particulate Matter (PM _{2.5})	µg/m ³	08 Hours	38.3	35.0	1.0	
Total Suspended Particles (TSP)	µg/m ³	08 Hours	321.2	500.0	1.0	
Lead	µg/m ³	08 Hours	ND	1.5	-	ASS Method

*SEQS= Sindh Environmental Quality Standards.
(24 Hours Standard for all the parameters Except O₃ and CO),
µg/m³= Micrograms per Cubic Meter
mg/m³= Milligrams per Cubic Meter
ppm = Parts per million
ND= Not Detected

Remarks:

The average concentration calculated for the 08 hours are well within guideline values set by SEQs.

Sample Analyzed By: Ather Adil	Signature of Laboratory Incharge: _____ Name : <u>Ali Raza</u>
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Lab Report Ref. No. : QTS/KE-DBG/22/3043

Reporting Date: 29/04/2022

Project Name : EIA- KE 220kV D/C, TWIN BUNDLE LILO T/ Line to KE DHABEJI Grid Station from NTDC

SAMPLE DESCRIPTION

Sample ID: Noise Level Test
Sample Description: Ambient Noise
No. of samples: 03
Sample Collected/Submitted by: QTS representative
Sampling Date: 27/04/2022
Sample Receipt at QTS - Date: 27/04/2022

NOISE LEVEL TEST REPORT

S.NO.	LOCATION/SOURCE	Noise Level Readings			
		Minimum	Maximum	Average	Limits
1	Near KE Dahbeji Grid Station	60.3	63.4	61.8	SEQS-Limits : 65dB(A)
2	Outside The Community Area Along the Transmission Line	57.8	59.4	58.6	
3	Near Road Side N-05	66.5	67.2	66.8*	

SEQS = Sindh Environmental Quality Standards.

dB (A) Leq=Time weighted average of the level of sound in decibel on scale which is relatable to human hearing.

Term & Condition:

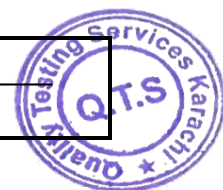
- This report is not valid for any negotiations
- Report is valid for current batch(sample)
- This report is intended only for your guidance & not for legal purpose or for advertisement.

Comments:

*The Noise Level from the sources is not within acceptable level as describe in SEQs.

Sample Analyzed by: Ather Adil

Signature of Laboratory In charge:
Name : Ali Raza



Lab Report Ref. No. : QTS/ KE-DBG/22/3052-A

Reporting Date: 29/04/2022

Report to: EIA- KE 220kV D/C, TWIN BUNDLE LILO T/ Line to KE DHABEJI Grid Station from NTDC

SAMPLE DESCRIPTION

Sample ID: Surface water
Sample Type: Grab Sample (Water channel)
Sampling Coordinates: 24°44'40.95"N 67°35'18.63"E
Sample Collected/Submitted by: QTS representative
Sampling Date: 27/04/2022

ANALYTICAL TEST REPORT

S.NO.	PARAMETERS TO BE ANALYZED	UNITS	RESULTS	TEST METHOD
1	pH value	-	8.2	USEPA 150.1
2	Chemical Oxygen Demand(COD)	mg/L	25	Hach 8000
3	Total Suspended Solids(TSS)	mg/L	07	Hach 8006
4	Total Dissolved Solids(TDS)	mg/L	450	Hach 8160
5	Oil & Grease	mg/L	0.11	APHA 5520-D
6	Fluoride(as F ⁻)	mg/L	0.31	USEPA 340.1
7	Chloride(as Cl ⁻)	mg/L	160	Hach 8206
8	Total Hardness(as CaCO ₃)	mg/L	230	Hach 8213
9	Turbidity	NTU	0.21	Turbidity meter
MICROBIOLOGICAL ANALYSIS REPORT				
10	Total Coliform	cfu	>115	APHA-SM9221B
11	Fecal Coliform	cfu	33	APHA-SM9221F
12	Escherichia Coli(E-Coli)	cfu	15	APHA-SM9221F

USEPA=United State Environmental Protection Agency method

Hach USA, method

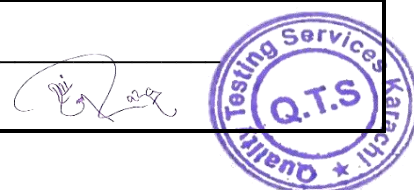
BDL=Below Detection Limit

APHA-SM = American Public Health Association- Standard Methods for Water & Waste water Examination

- This report is not valid for any negotiations
- Report is valid for current batch(sample)
- The remaining portion of the sample will be discarded after 07 days unless otherwise instructed

Sample Analyzed by: Hareem Zehra

Signature of Laboratory In charge:
Name : Ali Raza



Annex V

Environmental Management Plan (Tabulated)

Table Error! No text of specified style in document.-1: Environmental Management Plan for construction and operation of transmission line			
Environmental Aspect	Impacts	Mitigation Measures	Responsibility
Designing Phase			
Land acquisition and resettlement	Resettlement is not envisaged for the project	RoW will be obtained from authorities prior to construction of overhead and underground portions of TL.	KE
Birds	Chance of Collision of Birds with the conductor string	- All suspension poles shall have detachable bird protection devices, over each suspension insulator string. - All angle poles having jumper insulator strings will also be furnished with bird protection devices.	CC
Temporary Construction Camps	Deterioration of air & water quality, and social impacts	- Camps are to be located away from residents/commercial activities to minimize nuisance; - Sanitation facilities in the camps, if provided, should be mobile & collect its wastewater or connected to the local sewerage system; - Water conservation practices shall be adopted.	CC
Contract clauses	Contractor may not perform the work in environmentally friendly manner	- Construction Contractor / Waste Contractor shall be made responsible through contract documents for proper disposal of the spoil / excavated earth and not to dump these spoils/ earth near open plots / open spaces / open storm water drains / in front of residents or leave unattended along the construction site. It should be disposed in designated landfill site. - A proper site rehabilitation plan shall be made by the contractor which includes the spoil / excavated earth disposal arrangements - Contractors shall also be made responsible through contract documents to follow Sindh Environmental Quality Standards (SEQS) and applicable standards during all the construction operations and ensure compliance of the same through periodic environmental monitoring reports. - Contractors shall be made responsible through contract documents to follow Standard Practices and Standard Operating Procedures (SOPs) to ensure health & safety of workers at the site and public during all construction operations. - As the work is usually completed by contractors and sub-contractors, K-Electric should monitor their works to ensure proper task completion.	KE
Construction Phase			
Excavation, storage of soil and waste, generation of waste	Soil Erosion	- Construction activities should be scheduled to avoid runoff due to rain; - The dredged soil must be contained in an enclosure to reduce the chances of runoff during the seasons of precipitation; - Stock piles of fine material should be wetted or covered with tarpaulin especially during windy weather conditions;	CC

Table Error! No text of specified style in document.-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		• Cut and fill should be balanced to the extent practical at each site in order to minimize the need for fill and for spoil disposal. Cut material should be used to level the site area or be disposed at designated spoil disposal sites; • Excess spoil should only be directed to designated disposal areas and temporary quarries; no disposal in waterways is allowed.	
Water Resources	Impact on Surface and ground water sources	• All excavated soil left after backfilling should be completely removed; • Debris and vegetation clogging culverts and drains should be regularly cleared; and • Soil runoff from the site leading to off-site contamination (particularly during rainy season) should not be allowed. • Spillage of oil and grease from the vehicles should be avoided.	CC
Fuel, Oil & Chemical handling, storage and disposal	Soil contamination	• Chemicals and oils should be stored in secure designated areas with temporary impermeable bunds; • Refueling, oil changing and engine maintenance of machinery, equipment and vehicles should be avoided at construction site; • Oil contaminated materials should be disposed at designated waste disposal facilities.	CC
Construction Waste Disposal	This waste has the potential to cause negative impact on the surroundings if not properly managed and disposed of.	• A Comprehensive Waste Management Plan for Construction phase should be developed and implemented; • Construction sites should be equipped with temporary refuse bins, and construction wastes should be collected on a daily basis and contained in a temporary designated waste storage area on each site; • Designated waste storage areas should not be within 50 m of water ways; • Any hazardous waste should be separated and stored in areas clearly designated and labeled, and disposal through EPA certified waste contractor in environmentally friendly manner. • Non-hazardous waste should be routinely collected from the designated area(s) and disposed in an environmentally friendly manner or recycled or reused;	CC
Dust Emissions	Deterioration of local Air Quality	• Dust emissions from soil piles and aggregate storage stockpiles should be reduced by keeping the material wet by sprinkling water at appropriate frequency and erecting windshield walls on three sides of the piles; • Vehicular movement should be restricted to a specific time for dumping of supplies and construction materials; and	CC

Table Error! No text of specified style in document.-1: Environmental Management Plan for construction and operation of transmission line			
Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		Workers should wear dust masks and safety goggles, especially during dry and windy weather conditions to avoid health risk.	
Exhaust Emissions	Deterioration of local Air Quality	- All vehicles, generators and other equipment used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants; - Emissions from the machinery and vehicles will be monitored on regular basis to ensure compliance of SEQS; - Excessive engine idling will be discouraged and machinery causing excessive pollution (i.e. visible clouds of smoke) will be banned from sites; - Standby generators for power supply will be kept away from pathways and will be placed at locations where probabilities of human intervention are limited; and - The stack height of the generators used will be at least 3 m above the ground.	CC
Noise and Vibration	Construction activities are expected to produce noise levels in the range of 80 – 95 dB and may cause discomfort to local residents	- Machinery operation and high noise activities should be carefully planned and scheduled; - To the extent practical batching plants and construction areas should not be located within 500 meters of a settlement; - Where that is not possible, high noise activities should cease between 20:00 hrs. to 06:00 hrs. at any construction site within 500 meters of a settlement, or if noise complaints are received from settlement residents. - Vehicles and machinery will be equipped with silencers. Contractors will be required to fit noise shields on high noise construction machinery; - Site labor working in high noise area such as where noise level exceeds 80 dB (A), will wear earplugs; - The stationary sources of noise such as concrete mixers, batching plant, power generators and pumps will be selected and segregated from work areas and residents; and - Occupational health, safety and environmental procedures and Environmental management plan for proposed project would be followed.	CC
ROW Clearance	Impacts on Ecology (Flora and Fauna), cutting of trees	- Compensatory plantation shall be provided at a ratio of 1:3 for immature trees and at 1:5 for mature trees; - Selection of plants for landscaping should consider the habitat suitability, trees of national interest, flowering trees and shrubs; and	CC

Table Error! No text of specified style in document.-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		By using the best practice for vegetation clearing and disposal practices; will minimize the environmental risk associated with clearing and disturbance of vegetation.	
Safety Precautions for the Workers	The construction and civil works pose an inherent risk of injury to workers from accidents and hazardous working environment.	- Preventive and protective measures including modification, substitution, or elimination of hazardous conditions, with particular attention to live power lines, working at height, working above water, high noise levels, and exposure to chemicals will be made; - Measures for the management and appropriate disposal of hazardous wastes will be undertaken to ensure protection of the workforce and the prevention and control of releases and accidents; - Appropriate fire extinguishers and fire response plans will be available at the site; - Appropriately stocked first-aid equipment and stations at both work sites and temporary construction camps, including appropriately trained first aid staff on site and adequate transport facilities for moving injured persons to the nearest hospital will be available; - Training for workers and appropriate incentives to use and comply with health and safety procedures and PPE will be provided; - Procedures for documenting and reporting occupational accidents, diseases, and incidents; - Emergency prevention, preparedness, and response arrangements will be in place; - There will be strict safety requirements for personnel assigned to construction work; - Workers will not be interacted with the local populace. - To maintain safe conditions for the general public, construction camps will be fenced and gated; and To protect workers from heat stress - Move to a cool place e.g., cool shady area; - Provide plenty of drinking water; - Break the working in shifts	CC
Traffic Movement near construction site	Traffic flow in the locality of project will slightly increase during construction activities of the project, which directly impact the traffic flow	- Traffic management plan will be developed and implemented during the construction phase; - Construction activities will be scheduled to reduce the chances of traffic jams;	CC

Table Error! No text of specified style in document.-1: Environmental Management Plan for construction and operation of transmission line

Environmental Aspect	Impacts	Mitigation Measures	Responsibility
	along the right of way of transmission line. This increase in traffic may congest the flow of traffic and may cause some accidental injuries and deteriorate the air quality of ambient air.	• Adequate and appropriate road signs will be erected to warn road users along the ROW of transmission lines; • The movement of equipment (trucks) during the construction of the proposed project will be limited to daytime; • Raw materials for construction work will be adequately covered within the trucks to prevent any escaping into the air and along the roadway; • Vehicles will be maintained regularly to reduce the exhaust emissions; and • Any complaint launched by community member will be responded and appropriate action will be taken to avoid it in future.	
Social Impacts	Community health & safety issues	• Emergency response plan should be prepared and implemented during entire phase of construction; • Procedures for interaction with local and regional emergency and health authorities should be made; • In order to minimize traffic congestion (if applicable), deliveries of materials and equipment should avoid peak traffic hours; • Erection of towers and poles for the overhead TLs should be barricaded and crane movement should be assessed prior to the operation near the communities; • Proper lighting at night near trenches will be ensured; and • Diversions, danger points and works at culverts, bridges and construction sites will have appropriate warning signs; this is particularly important at night to avoid accidents. • Complaints register will be maintained.	CC
Impact on Flora and Fauna	Vegetation removal is minimal.	• Implement the best practice for vegetation clearing and disposal practices to minimize the environmental risk associated with clearing and disturbance of vegetation communities.	CC
Operational and Maintenance Phase			
Wind, fire and earthquakes	Electricity arcing, poles and towers dislodgment	• Transmission towers have been designed as per relevant national building codes which include earthquake resistance and loading requirements related to wind conditions. • Transmission support structures such as tower foundations have also been designed to withstand different combinations of loading conditions including extreme winds that generally exceed earthquake loads • System protection features designed to safeguard the public and line protection systems will consist of Transmission Line relays and circuit breakers that are	KE

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Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		designed to rapidly detect faults and cut-off power to avoid shocks and fire hazards. - Electricity arcing from power lines can be a fire hazard. To mitigate against fire hazards: - The fire hazards risk will be minimized through the use of tall towers and wide ROW. - System protection features designed to safeguard the public and line protection systems will consist of Transmission Line relays and circuit breakers that are designed to rapidly detect faults and cut-off power to avoid shocks and fire hazards. - Regular maintenance of the protection system including conductors and circuit breakers will be undertaken.	
Electromagnetic Interference	The corona of overhead TL conductors and high frequency currents of overhead Transmission Line can create radio noise which may interfere with broadcast signals or electronic equipment.	Standard design guidelines have been adopted to limit the conductor surface gradients so as to minimize electronic interference.	KE
Electrocution hazard	High voltage transmission lines may pose electrocution hazard for unauthorized person(s) attempting to climb the tower(s).	- Each tower shall be fitted with an anti-climbing device to prevent unauthorized persons from climbing the tower. The anti-climbing device shall be the ACD spiked type barbed wire or other approved type, and shall be fixed at a height not less than 3 meters above ground. - Reduction in the Resistance to Ground of the grounding system - Proper placement of ground conductors	KE
Gaseous Emissions	Air pollution	- All vehicles, power generators and other equipment used during the maintenance work will be properly tuned and maintained in good working conditions in order to minimize emission of pollutants; and - Emissions from the O&M vehicles will be monitored to ensure compliance with SEQS.	KE
Solid Waste	The maintenance activities may generate some hazardous and non-hazardous waste such as wires and wild vegetation etc.	- A Waste Management Plan for operation phase should be developed; - Ensure that all solid waste generated during operational or maintenance work is collected and segregated and non-hazardous waste should be disposed of in an approved disposal site or recycled or reused.	KE

Table Error! No text of specified style in document.-1: Environmental Management Plan for construction and operation of transmission line			
Environmental Aspect	Impacts	Mitigation Measures	Responsibility
		Any hazardous waste should be separated and stored in areas clearly designated and labeled, and disposal in environmentally friendly manner through EPA certified waste contractor.	
Notes KE = K-Electric; CC = Construction Contractor; SEQS = Sindh Environmental Quality Standards; PM = Particulate Matter, TL = Transmission Line			

Annex VI

Change Management Plan

Change Management Plan

Change in Operations

Any change in the project design or project operation if required, will be made in relevance to the EMP and all the impacts associated with changed process will be either similar to the existing impacts and if different, will be assessed and included in the mitigation management plan. This has, on the basis of nature of process change, been distributed into three categories.

a) First-Order Change

Change leading to a significant removal of any operation from the project described in the chapter on description of project of this report and consequently requires a reassessment of the environmental impacts associated with the changes. In such an instance, updated environmental impacts of the proposed change will be sent to EPA for approval.

b) Second-Order Change

Change that entails project activities not significantly different from those described in the EIA report, and which may result in project impacts whose overall magnitude would be similar to the assessment made in this report. In case of such changes, the environmental impacts of the activity will be reassessed. Additional mitigation measures, if required, will be identified and documented for being reported to EPA for their record.

c) Third-Order Change

Change that is of little consequence to the EIA findings. This type of change does not result in impact levels exceeding those already assessed in the EIA report; rather these may be made onsite to minimize the impact of an activity. The only action required in this regard will be to record the details of process change in the record register.

Change in Record Register

A record register will be maintained at project site at the start of project activities. All the changes to be made will be recorded in this register. This will assist in the step-by-step environmental monitoring and decision-making. Record register will be the responsibility of EHS department, and will be used internally.

Change in EMP

Changes in project design necessitate changes in the EMP. In this case, following actions will be taken:

- A meeting will be held between project management and contractor, to discuss and agree upon the proposed change to the EMP.
- Based on the discussion during the meeting, a report will be produced, which will include the additional EMP clauses and the reasons for their addition.
- Additional EMP clauses will be added to the original EMP as a second volume which will be distributed to the relevant project personnel and contractor.

Annex VII

Applicability of IFC Performance Standards to Project

Applicability of IFC Performance Standards to Project

S. No	Performance Standard	Triggered	Applicability (project context)
1	Assessment and Management of Environmental and Social Risks and Impacts	Yes	The EIA has taken into consideration various environmental and social risks that could arise during different stages of projects and corresponding mitigation measures have been given to minimize or eliminate them in the form of EMMP.
2	Labor and Working Conditions	Yes	The proposed project and its entailing activities will result in short to medium term employment, particularly for unskilled labour. Measures for worker protection against potential hazards during the course of project construction have been described in the report and shall be enforced by project proponent.
3	Resource Efficiency and Pollution Prevention	Yes	The proposed project aims for efficient electricity transmission by employing proven and standard technologies.
4	Community Health, Safety, and Security	Yes	TL RoW does not have established settlements. Communities in the area have nevertheless been consulted during the course of the EIA study. Measures to alleviate possible negative impacts of project to the communities have been aptly described in the EMMP.
5	Land Acquisition and Involuntary Resettlement	Yes	Land will be acquired for project. Involuntary resettlement is not envisaged from project activities.
6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes	The project area is predominantly barren and has xerophytes as the prevalent vegetation. No major adverse impacts are envisaged from the project activities on the existing biodiversity of the area.
7	Indigenous Peoples	No	No known designated indigenous people inhabit the project area.
8	Cultural Heritage	No	No gazetted cultural heritage site is located in the project area.