PROJECT IMPLEMENTATION UNIT (PIU), KWSSIP
KARACHI WATER & SEWERAGE CORPORATION
(KW&SC)

KWSSIP | Karachi Water and Sewerage Services Improvement Project

Environmental and Social Management Plan (ESMP)

KARACHI WATER & SEWERAGE SERVICES IMPROVEMENT PROJECT (KWSSIP)

CONSTRUCTION OF CENTER OF REFORM, RESEARCH AND INNOVATION (CERRI) FOR KARACHI WATER & SEWERAGE BOARD (KW&SB) AT SHAHRA-E-FAISAL KARACHI

January 2024

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AIIB	Asian Infrastructure Investment Bank
AoI	Area of Influence
BOD	Biochemical Oxygen Demand
BP	Bank Procedures
CC	Construction Contractor
CCR	Community Complaints Register
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
CERRI	Center of Reform, Research and Innovation
CFT	Cubic Foot
CLICK	Competitive and Livable City of Karachi
COD	Chemical Oxygen Demand
DC	Design Consultant
DCP	Dry Chemical Powder
DG	Director General
E&SS	Environmental And Social Safeguard
EA	Environmental Assessment
ECO	Economic Cooperation Organization
EHS	Environmental Health & Safety
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESC	Environmental And Social Cell
ESMMP	Environmental And Social Management & Monitoring Plan
ESMP	Environmental And Social Management Plan
GBV	Gender Based Violence
GFP	Grievance Focal Point
GHG	Green House Gases
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
HSE	Health, Safety and Environment
HVAC	Heating, Ventilation and Air Conditioning
IAQ	Indoor Air Quality
IEE	Initial Environmental Examination
IT	information technology
KDA	Karachi Development Authority
KMC	Karachi Metropolitan Corporation
KW&SC	Karachi Water and Sewerage Corporation
KWSSIP	Karachi Water and Sewerage Services Improvement Project
LG	Local Government
LGD	Local Government Department
LPG	Liquefied Petroleum Gas

MD	Managing Director
NCS	National Conservation Strategy
NESPAK	National Engineering Services Pakistan
NOC	No Objection Certificate
NTU	Nephelometric Turbidity Unit
O&M	Operation And Maintenance
OHS	Occupational Health & Safety
OIC	Organization of the Islamic Conference
OP	Operational Policy
PA	Personal Assistant
PGA	Peak Ground Acceleration
PHA	Parks & Horticulture Authority
PIU	Project Implementation Unit
PKR	Pakistan Rupees
PM	Particulate Matter
PPE	Personal Protective Equipment
PPRA	Public Procurement Regulatory Authority
PSHA	Probabilistic Seismic Hazard Assessment
R&D	research and development
SAARC	South Asian Association for Regional Cooperation
SBC	Seismic Building Code
SC	Supervision Consultant
SDS	Social Development Specialist
SE	Superintendent Engineer
SEPA	Sindh Environmental Protection Agency
SEQS	Sindh Environmental Quality Standards
SOPS	Series Of Projects
SPM	Suspended Particulate Matter
SSSD	Sindh Strategy for Sustainable Development
SSWMB	Sindh Solid Waste Management Board
SW	South West
SWM	Solid Waste Management
TCU	True Color Unit
TDS	Total Dissolve Solids
TSS	Total Suspended Solids
UNESCO	United Nation Educational Scientific and Cultural Organization
UNO	United Nations Organization
WB	World Bank
WBG	World Bank Group
WSW	West South West
XEN	Executive Engineer

Executive Summary

1. Project Background

The Karachi Water & Sewerage Corporation (KW&SC) is a service-based consumer-oriented organization responsible for production, transmission and distribution of potable water to the citizens of Karachi, managing sewerage system within the city to ensure hygienic environment, development of schemes to cover short falls in services and collection of revenues for sustained economic viability. KW&SC, since its inception, has grappled with conventional management systems and lacks a contemporary infrastructure. KW&SC has no state-of-the-art customer care centers and struggling for the centralization and streamlining of the records pertaining to the water & sewerage connections, tariffs & revenues etc. It also lacks research and innovation facilities and is not utilizing the modern Information Technology (IT) tools.

In an effort to address the aforementioned shortcomings, KW&SC intends to construct a building within its complex at Shahrah-e-Faisal, Karachi that will be called Center of Excellence, Reform, Research and Innovation (CERRI). CERRI is planned to address these critical gaps by ushering in a new era of modernization and efficiency. KW&SC plans to construct six (06) such centers at different places and CERRI is first among them.

By introducing a state-of-the-art facility, the proposed CERRI building will:

- Remedy the longstanding deficiency in streamlined service provision;
- Support the growth of various corporate offices;
- Serve as public facilitation/ customer-care center;
- Provide research and development (R&D) facilities;
- Establish information technology (IT) set-ups;
- House the Public Private Partnership (PPP) Cell;
- House the Katchi Abadi Cell; and
- Provide services for training and capacity building etc.

The environmental and social screening of the project indicates that the project interventions will have moderate to low environmental impacts and thus classified as Category B project based on World Bank's operational policies, which requires an ESMP. The current document present ESMP for the construction of CERRI.

2. Project Description

The project involves construction of a state-of-the-art building on the plot area 20,480 sq ft with the total covered area of 42,318.7 sq ft within the premises of KW&SC complex near Karsaz at Shahrah-e-Faisal, after demolishing an abandoned structure within the plot area. The project will comprise basement, ground floor and two upper stories. The basement will accommodate Research and Innovation Centre, training center and command & control room. The ground floor will feature a grand entrance and a welcoming reception area to facilitate customers, a display hall & library, customer facilitation center, record room, admin office, IT control room and server room. The first floor will be accessible through a separate entrance,

providing working space for 40-50 staff members. The first floor will also accommodate the management of KW&SC, providing working space for 11 offices. The second floor will house project offices, including the PPP Cell, providing working space for a specified number of individuals. The executive floors (1st and 2nd) will include a spacious boardroom, a separate meeting room equipped with state-of-the-art IT support for video conferencing, and a serene waiting room with a receptionist for visitors.

Following considerations have been adopted in the design of the building:

- Provision of solar system to use green energy;
- Provision of green terraces and trees in the surroundings;
- Maximum utilization of sunlight during day to ensure minimum usage of electricity;
- Provision of resource and energy efficient fixtures in the building;
- Cross ventilation of air; and
- Seismic provisions in the structure of building etc.

The CERRI will have an outside parking as well as allied facilities including access roads with separate drop of lanes, standby electricity arrangements, solar system, Heating Ventilation and Air Condition (HVAC) system, water supply, sewerage system, firefighting arrangements, emergency exits and assembly points and security arrangements.

The estimated total cost for construction of proposed project is **1386.20 million PKR**.

3. Policy, Legal and Administrative Framework

The national and provincial Government has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. The Ministry of Climate Change is the responsible authority for environmental protection policy making in Pakistan whereas Sindh Environmental Protection Agency (SEPA) is the regulatory authority in Sindh, which provides guidelines for conducting Environmental Impact Assessment (EIA)/Initial Environmental Examination (IEE) studies and has authority to issue regulatory clearance/ No Objection Certificates (NOCs) for various projects.

In addition to the laws of land, World Bank Operational Policies (OPs) are also applicable to the project including Environmental Assessment (OP 4.01), Gender policy (OP 4.20), and Access to information (BP 17.50).

4. Baseline Profile

Baseline study is intended to identify and establish all the physical, biological and social environmental conditions, prevailing before the execution of the project, in order to use this information as a reference datum to associate future changes and judge them if the conditions have changed for better or worse.

As per the environmental screening study conducted earlier, the project falls in “category B” which means that the impacts of the project activities are limited and within the boundary of

project area. The whole boundaries of project area have been considered as Area of Influence (AoI).

The proposed project site is located within the boundary of KW&SC complex and is away from the civic amenities of the Karachi Metropolitan Corporation (KMC), hence no Anti Encroachment Drive (AED) has been conducted in or near the site, therefore AED screening is not required.

A. Physical Environment

The project site is located at the Shahrah e Faisal Road within the premises of KW&SC complex. The project site is plain with no undulations in the ground. There is an existing building at the site surrounded by several trees. The ground levels in the project surroundings do not vary significantly. However, there are buildings, bridges and other structures in the surroundings.

The project area has moderate climate. It has hot summer and mild winters. The summer starts from May and lasts till September. May and June are the hottest month. The mean maximum temperature is observed 35 ºC for the month of May. The winter seasons lasts from November to February. January is the coldest month. The mean maximum and mean minimum temperature ranges from 27 ºC to 11 ºC in January. On average, August is with 82.0% the most humid. Maximum precipitation was observed in the month of July nearly 50 mm. The dominant wind speed throughout the year is >19 km/hr.

Karachi is a coastal city at the coast of Arabian Sea. Surface water resources of Karachi include three major rivers named as Indus, Lyari and Malir. Rivers Malir and Lyari basins are the two main basins which drain about 80 percent of the surface runoff of the city[1]. Surface runoff is collected by hundreds of small and large channels in the basins, finally draining into the Arabian Sea. Project area is located in Korangi in North of Malir River and South-eastern side of Lyari river.

The Project Area is located in Seismic Zone 2B, where 2B (upper moderate damage zone) represents peak horizontal ground acceleration from 0.16 to 0.24g.

B. Biological Environment

The project site lies in commercial zone with various commercial activities in the surroundings. There are no floral or faunal species of concern in the project area, however, some domestic animals (street dogs, cats, rats, lizards and worms etc.) can be seen there. Furthermore, there are several trees of native species in and around the project area including Neem and Kikar.

C. Social Environment

The proposed project will be constructed within KW&SC Complex. All the project activities as well as construction camps, material yards, parking of machinery and other associated works will be carried out within the premises of the site. The proposed site is located at the left side

1 2020, IMPLEMENTATION OF STORAGE AND DEWATERING INFRASTRUCTURE FOR WASTE MATERIAL REMOVED FROM STORM WATER DRAIN IN KARACHI, EIA, SSWMB.

of the main entrance gate of KW&SC at a linear distance of approximately 230 feet. The nearest business block of KW&SC is at linear distance of approximately 360 feet from the site. The farthest block is over 1000 feet away from the proposed location. The KW&SC complex also accommodates residential apartments for KW&SC staff. These apartments are located at the backside of the proposed site and are accessible through a separate entrance gate and 50 feet wide approach road. The residential apartments are Type H and Type F comprising 1 room and 2 rooms respectively.

Currently, the site is accessible through the main entrance gate of the KW&SC complex, but during construction, the other gate along the service road will be used thus avoiding any mobility as well as accessibility issues to the employees of KW&SC.

5. Public Consultation and Information Disclosure

The consultation process was initiated to disseminate the project related information to the stakeholders and access their views, suggestions and apprehensions (if any) towards the project. The stakeholders include government departments i.e., K. Electric, SEPA etc. as well as employees of KW&SC working in various blocks of KW&SC in the near vicinity of the proposed site.

Following are the major findings of the consultations:

- KW&SC needs a modern office building and customer service center to introduce the corporate culture and change the outdated perspective of water board;
- The proposed site is located away from the existing buildings; hence no major issues are envisaged during the construction;
- In addition to the main entrance, there are two more gates on the service road, which may be used during construction to avoid accessibility issues;
- There is complaint cell in the complex which mostly receives complains on call and very few complainants do physically come to lodge the complaints, therefore, the customers will also not be affected. Furthermore, the customers use separate gate to visit the complaint cell;
- The staff colony also has a separate access road and entrance gate; hence the residents are also not envisaged to be disturbed.

6. Anticipated Environmental Impacts & Mitigation Measures

The construction activities would cause changes in topography, soil contamination, surface & groundwater pollution, air pollution, noise & vibration, solid waste generation, overburdening of resources, construction camps issues, health & safety issues, emergency situations, traffic disruption and social issues. All these impacts can be mitigated by adopting prescribed mitigation measures and ensuring good workmanship during the execution of the project.

Anticipated impacts during operational stage will include water pollution, air pollution, soil contamination, heat island effect, solid waste generation, occupational health & safety issues and emergency situations.

Some other positive impacts include economic development, employment generation and one window facilitation center for KW&SC customers.

7. Environmental & Social Management & Monitoring Plan

Recommended mitigation measures to control potential adverse impacts are described in the Environmental & Social Management Plan (ESMP). ESMP shall become the part of construction contract agreement and shall be strictly enforced during the implementation of the proposed project.

The project activities will be monitored and managed by the PIU-KWSSIP. The Environmental and Social Cell (ESC) staffed with qualified environmental, Gender and social specialist has already been established under PIU-KWSSIP. The ESC will be the custodian of the ESMP. ESC will support to ensure the compliance of ESMP. ESC will submit progress report for the implementation of the ESMP to WB and SEPA as per environmental approval/ NOC conditions for the KWSSIP.

Environmental Budget

The Environmental Budget for the proposed project activities is **PKR 9,484,650/-**.

1 INTRODUCTION

1.1 Overview

The Karachi Water & Sewerage Corporation (KW&SC) is a service-based consumer-oriented organization responsible for production, transmission and distribution of potable water to the citizens of Karachi, managing sewerage system within the city to ensure hygienic environment, development of schemes to cover short falls in services and collection of revenues for sustained economic viability. KW&SC, since its inception, has grappled with conventional management systems and lacks a contemporary infrastructure. KW&SC has no state-of-the-art customer care centers and struggling for the centralization and streamlining of the records pertaining to the water & sewerage connections, tariffs & revenues etc. It also lacks research and innovation facilities and is not utilizing the modern Information Technology (IT) tools.

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- Provide services for training and capacity building etc.

The environmental and social screening of the project indicates that the project interventions will have moderate to low environmental impacts and thus classified as Category B project based on World Bank's operational policies, which requires an ESMP. The current document present ESMP for the construction of CERRI.

1.2 Objective of ESMP

The following are the objectives of ESMP:

- To assess the existing environmental and socioeconomic conditions of the project area;
- To identify potential impacts of the proposed interventions on the environmental, ecological, social and gender-related aspects of the project area, to predict and evaluate these impacts and determine their significance;
- To assess the gender and gender-based violence (GBV) related impacts of the proposed interventions and propose appropriate mitigation measures to address gender discrimination;

- To propose appropriate mitigation measures that should be incorporated in the design of the project to avoid or minimize (if cannot eliminate) the potentially adverse impacts;
- To assess the compliance status of the proposed activities with respect to the national and provincial environmental legislation and WB's OPs;
- To provide institutional, monitoring, reporting and documentation measures for environmental, social safeguards and gender equality compliance; and
- To aid decision makers to take informed decisions.

1.3 Scope of ESMP

The ESMP identifies the potentially significant impacts of the proposed project and suggests the applicable mitigation measures to avoid, minimize or reduce the magnitude of the impacts. It will also indicate the institutional and training requirements to implement mitigation measures during the construction and operation of the proposed project.

The current ESMP presents a roadmap for environment and social management for construction and operation of the proposed project. The proposed project is under the Category B in view of its associated environmental and social impacts, which means that the project impacts are not envisaged to go beyond the project boundaries. The boundaries of the project area have been defined as the area of influence (AoI) and the potential impacts within the AoI have been focused to design the mitigation measures.

1.4 Contractual Requirements/ Obligations of ESMP

The impacts and their mitigation measures summarized in the ESMP, will be integral part of the Bidding Documents making it mandatory to Contractor, Subcontractors and their nominees to adhere to its requirements throughout the project construction phase.

With the assistance of the Supervision Consultant, the PIU will monitor compliance of the ESMP implementation by the Contractor.

At the bidding stage, the Contractors must consider the environmental and social/gender management requirements contained in this ESMP when preparing their bids and pricing Work items. The Contractor must acknowledge that the ESMPs provisions and clauses are an integral part of the Contract except for separate items in the Bill of Quantities (BoQs). Payment will not be separately made for ESMP compliance. Failure by the Contractor or Subcontractors to implement the ESMP recommendations may lead, the Engineer to take serious actions to ensure compliance and rectify any resulting damages. The actions may include the suspension/ halt of project activities, imposing penalties & fines, or in the worst-case suspension of the services.

The Contractor will be required to provide the human and financial resources necessary to progress and achieve statutory compliance and implementation of the Contract and the ESMP. The Contractor shall carry out his/her duties as required in the ESMP implementation which shall include but not necessarily be limited to the following:

- Maintaining up to date records on actions taken by the Contractor regarding the implementation of ESMP requirements;

- Timely submission of reports, information, and data;
- Participation in the meetings convened by the PIU, and
- Any other assistance requested by the PIU as specified in the bid documents including Health & Safety (HSE) arrangements at site, hiring of relevant HSE staff and providing secure work environment.

The Contractor will provide Monthly Monitoring Report within 10 days of the following month to the supervision consultant, relative to the implementation of the requirements contained in the ESMP and the results of the environmental performance monitoring.

1.5 Approach & Methodology to Work

1.5.1 Approach

The study has been conducted in accordance with World Bank Safeguards policies (OP 4.01, OP 4.12, OP 4.20 & BP 17.50) applicable to this project. However, the project does not involve any type of resettlement, therefore OP 4.12 Involuntary Resettlement does not apply in this project. The study is based on both primary and secondary data and information. The assessment remains subject to change with respect to finalization of technical design.

1.5.2 Methodology

The following methodology was adopted to develop the ESMP of the proposed Project:

A. Orientation/ Team Mobilization

Meetings and discussions were held among the members of the ESMP Consulting Team. This activity is aimed at achieving a common ground of understanding of various issues of the Study between the Consultants and PIU.

B. Data Collection Planning

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the ESMP Consulting Team. The plan included; identification of specific data requirements and their sources; determination of time schedules and responsibilities for their collection and indication of the logistics and other support needed for the execution of the data acquisition plan. Field surveys were then conducted based on the data collection plan.

C. Sampling & Analysis of Physical Environmental Parameters

M/s SGS Laboratory (SEPA Certified Laboratory) was hired for environmental monitoring. The Laboratory was mobilized on July 4, 2023.

D. Review of Secondary Data

Following documents were consulted for collection of secondary information:

- District Census Reports (DCRs) etc. (2017).

E. Review of Environmental and Social Laws and Institutional Requirements

The project needs to comply with all the applicable national and provincial environmental and social policies, laws, guidelines, acts and legislations and World Bank's Operational Policies (OPs) requirements. All these requirements and policies were reviewed (refer Section 2).

F. Area of influence (AOI)

The area of influence is the area likely to be affected by the project, including all its ancillary aspects. The AoI includes the areas where positive and adverse impacts may be foreseen due to the implementation of the proposed project.

A team of environmental and social experts, including environmental engineers and sociologists carried out the environmental, social and gender survey of the AoI. These initial surveys helped in identification/ demarcation of AoI. In case of this said project, the boundaries of project area have been defined as the area of influence (AoI) and the potential impacts within the AoI have been focused to design the mitigation measures. The total area in the AoI measures to be 21,500 square feet.

G. AED Screening

The proposed project site is located within the boundary of KW&SC complex and is away from the civic amenities of the Karachi Metropolitan Corporation (KMC), hence no Anti Encroachment Drive (AED) has been conducted in or near the site, therefore AED screening is not required.

H. Environmental and Social Baseline Survey of the Project

Environmental and social survey was carried out to establish the baseline of the project area during March 22, 2023 and July 04 to July 05, 2023. Prior to the start of field activities, comprehensive checklists, proformas and maps were developed to gather the following information:

Physical Environment

Following information was acquired for the establishment of physical environment baseline:

- Topography;
- Water resources (including available surface and groundwater resources water supply, water contamination etc.);
- Climate data (including temperature, precipitation, humidity, wind speed, direction etc.);
- Water, Surface Water, Ambient air quality and noise level monitoring data;
- Existing water supply and sewerage systems;
- Seismology;
- Land resources (including land use pattern, soil & geology)

Ecological Environment

- Flora (trees, herbs, shrubs, grasses and overall vegetation including valuable or rare trees and their loss due to implementation of the Project etc.);
- Fauna/ Wildlife (Mammals, reptiles, amphibians and avifauna.)

Socio-Economic Environment

- The socioeconomic baseline was established through secondary data.

I. Stakeholder Consultations

Apart from secondary data, consultations were held with stakeholders to establish the social baseline of the area.

The study team met with the government functionaries and the other stakeholders. The objective of the consultation was to disseminate information on the project and its expected impacts, long-term as well as short-term, among primary (KW&SC) and secondary (SEPA, SBCA) stakeholders and to gather information on relevant issues so that the feedback received could be used to address these issues at an early stage.

J. Impact Assessment and Mitigation Measures

A logical and systematic approach (using critical thinking (logic) and practical as well as a holistic approach to ensure as much accuracy as possible) was adopted for impact identification and assessment. The process began during the screening and continued through scoping which identified the key issues and classified them into different categories. For impact assessment Environmental and social/gender screening report was used as a tool.

Identification of potential environmental and social impacts in terms of their nature, magnitude, extent, location, timing and duration were carried out. The impacts were correlated to the project location, design stage, construction as well as operation stage. Based on the impacts prediction methods and as a result of public/stakeholder consultations, ESMP team screened the adverse environmental and social impacts for inclusion in the mitigation measures and environmental and social management plan. Stakeholder consultations (which provided feedback on the impacts from the stakeholder's viewpoint) were used to screen out the insignificant impacts.

ESMP team strived to propose practicable, economically feasible and socially acceptable mitigation measures for the significant adverse environmental and social impacts. These measures were based on exploring the ways to achieve the project objectives causing least disturbance to the existing environment by alternative ways, proposing changes in the project design, through improved monitoring and management practices (storage of construction materials, labour camps, waste disposal, and disposal of construction debris etc. or through monetary compensation).

K. Environmental and Social Management Plan

The data collected from the field was analyzed and the impacts of the proposed project on the physical, biological and socio-economic environment prevalent in the project area were identified and characterized with respect to significance and probability of occurrence at the design, construction, operation and decommissioning phases. Possible mitigation measures and implementation mechanisms are proposed so that the impacts can be mitigated/ controlled and the project implementation remains sustainable.

1.6 Structure of Report

The structure of this report is listed below:

Section 1: Introduction briefly presents the project background, objectives, methodology and need of the study.

Section 2: Project Description provides an overall description of the project including design considerations and concepts, manpower requirement, waste generation, machinery and material requirements.

Section 3: Legal and Administrative Framework lists national as well as provincial laws, regulations and procedures and applicable World Bank Operational Policies (OPs).

Section 4: Baseline Profile gives a description of baseline physical, biological and socio-economic conditions of the project area.

Section 5: Public Consultation and Information Disclosure identifies the main stakeholders and their concerns raised during scoping sessions and deals with the measures to mitigate the social impacts.

Section 6: Potential Environmental and Social Impacts and their Mitigations Measures identify, predict and evaluates impacts of the project activities during the construction and operation stages and deals with the measures proposed to mitigate potential environmental and social impacts of the proposed project.

Section 7: Environmental & Social Mitigation & Monitoring Plan outlines organizational framework, mitigation and monitoring plans, training requirements, defines roles and responsibilities, estimates budgets requirements for satisfactory implementation.

2 PROJECT DESCRIPTION

The project involves construction of a state-of-art building with the total covered area of 42,318.7 sq ft in the premises of KW&SC complex near Karsaz at Shahrah-e-Faisal, after demolishing an abandoned building. The proposed building will serve as the facilitation center as well center of reforms, research and innovations for KW&SC.

2.1 Project Location

The proposed project site is located near Karsaz, at Shahrah e Faisal, Karachi within KW&SC Complex. The proposed site is located at the left side of the main entrance gate of KW&SC at a linear distance of approximately 230 feet. The nearest business block of KW&SC is at linear distance of approximately 360 feet from the site. The farthest block is over 1000 feet away from the proposed location. The KW&SC complex also accommodates residential apartments for KW&SC staff. These apartments are located at the backside of the proposed site and are accessible through a separate entrance gate and 50 feet wide approach road. The location map of the proposed site is shown in **Figure 2.1.**

Figure 2.1: Location Map of CERRI

2.2 Project Components

Following are the salient features of the proposed project:

2.2.1 Project Area

The total covered area of the proposed building is 40,206 SFT. The 3D view of the proposed building is shown in **Figure 3.2**. The details of each floor are given in **Table 3.1** and their plans are shown in **Figure 3.3** to **Figure 3.6**. The schedule of area is given below:

Table 2.1: Details of Each Floor

A. Covered Area		
1.	Plot	20,216 sq. ft
2.	Parking	12,546 sq. ft
B. Floor Plans		
1.	Ground Floor	9,383 sq. ft
2.	First Floor	10,691 sq. ft
3.	Second Floor	10,691 sq. ft
4.	Basement	9,441 sq. ft
	Total	**40,206 sq. ft**
C. External Services		
1.	Pump Room	451.335 sq. ft
2.	Substation	608 sq. ft
3.	Toilet Block	212 sq. ft
	Total	**1,271.335 sq. ft**
	Grand Total	**42,318.761 sq. ft**

Figure 2.2: 3D View of Proposed Building

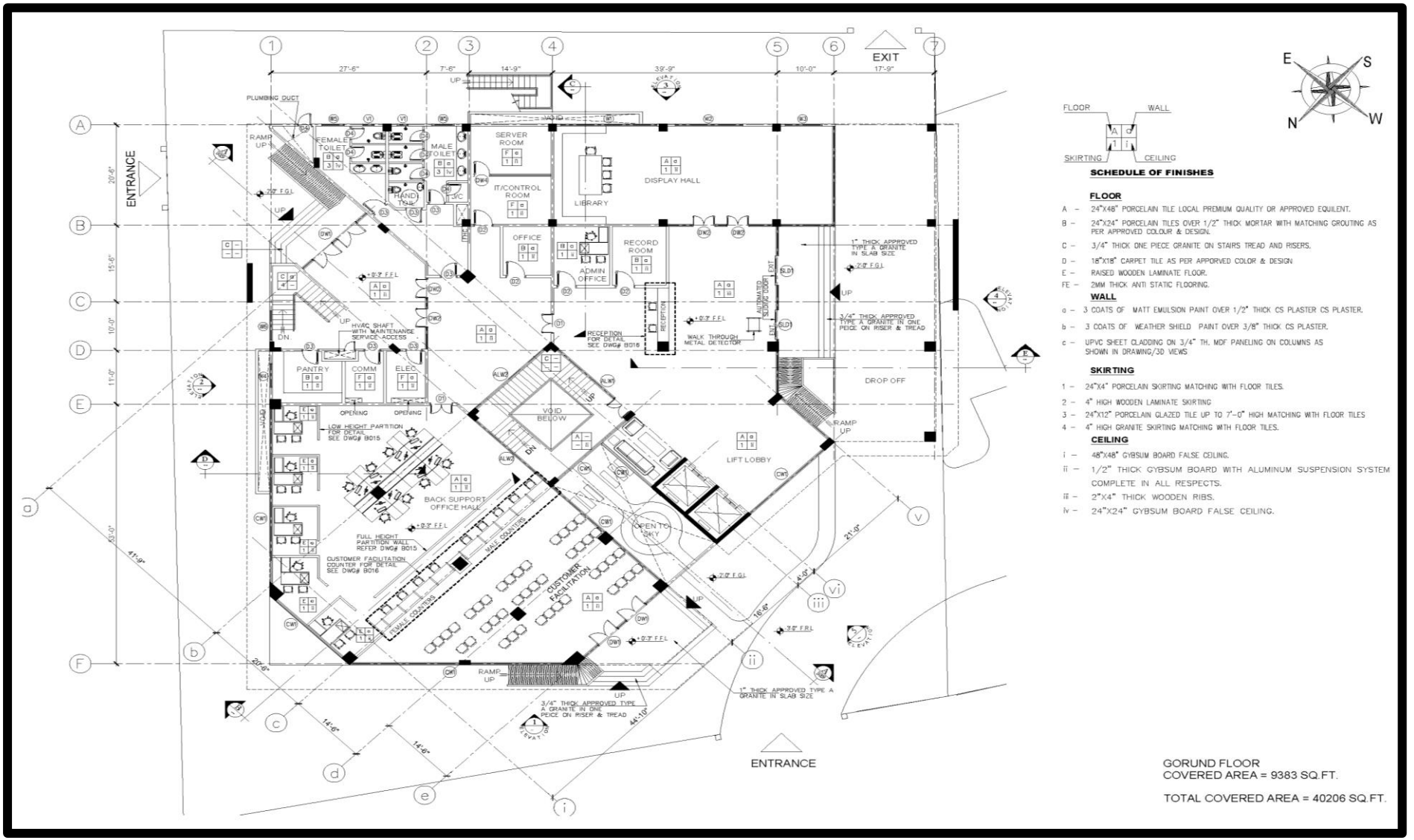


Figure 2.3: Ground Floor Plan

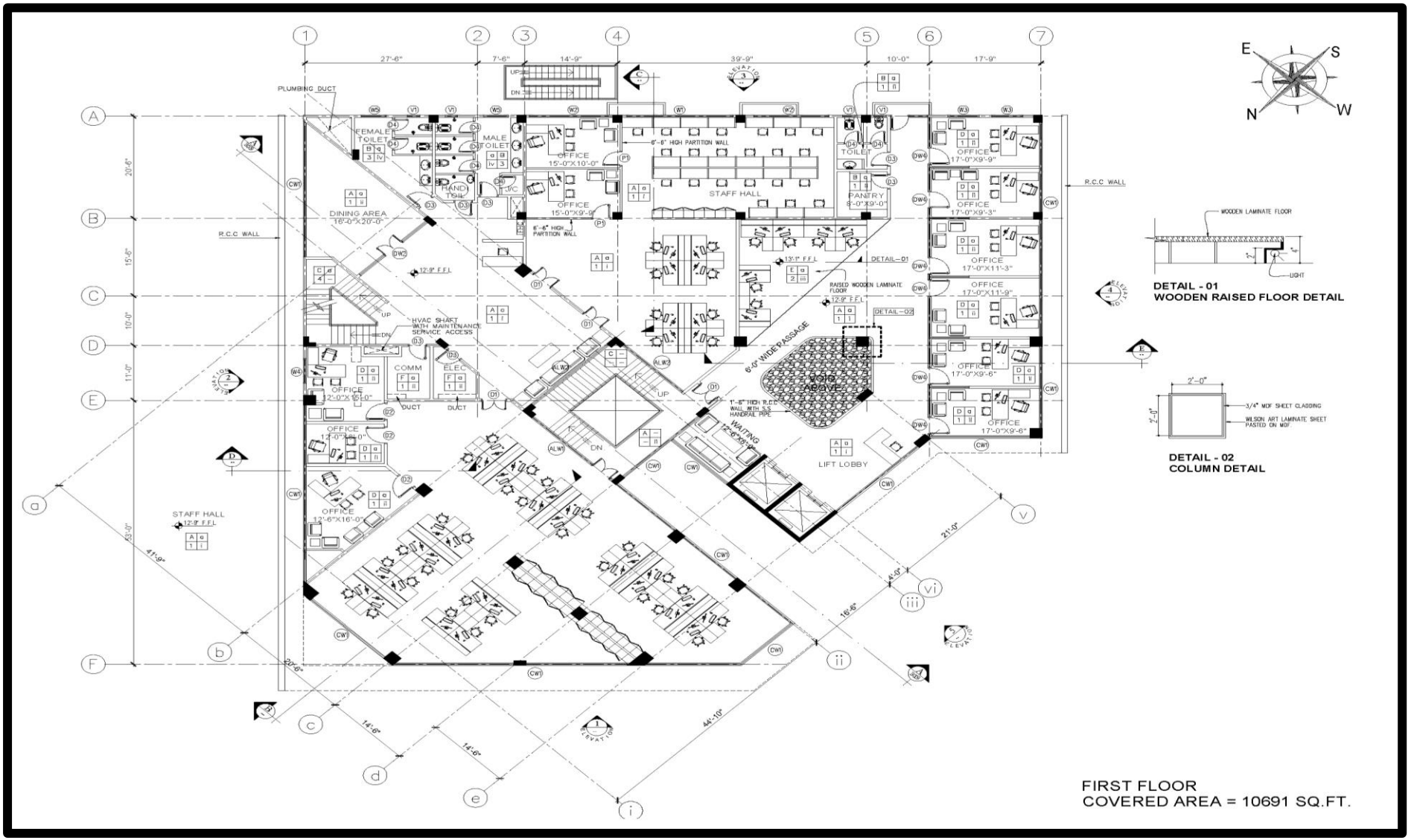


Figure 2.4: First Floor Plan

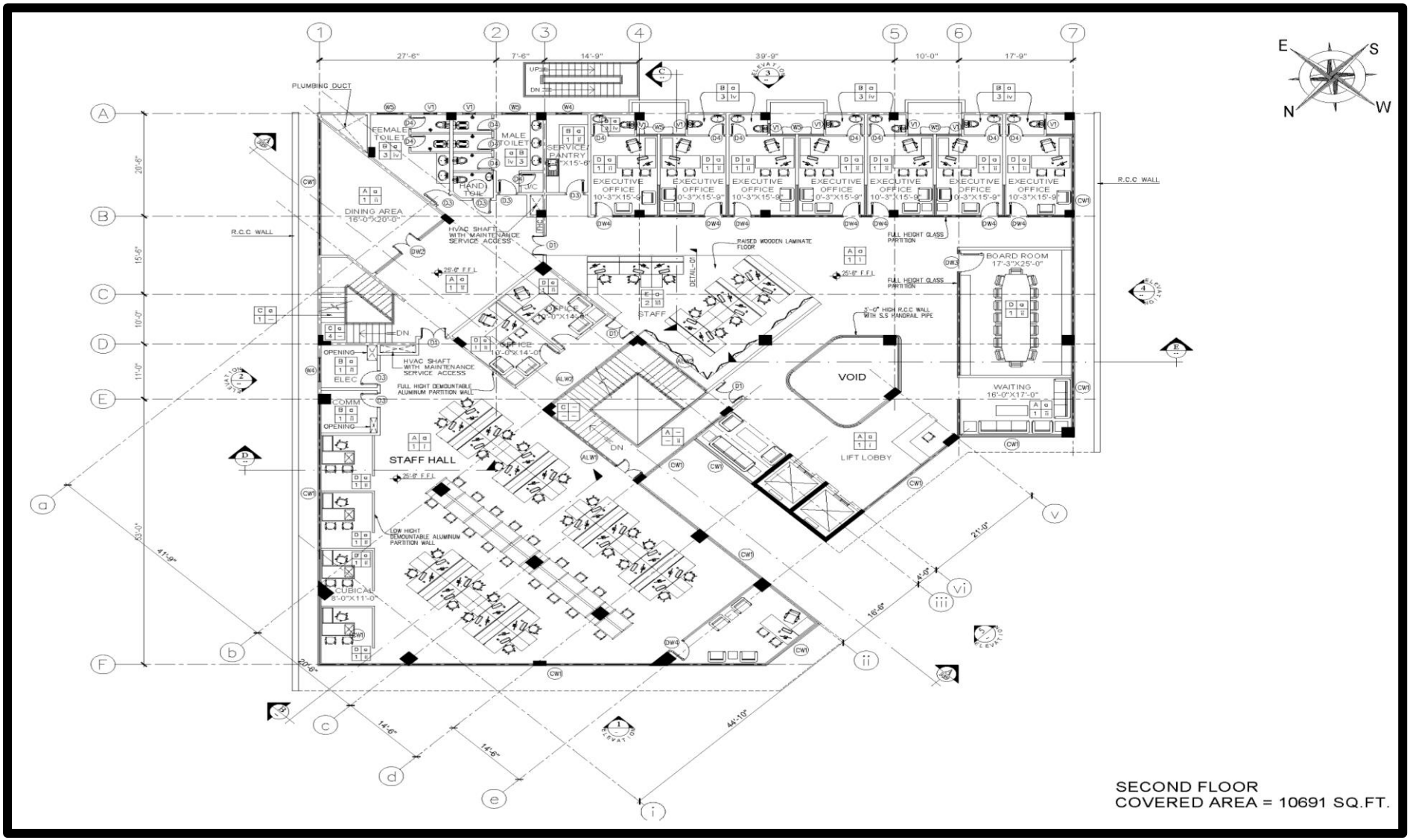


Figure 2.5: Second Floor Plan

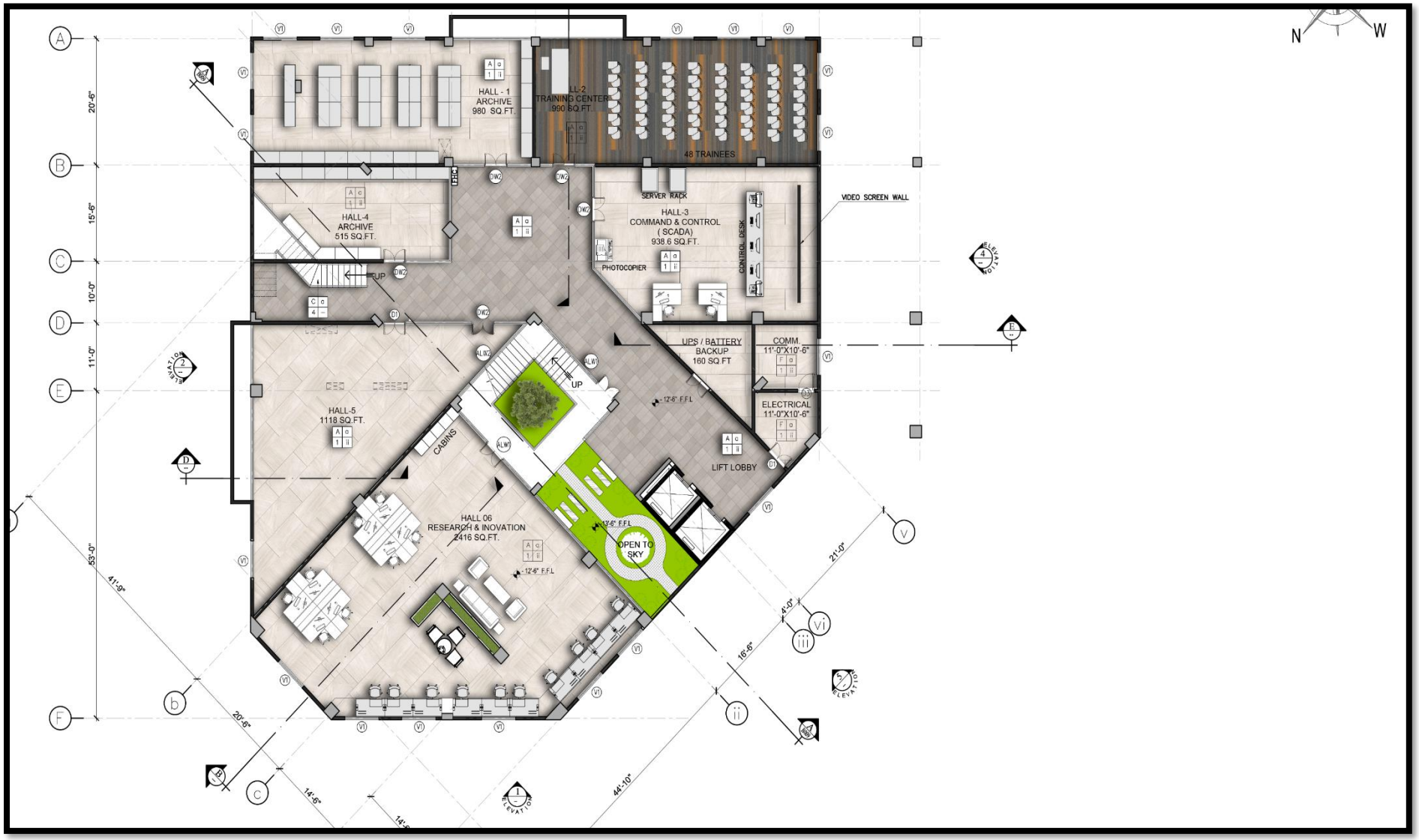


Figure 2.6: Basement plan

2.2.2 Proposed Exterior and Interior Designs

Proposed exterior and interior designs for the said building are shown hereunder reflecting a modern and state-of-the-art visual. Eliminating all space congestion issues within office areas along with provision of an ample parking for the employees. Interior ambience will foster a healthy atmosphere by integrating all sustainable requirements including energy efficiency in lighting and HVAC system, indoor air quality, thermal comfort, water efficiency, daylight utilization, waste reduction etc.

The proposed exterior and Interior of proposed building are shown below in **Plate 2.1** and **Plate 2.2**.

Plate 2.1: Exterior of Proposed Building


Plate 2.2: Interior of Proposed Building

2.3 Environmentally Friendly Design Considerations

Following considerations have been adopted in the design of the building:

- Provision of solar system to use green energy;
- Provision of green terraces and trees in the surroundings;
- Maximum utilization of sunlight during day to ensure minimum usage of electricity;
- Provision of resource and energy efficient fixtures in the building;
- Cross ventilation of air; and
- Seismic provisions in the structure of building etc.

The details are given hereunder:

2.3.1 Energy Efficiency

The energy efficiency of the building design takes into consideration several factors to achieve a balance between natural lighting and cooling requirements. While the glass front on the north-facing side provides ample natural light, measures have been taken to mitigate excessive heat gain and ensure energy efficiency.

Firstly, the use of double-glazed glass for the front helps in reducing heat transfer through the windows. Double glazing consists of two panes of glass with a layer of gas in between, which acts as insulation and reduces heat transmission. This helps in maintaining a comfortable indoor temperature and reducing the need for excessive cooling, thus improving energy efficiency.

Additionally, the slits used on the other two sides of the building are strategically designed to allow controlled natural and limiting direct sunlight.

The Energy Efficient LED lights with high lumens output per watt have been proposed to save maximum energy consumption in the building.

A Variable Refrigerant Flow system is proposed. It is a cooling/heating system with high efficiency.

By integrating the energy-efficient features mentioned above, the building would demonstrate of a green building with a contemporary aesthetic. By embracing the concept of a green building with a modern design, KW&SB can showcase its commitment to sustainability, energy efficiency, and the use of cutting-edge technologies. Furthermore, Water-saving measures, such as rainwater storage systems and efficient plumbing fixtures, can reduce water consumption and express a commitment to sustainability.

2.3.2 Solar System

A solar system of 85 kW has been proposed in the design which will partly share the load in addition to K-Electric supplies.

2.3.3 Green Spaces

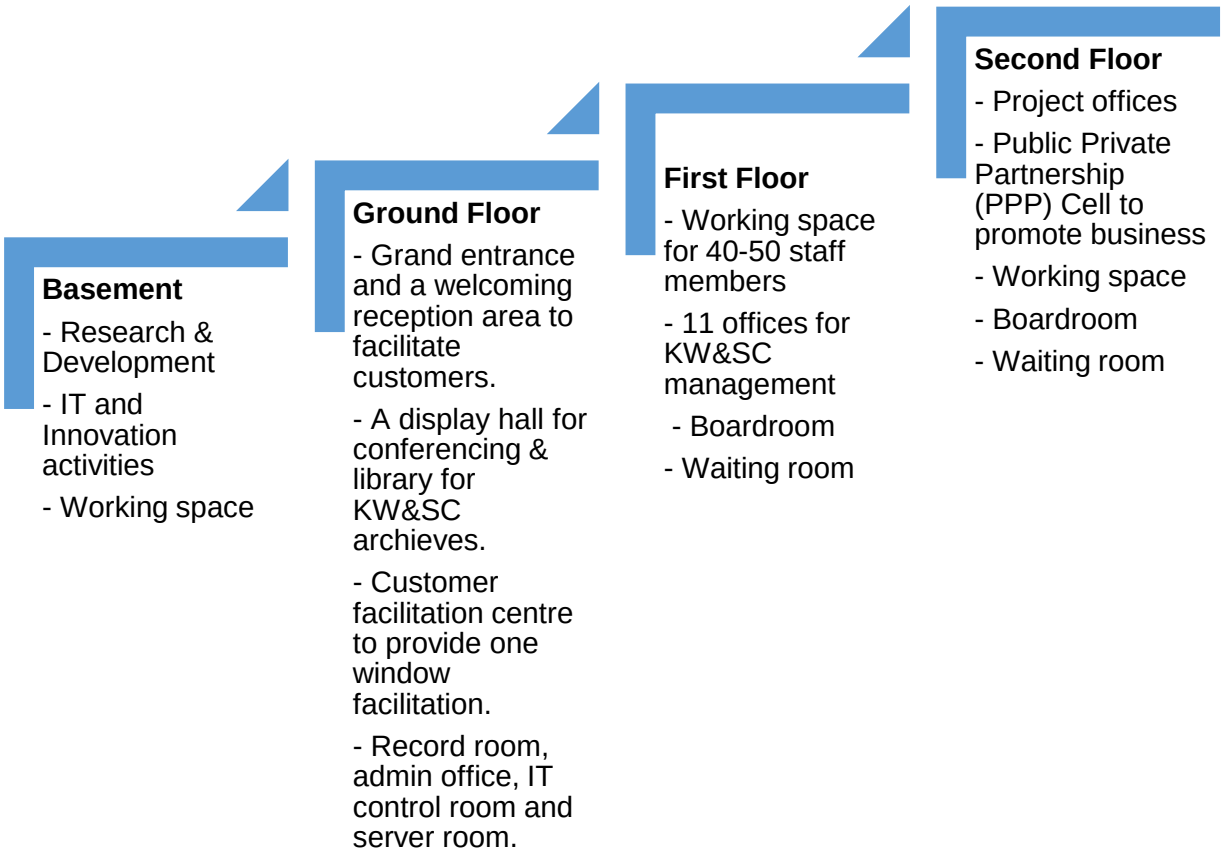
The proposed building has open spaces for plantation of trees. A total of 50 trees will be planted according to Tree Plantation Plan given in **Section 7.13**.

2.3.4 Water Harvesting

A rain water collection tank of size 24 feet * 10 feet has been proposed to collect the rainwater for reuse in agriculture.

2.4 Salient Features

The building will consist of Basement, Ground floor along with two upper stories.



- The first floor will be accessible through a separate entrance.
- All floors will feature open and well-lit halls with comfortable workspaces and well-designed circulation areas, facilitating easy movement and staff interaction. The departments and teams will be seated together, with the offices of their respective management in close proximity.
- The executive floors (1st and 2nd) will include a spacious boardroom, a separate meeting room equipped with state-of-the-art IT support for video conferencing, and a serene waiting room with a receptionist for visitors.
- Each executive will have an adjoining secretary's room with sufficient space for file storage and office accessories.
- Car parking areas will be designated within the plot for executives, senior staff, and general staff, while visitors' parking will be provided outside the plot.
- The building will have a comprehensive HSE system (emergency exits, escape routes, fire alarms, etc.).
- Adequate toilet facilities will be available on all floors, catering to both male and female employees. Executive offices will have attached restrooms for added convenience.
- Separate prayer areas for men and women.

The CERRI will have an outside parking as well as allied facilities including access roads with separate drop of lanes, standby electricity arrangements, solar system, Heating Ventilation and Air Condition (HVAC) system, water supply, sewerage system, firefighting arrangements, emergency exits and assembly points and security arrangements.

2.5 Project Cost

The estimated total cost for construction of proposed project is **PKR 1386.20 million**. This cost is tentative and will be finalized with the detailed technical design of the proposed project.

2.6 Land Acquisition

No land acquisition is involved as the land is owned by KW&SC.

2.7 Project Administrative Jurisdiction

The proposed project falls under the jurisdiction of Deputy Commissioners of District Korangi in Karachi Division.

2.8 Project Implementation Schedule

The project is scheduled to be completed in 12 months.

2.9 Construction Camps

Construction Camp will be established within the project boundary as there is adequate space available for parking of machinery, pilling of materials and site/container office.

2.10 Earthwork and Backfilling

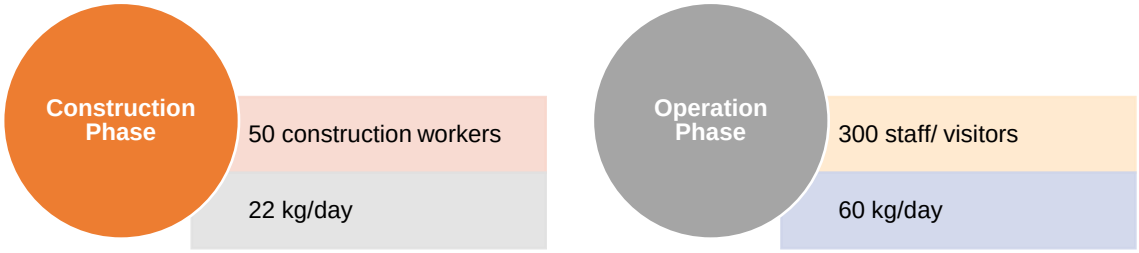
Total earthwork involved is 179,538 CFT and total backfill quantity is 50,381 CFT. The remaining waste shall be transferred to the secondary users.

2.11 Workforce Requirement

Manpower required during construction would include 50 personnel while 05 persons will be required during operational phase pf the project. The proposed building will house 300 persons, when it will be fully functional.

2.12 Solid Waste Generation

The solid waste will include construction and demolition waste of the existing building, the construction debris as well as domestic waste from the contractor's camps. The total quantity of construction and demolition waste corresponds to 12,700 cubic feet which will be partially used in the floorings and the rest of the waste will be transferred to the secondary users. The optimal use of construction materials will be preferred; however, the construction debris will be generated and may either be used in the other construction activities or will be transferred to the designated dumping site near Jam Chakro, along with the domestic waste. The estimated domestic waste based on 50 construction workers is given hereunder:



Waste Generation Rate = 0.2 kg/capita/day
Ref: Characteristics & Management of Institutional Solid Waste of Jamal Khan Ward, Chittagong, Bangladesh

The solid waste during construction will be the responsibility of the Construction Contractor, while during operation it will be managed by the KW&SC. It is estimated that 60 kg of solid waste will be generated on daily basis at the full occupation of 300 persons in the proposed building. To manage the waste, each of the work station and offices will be provided with small bins. The designated staff will daily remove the waste from the small bins and transfer it to a larger building placed outside the building which will be ultimately carried away by the SSWMB vehicles.

2.13 Water requirement

The water will be required for construction activities as well as the for the domestic use in construction camps. The major portion of water will be required in concrete works which is estimated to be 100,000 liters (based on quantity of concrete). The total water requirement during the construction phase will be 180,000 liters.

The water requirement during the operational phase will be based on total number of staff members and visitors which is estimated to be 300 persons. The water requirement adopted in the design is summarized hereunder:

Sr. No	Occupants	Total No. of Persons	Avg. Water Demand per person per day	Total Avg. Water Demand per Day
		Nos.	US Gal./Day	US Gal./DAY
1	**Potable Water Demand**			
i.	Working Staff	300	12	3,600.0
ii.	Expected Visitors (Daily)	200	5	1,000.0
			Potable Water Demand	4,600.0
			Contingency (5%)	230.0
			Potable Water Demand i/c Contingency	4,830.0
			Potable Water Demand (Say)	5,000.0
			No. of Storage Days	2.0
			Capacity of Tank (US Gallons)	10,000.0
2	**Firefighting Demand**			
iii.	2 FHC @ 200 gpm for 120 Minutes			24,000.0
Total Capacity of Tanks (Potable + Fire)				34,000.0

2.14 Power Requirement

The electric connection will be taken from existing KW&SC building. However, during the operational phase it is estimated to be 600 Kilo watt, which will be drawn from K-Electric lines. The load will be partly shared by 85 kW solar system.

2.15 Wastewater Generation during Construction Phase

The water used in the concrete works will be absorbed and a portion of water will be used in curing. Therefore, the generation of wastewater will be minimal as compared to the water requirement. The estimated wastewater generation from the domestic use of contractor's camps and construction works will be approximately 250 liters. The wastewater generation during the operation phase (at full capacity) is estimated to be 3680 US Gallons per day which will be connected to the existing sewerage system that has sufficient capacity to accommodate that load.

2.16 Approval from Concerned Authority

The Sindh Building Control Authority (SBCA) was approached for the approval of drawings of CERRI. It was informed that the government department do not require clearance as per official order attached as **Annex-I.**

3 LEGAL AND ADMINISTRATION FRAMEWORK

3.1 General

This section deals with the current environmental policy as well as legal and administrative framework required to develop the Environmental & Social Management & Monitoring Plan (ESMMP) for the proposed interventions in the project area. All relevant provisions of environmental policies laid down by the Government of Pakistan, Government of Sindh along with applicable World Bank Policies have been duly discussed and the project proponent will be required to adhere to these regulations throughout the course of the project. The institutional arrangement for compliance with these laws has been described in ESMP (Section 7).

3.2 Summary of Key National Legislations

The relevant national legislations are briefly described in chronological order in **Tables 3.1**:

Table 3. 1: Relevant National Legislations

Sr. No.	National Legislations	Brief Coverage	Relevance to project
1.	Fatal Accidents Act 1855	This is an Act to provide compensation to families for loss occasioned by the death of a person caused by actionable wrong.	This law shall be applicable for labor-related accidents.
2.	National Conservation Strategy, 1992	Pakistan National Conservation Strategy (NCS), which was approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the Country. The NCS outlines the Country's primary approach towards encouraging sustainable development, conserving natural resources and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.	The core area that is relevant in the context of the proposed project is pollution prevention during construction.
3.	The Protection Against Harassment of Women at the Workplace Act, 2010	The Protection Against Harassment of Women at the Workplace Act, 2010 is a legislative act in Pakistan that seeks to protect women from sexual harassment at their place of work, and equally applicable to this project.	This Act shall be applicable to ensure protection of women in the implementation of the proposed project.
4.	Pakistan Climate Change Act, 2017	An Act to meet Pakistan's obligations under international conventions relating to climate change and address the effects of climate change, whereas it is expedient to meet Pakistan's obligations under international conventions relating to climate change and to provide for adoption of comprehensive adaptation and mitigation policies, plans, program, projects and other measures required to address the	The construction activities of the project involve various activities that contribute to the spread of pollution. The key areas of concern in relation to the proposed project

Sr. No.	National Legislations	Brief Coverage	Relevance to project
		effects of climate change and for matters connected therewith. 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.	are preventing pollution during construction and abstaining from any practices that generate greenhouse gases to address climate change.
5.	Pakistan Labor Laws	Labor rights in Pakistan specified under Articles 11 and 17 of the constitution of Pakistan, shall be applicable to the proposed project. More specific laws are described separately. The laws are relevant to the project.	This law will be applicable in terms to provide proper labor rights to the labor of the project site.

3.3 Summary of Key Provincial Legislations

The relevant provincial legislations are briefly described in chronological order in **Tables 3.2**:

Table 3.2: Provincial Legislations

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
!.	The Sindh Environmental Protection Act, 2014	Subject to the provisions of this Act and the rules and regulations, no person shall discharge 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.	A meeting was held with Deputy Director (Technical), SEPA regarding submission of requisite environmental document. It was conveyed that no documentation is required for SEPA.
2.	Sindh Solid Waste Management Board (SSWMB) Act, 2014	The SSWMB Act, 2014 enacted to establish a board for collection and disposal of all solid waste, to arrange effective delivery of sanitation services, to provide pollution free environment and to deal with other relevant matters. The Board established under the Act headed by the Chief Minister or his nominee and constitutes of thirteen other ex-officio members of other relevant departments.	. KWSSIP will dispose the waste generated during construction and operation phases in coordination with SSWMB
3.	Sindh Minimum Wages Act, 2015	This act provides for the regulation of minimum rates of wages and various allowances for different categories of workers employed in certain industrial and commercial undertakings and establishments. The contractors and operators of the project will be bound	The contractors will ensure to pay remunerations to the labor and employee

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
		to pay wages to the labor and employees as per the requirement of this act.	as per obligation of this act.
4.	Sindh Workers Compensation Act, 2015	This act is expedient to provide for the payment by certain classes of employers to their workers or their legal heirs of compensation for injury or death by accident.	Adherence to the act is mandatory in case of injury or loss of life of any worker.
5.	Sindh Environmental Quality Standards, 2016	Sindh Environmental Quality Standards (SEQS) have been set up by SEPA. These are discharge standards and are applicable at the point of discharges of emissions. SEQS are relevant for wastewater treatment plants and landfills activities. Standards for the following types of effluent and emissions are stated in the SEQS and may be related to the specified projects: Municipal and liquid industrial effluent parameters (32) for discharge to inland waters, sewage treatment facilities, and the sea Industrial gaseous emissions (16) into the atmosphere Motor and vehicle exhaust and noise (3 to 5) Ambient air quality (9) Drinking water quality (33) Noise standards for residential, commercial, industrial, and silence zones SEQS apply to both discharge and ambient pollutant concentrations: gaseous emissions and liquid effluents discharged by batching plants and construction machinery, and ambient air quality and ambient noise. The standards for motor vehicle exhaust and noise apply through the construction as well as operation stage of the project will need to be accounted.	SEQS shall be adopted in the project design and their compliance shall be ensured during execution of the project.
6.	Sindh Occupational Safety and Health Act, 2017	Act to make provision for occupational safety and health conditions at all workplaces for the protection of persons at work against risk of injury arising out of the activities at workplaces and for the promotion of safe, healthy and decent working environment adapted to the physical, physiological and psychological needs of all persons at work;	The Construction Contractor and PIU shall ensure the safety of workers and other staff by adopting adequate safety measures under this Act.
7.	Sindh Payment of Wages Act, 2015 (Sindh Act No. VI of 2017)	This Sindh payment of wages act came into formation in 2015. This act provides the mechanism to regulate the disbursement of wages to certain classes of persons who are engaged as employee in different industries, factories and commercial places in the province of Sindh.	This wages to the labors will be disbursed under this Act.

Sr. No.	Strategies / Policies / Legislations / Acts / Laws & Regulations	Brief Coverage	Relevance to project
8.	The Sindh Prohibition of Employment of Children Act, 2017	An Act to prohibit the employment of children and to regulate the employment of adolescents in certain occupations and processes to be taken place within provincial boundaries.	The Act prohibits and regulates the employment of children less than 14 years and is applicable to the project and the Contractors and sub-contractors will have to comply with this Act.
9.	Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021	Sindh EPA has notified Environmental Assessment Regulations, 2021, which set out procedures for environmental assessment studies, review, and approvals.	As per Review of IEE/EIA Regulations 2021 of SEPA, an IEE is required if the covered area is greater than 100,000 square feet. The covered area in the current project is 42,318 square feet, therefore no IEE or EIA is required. (Refer Schedule 2 of SEPA regulations 2021, section J).

3.4 Applicable World Bank Policies

3.4.1 World Bank Operational Policies

The World Bank operational policies applicable to the project and its compliance mechanism, are summarized in the description below in **Table 3.3**.

Table 3.3: Relevant World Bank Operational Policies

Sr. No.	World Bank Operational Policies	Brief Coverage	Relevance to SOP-1, KWSSIP	Relevance to sub-project
1.	Environmental Assessment (OP 4.01)	Under this OP, the World Bank requires environmental assessment (EA) of projects proposed for Bank's financing to help ensure that they are environmentally sound and sustainable and thus to improve decision making	Environmental assessment studies will be conducted for all the subprojects under SOP-1	The current ESMP has been prepared in the light of OP 4.01.

Sr. No.	World Bank Operational Policies	Brief Coverage	Relevance to SOP-1, KWSSIP	Relevance to sub-project
		through appropriate analysis of actions and of their likely environmental impacts.		
2.	Gender policy (OP 4.20)	The objective of the Bank's gender and development policy is to assist associate countries to curtail poverty and improve economic growth, human well-being, and development effectiveness by addressing the gender disparities and inequalities that are barriers to development, and by assisting member countries in formulating and implementing their gender and development goals, and the Bank occasionally assesses the gender dimensions of development.	The objective of this operational policy is to avoid any gender discrimination and provide proper opportunities to both male and female where applicable for human well-being.	The proposed project has a gender sensitive design in terms of accessibility, workstations, separate waiting areas at the customer service centers, washroom facilities and female employees etc.
3.	Access to information (BP 17.50)	The World Bank's Policy on Disclosure of Information is to be open about its activities and to welcome and seek out opportunities to explain its work to the widest possible audience. The Bank has broadened the scope of information about its activities that it makes publicly available. The Bank has established the Info-Shop at headquarters, plus regional Public Information Centers (PICs), to serve individuals seeking to obtain Bank information. In addition, Country Offices are encouraged to establish modest PIC services for their country clientele. This policy is triggered for proposed projects categorized as A and B. The developer consults project affected groups and	This operational policy is applicable as to disclose all the relevant information about the project to the local community to avoid any unnecessary conflicts at construction site.	This operational policy is applicable as to disclose all the relevant information about the project and ascertain views, suggestions and apprehensions of all the stakeholders.

Sr. No.	World Bank Operational Policies	Brief Coverage	Relevance to SOP-1, KWSSIP	Relevance to sub-project
		local NGOs: a) during scoping and before TORs are prepared; b) when the draft EA is available; and c) throughout project implementation as necessary. The developer provides relevant information in a timely manner prior to consultation and in a form and language accessible to the groups being consulted.		

3.5 Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx Guidelines

This guidance note provides direction on identifying, assessing and managing the risks of adverse social and environmental impacts that are associated with the temporary influx of labor resulting from Bank supported projects. The guidance note contains guiding principles and recommendations to be considered as part of the design and implementation of projects with civil works that require labor from outside the project's area of influence.

3.6 Environmental, Health & Safety (EHS) Guidelines

In addition to operational policies (OP), the World Bank Group (WBG) has also established its EHS guidelines for all the interventions that are financed by the group. These EHS Guidelines are technical reference documents with general and sector-specific examples of Good International Industry Practice (GIIP). Following EHS guidelines are relevant to the proposed project during the construction and operation phase:

General EHS Guidelines: Issues associated with the construction and operation of maintenance facilities are addressed in the General EHS Guidelines with other key element like environment and occupational health and safety (OHS) at workplace as well as for community.

3.7 Institutions Responsible for Planning, Policies and Regulations

The institutional setting in Karachi has traditionally comprised of various agencies at federal, provincial and local government (LG) levels with separate land areas, separate legal and administrative frameworks etc.

3.7.1 Sindh Environmental Protection Agency (SEPA)

Implementation of SEPA 2014 is the mandate of the Sindh Environmental Protection Agency (Sindh EPA). No documentation is required for SEPA before commencement of the project.

3.7.2 Karachi Water and Sewerage Corporation (KW&SC)

Karachi Water and Sewage Corporation (KW&SC) operates under the provincial government but operates as an independent organization. It is responsible for sewage disposal for the city of Karachi and is involved in initiatives for improved sewage disposal. It is also responsible for provision of water to the city of Karachi. The proposed building will house the staff of KW&SC and will serve are the center of excellence, reform, research and innovation.

3.7.3 Karachi Water and Sewerage Services Improvement Project (KWSSIP)

Karachi Water & Sewerage Services Improvement Project (KWSSIP), funded by World Bank and AIIB, is an initiative of Government of Sindh (GoS) and Karachi Water and Sewerage Corporation (KW&SC) to improve water and sewerage services in Karachi. As explained in Chapter-1, the construction of CERRI building is a sub-project under KWSSIP-1. Therefore, the management and Environmental & Social Cell of the KWSSIP will be responsible for ensuring environmental and social compliance of the sub-project during design and construction phases. One the building is handed over to KWSC for operations, the onus of compliance will shift to KWSC. Detailed TORs and expected outputs of KWSSIP including the ESC are included in Section 7 later in the ESMP.

3.7.4 Labour & Human Resource Department

Labour & Human Resources Department is mandated to promote investment and employment in the province. It is also responsible for the welfare of working labour force and enhancement of its capacity through training and development. The labour force engaged with the construction contractor can approach the department for any complaints and issues.

4 Baseline Profile

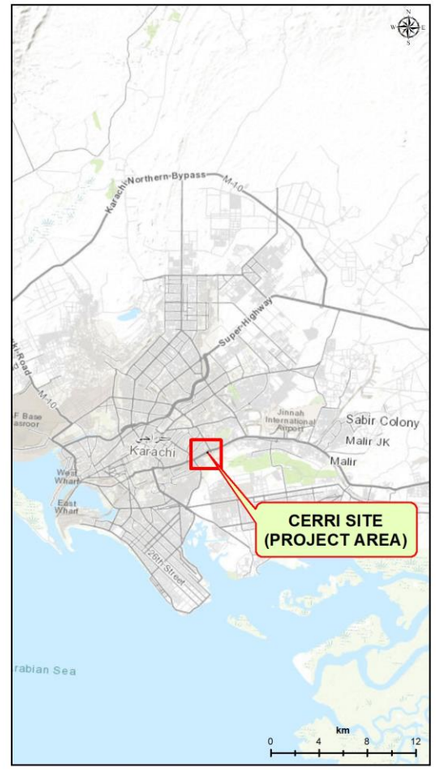
4.1 General

This section presents the current environment around the proposed development which has been considered with respect to physical, ecological and socio-economic resources. An environmental baseline study is intended to establish a database against which potential project impacts can be predicted and managed later. The ESMP of the proposed project covers a comprehensive description of the project area, including the environmental and social features which are likely to be affected by the project as well as those which are not expected to be directly affected by the construction and operation of the project.

ESMP team conducted the reconnaissance and detailed surveys of the project area for baseline data collection during field visits in March, 2023. The prime objective of the field visits was to collect the baseline data on physical, ecological environmental, social & gender aspects along with identification, assessment and categorization of the significant environmental and social impacts of the proposed Project. The secondary data was collected from published sources/reports and relevant departments, which were also verified through visual observations during reconnaissance and detailed surveys.

4.2 Delineation of Study Area/ Area of Influence (AOI)

As per the environmental screening study conducted earlier, the project falls in “category B” which means that the impacts of the project activities are limited and within the boundary of project area. Therefore, the boundary of the project area has been considered Area of Influence (AOI) **Figure 4.1** represents the AOI of project area.



CLIENT: PIU-KWSSIP, KW&SC

CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
HEAD OFFICE:- NESPAK HOUSE 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

Legend: Air, Noise, Main Roads, AOI, Ground Water, Wastewater, KW& SC Complex

PROJECT: DESIGN FOR CENTER OF REFORM, RESEARCH AND INNOVATION (CERRI)

AOI & MONITORING LOCATIONS MAP OF PROJECT AREA

Meters 0 35 70 140

SCALE: 1:2,300

Figure 4. 1: Study Area Map / AoI of Project Area

As per the national and provincial regulations along with the requirements of World Bank's OP's, impacts and risks have been analyzed within the project AOI. The AOI does not include potential impacts that might occur without the project or independently of the project. Environmental and social impacts and risks have also been analyzed for all relevant stages of the project cycle, including pre-construction, construction and operation phases of the project.

4.3 Physical Environment

The physical environment includes topography, soil & geology, climate, hydrology, seismology, surface water, groundwater, ambient air quality, and noise monitoring etc.

4.3.1 Topography

The project site is located at the Shahrah e Faisal Road within the premises of KW&SC complex. The site is flat. There is an existing building at the site surrounded by several trees. The ground levels in the project surroundings do not vary significantly. However, there are high rise buildings, bridges and other structures in the surroundings. The topographic survey indicates/informs that the ground levels in the project area varies from 58.5 to 61.0 feet.

4.3.2 Soil & Geology

Project area is situated in the Zone of dissected plateau. The zone is situated to the east of Malir River and beyond. This surface in the project area is developed on the eroded edges of soft, friable sandstone and shales of Manchar formation of Plio-Pleistocene age. Manchar formation shows very gentle warping. Pleistocene conglomerates lie unconformably on the erosional surface of the Manchar formation and appears as scattered, subdued mound.

4.3.3 Climate and Meteorology

i. Average Temperatures

Figure 4.2 represents mean monthly maximum and minimum temperatures for different months of the last 30 years. The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Karachi. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years.[2]

2 MICHAELASCHLUDECKER. (2022, AUGUST 23). *SIMULATED HISTORICAL CLIMATE & WEATHER DATA FOR KARACHI*. METEOBLUE. RETRIEVED AUGUST 25, 2022, FROM HTTPS://WWW.METEOBLUE.COM/EN/WEATHER/HISTORYCLIMATE/CLIMATEMODELLED/KARACHI_PAKISTAN_1174872

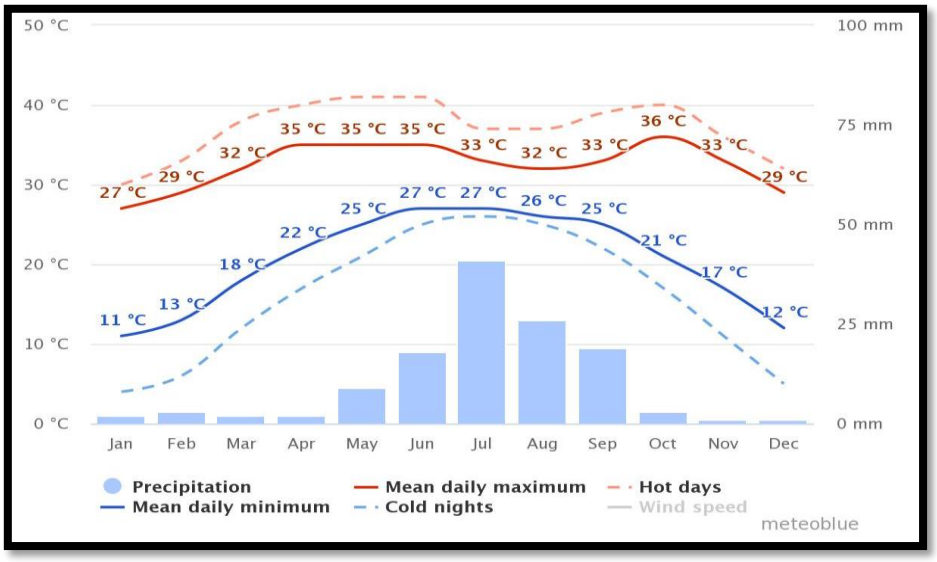


Figure 4. 2: Average Temperatures & Precipitation

The project area has a mild climate. It has hot summers and mild winters. The summer starts in May and lasts till September. May and June are the hottest months. The mean maximum temperature is observed 35 ºC for the month of May as shown in **Figure 4.3.** The winter season lasts from November to February. January is the coldest month. The mean maximum and mean minimum temperature ranges from 27 ºC to 12 ºC in January. The maximum temperatures are presented in **Figure 4.3.**

The construction activities in the scorching heat may affect the workers' health. It may cause heat strokes etc. The impact has been considered and the mitigations have been provided including scheduling of labors, provision of tents/ shades and provision of cold drinking water.

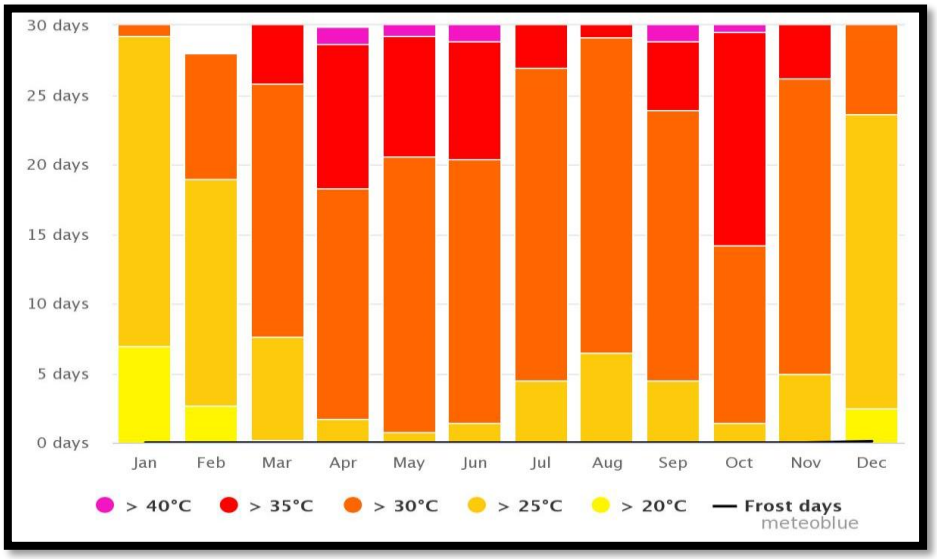


Figure 4. 3: Maximum Temperatures

ii. Humidity

The graph below represents the Average relative humidity over the year. **Figure 4.4** shows the Average relative humidity of Karachi.

- On average, August is with 82.0% the most humid.
- On average, January is, with 54.0%, the least humid month.
- The average annual percentage of humidity is 70%[3]

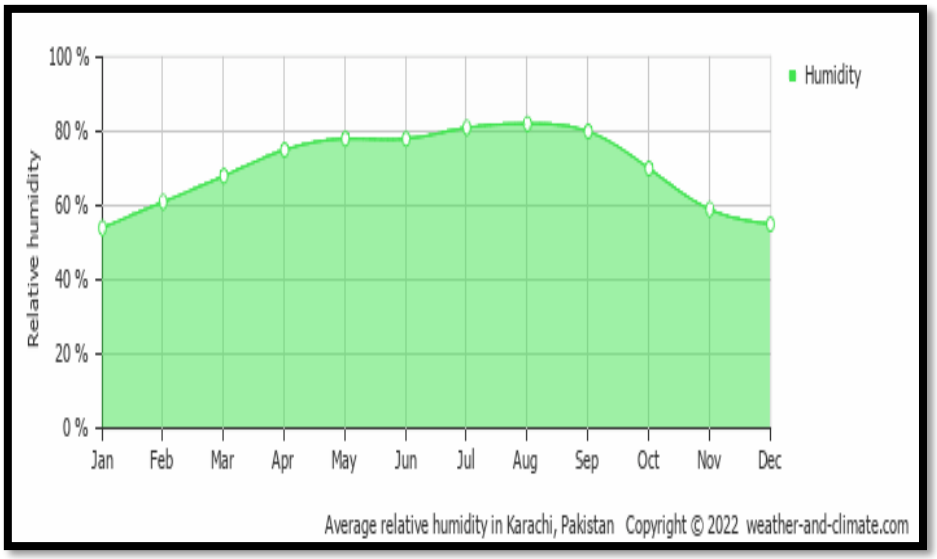


Figure 4. 4: Shows Average Relative Humidity

The relative humidity is at its peak in the month of May to September. These humid months are the toughest for the human activities as it causes severe dehydration. The worker will be provided with cold drinking water to stay hydration in these months.

iii. Rainfall

The meteorological station at Karachi Airport collects climatic data. Rainfall near the Karachi coast is extremely low and erratic, and this region falls in the semi-arid climatic zone. Maximum precipitation was observed in the month of July, nearly 50mm. Precipitation system continues from May to September as Shown in **Figure 4.5**.

Figure 4.5 shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

It is clear from the chart that most of the times of year partly cloudy days dominate in summer season, while sunny days are observed in winter season, with seldom overcast days. The

3 (2022, August 23). *simulated historical climate & weather data for Karachi*. Meteoblue. retrieved august 25, 2022, from https://weather-and-climate.com/average-monthly-humidity-perc,karachi,pakistan

maximum participation days are observed during May to September as shown in **Figure 4.5** below.

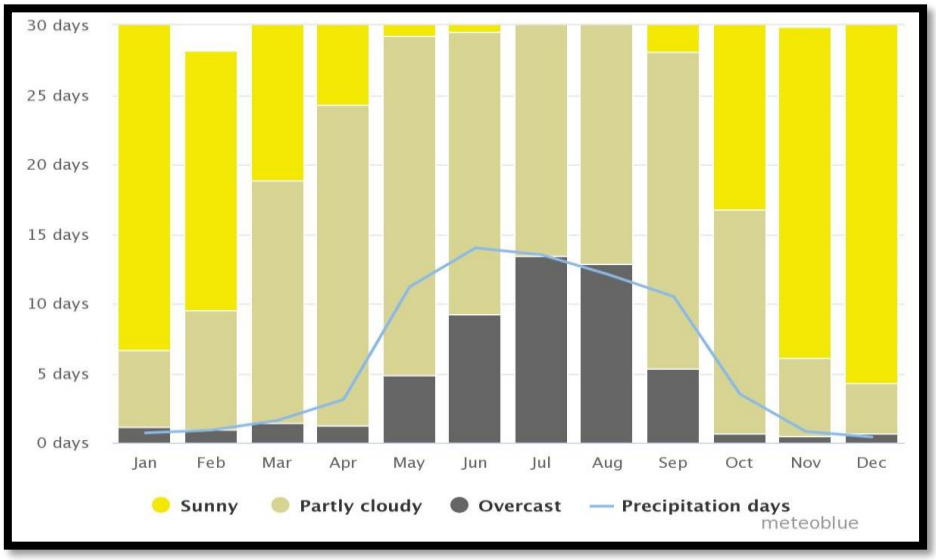


Figure 4.5: Cloudy, Sunny and Precipitation Days

Figure 4.6 shows how many days per month certain precipitation amounts are reached. It can be seen from the chart that the precipitation in July to September is maximum and ranges between 2-5 mm. Highest intensity of precipitation is observed in the month of July as Shown in **Figure 4.6**.

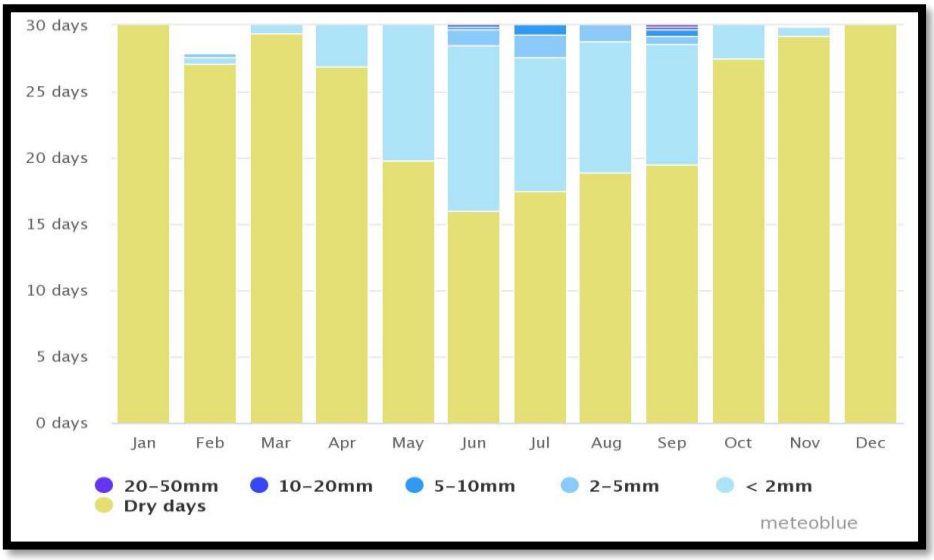


Figure 4.6: Precipitation Amounts

The rainfall can temporarily undermine the construction activities and may cause unwanted delays in the project. The situation may exacerbate when the trenches are dug for laying of foundation.

iv. Wind Speed and Direction

Karachi weather is considered pleasant and is famous for its breeze from the sea. The onshore winds from the Arabian Sea contribute to humid conditions. The wind speed has highest velocities during the summer months, when the direction is south-west to west. During winter, the wind blows from north to northeast, shifting southwest to west in the evening hours. The wind usually carries sand and salt resulting in severe wind erosion and corrosion. Tropical cyclones are formed in the Arabian Sea in the pre-monsoon season, mostly in the month of June. **Figure 4.7** shows the days per month, during which the wind reaches a certain speed.

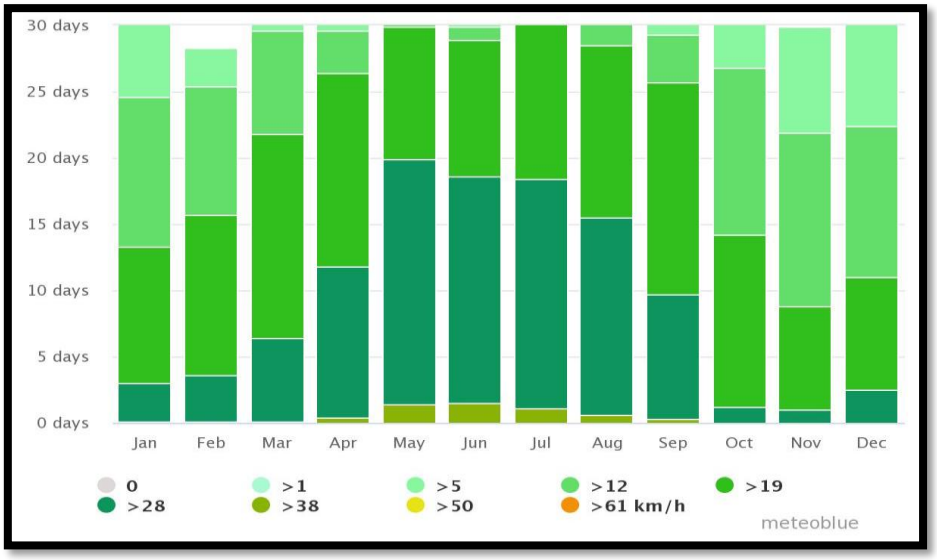


Figure 4.7: Wind Speed

Maximum wind speeds can be observed in the months of May to July. Wind speed >28 km/h dominates for seventeen to Eighteen days in these months. However, the dominant wind speed throughout the year is >19 km/hr.

The wind rose for Karachi for the last 30 years shows how many hours per year the wind blows from the indicated direction. Wind rose is shown in **Figure 4.8**.

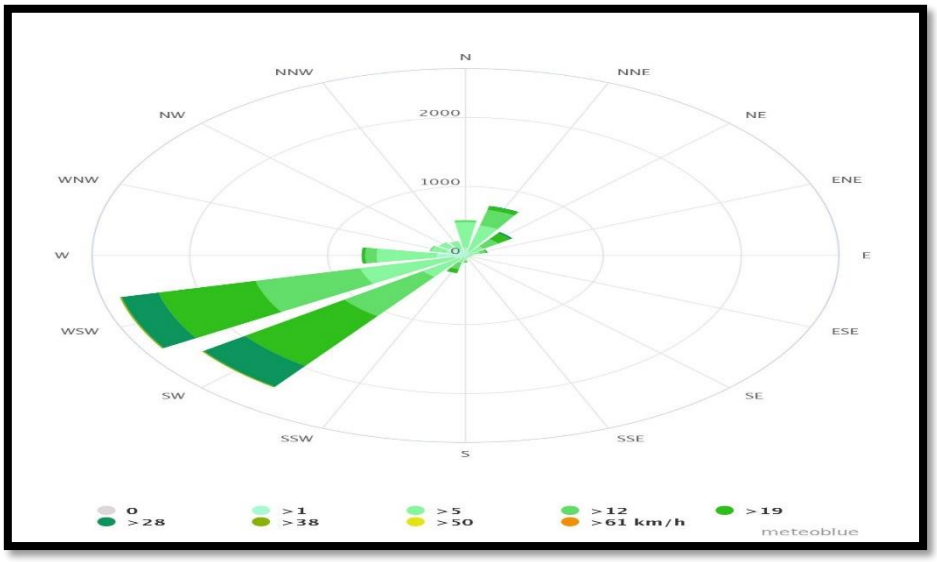


Figure 4.8: Wind Rose For Karachi

It can be seen from the wind rose that the dominant wind direction is from West Southwest (WSW) and South-West (SW).

The wind speed and direction are important as the loose construction material especially the sand may spread due to wind speed in the prevalent wind direction resulting in deposition of sand at various places in the downstream.

v. Climate Change Effects

Karachi city is affected by two types of climate change impacts i.e., flooding due to torrential rains and heat wave[4]. The Climate of Karachi is semi-arid and rainfall is low and highly variable. Despite being a relatively dry city, Karachi faces rainfall during the monsoon season and is vulnerable to recurrent urban flooding. Torrential rains and heavy rainfall mostly occur in the month of June under the effect of tropical storms. Climate change-related risks that are anticipated include flooding due to precipitation and heat waves. As a result of a tropical storm (6 June 2010) Karachi received 130 mm rain within a day which caused huge surface runoff. This trend has now continued and Karachi is receiving heavy precipitation each year. Currently in July 2022, the megacity is again being hit by heavy monsoon rain which is causing urban flooding. Three hourly rainfall data of extraordinary storms events at Karachi Airport and Karachi Masroor stations has been collected from Pakistan Meteorological Department. Based on the analysis of the data, following information is derived:

Return period	24-hr (mm)
2.33-year	88
5-year	134
10-year	173
25-year	221

[4] The World Meteorological Organization (WMO) defines heat-wave as "when the daily maximum temperature of more than five consecutive days exceeds the average maximum temperature by 5 °C, from the normal temperature of an area.

Return period	24-hr (mm)
50-year	258
100-year	293

The city is exposed to extreme temperature events, with deadly heat waves recently recorded in 2015, 2017 and 2018. In Karachi the cause of heat wave is mainly due to atmospheric condition and urban heat island effect[5].

4.3.4 Environmental Monitoring, Sampling and Testing for Proposed Project

To determine the ambient air, noise levels, groundwater/ drinking water and wastewater quality of the study area, 01 sample for each was collected. The sampling locations for the environmental monitoring of ambient air, noise and groundwater/ drinking water and wastewater are shown in **Figure 4.1**.

The task of environmental monitoring and testing was awarded to SEPA approved environmental laboratory i.e., M/S SGS. The work was awarded as per Public Procurement Regulatory Authority (PPRA) rules through competitive bidding.

A. Ambient Air Quality

The ambient air quality was monitored using a mobile station at specified locations in project area (1 sampling points). 24-hour continuous monitoring was conducted. The results of ambient air quality monitoring are given in **Table 4.1**

Table 4. 1: Ambient Air Quality Results

Sr. No.	Parameters	Avg. sampling time	Unit	Results	SEQS
				KW&SC Complex	
1	Carbon monoxide	24 hrs.	mg/m3 (8 Hour)	0.2	5
2	Nitrogen Dioxide		µg/m3	80*	40
3	Nitric oxide		µg/m3	4.0	80
4	Sulphur dioxide		µg/m3	0.9	120
5	Ozone		µg/m3	14.7	130
6	PM (2.5)		µg/m3	17.9	35
7	PM (10)		µg/m3	43.4	150
8	Suspended particulate Matter (SPM)		µg/m3	68.5	500
9	Lead		µg/m3	<1.0	1.5

[5] (June 2015). Government of Pakistan, Ministry of Climate Change, Technical Report on Karachi Heat Wave.

The Nitrogen Dioxide concentrations are observed to be high which indicates incomplete combustions in the surroundings including those of vehicles on the roads, generators or other equipment. The monitoring point is at a linear distance of 100 feet from the edge of Shahrah e Faisal and is separated by a wide green belt and a service road. Furthermore, there are existing trees in the project site and the flow of traffic is very smooth at that particular portion of the Shahrah e Faisal. Therefore, the results are not unexpected. It is pertinent to mention that the monitoring was conducted by M/s SGS which is well reputed environmental laboratory in the country.

B. Noise Level

The noise levels were monitored using potable noise meter at specified locations in project area (1 sampling points). 24-hour average was taken to get better results. The results of noise monitoring are given in **Table 4.2**.

Table 4. 2: Noise Monitoring Results

Sr. No.	Location	Equivalent Noise Level (L_{eq}) dB(A)		SEQS Limit dB(A)	
		Day Time	Night Time	Day Time	Night Time
1	KW&SC Complex	61.6	56.3	65	55

Noise level was observed to be high during night at the sampling point, which may be due to influx of vehicles on main roads, and commercial activities.

C. Drinking Water Quality

Tap (drinking) water sample was collected from KW&SC Complex Near Awami Markaz, Karsaz, Karachi on July 04, 2023 by SGS Laboratory and was analyzed for chemical and microbiological parameters. The analysis results of tap water samples are compared with SEQS are shown in **Table 4.3**. The detailed monitored results for drinking water quality are attached as **Annex-II**.

Table 4. 3: Results of Groundwater/ Tap water

Sr. No.	Measuring Parameter	Units	SEQS Limits	Tap Water (KW&SC Complex)
1	PH @ 25˚C		6.5-8.5	7.29
2	Color	TCU	<15TCU	23.00
3	Taste	…..	Non-Objectionable	Sweet
5	Odour	…..	Non-Objectionable	Odorless/Non-Objectionable
4	Turbidity	NTU	5	4.0
6	Total Dissolved Solids	TDS (mg/L)	<1000	648

Sr. No.	Measuring Parameter	Units	SEQS Limits	Tap Water (KW&SC Complex)
7	Total Hardness as CaCO3	(mg/L)	<500	211.37
8	Aluminium	Al $^{+3}$ (mg/L)	≤0.2	0.82
9	Antimony	Sb (mg/L)	≤0.005	<0.005
10	Arsenic	As (mg/L)	≤50	<0.005
11	Barium	Ba (mg/L)	0.7	<0.005
12	Boron	B(mg/L)	0.3	0.098
13	Cadmium	Cd.² (mg/L)	0.003	<0.003
14	Chloride	Cl^{1-} (mg/L)	<250	187.67
15	Chromium	Cr (mg/L)	≤0.05	0.011
16	Copper	Cu^{2+} (mg/L)	2.0	<0.005
17	Flouride	F^{-} (mg/L)	≤1.5	<0.05
18	Lead	Pb.² (mg/L)	≤0.005	<0.005
19	Manganese	Mn^{2+} (mg/L)	≤0.5	0.030
20	Mercury	Hg.² (mg/L)	≤0.001	<0.001
21	Nickel	Ni.² (mg/L)	≤0.02	0.005
22	Nitrate	NO_3^- (mg/L)	≤50	<0.003
23	Nitrite	NO_2^- (mg/L)	≤3	<0.003
24	Selenium	Se.² (mg/L)	0.01	<0.005
25	Residual Chlorine	Cl_2 (mg/L)	0.2-0.5	<0.02
26	Zinc	Zn.² (mg/L)	5	<0.005
27	Phenolic compound	Phol (mg/L)	-	0.006
28	Total Coliform	TC (count/100ml)	0/100ml	ABSENT
29	Escherichia Coli	E.Coli (count/100ml)	0/100ml	ABSENT
30	Feacal Coliform	F.Coli (count/100ml)	0/100ml	ABSENT

The sample was fit for drinking and potable uses with no microbial contamination; however, it imparts some color i.e., 23 TCU which might be due to minerals or organic matter.

D. Wastewater Quality

Wastewater sample was collected from KW&SC Near Awami Markaz, Karsaz, Karachi on July 04, 2023 by SGS Laboratory **(See Plate 4.4)** and was analyzed for its parameters. The analysis results of wastewater samples are compared with SEQS are shown in **Table 4.4**. The detailed monitored results for wastewater quality are attached as **Annex-II**.

Table 4. 4: Results of Wastewater

Sr. No.	Measuring Parameter	Units	SEQS Limits	Wastewater Drain (KW&SC Complex)
1	Temperature	◦C	40 + ≤ 03˚C	29◦C
2	pH @ 25˚C	pH	6 to 9	8.07
3	Total Dissolved Solids	(mg/L)	3500	772
4	Chemical Oxygen Demand (COD)	(mg/L)	150	896*
5	Biological Oxygen Demand (BOD)	(mg/L)	80	262*
6	Total Suspended Solids (TSS)	(mg/L)	200	668*
7	Chloride	(mg/L)	1000	189
8	Fluoride	(mg/L)	10	0.15
9	Oil & Grease	(mg/L)	10	9
10	Phenolic compound	(mg/L)	0.1	0.037
11	Cyanide	(mg/L)	1.0	<0.01
12	Anionic Detergent	(mg/L)	20	<0.10
13	Sulfate	(mg/L)	600	74.06
14	Sulfide	(mg/L)	1.0	<1.00
15	Ammonia	(mg/L)	40	8.51
16	Cadmium	(mg/L)	0.1	<0.003
17	Chromium	(mg/L)	1.0	0.011
18	Copper	(mg/L)	1.0	<0.005
19	Lead	(mg/L)	0.5	<0.005
20	Nickel	(mg/L)	1.0	0.011
21	Zinc	(mg/L)	5.0	0.065
22	Total Iron	(mg/L)	8.0	3.8
23	Manganese	(mg/L)	1.5	0.11
24	Selenium	(mg/L)	0.5	<0.005
25	Silver	(mg/L)	1.0	0.018
26	Arsenic	(mg/L)	1.0	<0.005
27	Barium	(mg/L)	1.5	<0.005
28	Boron	(mg/L)	6.0	0.086

The values of COD, BOD, and TSS are high because the sample was untreated wastewater.

4.3.5 Seismology

Karachi is located in a moderate earthquake zone. The Karachi Building Control Authority has placed Karachi in Zone-II. Based on the actual events, past observations of fault movement and other geological activities, Karachi is situated in a region where moderate earthquakes may occur of magnitude 5.0 to 6.0 equivalent to intensity between VII and VIII on Modified Mercalli Intensity Scale (M), which tells the intensity of the earthquake based on its effects.

The seismic zoning for Karachi was revised after the 2005 earthquake. Probabilistic Seismic Hazard Assessment (PSHA) carried out for revision of seismic provisions of the Building Code of Pakistan shows that central Karachi falls in Zone 2B. The Zone 2B has Peak Ground Acceleration (PGA) in the range of 0.16 g to 0.24 g for a return period of 475 years and is considered to be at 'Moderate' risk of a major earthquake event.

The seismic zoning on the basis of Peak Ground Acceleration (PGA) is summarized in **Table 4.5**.

Table 4. 5: Seismic Zones

Seismic Zone	**Peak Horizontal Ground Acceleration** "g" is the acceleration due to gravity
1	0.05 to 0.08g
2A	0.08 to 0.16g
2B	**0.16 to 0.24g**
3	0.24 to 0.32g
4	> 0.32g

Source: Building Code of Pakistan, Seismic Provisions

4.4 Biological Environment

The project site lies in commercial zone with various commercial activities in the surroundings. There are no floral or faunal species of concern in the project area, however, some domestic animals (street dogs, cats, rats, lizards and worms etc.) can be seen there. Furthermore, there are several trees of native species in and around the project area including Neem, Conocorpus and Peepal etc.

The trees present within the project boundary include the following:

Sr. No.	Type of Trees		Numbers
	Common Name	Scientific Name	
1	Conocarpus	Plum pine	3
2	Neem	Azadirachta indica	4
3	Jujube	Ziziphus Mauritiana	2
4	Oak Shrub	Calotropis gigantea	3

Furthermore, Neem shrub can also be found in the project area.

4.5 Socio-Economic Environment

4.5.1 Socio-Economic Baseline Structure

The proposed project will be constructed within KW&SC Complex. All the project activities as well as construction camps, material yards, parking of machinery and other associated works will be carried out within the premises of the site. The proposed site is located at the left side of the main entrance gate of KW&SC at a linear distance of approximately 230 feet. The nearest business block of KW&SC is at linear distance of approximately 360 feet from the site. The farthest block is over 1000 feet away from the proposed location. The KW&SC complex also accommodates residential apartments for KW&SC staff. These apartments are located at the backside of the proposed site and are accessible through a separate entrance gate and 50 feet wide approach road. The residential apartments are Type H and Type F comprising 1 room and 2 rooms respectively.

Currently, the site is accessible through the main entrance gate of the KW&SC complex, but during construction, the other gate along the service road will be used thus avoiding any mobility as well as accessibility issues to the employees of KW&SC. The pictorial view of existing site conditions is attached as **Annex – III**.

5 Stakeholder Engagement

5.1 General

This section describes the outcomes of the public consultation sessions held with different stakeholders that may be directly/ indirectly or positively/ adversely affected by the proposed project.

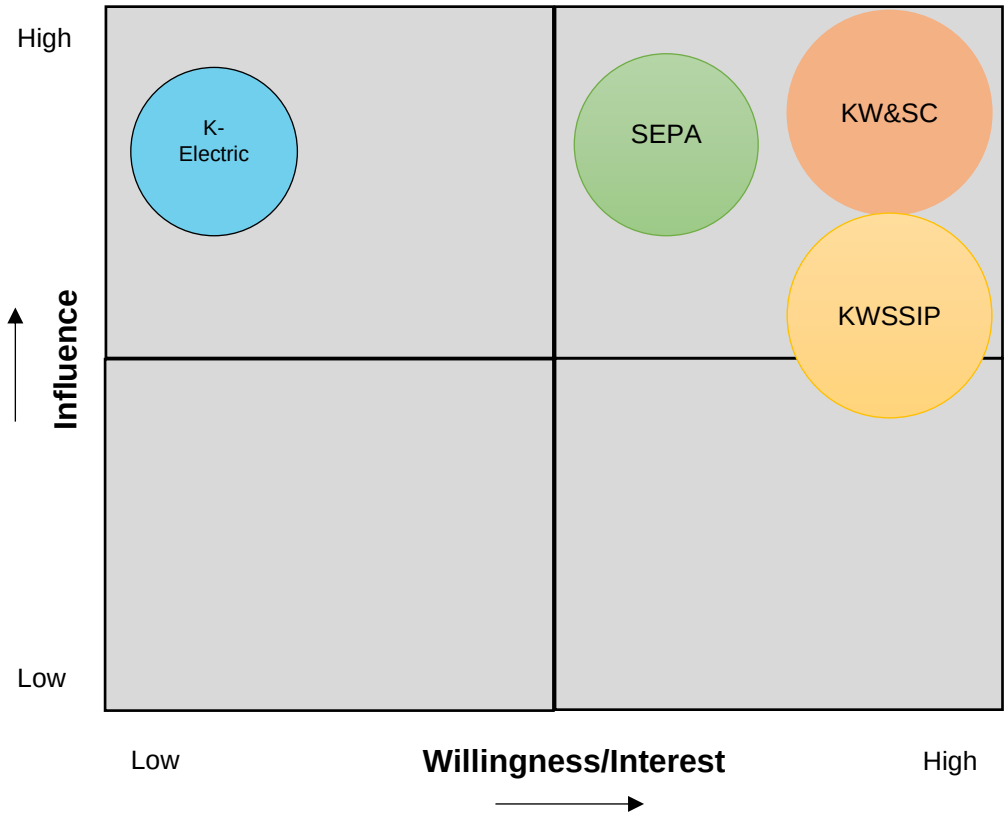
5.2 Objectives and Principles of Consultation

The consultation process provides a mechanism through which information relevant to the project is disseminated to the stakeholders and their views and concerns related to the project are obtained.

The stakeholders including KW&SC, SEPA, K-Electric etc. were consulted to apprise them regarding the project and discuss the environmental and social perspective of project activities. Their valuable concerns and suggestions were noted and thereafter incorporated in the ESMP.

5.3 Identification of Stakeholders

As mentioned earlier, the project will not have social implications during its execution. Furthermore, none of the infrastructure is expected to be damaged including electricity supply lines, Sui Gas lines, water supply and sewerage lines etc. Therefore, the line departments have not been identified as the stakeholders. However, efforts were made to interact with the employees of KW&SC as well as with the government departments including KW&SC officials as well as SEPA.



5.4 Findings of Consultation Meetings

Findings of consultation meetings are summarized in the **Table 5.1.**

Table 5.1: Findings of Consultation Meetings with Institutional Stakeholders

Sr. No	Department	Participants	Points of Discussion	Response
1	KW&SC	(PA to MD KW&SC) (AEE KW&SC) (AEE KW&SC) (Environmental Specialist NESPAK)	Study team apprised the proposed project activities and asked for the views regarding environmental and social aspects of the project. • No land acquisition is necessary as the existing building belongs to KW&SC. • The trees surrounding the project area are owned by KW&SC. Nonetheless, for every tree removed, ten (10) new trees will be planted. • The existing building is currently utilized by the Katchi Abadi cell, but KW&SC representatives have provided assurance that no utility lines pass near the building.	The mentioned factors will be integrated into the Environmental and Social Management Plan (ESMP) to ensure a responsible approach to environmental, social and gender aspects during the entire implementation process.
2	Sindh Environmental Protection Agency (SEPA)	Deputy Director Technical, SEPA Environmental Specialist, PIU Sr. Engineer, NESPAK	• Discussion on the required instruments to be prepared for No Objection Certificate • PIU shared the required information	• SEPA demanded the description and cost of the projects to identify the instrument to be prepared for the project to get no objection certificate from SEPA. • A detailed presentation on CERRI Building was delivered and it was decided that the proposed project does not require any environmental instrument because the covered area is

Sr. No	Department	Participants	Points of Discussion	Response
				less than 60,000 square feet. • Another meeting was conducted with SEPA and it was confirmed that no documentation is required.
3d	PSO Petrol Pump on Shahra-e-Faisal	PSO Petrol Manager / Workers Sr. Engineer, NESPAK	Consultations were held with the nearby PSO petrol pump located on KDA land. The existing PSO petrol pump is currently non-operational due to lease expiration. • Construction sites can pose safety risks to the surrounding community. Increased construction activity, heavy machinery, and potential hazards can raise safety concerns for pedestrians, nearby residents, and children. • Due to Construction activities traffic problems will increase, which can lead to congestion and difficulty accessing certain areas. Local residents may experience delays and restricted access to their homes or businesses due to construction activities. • The constant noise can be particularly bothersome for residents, schools, and businesses in the vicinity of the construction site. • Construction activities will generate significant amounts of waste, including construction debris, packaging materials, and discarded materials. • Due to construction activities noise will generate, which	• Team will implement appropriate mitigation measures to address the identified concerns. This can include strategies to minimize noise levels, manage traffic effectively, and ensure the safety of pedestrians and residents in the vicinity. Regular monitoring should be conducted to ensure compliance with these measures. • Proper waste management practices, such as recycling and responsible disposal, are essential to minimize the environmental impact of construction waste. • Maximum efforts will be made to

Sr. No	Department	Participants	Points of Discussion	Response
			can have adverse effects on the local environment. • Construction activities can lead to the emission of dust, particulate matter, and pollutants into the air. These emissions can degrade local air quality.	keep the project activities confined in the project boundary. • Implement measures to control dust emissions from construction activities, such as using water sprays, covering loose materials, and maintaining proper site drainage.

5.5 Outcomes of the Consultations with KW&SC Staff in the nearby Buildings

Different employees of KW&SC were consulted and were informed about the proposed project interventions to assess their views and suggestions. Following are the major findings of the consultations:

- KW&SC needs a modern office building and customer service center to introduce the corporate culture and change the outdated perspective of water board;
- The proposed site is located away from the existing buildings; hence no major issues are envisaged during the construction;
- In addition to the main entrance, there are two more gates on the service road, which may be used during construction to avoid accessibility issues;
- There is complaint cell in the complex which mostly receives complains on call and very few complainants do physically come to lodge the complaints, therefore, the customers will also not be affected. Furthermore, the customers use separate gate to visit the complaint cell;
- The staff colony also has a separate access road and entrance gate; hence the residents are also not envisaged to be disturbed.

Consultation with KW&SC Staff

Consultation with AEE, KW&SC

Consultation with PA to MD KW&SB

Consultation with Deputy Director Consumer Service

Project Manager, Call Center

Consultation with Assistant Director, SEPA

Plate 5.1: Photolog of Public and Department Consultation

5.6 Outcomes of the Consultations with Females in the nearby Buildings

A Gender Assessment was conducted to evaluate the potential impacts on women due to proposed project interventions. The females employed in various blocks of KW&SC Complex

as well as within the residential apartments of KW&SC were contacted. Following are the outcomes of gender assessment:

Table 5.2: Findings of Consultation Meetings with Institutional Stakeholders

Sr. No.	Venue	No. of Participants	Views/ Suggestions/ Apprehensions	Response of Consultants
1	KW&SC Complain Cell	4	• No significant issues were identified during the consultation. • The workspace is separate from the construction area, eliminating potential disturbances.	
2	KW&SC MD's Block	3	• **Mobility:** Female staff expressed concerns regarding mobility during their arrival and departure times due to potential disruptions caused by construction work. • **Noise:** Noise pollution emerged as a primary issue, affecting both the workplace and residential areas of KW&SC, particularly during construction activities. • **Harassment:** Female staff raised concerns about potential harassment from laborers during their entry and exit times from the office, emphasizing the need for measures to ensure their safety and security.	• During arrival and departure times (9-11 AM and 4-6 PM), labor presence at the entrance/gate site will be minimized. • A barrier will be installed at the boundary of project site to reduce interactions between labor and female staff.
3	KW&SC Private Call Center	3	• **Accessibility:** The females were mostly concerned with the accessibility during execution phase due to heavy machinery and workers in place.	The employees gate will not be used for the movement of machinery and workers rather separate access will be provided

				for the construction works.
4	Residential Apartments of KW&SC	2	• In the residential area of KW&SC, female expressed that they do not anticipate encountering any issues as there is already a boundary in place, and their only concern pertains to noise.	

In addition to the above referred issues, female staff also demanded the following to be provided with the proposed building:

- Females common room;
- Separate washroom facilities;
- Separate prayer room;
- First Aid facilities




Plate 5.2: Photolog of Gender Consultations

5.7 Disclosure

Key features of this ESMP have already been shared with the stakeholders during consultation meetings. However, the Final ESMP after approval from WB will be disclosed on KWSSIP website that will serve to inform the stakeholders about key aspects of the project.

6 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

6.1 General

This chapter identifies the beneficial as well as the potentially significant adverse environmental impacts of the project activities during design/ pre-construction, construction and operational phases of the proposed project on the physical, ecological domains of the environment. The appropriate mitigation and remedial measures are proposed in this chapter. A brief description of each aspect and the affected environment in the project area is presented below.

6.2 Scoping of Impacts

Potential environmental and social impacts from the proposed Project on key environmental and socio-economic features in the Project area were identified through the following actions:

- Selection of the Area of Influence (AOI) and marking with the help of Google Earth;
- Desk Study of engineering investigations, studies and designs;
- Environmental quality baseline monitoring of air, noise, surface water, wastewater and groundwater;
- Detailed review and analysis of primary and secondary data available for all environmental parameters in Project area such as physical, ecological and social resources;
- Stakeholder consultations with relevant departments, and government agencies; and
- Knowledge assimilation of international best practices on environmental assessment of building projects.

6.3 Methodology

The impacts have been assessed based on proposed project life cycle i.e., Pre-Construction, Construction and Operational and Maintenance (O&M) stages. Each phase is assessed based on the area of impact categorized on domain wise i.e., physical, and ecological. For the identification of the potentially significant and non-significant environmental and social impacts, different tools were utilized as detailed below:

6.4 Screening Checklist

Based on the findings of desk studies, processed satellite imageries, and site visits, screening checklists were prepared to screen out the potentially significant adverse environmental and social impacts during pre-construction, construction and operational phase of the proposed Project. The objective of the impact screening is to assess the significance of the issues related to the atmosphere, climate, water resources, land resources, ecological environment, socio-economic environment, transport, infrastructure and communication, natural risks, hazards and external constraints of the Project for the proposed development. After the compilation of baseline information, processing of acquired satellite imagery, the screening

checklist was filled to screen out the adverse impact of the proposed Project during the pre-construction, construction and operational phases.

6.4.1 Notion of Significance

The “notion of significance” is based on the following criteria:

Extent: The scale of impact, i.e., limited to the immediate areas of development activity (the site); limited to within a distance reach of the development or affecting the region as a whole; or occurring at a national or international scale;
Duration and Frequency: A prediction/forecasting of the lifetime of the impact: i.e., short-term; medium term; long term with the impact ceasing after the operational life of the development; or considered permanent and how many times the event will occur during that period;
Intensity: A description of the intensity (magnitude/size) of the impact: i.e., high, medium, low, or negligible (no impact). The specialist studies must attempt to quantify the magnitude of impacts and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact;
Reversible/Irreversible: Changes considered irreversible, for example, the loss of biodiversity due to a change in water quality;
Probability: The likelihood that the event will occur; and
Legal Restriction: If the action is likely to affect or be affected by a legal restriction.

Considering these criteria, potential significance was classified as either:

Low: an impact for which no mitigation is necessary;
Medium: an impact that requires effective mitigation; and
High: an impact, which, if not mitigated, could stop the Project from proceeding.

The potentially significant impacts were then further investigated in more detail to make a comprehensive assessment of the actual impacts.

6.4.2 Study Area/ Area of Influence

Refer Chapter 4: Description of the Environment, **Section 4.2**.

6.5 Anticipated Impacts during Pre-Construction/Design Phase

Impacts envisaged during Pre-construction/ Design Phase and the recommended mitigation measures are given below. The impact significance rating matrix is given in **Table 6.1** and **6.2.** No physical interventions are carried out during the planning/ designing phase. Hence the impacts on the physical, biological, and socioeconomic environment cannot be correlated in the design stage. However, the impacts of poor planning and designing are visible in the operational phase , which are adequately taken care of in that phase.

Table 6.1: Impact Significance Rating Matrix – Construction Phase

Sr. No.		Physical Environment					Biological Environment		Socioeconomic Environment				
	Environmental Components / Project Activities	Topography	Soil Erosion/Contamination	Air Quality	Drainage	Water Quality	Flora	Fauna	Health & Safety of Public and Workers	Employment	Disturbance to nearby buildings (staff)	Noise & Vibration	Traffic Issue
1	Site clearance	LA	MA	MA	O	O	MA	LA	MA	B	LA	MA	LA
2	Establishment & functioning of construction camps, workshops	LA	LA	LA	O	O	O	O	MA	O	LA	LA	LA
3	Excavation operations	LA	MA	MA	O	O	LA	LA	MA	B	LA	MA	LA
4	Transportation of construction materials	O	LA	MA	O	O	O	O	MA	O	MA	MA	LA
5	Generation of municipal and construction waste	O	LA	LA	O	O	O	LA	MA	B	LA	O	O
6	Project structural construction and finishing	O	LA	MA	O	O	O	O	MA	B	MA	MA	LA

Legend

O - Insignificant B - Beneficial A - Medium Adverse

LA - Low Adverse HA – High Adverse

Table 6.2: Impact Significance Rating Matrix – Construction Phase

Sr. No.		Physical Environment		Biological Environment		Socioeconomic Environment				
	Environmental Components / Project Activities	Air Quality	Groundwater	Flora	Fauna	Employment	HSE Issues	Noise	Economic activity	Security
1	Operation of Building (HVAC, Generators, Routine Maintenance)	LA	O	O	O	B	LA	LA	B	LA
2	Disposal of Wastewater	O	O	O	O	O	LA	O	O	O
3	Municipal waste generation and disposal	LA	O	O	O	B	LA	O	O	O
4	Visitor's Movement	LA	O	O	O	B	LA	LA	B	LA

Legend

O - Insignificant B - Beneficial MA - Medium Adverse
LA - Low Adverse HA – High Adverse

6.5.1 Layout Planning & Design

Potential Impact

Incompatible layout plans and engineering designs of the proposed project can undermine the overall aesthetic and ambience of the project area. Utilization of the available spaces and designing the layout without considering the prospective and futuristic needs may result in design with low social acceptability and functionality. This impact will be irreversible and **medium** adverse in nature.

Mitigation Measures

- All structural, layout and engineering design of the project are in strict accordance with the applicable national and international guidelines/ codes/ standards and engineering practices;

6.5.2 Shadows

Potential Impact

Building shadows are an important environmental issue because the users or occupants of certain land uses have expectations for direct sunlight and warmth from the sun for function, or physical comfort. There is no residential setup and adjoined buildings with the proposed project, hence the impact of shadow will be negligible/ insignificant. Furthermore, the proposed building will be mid-rise building and will not cast huge shadows.

Mitigation Measures

- No mitigation measure is required.

6.5.3 Energy and Lighting

Potential Impact

The proposed building shall have a higher energy demand that can put extra load on the available resources of power. Most of the energy will be required for the lighting purposes in the building. The inappropriate use of artificial lighting can lead to light pollution that can affect the human health and the environment of the proposed building. This impact will be low adverse in nature.

Mitigation Measures

- The design of the buildings will facilitate the maximum utilization of natural light in day time beside the artificial lights;
- Double-glazed glass has been used in the front which will help in reducing heat transfer through the windows. Double glazing consists of two panes of glass with a layer of gas in

between, which acts as insulation and reduces heat transmission. This helps in maintaining a comfortable indoor temperature and reducing the need for excessive cooling, thus improving energy efficiency.
- The slits used on the other two sides of the building are strategically designed to allow controlled natural and limiting direct sunlight.
- The Energy Efficient LED lights with high lumens output per watt have been proposed to save maximum energy consumption in the building.
- A Variable Refrigerant Flow system is proposed. It is a cooling/heating system with high efficiency.

6.5.4 Land Use/Land Value

Potential Impact

There shall be insignificant impact on land use because proposed project site is located within the boundary of KW&SC complex near Karsaz, at Shahrah e Faisal, Karachi which is meant for the construction of multi storey commercial and office buildings. However, the current project site is a commercial area with high land value. Construction of the proposed project will enhance the land value of the project area. This will be a positive impact.

Mitigation Measures

- No mitigation measure is required.

6.5.5 Land Acquisition

Potential Impact

No private land acquisition is involved in the proposed project. The proposed land for construction of CERRI Building is already owned by KW&SC and is located in within the boundary of KW&SC complex near Karsaz, at Shahrah e Faisal, Karachi, which has been earmarked for commercial development / activity by the Karachi Development Authority (KDA). The project involves the construction of new building after demolishing of an existing building.

Mitigation Measures

- No mitigation measure is required.

6.5.6 Seismic Hazard

Potential Impact

According to the seismic zoning map of Pakistan, the project area is in Seismic Zone 2B, where 2B (moderate damage) represents peak horizontal ground acceleration from 0.16 to 0.24 g. A low to moderate intensity earthquake impacting the project site can adversely impact

the development. This factor requires special consideration of the designers as project structure may be affected negatively in case of earthquake tremors and the significance of damage depends upon the severity of earthquake. However, no major earthquake has hit Karachi for the past multiple decades.

Mitigation Measures

- The CERRI building will be designed to withstand moderate earthquakes; and
- Seismic Building Code of Pakistan 2007 (SBC-07) has been adopted.

6.5.7 Traffic/Parking Problem

Potential Impact

During the operation stage, traffic in and around the project area is expected to increase and will cause congestion and parking problems. This will be a medium adverse impact.

Mitigation Measures

- Adequate parking facilities for about 250 - 300 employees and visitors has been provided along with separate entry gates for incoming and outgoing vehicles; and

6.5.8 Emergency Response

Potential Impact

Disasters such as earthquakes, flooding and other manmade disasters such as fires may occur, which have to be considered for minimizing their impacts. This shall be a moderate negative impact.

Mitigation Measures

- The Building Regulations of Karachi Development authority (KDA) have been strictly adhered to. Complete equipment control system, fire escape stairs and secured access system supplemented with close circuit surveillance equipment/alarms have been included in the design of the building.
- Adequate internal and external water distribution system has been designed, and provision of fire reserve in the underground and the overhead tanks has been kept, with standby system for drawing sufficient water from the fire reserve.

6.5.9 Fire Fighting System

Potential Impact

Inefficient firefighting system may cause severe damages. This will be an adverse impact.

Mitigation Measures

- An adequate firefighting system has been provided in the project design including sufficient number of emergencies exits & routes; fire hoses, DCP fire extinguishers and fire alarms etc.

6.5.10 Ecology

A. Flora

Potential Impact

Twelve (12) trees are envisaged to be cut for the construction of proposed building.

Mitigation Measures

- Compensatory plantation will be done against each tree that will be cut/ disturbed.
- 04 trees of indigenous species will be planted in compensation to each affected tree for net environmental improvement.

6.5.11 Effects of Concrete

Potential Impacts

Concrete has a high thermal mass, which means it can absorb, store, and release heat slowly. In hot weather, concrete can absorb heat from the sun and radiate it back into the environment over time. This can lead to a "heat island" effect in urban areas, where concrete-dominated surfaces retain heat and contribute to elevated temperatures. This can impact local microclimates and increase energy consumption for cooling the building. This impact will be low adverse in nature.

Mitigation Measures

- The building has been designed with energy-efficient envelopes that include proper insulation and shading to reduce heating and cooling needs;
- Design includes appropriate thermal mass to help regulate indoor temperatures.

6.5.12 Socio-Economic Environment

Potential Impacts

During the planning and design phase of the project, it is anticipated that there will be no potentially significant adverse impact on the socio-economic environment.

Mitigation Measures

- The main entrance gate of KW&SC will not be used for the movement of labors, construction equipment and machinery and the separate gate along the service road will be utilized.

6.6 Anticipated Impacts during Construction Phase

Anticipated Impacts during Construction Phase and the recommended mitigation measures are given below:

6.6.1 Air Quality

Potential Impact

Air quality will be affected by various construction activities. Emissions may be spread depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. The critical sources of air pollution during the construction phase will be:

- Transportation of materials;
- Excavation operations
- Construction equipment;
- Vehicular exhaust.

The air emissions may cause health impacts such as dryness and roughness of the throat, eyes, nose, etc. to the workers, staff of the contractor and the residents of area. These emissions may also affect the bio-physical environment. The impact is high adverse but temporary in nature.
During construction stage, the dust level may increase considerably. All earthworks construction, site clearing, stockpiling, operation of batching plants and hauling of materials will generate dust and affect the local air shed. The workers may be exposed to high dust levels during site preparation. This impact is site-specific, temporary, reversible, likely and high adverse.

Mitigation Measures

- All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition, properly tuned and maintained to minimize the exhaust emissions;
- Open burning of solid waste from the contractor’s camps will be strictly banned;
- SEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery will be enforced during construction works;
- Regular water sprinkling on the site will be carried out to suppress excessive dust emission(s);
- Blowing of dust and particulate matter from stockpiled loose materials (e.g., sand, soil) will be avoided either by sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water;
- The vehicles carrying construction materials and the construction material storage areas

will be covered with tarpaulin;
- Blowing of dust and particulate matter from stockpiled loose materials (e.g., sand, soil) will be avoided either by sheeting them with tarpaulin or plastic sheets or by sprinkling them with light shower of water;
- Regular water sprinkling of the site will be carried out to suppress excessive dust emission(s);
- There will be pre-arrangement of medical facilities and availability of ambulance in case of asthma cases (reported during medical screening of workers);
- Construction workers will be provided with masks for protection against the inhalation of dust.

6.6.2 Noise

Potential Impact

Noise level is expected to increase during construction activities. Main sources of noise and vibration will be heavy machinery such as excavators and other equipment. Noise generated by construction machinery is likely to affect the locality of the project area. Health risks associated with exposure to continuous noise levels include high blood pressure, hypertension, annoyance and sleep disturbance, temporary threshold shift etc. The impacts of noise would be temporary and high adverse in nature.

Mitigation Measures

- Construction workers will be provided suitable hearing protection like ear cap, or earmuffs and training them in their use;
- Selection of up-to-date and well-maintained equipment with reduced noise levels will be ensured by suitable in-built damping techniques or appropriate muffling devices; and
- Confining of excessively noisy areas and limiting the work to normal working hours in the day.

6.6.3 Disposal of Demolition / Construction Debris

Potential Impact

Typical solid wastes generated during demolition/construction may include waste concrete, steel scrap, wooden scaffolding, empty cement bags, excavated soil and wood remains. Earth-fill material will be in the form of bore-wash generated due to deep pile foundation. This waste has the potential to cause negative impact on the surroundings if not appropriately managed and disposed of. It is likely to block nearby drainage channels that can ultimately cause localized flooding during the monsoon. Improper storage of waste is hazardous to the workers at the site as well. Wind-blown debris is a nuisance to the neighbourhood. This impact will be medium adverse in nature.

Mitigation Measures

- A comprehensive waste disposal plan will be developed for effective management of construction waste being generated in large quantities.
- Effective and instant removal of unusable construction wastes such as broken bricks, damaged pipes, left over steel bars, wooden, glass and plastics pieces from the site for recycling will be made. The remaining non-separable waste such as concrete dust, plaster and soil (aggregate) will be immediately removed from the site and disposed of more appropriately in approved landfill site or used as filling material, required at other construction sites.
- Possibilities of re-use of waste concrete material and construction waste from demolition works will also be explored. Such waste material could be used as filling material in paving large concrete floors.

6.6.4 Health and Safety

A. Occupational Health and Safety

Potential Impact

Health risks and workers safety problems may result at the workplace if the working conditions provide an unsafe and/or unfavorable working environment. The health and safety issues are also associated with the operation of construction machinery and equipment, which may cause minor and severe injuries to workers. Accident of workers during demolishing will also be a major concern. It will be a long term and high adverse impact.

Mitigation Measures

- Obligatory insurance against accidents for labourers/workers and implementation of the provisions of Fatal Accidents Act;
- The site will be declared as ‘no-go area’ for general public;
- Basic medical training will be provided to specified work staff and basic medical service and supplies to workers;
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g., firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents will be developed and approved;
- Work safety measures and good workmanship practices will be followed by the contractor to ensure no health risks for labourers, including use of PPEs (oxygen masks/ kits etc.);
- Protection devices (earmuffs) will be provided to the workers doing job in the vicinity of high noise generating machines i.e., excavators;
- Workers will be provided with adequate shelters and resting places during high temperatures;
- There will provision of cold drinking water in high heat and workers will be rotated on timely basis;
- Double guard rails, floor coverings, safety harnesses coupled to lanyards that prevent

workers from reaching unprotected edges (fall restraint) will be provided for the works at certain heights;
- Implementation of Health and Safety Management Plan **(Annex – IV).**
- Use of safety signs at the construction site, as shown below.

B. Community Health and Safety

Potential Impact

The construction activities will generate dust and high noise which will affect the KW&SC employees working in various blocks of the complex as well as the visitors and the staff families residing in the quarters adjacent to the complex. Movement of machinery and piling of the construction material along with the construction waste will create temporary accessibility issues. Furthermore, the labors with different transmittable diseases (e.g., COVID-19) may cause spread out of those diseases in the KW&SC employees. s.

Mitigation Measures

- The laborers with different transmittable diseases will be restricted within the construction site;
- Ensure that the site is restricted for the entry of irrelevant people particularly children;
- Training will be provided about road safety to the drivers operating construction vehicles;
- Provision of proper safety signage, particularly at sensitive/accident-prone spots;
- The wastes will be temporarily stored at appropriate locations and then will be transferred to the ultimate disposal point;
- COVID-19 SOPs must be followed at work site and construction camps;
- Safety signage will be provided along the approach road as well as the project site; and
- Deep excavation will be protected by fence/barricade to avoid any accident.

C. Emergency Response (Natural and Man-Made Disasters)

Potential Impact

Natural disasters and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths.

Mitigation Measures

- An Emergency Response Plan (**Annex - V**) for urban flooding and manmade disasters has been developed by the proponent and will be implemented in close consultation with the Fire Fighting Department, bomb disposal squad and paramedics;

- Training of the staff/employees regarding the emergency procedures/plans will be regularly conducted;
- Emergency numbers will be clearly posted; and
- Minor incidents and near misses will be reported, and preventive measures will be formulated accordingly.

6.6.5 Sanitation and Solid Waste Disposal

Potential Impact

During the construction stage, the sanitary wastewater shall be generated at the workers' camp(s). If this wastewater is allowed to stagnate in water ponds on the site, it can create unhygienic conditions and some of the wastewater may also percolate the soil, thereby, polluting the groundwater. Ordinary solid waste shall be produced by the workers as well as by construction activities. This will be a low adverse impact.

Mitigation Measures

- The contractor will provide potable washrooms for the labors.
- The ordinary solid waste such as wood, plastic, metal, glass etc. will be handled and collected properly at site and will transferred to the community container located near the project site.

6.6.6 Re-location of Utilities

Potential Impact

The construction of the proposed Building will not involve relocation of any public utilities and therefore shall not cause any impact.

Mitigation Measures

- No mitigation measure required.

6.6.7 Biodiversity Conservation

The project area is not rich in the biodiversity and the effect of proposed construction activities will be insignificant.

Flora

Potential Impact

On account of construction of the proposed CERRI building 12 trees will be cut. Furthermore, the dust emissions due to excavation operations will stick on the leaves of existing trees in the surroundings and may close their stomata thus hindering the photosynthesis process.

Reduced photosynthesis may also reduce the productivity of existing trees. This impact is however temporary but minor negative in nature.

Exhaust of noxious gases from the movement of heavy machinery to be used for digging, will further pollute air which will adversely affect health and vigor of plants. Further, during construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camps requirements).

Mitigation Measures

- Regular water sprinkling will be done to supress the dust;
-
- Construction vehicles, machinery and equipment will remain confined within their designated areas of movement;
- 50 trees will be planted in the open spaces provided in the building design. Mostly, the plantation will be along the periphery of the building.

Fauna

Potential Impact

The local animals mostly cats and dogs get disturbed due to construction activities. However, there will be no damage to their health and life. Some reptiles and insects may get killed/ injured during excavation operations. This impact will be low adverse in nature.

Mitigation Measures

- Excavations will be limited to the approved engineering drawings.

6.6.8 Soil Erosion

Potential Impact

The soil would be exposed to erosion due to excavations for foundation. Construction activities such as clearing, excavation, filling, grading and setting up construction camps will affect the existing soil condition in the study area. This impact can be categorized as low adverse, site-specific, long term, permanent, and highly probable.

Mitigation Measures

- Good engineering practices will help to control or minimize the soil erosion both at the construction sites and in peripheral areas. Special slope protection measures will be adopted during the construction stage;
- Use of heavy machinery will be restricted as far as possible to avoid the destruction of soil structure;
- Confining excavations to the specified spots as per the approved engineering drawings

and unnecessary excavations should be avoided;
- Stored excavated material will be covered and preferably reused, e.g., in construction as backfill etc.

6.6.9 Soil Contamination

Potential Impact

Contamination of soil may also be caused by oil and chemical spills from construction machinery or uncontrolled runoff from equipment washing yards. This impact is irreversible and low adverse in nature.

Mitigation Measures

- Store chemicals/ hazardous products and waste on impermeable surfaces in secure, covered areas with clear labelling of containers and with a tray or bund to contain leaks;
- Regularly remove all construction wastes from the site to approved waste disposal sites;
- Washing yards will be paved to avoid seepage of runoff from the yard;
- Awareness in emergency spill response procedures will be conducted;
- Oil leakages, chemicals and other liquids spills will be avoided/ minimized by providing appropriate storage places depending on the type of material for storage.

6.6.10 Construction Camps/Camp Sites

Potential Impact

Improper construction camp location and mismanagement of construction camp activities can lead to various environmental impacts which may include noise, health and safety, traffic problems, soil degradation, loss of vegetation, solid waste and water pollution. This impact is temporary and medium adverse in nature.

Mitigation Measures

- Working hours of noisy activities will be limited to normal daytime working hours;
- Waste Management Plan will be implemented to include procedures for the classification, storage and disposal of all construction wastes and the training of employees who handle hazardous materials; and
- Construction camps will be established away from populated areas.
- Regular training of workers will be carried out regarding local cultural norms, human behaviour, gender issues by the contractor during construction activities at site.

6.6.11 Water Quality

Potential Impact

There is no surface water body near project area therefore impact on surface water body is negligible.

In rainy seasons, the stockpiles of wastes, sludge from old sewers and other mucking material may spread in the project area with the stormwater and cause nuisance in terms of spread of diseases and odor.

Mitigation Measures

- Stockpiles of cement and other construction materials will be kept covered when not being used;
- Maintenance of vehicles will be carried out only on impermeable areas where any oil spillages can be contained;
- No activity may be undertaken in monsoon and careful attention will be paid to weather forecast before excavation operations;
- All kinds of waste will be stored in covered containers and disposed of safely as soon as possible; and
- The contractor will ensure that construction debris do not find their way into the drainage which may get clogged.

6.6.12 Municipal and Construction Waste/ Wastewater

Potential Impact

Due to construction activities municipal and construction waste will be generated from construction activities. The construction waste will include wastewater, oil spillage from machinery, domestic waste, and construction waste etc.

Improper dumping of waste may generate odor and attract mosquitoes and other disease vectors. Empty containers containing toxic, flammable and corrosive materials may pose a hazard to the workers. This may result in health risk to the work force and public, if disposal site is improperly selected. This impact is temporary and low adverse in nature.

Mitigation Measures

- Solid Waste generated during construction and camp sites will be transferred to the secondary users and the contractor will provide a proper waste management plan, the contractor may further transfer its waste to the other construction sites, if needed;
- Burning of waste will be prohibited;
- Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc;
- Containers with covers will be provided on site to store waste; and

- Training of work force involved in the storage, handling and transportation of hazardous material regarding emergency procedures.

6.6.13 Chance of Finding Artifacts

Potential Impact

During excavation, there is a chance of finding artifacts. In case of finding any artifact, the contractor will immediately stop the activities and report through Supervision Consultant to Directorate General (DG) of Archeology, Government of Sindh to take further appropriate action to preserve those antiques or sensitive remains. The Chance Finds Procedure (as given in **Annex-VI**) will be adopted in case of any accidental discovery of cultural heritage.

6.6.14 Resource Conservation

Potential Impact

The materials used in construction of proposed project would include coarse aggregates (crush), fine aggregates (sand), brick ballast, water, and cement etc. Almost all the materials to be used in the construction of proposed project are non-renewable and therefore their sustainable use is necessary for the future use.

Large quantities of water will be used in the preparation of concrete mix and in watering the unfinished surfaces. Excessive water consumption for drinking and washing purposes by the construction staff may pressurize water resources in the project area and in certain cases may disturb the existing water supplies in the project area. Use of water is of major concern while developing resource conservation strategies.

Mitigation Measures

- Wastage of water will be reduced by training the workers involved in water use;
- Wastage of water will be controlled through providing proper valves and through controlling pressure of the water;
- Source of water will be carefully selected. Water use will not disturb the existing community water supplies;
- Reuse of construction waste materials will be considered;
- Unnecessary equipment washings will be avoided;
- The efficient and well-maintained equipment and machinery will be used;
- The equipment and machinery will be turned off when not in use;
- Regular maintenance of machinery to avoid fuel leakages; and
- Resource conservation plan (attached as **Annex-VII**) will be followed.

6.6.15 Liquid and Solid Waste from Construction Camps

Potential Impact

Development of construction camps will generate significant quantities of liquid and solid waste. Construction camps will be established in AOI accommodating approximately 50 skilled and unskilled staff.

As a general rule, the water consumption will be about 5 gallon/capita/day and will subsequently generate about 70 to 80% of this water as sewage. Disposal of wastewater without treatment will pollute the soil and surface water/ groundwater resources of the area.

Hence water demand will be 250 gallons/day for construction camp during the construction stage and estimated generated wastewater will be about 200 gallons/day for each construction camp.

Construction Camps will generate about 0.44 kg/capita/day domestic solid waste comprising kitchen waste, garbage, putrescible waste, rubbish, and small portions of ashes and residues. Estimated quantity of solid waste will be about 22 kg/day from site. Improper waste management activities can increase disease transmission, contaminate ground and surface water and ultimate damage to the ecosystem. This impact is medium term, reversible, possible and low adverse.

Mitigation Measures

To dispose the liquid and solid waste generated from the construction activities, the following steps should be taken by the Contractor:

- The waste generated from the camp site will be disposed of at approved sites by Contractor;
- Construction workers and supervisory staff will be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste;
- Domestic and chemical effluents from the construction camp will be disposed of by the development of on-site sanitation systems i.e., septic tank prior to discharge to nearby drain. Septic tank will be located adjacent to the construction camp. Proper monitoring to check the compliance of SEQS will be carried out;
- As per standard engineering practices after digestion of sludge for an extended period, the sludge will be dried and be used for the landfilling at proper location for final disposal;
- All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper SWM system. Toxic waste will be handled, stored, transported and disposed separately;
- The waste will be properly sealed in containers with proper labels indicating the nature of the waste; and
- Solid waste will be segregated at source so that it can be re-used or recycled.

6.6.16 Flammable and Hazardous Materials

Potential Impact

Flammable materials to be used during the construction activities include diesel, furnace oil, petrol, Liquefied Petroleum Gas (LPG), kerosene oil and machinery fuels. These materials present little risk to the environment, if properly transported, stored and used; otherwise, they are potentially very dangerous. Improper storage and handling practices for these flammable and explosive materials can pose dangers of fire and blasts in the area. Training of employees involved in the transportation of hazardous material regarding emergency procedures should be ensured. This impact is site-specific, temporary, reversible, possible, and moderate adverse.

Mitigation Measures

- Safety procedures will be developed and followed by the contractor and labour strictly while using, handling and storage of these materials. Contractors will be provided instructions about the methods and safe practices of using flammable materials and explosives;
- For safety of construction labour, it will be ensured that contractor's staff will be trained about the procedures of safe use, handling and storage of materials;
- Emphasis will be to decrease the volume of mucking material by reusing and then the disposal at the marked area (Jam Chakro) in environment friendly way. In order to reduce the volume of disposal material, maximum part of the excavated material can be used in backfilling and the remaining may be used in other projects.

6.6.17 Sexual Exploitation and Abuse (SEA) and Sexual Harasment (SH)

Potential Impacts

During the construction phase, there is potential for SEA/SH to arise as a result of discriminatory hiring practices that favor men over women, unequal work distribution, and the exploitation of male privilege, among other factors. Sexual harassment against women might occur as a consequence of mixing of men and women at the construction site. This impact is a low to medium adverse in nature during construction stage.

Mitigation Measures

With the effective measures and monitoring, the risk of SEA/SH could be minimized by adopting the following mitigation measures:

- The Contractor will make sure that no discrimination is made on the basis of gender while hiring of workers;
- Creating a safe and respectful work environment with clear guidelines against sexual harassment is essential to prevent and promptly address any such incidents.
- Fostering a culture of inclusivity and respect towards minimizing the risk of SEA/SH during

construction projects
- Providing s separate bathing, changing, and sanitation facilities; and
- Taking proper measures to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women workers, women staff of the KWSC and male staff of the contractors.

6.7 Anticipated Impacts during Operational Phase

Anticipated impacts during Operational Phase and the recommended mitigation measures have been described under biophysical and socio-economic categories as follows:

6.7.1 Air Pollution

Potential Impact

During operational stage of the proposed CERRI Building, the continuous operation of generators, air conditioners etc. may deteriorate the quality of air, if not managed properly. Increase in traffic volume and traffic congestion during office starting and closing time shall also deteriorate the air quality of the project area. Furthermore, indoor air quality may also be deteriorated due to use of aerosols/sprays, paints, refrigerators, and air conditioners etc. This shall be a low adverse impact.

Mitigation Measures

- Traffic management plan will be prepared and implemented especially for office starting and closing time to ensure smooth flow of vehicles;
- An indoor air quality monitoring and improvement plan will be developed to maintain indoor air quality;
- Indoor air quality will be monitored on regular basis for parameters like CO, CO_2, NO_2, Volatile Organic Carbons (VOCs), etc. and appropriate mitigation measures shall be implemented;
- Fresh air will be regulated to maintain the acceptable indoor CO_2 level in the open space and achieve saving in energy on partial occupancy;
- For control of indoor air quality (IAQ), carbon filters will be used in addition to normal filters to remove odour from circulating air. In addition, ducted return air instead of from ceiling plenum will be provided;
- Vehicles with excessive smoke emissions will not be allowed to enter the premises of the building; and
- Regular maintenance of Heating, Ventilation and Air Conditioning (HVAC) System.

6.7.2 Noise Pollution

Potential Impact

Noise is considered as an interference to and imposition upon comfort, health and the quality of life. Given the conditions like exposure limit and time, noise may have both physiological as

well as psychological effects on human health. Physiological effects include dizziness, nausea, unusual blood pressure variation, physical fatigue, loss of hearing, etc. While reduced mental capability and irritations may attribute to psychological effects.

During the operational stage, noise levels are anticipated to increase. Noise will be generated due to increased commercial activity, movement of vehicles in the parking area, operation of HVAC system, pumps, generators etc. for which proper mitigation measures are required. This shall be a medium adverse impact.

Mitigation Measures

- Noise will be controlled through proper sound proofing/ rubber lining of walls which will be built into the design/interior decoration of the building;
- Noise levels of generators, plant rooms etc will be monitored and workers of the area will be provided with ear muffs and noise protection gears;
- The ambient noise standards will be followed; and
  There will also be prohibition on the honking of horns near the building.

6.7.3 Solid Waste

Potential Impact

Solid waste generated from the building will include paper waste, plastic waste, food waste, and e-waste. Approximately 132 kg of waste will be generated on daily basis which shall have to be properly managed otherwise may cause contamination/ pollution, nuisance to the employee/workers, deteriorate the aesthetics of the building and can also become a breeding place of mosquitoes inside the building. The e-waste will be generated periodically and needs special attention. E-waste has Environmental repercussions of the various highly toxic elements like lead, cadmium, barium, mercury and chromium which are released during the dismantling of these used computers.

Mitigation Measures

The mitigation measures proposed to be adopted are as follows:

- The waste will be segregated in separate containers, stored at designated sites and transported frequently to the designated dumping site either by the help of KMC or by hiring a dedicated waste collection contractor;
- The e-waste will be given special attention in view of Basel Convention and will be transported to reuse facility.

6.7.4 Emergency Response/Preparedness/Training

Potential Impact

Emergency situation may arise due to different kinds of risk at the operational phase of the project. These could be internal, external or natural risks. Internal risks may arise from operational conditions or human error that could result in personal accidents, spills or fires, such as:

- Fire / explosions;
- Occupational accidents (serious or fatal), due to non-compliance to occupational health and safety guidelines, failure to comply with operating rules and procedures, negligence of the personnel, falls, burns, internal traffic accidents (drop zone and parking lot), bad use of equipment and personal protection items, etc.
- Environmental Contamination due to improper storage and disposal of solid waste, contamination of drinking water, etc.
- External risks may arise from delinquent actions, terrorism or vandalism whereas natural risks such as strong earthquake or a rain storm may result in damage to property and the personnel that could be beyond human control. The lack of emergency planning could lead to moderate to high impact depending upon the situation.

Mitigation Measures

Appropriate training will be imparted to the concerned CERRI staff which will enable them to respond during the emergency situation. Emergency contact list and related information like the location of the emergency equipment must be kept handy.

Personnel will be trained in the use of following:

- Internal alarm / notification system
- Evacuation Management System
- Re-entry procedures & assembly point locations
- Emergency incident reporting system
- External emergency response organization System
- Location(s) and contents of Emergency
- Two levels of response will be contemplated:
  - With Internal Personals
  - With External Agencies, such as Civil Defence, Fire Brigade, Police, Rescue 1122, Ambulance services etc.

Risk management

The management of contingencies at the CERRI Building will be based on:

- Early detection of smoke and fire (alarms, detectors, setting off of safety elements);
- Confinement of emergency / affected area;
- Application of the adequate response procedure;

- Follow-up and monitoring.

Assembly Point

An Assembly Point will be designated outside the building for the inhabitants in case of an emergency. A properly completed site plan will be prepared that satisfies contingency plan map requirements. The drawing showing primary and alternate evacuation routes, emergency exits, and primary and alternate staging areas must be prominently posted throughout the building in locations where it will be visible to personnel, staff, and visitors.

6.7.5 Traffic Management

Potential Impact

Traffic load will increase as a result of Project development and increase in number of visits. Traffic congestion will cause nuisance to people visiting the area. This is a medium adverse impact.

Mitigation Measures

The CERRI Management will adopt the following mitigations measures which can help in reducing the negative impacts:

- Monitoring all exhaust emissions regularly and rectifying deviations immediately;
- Monitoring ambient air quality regularly at various points on the access road and parking area of the CERRI building;
- Carrying out regular maintenance of generators, and gas fired absorption chillers;
- Ensure adequate and proper parking for vehicles according to the traffic/Parking plan.

6.7.6 Drinking Water Contamination

Potential Impact

Water pollution can originate at the internal water network. If the pipes and the overhead water storage tanks are not cleaned properly, they may lead to bacteriological contamination of the potable/drinking water and thus shall lead to infectious diseases/health problems to the employees of the building. This is a medium adverse impact.

Mitigation Measures

- The Management of CERRI Building will install small water filtration units with required capacity at each floor in order to avoid any bacterial contamination in the drinking water;
- Water dispensers will also be used in the building;
- Overhead water storage tank(s) will regularly be cleaned on quarterly basis.
- Water Quality Monitoring will also be conducted on quarterly basis and the quality shall be maintained according to SEQS for drinking water.

6.8 Positive Impacts

6.8.1 Landscape

Potential Impact

During the operation stage, new saplings of different plants would be planted to enhance the aesthetics to create a buffer zone and to compensate the environmental losses. This will have a positive impact of permanent nature.

6.8.2 Other Positive Impacts

Some other positive impacts include the following:

- Economic development
- Employment generation
- Facilitation to the customers through one-window operation

7 ENVIRONMENTAL & SOCIAL MITIGATION & MONITORING PLAN

7.1 General

This section aims to address the measures which need to be adopted during each phase of the project to avoid, contain, mitigate or compensate the potential impacts identified in **Section 6**. Environmental & Social Mitigation Plan (ESMP) is the major part of this section and form the gist of this study. ESMP not only includes Best Management Practices (BMPs) but also includes monitoring indicators, frequency, responsibility and estimated Environmental Budget. This ensures that mitigation, monitoring and management consideration form a part of the documentation used for decision making and the basic benefit of defining the responsibilities is to make sure that the suggested mitigation measures will be implemented at construction and operation stages of the project. Summary of the mitigation measures for potential impacts have also been given in this section to support ESMP. Moreover, framework for the implementation of ESMP has been discussed in this section.

7.2 Objectives of ESMP

The main objectives of ESMP are to:

- Provide details of the project impacts along with the proposed mitigation measures and the corresponding implementation activities;
- Define the roles and responsibilities of the Project Proponent, Contractor, Supervisory Consultants and other players and effectively communicate environmental issues among them;
- Define a monitoring mechanism, reporting frequency and identify monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented; and identify the resources required to implement the ESMP and outline the corresponding financing arrangements.
- Ensure that the project will adopt COVID-19 best international standard operating procedures (SOPs) during the construction and operational phases.

7.3 Implementation of Environmental & Social Management Plan (ESMP)

The institutional arrangement for the implementation of ESMP for CERRI is presented in **Figure 7.1**. The proponent PIU-KWSSIP will be responsible for the compliance of environmental and social safeguard requirements of the said project.

The project activities will be monitored and managed by the PIU-KWSSIP. qualified environmental social and gender specialist working under the PIU currently constitute the Environmental and Social Cell (ESC). The ESC will be the custodian of the ESMP. ESC will support to ensure the compliance of ESMP. ESC will submit progress report for the implementation of the ESMP to SEPA as per environmental approval/ NOC conditions for the CERRI.

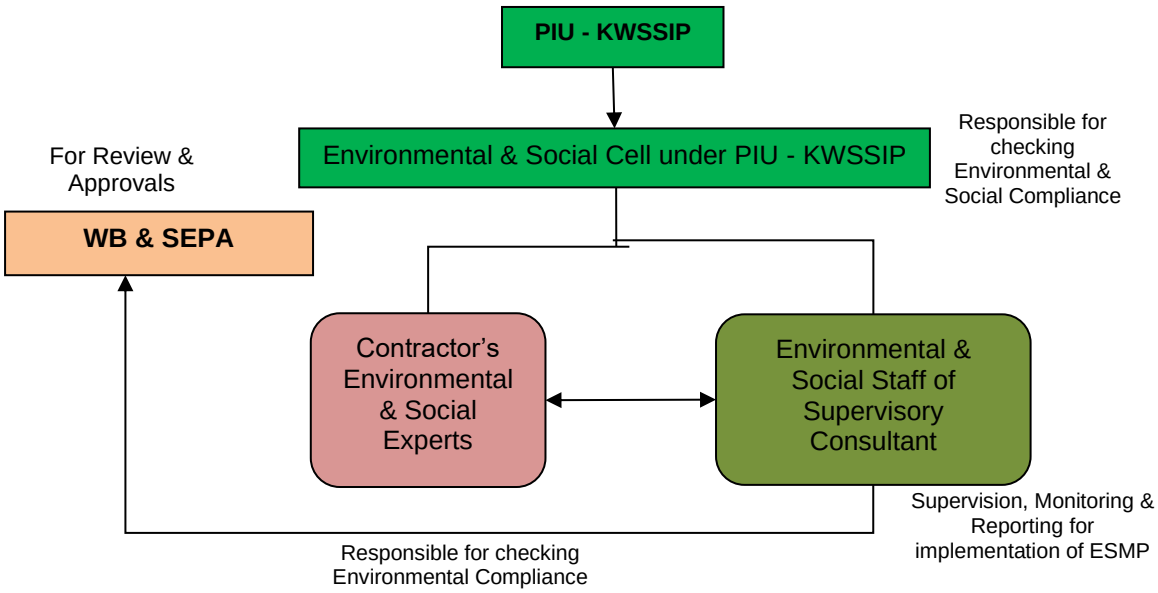


Figure 7.1: Organizational Setup for implementation of ESMP

7.3.1 Roles and Responsibilities of the Functionaries involved in ESMP Implementation

A. World Bank

The current sub-project falls under category B in view of limited environmental and social impacts and thus require an ESMP. World Bank will review and approve the safeguard documents including ESMP. The Bank will also review and approve the quarterly and biannually prepared progress reports.

B. SEPA

As per Sindh Environmental Protection Act, 2014, SEPA is responsible for environmental protection and pollution control. The SEPA is responsible for the approval of the EIA/ IEE of all the developmental projects under their jurisdictions. However, no documentation is required for SEPA.

C. Project Director (PIU-KWSSIP)

Project Director of PIU-KWSSIP is the in-charge for the financial and technical matters related to this project. His responsibilities for monitoring the ESMP will consist of:

- Ensuring that the required environmental training is provided to the concerned PIU staff;
- To carrying out random site visits to the construction sites to review the environmental performance of the Contractor;
- Review monitoring reports for the progress of environment related activities;

- Make sure that the Contractor is implementing the additional measures suggested by the Supervision Consultant (SC) in environmental monitoring reports;
- To assist Contractor for obtaining necessary approvals from the concerned departments;
- Maintaining interface with the other lined departments/ stakeholders.

D. Environmental and Social Cell (ESC-PIU)

An ESC has already been established in PIU, which consists of three specialists – one environment specialist, one social safeguard specialist and a gender specialist. The PIU will hire the services of independent environmental and social consultancy firm for Third Party Validation (TPV). The PIU responsibilities for monitoring the ESMMP will consist of:

Environmental Specialist

- Ensuring that the required environmental trainings are provided to the concerned PIU staff;
- To carrying out random visits to the construction sites to review the environmental performance of the Contractor;
- Review monitoring reports for the progress of environment and social management of the Project;
- Make sure that the Contractor is implementing the additional measures suggested by the Supervision Consultant (SC) in environmental and social monitoring reports;
- Maintaining interface with the other line departments/ stakeholders; and
- Reporting to the SEPA on status of ESMMP implementation.
- Make sure that all the contractual obligations related to the environmental and social compliance are met;
- Monitor the progress regarding implementation of environmental safeguards as provided in the ESMMP;
- Oversee the compliance of all the monitoring programs as given in ESMMP;
- Check randomly whether monitoring of the environmental aspects of the Project during construction and operational phases is being properly carried out;
- Document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports, and make follow-up on these actions to ensure progress toward the desired outcomes;
- Make sure that the Contractor implements the additional measures suggested by the monitoring and evaluation (M&E) Contractor; and
- Report the status of ESMMP compliance to Project Director, PIU-KWSSIP.

Social Development Specialist

- Ensure the required trainings on community engagement, community health and safety and other social safeguards compliance are imparted to the Project Management and Contractors work force
- Monitor the progress regarding implementation of social safeguards as provided in the ESMMP;
- Oversee the compliance of all the social monitoring programs as given in ESMMP;
- Review the progress monitoring reports for the social management of the Project;

- Make sure that the Contractor is implementing the additional measures suggested by the Supervision Consultant (SC) in environmental and social monitoring reports;
- Maintaining interface with the other line departments/ stakeholders;
- Ensure adequate site-level arrangements for GRM and dedicated and training work force for identifying, recording and monitoring complaints
- Monitor the complaints registration process under GRM and suggest corrective actions as necessary;
- Conduct periodic consultations with the primary stakeholders

Gender Specialist

- Resolve any GBV and SEA/SH related issues reported;
- Monitor the compliance of gender related measures;
- Oversee the gender issues reported through GRM.

E. Supervisory Consultant (SC)

Roles and responsibilities of SC will be:

- To ensure that one Environmental and one Social Safeguards Officer is hired for overseeing the day-do-day E&S compliance issues on site. The Environmental and Social Safeguards Officers must have extensive working experience in Karachi and must be approved by the E&S Specialists of PIU-KWSSIP before procurement by the SC;
- If the site situation requires based on mutual consensus between PIU-KWSSIP and SC, additional support staff, such as Male and Female Community Mobilizers will be hired to ensure appropriate community engagement and GRM;
- To closely monitor, oversee and report on the performance of the Contractor in line with the requirements set out in the ESMP;
- Ensuring that the day-to-day construction activities are carried out in line with all the E&S compliance protocols and guidelines that meet local as well as WB requirements;
- Strong coordination with the Contractor and PIU-KWSSIP;
- Preparing training materials and implementing programs for the Contractors staff working at all levels to ensure E&S Compliance, including but not limited to Incident Reporting, Tool Box Talks, GRM, GBV/SH, First Aid, and all HSE and OSH aspects relevant to the project site;
- Ensure the implementation of the mitigation measures suggested in ESMP;
- To supervise and monitor environmental activities being performed at site and report to the PIU-KWSSIP in an approved monitoring format;
- Periodic reporting as mentioned in ESMP; and
- Suggest any additional mitigation measures (if required).

F. Construction Contractor (CC)

Contractors will be bound to appoint competent Environmental and Social compliance officers with relevant educational background and throughout the implementation of the project The E&S team of the Contractors will be screened and recommended by the SC and approved by

the Environmental and Social Specialists of the PIU-KWSSIP. Contractors' Environmental and Social Manager will carry out following activities:

- Implementation of the mitigation measures at construction site;
- Contractor will be bound through contract to take actions against all the special and general provisions of the contract document;
- Contractor will make sure the compliance of ESMP recommendations related with construction and will also be responsible for effective liaison with stakeholders;
- Provision of proper Personal Protective Equipment (PPE) to the workers and train them for their proper use;
- Provision of hard barricades, first aid kits, complaint boxes, incident forms, banners related to project information and health and safety to the satisfaction of the SC
- Compliance with international best SOPs for COVID 19;
- To conduct the environmental and health & safety trainings to the workers/labour with support of the SC; and
- Coordinate with Environmental Specialist and Social Development Specialist (SDS) of SC.

In addition to above, the CC shall also follow Environmental Code of Practice (ECOPs) attached as **Annex-IX**.

7.3.2 Institutional Arrangement for Implementation of ESMP by PIU-KWSSIP during O&M Phase

The proposed Project will be administrated by KW&SC during the O&M phase. The Project Director, KWSSIP with his ESC will be responsible for the following:

- Compliance of ESMP requirements for O&M phase;
- Coordinating with the operational staff working under the ESC to monitor environmental compliance during project operation;
- Advising on, and monitoring tree plantations along the buffer zone of project area;
- Reporting on the progress of environmental compliance to the SEPA;
- Assessing the long-term environmental impacts of project operation;
- Sustaining a working partnership among the PIU-KWSSIP and SEPA departments of Sindh, NGOs and other related public private sector organizations; and
- Reporting to Managing Director (MD) KW&SC about progress of the work.

7.4 Reporting

The contractor shall prepare and submit weekly monitoring reports for compliance of implementation to supervision consultant environmental team.

Construction Supervision Consultant will prepare monthly & quarterly reports and submit to the PIU-KWSSIP, and annual monitoring reports as well as a final report of the sub-project based on implementation status. The distribution of periodic reports is given in **Table 7.1.**

Table 7. 1: Distribution of Periodic Reports

Report	Prepared by	Reviewed by	Distribution
Daily	Contractor	Reviewed by CSC	The Engineer and E&S Cell Project Implementation Unit
Weekly	Contractor	Reviewed by CSC	The Engineer and E&S Cell Project Implementation Unit
Monthly	SC	Reviewed by PIU-Environmental Unit; KWSSIP	The Engineer and Project Implementation Unit and The World Bank
Quarterly	SC	Reviewed by PIU-Environmental Unit; KWSSIP	The Engineer, Project Implementation Unit and The World Bank
Final	SC	Reviewed by PIU-KWSSIP-Environmental Unit; KWSSIP	The Engineer, Project Implementation Unit and The World Bank

7.5 Non-Compliance of the ESMP

The implementation of the proposed ESMP involves inputs from various functionaries as discussed earlier. The contractor will be primarily responsible for ensuring implementation of the mitigation measures proposed in the ESMP, which will be part of the contract documents. The provision of the environmental mitigation cost will be made in the total cost of project. However, if the contractor fails to comply with the implementation of ESMP and submission of the monthly compliance reports, following actions will be taken by the SC:

- Deductions will be made from the payments to the Contractor claimed under the heads of environmental components;
- Imposition of penalties;
- Suspension of services

7.6 Contractor's ESMP (CESMP)

The contractor will prepare a site specific ESMP based on the current ESMP and will get it approved from PIU-KWSSIP and WB. This will ensure the implementation of the ESMP based on the site conditions at the time of execution, by the contractor.

7.7 Inclusion of ESMMP in Bidding/ Contract Documents

The present ESMP will be included in the bidding/ contract documents and their implementation will be a contractual binding for the contractors.

7.8 Environmental and Social Monitoring Plan

Monitoring will be carried out to ensure that the mitigation plans are regularly and effectively implemented. It will be performed at three levels. At the PIU level, the ESC will do ESMP monitoring to ensure that the mitigation plans are being effectively implemented. The

environmental engineer of Supervision Consultant will regularly monitor the ESMP implementation by the contractor. At contractor's level, the environmental monitoring checklist will be filled on daily basis by their environmental manager and countersigned by environmental engineer of Supervision Consultant.

Table 7.2 outlines the parameters that will be monitored, expected frequencies of monitoring and responsible agency for monitoring. The Environmental Monitoring checklist is attached as **Annex – X**.

Table 7. 2: Environmental & Social Monitoring Plan

Parameter	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implementation	Supervision
Construction Phase (12 Months)					
Air Quality (Dust, smoke)	Along the access roads and at project site	Visual inspection to ensure good standard equipment is in use and dust suppression measures (sprinkling) are in place	Daily	CC	EE of SC ESC of PIU-KWSSIP
	Along the access road	Visual inspection to ensure dust suppression work plan is being implemented	Daily	CC	EE of SC ESC of PIU-KWSSIP
Air Quality (PM_{10}, NO_2, SO_2, CO_2, CO)	One point at active project site.	Air quality monitoring for 24hours for the parameters specified in SEQS	Quarterly	CC	EE of SC ESC of PIU-KWSSIP
Smoke from construction machinery	Close to construction area	Visual inspection for the color of the smoke	Daily	CC	EE of SC ESC of PIU-KWSSIP
Noise and vibration	One point at project site.	24hour noise monitoring through EPA certified laboratory	Quarterly	CC	EE of SC ESC of PIU-KWSSIP
	Close to noise generating equipment and road	Field observation	Daily	CC	EE of SC ESC of PIU-KWSSIP
Waste Management	Storage and camp area	Visual inspection that solid waste is disposed of at designated sites	Weekly	CC	EE of SC ESC of PIU-KWSSIP
Drinking water and sanitation	At construction camps	Visual inspection	Weekly	CC	EE of SC ESC of PIU-KWSSIP
Erosion	---	Visual inspection	Weekly	CC	EE of SC

Parameter	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implementation	Supervision
					ESC of PIU-KWSSIP
Reinstatement of work sites	---	Visual inspection	After completion of all works	CC	EE of SC ESC of PIU-KWSSIP
Safety of workers	At active construction sites	Visual inspection to ensure use of PPE by workers	Daily	CC	EE of SC ESC of PIU-KWSSIP
Provision of PPEs	At active construction sites	Visual Inspection	Daily	CC	EE of SC ESC of PIU-KWSSIP
Labor Management	At construction camps	Child labour, employment conditions, workers accommodation, Housekeeping, HIV/STDs etc.	Daily	CC	EE of SC ESC of PIU-KWSSIP
Labor Influx	At construction camps	Conflicts related to labour influx	Daily	CC	EE of SC ESC of PIU-KWSSIP
Grievances Redressal	At construction camps	Type and number of grievances	Daily	CC	GRC
Community/ Occupational Health & Safety	At construction camps	Type and number of accidents	Daily	CC	EE of SC ESC of PIU-KWSSIP
SEA/SH	At construction camps	Number of incidents of men and women harassment	Daily	CC	EE of SC ESC of PIU-KWSSIP
Training	At construction camps	Community/occupational health and safety and Gender in-equalities	Once during construction period	CC	EE of SC ESC of PIU-KWSSIP

Parameter	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implementation	Supervision
Operation Phase (1st Years)					
Air Quality	At the project Site	Air quality monitoring for 24hours for the parameters specified in SEQS	Annually	ESC of PIU-KWSSIP	SEPA
Noise and vibration	At project site	24-hour noise monitoring through EPA certified laboratory	Annually	ESC of PIU-KWSSIP	SEPA
Solid Waste	At the project Site	Physical and Chemical Analysis of solid waste	Biannually	ESC of PIU-KWSSIP	SEPA
Smoke/ emissions from vehicles	Close to operation area	Visual inspection for the color of the smoke	Daily	ESC of PIU-KWSSIP	SEPA
Fire Safety System	At the project site	Visual inspection of the fire extinguishers and other associated equipment	Daily	ESC of PIU-KWSSIP	SEPA
Tree Plantation	At the location as given in plantation plan	Field observation	Daily	ESC of PIU-KWSSIP	SEPA
Safety of workers	At the project site	Visual inspection to ensure use of PPE by workers	Daily	ESC of PIU-KWSSIP	SEPA
Labour Management Procedure	At the project site	Child labour, employment conditions, workers accommodation, housekeeping, HIV/STDs etc.	Daily	ESC of PIU-KWSSIP	SEPA
Training	At the project site	Community/ occupation health & safety	Annually	ESC of PIU-KWSSIP	SEPA
Grievances Redressal	At the project site	Type and number of grievances	Daily	GRC	SEPA
SEA/SH	At the project site	Number of incidents of gender in-equality	Daily	ESC of PIU-KWSSIP	SEPA

7.9 Environmental and Social Management Plan

The impacts and mitigation measures are discussed in **Table 7.3** below:

Table 7.3: Environmental and Social Mitigation Plan

Sr. No.	Parameters	Target	Mitigation	Responsibility
Design/ Pre-Construction Phase				
1.	Layout Planning & Design	To ensure safe and efficient functioning of the facility	• All structural, layout and engineering design of the project are in strict accordance with the applicable standards.	DC, PIU-KWSSIP
2.	Energy and Lighting	To conserve the energy resources	• The design of the buildings will facilitate the maximum utilization of natural light in day time beside the artificial lights; and • Double-glazed glass has been used in the front which will help in reducing heat transfer through the windows. Double glazing consists of two panes of glass with a layer of gas in between, which acts as insulation and reduces heat transmission. This helps in maintaining a comfortable indoor temperature and reducing the need for excessive cooling, thus improving energy efficiency. • The slits used on the other two sides of the building are strategically designed to allow controlled natural and limiting direct sunlight. • The Energy Efficient LED lights with high lumens output per watt have been proposed to save maximum energy consumption in the building. • A Variable Refrigerant Flow system is proposed. It is a cooling/heating system with high efficiency.	DC, PIU-KWSSIP
3.	Seismic Hazard	To keep the structures safe and intact in case of earthquakes.	• Seismic Building Code of Pakistan 2007 (SBC-07) has been adopted.	DC, PIU-KWSSIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
4.	Traffic/ Parking Problem	To ensure sufficient parking area	• Adequate parking facilities for about 250 - 300 employees and visitors has been provided along with separate entry gates for incoming and outgoing vehicles.	DC, PIU-KWSSIP
5.	Emergency Response	To manage any hazardous circumstances in case of emergency	• The Building Regulations of Karachi Development authority (KDA) have been strictly adhered to. Complete equipment control system, fire escape stairs and secured access system supplemented with close circuit surveillance equipment/alarms have been included in the design of the building. • Adequate internal and external water distribution system has been designed, and provision of fire reserve in the underground and the overhead tanks has been kept, with standby system for drawing sufficient water from the fire reserve.	DC, PIU-KWSSIP
6.	Fire Fighting System	To combat fire hazard.	• An adequate firefighting system has been provided in the project design including sufficient number of emergencies exits & routes; fire hoses, DCP fire extinguishers and fire alarms etc.	DC, PIU-KWSSIP
7.	Removal of Vegetation /Trees	To minimize the impact on flora due to project activities	• Compensatory plantation will do against each tree that will be cut/ disturbed. • A tree plantation plan has been proposed and given in the proceeding section for net environmental improvement in the project area.	DC, PIU-KWSSIP
8.	Effects of Concrete	To mitigate and avoid the heat island effect	• The building has been designed with energy-efficient envelopes that include proper insulation and shading to reduce heating and cooling needs; • Design includes appropriate thermal mass to help regulate indoor temperatures.	
Construction Phase				

Sr. No.	Parameters	Target	Mitigation	Responsibility
1.	Air Quality	To avoid air pollution	• All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition, properly tuned and maintained to minimize the exhaust emissions; • Open burning of solid waste from the contractor's camps will be strictly banned; • SEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery will be enforced during construction works; • Regular water sprinkling on the site and access roads will be carried out to suppress excessive dust emission(s); • The vehicles carrying construction materials and the construction material storage areas will be covered with tarpaulin; • Regular water sprinkling of the site will be carried out to suppress excessive dust emission(s); • Construction workers will be provided with masks for protection against the inhalation of dust.	CC, SC, PIU-KWSSIP
2.	Noise	To avoid noise pollution	• Construction workers will be provided suitable hearing protection like ear cap, or earmuffs and training them in their use; • Selection of up-to-date and well-maintained equipment with reduced noise levels will be ensured by suitable in-built damping techniques or appropriate muffling devices; and • Confining of excessively noisy areas and limiting the work to normal working hours in the day.	CC, SC, PIU-KWSSIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
3.	Disposal of Demolition / Construction Debris	To avoid/ minimize nuisance and environmental pollution in the project area due to solid waste	• A comprehensive waste disposal plan will be developed for effective management of construction waste being generated in large quantities. • Effective and instant removal of unusable construction wastes such as broken bricks/concrete blocks, damaged pipes, left over steel bars, wooden, glass and plastics pieces from the site for recycling will be made. The remaining non-separable waste such as concrete dust, plaster and soil (aggregate) will be immediately removed from the site and disposed of more appropriately in approved landfill site or used as filling material, required at other construction sites. • Possibilities of re-use of waste concrete material and construction waste from demolition works will also be explored. Such waste material could be used as filling material in paving large concrete floors.	CC, SC, PIU-KWSSIP
4.	Biodiversity Conservation A. Flora	To minimize the impact on flora due to project activities	• Regular water sprinkling will be done to suppress the dust; • Campsites will be established on vacant land as far as possible, at least 100 m away from the residential areas; • Construction vehicles, machinery and equipment will remain confined within their designated areas of movement; • Contractor will provide gas cylinders at the camps for cooking purposes and cutting of trees/ bushes for fuel will not be allowed. • Excavations will be limited to the approved engineering drawings; • Mistreatment of animals will be prohibited	CC, SC, PIU-KWSSIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
5.	Health and Safety A. Occupational Health and Safety	To minimize health risks to workers due to project activities	• Obligatory insurance against accidents for laborer/ workers and implementation of the provisions of Fatal Accidents Act; • The site will be declared as 'no-go area' for general public; • Providing basic medical training to specified work staff and basic medical service and supplies to workers; • Double guard rails, floor coverings, safety harnesses coupled to lanyards that prevent workers from reaching unprotected edges (fall restraint) will be provided for the works at certain heights; • Implementation of Health and Safety Management Plan (Annex – IV).	CC, SC, PIU-KWSSIP
	B. Community Health and Safety	To minimize health risks to public due to project activities.	• The laborers with different transmittable diseases will be restricted within the construction site; • Ensure that the site is restricted for the entry of irrelevant people particularly children; • Efforts shall be made to create awareness about road safety among the drivers operating construction vehicles; • Provision of proper safety signage, particularly at sensitive/accident-prone spots; • The wastes will be temporarily stored at appropriate locations and then will be transferred to the ultimate disposal point; • Safety signage will be provided along the approach road as well as the project site; • COVID-19 SOPs must be followed at work site and construction camps; and • Deep excavation will be protected by fence/barricade to avoid any accident.	CC, SC, PIU-KWSSIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
	C. Emergency Response (Natural and Man-Made Disasters)	To eliminate/ minimize natural and man-made hazards	• An Emergency Response Plan (Annex - V) implemented; • Training of the staff/employees regarding the emergency procedures/plans will be regularly conducted; • Emergency numbers will be clearly posted; and • Minor incidents and near misses will be reported, and preventive measures will be formulated accordingly.	CC, SC, PIU-KWSSIP
7.	Sanitation and Solid Waste Disposal	To avoid/ minimize nuisance and environmental pollution in the project area due to liquid & solid waste	• The ordinary solid waste such as wood, plastic, metal, glass etc. will be handled and collected properly at site and will transfer to the community container located near the project site.	CC, SC, PIU-KWSSIP
9.	Soil Erosion	To avoid degradation of soil.	• Use of heavy machinery will be restricted as far as possible to avoid the destruction of soil structure; • Confining excavations to the specified spots as per the approved engineering drawings and unnecessary excavations should be avoided; • Stored excavated material will be covered and preferably reused, e.g., in construction as backfill etc.	CC, SC, PIU-KWSSIP
10.	Soil Contamination	To avoid Contamination of soil.	• Store chemicals/ hazardous products and waste on impermeable surfaces in secure, covered areas with clear labelling of containers and with a tray or bund to contain leaks; • Regularly remove all construction wastes from the site to approved waste disposal sites; • Washing yards will be paved to avoid seepage of runoff from the yard; • Awareness in emergency spill response procedures will be conducted;	CC, SC, PIU-KWSSIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
			• Oil leakages, chemicals and other liquids spills will be avoided/ minimized by providing appropriate storage places depending on the type of material for storage.	
11.	Construction Camps / Camp Sites	To avoid construction camp related issues	• Working hours of noisy activities will be limited to normal daytime working hours; • Construction camps will be established away from populated areas. • Regular training of workers will be carried out	CC, SC, PIU-KWSSIP
12.	Water Quality	To avoid any water pollution	• Stockpiles of cement and other construction materials will be kept covered when not being used; • No activity may be undertaken in monsoon and careful attention will be paid to weather forecast before excavation operations; • All kinds of waste will be stored in covered containers and disposed of safely as soon as possible; and • The contractor will ensure that construction debris do not find their way into the drainage which may get clogged.	CC, SC, PIU-KWSSIP
13.	Municipal and Construction Waste/ Wastewater	To prevent inconvenience arising from the disposal of liquid and solid and liquid wastes.	• Solid Waste generated during construction and camp sites will be transferred to secondary users; • Burning of waste will be prohibited; • Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.; • Containers with covers will be provided on site to store waste; and • Training of work force involved in the storage, handling and transportation of hazardous material regarding emergency procedures.	CC, SC, PIU-KWSSIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
14.	Resource Conservation		• Wastage of water will be reduced by training the workers involved in water use; • Source of water will be carefully selected. Water use will not disturb the existing community water supplies; • Reuse of construction waste materials will be considered; • Unnecessary equipment washings will be avoided; • The efficient and well-maintained equipment and machinery will be used; • The equipment and machinery will be turned off when not in use; • Regular maintenance of machinery to avoid fuel leakages; and • Resource conservation plan (attached as Annex-VII) will be followed.	CC, SC, PIU-KWSSIP
15.	Liquid and Solid Waste from Construction Camps	To avoid nuisance due to liquid and solid construction waste	• The waste generated from the camp site will be disposed of at approved sites by Contractor; • Construction workers and supervisory staff will be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste; • All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper SWM system. Toxic waste will be handled, stored, transported and disposed separately; • The waste will be properly sealed in containers with proper labels indicating the nature of the waste; and • Solid waste will be segregated at source so that it can be re-used or recycled.	CC, SC, PIU-KWSSIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
16.	Flammable and Hazardous Materials	To avoid impacts of flammable and hazardous materials	• For safety of construction labour, the contractor's staff will be trained about the procedures of safe use, handling and storage of materials;	CC, SC, PIU-KWSSIP
17.	Gender Based Violence	To avoid GBV related issues	• The Contractor will make sure that no discrimination is made on the basis of gender while hiring of workers; • Contractor will take proper measures to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women; • Contractor will engage female workforce where required.	CC, SC, PIU-KWSSIP
			•	
Operation Phase				
1.	Noise Pollution	To avoid Noise pollution	• Noise will be controlled through proper sound proofing/ rubber lining of walls which will be built into the design/interior decoration of the building; • Noise levels of generators, plant rooms etc will be monitored and workers of the area will be provided with ear muffs and noise protection gears; • The ambient noise standards will be followed; and • There will also be prohibition on the honking of horns near the building.	KW&SC
2.	Solid Waste	To avoid/ minimize nuisance and environmental pollution in the project area due to solid waste	• The waste will be segregated in separate containers, stored at designated sites and transported frequently to the designated dumping site either by the help of KMC or by hiring a dedicated waste collection contractor; • The e-waste will be given special attention in view of Basel Convention and will be transported to reuse facility.	KW&SC
3.	Emergency Response/ Preparedness/ Training	To prepare for any emergency conditions	Personnel will be trained in the use of following: • Internal alarm / notification system • Evacuation Management System	KW&SC

Sr. No.	Parameters	Target	Mitigation	Responsibility

			• Re-entry procedures & assembly point locations
			• Emergency incident reporting system
			• External emergency response organization System
			• Location(s) and contents of Emergency
			• Two levels of response will be contemplated:
			  o With Internal Personals
			  o With External Agencies, such as Civil Defence, Fire Brigade, Police, Rescue 1122, Ambulance services etc.
			Risk management
			
			The management of contingencies at the CERRI Building will be based on:
			
			• Early detection of smoke and fire (alarms, detectors, setting off of safety elements);
			• Confinement of emergency / affected area;
			• Application of the adequate response procedure;
			• Follow-up and monitoring.	

4.	Traffic Management	To avoid traffic congestion issues	• Ensure adequate and proper parking for vehicles according to the traffic/Parking plan.	KW&SC
5.	Drinking Water Contamination	To avoid any contamination in drinking water	• The Management of CERRI Building will install small water filtration units with required capacity at each floor in order to avoid any bacterial contamination in the drinking water; • Water dispensers will also be used in the building; • Overhead water storage tank(s) will regularly be cleaned on quarterly basis.	KW&SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			• Water Quality Monitoring will also be conducted on quarterly basis and the quality shall be maintained according to SEQS for drinking water.	

KEY

CC	Construction Contractor
DC	Design Consultant
EPA	Environment Protection Agency
SC	Supervision Consultant
PIU-KWSSIP	PIU-Karachi Water & Sewerage Services Improvement Project

7.10 Grievance Redressal Mechanism (GRM)

The Grievance Redress Mechanism (GRM), outlines the policy and procedure for documenting, addressing, responding and employing methods to resolve project grievances and complaints that may be raised by the community members arising from environmental and social performance, the engagement process, resettlement and/or unanticipated environmental or social impacts resulting from project activities. The Section describes the scope and procedural steps and specifies roles and responsibilities of the parties involved. The purpose of the GRM is to receive, review and resolve grievances from stakeholders and ensure smooth and fair implementation of subproject activities.

7.10.1 GRM Principles

A GRM is established to address any complaints or grievances arising during the implementation period of the projects. People of the project area may perceive risks to themselves or their property or their legal rights or have concerns about the possible adverse environmental and social impact that a project may have. Any concerns or grievances should be addressed quickly and transparently, and without retribution to the complainant.

The primary principle of GRM is that all complaints or grievances are resolved as quickly as possible in a fair and transparent manner.

7.10.2 Objectives

The GRM will provide a predictable, transparent, and credible process to all stakeholders, resulting in outcomes that are seen as fair, effective, and lasting. The specific objectives of the GRM are as follows:

- To allow stakeholders the opportunity to lodge complaints and raise concerns.
- To ensure that comments, responses, and grievances are handled in a fair and transparent manners.
- To mitigate or prevent adverse impacts on communities caused by the project works; and
- To serve as an early alert system to project management of significant or recurring issues that might signal a systemic problem, and facilitate a resolution.

7.10.3 Type of Complaints

The complaints that may arise during the execution of the proposed project at site include:

- Noise pollution due to project activities:
- Air pollution issues due to arisen of dust during construction activities:
- Traffic inconvenience;
- GBV and harassment.

7.10.4 Lodging of Complaint

The complainant can lodge their complaints by opting of the following modes:

- A verbal or written complaint at the project site;
- A prescribed form available online at KWSSIP website of Grievances Redressal Mechanism Icon;
- Complaint by post on the specified address PIU;
- On a dedicated landline telephone number/line, which will be received by the GRM receiving officer; The grievance may be dropped in the complaint box placed at the working site;
- Complaint through e-portal of KWSSIP easily accessible from the mobile phones; and
- Complaints at Customer Services Center of KW&SC.

7.10.5 Disclosure of GRM

The GRM shall be disclosed at PIU-KWSSIP, KW&SC head offices, and concerned Executive Engineer (XEN) and Superintendent Engineer (SE) offices, KWSSIP website as well as on sub-projects sites.

7.10.6 Structure of Grievance Redress Mechanism

The project will establish a multi-tier GRM with designated staff responsibilities at each level. These tiers comprise the Site Team; Grievance Redress Committee (GRC) at the Project level; and GRC at the PIU level. These tiers are described below.

These levels comprise the following:

A. Site Team (Level - 1)

The site team will maintain a close rapport and coordination with local community throughout the project implementation. The site team will act as a coordinator among the PIU, and local community for coordination and information dissemination to keep them informed about day-to-day development on the project, particularly about the grievance resolution process. The project safeguards and engineering staff will coordinate to review and resolve the issue or concern related to planning or implementation as well as environmental and social concerns preferably within five days from receipt of the grievance. Any complaints that cannot be resolved at this level will be forwarded to the next tier.

B. Project Level GRC (Level - 2)

PIU will constitute a GRC headed by Project Manager (PM) at the project level to resolve all grievances and complaints of the stakeholders. GRC shall comprise of the following members:

- Project Manager (PM), as head/convener of GRC;
- SDS/Gender Specialist of PIU;
- SDS of Supervision Consultant;
- Environment Specialist of SC (where applicable);
- Resident Engineer of project construction supervision consultant;
- Environment, social and gender specialist of contractor will act as focal point; and

- A representative of local community.

Note: Representative from any other Department may be called as and when required by the GRC. Environmental Specialist of SC will join GRC meeting related to Environmental issues only.

The GRC will meet once a month and when the need arises. The GRC will review grievances involving all resettlement planning and implementation, environmental issues (such as water, air, noise pollution) and social issues including, compensation for business losses and other assistance as well as social issues that may arise due to restricted access to the resources and amenities.

GRC will perform following functions:

- Record grievances, categorize and prioritize the grievances that need to be resolved by the committee and solve them within a month;
- Invite and hear aggrieved persons/parties to produce evidence of their claims and record their view point;
- Communicate its decisions and recommendations on all resolved disputes to project executors and the aggrieved persons for implementation;
- Forward the unresolved cases/ complaints to PIU within an appropriate time frame with reasons recorded and its recommendations;
- Develop an information dissemination system and acknowledge the aggrieved parties about the development regarding their grievance;
- Maintain a complaint register accessible to the stakeholders with brief information about complaints and GRC decision with status report; and,
- Maintain complete record of all complaints received by the GRC with actions taken.

Any complaint that cannot be resolved at the Project level GRC, will be forwarded to the next tier – the PIU GRC.

C. PIU Level GRC (Level - 3)

At the third tier, the PIU has constituted a GRC at PIU level. The committee has the following composition:

- Project Director KWSSIP, (Chairman);
- SDS, Member
- Gender Specialist, Member;
- Concerned Project Manager – PIU, Member
- Senior Social Safeguards Specialist (Consultant) Member
- Representative of Civil Society.

The PIU GRC through authorized representative, will acknowledge the complainant about his/her complaint, scrutinize the record, investigate the remedies available and request the

complainant to produce any record in favour of his/her claim. After thorough review and scrutiny of the available record on complaint, field visit will be conducted to collect additional information, if required. Once the investigations are completed, the PIU GRC will give decision within 30 days of receipt of the complaint. If the complainant is still dissatisfied with the decision, he/she can go to the court of law, if he/she wishes so. Organization of the GRM is shown in **Figure 7.2.** Gender representation will be ensured by inducting a female member in both GRCs.

D. Gender Based Violence (GBV) Committee

Besides GRC, at PIU level GBV committee has also been established and notified consisting of the following members;

- Concerned Project Manager, head/ convener
- Gender Expert KWSSIP, secretary
- SDP KWSSIP, member

GBV Committee will address the gender related issues caused due to project activities.

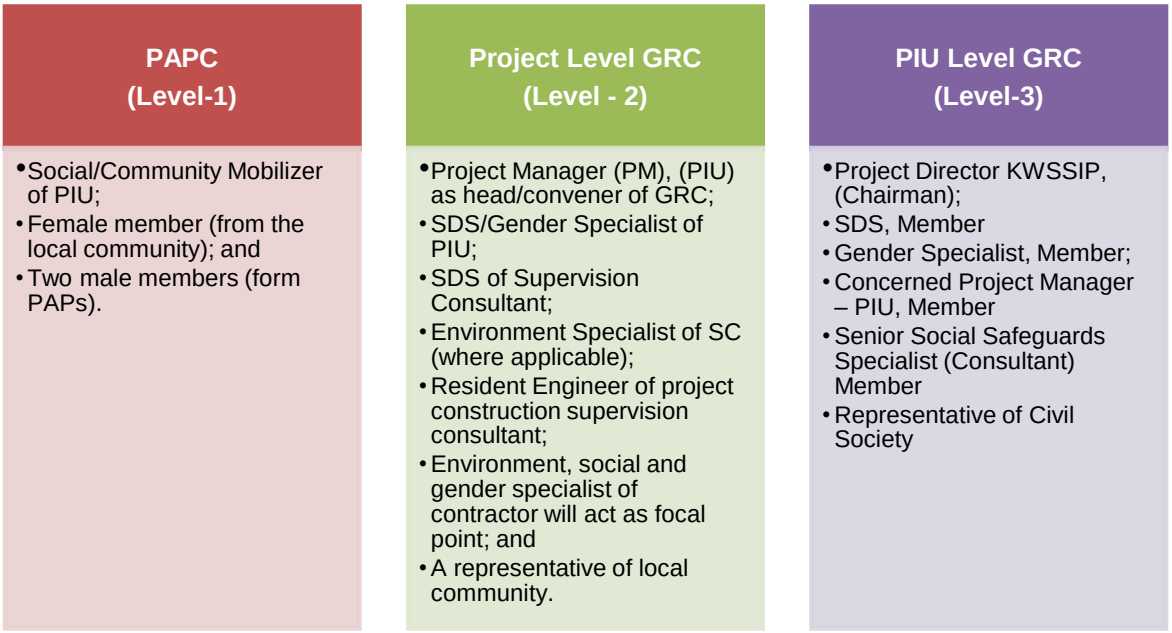


Figure 7. 2: Organogram for GRM

7.10.7 Grievance Redress Procedure

The complaints received through any media will be screened by type and category and registered in community complaints register (CCR), where the name and address of complainant, date, description of complaint and action taken will be recorded. The GRC will acknowledge the complaints within one day of receipt and will review available records. If required, GRC will advise the safeguards/engineering staff to conduct field visits in consultation with the aggrieved person, local community and submit a fact-finding report. Preferably, the fact finding will be completed within 10 days from receipt of complaints. The

GRC in its formal meeting to be conducted within 20 days from receipt of complaint will hear and clarify with the complainant (if required so) about the issue and shall conclude and communicate its recommendations for further implementation. Complainant will be kept informed during the process and the GRC decision will be communicated to him/her in a language and form understandable to him/her. The GRC proceedings will be documented step by step and all records will be maintained and summarized in the project progress and internal monitoring reports.

The complainant will be at liberty to access the formal legal course if s/he is dissatisfied with the GRC findings and recommendations. If GRC fails to conclude its recommendations either due to some technical or legal constraint, the GRC will immediately report the issue to PIU level GRC and will request guidance and support it deems necessary. PIU-GRC will ensure to resolve the grievance within 30 days. In case of any delay, the complainants will be informed on the progress and process about their grievances.

Environmental and social issues will be dealt according to the same GRM procedures described above.

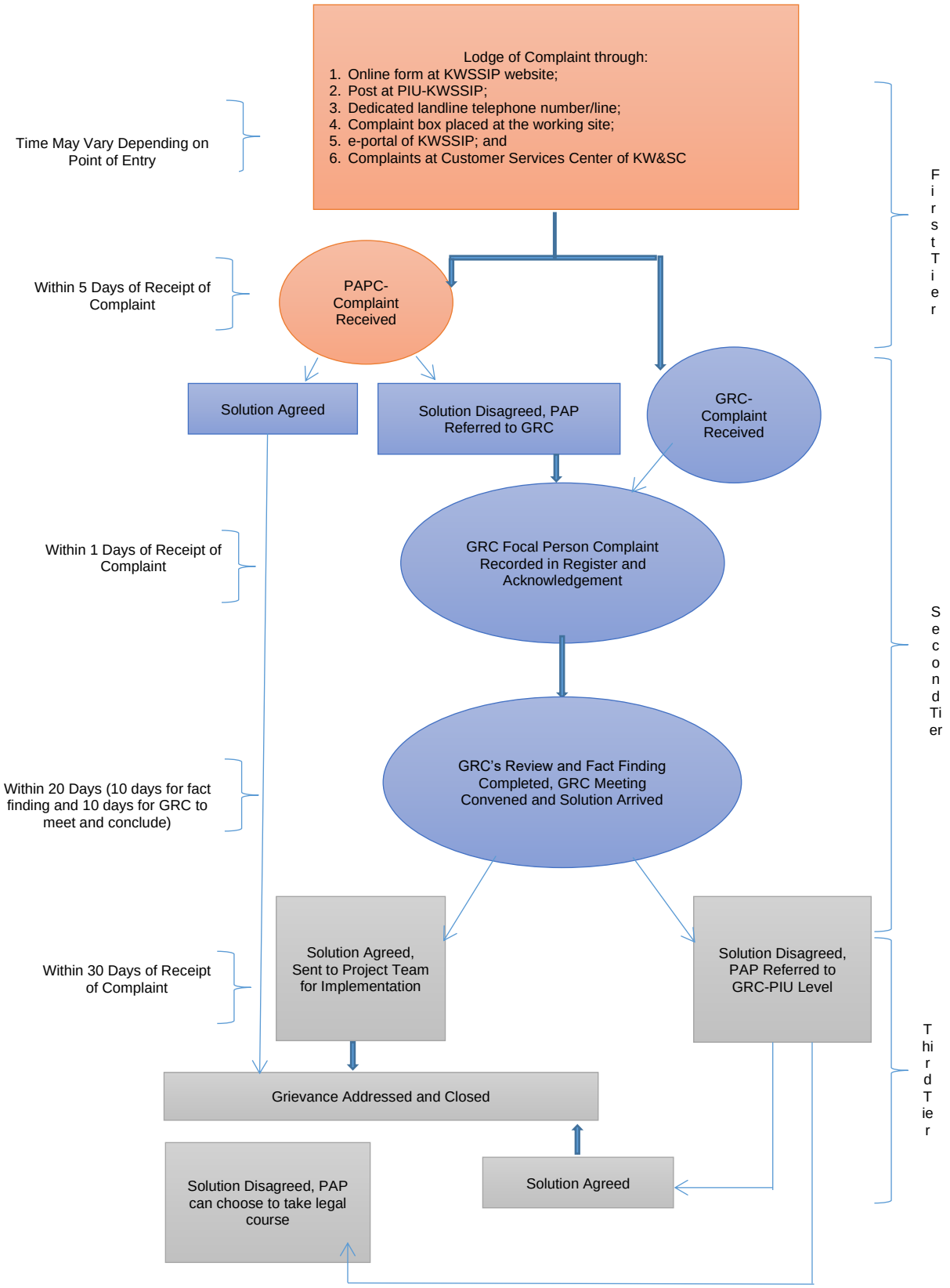


Figure 7. 3: Grievance Process and Time Frame

7.10.8 Workers' GRM

To mitigate the risks related to direct workers a GM for Contracted Workers will also be established:

- **Contractor's level.** Contractors should develop their own GRM and resolve the grievances of contracted workers. Grievance Focal Point (GFP) assigned by the Contractor will file the grievances and appeals of contracted workers and will be responsible to facilitate addressing the grievances. If the issue cannot be resolved at the contractor's level within 7 working days, then it will be escalated to the PIU of the KWSSIP local level.

- **Local level.** The Social Specialist of PIU local level in Karachi will serve as Grievance Focal Point (GFP) to file the grievances and appeals of the project workers. He/She will be responsible to coordinate with relevant departments/organizations and persons to facilitate addressing these grievances. If the issue cannot be resolved at the PIU level within 7 working days, then it will be escalated to the Agency level.

- **Central level:** If there is a situation in which there is no response from the PIU Local level, or if the response is not satisfactory then complainants and feedback providers have the option to contact the Project Director of KWSSIP or Focal Person in KW&SC Central Office directly to follow up on the issue.

7.11 Cost for testing of Ambient Air, Noise, Water

Testing and analysis for ambient air, noise and ground and surface water will be undertaken during construction and operational phases to ensure the effectiveness of the proposed mitigation measures. Certain environmental parameters will be selected and quantitative analysis will be carried out. The results of analysis will be compared with the guidelines; standards and pre-project conditions to investigate whether the ESMP and its implementation are effective for the mitigation of impacts or not. Parameters to be analyzed during construction and operation phase of the project and responsibilities for monitoring and reporting have been discussed in **Table 7.4.**

Table 7.4: Budget Estimate for Environmental Monitoring During the Construction and Operation Phases

Components	Parameters	Quantity			Frequency	Responsibility	Unit	Rate (PKR)	Duration	Amount (PKR)
		Sampling Points	Frequency	Total						
Construction Phase (12 months)										
Air Quality	All SEQS parameters	1	2	2	Biannually	Contractor	Each	35000	24 hours	70,000
Noise Level	-	1	2	2	Biannually	Contractor	Each	2000	24 hours	4,000
									Sub-Total	**74,000**
Components	**Parameters**	**Quantity**			**Frequency**	**Responsibility**	**Unit**	**Rate (PKR)**	**Duration**	**Amount (PKR)**
		Sampling Points	**Frequency**	**Total**						
Operation Phase										
Air Quality	All SEQS parameters	1	1	1	Once	Contractor	Each	35000	24 hours	35,000
Noise Level	-	1	1	1	Once	Contractor	Each	2000	24 hours	2,000
									Sub-Total	**37,000**
									GRAND TOTAL	**111,000**

7.12 Environmental Technical Assistance and Training Plan

In order to ensure that the ESMP provisions are implemented efficiently and effectively, training and capacity building/ strengthening of the implementing parties are required. Therefore, based on the assessment of the institutional capacities of the parties involved in the implementation of the ESMP, the following broad areas of capacity building/strengthening have been identified and recommended for effective implementation of the ESMP.

Table 7.5 shows the positions proposed for institutional strengthening for an effective implementation of environmental and social mitigation measures along with their responsibilities while **Table 7.6** presents cost of institutional strengthening.

7.12.1 Training Program

The environmental and social trainings will help to ensure that the requirements of the ESMP are clearly understood and followed by all project personnel. The primary responsibility of providing these trainings to all project personnel will be that of the contractor and the SC. The trainings will be provided to different professional groups separately such as managers, skilled personnel, unskilled labors, and camp staff. Capacity building will be aimed at strengthening the ESC, and operational staff in the field of environmental management and social development. **Table 7.7** provides detail of trainings required for implementation of ESMP during construction and operational phase.

Table 7.5: Institutional Strengthening

Institutional strengthening	Position	Scheduling (Months)	Responsibility
Construction Contractor	Environmental/ HSE Expert	12	▪ Complete understanding of WB, local and federal environmental regulations. ▪ Implement environmental guidelines and practices. ▪ Review and recommend improvements to existing environmental programs for compliance assurance. ▪ Generate environmental reports as requested by regulatory agencies. ▪ Provide guidance and direction to management for ensuring environmental compliance. ▪ Prepare permit applications and agreements as needed by regulatory agencies. ▪ Obtain, maintain, modify and renew environmental permits and licenses. ▪ Work with emergency response team to address environmental incidents such as chemical leaks and spills. ▪ Identify and solve environmental violations. ▪ Conduct regular environmental inspections to determine pollution level. ▪ Investigate environmental accidents and propose corrective actions. ▪ Educate workers on environmental health and safety procedures.

Table 7.6: Cost of Institutional Strengthening

Institutional Strengthening Cost					
Sr. No.	**Description (Position)**	**Quantity**	**Unit**	**Rate (PKR)**	**Amount (PKR)**
Construction Phase - 12 months					
1	Environmental Expert/ HSE Expert	12	Each	200,000	2,400,000
				Total Cost	**2,400,000**

Table 7.7: Institutional Training for Implementation

Construction Phase					
Training Activity	**Participants**	**Type of Training**	**Content**	**Scheduling**	**Amount PKR**
Environment code of practices	Contractor Staff	Presentation	Awareness & applicability of environmental code of practices	Once	100,000
Awareness workshop regarding Covid 19 and other vector borne diseases	Contractor Staff	Presentation	Risk, Prevention and available treatment	Once	100,000
Waste Management	Contractor Staff	Lecture	Awareness associated with waste Storage, collection and safe disposal	Once	100,000
Emergency Response	Contractor Staff	Workshop	Potential natural and other hazard/emergencies and dealing with emergency to minimize damage	Once	100,000
WB OPs & SEPA Regulations	Managerial Staff of Contractor	Lecture	Awareness on World Bank OPs, SEPA rules, guidelines, regulation and standards for satisfactory compliance	Once	100,000
Community/ Occupational health and safety	Contractor Staff	Lecture	Awareness on EHS Guidelines	Once	100,000
				Total	**600,000**
Operation Phase					
Environment code of practices	KW&SC Staff	Lecture	Awareness & applicability of environmental code of practices	Once	100,000
Awareness workshop regarding Covid 19 and other vector borne diseases	KW&SC Staff	Lecture	Risk, Prevention and available treatment	Once	100,000
Waste Management	KW&SC Staff	Lecture	Awareness associated with waste Storage, collection and safe disposal	Once	100,000
Workshop on Emergency Response	KW&SC Staff	Lecture	Potential natural and other hazard/emergencies and dealing with	Once	100,000

			emergency to minimize damage		
Workshop on Community/ Occupational health and safety	KW&SC Staff	Lecture	Awareness on EHS Guidelines	Once	100,000
				Total	**600,000**

7.13 Cost for Tree Plantation

Fifty (50) trees are proposed to be planted at the project site. Cost of tree planation has been estimated to be **PKR 950,000 /-**. Breakdown of cost is given in **Tables 7.8**.

Table 7.8: Tree Plantation Cost

Sr. #	Plants	Quantity	Unit	Rate (PKR)	Amount (PKR)
1	**Shady trees**				
1.1	Tree Native Species 18"(Bag)	120	Each	600	72,000
				Sub Total-A	**72,000**
1.3	Transportation charges	-	%	5	3,600
1.4	Mortality	-	%	15	10,800
1.5	Contractors Profit (of total cost)	-	%	20	14,400
				Sub Total-B	**28,800**
2	**Input Requirements**				
2.1	Fertilizer (NPK) (Transportation charges included)	10	Gram	0.20	2
2.2	FYM (Transportation charges included)	2	Kg	7	14
2.3	Pesticide	1	Each	10	10
2.4	Contractors Profit (of total cost)	20	%	-	5
				Sub Total (for 1 tree)	**31**
				Sub Total - C (for 120 trees)	**3,744**
3	**Development (For 1 Years)**				
3.1	Head Gardner	1	Man-Month	30,000	360,000
3.2	Gardner	1	Man-Month	22,000	264,000
					624,000
3.3	Miscellaneous (Vehicle expenditures, wear & tear of tools etc)	15	%	-	93,600
3.4	Contractors Profit (of total cost)	20	%	-	124,800
				Sub Total - (D)	**842,400**
				Grand Total (Sub Total A+B+C+D)	**946,944**
				Say	**950,000**

7.14 Cost for Health and Safety

Cost of Health and Safety during construction phase is worked out as **Table 7.9** below.

7.14.1 Cost for Health and Safety during Construction phase

Table 7.9: Health and Safety Cost during Construction Phase

Sr. No.	Description	Quantity	Unit	Rate (PKR)	Amount (PKR)
1	Medical screening for workers	50	Persons	5000	250000
2	Tarpaulins	1	L.S.	30,000	30000
3	Handling of hazardous material	12	L.S.	10,000	120000
4	Handling of solid waste	12	L.S.	2,000	24000
5	DCP Fire extinguishers in case of fire	5	Each	3,500	17500
	CO2 Fire extinguishers in case of fire	5	Each	10,000	50000
	Fire alarm	1	Each	10,000	10000
6	Special Measures for Covid-19		L.S.		100,000
7	Cost of Personal Protective Equipment (PPE)*		L.S.		1,140,000
Total Cost					**1,741,500**

Details of PPE cost is given below in **Table 7.10**.

Table 7.10: Break-up for PPEs Cost during Construction

Sr. No.	Description	Quantity	Unit	Rate (PKR)	Amount (PKR)
1	Ear plugs	600	Each	100	60,000
2	Helmets	100	Each	1500	150,000
3	Safety shoes	100	Each	3000	300,000
4	Protective goggles	100	Each	2000	200,000
5	Gloves	600	Each	300	180,000
6	Dust Mask	2,400	Each	100	240,000
7	First Aid Kit	2	Each	5000	10,000
				Total	**1,140,000**
Time required for Construction = 12 months					
No. of labor required = 50					
Detail of Personal Protective Equipment PPE					
Dust mask	1 dust mask to be used in a week by each laborer				
Safety Shoes	1 pair of safety shoe for six months for each laborer				
Safety Helmet	1 safety helmet for six months for each worker				
Gloves	1 pair of gloves for each laborer for a month				
Safety Goggles	1 safety goggles for six months for each laborer				
First Aid Box	2 first aid box				
Ear Plug	1 set of ears plug to be used for 1 month for each laborer				

7.14.2 Cost for Health and Safety during Operation Phase

Cost of Health and Safety during operation phase is worked out as **Table 7.11** below.

Table 7.11: Health and Safety Cost during Operation Phase

Sr. No.	Description	Quantity	Unit	Rate (PKR)	Amount (PKR)
1	Medical screening for workers	5	Persons	5000	25000
2	Handling of solid waste	12	L.S.	2,000	24000
3	DCP Fire extinguishers in case of fire	1	Each	3,500	3500
	CO2 Fire extinguishers in case of fire	1	Each	10,000	10000
	Fire alarm	1	Each	10,000	10000
4	Special Measures for Covid-19		L.S.		20,000
5	Cost of Personal Protective Equipment (PPE)*		L.S.		138,000
		Total Cost			**230,500**

Details of PPE cost is given below in **Table 7.12**

Table 7.12: Break-up for PPEs Cost during Operational

Sr. No.	Description	Quantity	Unit	Rate (PKR)	Amount
					PKR
1	Ear plugs	60	Each	100	6,000
2	Helmets	10	Each	1500	15,000
3	Safety shoes	10	Each	3000	30,000
4	Protective goggles	10	Each	2000	20,000
5	Gloves	60	Each	300	18,000
6	Dust Mask	240	Each	100	24,000
7	First Aid Kit	5	Each	5000	25,000
				Total	**138,000**
Time required for Construction = 12 months					
No. of labor required = 50					
Detail of Personal Protective Equipment PPE					
Dust mask	1 dust mask to be used in a week by each laborer				
Safety Shoes	1 pair of safety shoe for six months for each laborer				
Safety Helmet	1 safety helmet for each worker				
Gloves	1 pair of gloves for each laborer for a month				
Safety Goggles	1 safety goggles for six months for each laborer				
First Aid Box	5 first aid box				
Ear Plug	1 set of ears plug to be used for 1 month for each laborer				

7.15 ESMP Cost

Total cost for implementation of ESMP has been worked out as **PKR 9,484,650/-**. Detail is given as under in **Table 7.13**. The cost in construction phase shall be the responsibility of Contractor while KW&SC shall bear the cost in operational phase.

Table 7.13: Cost for Implementation of ESMP

Description	***Amount (Rs)***	
	Construction	***Operation***
Environmental Management Cost		
a) Environmental Monitoring	74,000	37,000
b) Training	600,000	600,000
c) Tree Plantation	950,000	Nil
d) Institutional Strengthening Cost	2,400,000	Nil
e) Health & Safety	1,741,500	230,500
Sub-Total	**8,165,500**	**867,500**
Contingencies @ 5%	408,275	43,375
Total	**8,573,775**	**910,875**
Grand Total	**9,484,650**	

** Note: The cost does not include contractor's profit and sales tax.*

Annex-I

Exclusion of Govt. Buildings

(SBCA Ordinance)

GOVERNMENT OF SINDH
SERVICES GENERAL ADMINISTRATION &
COORDINATION DEPARTMENT

Karachi dated the December 31, 2008

NOTIFICATION

NO.SOB (SGA&CD) 18-219/2008: In exercise of the powers conferred by Section 1 Sub-Section (3) of the Sindh Building Control Ordinance 1979, the Government of Sindh is pleased to exclude all the Government buildings under the purview of Government of Sindh from the operation of all the provisions of the Ordinance (Ibid).

FAZAL-UR-REHMAN
Chief Secretary Sindh

NO.SOB (SGA&CD) 18-219/2008 Karachi dated the December 31, 2008

A copy is forwarded for information to:-

1. The Additional Chief Secretary (Dev.) P&D Department/Local Government Department, Government of Sindh.
2. The Senior Member, Board of Revenue, Sindh, Hyderabad.
3. The Principal Secretary to Governor Sindh.
4. The Secretary to Chief Minister Sindh.
5. The Administrative Secretaries (All) Government of Sindh (including Members-Board of Revenue)
6. The Secretary to Provincial Ombudsman Sindh, Karachi.
7. The City/District Nazims (All) in Sindh.
8. The District Coordination Officers (All) in Sindh.
9. The Chairman Chief Minister's Inspection Team, Karachi.
10. The Chairman, Enquiries & Anti-Corruption Establishment, SGA&CD.
11. The Registrar High Court of Sindh, Karachi.
12. The Secretary, Provincial Assembly Secretariat, Karachi.
13. The Secretary, Sindh Public Service Commission, Hyderabad.
14. The Additional Secretary (Staff) to Chief Secretary.
15. All Officers in SGA&CD/Private Secretary to Chief Secretary Sindh.

(HABIB AHMED KHAN)
SECTION OFFICER (BUDGET)

No: SBCA/CAA & PAF Desk/ /2024
Dated: 11-01-2024

Phones: Tel: 021-9923029
Fax: 021-99230326
www.sbca.gov.pk

To,
DIRECTOR,
Architecture & Planning Section,
Sindh Building Control Authority,
Head Quarter, Karachi.

SUBJECT: **REVISED PROVISIONAL NOC FOR HEIGHT CLEARANCE UNDER OBSTRUCTION LIMITATION SURFACE STUDY OF CIVIL AVIATION RULES.**

Reference: **Your forwarding letter No. SBCA / Dir / OWC / Arch. & Planning / 2023 / 52, Dated: 17-10-2023**

Please refer to your above letter issued upon request of the owner/builder/sponsor for issuance of subject NOC for **52-6 feet** (AGL), allowable height under Civil Aviation's Obstruction & Limitation Surface Study for **52-6 feet** has been examined under the policy notified by the AUTHORITY and pursuant to approval of the Competent Authority i.e. DG SBCA, the height for the proposed construction is within the allowable limit with regards to flying safety zone for **44 feet** Above Ground level (AGL) OR **106 feet** Above Mean Sea Level (AMSL) for building including overhead Water Tank, Antenna, NEON Signboard etc. on roof top at **Plot No. Karachi Water & Sewerage Board, 9th Mile, Karsaz office, Deh Okawari, Karachi East, Karachi. (245223.31N 670538.18E, 245224.06N 670537.65E, 245223.79N 670539.24E & 245224.67N 670538.54E)** with the following terms and conditions: -

1. The allowable height of the building under PCAA OLS study is should not be more than **44 Feet (Forty-Four feet only)** Above Ground level (AGL) OR **106 feet (One Hundred & Six feet only)** Above Mean Sea Level (AMSL) including overhead water tank, antenna, neon signs board etc. on roof top of the building.
2. Obstruction light must be provided on top of the building in accordance with the specification contained in para 6.2 of chapter 06 of **AERODROME STANDARDS MANUAL OF PAKISTAN (ASMP)**.
3. The refuse shall not be kept open but always be stored in covered containers to ensure that birds are not attracted.
4. Sindh Building Control Authority Civil Aviation & PAF Desk, SBCA reserves the right to cancel the said NOC if the terms and Conditions are not complied with and the NOC will be treated as canceled.
5. This NOC is only valid for **HEIGHT CLEARANCE FOR FLIGHT SAFETY PURPOSES under the rules of PCAA and may not be considered as the NOC for construction.**
6. This Clearance is only related to the permissible height with regards to PCCA's OLS Study at proposed location and does not absolve the holder for fulfilling requirement of other concerned departments. Moreover, any omission due to submission of incorrect data or marginal error **SHALL NOT ENTITLE** the holder for any claim whatsoever, in future. **In addition, at any stage if, any dispute of land on the said survey numbers arises, this clearance shall stand Cancelled immediately.**
7. The issuance of PROVISIONAL NOC by SBCA is subject to reverification by CAA/PAF under the procedure approved by the Aviation Division Islamabad. In case any difference arises, the allowable height verified by CAA/PAF shall prevail and the height allowed by SBCA shall be treated as withdrawn/cancelled.
8. This NOC regarding determination of allowable height of the proposed building is subject to condition that the plot is free from all encumbrances and does not violate/ contradict any of the orders of Honorable High/ Supreme Court. The concerned office of the SBCA to ensure before issuance of any Construction Permit/ NOC that issuance of such NOC construction permit is not against the order of Honorable Courts, more particularly CP No. 815/2016 of Honorable Supreme Court of Pakistan and the compliance of Notification No. **SBCA/PS-CE/2021/44, Dated: 22-03-2021** shall be made where ever required. The directorate of OWC to ensure please.
9. The One Window Cell, SBCA to ensure that necessary fee is fully paid before issuance of NOC/ Permit.
10. The Completion of work is also required to be notified to HQCAA for the issuance of notices to the Aviators. After completion of the subject building, the builder/ owner shall forward a completion report (along with authenticated AMSL/ AGL height of top of the building from Survey of Pakistan) to Air Headquarters, Islamabad (Director Air Traffic Service) and CAA & PAF Desk, SBCA.
11. **NOT TO RAISE CONSTRUCTION ABOVE 35 FEET (AGL) TILL THE REVERIFICATION FROM CAA & PAF.**

Annex-II

Environmental Monitoring Reports

ENVIRONMENTAL MONITORING REPORT

SUBMITTED TO :

NATIONAL ENGINEERING SERVICES PAKISTAN PVT. LIMITED

SGS Ref: BOSS ORDER # 5020797

SUBMITTED BY:

SGS PAKISTAN (PVT) LTD.
INDUSTRIES & ENVIRONMENT

WHEN YOU NEED TO BE SURE

SGS Pakistan (Private) Limited H-3/3, Sector 5, Korangi Industrial Area, Karachi-74900, Pakistan. UAN: 111-222-747 Tel: 92-21-35121388-97 Fax: 92-21-35121386-87 Web: www.sgs.com

REPORT OF ENVIRONMENTAL MONITORING

DESCRIPTION OF SERVICES	:	ENVIRONMENTAL MONITORING w.r.t. • AMBIENT AIR MONITORING • GROUND WATER SAMPLING ANALYSIS • WASTEWATER SAMPLING ANALYSIS
SAMPLING SITE	:	NEAR KARSAZ, SHAHRA-E-FAISAL, KWSB BUILDING, KARACHI
DATE OF INTERVENTION	:	04 JULY , 2023
ACCOUNT / CLIENT	:	NATIONAL ENGINEERING SERVICES PAKISTAN PVT. LIMITED

Introduction:

NATIONAL ENGINEERING SERVICES PAKISTAN PVT. LIMITED hired the services of SGS Pakistan (Pvt.) Ltd. to conduct Environmental Monitoring at Near Karsaz, Shahra-e-Faisal, KWSB Building, Karachi. The site visit for Environmental Monitoring was conducted in 4 to 7 July, 2023.

Scope of Services:

The scope is as follows:

1. Ambient Air Quality Monitoring:

Ambient Air Quality Monitoring was conducted at client identified locations One (01) location. The monitoring was conducted to identify the concentration of CO, NO, NO_2, NO_X, SO_X, Ozone (O_3) Total Suspended Particulate Matter, Particulate Matter (PM_{10}), Particulate Matter ($PM_{2.5}$), Lead (Pb) and Noise. Detailed report of Ambient Air Quality Monitoring is attached as **Annexure A,** which forms an integral part of this report.

Sampling Points:

Sr. #	Description
01.	KWSB, Karsaz Near Main Gate

SGS Pakistan (Pvt.) Ltd. SGS KHI. Industrial Services

SGS Pakistan (Private) Limited H-3/3, Sector 5, Korangi Industrial Area, Karachi-74900, Pakistan. UAN: 111-222-747 Tel: 92-21-35121388-97 Fax: 92-21-35121386-87 Web: www.sgs.com

2. Ground Water Sampling & Analysis:

One (01) Ground water were collected from the client's identified sampling point. The collected samples were preserved as per specified protocol and brought to SGS laboratory for chemical & microbiological analysis.

Chemical & Microbiological Analysis:

Detailed analysis report of water is attached in **Annexure B,** which forms an integral part of this report.

Sr. #	Ground Water Description
01.	GROUND WATER

3. Wastewater Sampling & Analysis:

One (01) wastewater sample were collected from the client's identified sampling point. The collected samples were preserved as per specified protocol and brought to SGS laboratory for chemical analysis.

Chemical Analysis:

Detailed analysis report of water is attached in **Annexure B,** which forms an integral part of this report.

Sr. #	Wastewater Description
01.	WASTE WATER

4. Monitoring Schedule:

The schedule of monitoring is as follows:

Sr. #	Date	Scope of Services	Location
01.	04 to 07 July 2023	Ambient Air Monitoring	Near Karsaz, Shahra-e-Faisal, KWSB Building, Karachi.
02.		Ground Water and Wastewater Sampling	

****

SGS PAKISTAN (PVT) LTD.

SGS Pakistan (Pvt.) Ltd. SGS KHI. Industrial Services

SGS Pakistan (Private) Limited H-3/3, Sector 5, Korangi Industrial Area, Karachi-74900, Pakistan. UAN: 111-222-747 Tel: 92-21-35121388-97 Fax: 92-21-35121386-87 Web: www.sgs.com
Member of the SGS-Group (Société Générale de Surveillance)

Annexure - A

SGS

ANNEXURE - A
TEST REPORT #
SGS Ref.: 5020797
Report Date: July 20, 2023

Ambient Air Quality Monitoring Report
National Engineering Services Pakistan Pvt Limited
KWSB , Karsaz Near Main Gate

Ambient Air Quality Monitoring

SGS

ANNEXURE - A
TEST REPORT #
SGS Ref.: 5020797
Report Date: July 20, 2023

Meteorological Data

Client / Account : National Engineering Services Pakistan Pvt Limited
Location : Karsaz, Karachi
Sampling Point ID : KWSB, Karsaz Near Main Gate
Date of Intervention : 04-05 July, 2023

Time (Hrs)	Temperature °C	Wind Direction	Wind Speed m/s	Humidity %	Atmospheric Pressure (mmHg)
9:00	31.0	SW	6.0	44.0	748.1
10:00	32.0	SW	5.8	45.0	748.1
11:00	33.0	SW	6.1	45.0	748.1
12:00	34.0	S	6.0	44.0	748.1
13:00	35.0	S	5.4	45.0	748.2
14:00	36.0	S	6.1	46.0	748.3
15:00	37.0	SW	6.2	46.0	748.2
16:00	37.0	SW	6.3	46.0	748.3
17:00	36.0	SW	6.1	47.0	748.3
18:00	35.0	S	6.7	49.0	748.4
19:00	34.0	S	6.8	46.0	748.4
20:00	34.0	S	6.9	48.0	748.4
21:00	33.0	S	6.9	51.0	747.3
22:00	30.0	S	6.4	53.0	748.6
23:00	30.0	S	6.3	54.0	748.0
0:00	31.0	SW	4.2	61.0	748.2
1:00	31.0	SW	4.3	64.0	748.5
2:00	30.0	SW	6.6	63.0	748.3
3:00	30.0	SW	6.4	64.0	747.5
4:00	29.0	SW	6.3	63.0	747.6
5:00	28.0	SW	6.2	65.0	748.3
6:00	29.0	SW	6.6	69.0	749.3
7:00	30.0	SW	6.5	63.0	748.2
8:00	31.0	SW	6.3	64.0	748.5

Ambient Air Quality Monitoring

SGS Pakistan (Pvt.) Ltd. SGS KHI. Industrial Services

SGS

ANNEXURE - A
TEST REPORT #
SGS Ref.: 5020797
Report Date: July 20, 2023

Ambient Air Quality Data

Client / Account : National Engineering Services Pakistan Pvt Limited
Location : Karsaz, Karachi
Sampling Point ID : KWSB, Karsaz Near Main Gate
Date of Intervention : 04-05 July, 2023

Sr. #	Time	CO (mg/m^3)	NO ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	Nox ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)
1	9:00	0.0	3.8	1.0	4.8	0.0
2	10:00	0.0	3.9	1.0	4.9	0.0
3	11:00	0.1	3.9	1.1	5.0	0.0
4	12:00	0.0	3.8	1.1	4.9	0.1
5	13:00	0.1	3.9	1.2	5.1	0.1
6	14:00	0.1	3.8	1.2	5.0	0.0
7	15:00	0.1	3.9	1.1	5.0	0.0
8	16:00	0.1	3.9	1.2	5.1	0.0
9	17:00	0.2	3.9	1.0	4.9	0.1
10	18:00	0.1	3.9	1.0	4.9	0.0
11	19:00	0.2	3.6	1.2	4.8	0.0
12	20:00	0.3	4.6	1.3	5.9	2.1
13	21:00	0.1	4.1	1.4	5.5	2.1
14	22:00	0.1	4.2	1.5	5.7	2.1
15	23:00	0.2	4.2	1.6	5.8	2.1
16	0:00	0.1	4.9	0.1	5.0	2.1
17	1:00	0.2	4.6	0.0	4.6	1.9
18	2:00	0.3	4.6	0.0	4.6	1.6
19	3:00	0.5	3.9	0.0	3.9	1.4
20	4:00	0.1	3.6	0.0	3.6	1.3
21	5:00	0.1	3.7	0.0	3.7	1.2
22	6:00	0.2	3.2	0.0	3.2	1.4
23	7:00	0.3	3.7	0.0	3.7	1.5
24	8:00	0.4	3.6	0.0	3.6	1.6
24 Hours Average		0.2	4.0	0.1	4.7	0.9

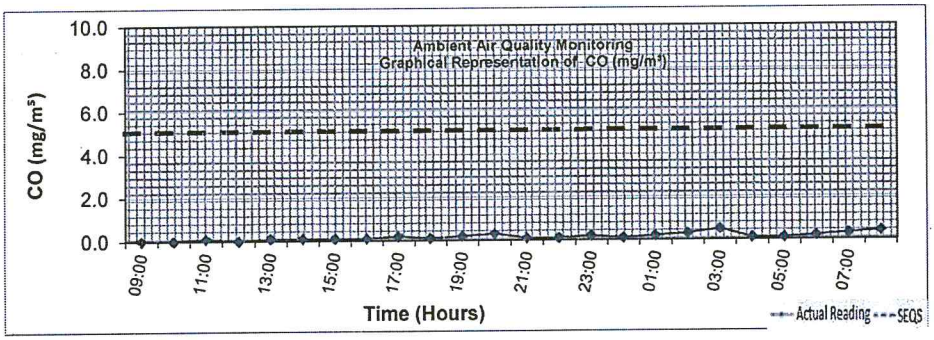
SGS Pakistan (Pvt.) Ltd. SGS KHI. Industrial Services

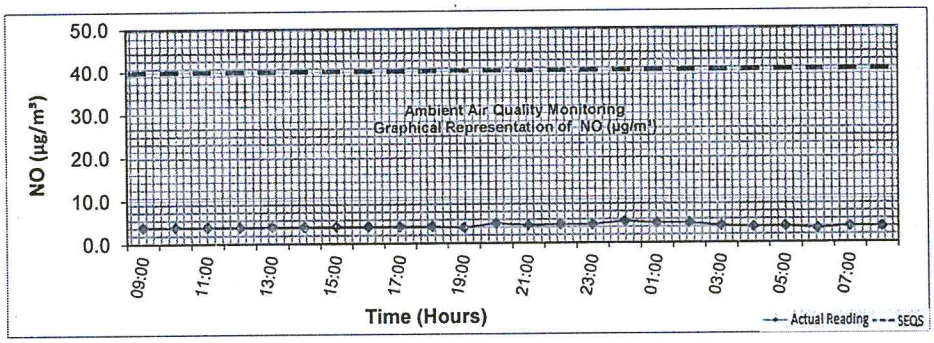
SGS

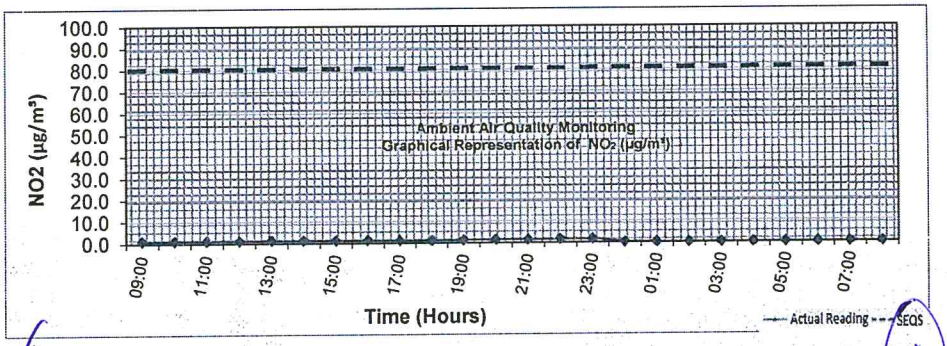
ANNEXURE - A
TEST REPORT #
SGS Ref.: 5020797
Report Date: July 20, 2023

National Engineering Services Pakistan Pvt Limited

Graphical Representation







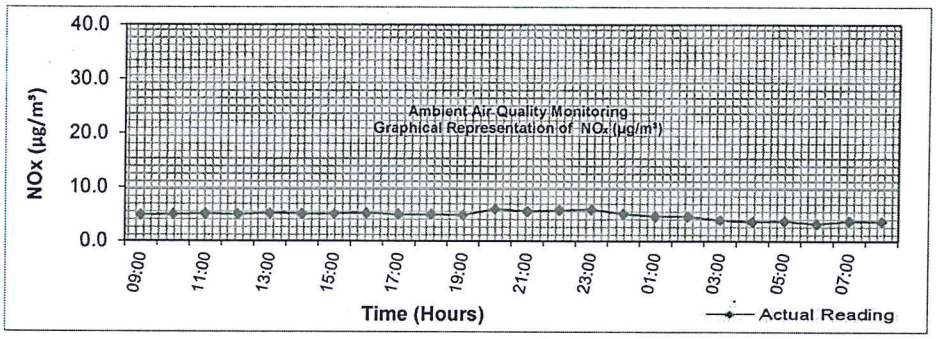
SGS Pakistan (Pvt.) Ltd. KHI. Industrial Services

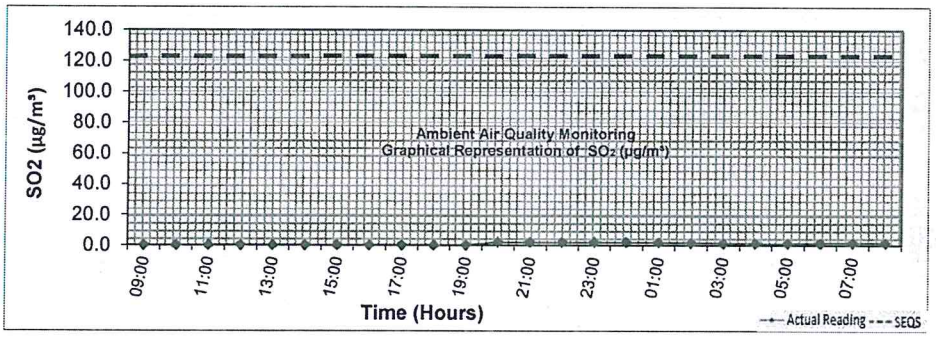
SGS

ANNEXURE - A
TEST REPORT #
SGS Ref.: 5020797
Report Date: July 20, 2023

National Engineering Services Pakistan Pvt Limited

Graphical Representation





SGS

ANNEXURE - A
TEST REPORT #
SGS Ref.: 5020797
Report Date: July 20, 2023

Average Results

Client / Account : **National Engineering Services Pakistan Pvt Limited**
Location : **Karsaz, Karachi**
Sampling Point ID : **KWSB, Karsaz Near Main Gate**
Date of Intervention : **04-05 July, 2023**

Parameters	Unit	Duration	Average Concentration	SEQS Limits
Carbon Monoxide (CO)	mg/m^3	24 Hours	0.2	5.0*
Nitrogen Dioxide (NO_2)	$\mu g/m^3$	24 Hours	0.1	80**
Nitrogen Oxide (NO)	$\mu g/m^3$	24 Hours	4.0	40**
Sulfur Dioxide (SO_2)	$\mu g/m^3$	24 Hours	0.9	120**
Total Suspended Particulate (TSP)	$\mu g/m^3$	24 Hours	68.5	500**
Particulate Matter (PM_{10})	$\mu g/m^3$	24 Hours	43.4	150**
Particulate Matter ($PM_{2.5}$)	$\mu g/m^3$	24 Hours	17.9	75**
Ozone (03)	ppb	24 hours	14.7	130***
Lead (Pb)	$\mu g/m^3$	24 Hours	<1.0	1.5**
Noise Day Time	dB	06:00 to 22:00	61.6	75
Noise Night Time	dB	22:00 to 06:00	56.3	65

SEQS : Sindh Environmental Quality Standards
$\mu g/m^3$: micro grams per cubic meter
mg/m^3 : miligram per meter cube.
ppb : part per billion
Noise Limits for Industrial Area
* SEQS limit of CO as per 8 hours
** SEQS limit for 24 hours
*** SEQS Limit of Ozone as per 1 hour measurement

SGS Pakistan (Pvt.) Ltd. SGS KHI. Industrial Services

Annexure - B

ANALYTICAL REPORT KH23-07027 R0

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED	Order Number	5020797
		Samples	Waste water(1) Water(1)
Address	KW & SB Near Awami Markaz, Karsaz, Karachi	SGS Reference	KH23-07027
		Received	04/07/2023
		Analysis started	04/07/2023
Contact	ALI HAMID	Analysis completed	19/07/2023
Telephone	+92 300 7464770	Approved	19/07/2023
Facsimile		Report Number	KH23-07027
Email	alihamid.nespak@gmail.com	Date Reported	19/07/2023

COMMENTS

The lab is accredited in accordance with ISO 17025 with accreditation numberLAB 023.
Uncertainty of results will be provided upon request.
The results are reported as absolute value +/- the absolute uncertainty of measurement estimated by the laboratory

SIGNATORIES

Zeeshan Shafi
Deputy Manager

Zeeshan Ali
Deputy Manager Laboratory

Sample List

			pH in water	Color	Odor in Water	Taste in Water	Turbidity	Hardness	Total Dissolved Solids	Metals in Water by ICPOES	Mercury in Water	Chloride	Cyanide in water	Fluoride	Nitrate in Water	Nitrite in Water	Total Phenolics in Water	Total Suspended Solids	Temperature	COD	BOD5	Oil & Grease
KH23-07027	001	Ground water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			
	002	Waste water	X						X	X	X	X	X	X			X	X	X	X	X	X

Sample List

			Anionic Detergent (MBAS) in Water	Sulphate in water	Sulfide in water	Ammonia by Titration	Residual Chlorine by Iodometric Method	Organo Chloro Pesticides	Total coliform	Fecal Coli Form (E.Coli)	Chlorine (Total, Free & residual)
KH23-07027	001	Ground water						X	X	X	X
	002	Waste water	X	X	X	X	X	X			

RESULTS

Sample n°	KH23-07027.001
Sample Name	Ground water
Sample Matrix	Water
Sampled By	Sampled by SGS Personnel
Sample Date	04/07/2023

Parameter	Units	RL	Result	Lower/Upper
[APHA 4500 H+ B 23rd Edition]				
pH @ 25 C	pH	0.1	7.29	
[APHA 2120 C 23rd Edition]				
True Color	Pt/Co Colour	5	23.00	
[APHA 2150 A 23rd Edition]				
* Odor	---	-	Odorless	
[APHA 2160 A 23rd Edition]				
* Taste	---	-	Sweet	
[APHA 2130 B 23rd Edition]				
* Turbidity	NTU	0.2	4.0	
[APHA 2340 A,B 23rd Edition]				
Total Hardness	mg/L	0.05	211.37	
[APHA 2540 C 23rd Edition]				
Total Dissolved Solids	mg/L	5	648.00	
[APHA 3120 B 23rd Edition]				
Aluminium, Al	mg/L	0.005	0.82	
Antimony, Sb	mg/L	0.005	<0.005	
Arsenic, As	mg/L	0.005	<0.005	
* Barium, Ba	mg/L	0.005	<0.005	
* Boron, B	mg/L	0.005	0.098	
Cadmium, Cd	mg/L	0.003	<0.003	
Total Chromium(Cr+3 + Cr+6)	mg/L	0.005	0.011	
Copper, Cu	mg/L	0.005	<0.005	
Lead, Pb	mg/L	0.005	<0.005	
Manganese, Mn	mg/L	0.005	0.030	
Nickel, Ni	mg/L	0.005	0.005	
Zinc, Zn	mg/L	0.005	<0.005	
* Selenium, Se	mg/L	0.005	<0.005	
[APHA 3112 B 23rd Edition]				
Mercury, Hg	mg/L	0.001	<0.001	
[APHA 4500 CL B 23rd Edition]				
Chloride	mg/L	5	187.67	
[APHA 4500 CN E 23rd Edition]				
* Cyanide	mg/L	0.01	<0.01	
[APHA 4500 F C 23rd Edition]				
Fluoride by ISE	mg/L	0.05	<0.05	
[APHA 4500 NO3 B 23rd Edition]				
Nitrate Nitrogen, NO3 as N	mg/L	0.003	<0.003	
[APHA 4500 NO2 B 23rd Edition]				
Nitrite Nitrogen, NO2 as N	mg/L	0.003	<0.003	

RESULTS

Sample n°	KH23-07027.001
Sample Name	Ground water
Sample Matrix	Water
Sampled By	Sampled by SGS Personnel
Sample Date	04/07/2023

Parameter	Units	RL	Result	Lower/Upper
[APHA 5530 B & C 23rd Edition]				
Total Phenols	mg/L	0.002	0.006	
[Temperature]				
* Temperature at the Field	°C	-	23	
Organo Chloro Pesticides [EPA 3510 + USEPA 8081]				
* Chloro Pesticides	µg/L	1	<1.00	
[0005 + APHA 9222 B 23rd Edition]				
Total Coliforms	cfu/100mL	1	Absent	
[0005 + APHA 9222 D 23rd Edition]				
Faecal Coliform (E.Coli)	cfu/100mL	1	Absent	
[APHA 4500 CL G 23rd Edition]				
* Residual Chlorine	mg/L	0.02	<0.02	

RESULTS

Sample n°	KH23-07027.002
Sample Name	Waste water
Sample Matrix	Waste water
Sampled By	Sampled by SGS Personnel
Sample Date	04/07/2023

Parameter	Units	RL	Result	Lower/Upper
[APHA 4500 H+ B 23rd Edition]				
pH @ 25 C	pH	0.1	8.07	
[APHA 2540 C 23rd Edition]				
Total Dissolved Solids	mg/L	5	772.00	
[APHA 3120 B 23rd Edition]				
Arsenic, As	mg/L	0.005	<0.005	
* Barium, Ba	mg/L	0.005	<0.005	
* Boron, B	mg/L	0.005	0.086	
Cadmium, Cd	mg/L	0.003	<0.003	
Total Chromium(Cr+3 + Cr+6)	mg/L	0.005	0.011	
Copper, Cu	mg/L	0.005	<0.005	
Lead, Pb	mg/L	0.005	<0.005	
Manganese, Mn	mg/L	0.005	0.11	
Nickel, Ni	mg/L	0.005	0.011	
Zinc, Zn	mg/L	0.005	0.065	
* Selenium, Se	mg/L	0.005	<0.005	
Total Iron (Fe+2 + Fe+3)	mg/L	0.005	3.8	
Silver, Ag	mg/L	0.005	0.018	
* Total toxic Metals	mg/L	-	0.13	
[APHA 3112 B 23rd Edition]				
Mercury, Hg	mg/L	0.001	<0.001	
[APHA 4500 CL B 23rd Edition]				
Chloride	mg/L	5	189.40	
[APHA 4500 CN E 23rd Edition]				
* Cyanide	mg/L	0.01	<0.01	
[APHA 4500 F C 23rd Edition]				
Fluoride by ISE	mg/L	0.05	0.15	
[APHA 5530 B & C 23rd Edition]				
Total Phenols	mg/L	0.002	0.037	
[APHA 2540 D 23rd Edition]				
Total Suspended Solids	mg/L	5	668.50	
[Temperature]				
* Temperature at the Field	°C	-	29	
[APHA 5220 D 23rd Edition]				
Chemical Oxygen Demand	mg/L	5	896.00	
[APHA 5210 D 23rd Edition]				
Biochemical Oxygen Demand (BOD5)	mg/L	2	262.00	
[USEPA 1664 B]				
* Oil & Grease	mg/L	1	9.00	
[APHA 5540 C 23rd Edition]				

RESULTS

Sample n°	KH23-07027.002
Sample Name	Waste water
Sample Matrix	Waste water
Sampled By	Sampled by SGS Personnel
Sample Date	04/07/2023

Parameter	Units	RL	Result	Lower/Upper
[APHA 5540 C 23rd Edition] (continued)				
* Anionic Surfactants as MBAS	mg/L	0.1	<0.10	
[APHA 4500 SO4 C 23rd Edition]				
Sulphate (SO_4^{2-})	mg/L	5	74.06	
[APHA 4500 S F 23rd Edition]				
* Sulfide	mg/L	1	<1.00	
[APHA 4500 NH3 B, C 23rd Edition]				
Ammonia	mg/L	1	8.51	
[APHA 4500 CL B 23rd Edition]				
* Residual Chlorine	mg/L	1	<1.00	
Organo Chloro Pesticides [EPA 3510 + USEPA 8081]				
* Chloro Pesticides	µg/L	1	<1.00	

FOOTNOTES

^	Performed by external SGS laboratory.	IS	Insufficient sample for analysis.
^^	Performed by outside laboratory.	LNR	Sample listed, but not received.
RL	Reporting Limit	NA	The sample was not analysed for this analyte
↑	Raised Limit of Reporting	NVL	Result to be validated
↓	Lowered Limit of Reporting	TBA	Parameter not yet analysed

ACCREDITATION NOTES

* This analysis is not covered by the scope of accreditation.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

--- End of the analytical report ---

Annex-III

Photolog of Existing Site Condition

Photolog of Existing Condition

Existing Building to be demolished

Existing Trees

Annex-IV

Health & Safety Management Plan

Health & Safety Management Plan (HSMP)

1.0 Introduction

This health and safety management plan has been prepared to identify and outline the manner in which construction site health and safety aspects will be managed to ensure the safe and efficient performance of the construction phase activities and to minimize adverse effects on the existing community and workers arising from construction activities. HSMP plan is prepared under the guidelines given in Health and Safety Framework for South Asia Region by the World Bank.

This plan is designed to identify, evaluate, and control health and safety hazards for the purpose of protecting employees. The plan provides for emergency response activities at the job site as well as covering site hazard analysis, training requirements, engineering controls, materials handling, and safe construction operations. This plan is intended to provide guidance and information in dealing with the hazards that may be faced on the construction site by the contractor and its workers.

The consultant as a third-party validator will monitor the compliance of the plan by the contractor and its workers on each construction site.

The purpose of this plan is to illustrate safety issues specific to the KWSSIP. This plan is intended to maintain a safe work environment and effectively reduce the number of accidents resulting in personal injury, property damage, and damage to construction equipment.

2.0 Scope of Project

2.1 Scope of Work

KWSC has conceived KWSSIP in the form of a series of projects (SOPs), which form a long-term program to address the serious water and sewerage service gaps in the rapidly growing city of Karachi.

This HSMP focuses on the health issues associated with the construction of CERRI building.

2.2 Site Location

The proposed project location is located at Shahra e Faisal near Karsaz, Karachi.

3.0 Health and Safety Responsibilities

The effectiveness and success of the safety plan implementation depend upon the active participation and cooperation of all employees. The duties and responsibilities of all employees under this policy are the following:

3.1 Project Engineer

- Prepare the Site-Specific Safety Plan.
- Direct and coordinate health and safety regulations related to the construction site.
- Participate in post-accident investigations.
- Assist in formulating policy matters.
- Implement contractor Safety Program and Policy

3.2 Foremen/Supervisors

- Be familiar with, explain, and enforce health and safety plan under his jurisdiction.
- Direct and coordinate health and safety activities within the area or responsibility
- Ensure safety devices and proper PPE are used by employees under supervision.
- Instruct and train all employees within the area of responsibility in job health and safety requirements, including (but, not limited to) hazard recognition and avoidance. Also, foreman/front-line supervisors must require compliance by employees with the established safety rules.
- Direct the correction of unsafe conditions.
- Ensure safety equipment is available, maintained, used, and stored correctly.
- Ensure injuries are treated promptly and reported properly.
- Participate in post-accident investigations.
- Coordinate daily job site inspection.
- Implement health and safety plan at each site as per required.

3.3 Construction Workers

The main responsibility of every worker at the construction site will be to follow the health and safety instructions and procedures.

- Be familiar with and comply with proper health and safety practices.
- Use the required safety devices and proper PPE.
- Notify the supervisor immediately of unsafe conditions/- acts, accidents, and injuries.
- Implement the health and safety plan

3.4 Subcontractors

By the contract, the subcontractors will have to comply with and ensure the compliance of their employees with the provisions of health and safety policy as well as their own safety program. Failure to fulfill this requirement is a failure to meet the conditions of the subcontract.

3.5 Supervision Consultant (SC)

SC will validate the effective implementation of the health and safety plan at the site. PIU-KWSSIP will be overall responsible for the safe construction work at each site.

4.0 General Health and Safety Procedures

4.1 Personal Protective Equipment (PPE)

The contractor provides Personal Protective Equipment (PPE) to all employees. Hard hats, safety glasses, and safety work boots are required to be worn at all times when on the job site. Reflective vests are required when working outside around equipment or traffic. Exceptions may be made to this PPE requirement only under an approved contractor work plan. Employees learn where to get PPE during their new-hire orientation and are responsible for wearing and maintaining the required PPE. Additional PPE may be required depending on the task and if there is a potential for exposure to hazardous conditions. PPE requirements are reviewed by the foreman. Employees are expected to use reasonable judgment regarding whether additional PPE (beyond the required) is necessary for certain tasks. If employees are unsure of the type of PPE required for a specific task or job, they should ask the supervisor.

4.2 Equipment Use and Operation

Equipment is used only for its intended use and as recommended by the manufacturer. Using equipment for purposes other than what it is designed for is prohibited. Employees are prohibited from operating a vehicle in a reckless manner or at a speed greater than is reasonable and proper, with due regard for weather, traffic, the character of roadway, load, type of vehicle, and any other conditions which may affect the safe operation of the vehicle. The vehicle must be kept under control at all times and special care is exercised when transporting personnel.

Employees may only ride equipment if there are seats or equal protection available for each person. Seatbelts are worn at all times while operating equipment with seats. No cell phone or earbud is used while operating equipment.

4.3 Repair

Employees are prohibited from making repairs, alterations, or attachments to equipment in the field except with the permission of the superintendent, foreman, or equipment mechanic. Only qualified personnel will perform repairs on equipment. Such repairs, alterations, or attachments are documented on the appropriate shop forms.

Employees are prohibited from removing a guard, safety device, or appliance from equipment or machinery except to make repairs. While making repairs, employees use appropriate lockout/tag-out procedures. When repairs are complete, the guard, safety device, or appliance is replaced immediately.

4.4 Conduct

The following conduct is prohibited and may result in discipline up to and including termination:

- Horseplay and scuffling on the job.
- Making a false report or misrepresentation.
- Fighting.
- Use of alcohol or any other drugs
- Dishonesty and theft of the property.
- Deliberate misuse of the equipment.
- Unnecessary risk-taking.
- Violating or disobeying any instruction given by a supervisor

5.0 General Jobsite Procedures

5.1 New Hire Orientation

New-hire orientation may consist of, but is not limited to, the following:

- Have the employee read the health and safety plan and other safety requirements, guidelines etc. Answer any questions the new hire may have about these policies and request a signature on the Statement of Understanding.
- Orient the employee to the job site indicating the location of the emergency facilities, portable fire extinguishers, first-aid station, emergency phone numbers, public notices, and any job site-specific information.
- Explain the injury and accident policy.
- Review the written hazard communication program. Discuss hazards, container labeling, and the use of protective equipment.
- Explain the emergency response plan for catastrophic events such as fire, explosion, etc.
- Issue PPE as required for the job

5.2 Training

Training and education are necessary for the success of this policy. Employees are trained to recognize job site hazards and the procedures to follow to minimize these hazards. Training may consist of (but is not limited to) the following:

- Weekly job site safety meetings.
- Orientation training for new hires.
- Individual job/task training, including the applicable regulations/standards for the specific job/task.

Supervisors and management receive ongoing safety training throughout the year.

5.3 Safety Meetings

Weekly safety meetings are held on the job site. All employees and subcontractors are required to attend. The meetings may cover a range of safety-related topics. The format and content of the

meetings are up to the discretion of the superintendent. Monthly safety meetings are held for all foremen, superintendents, project managers, project engineers, contractors, and other management personnel. These meetings are for the purpose of discussing companywide safety issues and providing continued safety training and education.

5.4 Safety Inspections

The superintendent and foreman conduct an initial safety inspection at the beginning of each project. In addition, a daily safety inspection of the job site is conducted by the contractor employees, employees of a subcontractor, or some combination thereof. The inspection is rotated between all workers on the job site. Any safety concern found during the inspection is reported. If a worker is unclear about any safety aspect, the foreman or project Engineer helps. If the area being inspected requires a *competent person*, the employee conducts the inspection with the competent person. Also, if time allows, the foreman for the worker conducting the inspection is encouraged to walk through it with them.

5.5 Hazard Communication

The contractor needs to develop a written hazard communication plan. It will be explained to each employee during the new-hire orientation. The purpose of the hazard communication plan is to provide employees with information on the chemical and physical hazards that may be present at the job site. Safety Data Sheets for all chemicals will be kept on site.

5.6 Job Hazard Analysis

A job hazard analysis may be developed covering the major activities of construction, the hazards associated with these activities, and ways to mitigate these hazards.

5.7 Housekeeping

Housekeeping is one of the most important factors for a safe job site. Form material should be scraped and all protruding nails pounded down. All other debris is cleared from work areas, passageways, and stairs. Excess materials are stacked neatly out of the way. Tools should be stored in the toolbox so these are available for all employees to use.

Combustible scrap and debris are removed at regular intervals during the course of construction. Containers with covers are provided for the collection and separation of waste, trash, oily and used rags, and other such refuse, which is removed safely and on a regular basis.

Foreign object and debris (FOD) is a significant concern in nearby occupied spaces and construction areas. It is extremely important to keep all trash and debris contained at this site. Housekeeping will be strictly enforced

5.8 Fall Protection

The contractor provides fall protection when employees are exposed to fall hazards.

Fall protection may consist of, but is not limited to, the following:

- A stairway or ladder is provided at any point of access where there is a break in elevation of 19 inches or more.
- Guardrails are installed for all leading-edge work. For loading bay locations fall-arrest systems or fall-restraint systems are used.
- Safety harnesses with approved lanyards and tie-off points are used for all other fall protection unless an appropriate procedure or device was approved in advance by a competent person.
- Stilts may be used on job sites but work area floors must be clean/clear of all debris, materials, and equipment.

5.9 Electrical Safety

Electrical safety may consist of, but is not limited to, the following:

- Live electrical parts are guarded against accidental contact by cabinets, enclosure, location, or guarding.
- Extension cords are kept in safe, working condition.
- All lamps for general illumination have the bulbs protected against breakage. All light sockets are filled with a working bulb.
- Employees will not work in such close (able to contact) proximity to any part of an electric power circuit unless the circuit is de-energized, grounded, or guarded by insulation.
- De-energized equipment or circuits are locked out and tagged out. The tags identify the equipment or circuits being worked on.
- All generators used for temporary power shall be grounded according to manufacturers' specifications.
- Equipment shall not be operated closer than 10 feet from power lines less than 50kV. Safe distance will increase near higher voltage power lines, (over 50kV)

5.10 Tools

The contractor provides tools for employees to use. Only trained employees are allowed to use such tools. The safe use of tools may consist of, but is not limited to the following:

- Unsafe or defective tools are removed from service and tagged out.
- Power tools are turned off and motion stopped before setting down.
- Tools are disconnected from the power source before changing drills, blades, or bits and before any repair or adjustment is made. Running tools are not left unattended.

- Portable abrasive grinders have guards installed covering the upper and back portions of the abrasive wheel.

5.11 Scaffolds

Scaffolds are erected, moved, dismantled, or altered under the supervision of a competent person for scaffolding. Scaffold use consists of, but is not limited to, the following procedures:

- Standard guardrails are installed on all open sides and ends of scaffold platforms and/or work levels more than ten feet below the ground.
- Scaffolds four to ten feet in height with a minimum horizontal dimension in any direction less than 45 inches have standard railings installed on all open sides/ends.
- Platforms at all working levels are fully planked. Planking is laid tight with no more than one inch space between them, overlap at least 12 inches, and extends over end supports 6-12 inches unless cleats are used.
- The front edge of all platforms is no more than 14 inches from the face of the work, except plastering/lathing may be 18 inches.
- Mobile scaffolds are erected no more than a maximum height of four times their minimum base dimension.
- Scaffold casters/wheels are locked whenever the platform is occupied.
- Scaffolds are not overloaded beyond their design loadings.
- Scaffold components are not used as tie-off/anchor points for fall-protection devices.
- Portable ladders, hook-on ladders, attachable ladders, integral prefabricated scaffold frames, walkways, or direct access from another scaffold or structure are used for access when platforms are more than two feet above or below a point of access.
- Cross braces are not used as a means of access to scaffolds.
- Scaffolds are not erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come close to exposed and energized power lines than the following:
    - Three feet from insulated lines of less than 300 volts;
    - Ten feet plus for any other insulated or uninsulated Lines

5.12 Excavation and Trenches

Excavation and trenching are done in the presence of a competent person and in compliance with, but not limited to, the following procedures:

- Any excavation or trench five feet or more in-depth is provided cave-in protection through shoring, sloping, benching, or the use of hydraulic shoring, trench shields, or trench boxes. Trenches less than five feet in depth and showing potential of cave-in are also provided cave-in protection. Specific requirements of each system are dependent upon the soil classification as determined by a competent person.
- A competent person inspects each excavation/trench daily prior to the start of work, after every rainstorm or other hazard-increasing occurrence, and as needed throughout the shift.

- Any material and equipment are kept at least two feet from the edge of the trench or excavation.

5.13 Ladders

Ladders are inspected during the weekly inspections to identify any unsafe conditions. Any ladders found to be unsafe are taken out of service. Extension ladders extend three feet above the work surface and are 100 percent tied off. Step ladders are only used in the open position. Ladders are stored lying down. No standing on the top step or first rung below the top of a step ladder.

5.14 Illumination

Construction areas and storage areas where work is in progress are lighted with either natural or artificial illumination.

5.15 Motor Vehicles and Mechanized Equipment

Vehicles and equipment are only operated by qualified persons (training or experience). All equipment operators are responsible for checking, on a daily basis, all fluid levels, drive components, and hydraulics. In addition, operators visually inspect the engine and look for structural breaks and cracks on the machine. Any and all deficiencies must be reported to a supervisor immediately.

When equipment is stopped or parked, parking brakes are set and other safety precautions are taken as required for the type of equipment such as placing the forks flat on the ground. Keys shall be removed from equipment at the end of each shift.

5.16 Severe Weather

Outside construction operations including, but not limited to site work, and concrete work are suspended if severe wind or rain conditions present safety hazards at the worksite. Rain and wind storm hazards are evaluated and appropriate measures are taken to abate potential hazards.

5.17 Accident

All accidents and near misses must be reported immediately to the foreman or superintendent. An accident report is then filled out by the employee and the supervisor. Filling out an accident report does not require the delay of medical attention. Any injury is treated first. Employees file such reports without fear of reprisal by management. The accident or incident may be discussed at weekly safety meetings to avoid that sort of accident in the future.

5.18 First Aid

First-aid kits are available in the project office, at the appropriate and accessible locations as indicated during orientation. In addition, foremen and superintendents maintain current first aid boxes at the site.

5.19 Fire Protection

The contractor maintains appropriate fire extinguishers at the fire-prone areas of the construction site. All equipment is fitted with portable fire extinguishers. Employees are instructed on the location and usage of these fire extinguishers. Emergency telephone numbers for fire protection and emergency medical services are posted on the field office bulletin board.

5.20 Emergency Action Plan

Each job site develops an emergency action plan that is reviewed with each employee during orientation. The emergency action plan covers emergency escape procedures, procedures followed by employees remaining to operate critical operations before they evacuate, procedures to account for all employees, rescue and medical duties, and how to report emergencies.

5.21 Environmental Protection Plan

This health and safety plan also contains an Environmental Protection Plan for the control, prevention, management, containment, cleanup, and disposal of petroleum products or other hazardous substances which may be generated on each project site. The Project Engineer directs measures to control and prevent accidental discharge of petroleum products or other hazardous substances during storage and transfer on all job sites. Any onsite storage is in approved containers. Absorbent pads and other recovery equipment shall available to contain and recover any fuel accidentally spilled. Any spills and contaminated soils are cleaned and disposed of in accordance with applicable requirements.

5.22 Traffic and Pedestrian Control

A traffic control plan will be developed and put in place prior to beginning work on the project for the protection of workers and the general public. Barricades and signage must place around job site areas to reroute vehicle traffic and keep pedestrians out of the job site.

Project Engineers and Superintendents will evaluate the site before work starts to plan site control. Fencing, signage, and barricades shall be erected and secured as to keep pedestrians out.

Any time while performing work near or on a roadway and a worker has a sense of traffic patterns not being controlled properly or speeds too extreme for conditions, the worker should remove

himself from the area and notify Supervisor. The Project Engineer shall stress and discuss, at weekly meetings, for all workers to be aware of traffic hazards and pedestrians.

5.24 Concrete Work

The project involves concrete work. There are many hazards associated with this work including but not limited to; Slips Trips, Falls, Strains and Sprains, Eye Injuries, Chemical Burns, and Silica Exposure. The risk assessment shall be performed for all concrete work to minimize the associated hazards

6.0 Monitoring and Reporting

Monitoring the implementation of the health and safety plan and progress reporting will be very important for the effective enforcement of the plan. PIU project team along with the supervision consultant will validate effective reinforcement of HSMP. The supervision consultant will frequently visit the construction sites and monitor the effectiveness of the plan implementation. The status of implementation will be reported to the PIU fortnightly.

Annex-V

Emergency Response Plan

Emergency Response Plan

1. Introduction

Emergency management can be defined as the organization, coordination and implementation of a range of measures to prevent, mitigate, respond to, overcome and recover from the consequences of emergency events affecting the community, its assets and the environment.

2. Purpose of Plan

This plan intends to provide a framework for safety and security to infrastructure, people and vehicles. It assigns responsibility to organizations and individuals for carrying out specific actions at projected times and places in an emergency situation that exceeds the capability or routine responsibility of any one agency.

The emergency response plan provides guidance to;

- Prevent any potential sources causing hazard to the resources during all stages of the project;
- Coordinate between various organizations to take actions in case of emergencies;
- Protect people and property in emergencies and disasters;
- Develop procedures to respond to the emergencies efficiently;
- Identify and ensure availability of personnel, equipment, facilities, supplies, and other resources for use in order to provide timely and efficient response and recovery operations; and
- Confirm that measures taken in an incident are adequate to recover the affected resources or further improvements are needed.

3. Planning

i. Emergency Response Team

A group/ team shall be dedicated to identify and control potential emergencies during the construction and operation of the project. The roles and responsibilities of the group members shall be clearly defined.

The primary responsibilities of the group are described below:

- Identify the potential hazard or risk sources that can lead to emergency situations; Ensure availability of adequate resources, procedures and communication system to deal with the identified emergency situations;
- Ensure awareness and training of the staff to facilitate implementation of the emergency response plan;
- Maintaining the records of any previous incidents; and
- Post-event analysis to bridge the gaps of the existing risk prevention procedures.

The emergency response team shall include but not limited to the following;

A. Site Incharge

- Approve/ modify devised measures to prevent or mitigate the risks associated with the identified risk sources;
- Arrange resources for dealing with potential emergencies including, financial, equipment and personnel required to deal with emergencies;
- Assure that the Emergency Response Plan is adequate, effective and implementable.

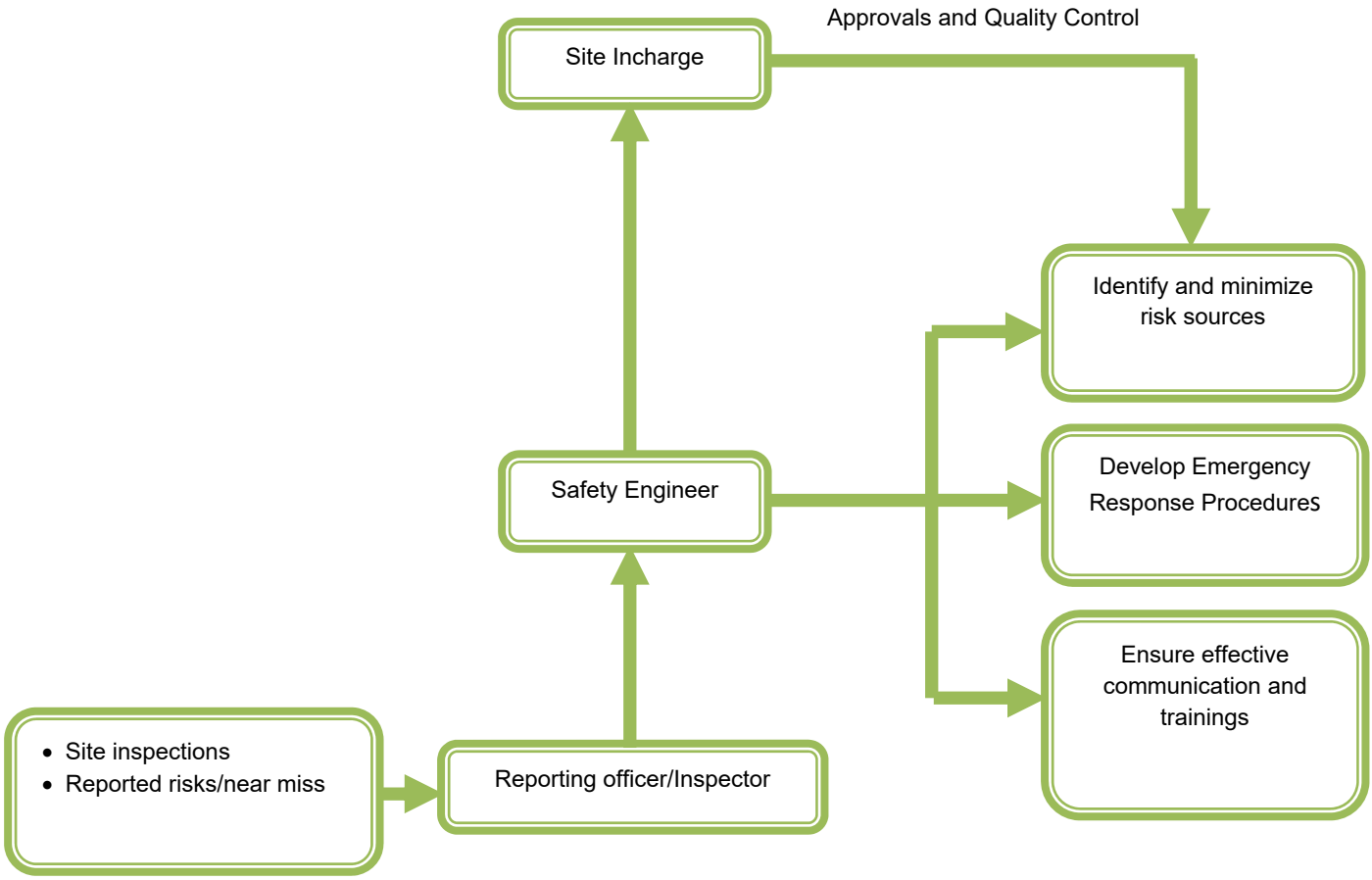
B. Safety Engineer

- Analyze the Identified risk sources and devise measures to prevent or mitigate the risks in close consultation with the Team Leader;
- Develop and implement the Emergency Response Procedures, in case of the possible emergencies arise;
- Ensure effective internal and external communication; and
- Provide regular trainings and arrange drills to make people aware of dealing with emergencies.

C. Reporting officer/Inspector

- Regular inspections of the site, to identify potential risks associated with equipment, materials and work practices;
- Anybody from the site can notify the reporting officer about potential risk and/ or near-misses on the site;
- Record any identified risks and mitigation measures to control the identified risk; and
- Notify the issue and control measures taken thereby to the safety engineer.

The designation, roles and responsibilities of each member shall be clearly defined and communicated to the employees. An outline of the framework of responsibilities is presented in the following organizational chart:



ii. Hazard Identification

A comprehensive identification and evaluation of the hazards/ risks likely to cause an emergency shall be done by Emergency Response Team (ERT). Major potential emergencies identified in projects are as follows:

- Fire
- Earthquake
- Terrorism (including bombing)
- Disease Outbreak
- Structural failure
- Disruption of Utilities (Power, Water, Telecommunications, Gas, etc.)
- Accidents (falls, slips, electric shocks etc.)
- Vehicular accident
- Failure of trenches
- Power/ equipment failure
- Vandalism

iii. Prevention and Mitigation

The ERT shall work to eliminate or reduce the impact of identified emergencies and increasing the resilience of an affected community to recover from the consequences of such events. These activities include:

- Design considerations to control flooding, earthquakes and adequate lightening for fog etc.;
- Regular inspection and maintenance of construction machinery and the structural integrity;
- Review of work schedules based on weather updates; and
- Security controls based on political situations.

4. Emergency Preparedness

The ERT shall be prepared with all necessary resources and the personnel shall be trained regularly.

i. Resources

Finance and administration

The financial resources shall be reserved for dealing with any emergencies arising on site during construction. Responsibilities of the person managing the resources in case of emergencies shall be clearly defined and the required resources shall be adequate and updated regularly.

Equipment

All the necessary equipment needed in an event of emergencies shall be made available, as a minimum, the equipment needed include;

- Personal Protective Equipment
- Alarms/ Warnings
- Fire extinguishers
- Crowd control, flashlights, signs, barricades
- First Aid Facility
- Detection instruments, e.g. personal alarm kits; smoke detection instruments
- Tools to fix minor vandalism

Communication

All external and internal communication systems shall be made available. Local emergency numbers shall be clearly posted and communicated to the personnel involved in construction.

The local emergency numbers are given below, which shall be regularly updated.

Emergency Numbers

	Service	Karachi (021)
1	Edhi Services	241 3232
2	Edhi Ambulance	115
3	Emergency Police	15
4	Fire Brigade Center	16
5	Civil Hospital	021-99215740
6	Chippa Service	1020

Trainings

Personnel shall be made aware of the importance of safety, potential emergencies and how to respond in case of emergencies. One day training and mock exercise shall be done to prepare, the personnel to deal with emergencies.

5. Emergency Response

Response includes actions taken to reduce the impacts of an emergency event, and to limit the threat to life, property and the environment.

The emergencies can be dealt with:

- On-site Management of the situation
- Off-site coordination to arrange necessary resources to support the on-site management
- Providing advice and reports of the situation to stakeholders

i. Emergency Response Procedure:

Any person can report about an emergency, an on-site worker, an outside agency, or the public. Circumstances change during the course of an emergency in different events, thus, the procedure will vary as per the specific situation on ground. However, a basic action plan to be followed in an emergency is discussed below. This order of response is applicable to almost any emergency and should be followed in sequence.

Assess the situation:

The most important thing to do in case of emergency is to stay calm and avoid panic. Assess the situation, the cause and most immediate requirement to control, limit and/ or manage the immediate, ongoing, or further damage.

Immediate control:

The most senior person on the scene should take control and contact, or delegate someone to contact emergency services as posted and communicated by ERT and inform the reporting officer of ERT and explain the situation. The area of emergency shall be restricted by barricades, tapes and adequate signage, if and as required.

Protection from further losses:

- Once the site is restricted, to provide protection and reduce further losses, the source causing the emergency shall be controlled including equipment, materials, environment and accident scene from continuing damage or further hazards to the area and people. e.g.: suppress fire, prevent objects from falling, shut down equipment or utilities, and take other necessary measures as required depending upon the type of emergency
- Provide first aid if required or in doing so.
- Designate people to emergency duties. e.g: assign personnel to guide emergency services on arrival.
- Headcount People/ personnel to identify any missing persons.
- People/ personnel shall be directed to safe location.
- Arrange diversions for the traffic to reduce disturbance to the flow of traffic, if and as far as possible.
- Preserve the accident scene until experts mark it safe; only disturb what is essential to maintain life or relieve human suffering and prevent immediate or further losses.

ii. Communication:

Emergency service providers:

The emergency service providers' needs to be kept informed of the situation. On site, personnel from the emergency services shall be guided towards the emergency scene, brief about the event, ongoing and potential hazards and cause(s), if known.

Emergency Response Team and Management:

Members of ERT shall be immediately informed and the management shall also be kept informed.

Public:

Timely notifications to public shall be disseminated through electronic and print media depending upon the requirement and urgency of the emergency so that they can adopt alternate routes and avoid the hazards associated with the emergency encountered.

Utilities:

In case of disruption of utilities, the utility control authorities shall be immediately contacted to control the situation.

6. Recovery:

Emergency affected individuals, communities and infrastructure shall be restored in terms of emotional, economic, and physical wellbeing including the following as a minimum:

- A detailed analysis and assessment of causes of emergency, extent of damage and gaps if any, in managing the emergency;
- Recovery/ replacement of the assets and infrastructure;
- Reinstatement of disrupted services;
- Updating of safety arrangements and Emergency response procedures to ensure better safety and security in any other arising emergencies.

Annex-VI

Chance Find Procedure

CHANCE FIND PROCEDURES

Project may involve deep excavation. Therefore, the possibility of chance find is not ignorable. In case of any chance find, the contractor will immediately report through Supervision Consultant to Directorate General (DG) of Antiquities & Archaeology, Government of Sindh to take further suitable action to preserve those antique or sensitive remains. Representative of the "Director Archaeology and Museum (DAM)" will visit the site and observed the significance of the antique, artifact and Cultural (religious) properties and significance of the project. The documentation will be completed and if required suitable action will be taken to preserve those antiques and sensitive remains.

In case any artifact, antiques and sensitive remains are discovered, chance find procedures should be adopted by contractor workers as follows:

- Stop the construction activities in the areas of chance find;
- Delineate the discovered site or area;
- Consult with the local community and provincial Archeological Department
- The suggestion of the local communities and the concerned authorities will be suitably incorporated during taking the preventive measures to conserve the antique, artifact and cultural (religious) properties
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remain, a night guard shall be arranged until the responsible local authorities take over;
- After stopping work, the contractor must immediately report the discovery to the Supervision Engineer.

The contact Address of Directorate General of Antiquities & Archaeology is given below:

Antiquities House. C/82, Block-2,
Near Bilal Masjid, Clifton, Karachi,
Sindh 75600
Tel: 021-99212126021-99212127

Annex-VII

Resource Conseration Plan

Resource Conservation Plan

1. Introduction:

The resources in this world are not infinite. We are completely dependent on the resources of the earth to fulfill all our day-to-day requirements. Sustainable development calls for the need to conserve resources, especially the non-renewable resources.

2. Objective of the plan:

The Resource Conservation Plan is intended to make an effort towards achieving sustainable development. The objective of the resource conservation plan is to:

- Minimize the use of natural resources; and
- Mitigate/ prevent pollution contaminating the natural resources.

3. Planning:

Careful estimations of quantities of material, fuel, water and energy required directly or indirectly shall be done to avoid excessive or unnecessary wastage of these materials. In addition to this, pollution prevention strategies shall also be devised to prevent contamination of resources.

The estimations include the following:

1. Estimation of construction material required for the project
2. Estimation of fuel consumption for construction machinery, construction vehicles and generators etc.
3. Estimations of the energy requirements during all the stages of the project
4. Estimations of water consumption for construction activities and construction camp sites.

The pollution prevention strategies include the following

1. Strategies shall be planned to reduce loads on the identified resources to be consumed;
2. Best management practices shall be devised to control or reduce pollution resulting from the activities during different stages of the project; and
3. An inspector shall be assigned responsibility to oversee the ongoing activities to check the compliance of the planned strategies.

4. Execution of the plan:

The planned strategies shall be implemented to conserve the natural resources including but not limited to the following:

Material

- Material supplied shall be in conformance with the estimated quantities and excess material shall be returned to the supplier;
- Material wastage shall be avoided by using best management practices;
- Waste produced during the project execution shall be disposed of safely to the designated disposal sites through approved contractors; and
- Reuse of the materials shall be appreciated.

Fuel/Energy

- Reduce trips and optimize routes to and from the construction site for all kinds of activities;
- Regular maintenance of equipment and vehicles to avoid leaks and sustain efficient fuel consumption;
- Switch off/plug off idle equipment and vehicles to avoid wastage of fuel;
- Minimize warm up time, unnecessary acceleration and deceleration of the construction equipment and vehicles;
- Avoid unnecessary burning of fuel for cooking in construction camps;
- Avoid unnecessary heating/cooling systems during extreme weathers;
- Construction shall start in early hours of the day to avoid heat in summers and utilization of day light; and
- Alternate energy sources shall be considered for electricity generations during construction to conserve fossil fuel as it is nonrenewable resource.

Water

- Avoid using potable water for sprinkling, curing and washing of equipment/ vehicles. Surface water or treated effluent can be used instead;
- Wastage of water should be controlled through providing proper valves and through controlling pressure of the water;
- Unnecessary equipment washings should be avoided;
- Awareness amongst workers shall be raised to conserve water and immediately report for any leaks detected; and

Pollution:

- Emissions shall be reduced/controlled as far as possible and direct discharges to air shall be avoided by strictly adhering to the mitigation measures outlined in ESMP report;
- Waste water shall not be discharged directly into the water body and must be managed as per the recommendations presented in ESMP; and

- Construction & demolition waste and municipal solid waste shall not be dumped/ burnt openly and shall be handled according to the preventative measure given in ESMP study.

5. Checking and Corrective Actions

The proponent shall bind the construction contractor through contract agreement to comply the strategies outlined in Resources Conservation Plan. The proponent shall also appoint an Inspector who shall monitor the daily onsite activities and shall report any issues/ concerns raised in relation to Resource Conservation Plan. The inspector shall recommend adequate corrective actions to mitigate the issues raised.

Annex- VIII

Worker's Code of Conduct

Workers' Code of Conduct

I, _____, acknowledge that preventing any misconduct as stipulated in this code of conduct, including sexual exploitation and abuse (SEA), sexual harassment (SH), and child abuse/exploitation are important. Any activity, which constitute acts of gross misconduct are therefore grounds for sanctions, penalties or even termination of employment. All forms of misconduct are unacceptable be it on the work site, the work site surroundings, or at worker's camps. Prosecution of those who commit any such misconduct will be pursued as appropriate. I agree that while working on this project, I will:

1. Consent to security background check;
2. Treat women, children (persons under the age of 18) and persons with disability with respect regardless of race, colour, language, religion, political or other opinion, national, ethnic or social origin, property, birth or other status;
3. Not use language or behaviour towards men, women or children/learners that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate;
4. Carry out his/her duties competently and diligently;
5. Comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
6. Maintain a safe working environment including by:
    a. Ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
    b. Wearing required personal protective equipment;
    c. Using appropriate measures relating to chemical, physical and biological substances and agents; and
    d. Following applicable emergency operating procedures.
7. Report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and danger to his/her life or health;
8. Treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
9. Not engage in any form of sexual harassment including unwelcome sexual advances, requests for sexual favours, and other unwanted verbal or physical conduct of a sexual nature with other Contractor's or Employer's Personnel;
10. Not participate in sexual activity with children/learners—including grooming or through digital media. Mistaken belief regarding the age of a child and consent from the child is not a defence;
11. Not exchange money, employment, goods, or services for sex, with community members including sexual favours or other forms of humiliating, degrading or exploitative behaviour;
12. Attend trainings related to HIV and AIDS, SAE/SH, occupational health and any other relevant courses on safety as requested by my employer;

13. Report to the relevant committee any situation where I may have concerns or suspicions regarding acts of misconduct by a fellow worker, whether in my company or not, or any breaches of this code of conduct provided it is done in good faith;
14. Regarding children (under the age of 18):
    a) Refrain from hiring children for domestic or other labour, which is inappropriate given their age, or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury.
    b) Comply with all relevant local legislation, including labour laws in relation to child labour.
15. Refrain from any form of theft for assets and facilities including from surrounding communities.
16. Remain in designated working area during working hours;
17. Refrain from possession of alcohol and illegal drugs and other controlled substances in the workplace and being under influence of these substances on the job and during workings hours;
18. Follow prescribed environmental occupation health and safety standards;
19. Channel grievances through the established grievance redress mechanism.

I understand that the onus is on me to use common sense and avoid actions or behaviours that could be construed as misconduct or breach this code of conduct.

I acknowledge that I have read and understand this Code of Conduct, and the implications have been explained with regard to sanctions on-going employment should I not comply.

Signed by: _____

Signature: _____

Date: _____

For the Employer/Contractor

Signed by: _____

Signature: _____

Date: _____

Annex-IX
Environmental Code of Practices

Environmental Codes of Practice

1. Rationale of this ECOPs

This Environmental Codes of Practice (ECOPs) sets out standards and procedures for managing the potential environmental impacts associating with the construction activities for CERRI building. The environmental impacts associated with this small civil work are considered to be minor, temporary and reversible, and readily managed with good practices during implementation. The ECOPs lay out outline simple rules and procedures regarding identification, monitoring and mitigation of those environmental impacts. The ECOPs shall be included in all relevant contracts.

2. Environmental Screening and Assessment

During construction, the potential impacts include dust and solid waste generation associated with minor civil work activities. These impacts are small, localized and can be mitigated by incorporating good civil work practices, including proper housekeeping measures, proper material storage and disposal of solid waste and pollution control.

In addition, to ensure the environmental sanitation and safety during operation, it is requested that design for chlorination stations shall be in line with the quality standards including appropriate ventilation, trash bin, lighting, fire extinguisher, eye-wash facilities and toilet facilities etc.

3. Project ECOP Implementation Arrangements

a. The Project Implementation Unit (PIU) – KWSSIP

The PIU-KWSSIP will be responsible for over-sighting the implementation of project. During implementation, the PIU is responsible for ensuring that the ECOPs will be incorporated in the bidding document and complied by contractors. The PIU has ultimate responsibility in the event of non-compliance with the ECOP during construction.

b. The Contractor

The Contractor, has the responsibility of establishing and maintaining contact with the PIU or delegated agencies and local residents and keeping them informed of construction matters likely to affect them. The Contractor and any agents or Sub-Contractors will be contractually required to comply with the requirements as specified in the ECOPs. The Contractor will responsible for implementation of the ECOPs, including workplace safety, and will ensure adequate resources are available for the implementation of the ECOPs throughout the construction period.

The Contractor has a duty to inform local residents likely to be affected by such activities at least 14 days prior to undertaking the works, as well as applying for the appropriate permits and licenses.

4. Construction Activities and Environmental Rules for Contractors

a. Management of Construction Site

This part describes basic requirements for all Contractors carrying out minor construction activities. It will be included in all construction contracts of the civil works. The Contractor is required to minimize, as far as reasonably practicable, any adverse environmental impact of their construction activities.

Prohibitions

The following activities are prohibited on or near the project site:

(a) Cutting of trees for any reason outside the approved construction area;
(b) Illegal dumping of demolition material and debris.
(c) Use of unapproved toxic materials, including lead-based paints, asbestos, etc.;
(d) Disturbance to anything with architectural or historical value;
(e) No burning of waste
(f) Use of alcohol by workers.

Working hours: Core working hours will be from 0800 to 1800 on weekdays and 0800 to 1300 on weekend. Individual site requirements which differ from the above will be considered on a site-by-site basis. Noisy operations shall not take place outside these hours without prior approval from the PIU and/or delegated agencies and local authorities.

Good housekeeping: The Contractor will follow a 'good housekeeping' policy at all times. This will include, but not necessarily be limited to the following: Ensure considerate site behavior of the Contractor's staff; Prohibit open fires; Ensure that appropriate provisions for dust control and road cleanliness are implemented; Remove rubbish at frequent intervals, leaving the site clean and tidy; Remove food waste; Frequently inspect, repair and re-paint as necessary all site hoardings to comply with the local conditions and local regulations, all flying post/ board is to be removed as soon as reasonably practicable and within 24 hours of notice**;** Maintain toilet facilities and other welfare facilities for its staff;

Public information and site access: As a minimum, the Contractor will provide public information on the site program (start and finish dates), plus the telephone for public contacts and/or requests especially during the school year. Any un-authorized entry to or exit from the sites should be control as much as possible.

Site layout and facilities: Location of site huts, office accommodation, toilets and welfare facilities should be accommodated within the boundaries of the site.

Emergency Procedures: The Contractor will ensure that emergency procedures are developed to facilitate effective actions in case of medical/fire emergency as well as environmental pollution (major spillage of gasoline, used oil, and/or toxic chemicals, etc.). The emergency procedure will contain emergency phone numbers and the method of notifying the statutory authorities. Contact numbers for the key staff of the contractor will also be included.

Fire prevention and control: All construction sites and associated accommodation or welfare facilities will have in place appropriate plans and management controls to prevent fires. The site fire plans will be prepared and will have due regard to the GoS regulations. During operation and

maintenance of equipment and vehicles, the Contractor will ensure that its workers are well aware of the procedures and have enough knowledge to comply with them. The specification of non-combustible materials, products and packaging will be pursued wherever reasonably practicable. The project will also have to comply with GoS requirements as may be appropriate at specific sites.

Operation of equipment: The Contractor must take all reasonable precautions to ensure that equipment is operated in a manner so as not to cause safety risk and/or nuisance to surrounding residents and occupiers. Operations of crane and other large equipment will have to be closely supervised. Permission may be required as per GoS regulations.

Clearance of the construction site after completion: On completion of the works the Contractor will clear away and remove all materials and rubbish and temporary works of every kind. The site will be left clean and in a condition to the satisfaction of the PIU and/or delegated agencies.

5. Management of Environment and Sanitation

Nuisance, Dust and Noise Control

To control nuisance, dust and noise in the construction sites the Contractor should:

(a) To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90 db.
(b) In sensitive areas (including residential neighborhoods, hospitals, etc.) more strict measures may need to be implemented to prevent undesirable noise levels. Minimize production of dust and particulate materials at all times, to avoid impacts on surrounding families and businesses, and especially to vulnerable people (children, elders).
(c) Place dust screens around construction areas, fencing should be provided along the boundary so that the emissions do not affect the immediate neighbors, paying particular attention to areas close to housing, commercial areas, and recreational areas.
(d) Spray water periodically as needed on construction areas, especially at site located near residential area
(e) Apply proper measures to minimize disruptions from vibration or noise coming from construction activities.

Disposal of Construction Waste

The Contractor shall establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.

Debris generated due to the demolition of the existing structures shall be suitably reused, to the extent feasible. The disposal of remaining debris shall be carried out only at sites identified and approved by local authorities. The contractor should ensure that these disposal sites: (a) are not located within designated forest areas; (b) do not impact natural drainage courses; Under no circumstances shall the contractor dispose of any material in environmentally sensitive areas. Dispose in authorized areas all of garbage, metals, used oils, and excess material generated during construction, incorporating recycling systems and the separation of materials. In the event any debris or silt from the sites is deposited on adjacent land, the Contractor shall immediately remove such debris and restore the affected area to its original state to the satisfaction of the PIU and/or delegated agencies and local communities.

Water quality

The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into all rivers and canals and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality. Whenever possible, the Contractor must minimize the amounts of wastewater that need to be discharged and find alternative means of disposal. Liquid spills of lubricant, fuel and oil within the site should be attended at the earliest in order to minimize land & groundwater contamination. The Contractor will ensure that any seepage and wastewater arising from the works must be collected and discharged via a settlement tank. Water drainage must be designed to avoid stagnant conditions that could create bad smell and unsanitary condition in the construction area and surrounding environment.

Workforce and Workers; Sanitation

The Contractor should whenever possible locally recruit the majority of the workforce and shall provide appropriate training as necessary.

The Contractor shall not allow the use of fuel wood for cooking or heating at the construction site or surrounding area.

The Contractor shall ensure that site offices, depots, and workshops are located in appropriate areas. Clean and well-maintained toilets should be made available.

Clean water shall be adequately provided for workers by the Contractor.

Safety during Construction

The Contractor's responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all government safety requirements and any other measures necessary to avoid accidents, including the following:

(a) Notice signs/board shall properly be installed at the construction sites
(b) If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours;
(c) Conduct safety training for construction workers prior to beginning work;
(d) Provide necessary personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed and –shanked boots, etc.,) for construction workers and enforce their use;
(e) During emergencies of any kind, suspend all work.

Community Relations

To enhance adequate community relations the Contractor shall:

(a) Inform the local authorities and community about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, as appropriate.
(b) Limit construction activities at night. When necessary, ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures.

Physical Cultural Property Chance-finds Procedures

If the Contractor discovers archeological sites, historical sites, remains and objects the Contractor shall:

(c) Stop the construction activities in the area of the chance find;
(d) Delineate the discovered site or area;
(e) Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the Directorate of Archeology take over;
(f) Notify the supervisory Engineer who in turn will notify the responsible local authorities immediately (within 24 hours or less);
(g) Responsible local authorities, would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
(h) Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;
(i) Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and
(j) Construction work could resume only after permission is given from the responsible local authorities concerning safeguard of the heritage.

Annex- X

Monitoring Checklist

Monitoring and Supervision Checklist

Project	
Site Location	
Current Status	
Supervision Date	
Supervised By	

Inspection Items	Implementation			Remarks (i.e., specify location, good practices, problem observed, possible cause of nonconformity, and/or proposed corrective/preventative actions)
	Yes	No*	N/A	
1. Air Pollution Control				
1.1. Vehicle loads covered with any suitable material while transporting construction material?				
1.2. Are stockpiles of dusty materials covered or watered?				
1.3. Does the Construction Contractor (CC) have the proper material handling practices at the site?				
1.4. Others (please specify)				
2. Surface and Ground Water Pollution Control				
2.1. Area chemicals or hazardous material stored at designated places?				
2.2. Are effluents from the construction sites released to drinking water sources, cultivation fields, irrigation channels, and critical habitats?				
2.3. Does the CC have tarpaulin sheets available at the site?				
2.4. Others (please specify)				
3. Noise Control				
3.1. Are machinery operations and high noise activities carefully planned and scheduled?				
3.2. Are high noise activities ceased between 20:00 and 06:00hrs?				
3.3. Is the noise level monitoring carried out periodically? And is the monitoring register maintained?				
3.4. Others (please specify)				
4. Solid Waste Management				
4.1. Is recycling of solid waste carried out?				
4.2. Are the construction sites equipped with temporary refuse bins?				
4.3. Is the waste dumped or thrown				

around the project site?				
4.4. Is the waste tracking register maintained at the site?				
4.5. Is the waste properly disposed of in designated areas and not affecting the drinking water sources, cultivation fields, irrigation channels, natural drainage paths, the existing waste management system in the area, local routes, and the general aesthetic value of the area?				
4.6 Is Covid 19 prevention waste being handled and stored properly?				
4.7. Others (please specify)				
5. Occupational Health and Safety				
5.1. Are WB Group's Environment, Health, and Safety (EHS) Guidelines implemented in letter and spirit?				
5.2. Are appropriate personal protective equipment (PPE) provided to minimize risks, such as appropriate outerwear, boots, and gloves; safety helmets as well as per COVID-19 requirements?				
5.3. Are first-aid equipment at works provided?				
5.4. Is water stagnation observed near the construction site?				
5.5 Are protocols for slips and trips being followed?				
5.6. Are protocols for work at height being followed?				
5.7. Is training for workers for the use of PPE provided?				
5.8. Are procedures for documenting and reporting accidents, diseases, and incidents implemented at the site?				
5.9. Others (please specify)				
6. Labor Issues				
6.1. Are labor locally procured for the construction activities?				
6.2. Is there any child working?				
6.3. Others (please specify)				
7. Project Exclusions				
7.1. Are environment-friendly designs of proposed water supply and sewerage systems disseminated within the communities as a guide?				
7.4. Are women's and vulnerable groups' participation in consultation for project interventions ensured?				
7.5. Is the GRM implemented for				

the amicable resolution of disputes or conflicts?				
7.6. Others (please specify)				